

NHP SAFETY REFERENCE GUIDE



PRODUCTS

Safety Interlocks,
Mechanical and
Non-Contact

Safety Interlock Switches

Elf Series

Light duty safety interlock switch, ideal for guard door monitoring applications.



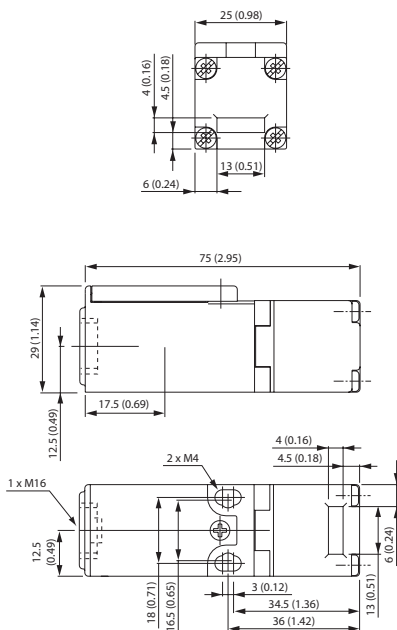
Features:

- Thermoplastic enclosure
- Slim design, for light duty applications
- IP 67
- Actuator head can be repositioned in 4 x 90° steps
- M16 conduit entry

Ordering Details:

Cat. No.	Contacts
440K-E33014	1 N/O / 1 N/C
440K-E33047	2 N/C
ACTUATORS SOLD SEPARATELY	
440K-A21014	Flat actuator
440K-A21030	Flexible actuator
440K-A21006	90° angled actuator

Dimensions & Wiring:



Technical Data:

Standards	IEC/EN 60947-5-1; EN 1088; EN 954-1; ISO 13849-1; IEC/EN 60204-1; ISO 14119; AS 4024.1
Safety classification	Category 1 device per EN 954-1 Dual channel interlocks suitable for category 3 or 4 systems
B10d	2 x 10 ⁶ operations
PFHd*	3 x 10 ⁻⁷ operations
MTTFd*	385 years
Enclosure	UL approved glass-filled PBT
Actuator	Stainless steel
Protection class	IP 67
Rated insulation voltage	2500 V
Switching current min.	5 mA @ 5 V DC
I_{the}	5 A
I_e / U_e	3 A/250 V AC; 6 A/24 V AC; 2 A/24 V DC
Utilisation category	AC-15, DC-13
Break contact force	6 N
Ambient temperature	-20°C ... +80°C

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a Mission Time / Proof Test interval of 38 years.

Safety Interlock Switches

Cadet Series

Light duty safety interlock switch, ideal for guard door monitoring applications.

Features:

- Thermoplastic enclosure
- Compact design, for light duty applications
- IP 67
- Actuator head can be repositioned in 4 x 90 ° steps
- M16 conduit entry

Ordering Details:

Cat. No.	Contacts
440K-C21070	3 N/C
440K-C21055	1 N/O / 2 N/C
ACTUATORS SOLD SEPARATELY	
440K-A21014	Flat actuator
440K-A21030	Flexible actuator
440K-A21006	90° Angled actuator

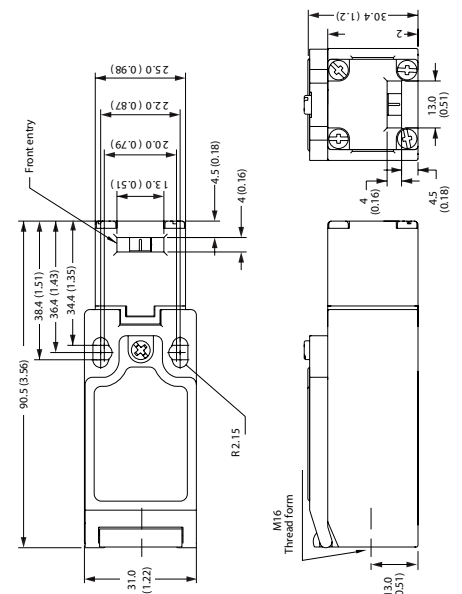


Technical Data:

Standards	IEC/EN 60947-5-1; EN 1088; EN 954-1; ISO 13849-1; IEC/EN 60204-1; ISO 14119; AS 4024.1
Safety classification	Category 1 device per EN 954-1. Dual channel interlocks suitable for category 3 or 4 systems
B10d	2 x 10 ⁶ operations
PFHd*	3 x 10 ⁻⁷ operations
MTTFd*	385 years
Enclosure	UL approved glass-filled PBT
Actuator	Stainless steel
Protection class	IP 67
Rated insulation voltage	500 V
Switching current min	5 mA @ 5 V DC
I_{the}	10 A
I_e / U_e	3 A/250 V AC; 2 A/24 V DC
Utilisation category	AC-15, DC-13
Break contact force	15 N
Ambient temperature	-20°C ... +80°C

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a Mission Time / Proof Test interval of 38 years.

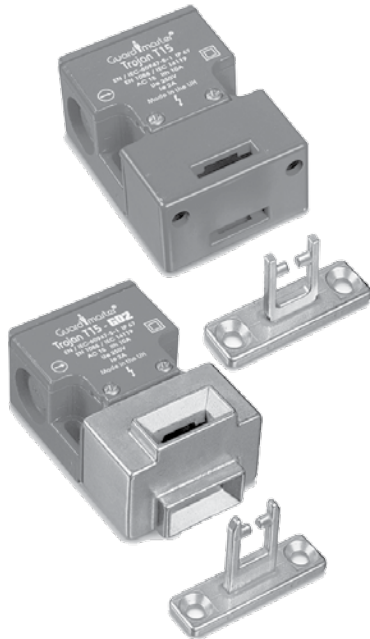
Dimensions & Wiring:



Safety Interlock Switches

Trojan 15 Series

General duty safety interlock switch, ideal for guard door monitoring applications.



Features:

- Thermoplastic enclosure
- IP 67
- Versatile switch for general duty applications, GD2 version for demanding applications
- M20 conduit entry

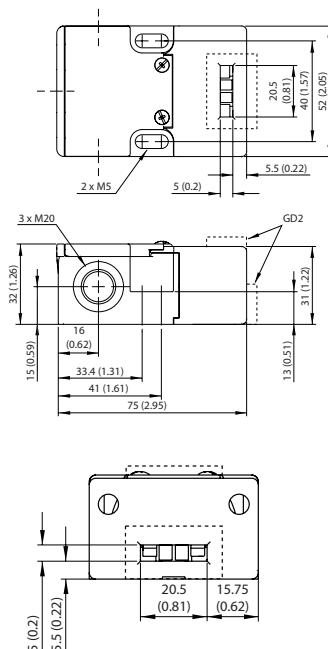
Ordering Details:

Cat. No.	Contacts
440K-T11269	2 N/C
440K-T11270	1 N/O / 1 N/C
440K-T11280 (GD2)	2 N/C
440K-T11279 (GD2)	1 N/O / 1 N/C

ACTUATORS SOLD SEPARATELY

440K-A11112	GD2 Flat actuator
440K-A11238	Standard actuator
440G-A27011	GD2 Standard actuator
440K-A11144	Semi-flexible actuator
440K-A27010	Flexible actuator
440G-A27163	Sliding bolt actuator

Dimensions & Wiring:



Technical Data:

Standards	IEC/EN 60947-5-1; EN 1088; EN 954-1; ISO 13849-1; IEC/EN 60204-1; ISO 14119; AS 4024.1
Safety classification	Category 1 device per EN 954-1. Dual channel interlocks suitable for category 3 or 4 systems
B10d	2 x 10 ⁶ operations
PFHd*	3 x 10 ⁻⁷ operations
MTTFd*	385 years
Enclosure	UL approved glass-filled PBT
Actuator	Stainless steel
Protection class	IP 67
Rated insulation voltage	500 V
Switching current min.	5 mA @ 5 V DC
I_{the}	10 A
I_e/U_e	3 A/250 V AC; 2 A/24 V DC
Utilisation category	AC-15, DC-13
Break contact force	30 N
Ambient temperature	-20°C ... +80°C

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a Mission Time / Proof Test interval of 38 years.



Safety Interlock Switches

Trojan 5 & 6 Series

General duty safety interlock switch, ideal for guard door monitoring applications.

Features:

- Thermoplastic enclosure
- IP 67
- Versatile switch for general duty applications, GD2 version for demanding applications
- M20 conduit entry

Ordering Details:

Cat. No.	Contacts
Trojan 5	
440K-T11089	1 N/O / 2 N/C
440K-T11147 (GD2)	1 N/O / 2 N/C
440K-T11333 (latching)	1 N/O / 2 N/C
Trojan 6	
440K-T11449	1 N/O / 3 N/C
440K-T11452	2 N/O / 2 N/C
440K-T11188 (GD2)	1 N/O / 3 N/C
440K-T11459 (GD2)	2 N/O / 2 N/C
ACTUATORS SOLD SEPARATELY	
440K-A11112	GD2 Flat actuator
440K-A11095	Standard actuator
440G-A27011	GD2 Standard actuator
440K-A11144	Semi-Flexible actuator
440K-A27010	Flexible actuator
440G-A27163	Sliding bolt actuator

Technical Data:

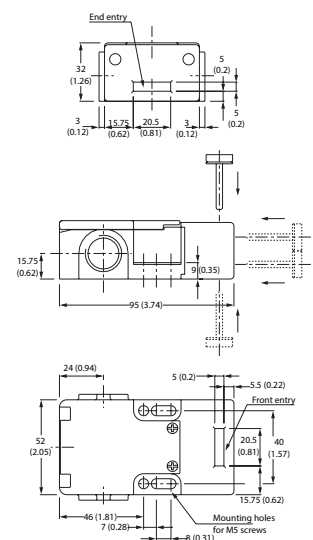
Standards	IEC/EN 60947-5-1; EN 1088; EN 954-1; ISO 13849-1; IEC/EN 60204-1; ISO 14119; AS 4024.1
Safety classification	Category 1 device per EN 954-1. Dual channel interlocks suitable for category 3 or 4 systems
B10d	> 2 x 10 ⁶ operations
PFHd*	3 x 10 ⁻⁷ operations
MTTFd*	385 years
Enclosure	UL approved glass-filled PBT
Actuator	Stainless steel
Protection class	IP 67
Rated insulation voltage	500 V
Switching current min.	5 mA @ 5 V DC
I_{the}	10 A
I_e/U_e	Trojan 5: 3 A/250 V AC; 2 A/24 V DC, Trojan 6: 3 A/240 V AC; 2 A/24 V DC
Utilisation category	AC-15, DC-13
Break contact force	Trojan 5: 12 N and 30 N (latching version), Trojan 6: 20 N
Ambient temperature	-20°C ... +80°C

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a Mission Time / Proof Test interval of 38 years.

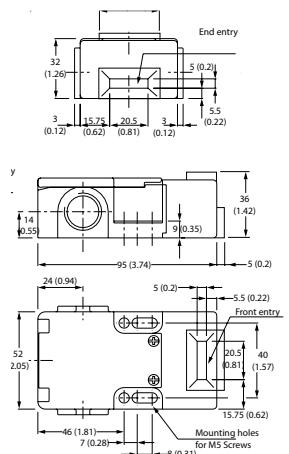


Dimensions & Wiring:

Standard model



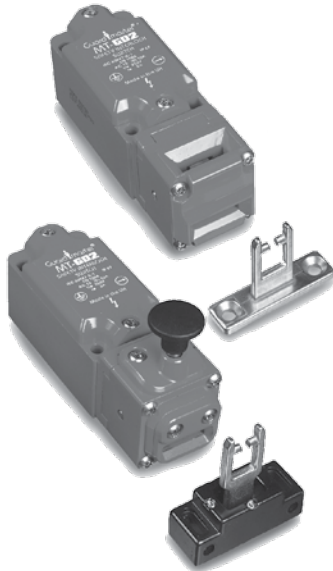
GD2 model



Safety Interlock Switches

MT-GD2 Series

Medium to heavy duty safety interlock switch, ideal for guard door monitoring applications.



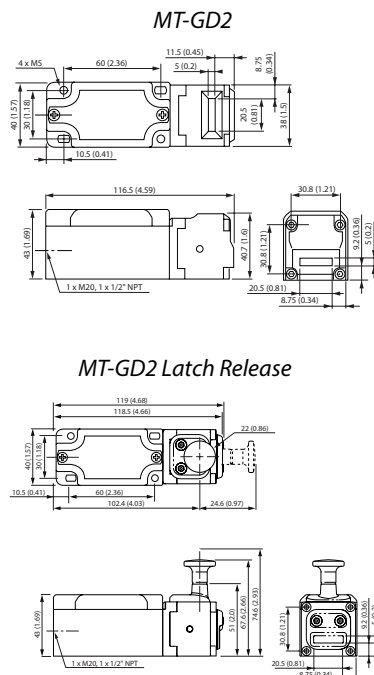
Features:

- Metal enclosure
- IP 67
- Optional latch release style
- M20 conduit entry

Ordering Details:

Cat. No.	Contacts
MT-GD2	
440K-MT55002	1 N/O / 3 N/C (BBM)
440K-MT55005	2 N/O / 2 N/C (BBM)
MT-GD2 (latching)	
440K-MT55039	1 N/O / 3 N/C (BBM)
440K-MT55063	2 N/O / 2 N/C (BBM)
ACTUATORS SOLD SEPARATELY	
440K-A11112	GD2 Flat actuator
440G-A27011	GD2 Standard actuator
440G-A27143	Fully flexible actuator
440G-A27163	Sliding bolt actuator
440K-A17116	Extended flat actuator

Dimensions & Wiring:



Technical Data:

Standards	IEC/EN 60947-5-1; EN 1088; EN 954-1; ISO 13849-1; IEC/EN 60204-1; ISO 14119; AS 4024.1
Safety classification	Category 1 device per EN 954-1. Dual channel interlocks suitable for category 3 or 4 systems
B10d	> 2 x 10 ⁶ operations
PFHd*	3 x 10 ⁻⁷ operations
MTTFd*	385 years
Enclosure	Painted zinc
Actuator	Stainless steel
Protection class	IP 67
Rated insulation voltage	500 V
Switching current min.	5 mA @ 5 V DC
I_{the}	10 A
Utilisation category	AC-15, DC-13
Break contact force	BBM : 12 N
Ambient temperature	-20°C ... +80°C

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a Mission Time / Proof Test interval of 38 years.



Guard Locking Safety Switches

440G-MT Series

Medium to heavy duty safety interlock switch, ideal for guard door monitoring and locking applications.

Features:

- Metal enclosure
- IP 67
- Slim design
- 3 x M20 conduit entries

Ordering Details:

Cat. No.	Voltage
440G-MT47007	24 V AC/DC
440G-MT47016	230 V AC/DC
ACTUATORS SOLD SEPARATELY	
440G-A27011	GD2 standard
440K-A11112	GD2 flat
440G-A27143	Flexible
440K-A17116	Extended flat
440G-A27163	Sliding bolt

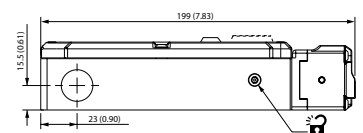
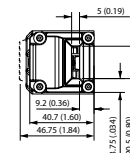
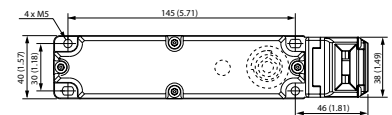


Technical Data:

Standards	IEC/EN 60947-5-1; EN 1088; EN 954-1; ISO 13849-1; IEC/EN 60204-1; ISO 14119; AS 4024.1
Safety classification	Category 1 device per EN 954-1. Dual channel interlocks suitable for category 3 or 4 systems
B10d	> 2 x 10 ⁶ operations
PFHd*	3 x 10 ⁻⁷ operations
MTTFd*	385 years
Enclosure	Painted zinc
Actuator	Stainless steel
Protection class	IP 67
Rated insulation voltage	500 V
Switching current min.	5 mA @ 5 V DC
I_{the}	10 A
I_e/U_e	3 A/ 240 V AC; 2 A/24 V DC
Utilisation category	AC-15, DC-13
Break contact force	6 N
Ambient temperature	-25°C ... +60°C
Locking type	Power to release
Holging force	1600 N

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a Mission Time / Proof Test interval of 38 years.

Dimensions & Wiring:



Guard Locking Safety Switches

440G-LZ Series

Medium to heavy duty safety interlock switch, ideal for partial body access guards.



Features:

- Certified PLe for both door position and lock monitoring
- High 1300N (Fzh) holding force
- IP69k and hygienic design
- Bright 270° LEDs for diagnostics
- Series connectable solid-state OSSD outputs

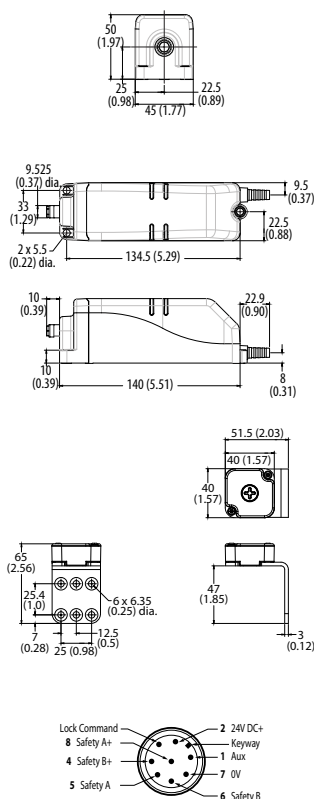
Ordering Details:

Cat. No.	Description
440GLZS21SPRH	Power to release, standard coded actuator, M12 connector
440GLZS21SPRA	Power to release, standard coded actuator, 3m cable
440GLZS21UPRH	Power to release, uniquely coded actuator, M12 connector

ACTUATOR INCLUDED

Dimensions & Wiring:

440G-LZ



Technical Data:

Standards	IEC 60947-5-3, IEC 60947-5-1, IEC 61508, EN ISO 13849-1, IEC 62061, ISO 14119,
Safety Classification	PLe Category 4 per ISO 13849-1, SIL 3 per IEC 61508 and IEC 62061
Certifications	CE Marked for all applicable EU directives, cULus (UL 508), TÜV, C- tick
PFHd*	9.1 x 10 ⁻¹⁰
Holding force Fmax (EN/ISO 14119)	1690N
Holding force Fzh (EN/ISO 14119)	1300N
Power supply	24V DC +10% / -15%
Maximum output current (each output)	200mA
Power consumption (locked or unlocked)	2.5W
Response time (Off)	100 ms first switch, 50 ms additional for each switch
Safety Outputs	2 x PNP, 0.2 A max
Auxiliary Outputs	1 x PNP, 0.2 A
Enclosure type rating	IP66, IP67, IP69K
Hygienic	ISO 14159:2004 and EN 1672-2005, (for that part of the machine defined as "food splash area")
Operating temperature	0...+55°C

* Mission time/proof test interval of 20 years



Guard Locking Safety Switches

TLS-Z GD2 Series

Medium to heavy duty safety interlock switch, ideal for guard door monitoring and locking applications.

Features:

- Second monitoring principle using RFID technology
- Can be wired into SensaGuard systems without degrading SIL, PL or CAT
- Power-to-release or Power-to-lock models available
- Locking force up to 2000N
- PLe, CAT 4 and SIL 3 rating

Ordering Details:

Cat. No.	Description
440GTZS2IUPRH	Power to release
440GTZS2IUPLH	Power to lock
ACTUATORS INCLUDED	

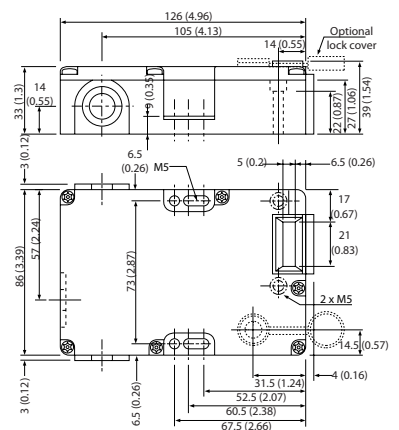
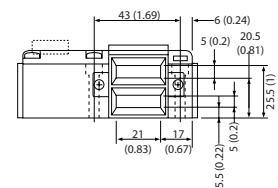


Technical Data:

Standards	IEC 60947-5-3, IEC 60947-5-1, IEC 61508, EN ISO 13849-1, IEC 62061, ISO 14119
Safety Classification	PLe per ISO 13849-1, SIL 3 per IEC 61508 and IEC 62061
Certifications	CE Marked for all applicable EU directives, cULus (UL508) and TÜV
PFHd*	1.69×10^{-9}
Mission Time (Tm)	20 years or 1×10^6 operations
Power Supply	24V DC, -15% ... +10%
Current Consumption	50mA – Solenoid not energised, 120mA solenoid energised
Safety Outputs	2 x PNP, 0.2 A max
Auxiliary Output	1 x PNP, 0.2A max
Locking Force	2000N
Response Time	75ms
Enclosure Type Rating	IP 66, IP 69K
Operating Temperature	-10°C ... +60°C

* Data based on usage rate of 1op/10min, 24 hrs/day, 360 days/year, representing 51840 operations per year. Mission time/Proof test interval of 30 yrs.

Dimensions & Wiring:





Guard Locking Safety Switches

TLS-GD2 Series

Medium to heavy duty safety interlock switch, ideal for guard door monitoring and locking applications.



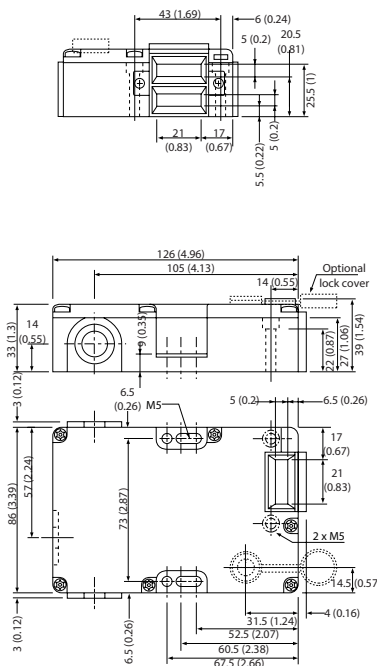
Features:

- Thermoplastic enclosure
- IP 67, IP 69K additional
- Power to release or power to lock
- 3 x M20 conduit entries

Ordering Details:

Cat. No.	Contacts
TLS-1 GD2 (24 V AC/DC Solenoid voltage, power to release)	
440G-T27121	2 N/O / 3 N/C
TLS-1 GD2 (230 V AC Solenoid voltage, power to release)	
440G-T27123	2 N/O / 3 N/C
TLS-2 GD2 (24 V AC/DC Solenoid voltage, power to lock)	
440G-T27127	2 N/O / 3 N/C
TLS-2 GD2 (230 V AC Solenoid voltage, power to lock)	
440G-T27129	2 N/O / 3 N/C
ACTUATORS SOLD SEPARATELY	
440K-A11112	GD2 flat actuator
440G-A27011	GD2 Standard actuator
440G-A27143	Fully flexible actuator
440G-A27163	Sliding bolt actuator
440K-A17116	Extended flat actuator

Dimensions & Wiring:



Technical Data:

Standards	IEC/EN 60947-5-1; EN 1088; EN 954-1; ISO 13849-1; IEC/EN 60204-1; ISO 14119; AS 4024.1
Safety classification	Category 1 device per EN 954-1. Dual channel interlocks suitable for category 3 or 4 systems
B10d	> 2 x 10 ⁶ operations
PFHd*	3 x 10 ⁻⁷ operations
MTTFd*	385 years
Enclosure	UL approved glass-filled PBT
Actuator	Stainless steel
Protection class	IP 67, IP 69K additional IP ratings
Rated insulation voltage	500 V
Switching current min.	5 mA @ 5 V DC
I_{the}	10 A
I_e/U_e	3 A/ 240 V AC; 2 A/24 V DC
Utilisation category	AC-15, DC-13
Break contact force	20 N
Ambient temperature	-25°C ... +60°C
Holding force	2000 N

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a Mission Time / Proof Test interval of 38 years.



Guard Locking Safety Switches

Atlas 5 Series

Heavy duty safety interlock switch, ideal for guard door monitoring and locking applications.

Features:

- Die cast alloy enclosure
- IP 65
- High locking force - 5000 N
- 3 x M20 conduit entries

Ordering Details:

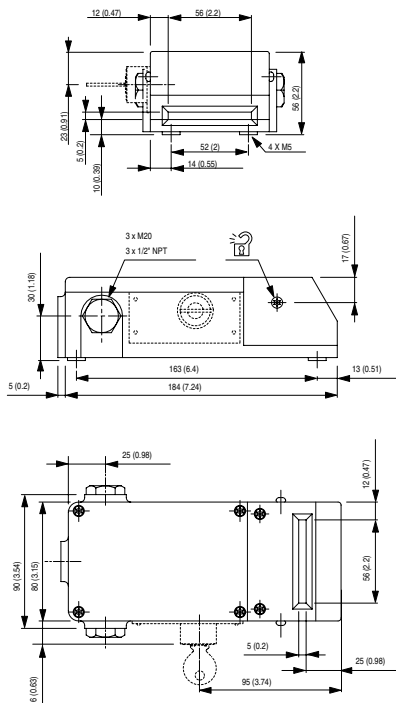
Cat. No.	Contacts
Atlas 5 (24 V AC/DC Solenoid voltage)	
440G-L07264	2 N/O / 4 N/C
Atlas 5 (230 V AC Solenoid voltage)	
440G-L07262	2 N/O / 4 N/C
ACTUATORS SOLD SEPERATELY	
440G-A07136	Standard actuator
440G-A07269	Fully flexible actuator

Technical Data:

Standards	IEC/EN 60947-5-1;EN 1088;EN 954-1;ISO 13849-1; IEC/EN 60204-1;ISO 14119; AS 4024.1
Safety classification	Category 1 device per EN 954-1. Dual channel interlocks suitable for category 3 or 4 systems
B10d	> 2 x 10 ⁶ operations
PFHd*	3 x 10 ⁻⁷ operations
MTTFd*	385 years
Enclosure	Die cast alloy
Actuator	Stainless steel
Protection class	IP 65
Rated insulation voltage	500 V
Switching current min.	5 mA @ 5 V DC
I_{the}	10 A
I_e/U_e	1.5 A/ 240 V AC; 2 A/24 V DC
Utilisation category	AC-15, DC-13
Break contact force	12 N
Ambient temperature	-10°C ... +60°C
Locking type	Power to release
Holding force	5000 N

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a Mission Time / Proof Test interval of 38 years.

Dimensions & Wiring:





Guard Locking Safety Switches

Allen-Bradley Guardmaster 442G – Multifunctional Access Box

A Flexible, Secure and Easy to Use Safeguarding Solution.

Features:

- High holding force 2000N (Fzh tested to ISO 14119) is suitable for a wide range of guarding applications
- Unique RFID coded bolt actuator achieves the highest level of tamper resistance
- Available in two models: Power-to-Release and Power-to-Lock
- Available with up to three controls and indicators including an E-stop push button (a fourth control is possible for future configurations)
- Optional escape release allows a person locked inside the safeguarded area to exit quickly and easily
- Four bright LEDs provide status and diagnostics
- Outputs for door position, bolt position, and lock status are available to the control system
- Two integrated hasps available to affix padlocks
- Can be operated as a standalone device or in series with other devices

Ordering Details:

Description	Connector/Image	Cat. No.
Handle Assembly		
Right handle		442G-MABH-R
Left handle		442G-MABH-L
Lock Module		
Power-to-release	M23 (19-pin)	442G-MABR-UxM-*
	M20 (cable entry)	442G-MABR-UT-*
Power-to-lock	M23 (19-pin)	442G-MABL-UxM-*
	M20 cable entry	442G-MABL-UT-*
Cover Controls		
Blank cover		442G-MABR-UxM-C00
One illuminated push button with a coloured lens kit, 1 blue, green, red, yellow, 2 white		442G-MABR-UT-C01
Two illuminated push buttons with a coloured lens kit, 1 blue, green, red, yellow, 2 white		442G-MABL-UxM-C02
E-stop with two illuminated push buttons with a coloured lens kit, 1 blue, green, red, yellow, 2 white		442G-MABL-UT-C03
(Optional) Select escape release		
Escape release assembly with standard actuation shaft		442G-MABE1

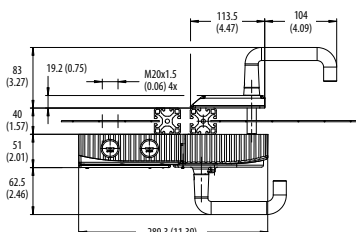
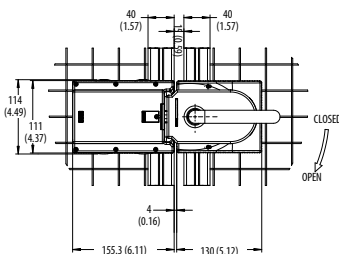
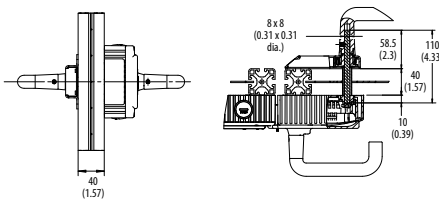
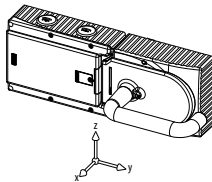
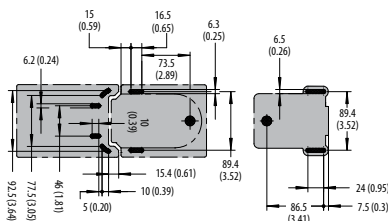
Replace the * with the code for the selected cover controls. x = R for use with right handle 442G-MABH-R or L for use with left handle 442G-MABH-L.

Note: The standard shaft (115 mm/4.53 in.) is optimized for use on 40 mm and 45 mm profiles. An extended shaft is available (see Accessories) for profiles larger than 45 mm (or when used with mounting plates on a 45 mm profile).



Right-hand Multifunctional Access Box mounted on a hinged guard.

Dimensions & Wiring:





Guard Locking Safety Switches

Allen-Bradley Guardmaster 442G – Multifunctional Access Box cont

Accessories:

Description	Image	Cat. No.	Description	Image	Cat. No.
Escape release shaft (250 mm)		442G-MABASHFT	Escape release mounting plate		442G-MABAMPE
Handle assembly mounting plate ⁺		442G-MABAMPH	19-pin M23 2 m cordset*		889M-F19RM-2
Lock module mounting plate ⁺		442G-MABAMPL			

- + Handle and Lock Module mounting plates must be used together.
- Other cordset lengths available on ab.com.

Technical Data:

Standards		IEC 60947-5-3, EN ISO 13849-1, ISO 14119, UL 508 (evaluated for risks of electrical shock and fire; only suitable for NFPA 79 applications only)
Safety ratings	Safety classification	Type 4 interlocking device with guard locking and highcoded RFID actuators according to ISO 14119
	Functional safety data	PFHd: 2.47×10^{-8} ; PLe, Cat. 4 (according to ISO 13849-1). Mission time: 20 years. B10d for E-stop: 1.0×10^5 cycles
	Certifications	cULus (UL 508) and CE Marked for all applicable EU directives
	MTTFd*	385 years Dual channel interlock may be suitable for performance levels PLe or PLd (according to ISO 13849-1:2006) and for use in SIL 2 or SIL 3 systems (according to IEC 62061) depending on application characteristics Certifications CE marked for all applicable directives, cULus (UL 508), and TÜV
Outputs	Safety outputs (FO1A/FO1B)	Semiconductor outputs, PNP
	Output Current, maximum (each)	200 mA
	Output voltage U_{FO1A} / U_{FO1B} 1 @ 50 mA switching current	ON: $U_B - 2V \dots U_B$, OFF: $0 \dots 1V$ DC
	Monitoring Outputs	
	Monitoring Outputs (OD, OT, OL, OI)	P-switching and short circuit-proof
	Output Voltage	$U_A - 2V \dots U_A$
	Maximum Load (each)	50 mA, maximum
Push Button Controls and Indicators	Operating Voltage	5...24 V DC
	Operating Current	1...100 mA
	Breaking Capacity, maximum	250 mW
	Power Supply LED	24 V DC



Guard Locking Safety Switches

Allen-Bradley Guardmaster 442G – Multifunctional Access Box *cont*

Technical Data:

Operating Characteristics	Torque Settings, maximum	1 Nm lock module cover screws (6x) 0.5 Nm manual release locking screw 2 Nm handle set screw (handle and escape release)
	Locking Force F _{max}	2600 N
	Holding Force F _{zh} (ISO 14119)	2000 N
	Maximum Impact Energy Withstand	300 J
	Locking Bolt Alignment Tolerance	Horizontal: ± 4 mm; Vertical: ± 5 mm
	Operating Voltage U _B	Class 2 PELV 24V DC +10/-15% required
	Auxiliary Power U _A	Class 2 PELV 24V DC +10/-15% required
	Protection Type	Short circuit and reverse polarity protected, cross-fault detection
	Current Consumption I _{UB} (no load on any outputs)	80 mA
	With energized guard-locking solenoid and unloaded outputs OI,OL,OT and OD	350 mA
	Push button (no load, per LED)	5 mA
	External Fuse	Refer to 442G-MAB Multi-functional Access Box User Manual
	Response Time (On)	570 ms
	Response Time (Off)	350 ms first switch, 5 ms each additional switch
	Risk Time (per IEC 60947-5-3)	350 mS
	Discrepancy Time	10 ms (maximum)
	Start-up Time (availability)	0.5 s configured for standalone operation 8 s configured for series operation
	Maximum Length of Switch Chain	10 MAB devices
	Utilization Category (IEC 60947-5-2)	DC-13 24V 200 mA
	Insulation Voltage U _i (IEC 60947-1)	30V
	Impulse Withstand Voltage U _{imp}	1.5 kV
	Pollution Degree (IEC 60947-1)	3
	Manual Release	Built in (ISO 14119)
	Mechanical Life	1,000,000 operations
Environmental Characteristics	Ambient Temperature [C (F)] at U _B = DC 24 V	-20...+55° (-4...+131°)
	Storage Temperature [C (F)]	-20...+65° (-4...+149°)
	Enclosure Rating	IP65
	Operating Humidity	5...80% relative
	Vibration/Shock	IEC 60068-2-27 30 g, 11 ms/IEC 60068-2-6 10...55 Hz
Physical Characteristics	Weight	Lock module with cover 750 g, handle assembly 1000 g, escape release 500 g
	Materials	Glass fiber reinforced plastic, nickel-plated die-cast zinc, anodized aluminum handle, stainless steel hardware

Non-contact Safety Switches

SensaGuard™ Series

Featuring the latest in RFID technology sensors, ideal for guard door monitoring.

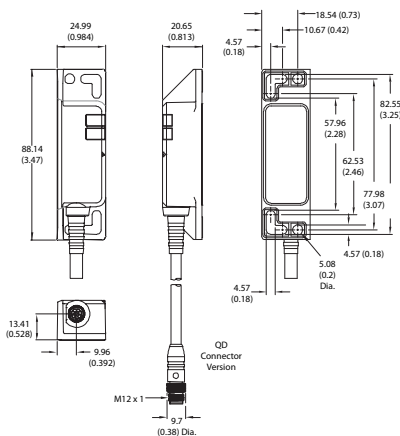
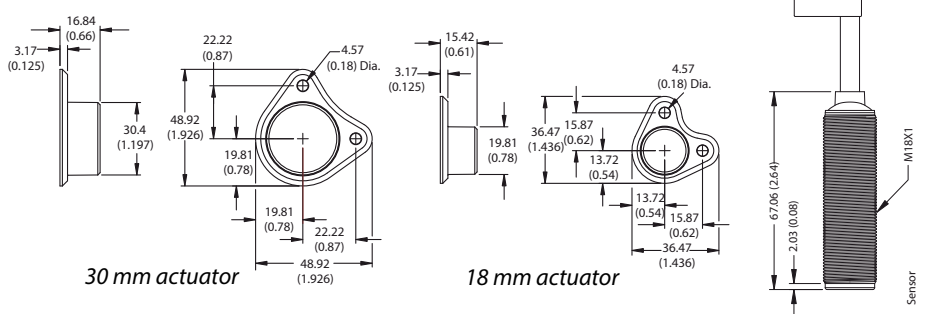
Features:

- Plastic or stainless steel housing
- IP 69K
- Large sensing distances
- Tolerance to misalignment
- CAT4/SIL 3 rating maintained even with multiple units connected in series
- Uniquely coded versions available
- Includes models with integrated latch

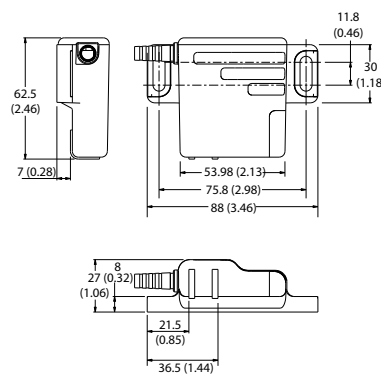


Dimensions & Wiring:

18 mm Barrel

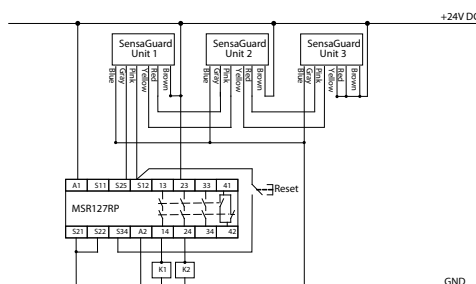


Large plastic rectangular

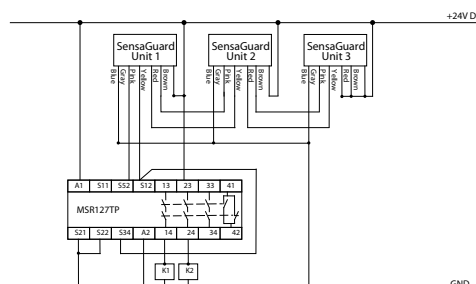


Integrated latch

Monitored Reset



Automatic Reset





Non-contact Safety Switches

SensaGuard™ Series *cont*

Ordering Details:

Cat. No. (All part numbers below include actuators)	Body type	Actuator type	Sensing distance	Actuator Code Type	Connection
440NZ21S16A	18mm plastic barrel	18 mm plastic	15 mm	Standard	3 m cable
440NZ21U16A				Unique	
440NZ21S16H	18mm plastic barrel	18 mm plastic	15 mm	Standard	6-inch pigtail 8-pin M12
440NZ21U16H				Unique	
440NZ21S26A	18mm plastic barrel	30 mm plastic	25 mm	Standard	3 m cable
440NZ21U26A				Unique	
440NZ21S26H	18mm plastic barrel	30 mm plastic	25 mm	Standard	6-inch pigtail 8-pin M12
440NZ21U26H				Unique	
440NZ21S17A	18mm stainless steel barrel	18 mm stainless steel	10 mm	Standard	3 m cable
440NZ21U17A				Unique	
440NZ21S17B	18mm stainless steel barrel	18 mm stainless steel	10 mm	Standard	10 m cable
440NZ21U17B				Unique	
440NZ21S17H	18mm stainless steel barrel	18 mm stainless steel	15 mm	Standard	6-inch pigtail 8-pin M12
440NZ21U17H				Unique	
440NZ21SS2A	Rectangular plastic	Standard	15 mm	Standard	3 m cable
440NZ21US2A				Unique	
440NZ21SS2H	Rectangular plastic	Standard	15 mm	Standard	6-inch pigtail 8-pin M12
440NZ21US2H				Unique	
440NZ21SS2AN (with margin indication)	Rectangular plastic	Standard	15 mm	Standard	3 m cable
440NZ21US2AN (with margin indication)				Unique	
440NZ21SS2HN (with margin indication)	Rectangular plastic	Standard	15 mm	Standard	6-inch pigtail 8-pin M12
440NZ21US2HN (with margin indication)				Unique	
440NZ21SS3PA	Rectangular with integrated latch	Integrated latch version	N/A	Standard	3 m cable
440NZ21US3PA				Unique	
440NZ21SS3PH	Rectangular with integrated latch	Integrated latch version	N/A	Standard	6-inch pigtail 8-pin M12
440NZ21US3PH				Unique	

Connection systems	Body type	Spare Actuators	Body Type	Spare Actuators	Body Type
889DF8AB5	Cordset (5m)	440NZ18PT	18mm plastic actuator	440NZPREC	Rectangular plastic actuator
889DF8ABDM5	Patchcord (5m)	440NZ18UPT	18mm unique coded plastic actuator	440NZUPREC	Unique coded rectangular plastic actuator
898D438YD8	T-port	440NZ30PT	30mm plastic actuator	440NZPRECM	Rectangular plastic actuator with margin indication
898D418UDM	Shorting plug	440NZ30UPT	30mm unique coded plastic actuator	440NZUPRECM	Unique coded rectangular plastic actuator with margin indication
		440NZ18SST	18mm stainless steel actuator	440NZLPREC	Rectangular plastic actuator with integrated latch
		440NZ18USST	18mm unique coded stainless steel actuator	440NZULPREC	Unique coded rectangular plastic actuator with integrated latch



Non-contact Safety Switches

SensaGuard™ Series *cont*

Technical Data:

Standards		IEC 60947-5-3, IEC 61508, EN 954
Safety ratings	Safety classification	Category 4/SIL 3
	Functional safety data	For up-to-date information, visit http://www.ab.com/Safety/
	PFHd*	1.12 x 10 ⁻⁹ operations
	MTTFd*	385 years Dual channel interlock may be suitable for performance levels PLe or PLd (according to ISO 13849-1:2006) and for use in SIL 2 or SIL 3 systems (according to IEC 62061) depending on application characteristics Certifications CE marked for all applicable directives, cULus (UL 508), and TÜV
	Outputs	(Guard Door Closed, actuator in Place) Safety Outputs 2 x PNP, 0.2 A, max.; Status: ON (+24 V DC)
	Auxiliary outputs	1 x PNP, 0.2 A max.; Status: OFF (0 V DC)
Operating characteristics	Sensing distance (assure)	18 mm plastic barrel/18 mm target 15 mm (0.59 in) 18 mm plastic barrel/30 mm target 25 mm (0.98 in) 18 mm stainless steel barrel/standard target 10 mm (0.39 in) Large rectangular flat pack with standard target 15 mm (0.59 in)
	Repeat Accuracy	10% of sensing range
	Output current (max)	200 mA (all outputs)
	Operating voltage	24 V DC, +10%/-15% Class 2
	Current consumption	50 mA
	Frequency of operating cycle	1 Hz
	Response time	(Off) 54 ms
Environmental	Enclosure type rating	IP 69K
	Operating temperature	-10°C ...+55°C
	Relative humidity	5...95%
	Shock	IEC68-2-27 30 g, 1 ms
	Vibration	IEC 68-2-6, 10...55 Hz
	Radio frequency	IEC 61000-4-3, IEC 61000-4-6
Physical characteristics	Housing material	Valox® DR 48
	Actuator material	Valox® DR 48
	Colour	Red

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a Mission Time / Proof Test interval of 30 years.



Non-contact Safety Switches

MC1-MC2 Series

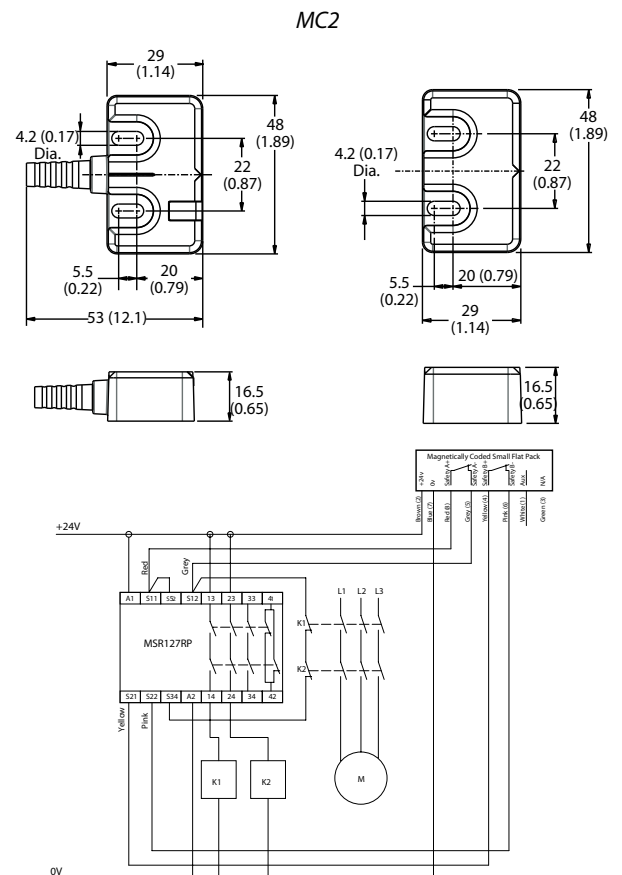
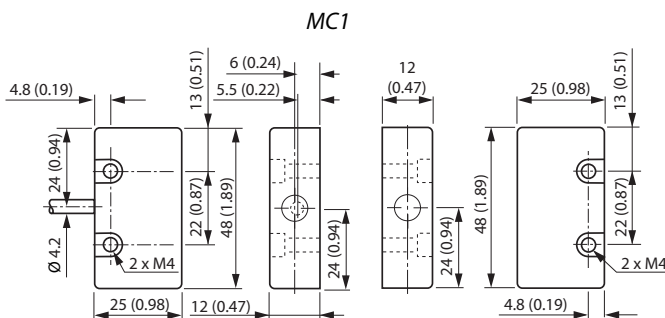
Features:

- Non-contact actuation
- IP 67 or IP 69K
- 2 N/C Reeds
- Magnetic coded sensing
- High tolerance to misalignment

Ordering Details:

Cat. No.	Type	LED Indicator	Connection
440NZ2NRS1A	MC1	No	3m cable
440NZ21W1PH	MC2	Yes	8-PIN micro (M12)
Spare Actuators			
440NA17233	MC1 spare actuator		
440NA32114	MC2 spare actuator		

Dimensions & Wiring:





Non-contact Safety Switches

MC1-MC2 Series *cont*

Technical Data:

Standards		EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, IEC60947-5-1, IEC/EN60947-5-3, ANSI B11.19, AS4024.1
Safety ratings	Safety classification	Category 1 device per EN 954-1 dual channel contacts suitable for category 3 or 4 systems
	B10d	> 2 x 10 ⁶ operations at min.
	PFHd*	3 x 10 ⁻⁷
	MTTFd*	> 385 years Dual channel interlock may be suitable for performance levels PLe or PLd (according to ISO 13849-1:2006) and for use in SIL 2 or SIL 3 systems (according to IEC 62061) depending on application characteristics Certifications CE marked for all applicable directives, cULus, and TÜV
	Outputs	Guard door closed, actuator in place
	Safety outputs	MC1: 2 N/C Reeds MC2: 2 N/C Solid State Relays
	Auxiliary	MC1: - MC2: 1PNP, 0.2 A max. Status Off (0 V DC)
Operating characteristics	Operating distance: make mm	MC1: 8 mm MC2: 10 mm
	Operating distance: break mm	MC1: 15 mm MC2: 25 mm
	Repeat accuracy	10% of sensing range
	Output current max	200 mA
	Switching current @ voltage, max.	MC1: 24 V DC @ 200 mA MC2: 24 V DC @ 200 mA +10%/-15%
	Operating voltage/ power supply	MC2: 24 V DC, +10%/-15%/50 mA max./Class 2 SELV
	Frequency of operating cycle	1 Hz
Environmental	Enclosure type rating	MC1: IP 67 MC2: IP 69K
	Operating temperature	-10°C ... +55°C
	Relative humidity	5..95%
	Shock	IEC 68-2, 27. 30 g, 11ms
	Vibration	IEC 68-2-6, 10..55 Hz
	Radio frequency	IEC 61000-4-3, IEC 61000-4-6
Physical characteristics	Housing material	MC1: Molded ABS MC2: Ultrador
	Actuator material	MC1: Molded ABS MC2: Ultrador
	Colour	Red

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a Mission Time / ProofTest interval of 38 years.



Non-contact Safety Switches

Sipa Sensors Series

Features:

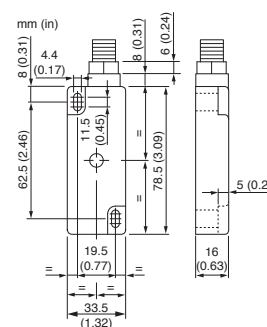
- Non-contact actuation
- Magnetic coded sensing
- Four housing styles
- Must use dedicated Sipa control unit

Ordering Details:

Cat. No.	Housing material	Safety contacts	Auxiliary contacts	Body type	Connection
440NS32022	ABS plastic	1 N/C / 1 N/O	1 N/C	S12	3 m cable
440NS32032	ABS plastic	1 N/C / 1 N/O	1 N/C	S12	10 m cable
440NS32037	ABS plastic	1 N/C / 1 N/O	1 N/O	S13	3 m cable
440NS32015	ABS plastic	1 N/C / 1 N/O	–	S21	3 m cable
440NS32101	Nylon	1 N/C / 1 N/O	None	S31	3 m cable
440NS32047	Stainless steel	1 N/C / 1 N/O	1 N/C	S42	8-PIN micro M12

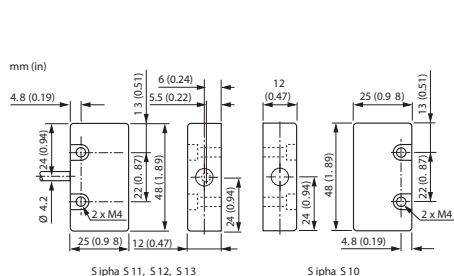
Recommended Logic Interfaces

Cat. No.	Housing	Supply voltage	Safety contacts	Auxiliary contacts	Housing width	Type
440N-S32013		24 V AC/DC	1 N/O	1 N/C solid state	22.5 mm	Control unit 1
440N-S32021		24 V AC/DC; 115/230 V AC	2 N/O	1 N/C	45 mm	Control unit 2
440N-S32052		24 V AC/DC; 115/230 V AC	2 N/O + 1 N/O delayed	1 N/C	90 mm	Sipa 6

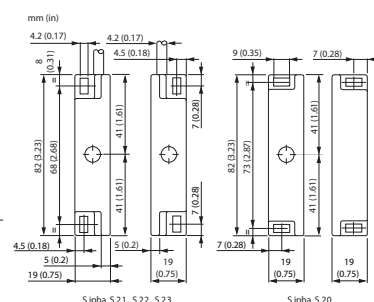


Sipa S42, S43

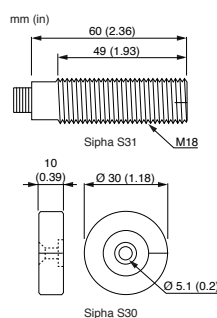
Dimensions & Wiring:



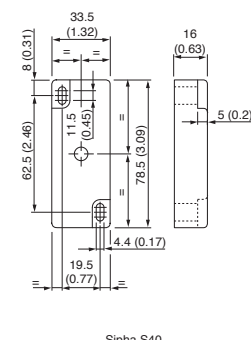
Sipa S1



Sipa S2



Sipa S3



Sipa S4

Dimensions are approximate and are not intended to be used for installation purposes.



Non-contact Safety Switches

Sipha Sensors Series *cont*

Technical Data:

Standards		EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, IEC60947-5-1, IEC/EN60947-5-3, ANSI B11.19, AS4024.1
Safety ratings	Safety classification	Safety classification rating dependent on control unit and application.
	Functional safety data	
	B10d	> 2 x 10 ⁶ operations at min.
	PFHd	3 x 10 ⁻⁷
	MTTFd	> 385 years Dual channel interlock may be suitable for performance levels PLe or PLd (according to ISO 13849-1:2006) and for use in SIL 2 or SIL 3 systems (according to IEC 62061) depending on application characteristics Certifications CE marked for all applicable directives, cULus, and TÜV
	Auxiliary output switching	300 V DC, 250 V AC, 0.5 A including inrush. 15 V A/10 W suitable for AC/DC circuits
Operating characteristics	Operating distance: make mm	Style S1: 5 Style S2: 9 Style S3: 5 Style S4: 10
	Operating distance: break mm	Style S1: 11 Style S2: 12 Style S3: 12 Style S4: 13
Environmental	Enclosure type rating	IP 67
	Operating temperature	S1, S2, S3: -10°C ...+55°C S4 (GD2): -25°C ...+125°C
	Vibration	1 mm, 10...55 Hz
	Shock	30 g, 11 ms half-sine
Physical characteristics	Cable size	0.54 mm ² (20 AWG) 4-wire PVC jacket OD – 4 mm
	Material	S1, S2: Molded ABS S30 (actuator): Polyester S31 (sensor): Nylon (Trogamid) S4 (GD2): Stainless steel
	Mounting	Any position
	Weight	S1: sensor: 18 g; actuator: 15 g S2: sensor: 20 g; actuator: 30 g S3: sensor: 18 g; actuator: 6 g S4: sensor: 150 g; actuator: 170 g



Safety Hinge Switches

Sprite Series

Features:

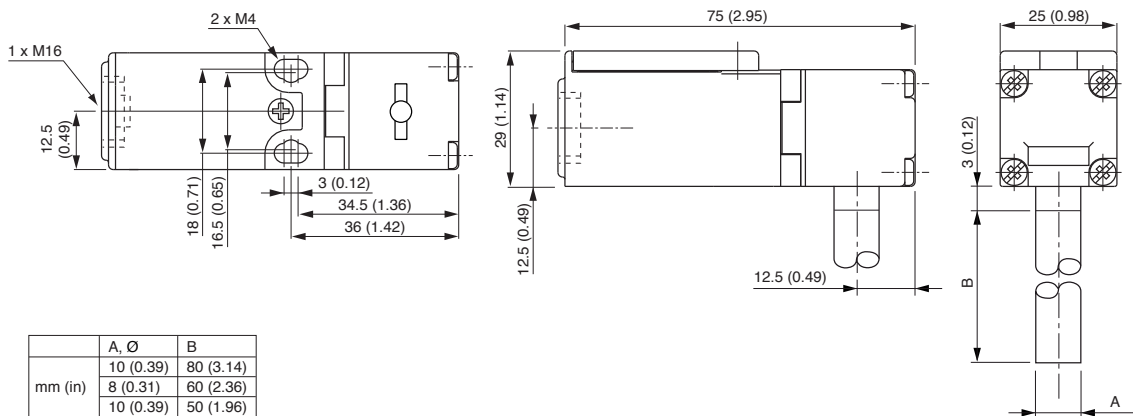
- Ideal for small light-weight guards
- The smallest hinge interlock switch available, 75 x 25 mm case
- Degree of operation can be customised with adjustable cam
- Contacts: 2 N/C or 1 N/O / 1 N/C
- Four possible shaft positions, easy to install

Ordering Details:

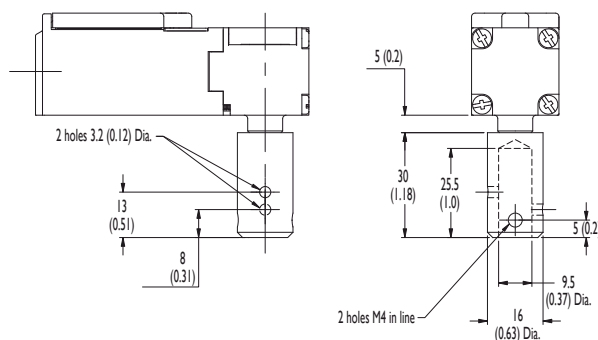
Cat. No.	Housing material	Safety contacts	Shaft type	Connection
440HS34010	Glass-filled PBT	2 N/C	Solid	M16 conduit
440HS34021	Glass-filled PBT	1 N/O / 1 N/C	Solid	M16 conduit

Dimensions & Wiring:

= mm (in)



Hollow Shaft



Dimensions are approximate and are not intended to be used for installation purposes.



Safety Hinge Switches

Sprite Series *cont*

Technical Data:

	Standards	EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, IEC/EN60947-5-1, ANSI B11.19,
Safety ratings	Safety classification	Category 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	B10d	> 2 x 10 ⁶ operations at min. load
	PFHd*	< 3 x 10 ⁻⁷
	MTTFd*	> 385 years May be suitable for use in performance levels Pl _e or Pl _d systems (according to ISO 13849-1:2006) and for use in SIL 2 or SIL 3 systems (according to IEC 62061) depending on the architecture and application characteristics Certifications CE marked for all applicable directives, cULus NRTL/C and TÜV
Outputs	Safety contacts	2 N/C direct opening action 1 N/C direct opening action
	Auxiliary contacts	Auxiliary contacts — 1 N/O Shaft rotation for contact operation maximum 11° Minimum 3° (adjustable)
	Thermal current	10 A
	Rated insulation voltage (U _i)	500 V
	Switching current @ voltage	Min. 5 mA @ 5 V DC
Operating characteristics	Break contact force	Min. 8 cNm (torque on shaft)
	Actuation speed	Max. 160 mm per sec.
	Actuation frequency	Max. 1 cycle per sec.
	Operating life	@ 100 mA load 1,000,000 operations
Environmental	Enclosure type rating	IP 67
	Operating temperature	-20°C ...+80°C
Physical characteristics	Housing material	UL approved glass-filled PBT
	Shaft material	Stainless steel
	Weight	80 g
	Colour	Red

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, / representing 51840 operations per year.
Also a Mission Time / Proof Test interval of 38 years.



Safety Hinge Switches

Ensign 3 Series



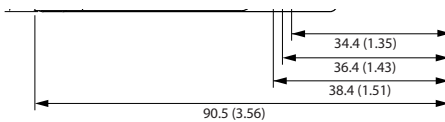
Features:

- Ideal for small light-weight guards
- Degree of operation can be customised with adjustable cam
- Contacts 2 N/C & 1 N/O or 3 N/C (sealed to IP 67)
- Four possible shaft positions, easy to install
- Solid and hollow shafts available

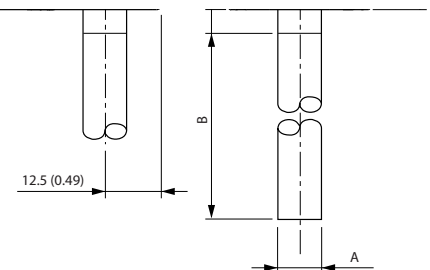
Ordering Details:

Cat. No.	Housing material	Safety contacts	Auxiliary contacts	Shaft type	Connection
440HE22027	Stainless steel	2 N/C	1 N/O	Solid	M16 conduit
440HE22025	Stainless steel	3 N/C	-	Solid	M16 conduit

Dimensions & Wiring:

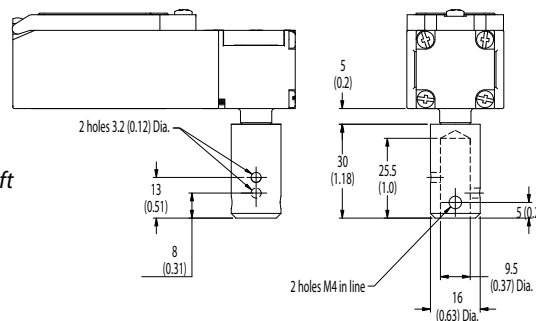


	A, Ø	B
mm (in)	10 (0.39)	80 (3.14)
	8 (0.31)	60 (2.36)
	10 (0.39)	50 (1.96)



Hollow Shaft

Hollow Shaft





Safety Hinge Switches

Ensign 3 Series cont

Technical Data:

Standards		EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, IEC/ EN60947-5-1, ANSI B11.19, AS4024.1
Safety ratings	Safety classification	Category 1 device per EN 954-1 dual channel interlocks suitable for category 3 or 4 systems
	Functional safety data	Note: For up-to-date information, visit http://www.ab.com/Safety/
	B10d	> 2 x 10 ⁶ operations at min. load
	PFHd*	< 3 x 10 ⁻⁷
	MTTFd*	> 385 years May be suitable for use in performance levels Plc or Pld systems (according to ISO 13849-1:2006) and for use in SIL 2 or SIL 3 systems (according to IEC 62061) depending on the architecture and application characteristics Certifications CE marked for all applicable directives, cULus, and TÜV.
Outputs	Safety contacts	3 N/C direct opening action 2 N/C direct opening action
	Auxiliary contacts	1 N/O Shaft rotation for contact operation 3 N/C Adjustable 12° max.: 3° min. 2 N/C 1 N/O (BBM) adjustable 14° max.: 5° min. 2 N/C 1 N/O (MBB) adjustable 12° max.: 3° min.
	Thermal current	10 A
	Rated insulation voltage (Ui)	500 V
	Switching current @ voltage	Min. 5 mA @ 5 V DC
Operating characteristics	Break contact force	8 cNm (torque on shaft)
	Actuation speed	160 mm (6.29 in) per sec.
	Actuation frequency	1 cycle per sec.
	Operating life	@ 100 mA load 1,000,000 operations
Environmental	Enclosure type rating	IP 67
	Operating temperature	-20°C ...+80°C
Physical characteristics	Housing material	UL approved glass-filled PBT
	Shaft material	Stainless steel
	Weight	100 g
	Colour	Red

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a Mission Time / ProofTest interval of 38 years.



Safety Hinge Switches

Rotacam Series



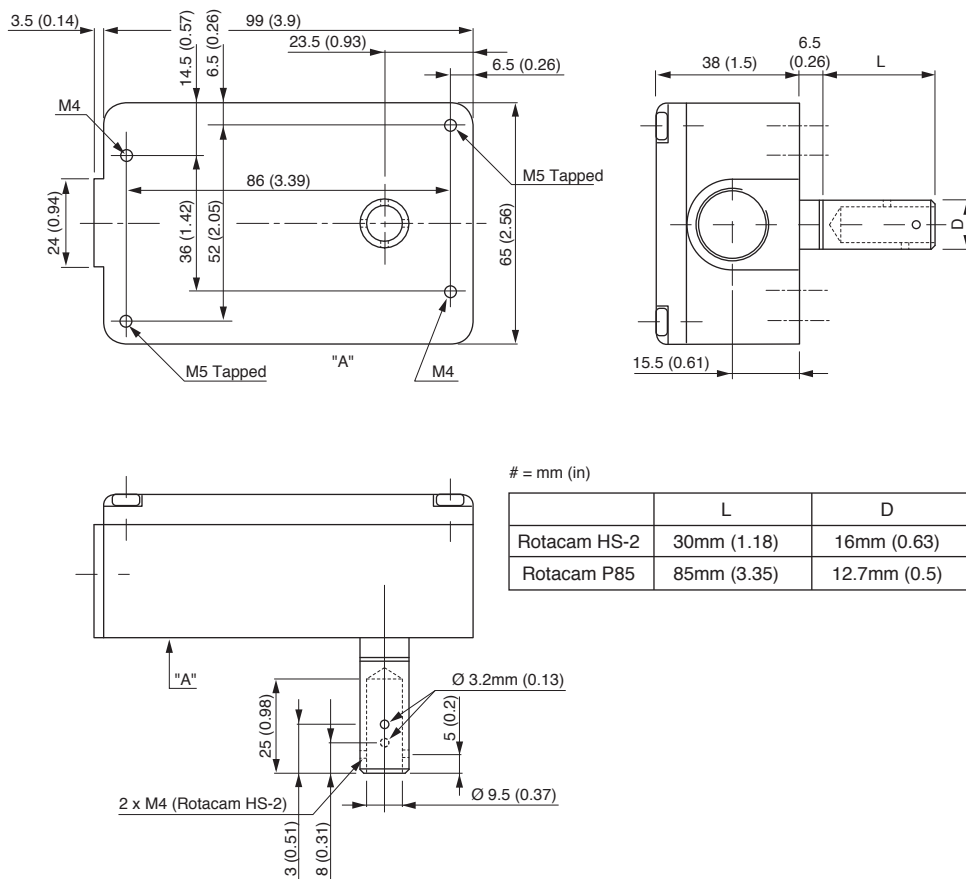
Features:

- Can be used as a hinge pin on light or medium weight guard doors
- Isolates power within 5° of door movement
- Degree of operation can be customised with adjustable cam
- Robust die-cast case, ideal for heavy duty applications
- Contacts, 2 N/C & 1 N/O

Ordering Details:

Cat. No.	Housing material	Safety contacts	Auxiliary contacts	Shaft type	Connection
440RH03074	Heavy duty die-cast alloy	2 N/C	1 N/O	Pre-bored	M20 conduit
440RH03079	Heavy duty die-cast alloy	2 N/C	1 N/O	Solid	M20 conduit

Dimensions & Wiring:





Safety Hinge Switches

Rotacam Series cont

Technical Data:

Standards		EN954-1, ISO13849-1, IEC/EN60204- 1, NFPA79, EN1088, ISO14119, IEC/EN60947-5-1, ANSI B11.19, AS4024.1
Safety ratings	Safety classification	Category 1 Device per EN954-1 Dual-channel interlocks suitable for category 3 or 4 systems
Functional safety data	B10d	> 2 x 10 ⁶ operations at min. load
	PFHd*	< 3 x10 ⁻⁷
	MTTFd*	> 385 years May be suitable for use in performance levels Plc or Pld systems (according to ISO 13849-1:2006) and for use in SIL 2 or SIL 3 systems (according to IEC 62061) depending on the architecture and application characteristics Certifications CE marked for all applicable directives, cULus, SUVA, and TÜV
Outputs	Safety contacts	2 N/C direct-opening action
	Auxiliary contacts	1 N/O Shaft Rotation for Contact Operation 11° maximum; 5° minimum, (adjustable)
	Thermal current	10 A
	Rated insulation voltage (Ui)	500 V
	Switching current @ voltage	5 mA @ 5 V DC
Operating characteristics	Break contact force	12 cNm (torque on shaft)
	Actuation speed	160 mm (6.29 in) per sec.
	Actuation frequency	1 cycle per sec.
	Operating life	@ 100 mA load >1,000,000 operations
Environmental	Enclosure type rating	IP 66
	Operating temperature	-20°C ...+80°C
Physical characteristics	Housing material	Heavy duty die-cast alloy
	Shaft material	Stainless steel
	Weight	420 g
	Colour	Red

* Data based on usage rate of 1 op / 10 mins., 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a Mission Time / Proof Test interval of 38 years.

NHP SAFETY REFERENCE GUIDE



PRODUCTS

Trapped Key Interlocks



Prosafe Trapped Key Systems

Rotary Switches and Isolators

Features:

- 316L Stainless steel keys
- Direct drive operation - positively opens contacts
- IP 65 rated enclosure - water and dust resistant
- Stainless steel dustcap included
- Up to 400 A isolation
- 4 N/O or 2 N/O and 2 N/C contacts
- Replacable code barrel assembly

Ordering Details:

Cat. No.	Contacts	Current rating	Type
440TMRKSE10*	4 N/O	20 A	Enclosure type (IP 65)
440TMRKSE11*	2 N/O & 2 N/C	20 A	Enclosure type (IP 65)
440TMRPSE10*	4 N/O	20 A	Panel mounted
440TMRPSE11*	2 N/O & 2 N/C	20 A	Panel mounted

Accessories

Cat. No.	Description
440TAKEYE10*	Stainless steel key
440TASCBE14*	Stainless steel replacement code barrel for products other than 100 A RPS/RKS unit
440TASCBE11*	Stainless steel replacement code barrel for 100 A unit rotary switch
440TASFC10*	Stainless steel weatherproof replacement dust cap

* Substitute the desired primary code for this symbol

How to Order:

To complete the Cat. No. substitute the * symbol with the desired primary key code.

The primary key does not come with the rotary switch, it must be ordered separately.

For example: To order a panel mounted rotary switch, that is 2 N/O & 2 N/C rated at "20 A" and "Aa" coded the part number would be **440TMRPSE11AA** a primary key would also need to be ordered. **440TAKEYE10AA**.

Preferred key codes:

AA	"Aa" code
BA	"Ba" code
CA	"Ca" code
DA	"Da" code
EA	"Ea" code
FA	"Fa" code
GA	"Ga" code
HA	"Ha" code

Preferred key codes are typically stocked in larger quantities, reducing lead times to receive your trapped key system.

You will need to allow time for your system to be assembled which takes approximately 3 days from receipt of order, providing the key codes are available.

When using key codes not in the preferred list, please check availability and lead times with NHP.



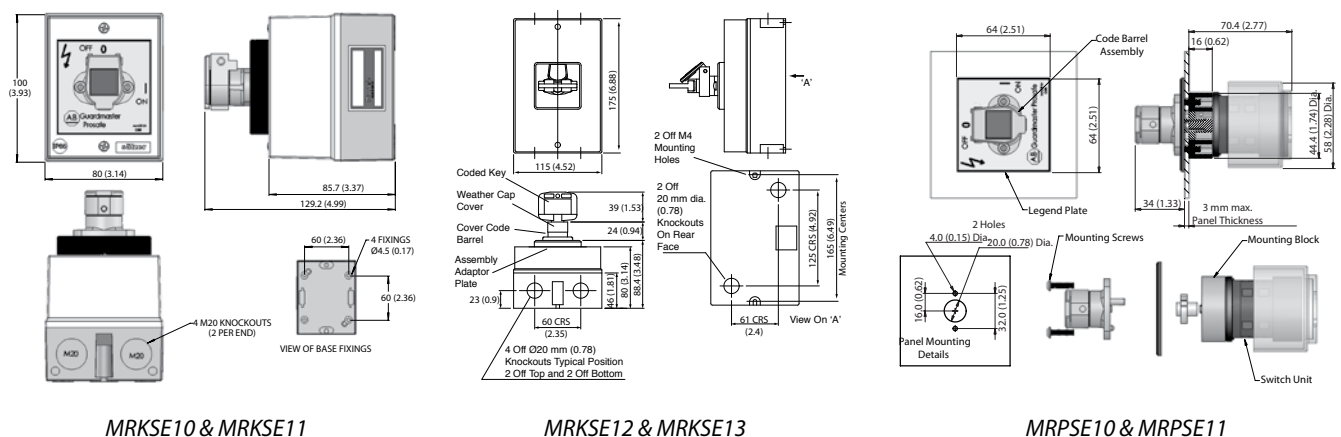
Prosafe Trapped Key Systems

Rotary Switches and Isolators *cont*

Technical Data:

Technical ratings		Stainless steel construction
Standards		EN292-1&2, EN1088, IEC/EN60204-1, IEC/EN60947-5-1, ISO12100-1&2, ISO14119, GS-ET-19, AS4024.1, UL508, CSA 22.2
	Safety classification	Category 1 per EN 954-1 (ISO 13849-1) suitable for category 2, 3, and 4 systems
Certifications		CE marked for all applicable directives, BG, cULus on contact block; C-Tick not required
	Enclosure type rating	IP 65 (RKS only)
	Conduit entry	4 x M20 (RKS only)
	Operating temperature	-10...40°C
	Mechanical life	100,000 operations
	Shear force to key	15.1 kN (3398 lbs), max.
	Torque to key	14 N•m (124 lb•in), max.
	Relative humidity	95%
	Finger protection	DIN 57106/VDE 0106 T.100
	Electrical life	100,000 operations
	Climatic test	Constant to DIN IEC 68 Part 2-3 Variable to DIN IEC 68 Part 2-30
	Ambient temperature, operation encased	-25°C ...+40°C
	(Ui) Rated insulation voltage	690 V
	(Uimp)	Rated Impulse withstand
	Voltage	6 kV
	S3 intermittent rating duty factor	(VDE 0530, Part 1) 60/40/25% = 1, 3/1, 6/2 xlu

Dimensions & Wiring:





Prosafe Trapped Key Systems

Solenoid Release Unit

Features:

- Direct drive operation - positively opens contacts
- Integral solenoid monitoring
- Key trapped until release signal is applied
- IP 65 enclosure or panel mounted versions
- LED or NEON "key free" indication
- 316L stainless steel constructions
- Weatherproof stainless steel dust cap as standard
- UL and CSA approval on switches
- Single or multiple key units available

Ordering Details:

Cat. No.	Contacts	Current rating	Solenoid voltage
440TMSRUE11*	2 N/O & 2 N/C	20 A	24 V DC
440TMSRUE10*	4 N/O	20 A	24 V DC
440TMSRUE33*	2 N/O & 2 N/C	20 A	230 V AC
440TMSRUE30*	4 N/O	20 A	230 V AC

Accessories

Cat. No.	Description
440TAKEYE10*	Stainless steel key
440TASCBE14*	Stainless steel replacement code barrel for products other than 100 A RPS/RKS unit
440TASFC10*	Stainless steel weatherproof replacement dust cap
440TAIPB10	Optional IP 65 plastic enclosure (with 20 A Units)
440TAIPB22	Optional IP 65 plastic enclosure (with 32 A Units)

* Substitute the desired primary code for this symbol

How to Order:

To complete the Cat. No. substitute the * symbol with the desired primary key code.

The primary key does not come with the solenoid release unit, it must be ordered separately.

For example: To order a solenoid release unit, that is 2 N/O & 2 N/C rated at "20 A" and "Aa" coded the part number would be **440TMSRUE11AA**, a primary key would also need to be ordered **440TAKEYE10AA**.

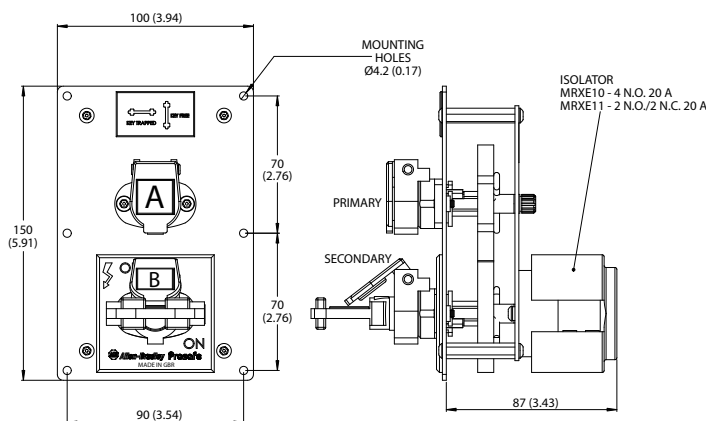
Preferred key codes:

AA	"Aa" code
BA	"Ba" code
CA	"Ca" code
DA	"Da" code
EA	"Ea" code
FA	"Fa" code
GA	"Ga" code
HA	"Ha" code

Preferred key codes are typically stocked in larger quantities, reducing lead times to receive your trapped key system. You will need to allow time for your system to be assembled which takes approximately 3 days from receipt of order, providing the key codes are available.

When using key codes not in the preferred list, please check availability and lead times with NHP.

Dimensions & Wiring:





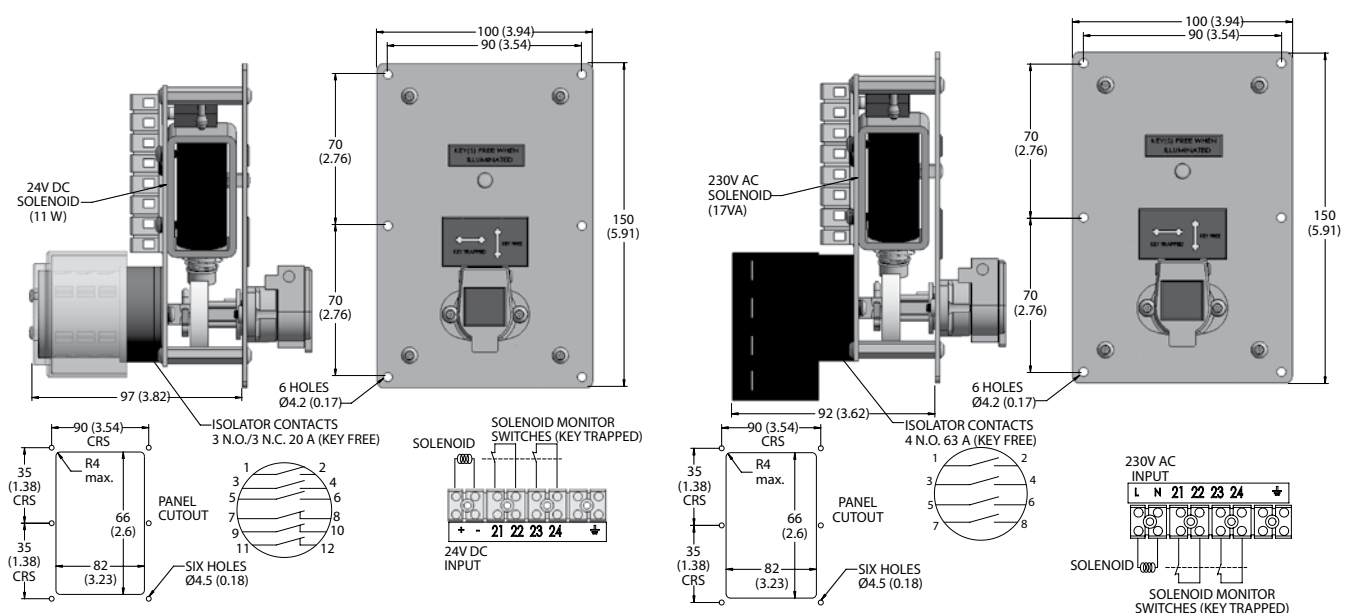
Prosafe Trapped Key Systems

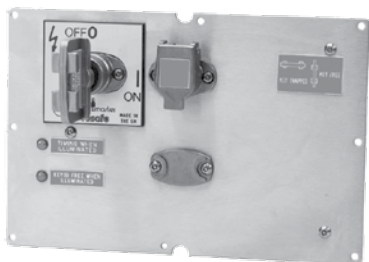
Solenoid Release Unit *cont*

Technical Data:

Technical ratings		Stainless steel construction
Standards		EN292-1&2, EN1954-1, IEC/EN60204-1, EN1088, IEC/EN60947-5-1, ISO13849-1, ISO12100-1&2, ISO14119, GS-ET-19, AS4024.1
Certifications		CE marked for all applicable directives, BG, and cULus
	Solenoid voltage	24 V DC, 110 V AC, 230 V AC
	Solenoid power	DC Types: 6.5 W continuous
	AC types	6 V A continuous
	Shear force to key	15.1 kN max.
	Torque to key	14 N•m max.
Material	Trapped key components	316L stainless
	Steel face plate	316L stainless steel
	Optional box	ABS plastic
	Operating temperature	0°C ... +40°C
	Enclosure type rating with optional plastic enclosure	IP 65
	Electrical life	100,000 operations
	Mechanical life	100,000 operations

Dimensions & Wiring:





Prosafe Trapped Key Systems

Electronic Timed-Delay Units

Features:

- Timed-delay output up to 40 minutes
- Single key or dual key
- 316L stainless steel keys
- Category 1 stop
- Replaceable code barrel assembly
- Optional IP 65 enclosure

Ordering Details:

Cat. No.	Contact set 1	Contact set 2	Solenoid voltage	Type
440TMSTUE10*	3 N/O 40 A	1 N/O 20 A	24 V DC	Single key out panel mounted
440TMSTUE11*	2 N/O 20 A	1 N/C 20 A	24 V DC	Single key out panel mounted
440TMSTUE30*	3 N/O 40 A	1 N/O 20 A	230 V AC	Single key out panel mounted
440TMSTUE33*	2 N/O 20 A	1 N/C 20 A	230 V AC	Single key out panel mounted
440TMDTUE10**	3 N/O 40 A	1 N/O 20 A	24 V DC	Dual key out panel mounted
440TMDTUE11**	2 N/O 20 A	1 N/C 20 A	24 V DC	Dual key out panel mounted
440TMDTUE30**	3 N/O 40 A	1 N/O 20 A	230 V AC	Dual key out panel mounted
440TMDTUE33**	2 N/O 20 A	1 N/C 20 A	230 V AC	Dual key out panel mounted

Accessories

Cat. No.	Description
440TAKEYE10*	Stainless steel key
440TASCB14*	Stainless steel replacement code barrel for products other than 100A RPS/RKS unit
440TASFC10*	Stainless steel weatherproof replacement dust cap
440TAIPB20	Optional IP 65 plastic enclosure (20 A units)
440TAIPB23	Optional IP 65 plastic enclosure (40 A units)
440TAIPB46	Optional stainless steel enclosure

* Substitute the desired primary code for this symbol

How to Order:

To complete the Cat. No. substitute the * symbol with the desired primary key code.

The primary key does not come with the electronic timed-delay unit, it must be ordered separately.

For example: To order an electronic timed-delay switch, that is 2 N/O & 1 N/C rated at "20 A" with 24 V solenoid voltage and "Aa" coded the part number would be **440TMSTUE11AA** a primary key would also need to be ordered **440TAKEYE10AA**.

Preferred key codes:

AA	"Aa" code
BA	"Ba" code
CA	"Ca" code
DA	"Da" code
EA	"Ea" code
FA	"Fa" code
GA	"Ga" code
HA	"Ha" code

Preferred key codes are typically stocked in larger quantities, reducing lead times to receive your trapped key system.

You will need to allow time for your system to be assembled which takes approximately 3 days from receipt of order, providing the key codes are available.

When using key codes not in the preferred list, please check availability and lead times with NHP.



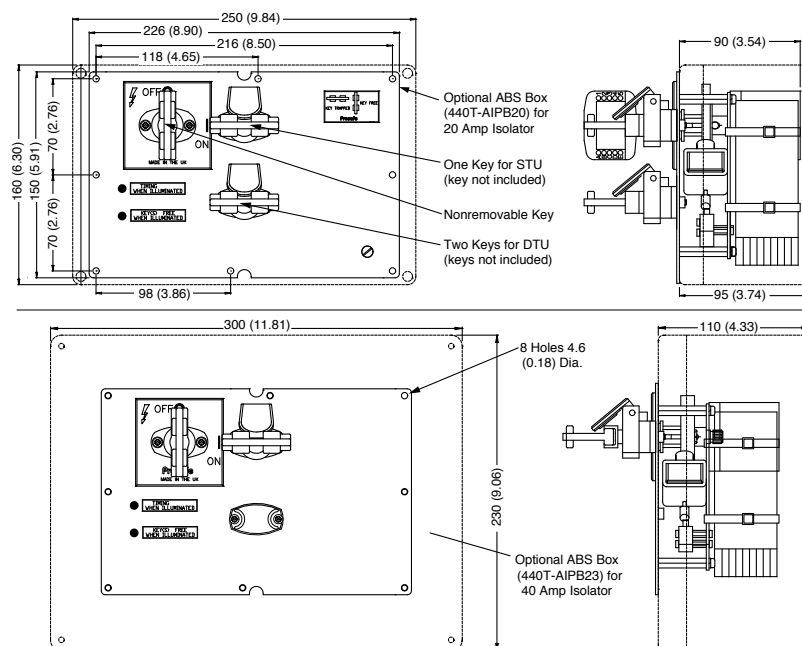
Prosafe Trapped Key Systems

Electronic Timed-Delay Units *cont*

Technical Data:

Standards		EN292-1&2, EN1954-1, IEC/EN60204-1, EN1088, IEC/EN60947-5-1, ISO13849-1, ISO12100-1&2, ISO14119, GS-ET-19, AS4024.1
Category		Category 1 per EN 954-1 (ISO 13849-1)
Certifications		CE marked for all applicable directives and BG
	Operating temperature	0°C ...+40°C
	Relative humidity	95%
	Electrical life	100,000 operations
	Mechanical life	100,000 operations
	Shear force to key	15.1 kN
	Torque to key	14 N•m
Material	Trapped key components	316L stainless steel
	Face plate	316L stainless steel
	Optional box	ABS plastic or stainless steel
	Solenoid voltage	24 V DC, 110 V AC and 230 V AC
	Time delay	0.1 second...40 minutes

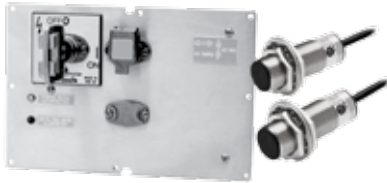
Dimensions & Wiring:





Prosafe Trapped Key Systems

Stopped Motion Units



Features:

- Stopped motion detection
- NPN and PNP proximity sensors
- Timed-delay output up to 40 minutes
- Category 1 stop
- Replaceable code barrel assembly
- Optional IP 65 enclosure

Ordering Details:

Cat. No.	Contact set 1	Contact set 2	Solenoid voltage	Type
440TMSMSE10*	3 N/O 40 A	1 N/O 20 A	24 V DC	Single key out panel mounted
440TMSMSE11*	2 N/O 20 A	1 N/C 20 A	24 V DC	Single key out panel mounted
440TMSMSE30*	3 N/O 40 A	1 N/O 20 A	230 V AC	Single key out panel mounted
440TMSMSE33*	2 N/O 20 A	1 N/C 20 A	230 V AC	Single key out panel mounted
440TMDMSE10**	3 N/O 40 A	1 N/O 20 A	24 V DC	Dual key out panel mounted
440TMDMSE11**	2 N/O 20 A	1 N/C 20 A	24 V DC	Dual key out panel mounted
440TMDMSE30**	3 N/O 40A	1 N/O 20 A	230 V AC	Dual key out panel mounted
440TMDMSE33**	2 N/O 20 A	1 N/C 20 A	230 V AC	Dual key out panel mounted

Accessories

Cat. No.	Description
440TAKEYE10*	Stainless steel key
440TASCBE14*	Stainless steel replacement code barrel for products other than 100 A RPS/RKS unit
440TASFC10*	Stainless steel weatherproof replacement dust cap
440TAIPB20	Optional IP 65 plastic enclosure (20 A units)
440TAIPB23	Optional IP 65 plastic enclosure (40 A units)
440TAIPB46	Optional stainless steel enclosure

* Substitute the desired primary code for this symbol

Inductive Proximity Sensors

Type	Cat.No.	Size	Type
Inductive proximity sensor three-wire, DC	872CD3NN12E2	12 mm	NPN
Inductive proximity sensor three-wire, DC	872CD3NP12E2	12 mm	PNP
Inductive proximity sensor three-wire, DC	872CD5NN18E2	18 mm	NPN
Inductive proximity sensor three-wire, DC	872CD5NP18E2	18 mm	PNP
Inductive proximity sensor three-wire, DC	872CD10NN30E2	30 mm	NPN
Inductive proximity sensor three-wire, DC	872CD10NP30E2	30 mm	PNP

How to Order:

To complete the Cat. No. substitute the * symbol with the desired primary key code.

The primary key does not come with the stopped motion unit, it must be ordered separately.

For example: To order a stopped motion unit, that is 2 N/O & 1/NC rated at "20 A" and 24 V solenoid voltage and "Aa" coded the part number would be **440TMSMSE11AA** a primary key would also need to be ordered. **440TAKEYE10AA**.

Preferred key codes:

AA	"Aa" code
BA	"Ba" code
CA	"Ca" code
DA	"Da" code
EA	"Ea" code
FA	"Fa" code
GA	"Ga" code
HA	"Ha" code

Preferred key codes are typically stocked in larger quantities, reducing lead times to receive your trapped key system.

You will need to allow time for your system to be assembled which takes approximately 3 days from receipt of order, providing the key codes are available.

When using key codes not in the preferred list, please check availability and lead times with NHP.

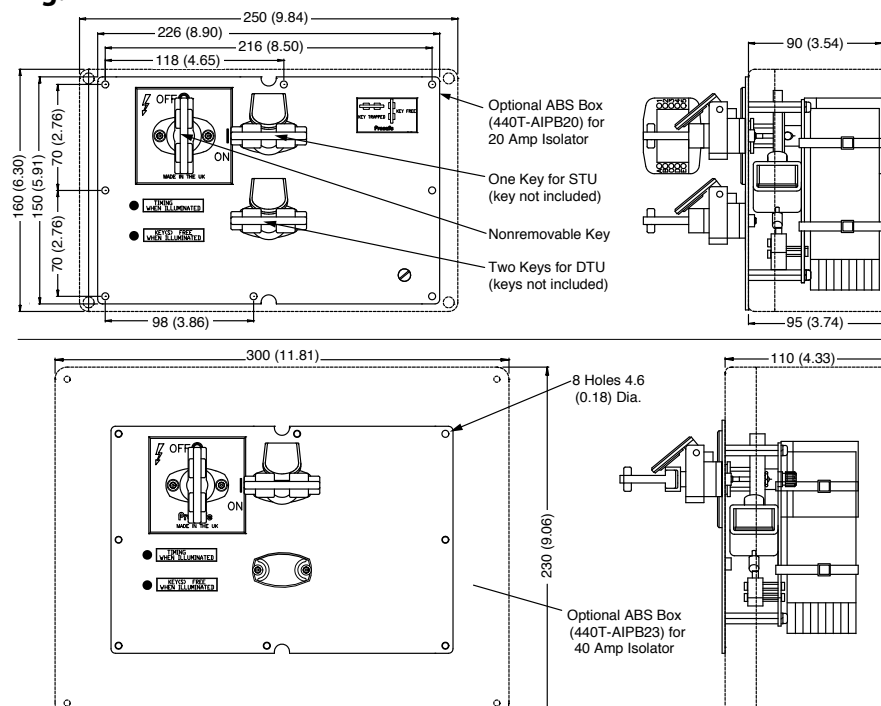
Prosafe Trapped Key Systems

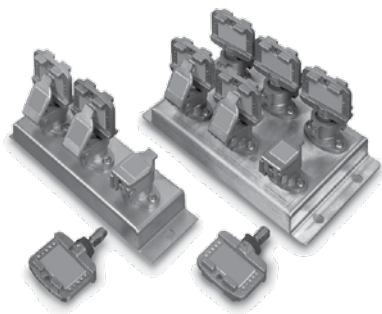
Stopped Motion Units *cont*

Technical Data:

Standards		EN292-1&2, EN1954-1, IEC/EN60204-1, EN1088, IEC/EN60947-5-1, ISO13849-1, ISO12100-1&2, ISO14119, GS-ET-19, AS4024.1
Category		Category 1 per EN 954-1 (ISO 13849-1)
Certifications		CE marked for all applicable directives and BG
	Operating temperature	0°C ...+40°C
	Relative humidity	95%
	Electrical life	100,000 operations
	Mechanical life	100,000 operations
	Shear force to key	15.1 kN
	Torque to key	14 N•m
Material	Trapped key components	316L stainless steel
	Face plate	316L stainless steel
	Optional box	ABS plastic or stainless steel
	Inductive sensors	Stainless steel barrel, plastic face
	Mounting	Tamper resistant screws
	Weight (kg)	2
	Solenoid voltage	24 V DC, 110 V AC and 230 V AC
	Time delay	0.1 second...40 minutes
	Zero speed sensors	2x inductive sensors

Dimensions & Wiring:





Prosafe Trapped Key Systems

Exchange Units

Features:

- A range of off-the-shelf units in various combinations
- 316L stainless steel construction
- Primary key(s) in release secondary keys simultaneously on units up to six ways
- Weather proof stainless steel dust cap as standard
- Replaceable code barrel assembly

Ordering Details:

Cat. No.	Keys in and out	Number of keys	Cat. No.	Keys in and out	Number of keys
440TMKEXE10?	1 key in 1 key out	2	440TMKEXE15?	2 keys in 2 keys out	4
440TMKEXE11?	1 key in 2 keys out	3	440TMKEXE16?	2 keys in 3 keys out	5
440TMKEXE12?	1 key in 3 keys out	4	440TMKEXE17?	2 keys in 4 keys out	6
440TMKEXE13?	1 key in 4 keys out	5	440TMKEXE18?	3 keys in 3 keys out	6
440TMKEXE14?	1 key in 5 keys out	6			

When ordering, please quote key codes required in order notes.

Accessories

Cat. No.	Description
440TAKEYE10*	Stainless steel key
440TASCBE14*	Stainless steel replacement code barrel for products other than 100A RPS/RKS unit
440TASFC10*	Stainless steel weatherproof replacement dust cap

* Substitute the desired primary code for this symbol

Optional Key Exchange Boxes

Number of keys	Cat. No.
7..11 way (max) painted mild steel	440TAIPB30
12..15 way (max) painted mild steel	440TAIPB33
16..25 way (max) painted mild steel	440TAIPB34
12..15 way (max) stainless steel	440TAIPB40
16..25 way (max) stainless steel	440TAIPB44

How to Order:

The **primary keys** (keys in) and **secondary keys** (keys out) **codes must be added as an order note** when ordering an exchange unit. The **primary keys** does not come with the exchange unit, they must be ordered separately. The **secondary keys** do come with the exchange unit.

For example: When ordering a three-way system, with **Aa** code primary and two **Ba** code secondaries Cat. No. would be **440T-MKEXE11?** and order note of **AABABA**. An additional primary key would also need to be ordered **440TAKEYE10AA**.

Preferred key codes:

AA	"Aa" code
BA	"Ba" code
CA	"Ca" code
DA	"Da" code
EA	"Ea" code
FA	"Fa" code
GA	"Ga" code
HA	"Ha" code

Preferred key codes are typically stocked in larger quantities, reducing lead times to receive your trapped key system.

You will need to allow time for your system to be assembled which takes approximately 3 days from receipt of order, providing the key codes are available.

When using key codes not in the preferred list, please check availability and lead times with NHP.



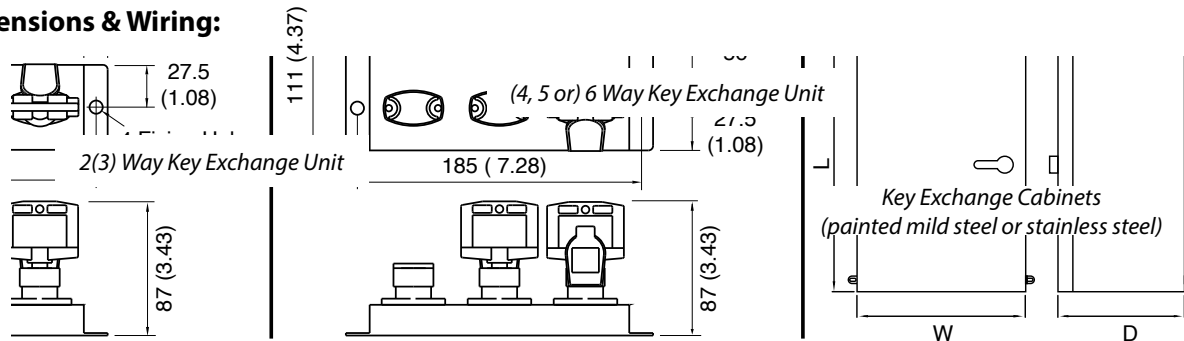
Prosafe Trapped Key Systems

Exchange Units *cont*

Technical Data:

Standards		EN292-1&2, EN1088, ISO12100-1&2, ISO14119, AS4024.1
Category		Category 3 per EN 954-1 (ISO 13849-1) c-Ulus and TUV
Certifications		CE marked for all applicable directives and BG; C-Tick not required
	Operating temperature	-40°C ... 80°C
	Mechanical life	100,000 operations
	Shear force to key	15.1 kN, max.
	Torque to key	14 N•m, max.
	Shear force to key	15.1 kN
	Relative humidity	95%
Material		316L stainless steel Stainless steel construction

Dimensions & Wiring:





Prosafe Trapped Key Systems

Bolt Interlocks

Features:

- 316L stainless steel construction
- Single or dual key units
- Various extensions of bolt
- Direct drive push/pull operation
- Replaceable code barrel assembly
- Fitted with tamper resistant screws
- Weatherproof stainless steel dust cap as standard

Ordering Details:

Cat. No.	Trapped key condition	Bolt retracted (mm)	Bolt extended (mm)	Type
440TMSBLE10*	Trapped key to retract bolt	0	14	Single key
440TMDBLE10**	Both keys trapped to retract bolt	0	14	Dual key
440TMDBLE14*®	Primary key trapped, secondary key free to retract bolt	0	14	Dual key
440TMDBLJ14*®	Primary key trapped, secondary key free to retract bolt	0	14	Dual key with secondary ejector key

Accessories

Item	Cat. No.
Stainless steel key	440TAKEYE10*
Stainless steel replacement code barrel for products other than 100 A RPS/RKS unit	440TASCBE14*
Stainless steel weatherproof replacement dust cap	440TASFC10*
Stainless steel ejector key	440TAKEYE13*

How to Order:

To complete the Cat. No. substitute the * with the desired primary key code and substitute the ® with the desired secondary key code. The primary keys do not come with the bolt interlock, they must be ordered separately. The secondary keys do come with the bolt interlock.

For example: To order a bolt interlock, with one "Aa" coded primary key trapped and one "Ba" coded secondary key free to retract bolt (without ejector key), the part number would be 440TMDBLE14AABA a primary key would also need to be ordered 440TAKEYE10AA.

Preferred key codes:

AA	"Aa" code
BA	"Ba" code
CA	"Ca" code
DA	"Da" code
EA	"Ea" code
FA	"Fa" code
GA	"Ga" code
HA	"Ha" code

Preferred key codes are typically stocked in larger quantities, reducing lead times to receive your trapped key system.

You will need to allow time for your system to be assembled which takes approximately 3 days from receipt of order, providing the key codes are available.

When using key codes not in the preferred list, please check availability and lead times with NHP.

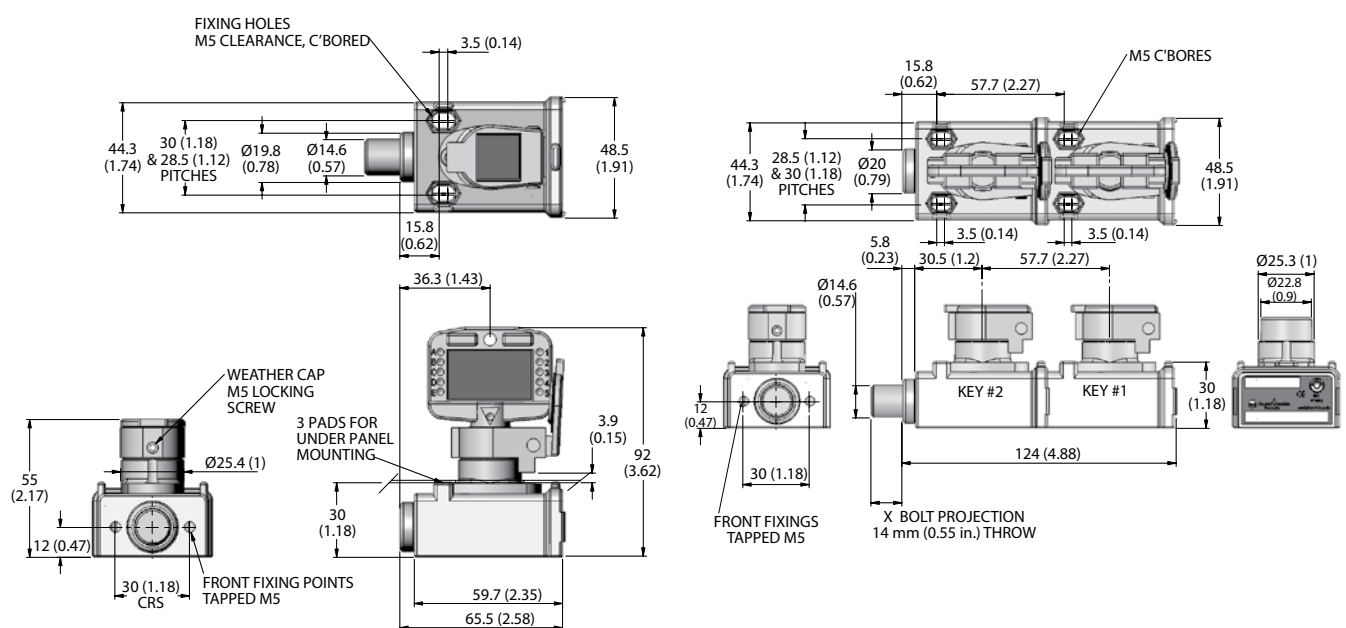
Prosafe Trapped Key Systems

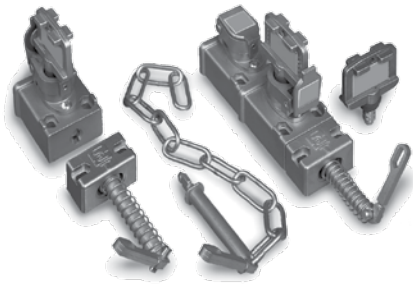
Bolt Interlocks *cont*

Technical Data:

Standards		EN292-1&2, EN1088, ISO12100-1&2, ISO14119, AS4024.1
Category		Category 1 per EN 954-1 (ISO 13849-1) Suitable for Category 2, 3, or 4 systems
Certifications		CE marked for all applicable directives and BG; C-Tick not required
	Operating temperature	-40°C... +80°C
	Mechanical life	100,000 operations
	Shear force to key	15.1 kN, max.
	Torque to key	14 N•m, max.
	Relative humidity	95%
	Weight (kg)	SBL: 0.60 DBL: 1.10
Material		316L stainless steel
	Mounting	SBL: 2 x M5 counterbored from top or 2 x M5 from underside with M5 nuts DBL: 4 x M5 counterbored from top or 4 x M5 from underside with M5 nuts
	Bolt diameter	15 mm

Dimensions & Wiring:





Prosafe Trapped Key Systems

Access / Chain Interlocks

Features:

- 316L stainless steel construction
- Single or dual key units
- Direct drive operation
- Fitted with tamper resistant screws
- Stainless steel dust cap as standard
- Replacable barrel code assembly

Ordering Details:

Cat. No.	Bolt retracted	Trapped key condition	Type
440TMSALE10*	Lever	Key trapped to release lever	Single key
440TMSCLE10*	Chain	Key trapped to release chain	Single key
440TMDALE10*®	Lever	Primary key trapped, secondary key free to release lever	Dual key
440TMDALJ10*®	Lever	Primary key trapped, secondary spring eject key	Dual key with eject key
440TMDALE11**	Lever	Both keys trapped to release lever	Dual key
440TMDCLE10*®	Chain	Primary key trapped, secondary key free to release lever	Dual key
440TMDCLJ10*®	Chain	Primary key trapped, secondary spring eject key	Dual key with eject key
440TMDCLE11**	Chain	Both keys trapped to release lever	Dual key

Accessories

Item	Cat. No.
Stainless steel key	440TAKEYE10*
Stainless steel replacement code barrel for products other than 100A RPS/RKS unit	440TASCBE14*
Stainless steel weatherproof replacement dust cap	440TASFC10*
Replacement spare block catch	440TACAD10
Replacement spare block catch	440TACHA10
Stainless steel ejector key	440TAKEYE13*

How to Order:

To complete the Cat. No. substitute the * with the desired primary key code and substitute the ® with the desired secondary key code.

The primary keys do not come with the access/chain interlock, they must be ordered separately. The secondary keys do come with the access/chain interlock.

For example: To order an access interlock, with one "Aa" coded primary key trapped and one "Ba" coded secondary key free to retract bolt (without ejector key), the part number would be 440TMDALE10AABA a primary key would also need to be ordered 440TAKEYE10AA.

Preferred key codes:

AA	"Aa" code
BA	"Ba" code
CA	"Ca" code
DA	"Da" code
EA	"Ea" code
FA	"Fa" code
GA	"Ga" code
HA	"Ha" code

Preferred key codes are typically stocked in larger quantities, reducing lead times to receive your trapped key system.

You will need to allow time for your system to be assembled which takes approximately 3 days from receipt of order, providing the key codes are available.

When using key codes not in the preferred list, please check availability and lead times with NHP.

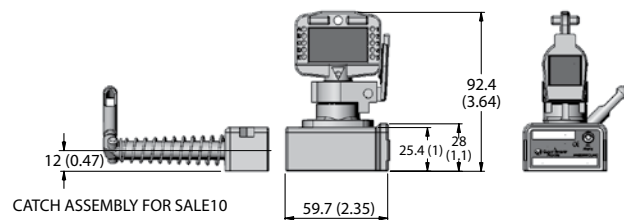
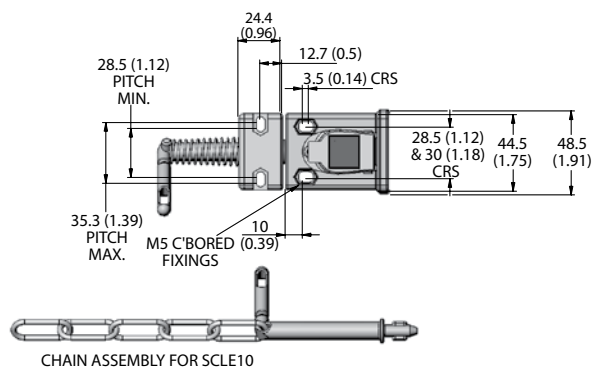
Prosafe Trapped Key Systems

Access / Chain Interlocks *cont*

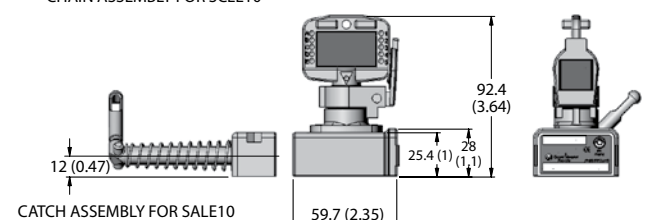
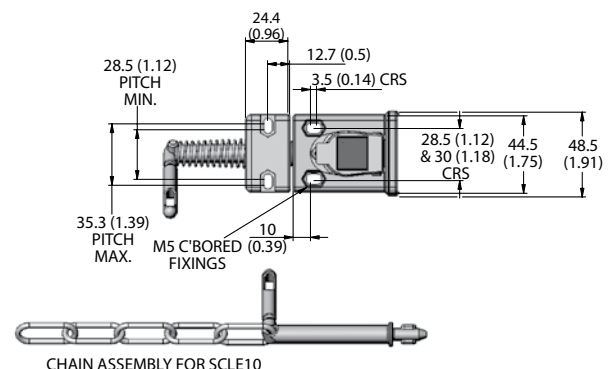
Technical Data:

Standards		EN292-1&2, EN1088, ISO12100-1&2, ISO14119, AS4024.1
Category		Category 1 per EN 954-1 (ISO 13849-1)
Certifications		CE marked for all applicable directives and BG; C-Tick not required
	Misalignment tolerance	±10 mm
	Shear force to key	15.1 kN max.
	Torque to key	14 N•m max.
	Operating temperature	-40°C ...-80°C
	Relative humidity	95%
Material		316L stainless steel
	Mounting	SAL and SCL: 2 or 4 x M5 counterbored from top or 2 or 4 x M5 from underside with nuts DAL and DCL: 4 or 6 x M5 counterbored from top or 4 or 6 x M5 from underside with nuts
	Weight	SAL and SCL: 0.8 kg DAL and DCL: 1.35 kg (3)
	Mechanical life	100,000 operations

Dimensions & Wiring:



MSALE10

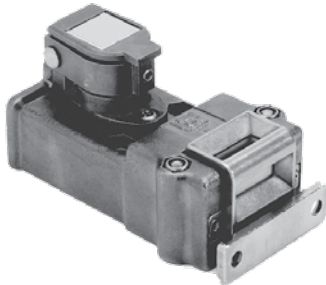


MDALE10 and MDCLE10



Prosafe Trapped Key Systems

Slamlock Mechanical



Features:

- 316L stainless steel construction
- Selection of actuator types available
- Single or dual key versions available
- Direct drive operation
- Replaceable code barrel assembly
- Fitted with tamper resistant screws
- Weatherproof stainless steel dust cap as standard
- Conforms to EN 292, EN 1088, GS ET 19

Ordering Details:

Cat. No.	Actuator type	Trapped key condition	Type
440TMSLE10*	Standard	Key trapped to release actuator	Single key
440TMSLE10*®	Standard	Primary key trapped secondary key free to release actuator	Dual key
440TMSLE20**	Standard	Both keys trapped to release actuator	Dual key
440TMSLJ10*®	Standard	Primary key trapped, secondary key free to release actuator	Dual with secondary ejector key

Accessories

Item	Cat. No.
Stainless steel key	440TAKEYE10*
Stainless steel replacement code barrel for products other than 100A RPS/RKS unit	440TASCB14*
Stainless steel weatherproof replacement dust cap	440TASFC10*
GD2 standard actuator	440GA27011
GD2 flat actuator	440KA11112
Fully flexible actuator	440GA27143
Stainless steel ejector key	440TAKEYE13*

How to Order:

To complete the Cat. No. substitute the * with the desired primary key code and substitute the ® with the desired secondary key code.

The primary keys do not come with the slamlock, they must be ordered separately. The secondary keys do come with the slamlock.

For example: To order a slamlock, with one "Aa" coded primary key trapped and one "Ba" coded secondary key free to retract bolt (without ejector key), the part number would be 440TMSLE10AABA a primary key would also need to be ordered. 440TAKEYE10AA.

Preferred key codes:

AA	"Aa" code
BA	"Ba" code
CA	"Ca" code
DA	"Da" code
EA	"Ea" code
FA	"Fa" code
GA	"Ga" code
HA	"Ha" code

Preferred key codes are typically stocked in larger quantities, reducing lead times to receive your trapped key system.

You will need to allow time for your system to be assembled which takes approximately 3 days from receipt of order, providing the key codes are available.

When using key codes not in the preferred list, please check availability and lead times with NHP.



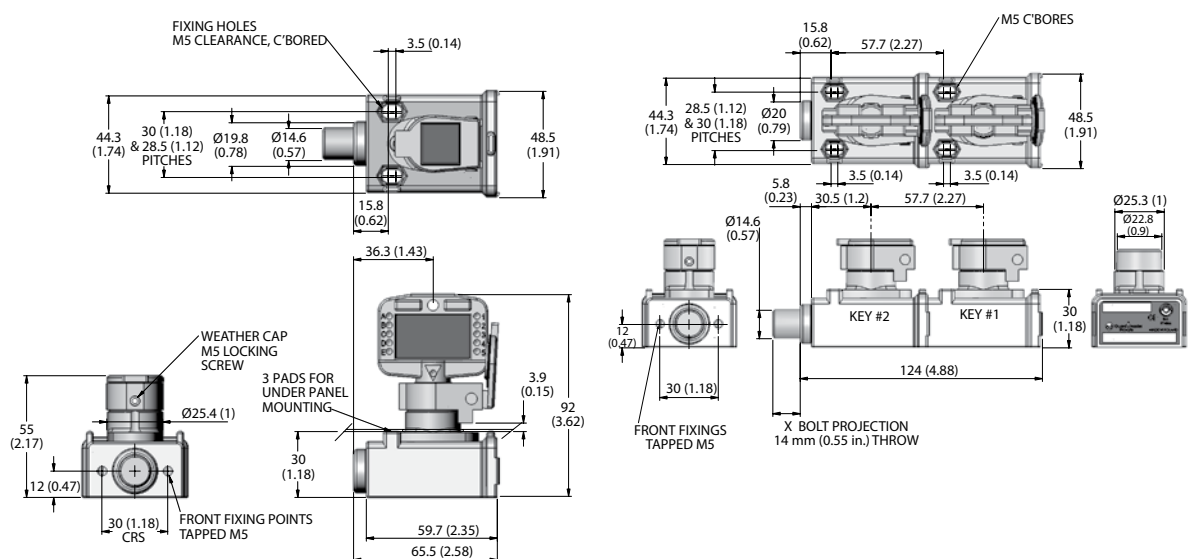
Prosafe Trapped Key Systems

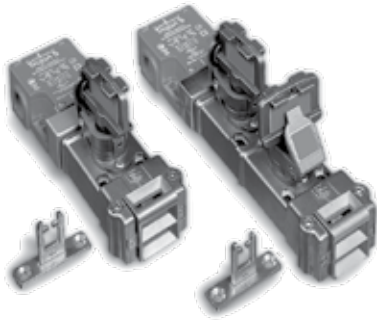
Slamlock Mechanical *cont*

Technical Data:

Standards		EN292-1&2, EN1088, IEC/EN60947-5-1, GS-ET-19, ISO12100-1&2, ISO14119, AS4024.1
Category		Category 1 per EN 954-1 (ISO 13849-1) Suitable for Category 2, 3, or 4 systems
Certifications		CE marked for all applicable directives and BG; C-Tick not required
	Operating temperature	-40°C... +80°C
	Mechanical life	In excess of 100,000 operations under normal working conditions
	Shear force to key	15.1 kN max.
	Torque to key	14 N•m max.
	Relative humidity	95%
	Single key	0.76
	Dual key	1.33
	Code barrel life	Tested to 100,000 operations
	Ambient temperature	-10°C... +50°C
Material		316L stainless steel
	Mounting	SSL: 2 x M5 counterbored from top or 2 x M5 from underside with nuts DSS: 4 x M5 counterbored from top or 4 x M5 from underside with nuts
	Holding force	Max. 2000 N (450 lbs)

Dimensions & Wiring:





Prosafe Trapped Key Systems

Slamlock Electrical

Features:

- Electrical safety contacts combined with trapped key/enforced sequence feature
- Selection of actuator types available
- Single or dual key versions available
- Direct drive operation
- Replaceable code barrel assembly
- Weatherproof stainless steel dust cap as standard

Ordering Details:

Cat. No.	Type	Actuator type	Trapped key condition	Contact
440TMSSE10*	Single key	Standard	Key trapped to release actuator	2 N/C + 1 N/O Break before make
440TMDSE10*®	Dual key	Standard	Primary key trapped, secondary key free to release actuator	2 N/C + 1 N/O break before make
440TMDSSJ10*®	Dual key	Standard	Primary key trapped, secondary key eject to release actuator	2 N/C + 1 N/O break before make

Accessories

Item	Cat. No.
Standard actuator	440GA27011
GD23 Flat actuator	440KA1112
Fully flexible actuator	440GA27143
Stainless steel key	440TAKEYE10*
Stainless steel replacement code barrel for products other than 100 A RPS/RKS unit	440TASCBE14*
Stainless steel weatherproof replacement dust cap	440TASFC10*

How to Order:

To complete the Cat. No. substitute the * with the desired primary key code and substitute the ® with the desired secondary key code. The primary keys do not come with the slamlock, they must be ordered separately. The secondary keys do come with the slamlock.

For example: To order a slamlock, with one "Aa" coded primary key trapped and one "Ba" coded secondary key free to retract bolt (without ejector key), the part number would be 440TMDSE10AABA a primary key would also need to be ordered 440TAKEYE10AA.

Preferred key codes:

AA	"Aa" code
BA	"Ba" code
CA	"Ca" code
DA	"Da" code
EA	"Ea" code
FA	"Fa" code
GA	"Ga" code
HA	"Ha" code

Preferred key codes are typically stocked in larger quantities, reducing lead times to receive your trapped key system.

You will need to allow time for your system to be assembled which takes approximately 3 days from receipt of order, providing the key codes are available.

When using key codes not in the preferred list, please check availability and lead times with NHP.



Prosafe Trapped Key Systems

Slamlock Electrical cont

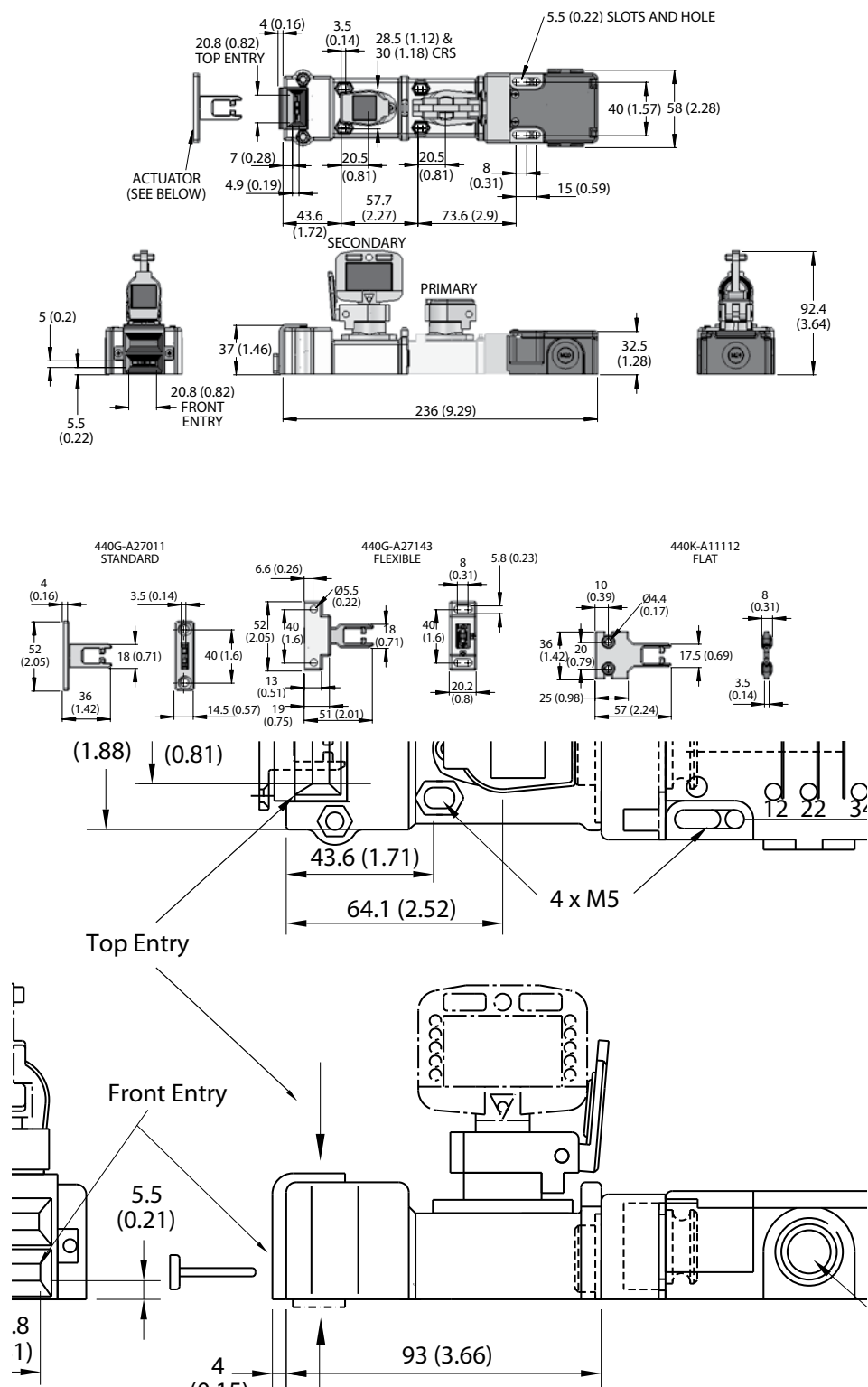
Technical Data:

Standards		EN292-1&2, EN1088, IEC/EN60947- 5-1, GS-ET-19, ISO12100-1&2, ISO14119, AS4024.1
Category		Category 1 per EN 954-1 (ISO 13849-1) Suitable for category 2, 3, or 4 systems
Certifications		CE marked for all applicable directives and BG; C-Tick not required
	Safety contacts	2 N/C positive break
	Switching current	@ Voltage, max. 500 V/500 V A
	Thermal current	10 A
	Current	5 V, 5 mA, DC
	Safety contact gap	>2 x 2 mm (0.07 in)
	Rated insulation voltage	500 V
	Rated impulse withstand voltage	(Uimp) 2500 V
	Auxiliary contacts	1 N/O
	Pollution degree	3
	Actuator travel for positive opening	5 mm (0.19 in)
	Operating radius	175 mm (60 mm with flexible actuator)
	Break contact force	12 N
	Actuation speed	1 m/s
	Actuation frequency	2 cycle/s
Material	Case material	UL approved glass-filled polyester & 316L stainless steel
	Actuator Material	Stainless steel
	Enclosure type rating	IP 67
	Conduit entry	3 x M20
	Operating temperature	-20°C +60°C
	Relative humidity	95%
	Mounting	SSS: 4 x M5 counterbored from top or 4 x M5 from underside with nuts DSS: 6 x M5 counterbored from top or 6 x M5 from underside with nuts
	Mechanical life	100,000 operations
	Electrical life	1,000,000 operations
	Weight	SSE: 1160 g, DSE: 1700 g
	Colour	Red / stainless
	Actuator holding force	Max. 2000 N
	Releasable load	Max. 100 N
	Shear force to key	15.1 kN max.
	Torque to key	14 N•m max.

Prosafe Trapped Key Systems

Slamlock Electrical *cont*

Dimensions & Wiring:





Prosafe Trapped Key Systems

Switchgear Adaptors

Features:

- Virtually maintenance free.



Ordering Details:

Cat. No.	Trap direction	Mounting
440TMSGAU10*	65° CW to trap	2 x M4
440TMSGAU11*	65° CCW to trap	2 x M4
440TMSGAU12*	90° CW to trap	2 x M4
440TMSGAU13*	90° CCW to trap	2 x M4
440TMSGAU14*	±90° CW to trap	2 x M4
440TMSGAU17*	45° CW to trap	2 x M4
440TMSGAU18*	45° CCW to trap	2 x M4

Accessories

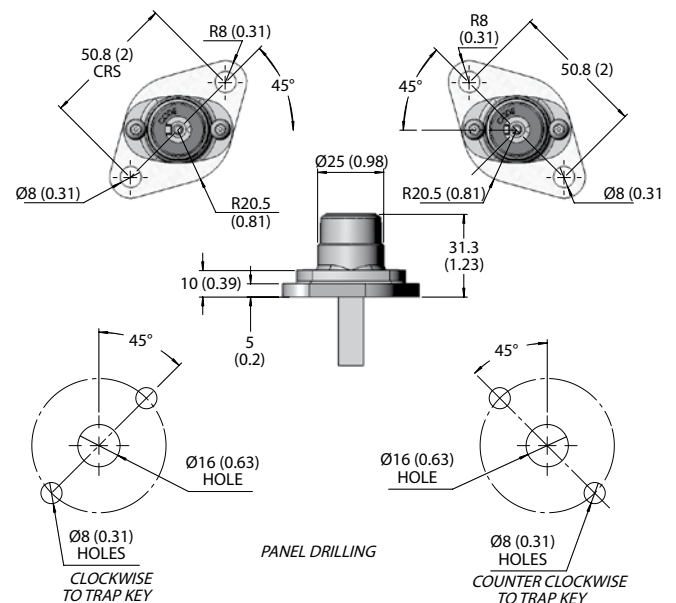
Item	Contacts
Stainless steel key	440TAKEYE10*
Stainless steel weatherproof dust cap for switchgear adaptor	440TASFC11*

* Substitute the desired primary code for this symbol.
Key is not included with adaptor, must be ordered separately.

Technical Data:

Standards		EN292-1&2, EN1088, ISO12100-1&2, ISO14119, AS4024.1
Category		Category 1 per EN 954-1
Certifications		CE marked for all applicable directives and BG
	Operating temperature	-10°C ... +50°C
	Mechanical life	>100,000 operations
	Shear force to key	15.1 kN max.
	Torque to key	14 N·m max.
	Relative humidity	95%
Physical characteristics	Weight	0.30 kg
	Material	316L stainless steel
	Mounting	2 x M4
	Shaft dimensions	3/8 sq in x 7/8 in long (standard) 9/16 in dia. x 7/8 in long (optional: contact NHP)

Dimensions & Wiring:



NHP SAFETY REFERENCE GUIDE



PRODUCTS

Pullwire Switches
and Safety Operators



Cable Pull Switches Lifeline 3 Series

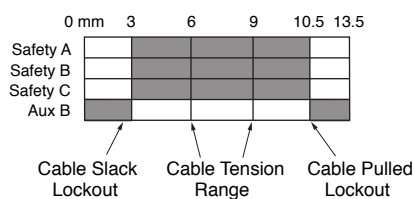
Features:

- Cable span up to 30 m
- Universal mounting and operation
- Switch lockout on cable pulled and cable slack
- Cable-status indicator on switch lid
- Industry standard fixing centre centres to DIN/EN 50041
- Quick disconnect styles available

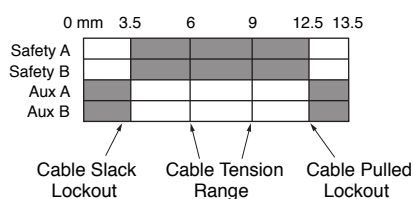
Ordering Details:

Cat. No.	Contacts	
M20 conduit	Safety	Auxiliary
440ED13118	2 N/C	2 N/O
440ED13112	3 N/C	1 N/O

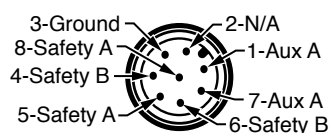
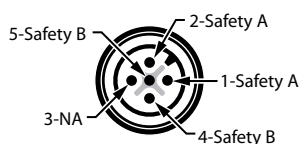
3 N/C & 1 N/O



3 N/C & 2 N/O



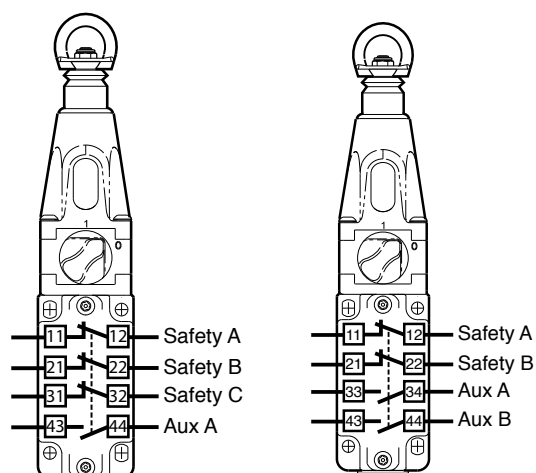
□ Open ■ Closed



Accessories

	Item	Contacts
	440EA13078	Lifeline tensioner spring (50 N force)
	440AA17101	Lifeline inside corner pulley (Zinc-plated mild steel)
	440AA17102	Lifeline outside corner pulley (Zinc-plated mild steel)
	440AA07265	Blanking plug, M20 conduit
	440EA17003	Lifeline P. bolt

Dimensions & Wiring:





Cable Pull Switches

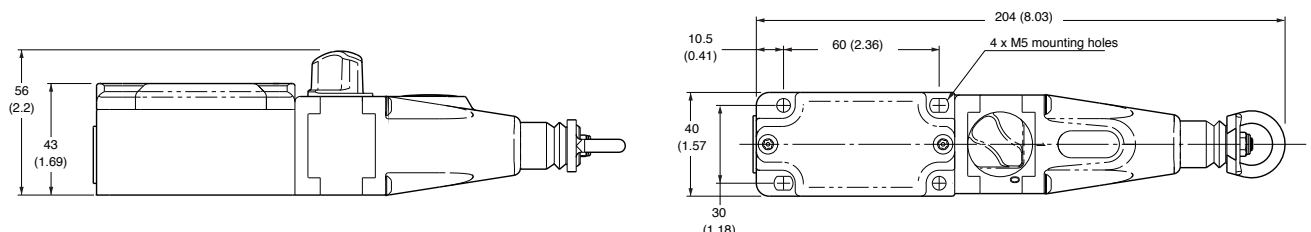
Lifeline 3 Series *cont*

Technical Data:

Safety ratings	Standards	EN 418, ISO 13850, EN ISO 12100, IEC 60947-5-1, IEC 60947-5-5
	Safety classification	Category 1 device per EN 954-1 May be suitable for use in category 3 or 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
	PFHD*	< 3 x 10 ⁻⁷
Certifications	MTTFd*	> 385 years May be suitable for use in performance levels Pl _e or Pl _d systems (according to ISO 13849-1:2006) and for use in SIL 2 or SIL 3 systems (according to IEC 62061) depending on the architecture and application characteristics.
		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	10 A
	Rated insulation voltage	500 V
	Switching current @ voltage	5 mA @ 5 V DC
Operating characteristics	Cable span between switches	Max. 30 m
	Tensioning force to run position	103 N typical
	Tensioning force to lockout	188 N typical
	Operating force	Min. <125 N at 300 mm deflection
	Actuation frequency	Max. 1 cycle per sec
	Operating life	@ 100 mA load 1 x 10 ⁶
Environmental	Enclosure type rating	IP 67
	Operating temperature	-25°C ... +80°C
Physical characteristics	Housing material	Heavy duty painted zinc-based die-cast alloy
		Indicator material glass filled nylon
		Eye nut material stainless steel
	Weight	610 g
	Colour	Yellow body, blue reset button

* Data based on a usage rate of 1 op / 10 mins, 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a mission time / proof test interval of 38 years.

Dimensions & Wiring:





Cable Pull Switches Lifeline 4 Series

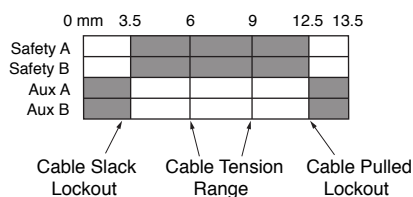
Features:

- Switches up to 125 m span
- Universal mounting and operation
- Lid mounted emergency stop button, designed to conform to EN418
- Switch lockout on cable pulled and cable slack
- Cable status indicator on switch lid

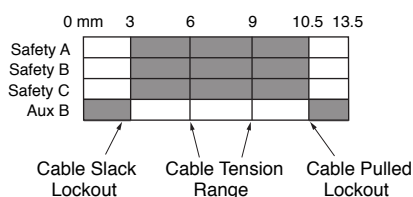
Ordering Details:

Cat. No.	Contacts		
M20 conduit	Cable span	Safety	Auxiliary
440EL13137	75 m	2 N/C	2 N/O
440EL13042	75 m	3 N/C	1 N/O
440EL13153	75 m - 125 m	2 N/C	2 N/O

2 N/C & 2 N/O

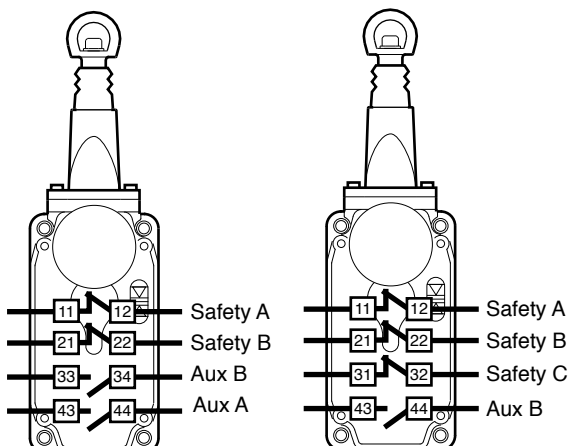


3 N/C & 1 N/O



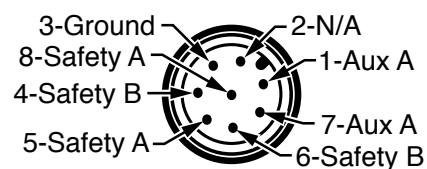
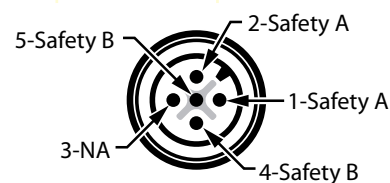
□ Open ■ Closed

Dimensions & Wiring:



Accessories

	Item	Contacts
	440EA13078	Lifeline tensioner spring (50 N force)
	440AA17101	Lifeline inside corner pulley (zinc-plated mild steel)
	440AA17102	Lifeline outside corner pulley (zinc-plated mild steel)
	440AA07265	Blanking plug, M20 conduit
	440EA13054	Replacement cover for lifeline 4 cable/push button
	440EA17115	Replacement cover for lifeline 4 cable/push button, no E-stop
	440EA17003	Lifeline P. bolt





Cable Pull Switches

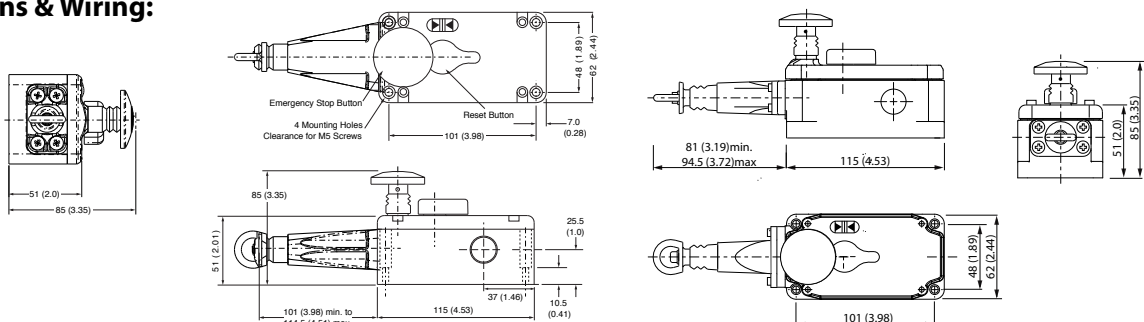
Lifeline 4 Series *cont*

Technical Data:

Safety ratings	Standards	EN 418, ISO 13850, EN ISO 12100, IEC 60947-5-1, IEC 60947-5-5
	Safety classification	Category 1 device per EN 954-1. May be suitable for use in category 3 or 4 systems depending on the architecture and application characteristics.
Functional safety data	B10d	$> 2 \times 10^6$ operations at min load
	PFHD*	$< 3 \times 10^{-7}$
	MTTFd*	> 385 years May be suitable for use in performance levels Pl _e or Pl _d systems (according to ISO 13849-1:2006) and for use in SIL 2 or SIL 3 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	10 A
	Rated insulation voltage	500 V
	Switching current @ voltage	5 mA @ 5 V DC
Operating characteristics	Cable span between switches	Max. 75 m standard model and 75...125 m extended length model
	Tensioning force to run position	103 N typical
	Tensioning force to lockout	188 N typical
	Operating force	Min. < 125 N at 300 mm deflection
	Actuation frequency	Max. 1 cycle per sec
	Operating life	@ 100 mA load 1×10^6
Environmental	Enclosure type rating	IP 66
	Operating temperature	-25°C ...+80°C
Physical characteristics	Housing material	Heavy duty painted zinc-based die-cast alloy (LM24)
	Indicator material	Glass filled nylon
	Eye nut material	Stainless steel
	Weight	630 g

* Data based on a usage rate of 1 op / 10 mins, 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a mission time / proof test interval of 38 years.

Dimensions & Wiring:





Cable Pull Switches

Lifeline 4 Stainless steel Series

Features:

- Switches up to 75 m 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
- Made from stainless steel 316

Ordering Details:

Cat. No.	Contacts		
M20 conduit	Cable span	Safety	Auxiliary
440EL22BNSM	Up to 75 m	2 N/C	2 N/O
Installation kits		Eye bolts	Cat. No.
Stainless steel insulation kit - 20 m		8	440EA13197
Stainless steel insulation kit - 75 m		30	440EA13200

Accessories

	Item	Contacts
	440EA13201	Stainless steel 302 eye bolt
	440EA13202	Stainless steel tensioner spring
	440EA13203	Replacement cover
	440EA13204	Replacement cover no E-Stop
	440EA13205	Stainless steel 316 inside cover pulley
	440EA13206	Stainless steel 316 outside cover pulley



Cable Pull Switches

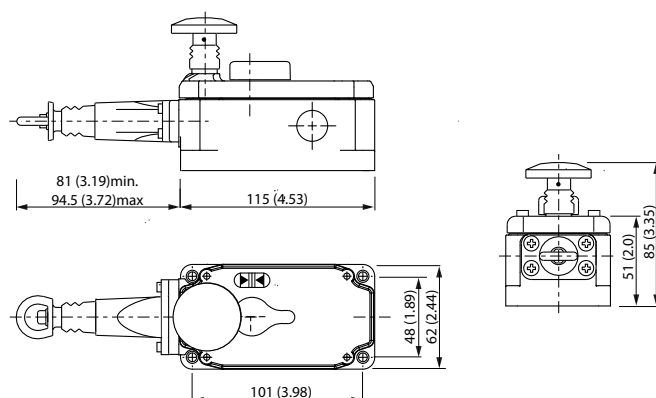
Lifeline 4 Stainless steel Series *cont*

Technical Data:

Safety ratings	Standards	EN 60947-5-5, ISO 13850, EN ISO 12100, IEC 60947-5-1, EN 418
	Safety classification	Category 1 device per EN 954-1. May be suitable for use in category 3 or 4 systems depending on the architecture and application characteristics
Functional safety data	B10d	> 2 x 10 ⁶ operations at min. load
	PFHD*	< 3 x 10 ⁻⁷
	MTTFd*	> 385 years May be suitable for use in performance levels Pl _e or Pl _d systems (according to ISO 13849-1:2006) and for use in SIL 2 or SIL 3 systems (according to IEC 62061) depending on the architecture and application characteristics.
Certifications		CE marked for all applicable directives, cULus certified and TÜV
Outputs	Safety contacts	2 N/C direct opening action
	Auxiliary contacts	2 N/O
	Thermal current	10 A
	Rated insulation voltage (U _i)	500 V
	Switching current @ voltage	5 mA @ 5 V DC
Operating characteristics	Cable span between switches	Max. 75 m
	Tensioning force to run position	103 N typical
	Tensioning force to lockout	188 N typical
	Operating force	Min. <125 N (300 mm deflection)
	Actuation frequency	Max. 1 cycle per sec
	Operating life	@ 100 mA load 1 x 10 ⁶
Environmental	Enclosure type rating	IP 66, IP 67, IP 69K
	Operating temperature	-25...80°C
Physical characteristics	Housing material	Stainless steel 316
	Indicator material	Acetal
	Eye nut material	Stainless steel
	Weight	1442 g

* Data based on a usage rate pf 1 op / 10 mins, 24 hrs / day, / 360 days / year, representing 51840 operations per year.
Also a mision time / proof test interval of 38 years.

Dimensions & Wiring:





Emergency Stop Trip Wire Switches

NTW Series: Standard Range

Features:

- IP 65/IP 67 padlockable trip-wire switches
- Single-sided or double-sided operation
- Supplied with silver wiping action contact blocks (gold available on request)

Ordering Details:

Cat. No.			Description
Trip Wire Switch double-sided**	Trip Wire Switch single-sided left**	Trip Wire Switch single-sided right**	
55.4.00NBB	55.4.00LHNBB*	55.4.00RHNBB^	Standard switch with 2 N/O + 2 N/C contact blocks
55.4.00GWNBB	55.4.00LHGWNBB*	55.4.00RHGWNBB^	Standard switch with glass window and 2 N/O + 2 N/C contact block
55.4.01NBB	55.4.01LHNBB*^	55.4.01RHNBB*^	Standard switch with pilot light and 2 N/O + 2 N/C contact block
55.4.01STRANBB	–	–	Standard switch with amber strobe indication and 2 N/O + 2 N/C contact block

* Available on indent only.

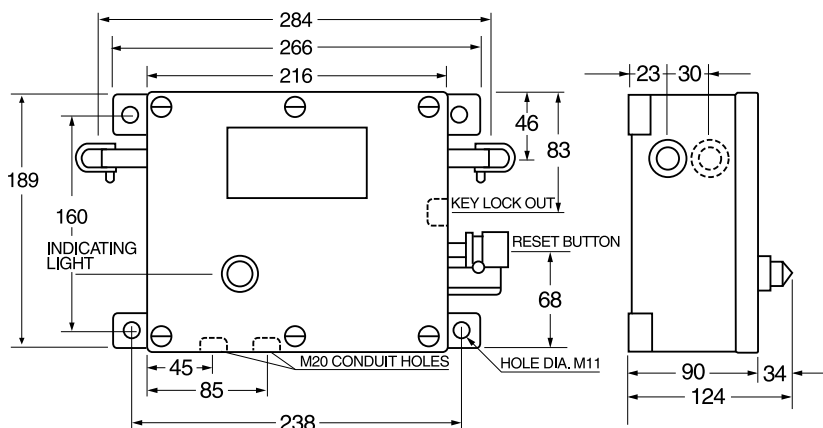
^ These items assembled to order.

** Installation information, lanyard rope and accessories, refer pages 6 - 15 to 6 - 18.

Also available with gold plated contacts at extra cost – insert 'G' at the end of Cat. No. Contact NHP for additional price.

Supplied with red and amber lenses, lamp must be ordered separately.

Dimensions & Wiring:



Emergency Stop Trip Wire Switches

NTW Series: Explosion Proof (EP)

Features:

- Special trip-wire switch for hazardous environments such as grain handling.
- Supplied with 2 N/O + 2 N/C contact blocks. Complies with AS/NZS 61241.



Ordering Details:

Cat. No.			Description
Standard Switch*	Switch with glass window*	Switch with lid mounted *	
EX55400NBB	EX55400GWNBB	EX55401NBB	Standard switch with 2 N/O + 2 N/C contact blocks

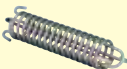
** Installation information, lanyard rope and accessories, refer pages 6 - 15 to 6 - 18.
Also available with gold plated contacts at extra cost – insert 'G' at the end of Cat. No. Contact NHP for additional price. Assembled to order.

Emergency Stop Trip Wire Switches

NTW Series: Standard Range

Accessories:

Lanyard Accessories

	Item	Standard Cat. No.	316 Grade Stainless Steel Cat. No.
	'D' Shackle	–	55.2.19NTW
	Tension spring suits NTW 55.4 only ¹⁾	55.2.46	55.2.46SS
	Lanyard support bracket	55.1.50	55.1.50SS
	5 mm thimble/sleeve	55.1.51	55.1.51SS
	5 mm clamp/shackle	55.1.52	55.1.52SS
	Turnbuckle hook and eye 10 mm x 145 mm ⁴⁾	55.1.64	55.1.64SS

Spare contact blocks/Lamp block

Item	Standard Silver Contact Cat. No.	Gold Contact Cat. No.
1 N/O + 1 N/C contacts	NBAFP	NBAG
2 N/O + 2 N/C contacts	NBBFP	NBBG
3 N/O + 3 N/C low voltage micro contact set and bracket	–	554LVKIT*
Lamp block for 55.4.01 (suit SES lamp)	VFBC	

Spare lamps SES style for trip-wire pilot light ^{5) 6)}

Item	Voltage SES	Cat. No.
Full voltage pilot light	12 V 4 W	NO2243
Full voltage pilot light	24 V 4 W	NO2242
Resistor and full voltage pilot light	110 V 4 W	NO2551
Resistor and full voltage pilot light	260 V 4 W	NO2556



2551
SES 110V lamp

Spare Parts

Item	Cat. No.
Lid gasket	55.2.17
Shaft bellows ³⁾	55.2.37
Spare Lid for 55.4.00 ²⁾	55.2.16
Spare Lid for 55.4.00GW ²⁾	55.2.16GW
Spare Lid for 55.4.01 ²⁾	55.2.16PL

¹⁾ 55.2.46 tension spring is only suitable for NTW 55.4 trip-wire switches.

²⁾ Supplied complete with gasket 55.2.17.

³⁾ Use with clip 55.2.40.

⁴⁾ Eye/Eye turnbuckle available contact NHP.

⁵⁾ Other voltages available contact NHP.

⁶⁾ Stock brought in to order on some voltages.

* These items assembled to order.



Enabling Switches GripSwitch Series

Features:

- Dual three position enabling switches
- Lightweight and ergonomic
- Optional jog and E-stop functions



Ordering Details:

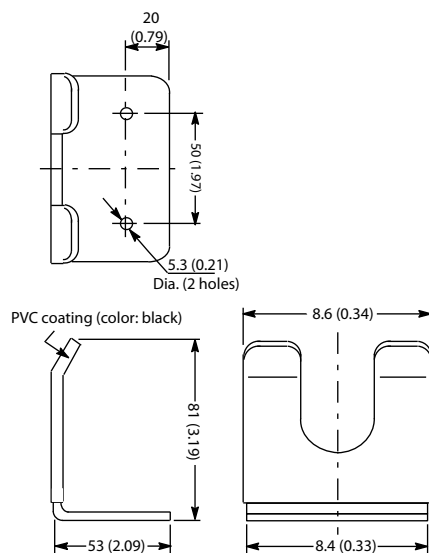
Cat. No.	Description
M20 conduit with cable strain relief	
440JN21TNPMNP	Switch with jog button
440JN2NTNPMNE	Switch with emergency stop button

Accessories

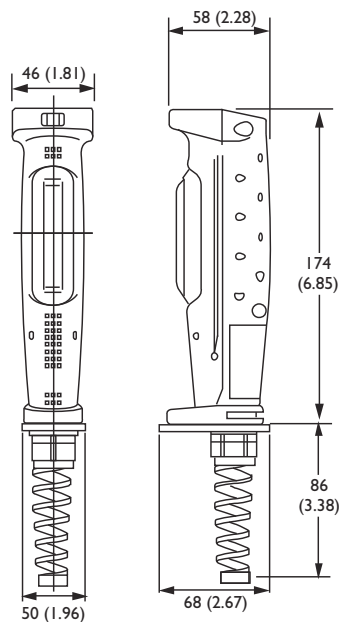
Item	Contacts
Mounting bracket for single enabling switch	440JA00N

Dimensions & Wiring:

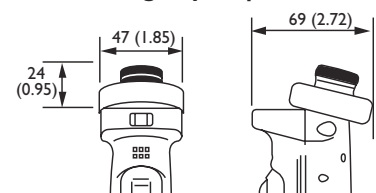
440J-A00N enabling switch mounting bracket



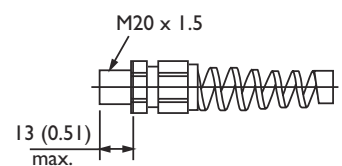
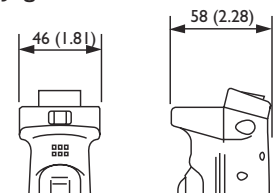
Standard Switch



Emergency Stop Button



Jog Button





Enabling Switches

GripSwitch Series cont

Technical Data:

Safety Ratings	Standards	IEC/EN60947-5-8, IEC/EN 60947-5-1, IEC/EN 60204-1, NFPA 79, ANSI B11.19, ANSIR15.06, ISO 10218, ISO 11161
	Safety classification	Category 1 Device per EN954-1; dual channel suitable for category 3 or 4 systems
Certifications		CE marked for all applicable directives, cULus, BG
Outputs	Safety contacts	2 N/C direct opening action
	Auxiliary contacts	1 N/C
	Jog contact	1 N/O
	E-stop	2 N/C direct opening action
	Thermal current	3 A
	Rated insulation voltage	250 V (jog button 125V)
	Switchingcurrent	5 mA @ 3V AC/DC
Operating characteristics	Operating force	Position 2: 15 N approx.
	Position 3	50 N max.
	Direct opening force	90 N
	Actuation frequency	Max. 1200 operations per hour
Environmental	Enclosure type rating	IP 66 standard switch (NEMA 6) IP 65 jog button and E-stop switches
	Relative humidity	45...85%
	Operating temperature	-10°C...+60°C
	Vibration	5...55 Hz, 0.5 mm
	Shock	10 g
Physical characteristics	Wire size	0.14...1.5 mm ²
	Cable size	7...13 mm
	Terminal screw torque	0.5...0.6 N•m
	Conduit type	M20
	Material polyamide (nylon)	PA66
	Boot material	NBR/PVC nitrile blended with PVC
	Weight	250 g with E-stop 210 standard and jog
	Colour	Black / grey

Push Buttons

800F 22.5 mm Series

Features:

- Dual three position enabling switches
- Lightweight and ergonomic
- Optional jog and E-stop functions



Ordering Details:

2 position push-pull operators, non-illuminated - twist-to-release (trigger action), push-pull (trigger action)

Twist-to-release (trigger action)		Push-pull (trigger action)		Colour	Size (mm)
Cat. No. (plastic)	Cat. No. (metal)	Cat. No. (plastic)	Cat. No. (metal)		
800FPMT34	800FMMT34	-	-	Red	30
800FPMT44	800FMMT44	800FPMP44	800FMMP44	Red	40
800FPMT64	800FMMT64	-	-	Red	60

Package qty: 1

2 position push-pull operators, illuminated - twist-to-release (trigger action), push-pull (trigger action)

Twist-to-release (trigger action)		Push-pull (trigger action)		Colour	Size (mm)
Cat. No. (plastic)	Cat. No. (metal)	Cat. No. (plastic)	Cat. No. (metal)		
-	-	800FPLMP34	800FMLMP34	Red	30
800FPLMT44	800FMLMT44	800FPLMP44	800FMLMP44	Red	40
800FPLMT64	800FMLMT64	800FPLMP64	800FMLMP64	Red	60

Package qty: 1

2 position non-illuminated operators - mushroom, key release (trigger action)

Ronis key lock (trigger action)

Cat. No. (plastic)	Cat. No. (metal)	Colour	Size (mm)
800FPMK44	800FMMK44	Red	40

Package qty: 1

Back-of-panel components

Compact blocks with latch - composite

Cat. No.	Contacts	Terminals	Material
800FPQ01S	1 N/C + 1 N/C self monitoring	Screw clamp	Plastic
800FMQ01S	1 N/C + 1 N/C Self monitoring	Screw clamp	Metal



60 mm Non-Illuminated Twist-to-Release
Cat. No. 800FP-MT64



40 mm Non-Illuminated Push-Pull
Cat. No. 800FP-MP44



40 mm Illuminated Twist-to-Release
Cat. No. 800FP-LMT44



40 mm Mushroom Push/Pull
Cat. No. 800FM-LMP44



40 mm Non-Illuminated Key Release
Cat. No. 800FP-MK44

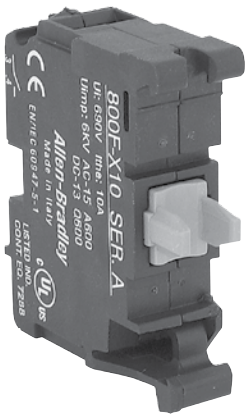


40 mm Key Release Mushroom
Cat. No. 800FP-MK44



Push Buttons

800F 22.5 mm Series *cont*



Ordering Details:

Assembled Stations

Cat. No.	Enclosure material	Operator type	Illumination voltage	Contact configuration
800F1YM3	Plastic (metric knockouts)	Twist-to-release 40 mm	Non-illuminated	2 N/C

Accessories

Emergency stop legend plates	Size	Text
800F15YSE112	60 mm round (22.5 mm mounting hole)	Emergency stop



Push Buttons

800F 22.5 mm Series *cont*

Technical Data:

Specifications: front of panel (operators)

Mechanical ratings

Description		Plastic (Bulletin 800FP)	Metal (Bulletin 800FM)
Vibration (assembled to panel)		Tested at 10...2000 Hz, 1.52 mm displacement (peak-to-peak) max./10 G max. for 3 hr duration, no damage	
Shock		Tested at 1/2 cycle sine wave for 11 ms; no damage at 100 G	
Degree of protection [†]		IP 65/66 (Type 3/3R/4/4X/12/13)	IP 65/66 (Type 3/3R/4/12/13)
Mechanical durability per EN 60947-5-1 (Annex C)	10 000 000 cycles	Momentary push buttons, momentary mushroom	
	1 000 000 cycles	Multi-function, selector switch, key selector switch, selector jog, SensEject™ key selector switch	
	500 000 cycles	Non-illuminated push-pull E-stop	
	300 000 cycles	Twist-to-release E-stop, illuminated push-pull E-stop, alternate action push buttons	
	100 000 cycles	Potentiometer, toggle switch	
Operating forces (typical with one contact block)		Flush/extended = 5 N, E-stop = 36 N Mushroom = 9 N	
Operating torque (typical application with one contact block)		Selector switch = 0.25 N•m (2.2 lb•in)	
Mounting torque	Plastic	1.7 N•m (15 lb•in)	
	Metal	4.4 N•m (40 lb•in)	

Environmental

Temperature range (operating)	–25°C ...+70°C (–13°F ...+158°F)‡
Temperature range (short term storage)	–40°C...+85°C (–40°F ...+185°F)
Humidity	50...95% RH from 25°C ...+60°C (77°F ...+140°F)

Product certifications

Certifications	UR/UL, CSA, CCC, CE
Standards compliance — CE marked	NEMA ICS-5; UL 508, EN ISO 13850, EN 60947-1, EN 60947-5-1, EN 60947-5-5
Terminal identification	EN/IEC 60947-1
Shipping approvals	ABS
RoHS	√

Notes

[†] Momentary mushroom operators are IP 65. Plastic keyed operators are IP 66, Type 4/13; not Type 4X.

[‡] Operating temperatures below 0 °C (32 °F) are based on the absence of freezing moisture and liquids, UL Recognised to 55 °C (131 °F) - Incandescent module Max 40 °C (104 °F).



Push Buttons

800F 22.5 mm Series cont

Technical Data:

Back-of-panel components

Electrical ratings

Standard contact block ratings		A600, Q600, 600V AC, AC 15, DC 13 to IEC/EN 60947-5-1 and UL 508, 17V, 5 mA min.		
Low voltage contact block ratings ^T		5 V, 1 mA DC min. C300, R150, AC 15, DC 13 to EN 60947-5-1 and UL 508		
LED module ratings	Nominal voltage	Range	Current draw	Frequency
	24 V AC	10...29 V AC	31 mA	50/60 Hz
	24 V DC	10...30 V DC	24 mA	DC
	120 V AC	70...132 V AC	25 mA	50/60 Hz
	240 V AC	180...264 V AC	22 mA	50/60 Hz
Thermal current		10 A max. enclosed (40°C ambient) to UL508, EN 60947-5-1		
Insulation voltage (Ui)		Screw terminal = 690V, spring-clamp = 300 V		
Wire capacity (screw terminal)‡		#18...12 AWG (0.75...2.5 mm ²) Max. (2) #14 AWG or (1) #12 AWG		
Wire capacity (spring-clamp terminal)		#18...14 AWG (0.75...1.5 mm ²) One per spring clamp, two spring clamps per terminal		
Recommended tightening torque on screw terminals		0.7...0.9 N•m (6...8 lb•in)		
Dielectric strength (minimum)		2500 V for one minute		
External short circuit protection	Standard blocks	10 A type gL/gG cartridge fuse to EN 60269-2-1 or gN (Class J to UL 248-8 or Class C to UL 248-4)		
	Low voltage contact blocks	6 A type gL/gG cartridge fuse to EN 60269-2-1 or gN (Class J to UL 248-8 or Class C to UL 248-4)		
Electrical shock protection		Finger-safe conforming to IP2X		

Mechanical ratings

Vibration (assembled to panel)		Tested at 10...2000 Hz, 1.52 mm displacement (peak-to-peak) max./10 G max. 6 hr		
Shock		Tested at 1/2 cycle sine wave for 11 ms and no damage at 100 G max.		
Contact durability per EN 60947-5-1 (Annex C)		10 000 000 cycles		
Contact operation	N/O	Slow double make and break		
	N/C	Slow double make and break — positive opening 		
	N/O EM	Double break / double make, early make		
	N/C LB	Double break / double make, late break — positive opening 		
	N/C EB	Double break / double make, early break — positive opening 		
Push button travel to change electrical state	N/C and N/OEM	1.5 mm (0.060 in.)		
	N/O and N/CLB	2.5 mm (0.1 in.)		
Operating forces (typical)	Single circuit contact block	3.4 N		
	Dual circuit contact block	5... 6.5 N		



Push Buttons

800F 22.5 mm Series *cont*

Technical Data:

Illumination

LED dominant wavelength	Green	525 nm
	Red	629 nm
	Yellow	590 nm
	Blue	470 nm
	White	—
LED luminous intensity	Green	780 mcd
	Red	780 mcd
	Yellow	600 mcd
	Blue	168 mcd
	White	360 mcd
Incandescent maximum wattage	2.6 W	

Materials

Springs	Stainless steel and zinc coated music wire	
Electrical contacts	Standard	Silver-nickel
	Low voltage	Gold-plated over silver
Terminals	Screw	Brass
	Spring-clamp	Silver-plated brass

[†] Low voltage contacts are recommended for applications below 17V, 5 mA.

[‡] Wires less than #18 AWG (0.75 mm²) may not hold in terminal securely.



Push Buttons

800F 22.5 mm Series cont

Technical Data:

Material Listing

Component	For use with	Material used
Panel gasket	All operators	Nitrile, TPE
Diaphragm seal	Illuminated push button, non-illuminated push button	Automotive industry acceptable silicone
K-seal	Selector switch, key selector switch, push/twist-to-release E-stop, key E-stop, push/pull mushroom	Nitrile
Diaphragm retainer, return spring I	Illuminated push button, non-illuminated push button, momentary mushroom	Stainless steel
Return spring II	Reset, selector switch, key selector switch, alternate action, push/twist-to-release E-stop, key E-stop, push/pull mushroom	Zinc-coated music wire
Button cap/mushroom head	Non-illuminated push button, momentary mushroom, reset, push/twist-to-release E-stop, key E-stop, push/pull mushroom, multi-function	PBT/polycarbonate blend
2-Colour molded button cap	Non-illuminated push button	PBT/polycarbonate blend
Lens	Multi-function	Acetal
Lens, knob	Illuminated push button, illuminated momentary mushroom, illuminated selector switch	Polyamide
Knob	Non-illuminated selector switch	Glass-filled polyamide
Plastic bezel/bushing I	Non-illuminated push button, illuminated push button, momentary mushroom, selector switch, key selector switch, push/twist-to-release E-stop, key E-stop, push/pull mushroom, multi-function, reset	Glass-filled polyamide
Plastic bezel/bushing II, jam nut	Pilot light, reset jam nut, reset pushers	Glass-filled PBT
Metal bezel/bushing	All metal operators	Zinc
Diffuser	Illuminated push button, pilot light	Polycarbonate
Legend frames	—	Glass-filled polyamide
Plastic mounting ring	All plastic operators	Glass-filled polyamide
Metal mounting ring	All metal operators	Chromated zinc
Plastic latch	—	Glass-filled polyamide
Metal latch	—	Chromated zinc + stainless steel
Plastic enclosure	—	PBT/polycarbonate blend
Metal enclosure	—	Aluminium
Terminal screws	LED module, incandescent module, contact blocks	Zinc-plated steel with chromate
Terminals	LED module, incandescent module, contact blocks	Brass with silver-nickel contacts
Spring clamps	LED module, incandescent module, contact blocks	Stainless steel
Lamp socket	Incandescent module	Brass
Housing	Incandescent module, LED module	Glass-filled polyamide
Low-voltage terminals	Contact blocks	Gold-plated silver-nickel contacts
Low-voltage spanner	Contact blocks	Gold-plated silver-nickel contacts
Spanner	Contact blocks	Brass with silver-nickel contacts
Boot	Toggle Switch, illuminated push button, non-illuminated push button, multi-function illuminated and non-illuminated	Automotive industry acceptable silicone

NHP SAFETY REFERENCE GUIDE



PRODUCTS

Safety Light Curtains
and Laser Scanners



Safety Light Curtains

Guardshield Series Standard

Features:

- Fixed blanking - teachable
- Floating blanking
 - One beam floating blanking on 30 mm resolution
 - Two beam floating blanking on 14 mm resolution
- Integrated laser alignment available
- Beam coding
- External device monitoring
- Start/restart interlock
- Can be used as last segment pair in cascading system

Ordering Details:

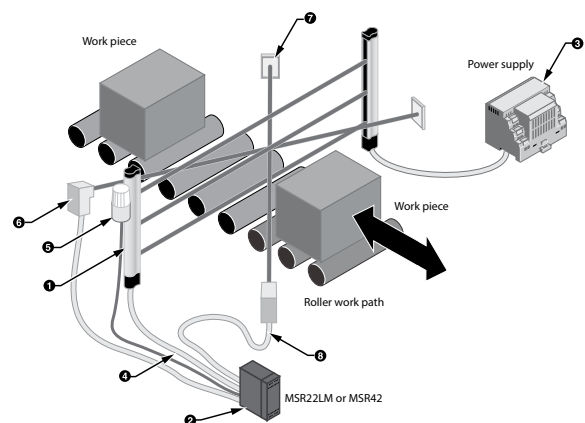
Standard cat. No.	Protected height (mm)	Resolution (mm)	Number of beams	With laser alignment cat. No.
440LP4J0480YD	480	14	48	440LP4JL0480YD
440LP4J1280YD	1280	14	128	440LP4JL1280YD
440LP4K0160YD	160	30	8	–
440LP4K0320YD	320	30	16	440LP4KL0320YD
440LP4K0480YD	480	30	24	440LP4KL0480YD
440LP4K0640YD	640	30	32	440LP4KL0640YD
440LP4K0800YD	800	30	40	440LP4KL0800YD
440LP4K0960YD	960	30	48	440LP4KL0960YD
440LP4K1120YD	1120	30	56	440LP4KL1120YD
440LP4K1280YD	1280	30	64	440LP4KL1280YD
440LP4K1600YD	1600	30	80	440LP4KL1600YD
440LP4K1760YD	1760	30	88	–

Safety relay interfaces (optional) See other projected heights available.

Cables

Transmitter cable	Length (m)	Connector type
889DF4AC2	2	Straight
889DF4AC5	5	Straight
889DF4AC10	10	Straight
889DF4AC15	15	Straight

Receiver cable	Length (m)	Connector type
889F8AB2	2	Straight
889F8AB5	5	Straight
889F8AB10	10	Straight
889F8AB15	15	Straight



GuardShield in muting application

Accessories

Please refer page 57 for more accessories and recommended logic interfaces on page 58.

Specifications

Please refer page 61.

Dimensions

Please refer page 59.



Safety Light Curtains Guardshield Series Cascadable

Features:

- Easy to interconnect light curtains, up to 3x 1760 mm segments
- No increase to response time
- Fixed floating / blanking
- Beam coding
- External device monitoring
- Integrated laser alignment available

Ordering Details:

Standard cat. No.	Protected height (mm)	Resolution (mm)	Number of beams	With laser alignment cat. No.
440LC4J0480YD	480	14	48	440LC4JL0480YD
440LC4J1280YD	1280	14	128	440LC4JL1280YD
440LC4K0320YD	320	30	16	440LC4KL0320YD
440LC4K0480YD	480	30	24	440LC4KL0480YD
440LC4K0640YD	640	30	32	440LC4KL0640YD
440LC4K0800YD	800	30	40	440LC4KL0800YD
440LC4K0960YD	960	30	48	440LC4KL0960YD
440LC4K1120YD	1120	30	56	440LC4KL1120YD
440LC4K1280YD	1280	30	64	440LC4KL1280YD
440LC4K1600YD	1600	30	80	440LC4KL1600YD
440LC4K1760YD	1760	30	88	–

Cables

Transmitter cable	Length (m)	Connector type
889DF4AC2	2	Straight
889DF4AC5	5	Straight
889DF4AC10	10	Straight
889DF4AC15	15	Straight
Transmitter cable	Length (m)	Connector type
889F8AB2	2	Straight
889F8AB5	5	Straight
889F8AB10	10	Straight
889F8AB15	15	Straight

Patchcords – between L/C pairs

Transmitter patchcords	Length (m)
889DF4ACDM0M3	0.3
889DF4ACDM1	1
889DF4ACDM3	2
Receiver patchcords	Length (m)
889DF8ABDM0M3	0.3
889DF8ABDM1	1
889DF8ABDM2	2
Receiver terminator	Description
898D81CUDM	Required for a standalone or last segment receiver.

Accessories

Please refer page 57 for more accessories and recommended logic interfaces on page 58.

Specifications

Please refer page 61.

Dimensions

Please refer page 60.



Safety Light Curtains

Guardshield Series cont

Accessories

Item	Description	Cat. No.
	Steel L-shaped and cap mounting bracket (4 per package). <i>Note: four brackets supplied with each GuardShield pair.</i>	440LAF6101
	Aluminium middle mounting bracket for vibratory applications.	440LAF6108
	Power supply: output 24 V DC, 3 Amps, 72 W	1606XLP72E
	Laser alignment tool	440LALAT
	GuardShield laser alignment tool bracket	440LAF6109
	Mounting stand	440LAMSTD
	Vertical shock mount kit	440LAF6120
	Horizontal shock mount kit	440LAF6121
	Middle vertical mount kit	440LAF6122
	Middle horizontal mount kit	440LAF6123
	GuardShield weld shield (Cat. No. is for a pair of light curtains).	440LAGWS0160
		440LAGWS0320
		440LAGWS0480
		440LAGWS0640
		440LAGWS0800
		440LAGWS0960
		440LAGWS1120
		440LAGWS1280
		440LAGWS1440
		440LAGWS1600
	GuardShield washdown enclosure kit <i>Note: only for use with standard GuardShield light curtain.</i>	440LAGWS1760
		440LAGST320
		440LAGST480
		440LAGST640
		440LAGST800
		440LAGST960



Safety Light Curtains

Guardshield Series *cont*

Recommended Logic Interfaces:

Description	Safety outputs	Reset type	Power supply	Cat. page No.	Cat. No.
Single-function relay					
MSR127	3 N/O	Auto / manual	24 V AC/DC	90	440RN23132
		Monitored	24 V AC/DC	90	440RN23135
Modular relay					
MSR211	2 N/O	Auto / manual or monitored	24 V DC	103	440RH23177
MSR221	–	–	24 V DC from base	103	440RH23179
MSR320	–	–	24 V DC from base	104	440RW23218
Muting modules					
MSR22LM	2 N/O	Auto / manual	24 V DC	96	440RP23071
MSR42	2 PNP	Auto / manual or monitored	24 V DC	97	440RP226AGSNNR

Safety Light Curtains

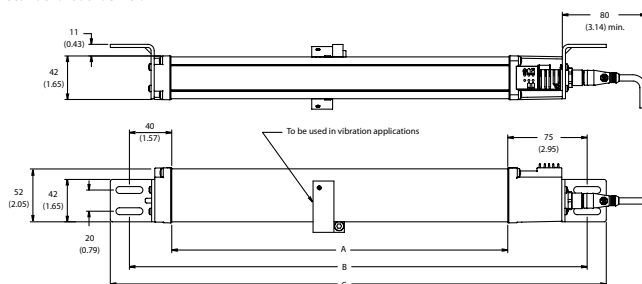
Guardshield Series *cont*

Standard Dimensions:

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

Dimensions & Wiring:

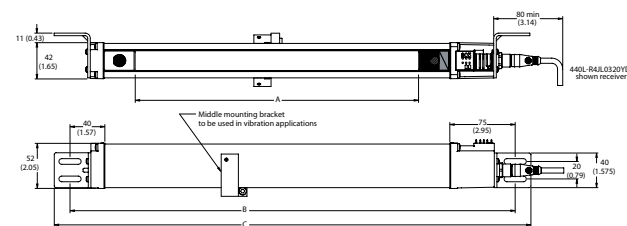
Standard GuardShield



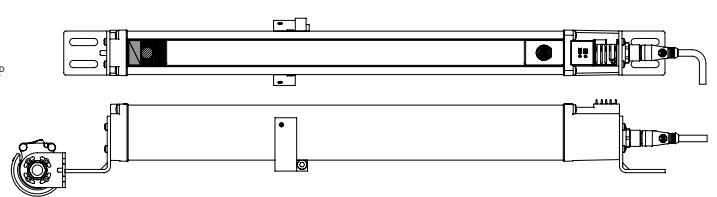
- * P = Pair, T = Transmitter, R = Receiver,
- * P = Pair, T = Transmitter, R = Receiver,
- C = Host Pair, G = Host Transmitter, F = Host Receiver
- ± J = 14 mm resolution or K = 30 mm resolution
- § 160 mm is not available for cascading GuardShield Light Curtains

Type	A: Protective height (mm)	B: Mounting value (mm)	C: Total length (mm)
440L- $\ast$ 4 $\ddagger$ 0160YD	160 $\pm$ 0.5§	276	312 $\pm$ 1.5
440L- $\ast$ 4 $\ddagger$ 0320YD	320 $\pm$ 0.5	436	472 $\pm$ 1.5
440L- $\ast$ 4 $\ddagger$ 0480YD	480 $\pm$ 0.5	596	632 $\pm$ 1.5
440L- $\ast$ 4 $\ddagger$ 0640YD	640 $\pm$ 0.5	756	792 $\pm$ 1.5
440L- $\ast$ 4 $\ddagger$ 0800YD	800 $\pm$ 0.6	916	952 $\pm$ 1.5
440L- $\ast$ 4 $\ddagger$ 0960YD	960 $\pm$ 0.6	1076	1112 $\pm$ 1.5
440L- $\ast$ 4 $\ddagger$ 1120YD	1120 $\pm$ 0.6	1236	1272 $\pm$ 1.8
440L- $\ast$ 4 $\ddagger$ 1280YD	1280 $\pm$ 0.7	1396	1432 $\pm$ 1.8
440L- $\ast$ 4 $\ddagger$ 1440YD	1440 $\pm$ 0.7	1556	1592 $\pm$ 1.8
440L- $\ast$ 4 $\ddagger$ 1600YD	1600 $\pm$ 0.8	1716	1752 $\pm$ 2.0
440L- $\ast$ 4 $\ddagger$ 1760YD	1760 $\pm$ 0.8	1876	1912 $\pm$ 2.0

Standard GuardShield receiver with integrated laser alignment



Standard GuardShield transmitter with integrated laser alignment



Type	A: Protective height (mm)	B: Mounting value (mm)	C: Total length (mm)	D: Mounting value (mm)
440L-P4 $\ast$ L0320YD	320 $\pm$ 0.5	516	552 $\pm$ 1.5	426
440L-P4 $\ast$ L0480YD	480 $\pm$ 0.5	676	712 $\pm$ 1.5	586
440L-P4 $\ast$ L0640YD	640 $\pm$ 0.5	836	872 $\pm$ 1.5	746
440L-P4 $\ast$ L0800YD	800 $\pm$ 0.6	996	1032 $\pm$ 1.5	906
440L-P4 $\ast$ L0960YD	960 $\pm$ 0.6	1156	1192 $\pm$ 1.5	1066
440L-P4 $\ast$ L1120YD	1120 $\pm$ 0.6	1316	1352 $\pm$ 1.5	1226
440L-P4 $\ast$ L1280YD	1280 $\pm$ 0.7	1476	1512 $\pm$ 1.5	1386
440L-P4 $\ast$ L1440YD	1440 $\pm$ 0.7	1636	1672 $\pm$ 1.5	1546
440L-P4 $\ast$ L1600YD	1600 $\pm$ 0.7	1796	1832 $\pm$ 1.5	1706

J = 14 mm resolution, K = 30 mm resolution



Safety Light Curtains

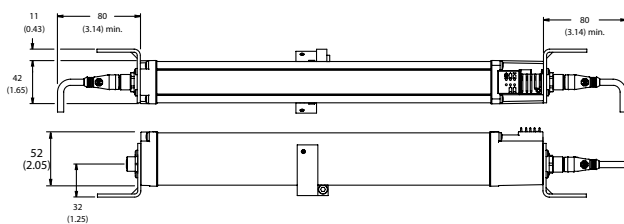
Guardshield Series cont

Cascadable Dimensions:

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

Dimensions & Wiring:

Cascadable GuardShield



Middle mounting bracket should be used in vibration applications on GuardShield light curtain protective heights of 1120 mm and larger.

* P = Pair, T = Transmitter, R = Receiver,

* P = Pair, T = Transmitter, R = Receiver,

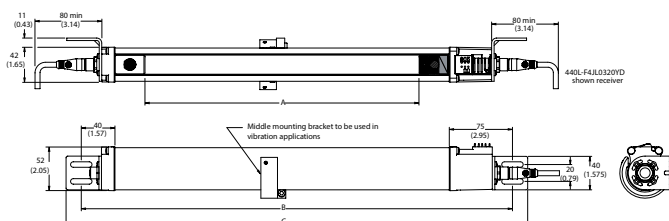
C = Host Pair, G = Host Transmitter, F = Host Receiver

± J = 14 mm resolution or K = 30 mm resolution

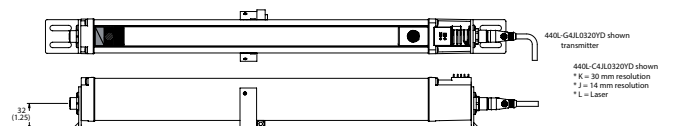
§ 160 mm is not available for cascading GuardShield Light Curtains

Type	A: Protective height (mm)	B: Mounting value (mm)	C: Total length (mm)
440L-※4†0160YD	160±0.5§	276	312±1.5
440L-※4†0320YD	320±0.5	436	472±1.5
440L-※4†0480YD	480±0.5	596	632±1.5
440L-※4†0640YD	640±0.5	756	792±1.5
440L-※4†0800YD	800±0.6	916	952±1.5
440L-※4†0960YD	960±0.6	1076	1112±1.5
440L-※4†1120YD	1120±0.6	1236	1272±1.8
440L-※4†1280YD	1280±0.7	1396	1432±1.8
440L-※4†1440YD	1440±0.7	1556	1592±1.8
440L-※4†1600YD	1600±0.8	1716	1752±2.0
440L-※4†1760YD	1760±0.8	1876	1912±2.0

Cascadable GuardShield receiver with integrated laser alignment



Cascadable GuardShield transmitter with integrated laser alignment



Type	A: Protective height (mm)	B: Mounting value (mm)	C: Total length	D: Mounting
440LC4*L0320YD	320±0.5	516	552±1.5	426
440LC4*L0480YD	480±0.5	676	712±1.5	586
440LC4*L0640YD	640±0.5	836	872±1.5	746
440LC4*L0800YD	800±0.6	996	1032±1.5	906
440LC4*L0960YD	960±0.6	1156	1192±1.5	1066
440LC4*L1120YD	1120±0.6	1316	1352±1.5	1226
440LC4*L1280YD	1280±0.7	1476	1512±1.5	1386
440LC4*L1440YD	1440±0.7	1636	1672±1.5	1546
440LC4*L1600YD	1600±0.7	1796	1832±1.5	1706

J = 14 mm resolution, K = 30 mm resolution

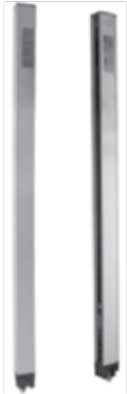


Safety Light Curtains

Guardshield Series cont

Technical Data:

Safety ratings	Standards	IEC/EN 61496 Parts 1 & 2, UL 61496 Parts 1 & 2, UL 1998
	Safety classification	Type 4 per IEC/EN61496, category 4 device per EN 954-1
Certifications		cULus, UL 61496, UL 1998, TÜV, and CE marked for all applicable directives
Power supply		Input power, max. 24 V DC $\pm 20\%$ maximum residual ripple 0.05 Vss power consumption 0.4 A max (no load)
Outputs	Safety outputs	2 OSSD, 0.5 A, short-circuit protected
	Non-safety outputs	1 OSSD, 0.5 A max.
	Output voltage	Min. $U_v - 2$ V
	Switching current	500 mA @ 24 V DC
Operating characteristics	Response time	14 mm; 160 mm...1440 mm 20 ms, 1600 mm and 1760 mm, 25 ms. 30 mm; 20 ms. Add 10 ms when beam coding activated.
	LED indicators	ON state, OFF state, blanking, alignment, interlock
	Protected height	160...1760 in 160 mm increments
	Resolution	14 or 30 mm
	Scanning range/resolution	0.3...7 m / 14 mm 0.3...16 m / 30 mm Synchronisation optical, first beam adjacent to LEDs
	Wavelength	870 nm
Environmental	Enclosure type rating	IP 65
	Relative humidity	15...95% (noncondensing)
	Operating temperature	-10°C ...+55°C
	Vibration	IEC60068-2-6
	Frequency	10...55 Hz
	Amplitude	0.35 mm
	Shock	IEC60068-2-29
	Acceleration	10 g, pulse duration 16 ms 10...55 Hz
Physical characteristics		Mounting end-cap brackets supplied
	Weight	Varies by protective height
	Housing cross section	40 mm x 50 mm
	Connection type transmitter	4-pin M12 micro QD
	Receiver	8-pin M12 micro QD
	Cable length	30 m max



Safety Light Curtains

Safe 4 Series

Features:

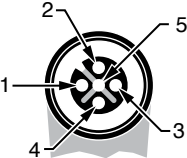
- M12 connectors
- Optically synchronised
- Intergrated laser alignment system
- IP 65 enclosure rating
- Simple installation
- cULus and CE Marked for all application directives

Ordering Details:

Cat. No.	Number of beams (14 mm)	Number of beams (30 mm)	Protected height (mm)
445LP4*0360YD	48	24	360
445LP4*0600YD	80	40	600
445LP4*0960YD	128	64	960
445LP4*1200YD	160	80	1200
445LP4*1440YD	172	86	1440
445LP4*1800YD	220	110	1800

* For 14 mm resolution replace with an 'L' for 30 mm resolution replace with 'S'. Other protected heights available.

Female connector (Sensor end)

Face view of female	Cat. No.	Connector style	Pin/wire color	Wire rating	Length
	889D-F5AC-2	Straight female – nonshielded	1 Brown 2 White 3 Blue 4 Black 5 Grey	22 AWG 250 V 4 A	2 m (6ft.56in.)
	889D-F5AC-5				5 m (16ft.4in.)
	889D-F5AC-10				10 m (32ft.8in.)
	889D-F5AC-15				15 m (49ft.2in.)
	889D-F5AC-20				20 m (65ft.6in.)
	889D-F5AC-30				30 m (98ft.4in.)
	889D-F5EC-2	Straight female – shielded	1 Brown 2 White 3 Blue 4 Black 5 Grey	22 AWG 22 AWG 300 V 4 A	2 m (6ft.56in.)
	889D-F5EC-5				5 m (16ft.4in.)
	889D-F5EC-10				10 m (32ft.8in.)
	889D-F5EC-15				15 m (49ft.2in.)
	889D-F5EC-20				20 m (65ft.6in.)
	889D-F5EC-30				30 m (98ft.4in.)

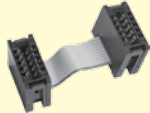


Safety Light Curtains

Safe 4 Series *cont*

Ordering Details:

Accessories

	Description	Cat. No.
	Standard kit (four pieces - supplied with each pair)	445LAF6140
	180° adjustable kit (two kits required per pair)	445LAF6141
	Safe 2 / Safe 4 shock mount kit	445LAF6142
	Vertical mounting kit (two kits required per pair)	445L-AF6144
	MSR42 multifunction module (requires cat. No. 440L-AF6150 to program)	440R-P226AGS-NNR
	MSR45E - Safety relay expansion module for MSR42	440RP4NANS
	USB optical interface software configuration tool used to configure the MSR42 (Used to configure the MSR42 module or get diagnostic information from the Safe 4.)	445LAF6150
	Ribbon cable — to connect one MSR45E to an MSR42	440R-ACABL1
	Ribbon cable — to connect three MSR45Es to an MSR42	440R-ACABL2
	Ribbon cable — to connect three MSR45Es to an MSR42	440R-ACABL3
	Mounting stand	440LAMSTD



Safety Light Curtains

Safe 4 Series *cont*

Recommended Logic Interfaces:

Description	Safety outputs	Reset type	Power supply	Cat. page No.	Cat. No.
Single-function relay					
MSR127	3 N/O	Auto / manual	24 V AC/DC	90	440RN23132
		Monitored	24 V AC/DC	90	440RN23135
Modular relay					
MSR211	2 N/O	Auto / manual or monitored	24 V DC	103	440RH23177
MSR221	–	–	24 V DC from base	103	440RH23179
MSR320	–	–	24 V DC from base	104	440RW23218
Muting modules					
MSR22LM	2 N/O	Auto / manual	24 V DC	96	440RP23071
MSR42	2 PNP	Auto / manual or monitored	24 V DC	97	440RP226AGSNNR

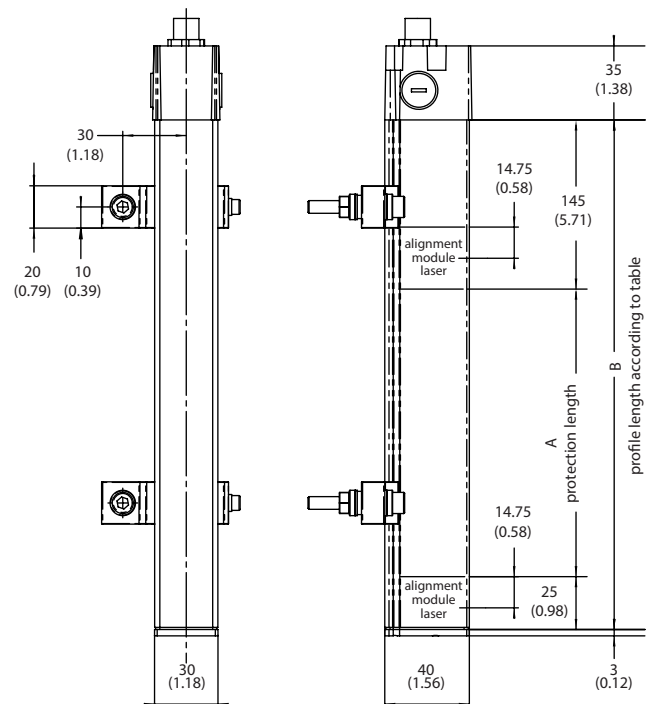
Dimensions:

Type	A: protective height [mm (in.)]	B: Mounting value [mm (in.)]
445L-P4*0120YD	120 (4.7)	290 (11.4)
445L-P4*0240YD	240 (9.4)	410 (16.1)
445L-P4*0360YD	360 (14.2)	530 (20.9)
445L-P4*0480YD	480 (18.9)	650 (25.6)
445L-P4*0600YD	600 (23.6)	771 (30.4)
445L-P4*0720YD	720 (28.3)	891 (35.1)
445L-P4*0840YD	840 (33.1)	1011 (39.8)
445L-P4*0960YD	960 (37.8)	1131 (44.5)
445L-P4*1080YD	1080 (42.5)	1252 (49.3)
445L-P4*1200YD	1200 (47.2)	1372 (54.0)
445L-P4*1320YD	1320 (51.9)	1492 (58.7)
445L-P4*1440YD	1440 (56.7)	1612 (63.5)
445L-P4*1560YD	1560 (61.4)	1733 (68.2)
445L-P4*1680YD	1680 (66.1)	1853 (72.9)
445L-P4*1800YD	1800 (70.8)	1973 (77.7)
445L-P4*1920YD	1920 (75.6)	2093 (82.4)

* For 14 mm resolution replace with an "L".
For 30 mm resolution replace with an "S".

Example: Cat. No. 445L-P4S0480YD (for 30 mm resolution).

Dimensions & Wiring:





Safety Light Curtains

Safe 4 Series *cont*

Technical Data:

Safety ratings	Standards	IEC/EN61496 Parts 1 and 2, UL61496 Parts 1 and 2, UL1998
	Safety classification	Type 4 per IEC 61496, category 4 device per EN 954-1
Certifications		cULus and CE Marked for all applicable directives
Power supply	Input power	Max. 24 V DC $\pm$ 20%
	Maximum residual ripple	< 10% of U_{sp}
	Power consumption	<500 mA (no load)
Outputs	Safety outputs	2 PNP OSSD. 0.3 A, short-circuit protected
	Output voltage	> U_{sp} (at load = 0.1A)
	Switching current @ voltage	Min. 300 mA @ 24 V DC
Operating characteristics	Response time	Varies by protective height, see installation manual
	Indicator LEDs	ON -State, OFF-State, internal error
	Protected height (mm)	120...1920 mm in 120 mm increments
	Resolution (mm)	14 mm /30 mm
	Scanning range	5...30 m
	Synchronisation	Optical, first beam adjacent to LEDs
	Wavelength	950 nm
Environmental	Enclosure type rating	IP 65
	Relative humidity	15...95% (noncondensing)
	Operating temperature	0°C... +55°C
	Vibration	IEC 60068-2-6
	Frequency	10...55 Hz
	Amplitude	0.35 mm
Physical characteristics	Shock	IEC 60068-2-29; acceleration 10 g, pulse duration 16 ms 10...55 Hz; amplitude (0.35mm)
	Mounting	Rear mounting, standard and adjustable (180°)
	Weight	Varies by protective height, see installation manual
	Housing cross section	30 x 40 mm
	Connection type transmitter	5-pin M12 micro QD
	Receiver	5-pin M12 micro QD
	Cable length	2, 5, 10, 15, 20, or 30 m
	ILAS laser class	Class 2, IEC 60825-1



Safety Light Curtains Micro 400 Series

Features:

- Very small profile 15 x 20 mm
- M12 connector on 20 inch pigtails
- Minimal dead space of optic heads
- IP69K rated version

Ordering Details:

Standard

Cat. No.	Protected height (mm)	Resolution (mm)	No. of beams
445LP4C0150FP	150	14	15
445LP4C0300FP	300	14	30
445LP4C0750FP	750	14	75
445LP4C1050FP	1050	14	105
445LP4E0150FP	150	30	6
445LP4E0300FP	300	30	12
445LP4E0750FP	750	30	30
445LP4E1050FP	1050	30	42

Other protected heights available

Cascadable

Cat. No.	Protected height (mm)	Resolution (mm)	No. of beams
445LC4C0150YD	150	14	15
445LC4C0300YD	300	14	30
445LC4C0600YD	600	14	60
445LC4C1200YD	1200	14	120
445LC4E0150YD	150	30	6
445LC4E0300YD	300	30	12
445LC4E0600YD	600	30	24
445LC4E1200YD	1200	30	48

Other protected heights available

IP 69K Light Curtains

Cat. No.	Protected height (mm)	Resolution (mm)	No. of beams
445LP4C0300KD	300	14	30
445LP4C0600KD	600	14	60
445LP4C0900KD	900	14	90
445LP4C1200KD	1200	14	120



Safety Light Curtains

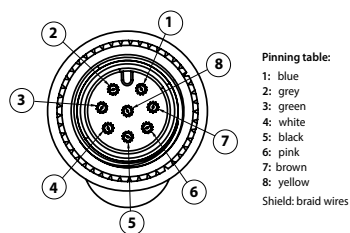
Micro 400 Series *cont*

Ordering Details:

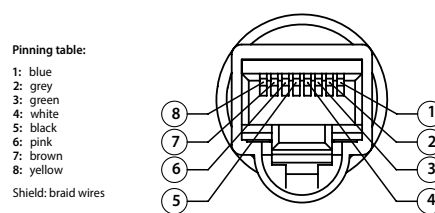
Cables

Standard micro 400 patchcords — required (transmitters and receivers both use 8-PIN M12 to RJ45 patchcords)

Face view M12 connector



Face view RJ45 Connector



Cascadable patchcords: M12 / RJ 45 Connectors

Description	Cat. No.
1 m patchcord, PVC jacket	445L-AC8RJ1
2 m patchcord, PVC jacket	445L-AC8RJ2
3 m patchcord, PVC jacket	445L-AC8RJ3
5 m patchcord, PVC jacket	445L-AC8RJ5
8 m patchcord, PVC jacket	445L-AC8RJ8

Micro 400 Patchcord for Interconnecting Cascaded Segments (if required)



Cascadable patchcords: Micro 400

Description	Cat. No.
1 m (39.37 in.) in patchcord	445LAC8PC1
3 m (118.11 in.) in patchcord	445LAC8PC3
5 m (196.85 in.) in patchcord	445LAC8PC5



Safety Light Curtains

Micro 400 Series *cont*

Accessories

item	Description	Cat. No.
	Adjustable 180° bracket kit (two per kit) supplied with each pair. Two kits required per pair	445L-AF6143
	Flat bracket kit (two per kit) Two kits per pair	445L-AF6145
	Adjustable flat bracket (two per kit) Two kits required per pair	445L-AF6149
	IP 69K mounting bracket kit (two kits per pair supplied with each pair)	445L-AF6160

Required micro 400 controller – select one

Item	Mounting	Size	Cat. No.
	35 mm DIN Rail	22.5 mm	440R-P221AGS
	35 mm DIN Rail	22.5 mm	440R-P226AGS-NNR

Optional safety relay interfaces

Relay	Input voltage	Reset	Outputs	Cat. No.
	Supplied by MSR41 or MSR42	Determined by MSR41 or MSR42	2 N/O	440R-P4NANS

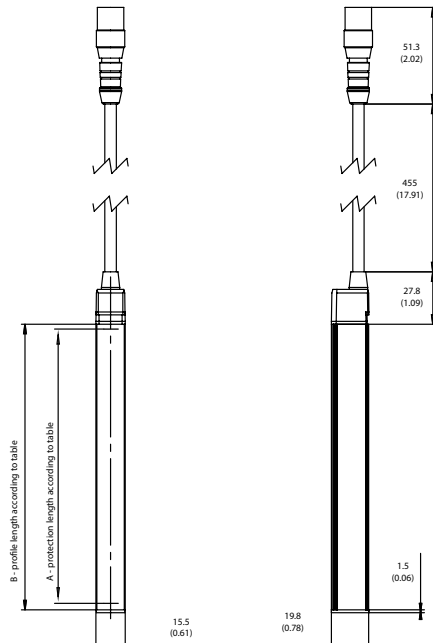


Safety Light Curtains

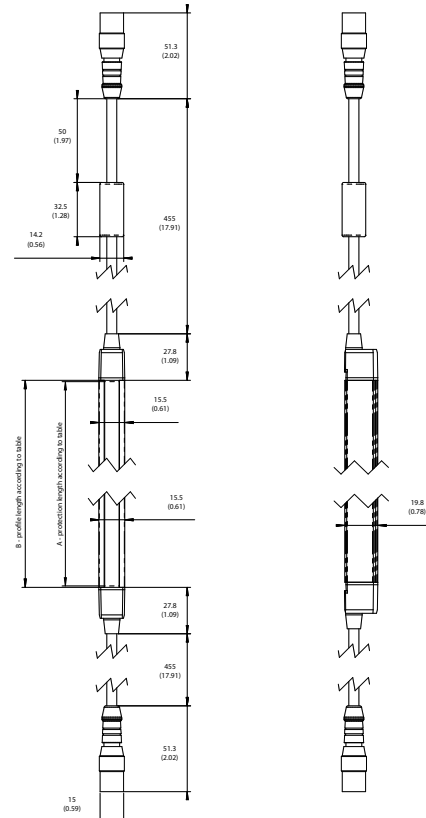
Micro 400 Series *cont*

Dimensions & Wiring:

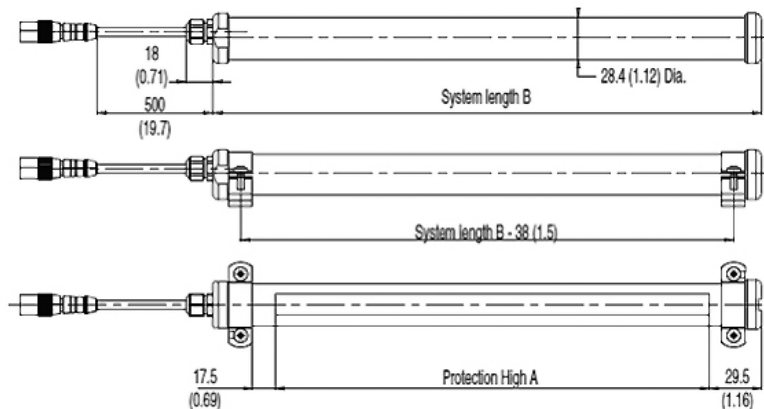
Safety Light Curtains—Standard



Safety Light Curtains—Cascadable



Safety Light Curtains—IP 69K Micro 400



Type	A: Protective height (mm)	B: Profile length (mm)
445L- $\ast$ 4 $\ddagger$ 0150FB	150	151.5 $\pm$ 0.3
445L- $\ast$ 4 $\ddagger$ 0300FB	300	301 $\pm$ 0.3
445L- $\ast$ 4 $\ddagger$ 0450FB	450	451 $\pm$ 0.3
445L- $\ast$ 4 $\ddagger$ 0600FB	600	601.5 $\pm$ 0.3
445L- $\ast$ 4 $\ddagger$ 0750FB	750	751.5 $\pm$ 0.3
445L- $\ast$ 4 $\ddagger$ 0900FB	900	901 $\pm$ 0.3
445L- $\ast$ 4 $\ddagger$ 1050FB	1050	1051 $\pm$ 0.3
445L- $\ast$ 4 $\ddagger$ 1200FB	1200	1251 $\pm$ 0.3

$\ast$ P = Standard Pair, C = Cascadable Pair.

$\ddagger$ C = 14mm, E = 30mm.



Safety Light Curtains

Micro 400 Series *cont*

Technical Data:

Safety ratings	Standards	IEC/EN61496 Parts 1 and 2, UL61496 Parts 1 and 2, UL1998
	Safety classification	Type 4 per IEC/EN61496. Category 4 device per EN 954-1, SIL 3 per IEC 61508, PLe per EN13894
Certifications		cULus, TÜV, CE Marked for all applicable directives
Power supply		Input power from MSR41 or MSR42 controller
	Input power	Max. 24 V DC $\pm$ 15%
	Maximum residual ripple	5% of V _{ss}
	Power consumption	0.07 A max. (no load)
Outputs	Micro 400 Outputs	Data output to controller (MSR41 or MSR42)
	MSR41/MSR42 Outputs	Two 400mA OSSD
	Non-safety outputs	Auxiliary outputs from MSR41 or MSR42 controller – 2 configurable 100mA, outputs
Operating characteristics		Response Time 14 mm: 14...42 ms; 30 mm; 12...23 ms, varies by protective height and resolution
	Indicator LEDs	ON -State, OFF-State, Intensity
	Protected height (mm)	150...1200 mm in 150 mm increments
	Resolution (mm)	14, 30
	Scanning range/resolution	14 mm resolution: 0...5 m 30 mm resolution: 0...5 m
	Synchronisation	Electrical through MSR42
	Wavelength	940 nm
Environmental	Enclosure type rating	Micro 400: IP54, IP69K version; MSR41/MSR42: IP20
	Relative humidity	15...95% (noncondensing)
	Operating temperature	0°C ...+ 55°C
	Vibration	IEC 60068-2-6
	Frequency	10...55 Hz
	Shock	IEC 60068-2-29; acceleration 10 g, pulse duration 16 ms 10...55 Hz; amplitude 0.35 mm
Physical characteristics	Mounting	Back side mounting, 180° adjustable or flat bracket
	Weight	Varies by protective height
	Housing cross section	15 mm x 20 mm
	Connection type	Transmitter/receiver: 8-pin M12 micro QD
	Cable length	3, 5, and 8 m, max system length can not exceed 10 m



Safety Light Curtains

GuardShield Perimeter Access Control

Features:

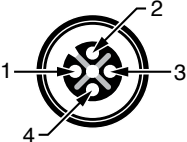
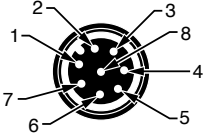
- Beam Coding
- Machine test signal
- External Device Monitoring (EDM)
- Start/restart interlock

Ordering Details:

Cat. No.	Protected height (mm)	Resolution (mm)	Number of beams	With laser alignment cat. No.
440LP4A2500YD	520	500	2	440LP4AL2500YD
440LP4A4300YD	820	400	3	440LP4AL3400YD

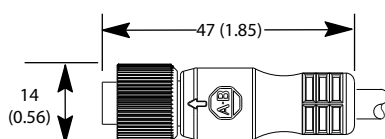


Cables: Female Connector (Sensor End)

Face view of female	Cat. No.	Connector style	Pin/wire color	Wire rating	Length (mm) (ft)
Transmitter 	889DF4AC2	Straight female	1 brown 2 white 3 blue 4 black	22 AWG 300 V 4 A	2 (6.56)
	889DF4AC5				5 (16.4)
	889DF4AC10				10 (32.8)
	889DF4AC15				15 (49.2)
	889DF4AC20				20 (65.6)
	889DF4AC30				30 (98.4)
Receiver 	889DF8AB2	Straight female	1 white 2 brown 3 green 4 yellow 5 grey 6 pink 7 blue 8 red	24 AWG 30 V AC/ 36 V DC 1.5 A	2 (6.56)
	889DF8AB5				5 (16.4)
	889DF8AB10				10 (32.8)
	889DF8AB15				15 (49.2)
	889DF8AB20				20 (65.6)
	889DF8AB30				30 (98.4)

Cordsets Approximate Dimensions (in.):

Dimensions are not intended to be used for installation purposes.





Safety Light Curtains

GuardShield Perimeter Access Control cont

Accessories – optional

Item	Description	Cat. No.
	steel L-shaped end cap mounting bracket (four per package) Note: four brackets supplied with each GuardShield pair.	440LAF6101 (1 package per system)
	Power supply: output 24 V DC, 3 A, 72 W	1606XLP72E
	Laser alignment tool	440LALAT
	GuardShield laser alignment tool bracket	440LAF6109
	Mounting stand	440LAMSTD
	GuardShield weld shield pair — three beam	440LAGWS0960
	GuardShield weld shield pair — two beam	440LAGWS0640
	Vertical shock mount kit	440LAF6120
	GuardShield washdown enclosure kit — two beam PAC	440LAGST640
	GuardShield washdown enclosure kit — three beam PAC	440LAGST960

Muting Sensors

Sensor type	Connection location	Type	Cat. No.
Retroreflective	Connected directly to muting module	Dark switching	42GRU9000QD
Transmitted beam	Receiver (connected directly to the muting module)		42GRR9000QD*
Retroreflective	Connected directly to muting module		42GRU9000QD*
Polarised retroreflective	Three inch standard reflector		92-39
Polarised retroreflective	Connected directly to muting module		42GRU9200QD*
Polarised retroreflective			92-39
Mechanical limit switch	Connected directly to muting module (operating lever must be selected separately)		802MNX10*
Muting lamp		Two cat. nos. make this assembly	855E24TL7 855EBVMC

* Use with 4-pin, DC Micro cordset when connecting to muting module (5 m length shown).
1 m, 2 m, 3 m, and 5 m lengths available.

889DF4AC5



Safety Light Curtains

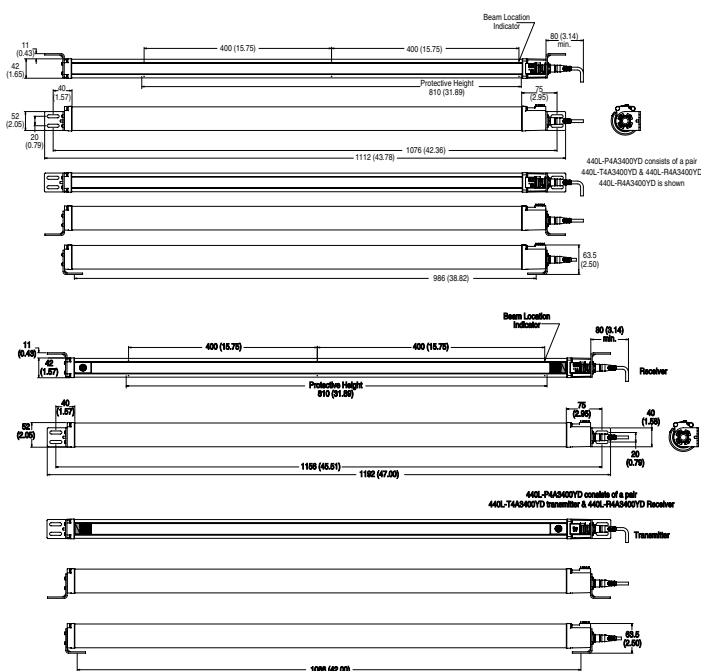
GuardShield Perimeter Access Control *cont*

Recommended Interfaces

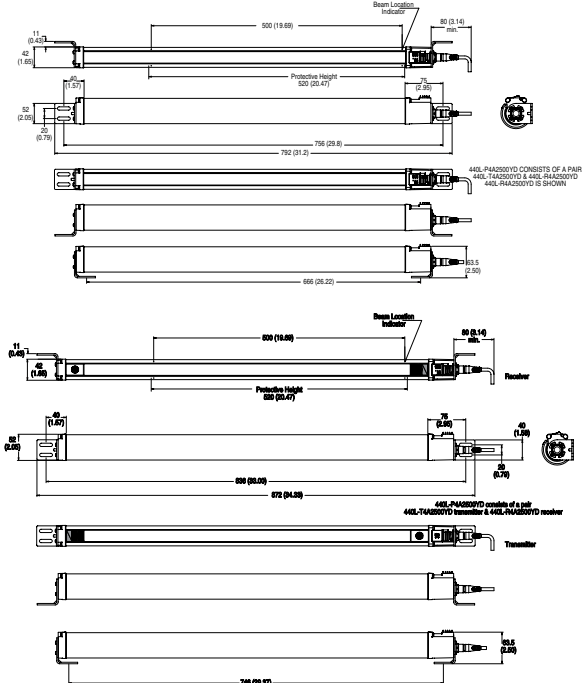
Description	Safety outputs	Reset type	Power supply	Cat. page. No.	Cat. No.
Single -function display					
MSR127	3 N/O	Auto/manual	24 V AC/DC	90	440RN23132
		monitored	24 V AC/DC	90	440RN23135
Modular Relay					
MSR211	2 N/O	Auto/manual or monitored	24 V DC	103	440RH23177
MSR221	–	–	24 V DC from base	103	440RH23179
MSR320	–	–	24 V DC from base	104	440RW23218
Muting Modules					
MSR22LM	2 N/O	Auto/manual	24 V DC	96	440RP23071
MSR42	2PNP	Auto/manual or monitored	24 V DC	97	440RP226AGSNNR

Dimensions & Wiring:

440LP4A3400YD



440LP4A2500YD



Cat. No.	A Protective height (mm)	B Mounting value (mm)	C total length
440L-P4A3400YD	820 ±0.5	1076	1112 ±1.5
440L-P4A2500YD	520 ±0.5	756	792 ±1.5



Safety Light Curtains

GuardShield Perimeter Access Control cont

Technical Data:

Safety ratings	Standards	IEC/EN 61496 Parts 1 & 2, UL 61496 Parts 1 & 2 UL 1998
	Safety classification	Type 4 (self-checking) per EN 61496
Certifications		UL 61496, UL 1998, cULus, TÜV and CE marked for all applicable directives
Power supply	Input power	Max. 24 V DC $\pm 20\%$
	Maximum residual ripple	0.05 Vss
	Power consumption	400 mA (no load)
Outputs	Safety outputs	2 x PNP, 0.5 A, short circuit protected
	Non-safety outputs	1 x PNP 0.5 A max.
	Output voltage	Min. 2 V
	Switching current @ voltage	Min. 500 mA @ 24 V DC
	Response time	20 ms, 30 ms with beam coding activated
	LED indicators	On-state, off-state, alignment, interlock
	Protected height	3 beam = 820 mm; 2 beam = 520 mm
Operating characteristics	Scanning range	16 m
	Synchronisation	Optical without separate synchronisation channel. First beam adjacent to LEDs
	Wavelength	870 nm
Environmental	Enclosure type rating	IP 65
	Relative humidity	15%...95% (noncondensing)
	Operating temperature	-10°C ... +55°C
	Vibration	IEC60068-2-6
	Frequency	10...55 Hz
	Amplitude	0.35 mm
	Shock	IEC60068-2-29 acceleration 10 g
	Pulse duration	16 ms
Physical characteristics	Mounting	End-cap mounting brackets
	Weight	Varies by cat. No.
	Housing cross section	40 mm x 50 mm
	Connection type transmitter	4-pin micro QD (M12)
	Receiver	8-pin micro QD (M12)
	Cable length	30 m max.



Safety Light Curtains

Safe4 Perimeter Access Control

Ordering Details:

Protected height (mm)	Beam spacing (mm)	Number of beams	Cat. No.
600	500	2	445LP4S2500YD
840	400	3	445LP4S3400YD

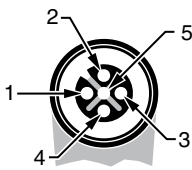
Cables

Cordsets – Transmitters and receivers both use 5-pin M12 cordsets.

Note: Unshielded cordsets are most commonly used for safety light curtains, however, shielded cordsets are also offered to increase immunity to electrical interference.

Female connector (sensor end)

Cable

Face view of female	Connector style	Pin/wire color	Wire rating	Length [m (ft)]	Cat. No.
	Straight female	1 brown 2 white 3 blue 4 black 5 grey	22 AWG 250 V 4 A	2 (6.56)	889DF5AC2
				5 (16.4)	889DF5AC5
				10 (32.8)	889DF5AC10
				15 (49.2)	889DF5AC15
				20 (65.6)	889DF5AC20
				30 (98.4)	889DF5AC30
	Shielded straight female	1 brown 2 white 3 blue 4 black 5 grey	22 AWG 22 AWG 300 V 4 A	2 (6.56)	889DF5EC2
				5 (16.4)	889DF5EC5
				10 (32.8)	889DF5EC10
				15 (49.2)	889DF5EC15
				20 (65.6)	889DF5EC20
				30 (98.4)	889DF5EC30

Required logic interface – possible options

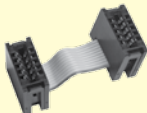
Description	Safety outputs	Reset type	Power supply	Cat. page. No.	Cat. No.
Single -function display					
MSR127	3 N/O	Auto/manual	24 V AC/DC	90	440RN23132
		monitored	24 V AC/DC	90	440RN23135
Modular relay					
MSR211	2 N/O	Auto/manual or monitored	24 V DC	103	440RH23177
MSR221	–	–	24 V DC from base	103	440RH23179
MSR320	–	–	24 V DC from base	104	440RW23218
Muting modules					
MSR22LM	2 N/O	Auto/manual	24 V DC	96	440RP23071
MSR42	2PNP	Auto/manual or monitored	24 V DC	97	440RP226AGSNNR



Safety Light Curtains

Safe4 Perimeter Access Control *cont*

Accessories – optional

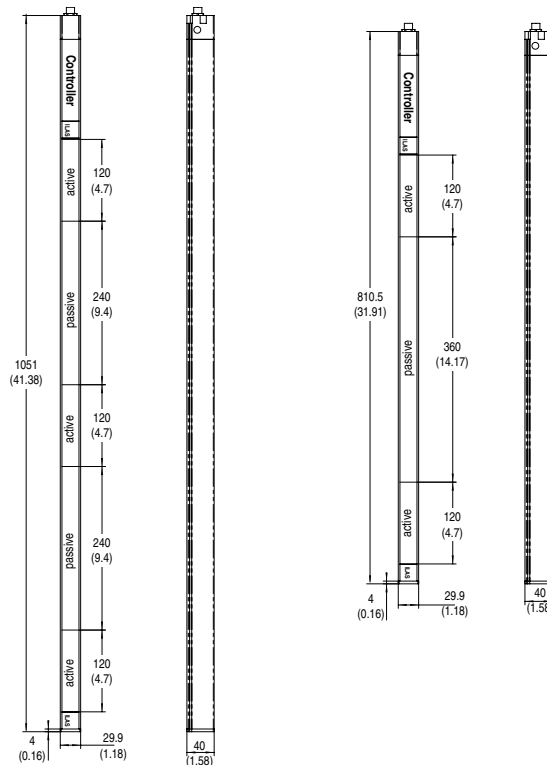
Item	Description	cat. No.
	Standard kit (four pieces – supplied with each pair)	445L-AF6140
	180° adjustable kit (two kits required per pair)	445L-AF6141
	Shock mount kit (two kits required per pair of light curtains)	445L-AF6142
	Vertical mounting kit (two kits required per pair)	445L-AF6144
	MSR42 multifunction module (requires 440L-AF6150 to program)	440R-P226AGS-NNR
	MSR45E – safety relay expansion module for MSR42	440R-P4NANS
	USB optical interface software configuration tool used to configure the MSR42 (Used to configure the MSR42 module or get diagnostic information from the Safe 4)	445L-AF6150
	Ribbon cable – to connect one MSR45E to an MSR42	440R-ACABL1
	Mounting stand (comes with hardware to level base and two GuardShield mounting brackets.)	440L-AMSTD



Safety Light Curtains

Safe4 Perimeter Access Control *cont*

Dimensions & Wiring:



Technical Data:

Safety ratings	Standards	IEC/EN 61496 Parts 1 & 2, UL 61496 Parts 1 & 2 UL 1998
	Safety classification	Type 4 per IEC/EN 61496, Category 4 device per EN 954-1, SIL 3 per IEC 61508 PLe per En/ISO 13849.
Power supply	Certifications	cULus Listed and CE marked for all applicable directives.
	Input power	Max. 24 V DC $\pm 20\%$
	Maximum residual ripple	$< 10\%$ of U_{sp}
Outputs	Power consumption	< 500 mA (no load)
	Safety outputs	2 x PNP, OSSD, 0.3A, short-circuit protected.
	Output voltage, min.	$U_{sp} - 1$
Operating characteristics	Switching current @ voltage	300 mA @ 24 V DC
	Protected height	3 beam = 840 mm; 2 beam = 600 mm
Environmental	Scanning range	5 - 30 m
	Enclosure rating	IP 65
	Relative humidity	15 - 95%
Physical characteristics	Operating temperature	0°C... +55°C
	Housing cross section	30 x 40 mm
	Connection type	Transmitter and receiver: 5-pin M12
	Cable length	30 m max.



Safety Light Curtains GuardShield Type 2

Features:

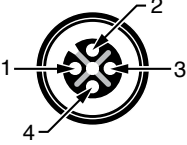
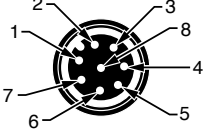
- Self contained 'two-box' type system
- Offered in a 'guard only' mode
- Designed for use on or around machinery
- Offer when a formal risk assessment has determined that a Type 2 safety device is of sufficient level of safety

Ordering Details:

Cat. No.	Protected height (mm)	Resolution (mm)	Number of beams
440LP2KA0320YD	320	30	16
440LP2KA0640YD	640	30	32
440LP2KA0960YD	960	30	48



Cables: Female Connector (Sensor End)

Face view of female	Cat. No.	Connector style	Pin/wire color	Wire rating	Length (mm) (ft)
Transmitter 	889DF4AC2	Straight female	1 brown 2 white 3 blue 4 black	22 AWG 300V 4 A	2 (6.56)
	889DF4AC5				5 (16.4)
	889DF4AC10				10 (32.8)
	889DF4AC15				15 (49.2)
	889DF4AC20				20 (65.6)
	889DF4AC30				30 (98.4)
Receiver 	889DF8AB2	Straight female	1 white 2 brown 3 green 4 yellow 5 grey 6 pink 7 blue 8 red	24 AWG 30V AC/36V DC 1.5 A	2 (6.56)
	889DF8AB5				5 (16.4)
	889DF8AB10				10 (32.8)
	889DF8AB15				15 (49.2)
	889DF8AB20				20 (65.6)
	889DF8AB30				30 (98.4)



Safety Light Curtains

GuardShield Type 2 cont

Accessories

Item	Description	Cat. No.
	Steel L-shaped and cap mounting bracket (four per package). <i>Note: four brackets supplied with each GuardShield pair.</i>	440LAF6101 (1 package per system)
	Aluminium middle mounting bracket for vibratory applications.	440LAF6108 (1 package per system)
	Power supply: output 24 V DC, 3 amps, 72 W	1606XLP72E
	Laser alignment tool	440LALAT
	GuardShield laser alignment tool bracket	440LAF6109
	Mounting stand	440LAMSTD
	GuardShield weld shield (Cat. No. is for a pair of light curtains).	440LAGWS0160
		440LAGWS0320
		440LAGWS0480
		440LAGWS0640
		440LAGWS0800
		440LAGWS0960
		440LAGWS1120
		440LAGWS1280
		440LAGWS1440
	Vertical shock mount kit	440LAGWS1600
		440LAGWS1760
	Horizontal shock mount kit	440LAF6120
	Middle vertical mount kit	440LAF6121
	Middle horizontal mount kit	440LAF6122
		440LAF6123

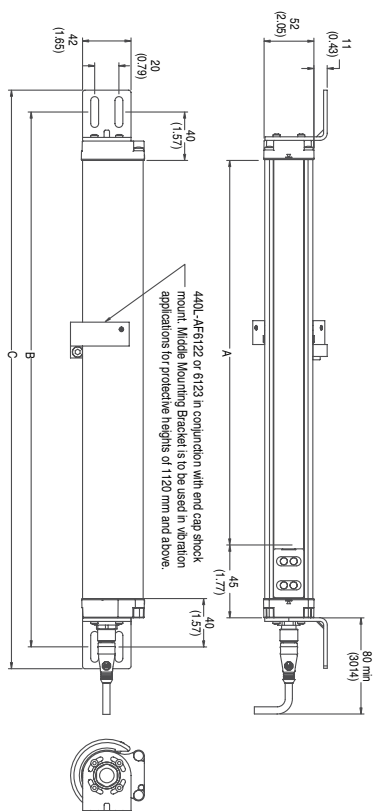
Safety Light Curtains

GuardShield Type 2 *cont*

Recommended Logic Interfaces

Description	Safety outputs	Reset type	Power supply	Cat. page. No.	Cat. No.
Single-function display					
MSR127	3 N/O	Auto/manual	24 V AC/DC	90	440RN23132
		monitored	24 V AC/DC	90	440RN23135
Modular relay					
MSR211	2 N/O	Auto/manual or monitored	24 V DC	103	440RH23177
MSR221	–	–	24 V DC from base	103	440RH23179
MSR320	–	–	24 V DC from base	104	440RW23218
Muting modules					
MSR22LM	2 N/O	Auto/manual	24 V DC	96	440RP23071
MSR42	2PNP	Auto/manual or monitored	24 V DC	97	440RP226AGSNNR

Dimensions & Wiring:





Safety Light Curtains

GuardShield Type 2 cont

Technical Data:

Safety ratings	Standards	IEC/EN 61496 Parts 1 & 2, UL 61496 Parts 1 & 2, UL 1998
	Safety classification	Type 2 per IEC/EN 61496, Category 2 device per EN 954-1
Certifications		CE marked for all applicable directives, UL 1998, cULus, and TÜV
Power supply	Input power	Max. 24 V DC $\pm 20\%$
	Maximum residual ripple	0.05 Vss
	Power consumption	400 mA max (no load)
Outputs	Safety outputs	2 OSSDs, 0.5 A, short-circuit protected
	Non-safety outputs	1 auxilliary output, 0.5 A max.
	Output voltage	Min. $U_v - 2V$
	Switching current @ voltage	Min. 500 mA @ 24 V DC
Operating characteristics	Response time	20 ms
	LED Indicators	On state, off state, alignment, interlock
	Protected height	160...1760 in 160 mm increments
	Resolution	30 mm
	Scanning range	16 m
	Synchronisation	Optical, without separate synchronisation channel
	Wavelength	870 nm
Environmental	Enclosure type rating	IP 65
	Relative humidity	15...95% (noncondensing)
	Operating temperature	-10°C...+55°C
	Vibration	IEC 60068-2-6, frequency, 10...55 Hz
	Amplitude	0.35 mm (0.01 in)
	Shock	IEC 60068-2-29 acceleration 10 g
Physical characteristics	Pulse duration	16 ms
	Mounting	End-cap mounting brackets
	Weight	Varies by protective height
	Housing cross section	40 mm x 50 mm
	Connection type transmitter	4-pin micro QD
	Receiver	8-pin micro QD
	Cable length	30 m max.



Safety Light Curtains

Area Access Control

Features:

- Long scan range
- Easy installation
- Die cast aluminium housing
- Heated front lens; can be used in outdoor applications

Ordering Details:

Transmitter	Receiver	Operating voltage	Connected type
440LT4F2070Q	440LR4F0020Q	24 V DC	Terminal chamber with cable gland (PG13.5 thread)



Accessories

Image	Cat. No.	Description
	440LALAT	Laser alignment tool
	440LALBRK1	Adaptor for alignment aid on AAC
	440LALBRK4	Mount bracket for AAC
	440LAMIRR1	Corner mirror for scanning range 0...30 m
	440LAMKIT	Mounting kit for 440LAMIRR1
	440L-AMBRK1	Mounting bracket for mirror 440LAMIRR1
	440LAMIRR2	Glass corner mirror, 45° angle 0...30 m



Safety Light Curtains

Area Access Control cont

Technical Data:

Safety ratings	Standards	IEC 61496, Parts 1 & 2
	Safety classification	Type 4
Certifications		CE marked for all applicable directives and BG
Power supply	Input power	Max. 24 V DC $\pm 20\%$ or 115 V AC $\pm 15\%$
	Maximum residual ripple	5% of U_v max.
	Power consumption	24 V DC 8 W max., 115 V AC 11 W max.
Outputs	Safety outputs	2 N/O relays
	Switching current @ voltage	0.02 A to 2 A
Operating characteristics	Response time	< 22 ms
	LED indicators	On state, Off state, alignment
	Beam diameter	23 mm (0.91 in)
	Scanning range	70 m max.
	Synchronisation	Optical
	Wavelength	950 nm
Environmental	Enclosure type rating	IP 67
	Relative humidity	15...95%
	Operating temperature	-25°C...+55°C
	Vibration	5 g, 10...55 Hz per IEC 68-2-6
	Shock	10 g, 16 ms per IEC 68-2-29
Physical characteristics		Front window heated
	Weight transmitter unit	Approx. 0.9...1.3 kg
	Receiver unit	Approx. 1...1.4 kg
	Housing cross section	50 x 156 x 116 mm
	Connection type	Terminal chamber with cable gland (PG13.5 thread)
	Cable length	50 m max



Vision Based Safety Sensor

SC 300

Ideal for machine openings of irregular shape.

Features:

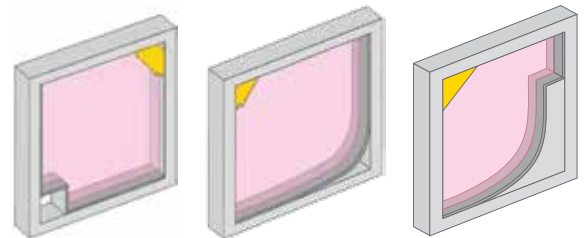
- Corner monitoring design
- CAT 3 rating
- Field range 110°
- Range of 2.1m

Ordering Details:

Cat. No.	Description
442L-SAFCAM1	SC 300 Vision Sensor
442L-ACAM24MMKIT	Reflective tape, 1.2m plus 24mm res. testing rod
442L-ACAM30MMKIT	Reflective tape, 1.5m plus 30mm res. testing rod

Accessories

Cat. No.	Description
889D-F8FB5	5m cable
442L-ACAMBRKI	S300 mounting brackets



Technical Data:

Standards	DIN EN61496-1:2009-03, IEC/TR 61496-4:2007-07, DIN EN 61508:2002/2003, DIN EN ISO 13849-1:2008-12
Safety Classification	Category 3 EN ISO 13849-1, Type 3 DIN EN61496-1, SIL 2 IEC 61508; SIL CL 2 EN 62061, PLd EN ISO 13849-1
Certifications	cULus, IFA, and CE marked for all applicable directives
PFHd	3.2×10^{-9}
Mission Time (Tm)	20 years (EN ISO 13849)
Power Supply	24V DC, -20% ... +20%
Power Consumption	4W (no load), 19W (max. output load)
Safety Outputs	2 OSSD, 0.25A
Switching Current @ Voltage min	6mA to 250mA @ 24V DC
Response Time	20ms
Field of View	$103^\circ \pm 3^\circ$
Safety Field Range	2.12m
Resolution	24mm, 30mm
Enclosure Type Rating	IP 54
Operating Temperature	-25°C ... +70°C



Safety Laser Scanner SafeZone Mini



- 270° scanning angle
- 2m safety field
- Configurable resolutions of 30mm, 40mm, 50mm and 70mm
- Seven segment diagnostic display
- Integrated EDM

Ordering Details:

Cat. No.	Description
442L-SFNMN	SafeZone Mini Scanner
442L-ACABL2	Cordset 2.5m
442L-ACABL10	Cordset 10m
442L-ACABL20	Cordset 20m
442L-ACUSB-2	Programming cable 2m
442L-ACUSB-10	Programming cable 10m

Accessories

Cat. No.	Description
442L-AMBSZMN1	Monitoring bracket – Kit 1
442L-AMBSZMN2	Monitoring bracket with optic protector – Kit 2
442L-AMBSZMN3	Adjustable bracket – used with Kit 1 or 2
442L-AMBSZMN4	Adjustable bracket – used with Kit 1 or 2 and 3
4142L-SZMNW	Replacement window kit



Safety Laser Scanner

SafeZone Mini *cont*

Technical Data:

Standards	DIN EN61496-1:2009-03, DIN EN 61508:2002/2002, DIN EN ISO 13849-1:2008-12
Safety Classification	Category 3 EN ISO 13849-1, Type 3 DIN EN61496-1, SIL 2 IEC 61508; SIL CL 2 EN 62061, PLd EN ISO 13849-1
Certifications	cULus, TÜV, and CE marked for all applicable directives
PFHd	9.8×10^{-9}
Mission Time (Tm)	20 years (EN ISO 13849)
Power Supply	24V DC, +25% ... -30%
Power Consumption	19W (no load), 55W (max. output load)
Safety Outputs	2 OSSD, 0.25A
Switching Current @ Voltage min	6mA to 250mA @ 24V DC
Response Time	80ms
Scanning Angle	270°
Safety Field Range	2m
Resolution	30mm, 40mm, 50mm, 70mm
Enclosure Type Rating	IP 65
Operating Temperature	-10°C ... +50°C



Safety Laser Scanner

SafeZone single zone and multi zone

Features:

- Single zone & multizone models available
- 190° scanning angle
- Seven-segment diagnostic display
- Configurable resolutions 30, 40, 70 and 150 mm
- Integrated EDM

Ordering Details:

Cat. No.	Description
442LSFZNMZ	Multi zone scan head and I/O module (required)
442L-SFZNSZ	Single zone scan head & I/O module
442LCSFZNMZ10	Prewired 13 conductor with memory module (10 m or 20 m)
442LCSFZNMZ20	Prewired 13 conductor with memory module (10 m or 20 m)
442LACR232	Programming cable (2 m)
442LACRS2328	Programming cable (10 m)

Accessories

Image	Cat. No.	Description
	442LAMBSFZNMZ1	Mounting kit 1: mounting bracket for direct mounting at the rear on wall or machine. No adjustment facility.
	1606XLP72E	3.0 A power supply
	9300USBS	USB to serial port adaptor cable
	442LC13GDS100	100 m cable spool 13 conductor
	442LSFZNMZW	Replacement window kit
	442LSFZNMZSM	Replacement part – single zone scan head, 4 m
	442LSFZNMZWSM	Replacement part – multi zone scan head, 5 m
	442LSFZNMZFM	Replacement part – singlezone I/O module, 1 field set
	442LSFZNMZWFM	Replacement part – multizone I/O module, 4 field sets
	442LSFZNMZMEM	Replacement part – unwired memory module – single zone
	442LSFZNMZWMEM	Replacement part – unwired memory module – multi zone



Safety Laser Scanner

SafeZone single zone and multi zone cont

Technical Data:

Safety ratings	Standards	IEC 61496-3, UL 61496, IEC 61508
	Safety classification	Type 3 per IEC 61496
Certifications		CE marked for all applicable directives, TÜV, cULus, Type 3 AOPDDR per IEC 61496, SIL 2 per IEC 61508
Power supply	Input power	Max. 24 V DC +20%/-30%
	Maximum residual ripple	5%
	Power consumption	55 W with max. output load, 19 W without output load
Outputs	Safety outputs	2 PNP OSSDs 500 mA short-circuit protection
	Auxiliary outputs	1 PNP, 500 mA non-safety
	Switching current @ voltage	2 A
Operating characteristics	Response time	60 ms or 120 ms
	LED indicators	OSSDs on, reset required, warning field interruption, front screen contaminated, OSSDs off
	Scanning angle	190° max.
	Resolution	30, 40, 50, 70, 150 mm
	Angular resolution	0.25...0.50°
	Wavelength	905 nm
	Power-up delay	9...20 sec
Environmental	Enclosure type rating	IP 65
	Operating temperature	-5°C...+55°C
	Storage temperature	-25°C...+70°C
	Vibration	10...150 Hz, 0.35 mm or 5 g per IEC 61496
	Shock (single)	15 g, 11 ms per EN 60068-2-27
Physical characteristics	Shock (continuous)	10 g, 16 ms per IEC 61496
	Weight	3.3 kg
	Material	Die cast aluminium
	Display window	Polycarbonate
	Cable length	10 m or 20 m

NHP SAFETY REFERENCE GUIDE



PRODUCTS

Safety Tactile Devices



Safety Mats

MatGuard Mats

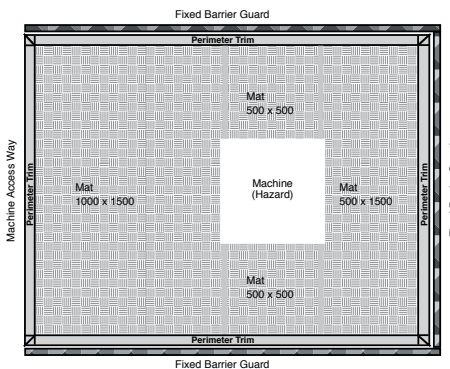
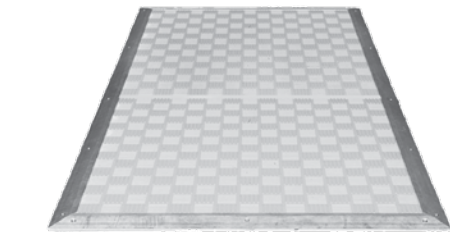
Features:

- Third party certification to EN 1760-1
- Also meets EN954-1 (ISO 13849-1) Category 3 system and IEC/EN 60204-1, AS4024.5, ANSI B11.19, ANSI RIA R15.06
- Overall sensitivity including uniting strip
- Mat manager monitors the status of each mat individually
- Rugged construction will take the pressure of 4500 psi (does not include the active uniting trim)
- Vinyl construction resistant to most oils
- Sealed to IP 67
- No dead spots
- 4-wire system to detect opens and shorts
- Can withstand static pressure of 4500 psi
- 5-year warranty on mats

Ordering Details:

Cat No.	Standard perimeter trim kit	Mat size (mm)
440FM1010BYNN	440FT1010	500 x 500
440FM1015BYNN	440FT1015	500 x 750
440FM1515BYNN	440FT1515	750 x 750
440FM1020BYNN	440FT1020	500 x 1000
440FM2020BYNN	440FT2020	1000 x 1000
440FM2030BYNN	440FT2030	1000 x 1500
Recommended control unit	440RC23139	

Other sizes available, refer NHP



Accessories

Image	Trim options	Dimensions	Description
	440FT3210	2 m	Standard perimeter trim (aluminium) for use with up to three cables running through a cabinet
	440FT3310	3 m	Standard perimeter trim (aluminium) for use with up to three cables running through a cabinet
	440FT3012	—	Standard perimeter trim (aluminium) external corner
	[i] 440FT3013	—	Standard perimeter trim (aluminium) internal corner
	[i] 440FT3211	2 m	Aluminium perimeter trim with cable channel. Used when up to eight channels need to be fed through channel
	440FT3120	1 m length	Active uniting trim used to join two mats to ensure no dead spot



Safety Mats

MatGuard Mats cont

Technical Data:

Safety ratings	Standards	EN1760-1, EN954-1, ISO 13849-1, IEC/EN60204-1, ANSI RIA R15.06, ANSI/B11.19, AS4024.5
	Safety classification	Category cat. 1 device per EN954-1, suitable for cat. 3 systems
Certifications		CE marked for all applicable directives, cULus, CSA Z432-04, and TÜV
Power supply		24 V DC, -20% +10%, provided by the control unit
	Connection wire length	Max. 200 m
	Cable length	4.5 m standard (see Product Selection)
	Detection weight	30 kg minimum on an 80 mm diameter circular disk
	Maximum pressure applied to mat	31,034 kPa (4500 psi)
	Zone size	100 m ² , maximum
Operating characteristics	Mechanical life	10,000,000 operations
Environmental	Operating temperature	-25°C...+55°C
	Relative humidity	100%
	Enclosure type rating	IP 67 (NEMA 6P)
	Vibration	5 g, 10...200 Hz
	Shock	11 ms 10 g/16 ms 10 g
	Terminal protection	IP 20 DIN 0470
Physical characteristics	Wire size	0.75 mm ² (18 AWG), 2 wire; 3.8 mm x 7.4 mm jacket OD
	Weight	10.9 kg/m ²
	Material	Plastisol vinyl
	Colour	Yellow or black
	Trim material	6063 aluminium
	Mounting	Flat surface
	Thickness	16 mm

Chemical resistance of sensor mat vinyl covering

Substance	Resistance of mat covering	Substance	Resistance of mat covering
Water	Excellent	Trichlorethylene	Poor to fair
Ethyl alcohol	Excellent	Benzene	Poor
Sodium chloride	Excellent	Acetone	Poor
Bleach	Excellent	Water (sea)	Excellent
Hydrochloric acid	Fair to excellent	Lubricating oil	Fair to excellent
Sulphuric acid	Fair to excellent	Cutting fluids	Fair to excellent
Nitric acid	Fair to excellent	Oil (auto)	Fair to excellent
Acetic acid	Fair	Brake fluids	Poor to fair
Petrol (gasoline)	Fair		



Safety Edge Safedge™ Profiles

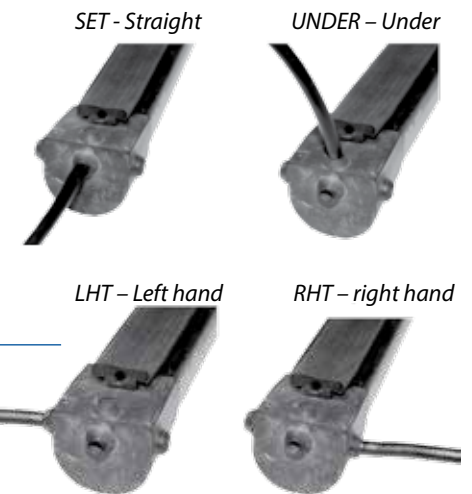
Features:

- Various profiles
- Conductive rubber technology
- Up to 50 m lengths
- Aluminium, plastic or zinc-coated steel mounting rails
- Rubber boot optional
- Active corners
- Sealing lip available

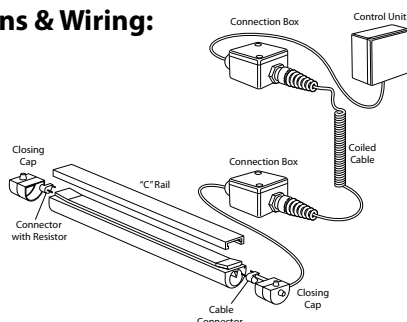
Ordering Details:

Factory Assembled Product Selection (standard profile)

440F –	E	C	A	M	V	01270
	*	a	b	c	d	e
Code	a Profile			b C-rail		c Cable entrance
A		0110S		1212 aluminium for profile codes A-L		LHT left entrance with 1 m cable
B		0110R		1112 zinc coated steel for profile codes A-L		LHT left entrance with 2 m cable
C		0110N		1212PB PVC black for profile codes A-L		LHT left entrance with 3 m cable
D		0510S with sealing lip on right side		1212PR PVC red for profile codes A-L		LHT left entrance with 5 m cable
E		1610S		1212PY PVC yellow for profile codes A-L		LHT left entrance with 10 m cable
F		1610N		1214 aluminium with vertical lip for profile codes A-L		RHT right entrance with 1 m cable
G		0804S with sealing lip on right side		1215 aluminium with horizontal lip for profile codes A-L		RHT right entrance with 2 m cable
H		0310S		1216 aluminium deep rail for profile codes A-L		RHT right entrance with 3 m cable
I		0210S with sealing lip on right side		–		RHT right entrance with 5 m cable
J		0510S with sealing lip on left side		2151 aluminium for profile codes N and O		RHT right entrance with 10 m cable
K		0804S with sealing lip on left side		–		SET straight entrance with 1m cable
L		0210S with sealing lip on left side		–		SET straight entrance with 2 m cable
M		–		–		SET straight entrance with 3 m cable
N		Rubber boot over 0110S		No C-rail (not needed)		SET straight entrance with 5 m cable
O		Rubber boot over 1610S		–		SET straight entrance with 10 m cable
P		No profile		–		UNDER entrance with 1 m cable
Q		–		–		UNDER entrance with 2 m cable
R		–		–		UNDER entrance with 3 m cable
S		–		–		UNDER entrance with 5 m cable
T		–		–		UNDER entrance with 10 m cable
U		–		–		No entrance components



Dimensions & Wiring:



Example application of profile using coiled cable. The coiled cable can not be directly connected to the profile due to the weight of the cable. The proper use of the coiled cable is to connect the coiled cable to the profile through the connection box. The coiled cable should be secured to both the moving and stationary objects so as to prevent straining of the terminal connections.

continued



Safety Edge

Safedge™ Profiles *cont*

Ordering Details:

Factory Assembled Product Selection (standard profile) *cont*

440F –	E	C	A	M	V	01270
	*	a	b	c	d	e

Code	d Termination	No. Code	e Length of edge																																								
A	LHT left exit with 1 m cable	5 digit number	Enter length of edge in mm; for example: 50 m = 50000, 500 mm = 00500; 300 mm minimum; ± 2.5 mm tolerance. * Order controller separately.																																								
B	LHT left exit with 2 m cable																																										
C	LHT left exit with 3 m cable																																										
D	LHT left exit with 5 m cable																																										
E	LHT left exit with 10 m cable																																										
F	RHT right exit with 1 m cable																																										
G	RHT right exit with 2 m cable	Chemical resistance of Safedge™ profile <table><tr><th>Substance</th><th>Resistance of mat covering</th><th>Substance</th><th>Resistance of mat covering</th></tr><tr><td>Water</td><td>Excellent</td><td>Trichlorethylene</td><td>Poor to fair</td></tr><tr><td>Ethyl alcohol</td><td>Excellent</td><td>Benzene</td><td>Poor</td></tr><tr><td>Sodium chloride</td><td>Excellent</td><td>Acetone</td><td>Poor</td></tr><tr><td>Bleach</td><td>Excellent</td><td>Water (sea)</td><td>Excellent</td></tr><tr><td>Hydrochloric acid</td><td>Fair to excellent</td><td>Lubricating oil</td><td>Fair to excellent</td></tr><tr><td>Sulphuric acid</td><td>Fair to excellent</td><td>Cutting fluids</td><td>Fair to excellent</td></tr><tr><td>Nitric acid</td><td>Fair to excellent</td><td>Oil (auto)</td><td>Fair to excellent</td></tr><tr><td>Acetic acid</td><td>Fair</td><td>Brake fluids</td><td>Poor to fair</td></tr><tr><td>Petrol (gasoline)</td><td>Fair</td><td>—</td><td>—</td></tr></table>		Substance	Resistance of mat covering	Substance	Resistance of mat covering	Water	Excellent	Trichlorethylene	Poor to fair	Ethyl alcohol	Excellent	Benzene	Poor	Sodium chloride	Excellent	Acetone	Poor	Bleach	Excellent	Water (sea)	Excellent	Hydrochloric acid	Fair to excellent	Lubricating oil	Fair to excellent	Sulphuric acid	Fair to excellent	Cutting fluids	Fair to excellent	Nitric acid	Fair to excellent	Oil (auto)	Fair to excellent	Acetic acid	Fair	Brake fluids	Poor to fair	Petrol (gasoline)	Fair	—	—
Substance	Resistance of mat covering			Substance	Resistance of mat covering																																						
Water	Excellent			Trichlorethylene	Poor to fair																																						
Ethyl alcohol	Excellent			Benzene	Poor																																						
Sodium chloride	Excellent			Acetone	Poor																																						
Bleach	Excellent			Water (sea)	Excellent																																						
Hydrochloric acid	Fair to excellent			Lubricating oil	Fair to excellent																																						
Sulphuric acid	Fair to excellent			Cutting fluids	Fair to excellent																																						
Nitric acid	Fair to excellent			Oil (auto)	Fair to excellent																																						
Acetic acid	Fair			Brake fluids	Poor to fair																																						
Petrol (gasoline)	Fair	—	—																																								
H	RHT right exit with 3 m cable																																										
I	RHT right exit with 5 m cable																																										
J	RHT right exit with 10 m cable																																										
K	SET straight exit with 1 m cable																																										
L	SET straight exit with 2 m cable																																										
M	SET straight exit with 3 m cable																																										
N	SET straight exit with 5 m cable																																										
O	SET straight exit with 10 m cable																																										
P	UNDER exit with 1 m cable																																										
Q	UNDER exit with 2 m cable																																										
R	UNDER exit with 3 m cable																																										
S	UNDER exit with 5 m cable																																										
T	UNDER exit with 10 m cable																																										
U	Parallel termination — 15 kΩ																																										
V	Series termination — 6 kΩ																																										
W	No exit components																																										

Recommended safety relays (required)

Single function safety relays	Cat. No.	Safety outputs	Aux. outputs	Terminals	Reset Type	Power supply
	440FC251D	2 N/O	1 N/C	Fixed	Automatic /Manual	24 V AC/DC or 110/230 V AC
	440FC252D	1 N/O	1 N/C	Removable	Automatic /Manual	24 V AC/DC
	440FC251P	2 N/O	1 N/C	Fixed	Automatic /Manual	24 V AC/DC or 110/230 V AC

For safety edge components, please refer NHP



Safety Edge

Safedge™ Profiles cont

Technical Data:

Safety ratings	Standards	Standards EN1760-2, EN 954-1, ISO13849-1, IEC/EN60204-1, ANSI B11.19, AS 4024.5
Certifications		CE marked for all applicable directives and TÜV. C-Tick not required.
Specifications	Certifications power supply	Operates on 4 V DC supplied from control unit
	Operating temperature	EPDM material: -5...+55°C NBR/CR material: 0...+55°C
	Relative humidity	90%
	Enclosure type rating	IP 65
Material	EPDM	Ethylene propylene diene modified rubber
	NBR/CR	Acrylonitrile (34% nitrile) butadiene
	Rubber	Chloroprene rubber
	Bend radius	Min. 500 mm

NHP SAFETY REFERENCE GUIDE



PRODUCTS

Safety Relays and
Programmable Devices

Standalone/Modular Safety Relays

GSR Series

Features:

This series is ideal for guard door, E-Stop, light curtain or safety mat applications. These relays can be configured standalone or expanded as a modular system.

The logic allows for the system to be split into multiple zones. The expansion units will provide immediate or delayed output signals and safe speed monitoring.

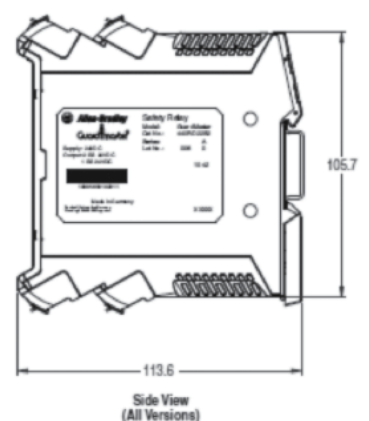
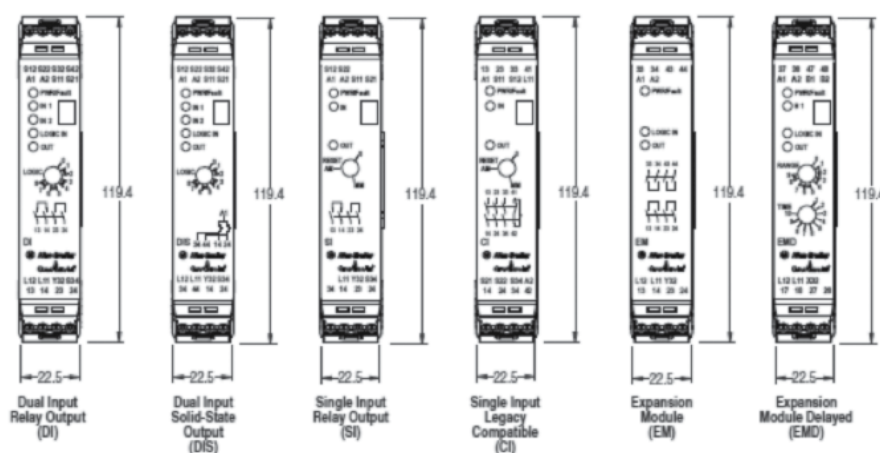
- Universal input for E-stop, safety gate, light curtains and safety mat applications
- Category 4, PLe and SIL 3 rating
- Safe speed functionality
- Standstill monitoring functionality
- Dual input models can monitor two safety devices
- Relays can be linked to each other
- AND/OR logic can be set between the relays
- Expansions models for both Stop Category 0 and 1



Ordering Details:

Cat. No.	No. of Input Devices	No. of Safety Outputs	No. of Aux. Outputs
440R-D22R2 (DI)	2 dual channel devices	2 NO	1 PNP
440R-D22S2 (DIS)		2 Solid state	
440R-S12R2 (SI)	1 dual channel device	2 NO	1 PNP
440R-S13R2 (CI)		3 NO	1 NC
440R-EM4R2 (EM)	N/A	4 NO immediate	1 PNP
440R-EM4R2D (EMD)		4 NO delayed	
440R-GL2S2P	2 PNP proxies & 1 dual channel device	2 solid state	1 PNP

Dimensions & Wiring:





Standalone/Modular Safety Relays

GSR Series cont

Technical Data:

Standards		IEC60204-1, EN ISO13849-1, EN ISO12100, IEC61508
Safety ratings	Safety classification	Suitable up to PLe and CAT 4 per EN ISO 13849-1:2006; SIL CL3 per IEC 61508:2010/IEC 62061:2006, depending on architecture and application characteristics. GLP: Suitable up to PLd and CAT 3 per ISO 13849-1:2006; SILCL 2 per IEC 61508:2010/IEC 62061:2006, depending on architecture and application characteristics
	Certifications	CE Marked for all applicable directives, cULus and TUV
	PFHd*	DI – 4.35 X 10 ⁻⁹ ; DIS – 4.39 X 10 ⁻⁹ ; SI – 3.98 X 10 ⁻⁹ ; CI – 4.26 X 10 ⁻⁹ ; EM – 1.81 X 10 ⁻⁹ ; EMD – 4.4 X 10 ⁻⁹ ; GLP – 7.18 x 10 ⁻⁹
	MTTFd*	DI – 355 yr; DIS – 484 yr; SI – 262 yr; CI – 164 yr; EM – 190 yr; EMD – 165 yr; GLP – 395 yr
Operating characteristics	Power Supply	24VDC (-15....+10%)
	Power Consumption	DI/SI – 2.5W, DIS – 2W, CI/EM/EMD – 3.5W, GLP – 2.5W
	Safety Inputs	DI/DIS – 2 dual NC or 2 dual OSSD or safety mats and 1 single wire safety input SI/CI – 1 dual NC or 1 dual OSSD or safety mats EM/EMD – 1 single wire safety input GLP: 1 dual NC or 1 dual OSSD and 1 single wire safety input.
	Reset	Configured automatic/manual or monitored manual
	Response Time (Safety outputs)	DI – 35ms (40ms with mat input), DIS – 25ms (30ms with mat input), SI/CI – 35ms (45ms with mat input), EM/EMD – 25ms, GLP – overspeed detetion time = 3/(speed limit)
	Response Time (Single wire safety outputs)	DI/DIS – 25ms (30ms with mat input), SI/CI – 25ms (35ms with mat inputs), GLP/EM/EMD – 25ms
	Safety Outputs	DI/SI – 2NO, CI – 3NO, GLP / DIS – 2PNP, EM – 4NO, EMD – 4NO delayed
	Auxiliary Outputs	GLP/DI/DIS/SI/EM/EMD – 1PNP, CI – 1NC
	Output impulse voltage	2500V
	Switching current (min)	10mA @ 10V
	Output fuse	6A slow blow or 10A quick blow
	Inductive rating AC-15	DI – 3A/250VAC, SI/CI – 1.5A/250VAC, EM/EMD – 1.5A/250VAC
	Inductive rating, DC-13	DI – 4A/24VDC, SI/CI – 2A/24VDC, EM/EMD – 2A/24VDC
	Output rating	DIS – Terminals 14&24: 1.5A, Terminals 34&44: 0.5A GLP – Terminals 14&24: 0.5A, Terminals 51&61:0.3A
	Protection class	Enclosure (IP40), Terminals (IP20)
Environmental	Ambient Temperature	-5°C....+55°C
	Vibration	10...55 Hz, 0.35mm
	Shock	10 g, 16 ms 100 shocks
Physical characteristics	Mounting	35 mm DIN rail
	Mechanical life	10 million operations

* Usable for ISO 13849-1:2006 and IEC 62061. Data is based on the following assumptions:

- Mission time/proof test interval of 20 years
- Functional test at least once within six-month period
- The PFHd given is the sum of the PFHd of the electronic aspects and the PFHd resulting from the B10d values of the two output relays based on 1 operation/hour, 365 days a year, 24 hours a day (8760 operations/year) at AC15 1A 230V AC or at DC13 1.5 A 24V DC



Standalone Safety Relays

GLP Module

Safety relay ideal for monitoring safe speed or motor standstill.

Features:

- Can perform either safe speed monitoring or standstill monitoring
- Category 3 PLd and SIL 3 rating
- Can communicate to the GSR range
- Connects to 2 PNP proximity sensors for speed detection
- Ability to monitor guard door as additional safety function

Ordering Details:

Cat. No.

440R-GL2S2P

Technical Data:

Standards	IEC 60204-1, EN ISO 13849-1, EN ISO 12100, IEC 61508
Safety Classification	Suitable up to PLd and CAT3 per ISO 13849-1:2006, SILCL 2 per IEC 61508:2010/IEC62061:2006 depending on architecture and application characteristics
Certifications	CE Marked for all applicable directives, cULus Listed and TÜV
MTTFd*	395 years
PFHd*	7.18×10^{-9}
Power Supply	24V DC (-15... +10%)
Power Consumption	2.5W
Safety Inputs	1 dual NC or 1 dual OSSD and 1 single/wire safety
Reset	Configured automatic/manual or monitored manual
Reset Pulse Duration	250ms ... 3s
Response Time (Single-Wire Safety Outputs)	25ms
Safety Outputs	2 PNP safety, 2 PNP Lock
Solid State Output Rating	2 x 0.5A (Safety), 2 x 0.3A (Lock); Total max 1.5A
Auxiliary Contact	1 PNP; 50mA max
Rated Impulse withstand Voltage	2500V
Enclosure Type Rating	IP 40
Terminal Protection	IP 20
Operating Temperature	-5°C ... +55°C
Vibration	10 ... 55Hz, 0.35mm
Shock	10g, 16ms, 100 shocks



* Usable for ISO 13849-1:2006 and IEC 62061. Data is based on the following assumptions:

- Mission time/proof test interval of 20 years
- Functional test at least once within six-month period
- The PFHd given is the sum of the PFHd of the electronic aspects and the PFHd resulting from the B10d values of the two output relays based on 1 operation/hour, 365 days per year, 24 hours a day

Guardmaster® 440R-ENETR EtherNet/IP™ Network Interface

Guardmaster® Series

Features:

Seamlessly communicates real-time terminal-level diagnostics to help increase productivity.

Enhanced flexibility

- Connectivity for Guardmaster Safety Relays to EtherNet/IP networks
- Optical link technology means no physical connectors
- Compliant with ODVA requirements for linear, star, and ring EtherNet/IP network topology

Optimized cost savings, minimized downtime

- Real-time terminal-level diagnostics of your safety system helps to minimize unplanned downtime
- Connect up to six Guardmaster safety relays on a single network interface
- Removable terminations accelerate commissioning

Easy-to-use, compact solution

- No routing tables and network scheduling required
- Fast, simple configuration and integration
- Full Add-on Profile in Logix Designer, no other software is needed
- Slim, 22.5 mm wide DIN Rail mounted design



Ordering Details:

Cat. No.	Description
440R-ENETR	Guardmaster Ethernet/IP Network Interface
1585J-M8TBJM-2	Straight Male RJ45 to Straight Male RJ45 Ethernet Patchcord, 8 conductor (4-pair), Cat 5e, TPE, 2 m length ¹⁾
1585J-E8TBJM-2	Right Angle Male RJ45 to Straight Male RJ45 Ethernet Patchcord, 8 conductor (4-pair), Cat 5e, TPE, 2 m length ²⁾
1585J-L8TBJM-2	Left Angle Male RJ45 to Straight Male RJ45 Ethernet Patchcord, 8 conductor (4-pair), Cat 5e, TPE, 2 m length ³⁾
Cat. No.	Supported Guardmaster Safety Relays
440R-D22R2	Guardmaster Safety Relay DI
440R-D22S2	Guardmaster Safety Relay DIS
440R-EM4R2	Guardmaster Safety Relay EM
440R-EM4R2D	Guardmaster Safety Relay EMD
440R-GL2S2P	Guardmaster Safety Relay GLP
440R-GL2S2T	Guardmaster Safety Relay GLT

Firmware V2 or later

Notes

¹⁾ All Ethernet Media Cables are available in 0.1 m increments up to 80 m.

²⁾ Recommended for RJ45 connection located at the top of the Guardmaster Ethernet/IP Network Interface.

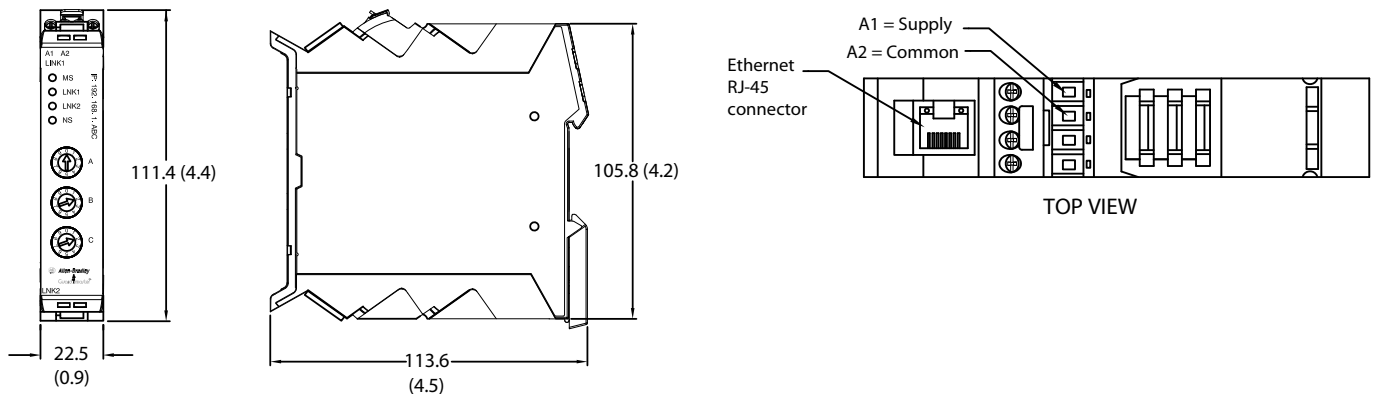
³⁾ Recommended for RJ45 connection located at the bottom of the Guardmaster Ethernet/IP Network Interface.



Guardmaster® 440R-ENETR EtherNet/IP™ Network Interface

Guardmaster® Series *cont*

Dimensions & Wiring:



Technical Data:

Specifications	Safety classification	Not applicable. This product is not intended for safety-related control or diagnostics.
	Guardmaster Safety Relay capacity	6 Guardmaster safety relays
	Supported modules (FW Rev 2.xx or greater)	GSR DI (Cat. No. 440R-D22R2) GSR DIS (Cat. No. 440R-D22S2) GSR EM (Cat. No. 440R-EM4RR2) GSR EMD (Cat. No. 440R-EM4R2D) GSR GLP (Cat. No. 440R-GL2S2P) GSR GLT (Cat. No. 440R-GL2S2T)
	Location	Left side of the Guardmaster Safety Relay system
Power Supply	Input voltage: rating	24 V DC
	Input voltage: range	11...26.4 V DC
	Input overvoltage protection	Reverse polarity protected
Ethernet Communication	Ethernet communication rate	10/100 Mbps/s, half or full-duplex
	Ethernet ports	2, configured as Embedded Switch
	Ethernet network topologies supported	Star, Tree, Daisy-chain/Linear, and Ring
	Ethernet connectors	RJ-45, Category 5
	Ethernet cable	Category 5: shielded or un-shielded
	Ethernet wire connections, max.	See Dimensions and Wiring above.



Guardmaster® 440R-ENETR EtherNet/IP™ Network Interface

Guardmaster® Series cont

Technical Data:

General Specifications	Indicators	2 red/green status indicators: • Module status • Network status (Ports 1 and 2 combined) 2 green/yellow status indicators: • Link 1 status • Link 2 status
	Power consumption, max.	2.2 W @ 26.4V DC
	Power dissipation, max.	0.8 W @ 26.4V DC
	Thermal dissipation, max.	2.7 BTU/hr @ 26.4V DC
	Module input	10...28V DC @ 1000 mA
	Dimensions (HxWxD), approx.	111.4 x 22.5 x 113.6 mm (4.39 x 0.89 x 4.47 in.)
	Enclosure type rating	None (open-style)
	Terminal base screw torque	0.8 Nm (7 lb-in)
	Weight, approx.	180 g (0.4 lb)
	Wiring category ⁽¹⁾	1 – on power ports 1 – on communications ports
	Wire size	Power connections: 0.34... 2.1 mm ² (22...14 AWG) solid or stranded copper wire rated @ 75 °C (167 °F) or greater, 1.2 mm (3/64 in.) insulation max. Ethernet wiring: RJ45 connector according to IEC 60603-7, 2 or 4 pair Category 5e min cable according to TIA 568-B.1 or Category 5 cable according to ISO/IEC 24702.
	North American temp code	T6
	IEC temp code	T6
Environmental Specifications	Temperature, operating	• IEC 60068-2-1 (Test Ad, Operating Cold), • IEC 60068-2-2 (Test Bd, Operating Dry Heat), • IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20...55 °C (-4...131 °F)
	Temperature, surrounding air max.	55 °C (131 °F)
	Temperature, nonoperating	• IEC60068-2-1 (Test Ab, Unpackaged Nonoperating Cold) • IEC60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) • IEC60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock): -40...85 °C (-40...185 °F)
	Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5...95% non-condensing
	Vibration	IEC 60068-2-6 (Test Fc, Operating): 5 g @ 10...500 Hz
	Shock, operating	IEC60068-2-27 (Test Ea, Unpackaged Shock): 15 g
	Emissions	CISPR 11: Group 1, Class A
	ESD immunity	IEC61000-4-2: 6 kV contact discharges 8 kV air discharges
	Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 10V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz



Guardmaster® 440R-ENETR EtherNet/IP™ Network Interface

Guardmaster® Series *cont*

Technical Data:

Environmental Specifications	EFT/B immunity	IEC 61000-4-4: ±4 kV @ 5 kHz on power ports ±2 kV @ 5 kHz on communications ports
	Surge transient immunity	IEC 61000-4-5: ±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±2 kV line-earth (CM) on communications ports
	Conducted RF immunity	IEC61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz
Certifications ⁽²⁾	c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E192904.
	CE	European Union 2004/108/EC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
	EtherNet/IP	ODVA conformance tested to EtherNet/IP specifications

⁽¹⁾ Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

⁽²⁾ See the Product Certification link at <http://www.rockwellautomation.com/rockwellautomation/certification/> for Declaration of Conformity, Certificates, and other certification details.



Standalone Safety Relays

MSR 127 series

Safety relay ideal for guard door, E-stop or light curtain (1 N/C or 2 N/C) monitoring applications.

Features:

- E-stop, safety gate, non-contact switches or light curtain applications
- Category 4
- Single channel or dual channel monitoring
- Stop category 0
- Monitored or automatic reset models
- Three N/O safety outputs

Ordering Details:

Cat. No.	Supply voltage
MSR 127 (auto/manual reset)	
440R-N23132	24 V AC/DC
440R-N23130	230 V AC
MSR 127 (monitored manual reset)	
440R-N23135	24 V AC/DC
440R-N23133	230 V AC



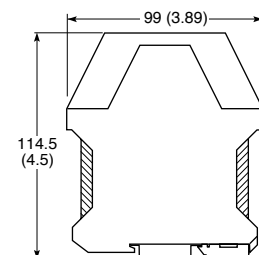
Technical Data:

Standards	EN 954-1;ISO 13849-1;IEC/EN 60204-1;IEC 60947-4-1; IEC 60947-5-1;AS 4024.1
Safety classification	Category 4 per EN 954-1 (ISO 13849-1), SIL 3 per AS 62061, PL e per ISO 13849-1
PFHd*	$< 1.45 \times 10^{-9}$
MTTFd*	> 398 years
Power supply	24 V AC/DC, 115 V AC or 230 V AC 50/60 Hz
Power consumption	2 W
Safety input	1 N/C, 2 N/C or light curtain
Outputs	3 N/O safety, 1 N/C auxiliary
Output I_{th}	24 V supply model: 3 x 4 A or 2 x 5 A nonswitching; 230 V supply model: 3 x 3 A, 2 x 4 A or 1 x 5 A nonswitching
Output impulse voltage	2500 V
Switching current min.	10 mA @ 10 V
Output fuse	External 6 A slow blow or 10 A fast acting
I_e / U_e	AC-1: 5 A/250 V AC; DC-1: 5 A/24 V DC; AC-15: 5 A/250 V AC; DC-13: 3 A/24 V DC
Protection class	IP 20 (Terminals)
Conductor size max.	0.2 - 4 mm ² (24 - 12 AWG)
Ambient temperature	-5°C...+55°C
Vibration	10 - 55 Hz, 0.35 mm
Shock	10 g, 16 ms 100 shocks
Mounting	35 mm DIN rail
Mechanical life	2 million operations

* Data based on Mission Time / Proof Test interval of 20 years and a functional test at least once per 6 months.

Dimensions & Wiring:

22.5 (0.88)



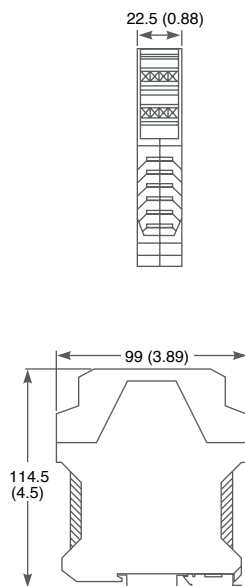
Standalone Safety Relays

MSR 33 series

Safety relay ideal for guard door or Sipha sensor (1 N/O / 1 N/C) monitoring applications.



Dimensions & Wiring:



Features:

- Safety gate or Sipha sensor applications
- Category four
- 1 N/O / 1 N/C input monitoring
- Stop category 0
- Two solid-state safety outputs

Ordering Details:

Cat. No.	Supply voltage
440R-F23200	24 V DC SELV

Technical Data:

Standards	EN 954-1; ISO 13849-1; IEC/EN 60204-1; AS 4024
Safety Classification	Category 4 per EN 954-1 (ISO 13849-1), SIL 3 per AS 62061, PL e per ISO 13849-1
PFHd*	$< 9.2 \times 10^{-10}$
MTTFd*	> 631 years
Power supply	24 V DC SELV
Power consumption	3 W
Safety input	1 N/O & 1 N/C
Outputs	2 N/O solid-state safety, 1 N/O solid-state auxiliary
Protection class	IP 20 (terminals)
Conductor size max.	0.2 - 2.5 mm ² (24 - 14 AWG)
Ambient temperature	-5°C...+55°C
Vibration	10 - 55 Hz, 0.35 mm
Shock	10 g, 16 ms 100 shocks
Mounting	35 mm DIN rail

* Data based on Mission Time / Proof Test interval of 20 years.



Standalone Safety Relays

MSR 131 series

Safety relay ideal for safety mat monitoring applications.

Features:

- Safety mat, light curtain or E-stop applications
- Category four
- Single or dual channel monitoring
- Stop category 0
- Three N/O safety outputs

Ordering Details:

Cat. No.	Supply voltage
440R-C23139	24 V AC/DC
440R-C23136	230 V AC

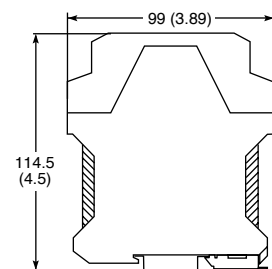
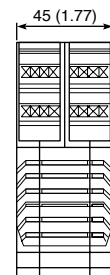


Technical Data:

Standards	EN 954-1;ISO 13849-1;IEC/EN 60204-1;IEC 60947-4-1; IEC 60947-5-1;AS 4024.1
Safety classification	Category 4 per EN 954-1 (ISO 13849-1), SIL 3 per AS 62061, PL e per ISO 13849-1
PFHd*	$< 1.67 \times 10^{-9}$
MTTFd*	> 389 years
Power supply	24 V AC/DC, 115 V AC or 230 V AC
Power consumption	4 W
Safety input	1 N/C, 2 N/C, safety mat or light curtain
Outputs	3 N/O safety, 2 N/C auxiliary
Output lth	1 x 6 A or 3 x 5 A nonswitching
Output impulse voltage	2500 V
Switching current min.	10 mA @ 10 V
Output Fuse	External 6 A slow blow or 10 A fast acting
I_e / U_e	AC-1: 6 A/250 V AC; DC-1: 6 A/24 V DC; AC-15: 6 A/250 V AC; DC-13: 3 A/24 V DC
Protection class	IP 20 (terminals)
Conductor size max.	0.2 - 4 mm ² (24 - 12 AWG)
Ambient temperature	-5°C... +55°C
Vibration	10 - 55 Hz, 0.35 mm
Shock	10 g, 16 ms 100 shocks
Mounting	35 mm DIN rail
Mechanical life	2 million operations

* Data based on Mission Time / Proof Test interval of 20 years and a functional test at least once per 6 months.

Dimensions & Wiring:





Standalone Safety Relays

MSR 178 series

Safety relay ideal for safety gate, light curtains, two hand control or E-stop monitoring applications with delayed stopping.

Features:

- Safety gate, E stop, light curtain, two hand control
- Category four
- Stop category one
- 3 N/O safety outputs

Ordering Details:

Cat. No.	Supply voltage
440R-M23227	24 V AC/DC, 115 V AC or 230 V AC

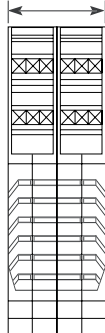
Technical Data:

Standards	EN 954-1; IEC 61508; AS 62061; ISO 13849-1; IEC/EN 60204-1; IEC 60947-5-1; AS 4024.1
Safety classification	Category 4 per EN 954-1 (ISO 13849-1), SIL 3 per AS 62061, PL e per ISO 13849-1
PFHd*	$< 2.74 \times 10^{-9}$
MTTFd*	> 285 years
Power supply	24 V AC/DC, 115 V AC or 230 V AC 50/60 Hz
Power consumption	4 W
Safety input	1 N/C, 2 N/C, 1 N/O, 2 N/O or light curtain
Outputs	3 N/O safety, 2 N/C auxiliary
Output Ith	6 A
Output impulse voltage	2500 V
Switching current min.	10 mA @ 10 V
Output fuse	External 6 A slow blow or 10 A fast acting
I_e / U_e	AC-15: 6 A/250 V AC; DC-13: 3 A/24 V DC
Protection class	IP 20 (Terminals)
Conductor size max.	0.2 - 4 mm ² (24 - 12 AWG)
Ambient temperature	-5°C...+55°C
Vibration	10 - 55 Hz, 0.35 mm
Shock	10 g, 16 ms 100 shocks
Mounting	35 mm DIN rail
Mechanical life	2 million operations

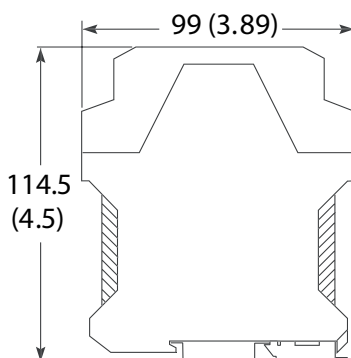
* Data based on Mission Time / Proof Test interval of 20 years and a functional test at least once per six months.

Dimensions & Wiring:

35 (1.78)



99 (3.89)



114.5
(4.5)



Standalone Safety Relays

CU4 series

Safety relay ideal for monitoring another safety relay's output or a gate switch/E-stop. This switch will then provide a delayed output useful for unlocking a solenoid interlock in a rundown time application.

Features:

- Input from other safety relay, safety gate or E-stop with delayed outputs
- Category 3
- Single or dual channel monitoring.
- Stop category 1
- Off delayed, 0.15 - 30 sec
- Two N/O safety outputs
- Automatic reset

Ordering Details:

Cat. No.	Time range
440R-S23173	0.15 - 3 sec
440R-S23174	0.5 - 10 sec
440R-S23175	1.5 - 30 sec



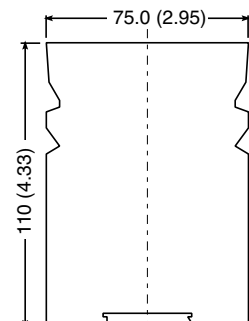
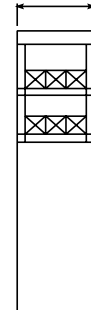
Technical Data:

Standards	EN 954-1; ISO 13849-1; IEC/EN 60204-1; IEC 60947-5-1; AS 4024.1
Safety classification	Category 3 per EN 954-1 (ISO 13849-1), SIL CL 2 per AS 62061, PL e per ISO 13849-1
PFHd*	$< 2.31 \times 10^{-9}$
MTTFd*	> 345 years
Power supply	24 V AC/DC, 50/60 Hz
Power Consumption	2.5 W
Safety Input	1 N/C or 2 N/C
Outputs	2 N/O safety, 1 N/C auxiliary
Output impulse voltage	2500 V
Switching current min.	10 mA @ 10 V
Output fuse	External 6 A slow blow or 10 A fast acting
I_e / U_e	AC-15: 5 A/250 V AC; DC-13: 3 A/24 V DC
Protection class	IP 20 (terminals)
Conductor size max.	0.2 - 4 mm ² (24 - 12 AWG)
Ambient temperature	-5°C...+55°C
Vibration	10 - 55 Hz, 0.35 mm
Shock	10 g, 16 ms 100 shocks
Mounting	35 mm DIN rail
Mechanical life	2 million operations

* Data based on Mission Time / Proof Test interval of 20 years and a functional test at least once per six months.

Dimensions & Wiring:

22.5 (0.88)





Standalone Safety Relays

MSR 125 series

Safety relay ideal for two-hand control monitoring applications.

Features:

- Input from two-hand control unit
- Category four
- Two N/O safety outputs
- Automatic reset

Ordering Details:

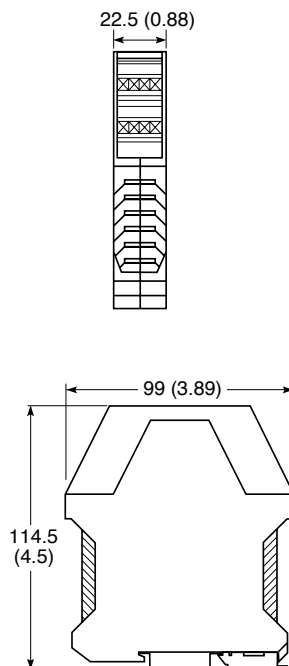
Cat. No.	Supply voltage
440R-D23171	24 V AC/DC
440R-D23168	230 V AC

Technical Data:

Standards	EN 954-1; IEC 61508; AS 62061; ISO 13849-1; IEC/EN 60204-1; IEC 60947-5-1; AS 4024.1
Safety classification	Category 4 per EN 954-1 (ISO 13849-1), SIL 3 per AS 62061, PL e per ISO 13849-1
PFHd*	$< 1.44 \times 10^{-9}$
MTTFd*	> 385 years
Power supply	24 V AC/DC, 115 V AC or 230 V AC
Power consumption	2 W
Safety input	1 N/O / 1 N/O per button
Outputs	2 N/O safety
Output lth	1 x 6 A or 2 x 4 A nonswitching
Output impulse voltage	2500 V
Switching current min.	10 mA @ 10 V
Output fuse	External 6 A slow blow or 10 A fast acting
I_e / U_e	AC-1: 8 A/250 V AC; DC-1: 6 A/24 V DC; AC-15: 6 A/250 V AC; DC-13: 3 A/24 V DC
Protection class	IP 40 (enclosures)
Conductor size max.	0.2 - 4 mm ² (24 - 12 AWG)
Ambient temperature	-5°C...+55°C
Vibration	10 - 55 Hz, 0.35 mm
Shock	10 g, 16 ms 100 shocks
Mounting	35 mm DIN rail
Mechanical life	2 million operations

* Data based on Mission Time / Proof Test interval of 20 years.

Dimensions & Wiring:





Standalone Safety Relays

MSR 22LM series

Safety relay ideal for light curtain muting applications.

Features:

- Input from light curtain and two or four muting sensors
- Category four
- Stop category zero
- Two N/O safety outputs
- Automatic reset

Ordering Details:

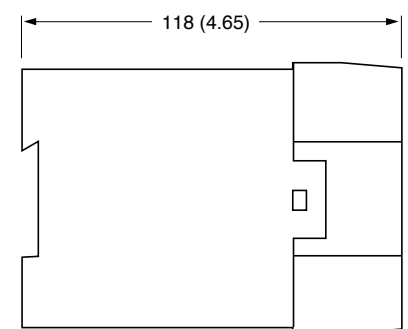
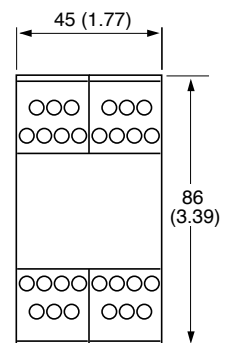
Cat. No.	Power supply
440R-P23071	24 V DC

Technical Data:

Standards	EN 954-1; IEC 61508; IEC 61496-1; ISO 13849-1; IEC/EN 60204-1; IEC 60947-5-1; AS 4024.3
Safety classification	Category 4 per EN 954-1 (ISO 13849-1), SIL 3 per AS 62061, PL e per ISO 13849-1
Power supply	24 V DC
Power consumption	4 W
Safety Input	Light curtains and two or four muting sensors
Outputs	2 N/O safety, 1 N/C auxiliary
Output lth	5 A nonswitching
Switching current min.	1 mA @ 10 V
Output fuse	External 6 A fast acting
I_e / U_e	AC-15: 3 A/250 V AC; DC-13: 3 A/24 V DC
Protection class	IP 20 (terminals)
Conductor size max.	1 x 2.5 mm ² (14 AWG) standard, 1 x 4 mm ² (12 AWG) solid
Ambient temperature	-15°C...+55°C
Vibration	10 - 55 Hz, 0.35 mm
Mounting	35 mm DIN rail
Mechanical life	10 million operations



Dimensions & Wiring:



Standalone Safety Relays

MSR 42 Controller

Safety relay ideal for multi-function light curtain applications.

Features:

- Can connect to light curtains, safety scanner or interlocks
- Category 4, SIL 3
- Expandable using the MSR4SE
- Stop category 0,1
- Muting and blanking capable

Ordering Details:

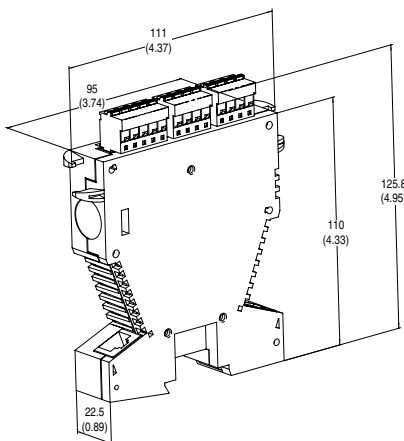
Cat. No.	Supply voltage
440RP226AGSNNR	24 V DC

Technical Data:

Standards	EN 954-1; IEC/EN 60204-1; IEC 61496-1
Safety classification	Category 4 per EN 954-1 (ISO 13849-1), SIL 3 per EN IEC 61508, PLe per ISO 13849
PFHd*	9×10^{-10}
MTTFd*	331 years
Power supply	24 V DC
Power consumption	2.4 W
Safety inputs	2 MC pr 2 PSSD, micro 400 software selectable
Outputs	2 PNP safety, 400 mA
Auxiliary outputs	2 PNP
Protection class	IP 20
Conductor size max.	1 x 2.5mm ²
Ambient temperature	0°C...+55°C
Vibration	0.35 mm, 10-15 Hz
Mounting	35mm DIN rail

* Data based on Mission Time / Proof Test interval of 20 years, and a functional test at least once per six months.

Dimensions & Wiring:





Standalone Safety Relays

MSR 45E Series

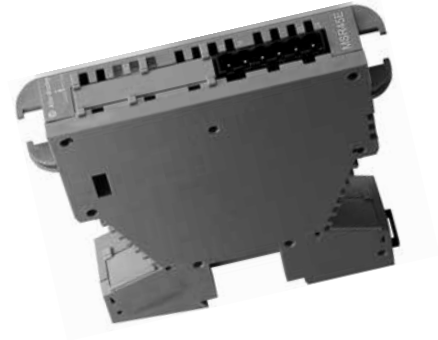
Safety relay is an expansion module for the MSR41/42.

Features:

- Category 4
- SIL CL3
- Stop category 0,1
- Two safety N/O contacts

Ordering Details:

Cat. No.	Supply voltage
440RP4NANS	24 V DC from base

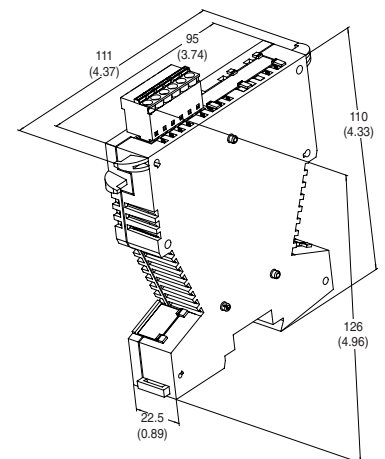


Technical Data:

Standards	EN 954-1;IEC/EN 60204-1;IEC 61496-1
Safety classification	Category 4 per EN 954-1 SIL CL 3 per EN IEC 61508
PfHd*	3×10^{-10}
MTTFd*	206 years
Power supply	24 V DC
Power consumption	1.5 W
Safety inputs	Determined by MSR 41/42
Outputs	2 N/O
Auxiliary outputs	–
Protection class	IP 20
Conductor size max.	1 x 2.5mm ²
Ambient temperature	0°C...+55°C
Vibration	0.35 mm, 10-15 Hz
Mounting	35 mm DIN rail

* Data based on Mission Time / Proof Test interval of 20 years, and a functional test at least once per six months.

Dimensions & Wiring:



Accessories

Description	Cat. No.
Ribbon cable for one MSR45E	440RACABL1
Ribbon cable for two MSR45E	440RACABL2
Ribbon cable for three MSR45E	440RACABL3



Standalone Safety Relays

MSR 57 series

Safety relay ideal for safe speed and standstill monitoring.



Features:

- One or two encoders (sin/cos and TTL) and 5 x 1 N/C, 2 N/C, Light curtain or 1 N/O / 1 N/C
- Category 4
- Stop category 0, 1 and 2
- Six N/O solid-state safety outputs

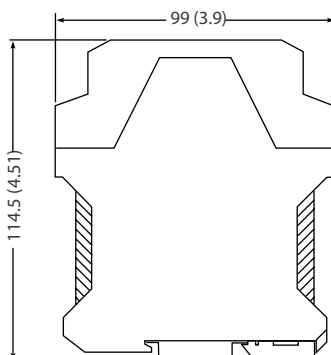
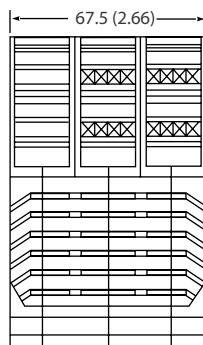
Ordering Details:

Cat. No.	Supply voltage
440R-S845AER-NNL	24 V DC

Technical Data:

Standards	EN 954-1; IEC 61508; ISO 13849-1; IEC/EN 60204-1; AS 4024.1
Safety classification	Category 4 per EN 954-1 (ISO 13849-1), SIL 3 per AS 62061, PL e per ISO 13849-1
Power supply	24 V DC
Power consumption	5 W
Safety Input	Light curtains, 1 N/O / 1 N/C, 2 N/C or 1 N/C
Outputs	6 N/O solid-state safety, 4 N/O solid-state auxiliary
Protection class	IP 20 (terminals)
Conductor size max.	0.2 - 2.5 mm ² (24-12 AWG)
Ambient temperature	-5°C...+55°C
Vibration	10 - 55 Hz, 0.35 mm
Mounting	35 mm DIN rail

Dimensions & Wiring:





Standalone Safety Relays

SIPHA series

Safety relay ideal for Sipa sensor monitoring applications.



Features:

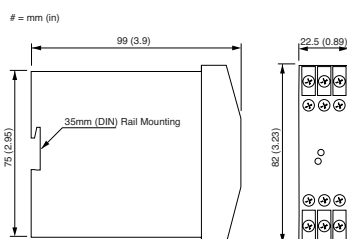
- Input from 1 or 6 sipa sensors
- Category 3 and 4 models
- Stop category 0 and 1
- 1, 2 or 4 N/O safety outputs

Ordering Details:

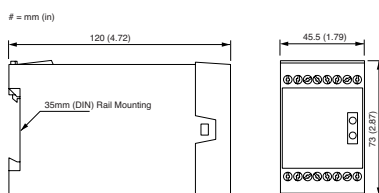
Cat. No.	Supply voltage
Sipha 1	
440N-S32013	24 V AC/DC
Sipha 2	
440N-S32021	24 V AC/DC or 230 V AC
Sipha 6	
440NS32052	24 V AC/DC or 230 V AC

Dimensions & Wiring:

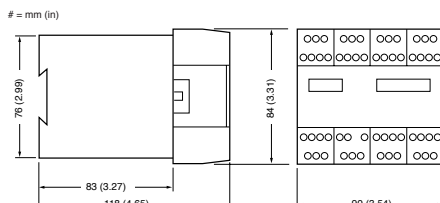
Sipha Control Unit Type 1



Sipha Control Unit Type 2



Sipha 6 Control Unit



Technical Data:

Standards	EN 954-1; ISO 13849-1; IEC/EN 60204-1; IEC 60947-5-1; AS 4024.1; EN1088; ISO 14119
Safety classification	Sipha 1 and 2: category 3 per EN 954-1; Sipha 6: category 4 per EN 954-1
Power supply	24 V AC/DC, 115 V AC or 230 V AC
Power consumption	Sipha 1 < 2 W; Sipha 2 and 6 < 4 W
Safety input	Sipha 1: 1 x 1 N/O / 1 N/O; Sipha 2 and 6: 6 x 1 N/O / 1 N/C
Outputs	Sipha 1: 1 N/O; Sipha 2: 2 N/O; Sipha 6: 2 N/O and 1 N/O delayed
Output impulse voltage	2500 V
Switching current min.	10 mA @ 10 V
Output fuse	External 5 A quick blow AC or 3 A fast acting DC
Conductor size max.	0.2 - 4 mm ² (24 - 14 AWG)
Ambient temperature	-10°C...+55°C
Vibration	10 - 55 Hz, 1 mm
Mounting	35 mm DIN rail
Mechanical life	2,000,000 operations



Standalone Safety Relays

Safedge Controller series

Safety relay ideal for Safedge monitoring applications.

Features:

- 1 N/O or 2 N/O safety outputs
- 1 N/C auxiliary
- Automatic/manual reset

Ordering Details:

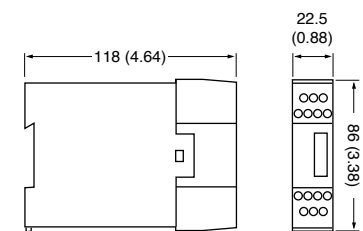
Cat. No.	Safety outputs	Supply voltage
440FC251D	2 N/O	24 V AC/DC or 230 V AC
440FC252D	1 N/O	24 V AC/DC



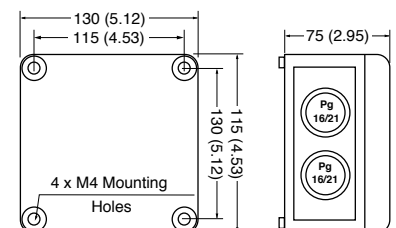
Technical Data:

Standards	EN 1760-2; EN 954-1; ISO 13849-1; AS 4024.5
Safety classification	Category 3 per EN 954-1
Power supply	251: 24 V AC/DC or 115 V AC or 230 V AC, 50/60 Hz; 252: 24 V AC/DC, 50/60 Hz
Power consumption	251: 6 W; 252: 4 W
Safety Input	Safedge
Outputs	251: 2 N/O; 252: 1 N/O
Output impulse voltage	2500 V
Switching current min.	10 mA @ 10 V
Output fuse	External 4 A on AC or 2 A on DC
Ambient temperature	-10°C...+55°C
Vibration	10 - 55 Hz, 1 mm
Shock	10 g, 11 ms
Mounting	35 mm DIN rail

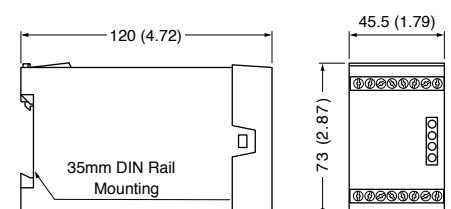
Dimensions & Wiring:



440F-C252D



440F-C251P

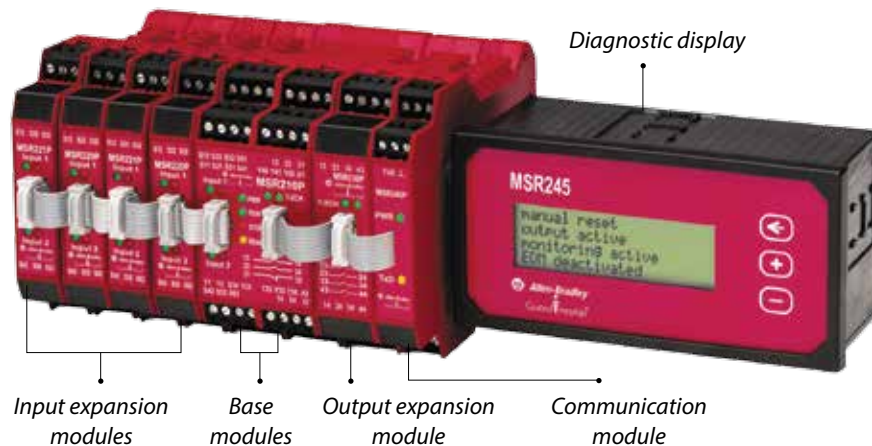


440F-C251D



Modular Safety Relay System

MSR 200 System



Features:

- Can connect up to 10 input modules and up to two output modules to one base module
- Ability to connect to diverse range of inputs: e.g. gate switches, E-stops, light curtains, safety mats
- Category 4, SIL 3 and PLe
- Stop category 0 and 1

Ordering Details:

Base module

Cat. No.	Input type	Outputs
440RH23176	1 N/C, 2 N/C, 3/NC or safety mat	2 N/O
440RH23177	1 N/C, 2 N/C or light curtains	2 N/O

Input module

Cat. No.	Input Configuration	Inputs / outputs
440RH23178	IN/C, 2 N/C, 3 N/C IN/O / IN/C or safety mat	2 inputs
440RH23179	IN/C, 2 N/C, or light curtains	2 inputs

Output expansion module

Cat. No.	Stop Category	Inputs / outputs
440RH23180	0	4 outputs
440RH23196	1	2 outputs

Communications module

Cat. No.	Communication interface
440RH23181	RS232
440RH23183	RS232 & RS485
440RH23187	DeviceNet

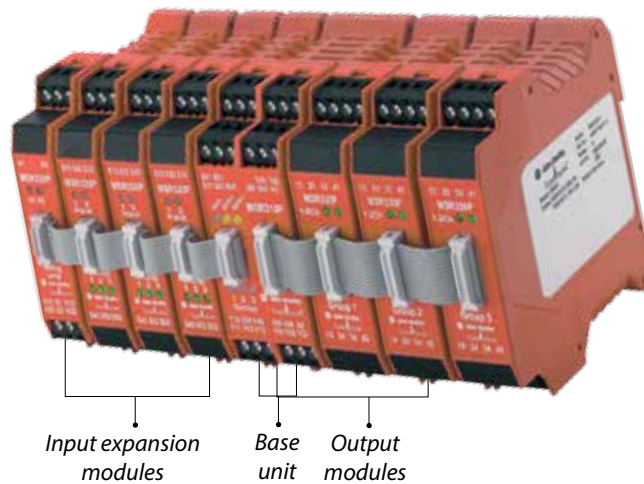
Display module

Cat. No.
440RH23184



Modular Safety Relay System

MSR 300 System



Features:

- Can control up to three individual zones with no programming
- Can connect up to ten input modules and up to six output modules to one base module
- Category 4, SIL 3 and PLe
- Stop category 0 and 1

Ordering Details:

Base module

Cat. No.	Communications interface
440R-W23219	RS232
440R-W23220	DeviceNet

Input module

Cat. No.	Input configuration	Inputs / outputs
440R-W23218	IN/C, 2 N/C, 3 N/C, IN/O / IN/C, light curtains	2 inputs
	Safety mat or two hand control	

Output module

Cat. No.	Stop category	Output group	Inputs / outputs
440R-W23221	0	1	3 outputs
440R-W23222	0	2	3 outputs
440R-W23223	0	3	3 outputs
440R-W23224	1	1	3 outputs
440R-W23225	1	2	3 outputs
440R-W23226	1	3	3 outputs



Configurable Safety Relays

Allen-Bradley® Guardmaster® 440C-CR30 Software

A flexible, cost-effective and easy-to-use safety solution

Features:

- Ple, SIL3 per EN ISO 13849-1, IEC 62061
- 22 embedded Safety I/O
- Embedded USB programming port
- Embedded Modbus RTU serial port
- Two plug-in ports supporting Micro800™ (2080) plug-ins

Ordering Details:

Cat. No.	I/O Type	Number
440C-CR3022BBB	Input Only (24V DC Sink)	10
	Input Multi-Purpose Terminal: • Input (24V DC Sink) • Single Wire Safety Input	2
	Multi-Purpose Terminal: • Input (24V DC Sink) • Test Output • Output (24V DC Source)	6
	Output Only (24V DC Source)	2
	Output Multi-Purpose Terminal: • Output (24V DC Source) • Single-Wire Safety Output	2

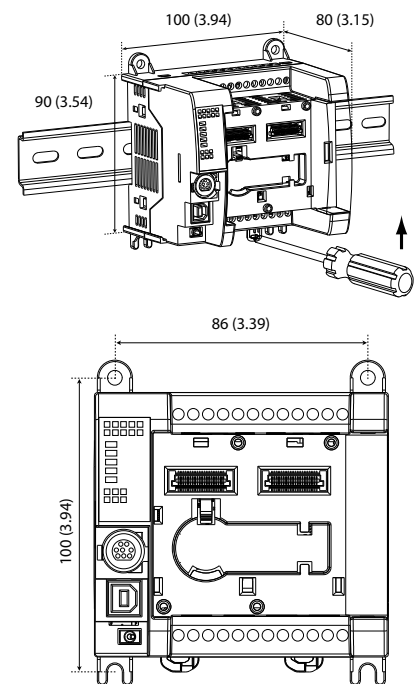
Technical Data:

Communications ports, embedded	• USB 2.0 (non-isolated) • RS232 non-isolated serial
Base Programming Port	USB 2.0 (non-isolated) Any standard USB printer cable will work
Base digital I/O points (see Types and Number of Inputs/Outputs)	22
Base number of plug-in modules	2
Maximum digital I/O⁽¹⁾	38
Types of plug-ins supported	2080-IQ4OB4 Digital I/O Combination module
Power supply	Embedded 24V DC power supply, optional external 120/240V AC power supply available
Software	Connected Components Workbench

⁽¹⁾ The number of maximum digital I/O assumes 8-point digital I/O plug-ins (for example, 2080-IQ4OB4) are used on all available plug-in slots. Standard digital inputs can only be used for non-safety rated diagnostics and control such as resets, muting sensors or external device monitoring feedback circuits.



Dimensions & Wiring:





Programmable Safety Controller

SmartGuard 600

Features:

- Has embedded I/O, 16 safety inputs, eight safety outputs and four test sources
- Can connect to distributed safety Guard I/O over DeviceNet
- Can connect to standard PLCs and HMIs over EtherNet/IP or DeviceNet
- Programmed in RSNetworx software with simple drag and drop environment

Ordering Details:

Cat. No.	Communications interface	Inputs / outputs
1752-L24BBB	DeviceNet (standard/safety)	16 / 8
1752-L24BBBE	DeviceNet (standard/safety) Ethernet (standard)	16 / 8

Software

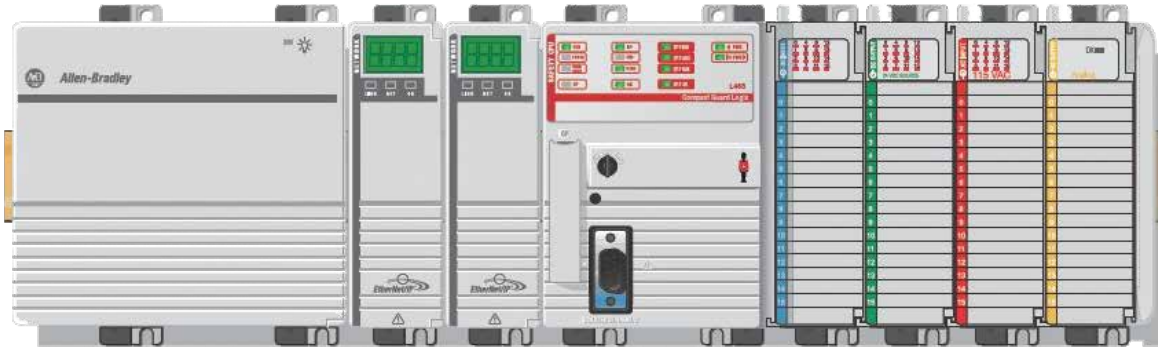
For system six or less nodes the demo version of the software may be used.

Cat. No.	Description
9357-DNETL3	RS Networx for DeviceNet



Programmable Safety Controller

Compact Guard Logix



Features:

- RSLogix 5000 is used as the programming software
- Has TUV certified safety instructions, to reduce engineering time
- Uses all the standard compact Logix hardware; I/O modules, power supplies, communication cards
- Communicates to distributed Guard I/O on EtherNet/IP network
- SIL 3 and PLe certified

Ordering Details:

Processors

Cat. No.	Memory	Distributed safety inputs / outputs
1768L43S	2 Mb standard 1/2 Mb safety	Guard I/O (remote via EtherNet/IP)
1768L45S	3 Mb standard 1 Mb safety	Guard I/O (remote via EtherNet/IP)

Software

RSLogix 5000 V18 is used for configuration of the Compact GuardLogix

Programmable Safety Controller

Guard Logix



Features:

- RSLogix 5000 is used as the programming software
- Comes with TUV certified safety instructions to reduce engineering time
- Compatible with Standard Control Logix hardware; I/O modules, power supplies, communication cards
- Communicates to distributed Guard I/O via EtherNet/IP or DeviceNet network
- SIL 3 and PLe certified

Ordering Details:

Processors

Cat. No.	Memory	Distributed safety inputs / outputs
1756L61S	2 Mb standard 1 Mb safety	Guard I/O (remote via EtherNet/IP or DeviceNet)
1756L62S	4 Mb standard 1 Mb safety	Guard I/O (remote via EtherNet/IP or DeviceNet)
1756L63S	8 Mb standard 3.75 Mb safety	Guard I/O (remote via EtherNet/IP or DeviceNet)
1756LSP	Safety partner, must use one 1756-LSP with a 1756-L6xS processor	Guard I/O (remote via EtherNet/IP or DeviceNet)



Safety I/O

Guard I/O

Features:

- Supports both standard and safety control.
- TUV and UL certified for functional safety up to SIL 3 and CAT4
- Use Guard I/O with any safety controller that communicates on DeviceNet or EtherNet/IP networks using CIP safely
- Guard I/O detects circuit failures at each I/O point while providing detailed diagnostics back to the controller
- Supports single or dual channel devices
- DIN tail mounting for easy installation



Ordering Details:

1791 Compact Block Guard I/O

Ideal for DeviceNet or small EtherNet/IP safety networks.

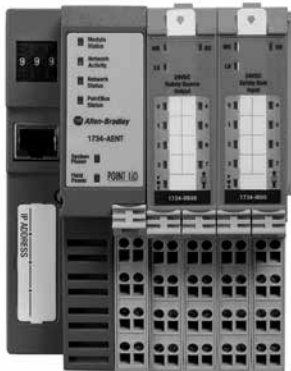
Cat. No.	Digital inputs	Digital outputs	Test pulse output	Communications
1791DSIB12	12	–	4	DeviceNet
1791DSIB16	16	–	16	DeviceNet
1791DSIB8XOB8	8	8 solid state	4	DeviceNet
1791DSIB8XOBV4	8	4x2 solid state	8	DeviceNet
1791DSIB4XOW4	4	4 relay	4	DeviceNet
1791ESIB16	16	0	16	EtherNet/IP
1791ESIB8XOBV4	8	4x2 solid state	8	EtherNet/IP



Safety I/O

Guard I/O *cont*

Ordering Details:



1734 Point Guard I/O

- Compact solution
- Can combine safety and standard I/O

Cat. No.	Digital inputs	Digital outputs	Test pulse output	Adaptor
1734IB8S	8	–	4	EtherNet (1734-AENT, 1734-AENTR)
1734IB8S	–	8	–	DeviceNet (1734-PND)



1732 Armor

Cat. No.	Digital inputs	Digital outputs	Test pulse output	Adaptor
1732DSIB8	8	–	8	DeviceNet
1732DSIB8XOBV4	8	4x2	8	DeviceNet