

小型非接觸式安全門開關/彈性安全組件 D40A/G9SX-NS

安全門開關

採用電子式的檢測方式，與舊型的非接觸式安全門開關相較之下，能夠達成更安定的動作



NEW

⚠ 請參閱第6頁的「安全門開關 通用注意事項」以及第123頁的「正確使用方式」。

通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

D40A
G9SX-NS

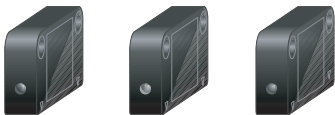
D40B

D4NS-SK
D4JL-SK

特長

容易辨識的2色LED顯示

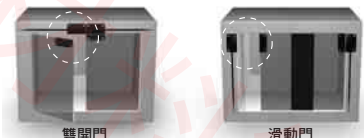
透過LED的紅色/黃色變化，可輕易辨識發生問題時開關的狀態。



亮紅燈：檢測安全門開啟
亮黃燈：檢測安全門關閉
熄燈：關閉電源或故障

兩側皆可安裝

採雙面安裝方式，便能選擇配線的繞線方向，因此適用於所有種類的安全門。

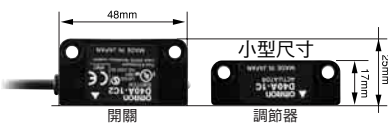


雙開門

滑動門

小型尺寸的調節器

調節器體積比開關小，即使安裝在安全門的內側也不會佔空間。安裝L型金具時的突出部分亦較小，因此不會造成任何妨礙。



48mm

小型尺寸

17mm

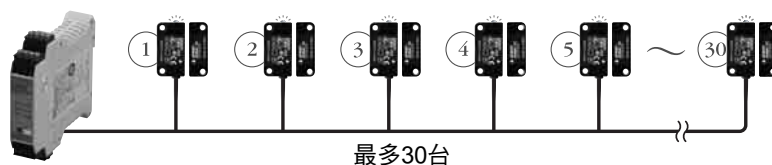
25mm

開關

調節器

1台控制器最多可連接30台

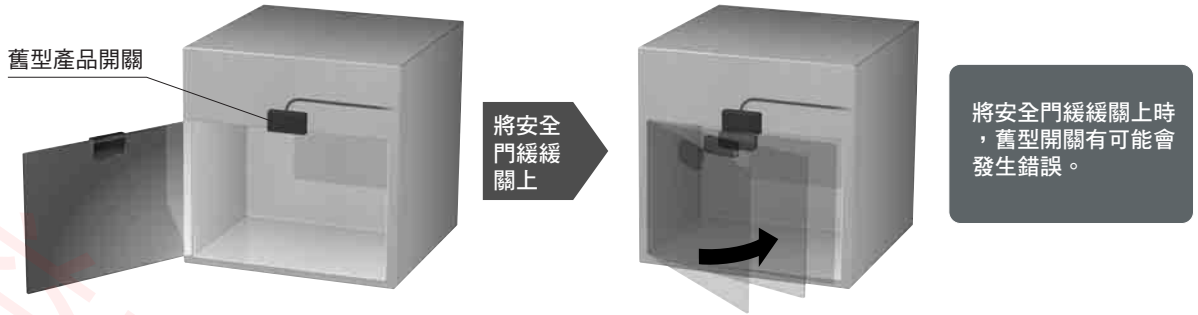
當開關的數量較多時，一台控制器最多可以連接30台，因此能降低成本。



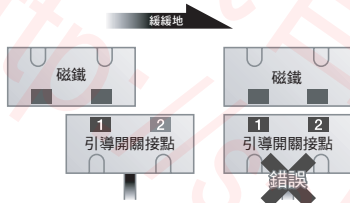
最多30台

可解決舊型產品的問題，同時達成精確且穩定的檢測。

問題1 將安全門緩緩關上時，開關會無法正常進行檢測而導致錯誤產生。



解決方法1 關於舊型產品...



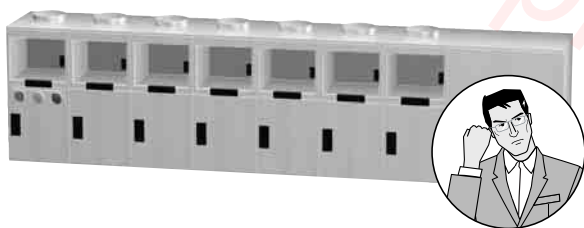
當引導開關接點1和2的切換時間點出現重大差異時，就會被控制器判讀為異常情形，並基於安全考量而將輸出關閉，以告知發生錯誤。
※圖片為示意圖。

D40A型以全新方式進行穩定的檢測

D40A型未使用引導開關，而係採用電子開關，因此能達成穩定檢測



問題2 若使用多個安全門時，將無法判斷哪一個安全門被開啟。



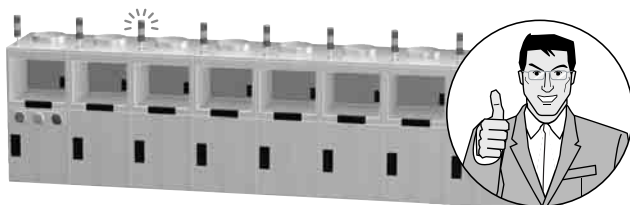
舊型產品在遇到錯誤時...

外觀上看起來安全門是關閉的，但是卻未輸出控制，因此造成裝置無法啟動。

無法判斷哪一扇安全門被開啟或是發生異常。

欲啟動裝置時，必須將所有的安全門重新關閉一次

解決方法2



D40A型情形時...

備有輔助輸出，因此無論哪一扇安全門被開啟，皆能一目了然。

另外，配備2色LED，讓安裝調整更為簡單。

OMRON首創業界先例，備有3有種功能(2色LED、輔助輸出、可連接30台)，因此能建構更安全的環境。

使用2種專用的控制器來解決「生產性」、「擴張性」、「維修性」等問題。

產品系列配備D40A型專用的G9SX-NS型，以及能和機械式安全門開關及D40A型併用的G9SX-NSA型等2種機型。

G9SX-NS型系列配備專用的控制器，除具備可將部分功能停止的邏輯連接功能外，還能夠將D40A型的功能發揮至極致。

2種專用控制器



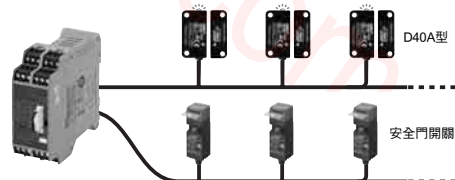
藉由LED顯示發揮「維修性」效果

檢測出配線異常等錯誤，並且以LED顯示其異常位置及發生原因。錯誤用輔助輸出亦能幫助縮短當機時間。



可與機械式安全門開關併用(G9SX-NSA型)

可將D40A型及機械式開關分別輸入。減少控制器的數量後，便能幫助降低成本。



使用增設組件後，即可輕鬆地擴充輸出數量(G9SX-NSA型)

透過連接接頭即可擴充輸出數量，操作十分簡單。最大可擴充至25個。



導入新概念的專用控制器，有助於降低成本。

問題 1 為配合緊急停止用按壓開關和非接觸式安全門開關，需要2台控制器。

應用

- 有1個危險源的情況下。
- 希望透過開啟安全門或是按下緊急停止開關的方式，將整個裝置停止。

為連接緊急停止用按壓開關，需增設G9SA型。

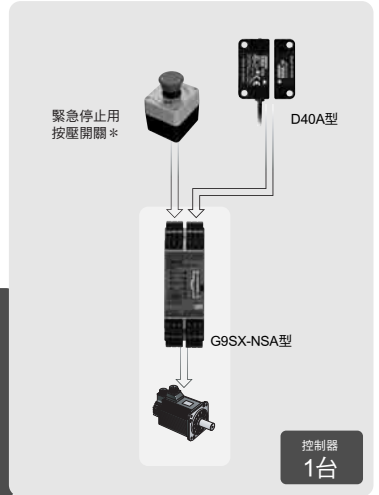


控制器
2台

解決方法1

使用D40A型
以簡化架構

1台G9SX-NSA222-2-T03□型可和非接觸式安全門開關及緊急停止用按壓開關互相連接。



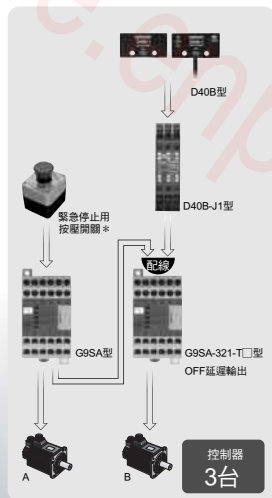
控制器
1台

課題 2 為使用OFF延遲計時器，必須追加控制器。

應用

- 有2個危險源的情況下。
- 希望按下緊急停止開關後，就能夠立刻將電源關閉。
- 希望在開啟安全門時，僅需將停止訊號傳送到伺服馬達就能夠關閉電源。

為使用OFF延遲計時器，必須追加G9SA型

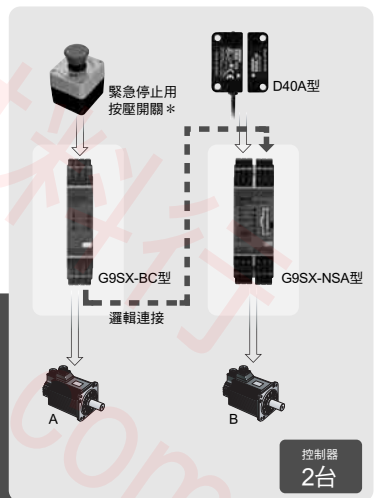


控制器
3台

解決方法2

使用D40A型
以簡化架構

G9SX-NSA222-T03□型配備OFF延遲輸出，因此能夠減少使用組件數量。



控制器
2台

* 欲透過緊急停止功能來使用裝置時，請務必使用手動復歸。

關於G9SX型系列的特長，請參閱第103頁的說明。

種類 (有◎記號者為標準機種，無記號者(訂製機種)之交貨日期請向經銷商洽詢。)

●非接觸式安全門開關(開關/制動器)

類型	形狀	輔助輸出	纜線長度	型式
標準型		半導體輸出 *	2m	◎D40A-1C2型
			5m	◎D40A-1C5型

註. 請務必與非接觸式安全門開關控制器(G9SX-NS□型)搭配使用。

* PNP開路集極之半導體輸出

●非接觸式安全門開關控制器(D40A型專用控制器)

安全輸出 *1		輔助輸出 *3	邏輯連接輸入	邏輯連接輸出	OFF延遲的最大設定時間 *4	額定電壓	端子台	型式
瞬間	OFF延遲 *2							
2 (半導體)	0	2 (半導體)	1	1	—	DC24V	螺絲式端子台	◎G9SX-NS202-RT型
	2 (半導體)				3.0秒		彈簧式端子台	◎G9SX-NS202-RC型
2 (半導體)		3.0秒	螺絲式端子台	◎G9SX-NSA222-T03-RT型				
	2 (半導體)		3.0秒	彈簧式端子台	◎G9SX-NSA222-T03-RC型			

*1. P頻道MOS FET電晶體輸出

*2. 將延遲時間設定為0秒後，即可將OFF延遲輸出做為瞬間輸出使用。

*3. PNP電晶體輸出

*4. OFF延遲時間為16段可變式，可設定為以下時間。

0/0.2/0.3/0.4/0.5/0.6/0.7/0.8/0.9/1.0/1.2/1.4/1.8/2.0/2.5/3.0秒

●增設模組

安全輸出		輔助輸出	OFF延遲時間	額定電壓	端子台類型	型式
瞬間	OFF延遲					
4a (接點)	—	1 (半導體) *1	—	DC24V	螺絲式端子台	G9SX-EX401-RT型
—	4a (接點)		*2		*2	彈簧式端子台
		螺絲式端子台				G9SX-EX041-T-RT型
—	4a (接點)	*2	*2		彈簧式端子台	G9SX-EX041-T-RC型

*1. PNP電晶體輸出。

*2. OFF延遲時間將與所連接的控制器G9SX-NSA222-T03-□型中所設定的OFF延遲時間同步。

安全門開關

通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

D40A
G9SX-NS

D40B

D4NS-SK
D4JL-SK

額定/性能

安全門開關

■額定/性能(非接觸式安全門開關)

項目	型式	D40A-1C□型
動作特性 *1	動作距離(OFF→ON)	5mm以上
	動作距離(ON→OFF)	15mm以下
	回應	請參考「●檢測領域」。
	溫度影響	在-10~+55°C之溫度範圍內,為+23°C時的動作距離之±20%以下
通用注意事項	使用環境溫度	-10~+55°C (不可結冰結露)
D4NS	使用環境濕度	25~85%RH
	絕緣阻抗(所有充電部與外殼之間)	50MΩ以上(DC500V Mega)
D4GS-N	耐電壓(所有充電部與外殼之間)	AC 1,000V 1分鐘
	耐震動	10~55~10Hz單側振幅0.75mm (重複振幅1.5mm)
D4BS	耐衝擊	300m/s ² 以上
	保護構造	IP67
D4GL	材質	PBT樹脂
	安裝	M4螺絲
D4GL-SK10-LK	鎖合扭力	1N·m
	消耗電力	0.6W以下
D4JL	輔助輸出 *2	DC24V 10mA (PNP開路集極輸出)
	LED顯示	未檢測到制動器(紅色)、檢測到制動器(黃色)
D4NL	連接線	2m、5m
	連接台數 *3	30台(但最大配線長度為100m)
	重量	開關約為145g、制動器約為20g (為D40A-1C2型時)

- *1. 開關與制動器的目標記號在同一軸上,且感測(sensing)面一致時,接近時為從OFF變為ON之距離,遠離時則為從ON到OFF之距離。
- *2. 接近制動器時會變為ON。
- *3. 詳細內容請參考124頁的(5)之內容。

■額定(非接觸式安全門開關控制器)

●電源部

項目	型式	G9SX-NS202-□型	G9SX-NSA222-T03-□型	G9SX-EX-□型
D40A G9SX-NS	電源電壓	DC24V		
	容許電壓變動範圍	電源電壓的-15%~+10%		
D40B	消耗電力 *	3W以下	4W以下	2W以下

* 不含對負載供應的電力。

●輸入部分

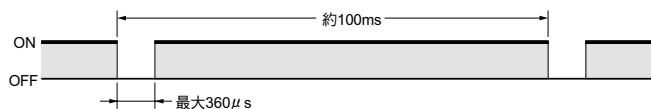
項目	型式	G9SX-NS202-□型G9SX-NSA222-T03-□型
安全輸入 *		動作電壓:DC20.4V~DC26.4V、內部阻抗:約2.8kΩ
回饋/復歸輸入		

* 僅G9SX-NSA222-T03-□型。表示非接觸式安全門開關控制器以外的輸入。

●輸出部

項目	型式	G9SX-NS202-□型G9SX-NSA222-T03-□型
安全瞬間輸出 *1 安全OFF延遲輸出 *1		P頻道MOS FET電晶體輸出 負載電流:DC0.8A以下 *2
輔助輸出		PNP電晶體輸出 負載電流:100mA以下

*1. 安全輸出啟動(ON)時,為了進行輸出回路診斷,將會輸出以下的脈衝訊號。
將安全輸出做為對控制機器(PLC等的輸入模組)的輸入訊號時,在設計上請注意下列的脈衝訊號。



*2. 密合安裝時,需進行如下降額(de-rating)。
G9SX-NS202-□型/G9SX-NSA222-T03-□型:負載電流為0.4A以下

●增設模組額定

項目	型式	G9SX-EX-□型
額定負載		AC250V 3A/DC30V 3A (阻抗負載)
額定通電電流		3A
接點電壓最大值		AC250V、DC125V

性能

項目	型式	G9SX-NS202-□型	G9SX-NSA222-T03-□型	G9SX-EX-□型
過電壓類別(Category) iIEC/EN60664-1		II		II (但繼電器接點輸出部為：端子13~43、端子14~44為III)
動作時間(OFF→ON) *1		邏輯連接輸入ON時,以及 非接觸式安全門開關輸入ON時:100ms 以下	安全輸入ON時:50ms以下 *2 邏輯連接輸入ON時,以及 非接觸式安全門開關輸入ON時:100ms 以下	30ms以下 *4
回應時間(ON→OFF) *1		邏輯連接輸入OFF時:15ms以下 非接觸式安全門開關輸入OFF時:20ms 以下 *6	安全輸入OFF時,以及 邏輯連接輸入OFF時:15ms以下 非接觸式安全門開關輸入OFF時:20ms 以下 *6	10ms以下 *4
ON時的殘留電壓		3.0V以下(安全輸出、輔助輸出)		
OFF時的漏電電流		0.1mA以下(安全輸出、輔助輸出)		
安全輸入、邏輯連接輸入以及非接觸式安全門開關 輸入的最大配線長度		100m以下(外部連接阻抗:100Ω以下,且為10nF以下)		
復歸輸入時間 (按下復歸時間)		100ms以上		
OFF延遲時間精確度 *5		—	±5%內(對設定值之比率)	±5%內(對設定值之比率)
絕緣阻抗	邏輯連接輸入端子⇄ 電源/其他所有輸入輸出端子	20MΩ以上DC100V mega		—
	所有端子⇄DIN軌道間			100MΩ以上DC500V Mega
耐電壓	邏輯連接輸入端子⇄ 電源/其他所有輸入輸出端子	AC500V 1min.		—
	所有端子⇄DIN軌道間			AC1,200V 1min.
	輸出異極之間	—		AC2,200V 1min.
	繼電器輸出以外的所有端子⇄ 繼電器輸出的所有端子	—		—
耐震動		10~55~10Hz單側振幅片振幅0.375mm (重複振幅復振幅0.75mm)		
耐衝擊	耐久	300m/s ²		
	誤動作	100m/s ²		
耐久性	電氣性	—		10萬次以上 (額定負載、開閉頻率1,800次/h)
	機械性	—		500萬次以上(開閉頻率7,200次/h)
使用環境溫度		-10~+55°C (但不可結冰或結露)		
使用環境濕度		25~85%RH		
端子鎖緊強度		0.5N·m (G9SX-NS□-RT型:僅螺絲式端子台型)		
重量		約125g	200g	165g

- *1. 對多台模組進行邏輯連接時, 邏輯連接輸入所需之動作時間/回應時間將依被邏輯連接至串聯中的台數分別計算。
- *2. 在已達成其他條件的狀態下, 安全輸入表示從OFF→ON的動作時間。
- *3. 在已達成其他條件的狀態下, 邏輯連接輸入以及非接觸式安全門開關輸入表示從OFF→ON的動作時間。
- *4. 此值不包含連接中的G9SX-NS□型的動作時間/回應時間。
- *5. 此值不包含在G9SX-EX-□型中之內部繼電器的動作時間與復歸時間。
- *6. 對於非接觸式安全門開關輸入的24V短路故障的故障檢測時間為35ms以下。
使用於安全門開關以外之應用範圍時, 請用35ms的故障檢測時間來計算其安全距離。

通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

D40A
G9SX-NS

D40B

D4NS-SK
D4JL-SK

●關於邏輯連接

項目	型式	G9SX-NS202-□型	G9SX-NSA222-T03-□型	G9SX-EX-□型
各邏輯連接輸出的平均連接台數		4個模組以下		
根據邏輯連接實施的總連接台數 *1		20個模組以下		
根據邏輯連接實施的連接階層數		5個模組以下		
增設模組連接的連接台數 *2			—	5個模組以下
以邏輯連接實施的配線長度		100m		

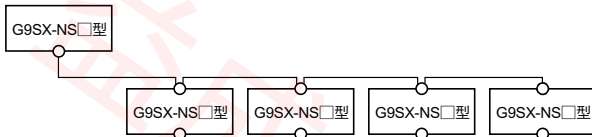
註. 詳細內容請參考下列的「邏輯連接的組合方式」。

*1. 不含G9SX-EX401-□型(增設模組)與G9SX-EX041-T-□型(增設模組OFF延遲型)的台數。

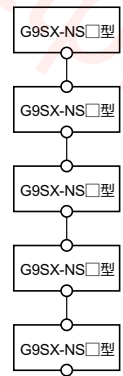
*2. 不含G9SX-EX401-□型(增設模組)與G9SX-EX041-T-□型(增設模組OFF延遲型)可以混合連接。

邏輯連接的組合方式

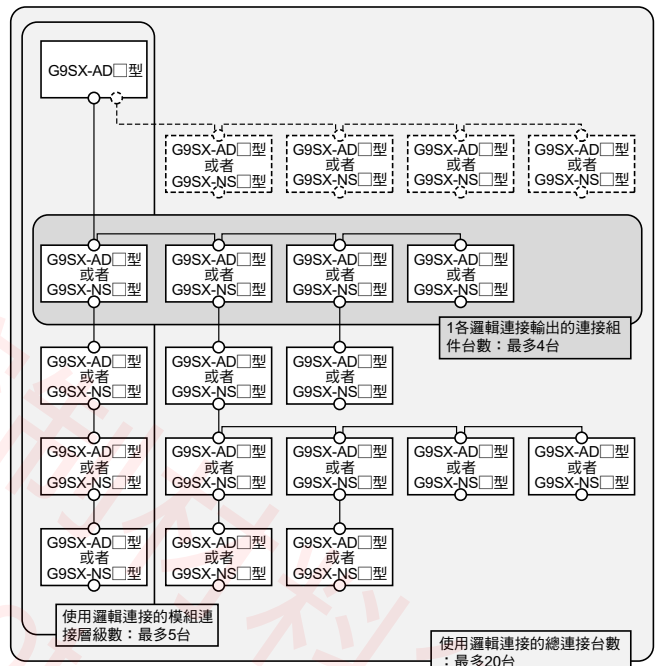
(1) G9SX-NS□型控制器的一個邏輯連接輸出點，最多可對4台控制器進行邏輯連接。



(2) 亦可從接收邏輯連接輸入的G9SX-NS□型控制器，再對其他控制器進行邏輯連接。(最大可連接至5個層級)



(3) 最大的系統構成係為控制器G9SXNS□型、高性能模組G9SX-AD□型以及單一功能模組G9SX-BC型合計20台。此時，可針對控制器或高性能模組再各自增設最多5台的增設模組。

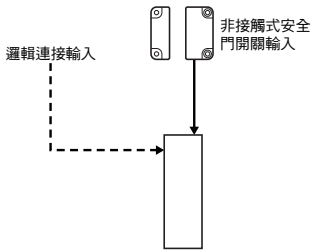


註. 亦可將上圖之G9SX-NS□型更換為高性能模組G9SX-AD□型。

關於高性能模組G9SX-AD□型的詳細資訊，請參閱彈性安全模組G9SX型系列的型錄(型錄編號：SGFM-025)。

●關於回應時間以及動作時間

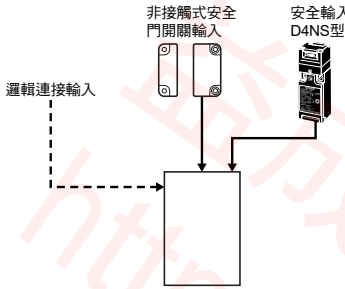
(1) G9SX-NS□型



	回應時間最大值 *1 (不含增設模組)	動作時間最大值 *2 (不含增設模組)
非接觸式安全門開關輸入	20ms	100ms
邏輯連接輸入	20ms	100ms

* 1. 回應時間的最大值，係指輸入從ON→OFF到輸出從ON→OFF為止的時間。
* 2. 動作時間的最大值，係指輸入從OFF→ON到輸出從OFF→ON為止的時間。

(2) G9SX-NSA□型

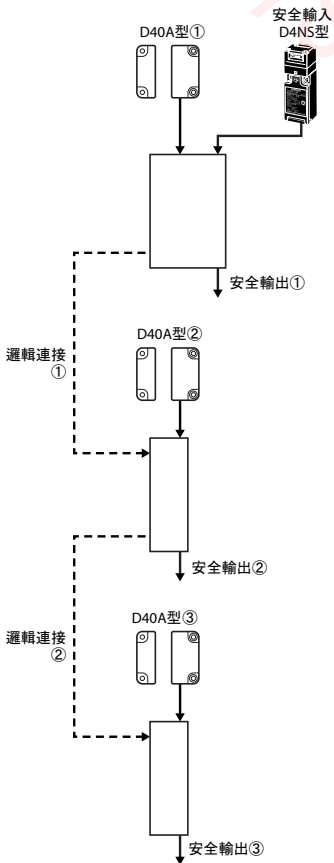


	回應時間最大值 *1 (不含增設模組)	動作時間最大值 *2 (不含增設模組)
非接觸式安全門開關輸入	20ms	100ms
安全輸入	15ms	50ms
邏輯連接輸入	20ms	100ms

* 1. 回應時間的最大值，係指輸入從ON→OFF到輸出從ON→OFF為止的時間。
* 2. 動作時間的最大值，係指輸入從OFF→ON到輸出從OFF→ON為止的時間。

(3) 連接數台非接觸式安全門開關控制器G9SX-NS□/NSA□型時

和數台控制器進行邏輯連接時，其回應時間為上述(1) (2)的回應時間之合計值。(動作時間亦同)



外殼(1)

從D40A 1型由ON→OFF，到安全輸出2由ON→OFF為止的時間

$$20\text{ms} \quad + \quad 20\text{ms} \quad = \quad 40\text{ms}$$

(D40A①型) (邏輯連接①)

外殼(2)

從D4NS型由ON→OFF，到安全輸出3由ON→OFF為止的時間

$$15\text{ms} \quad + \quad 20\text{ms} \quad + \quad 20\text{ms} \quad = \quad 55\text{ms}$$

(D4NS型) (邏輯連接①) (邏輯連接②)

通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

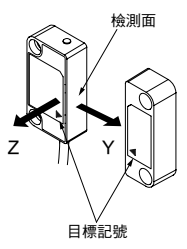
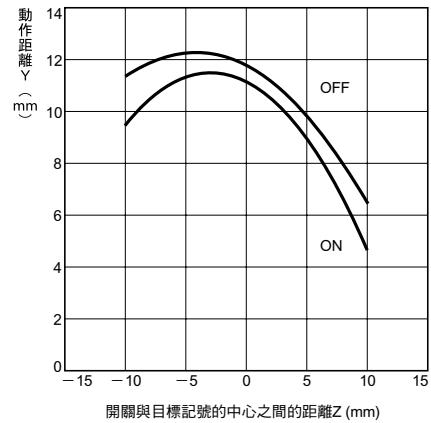
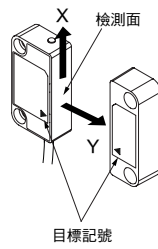
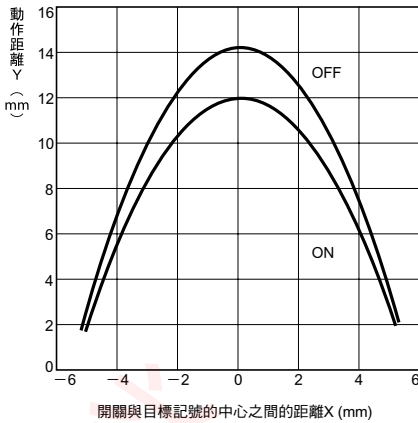
D40A
G9SX-NS

D40B

D4NS-SK
D4JL-SK

特性曲線

● 檢測領域(特性資料範例)

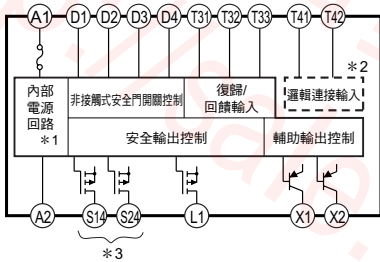


- 註1. 動作距離係為開關與制動器的檢測面之間的距離。
 註2. 圖表為周圍環境溫度在+23°C 時的代表性資料，而非動作的保證值。
 動作距離可能會因受到周圍的金屬、磁力或溫度之影響而產生變化。

連接

■ 內部連接圖

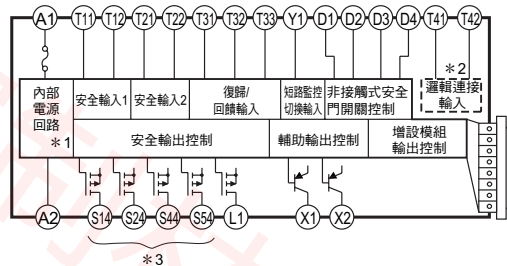
G9SX-NS202-□型(非接觸式安全門開關控制器)



- *1. 內部電源回路未經絕緣處理。
 *2. 邏輯連接輸入經過絕緣處理。
 *3. S14、S24的輸出部的內部回路經過雙重化處理。

G9SX-NSA222-T03-□型

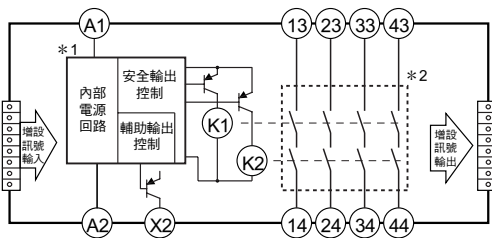
(非接觸式安全門開關控制器)



- *1. 內部電源回路未經絕緣處理。
 *2. 邏輯連接輸入經過絕緣處理。
 *3. S14~S54的輸出部的內部回路經過雙重化處理。

G9SX-EX401-□型/G9SX-EX041-T-□型

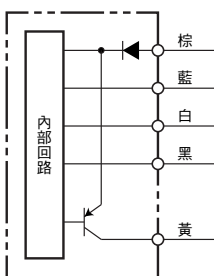
(增設模組/增設模組OFF延遲型)



- *1. 內部電源回路未經絕緣處理。
 *2. 繼電器接點輸出經過絕緣處理。

■ 內部回路圖

D40A-1C□型



安全門開關

通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

D40A
G9SX-NS

D40B

D4NS-SK
D4JL-SK

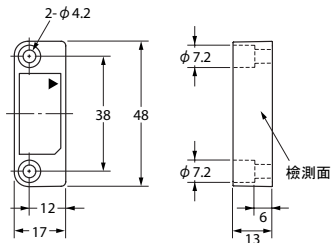
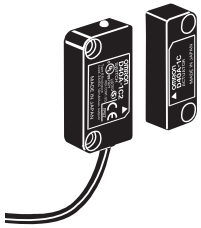
外觀尺寸/端子配置

(單位：mm)

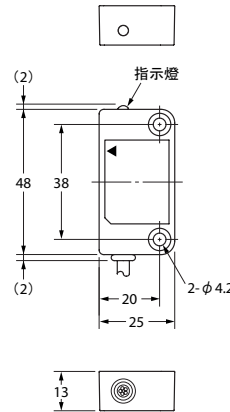
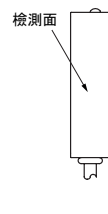
●非接觸式安全門開關(開關/制動器)

D40A-1C2型

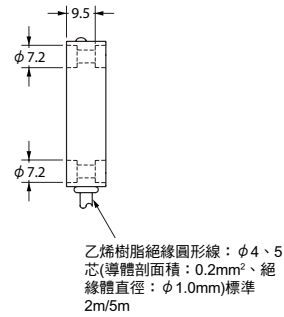
D40A-1C5型



(制動器部)



(開關部)



安全門開關

通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

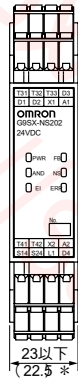
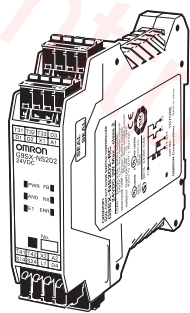
D40A
G9SX-NS

D40B

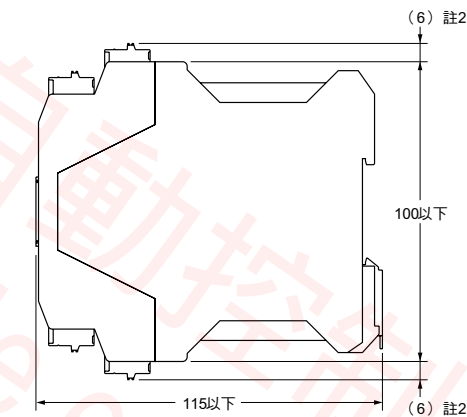
D4NS-SK
D4JL-SK

●非接觸式安全門開關控制器

G9SX-NS202-□型

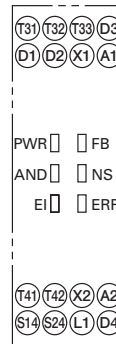


* 為平均尺寸。



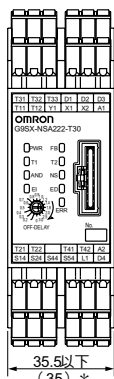
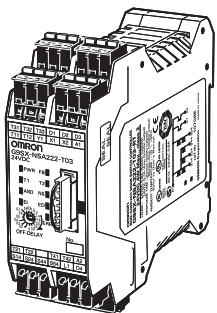
註1. 上圖為-RC型的示意圖。
註2. -RC型的範例。

端子配置

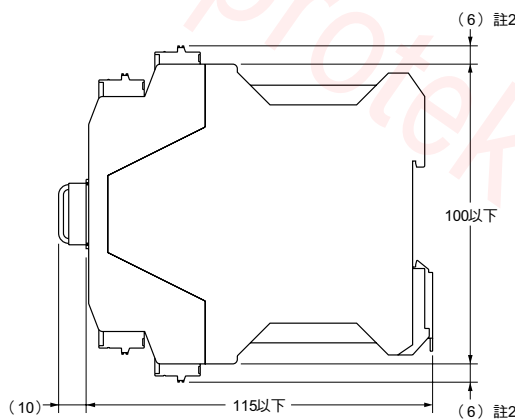


●非接觸式安全門開關控制器

G9SX-NSA222-T03-□型

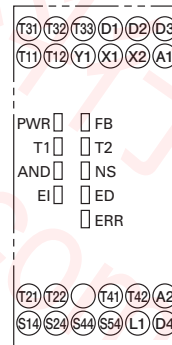


* 為平均尺寸。



註1. 上圖為-RC型的示意圖。
註2. -RC型的範例。

端子配置



安全門開關

- 增設模組
G9SX-EX401-□型
- 增設模組OFF延遲型
G9SX-EX041-T-□型

通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

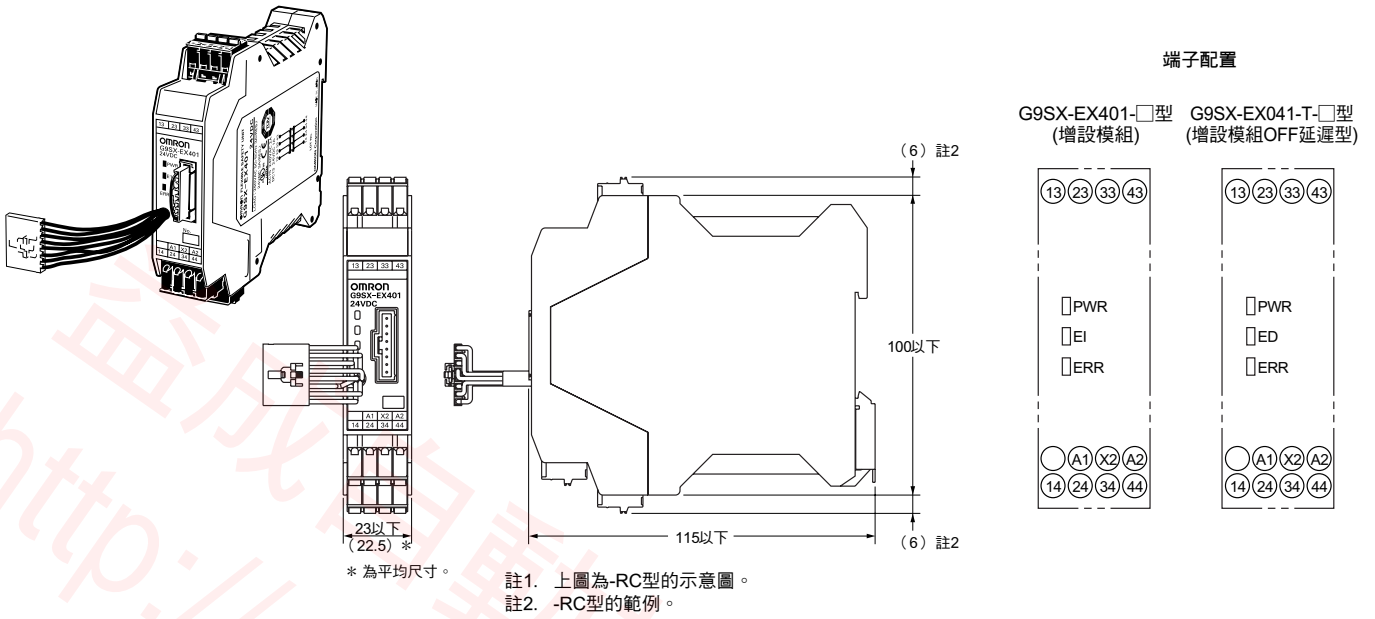
D4BL

D4NH

D40A
G9SX-NS

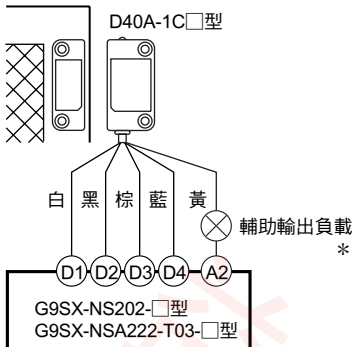
D40B

D4NS-SK
D4JL-SK



■非接觸式安全門開關與非接觸式安全門開關控制器之配線

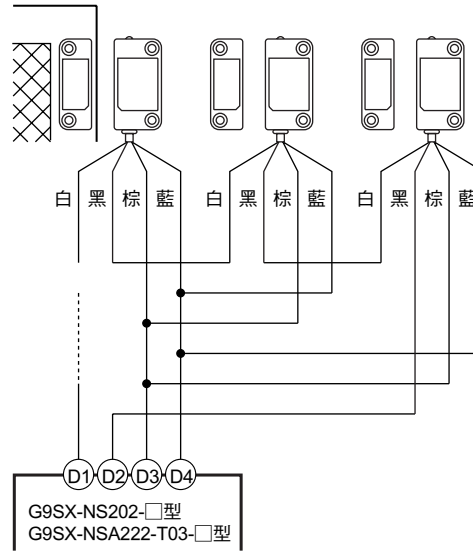
●D40A-1C□型



*請將輔助輸出之負載電流設為10mA以下。

●連接多台時的配線範例

請將非接觸式安全門開關的連接台數設為30台以下來進行架構。



●輸入輸出的配線相關事項

訊號名稱	纜線顏色	動作概述
非接觸式安全門開關電源輸入	棕色	對D40A型供應電源。 請連接至G9SX-NS□型的D3以及D4端子。
	藍色	
非接觸式安全門開關輸入	白色	輸入G9SX-NS□型的專用訊號。 非接觸式安全門開關輸出變為ON的必要條件，係為讓非接觸式安全門開關輸入變為ON狀態。
非接觸式安全門開關輸出	黑色	根據制動器檢測結果、非接觸式安全門開關輸入之狀態，來將輸出ON/OFF。
輔助輸出	黃色	於檢測到制動器時輸出。

通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

D40A
G9SX-NS

D40B

D4NS-SK
D4JL-SK

■輸入输出的配線相關事項

G9SX-NS202-□型

訊號名稱	端子名稱	動作概述	配線方式			
電源輸入	A1、A2	請將A1端子以及A2端子連接於電源。	將A1端子連接至電源的正側(DC24V)。 將A2端子連接至電源的正側(GND)。			
通用注意事項 D4NS	非接觸式安全門開關輸入 D1、D2、D3、D4	使安全輸出變為ON的必要條件，係為讓連接至G9SX-NS□型的所有非接觸式安全門開關輸入也變為ON的狀態。 未能達成此條件時，安全輸出不會成為ON的狀態。				
D4GS-N	回饋/復歸輸入 T31、T32、T33	對T33端子的訊號在ON的狀態為達成安全輸出ON的必須條件。 未能達成此條件時，安全輸出不會成為ON的狀態。	自動復歸 			
D4BS		對T32端子的訊號在OFF→ON→OFF的變換狀態，係為達成安全輸出ON的必須條件。如未達成此條件，則安全輸出不會成為ON的狀態。	手動復歸 			
D4GL-SK10-LK	邏輯連接輸入 T41、T42	將上層模組的安全訊號a傳遞到下層模組後，與安全訊號b所形成(透過AND方式輸出)的邏輯積(AND)即稱為邏輯連接。 透過邏輯連接方式，下層模組的安全輸出變為a(AND)b。(成為輸入a和輸入b的邏輯積(AND)輸出) 邏輯連接有效設定開關的設定必須為AND(有效)，且對T41端子的訊號內容必須為ON，此為達到安全輸出ON的必須條件。				
D4JL				安全瞬間輸出 S14、S24	依照非接觸式安全門輸入、回饋/復歸輸入、邏輯連接輸入之輸入邏輯，將輸出ON/OFF。在OFF延遲動作中時，則不依據輸入條件，安全瞬間輸出將會變成OFF。	不使用時，請切換成開路狀態。
D4NL				邏輯連接輸出 L1	輸出與安全瞬間輸出同期、同邏輯的訊號。	不使用時，請切換成開路狀態。
D4BL				輔助輸出(監視器) X1	輸出與安全瞬間輸出同期、同邏輯的訊號。	不使用時，請切換成開路狀態。
D4NH	輔助輸出(錯誤) X2	錯誤指示燈閃爍或亮燈時，將輸出變為ON。	不使用時，請切換成開路狀態。			

G9SX-NSA222-T03-□型

訊號名稱	端子名稱	動作概述	配線方式
電源輸入	A1、A2	請將A1端子以及A2端子連接於電源。	將A1端子連接至電源的+側(DC24V)。 將A2端子連接至電源的-側(GND)。
安全輸入1	T11、T12	安全輸入1、安全輸入2兩者的ON狀態為達成安全輸出ON的必須條件。 未能達成此條件時，安全輸出不會成為ON的狀態。	相當於安全類別2
安全輸入2	T21、T22		相當於安全類別3 (不監控安全輸入系統間的短路狀況)
			相當於安全類別3 (監控安全輸入系統間的短路狀況)
非接觸式安全門開關輸入	D1、D2、D3、D4	使安全輸出變為ON的必要條件，係為讓連接至G9SX-NS□型的所有非接觸式安全門開關輸入也變為ON的狀態。 未能達成此條件時，安全輸出不會成為ON的狀態。	
回饋/復歸輸入	T31、T32、T33	對T33端子的訊號在ON的狀態為達成安全輸出ON的必須條件。 未能達成此條件時，安全輸出不會成為ON的狀態。	自動復歸
		對T32端子的訊號在OFF→ON→OFF的變換狀態，係為達成安全輸出ON的必須條件。如未達成此條件，則安全輸出不會成為ON的狀態。	手動復歸
邏輯連接輸入	T41、T42、T51、T52	將上層模組的安全訊號a傳遞到下層模組後，與安全訊號b所形成(透過AND方式輸出)的邏輯積(AND)即稱為邏輯連接。 透過邏輯連接方式，下層模組的安全輸出變為a(AND)b。(成為輸入a和輸入b的邏輯積(AND)輸出) 邏輯連接有效設定開關的設定必須為AND (有效)，且對T41端子的訊號內容必須為ON，此為達到安全輸出ON的必須條件。	
短路監控切換輸入	Y1	配合短路監控切換輸入部的配線，切換對G9SX型之安全輸入的錯誤檢測(系統間短路監控功能)。	使用T11、T21端子(監控安全輸入系統間的短路狀況)時，請切換成開路狀態。 不使用T11、T21端子(相當於安全類別2、3之配線)時，請將其連接於24V。
安全瞬間輸出	S14、S24	請遵照安全輸入、回饋/復歸輸入、邏輯連接的輸入理論將輸出調整至ON/OFF。 OFF延遲動作中，若未依照輸入條件，則安全瞬間輸出會成為OFF。	不使用時，請切換成開路狀態。
安全OFF延遲輸出	S44、S54	和安全瞬間輸出相對的是OFF延遲動作的輸出。OFF延遲時間可套用根據設定開關所設定的時間。 設定時間為0秒時，以安全瞬間輸出方式輸出。	不使用時，請切換成開路狀態。
邏輯連接輸出	L1	輸出與安全瞬間輸出同期、同邏輯的訊號。	不使用時，請切換成開路狀態。
輔助輸出(監視器)	X1	輸出與安全瞬間輸出同期、同邏輯的訊號。	不使用時，請切換成開路狀態。
輔助輸出(錯誤)	X2	錯誤指示燈閃爍或亮燈時，將輸出變為ON。	不使用時，請切換成開路狀態。

通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

D40A
G9SX-NS

D40B

D4NS-SK
D4JL-SK

■與安全感測器的連接相關事項

G9SX-NSA222-T03-□型的安全輸入無法和安全感測器連接。

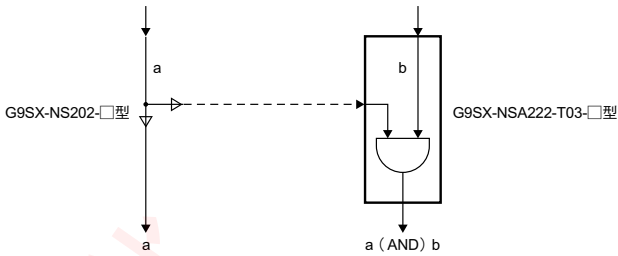
動作

安全門開關

■功能

●邏輯連接

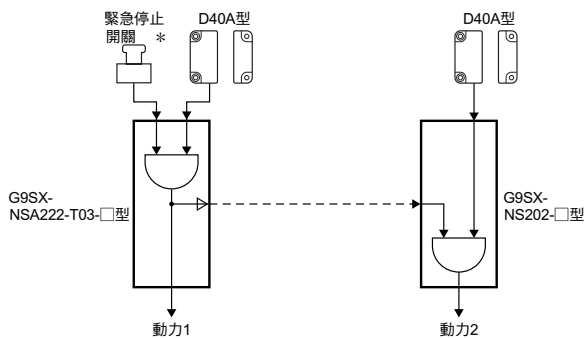
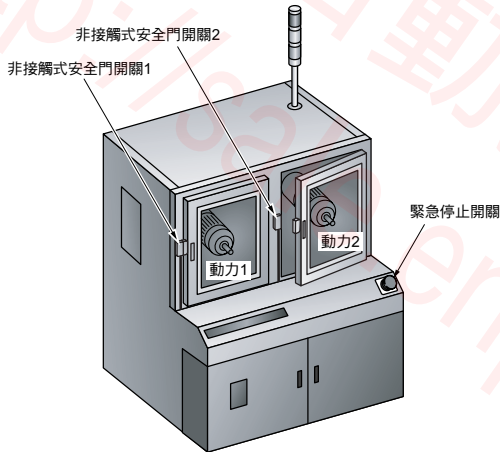
使G9SX型的安全訊號a透過其他的G9SX型和安全訊號b形成邏輯積(AND)，即稱為邏輯連接。進行如下圖中邏輯連接後，G9SX-NSA222-T03-□型的安全輸出會變為a(AND)b。



舉例來說，下圖說明在有動力1及動力2兩種危險來源存在的裝置中，透過非接觸式安全門開關以及緊急停止開關來構築安全對策的情況。此裝置的動作，在開啟門2的時候僅停止動力2(部分停止)，在開啟門1或是操作緊急停止按鈕時，動力1及動力2均會停止(全部停止)。

此應用範例可使用G9SX型來達到以下狀態。

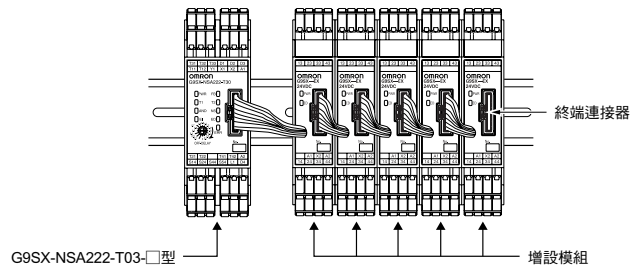
(註：G9SX-NS202-□型的邏輯連接設定必須設定成"AND有效"。)



* 在過緊急停止的情形下使用裝置時，請務必使用手動復歸。

●增設模組的连接

- 增設模組 G9SX-EX/G9SX-EX-T 型，可藉由連接非接觸式安全門開關控制器(G9SX-NSA222-T03-□型)來增加安全輸出點數。(不可與G9SX-NS202-□型連接)
- 1台G9SX-NSA222-T03-□型最多可連接5台增設模組。此時可混合連接瞬間型的G9SX-EX型以及OFF延遲型的G9SX-EX-T型。
- 拆除G9SX-NSA222-T03-□型的終端連接器，插入增設模組的连接電纜線之連接器。再將拆下的終端連接器插入終端(最右側)的增設模組。
- 連接增設模組時，所有的增設模組均須有電源輸入，因此使用時請特別注意。(實際的连接方法請參考下圖。)



通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

D40A
G9SX-NS

D40B

D4NS-SK
D4JL-SK

●關於設定方法

(1) 關於系統間短路監控(G9SX-NSA222-T03-□型)

安全輸入的系統間短路監控切換，請以Y1端子的24V短路或開放進行設定。

系統間短路監控為ON狀態時，檢測安全輸入T11-T12與T21-T22的系統間之短路。一旦檢測到短路時會有以下狀態。

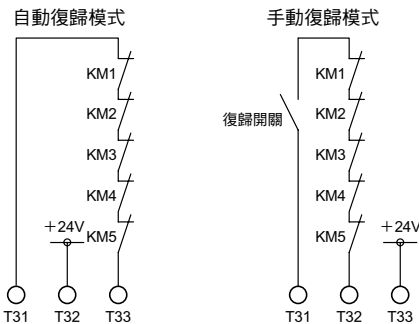
- ①鎖定安全輸出以及邏輯連接輸出
- ②LED顯示錯誤狀態
- ③錯誤輸出(輔助輸出)為ON

系統間短路監控	配線方式
OFF	相當於安全類別2
	相當於安全類別3
ON	相當於安全類別3 (監控安全輸入系統間的短路狀況)

(2) 關於復歸模式(G9SX-NS202-□/NSA222-T03-□型)

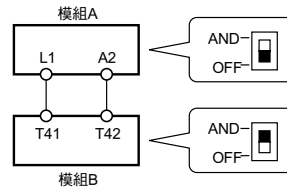
復歸模式的切換應以回饋/復歸入力端子T31/T32/T33進行設定。

如圖所示，將T32端子短路成24V時，將成為自動復歸模式；將T33端子短路成24V時，將成為手動復歸模式。



(3) 邏輯連接的設定(G9SX-NS202-□/NSA222-T03-□型)

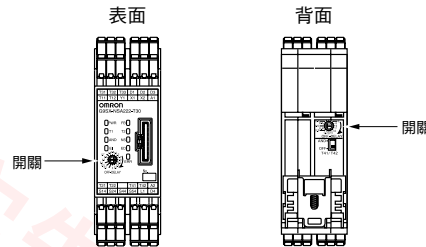
使用邏輯連接方式連接2台以上的非接觸式安全門開關控制器時，請將邏輯連接的輸入端模組(下圖的模組B)之邏輯連接設定開關設定為"AND"。



註：上圖中模組B的邏輯連接設定開關調整在"OFF"狀態時，模組B會判斷為設定錯誤而進行鎖定，因此設定時請特別注意。

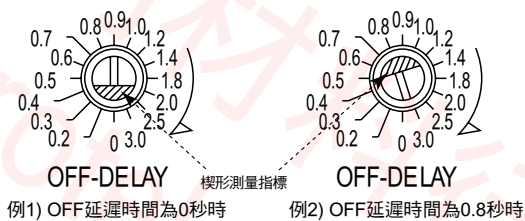
(4) OFF延遲時間設定(G9SX-NSA222-T03-□型)

請使用OFF延遲時間設定開關(模組表面與背面各有一個)，來進行G9SX-NSA222-T03-□型的OFF延遲安全輸出時間設定。只有在兩個開關之設定值一致時，才會正常動作。只有在兩個開關之設定值不一致時會導致錯誤發生，因此請特別注意。



設定開關的設定位置，請參考下例說明。

G9SX-NSA222-T03-□型



通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

D40A
G9SX-NS

D40B

D4NS-SK
D4JL-SK

●關於故障檢測

非接觸式安全門開關控制器檢測到錯誤時，ERR指示燈會亮燈或閃爍以通知錯誤內容。

請依下列表格內容進行因應對策，完成後再重新導入電源。

<G9SX-NS202-□/NSA222-T03-□型>

通用注意事項	ERR指示燈	ERR以外的指示燈	內容	原因	對策
	閃爍	—	雜訊或是G9SX型發生故障	(1) 過度的雜訊影響 (2) 內部回路故障	(1) 請確認周圍環境的雜訊。 (2) 請更換產品。
D4NS		T1閃爍	安全輸入1的異常	(1) 安全輸入1的配線異常 (2) 短路監控切換輸入的配線異常 (3) 安全輸入1內部回路故障	(1) 請確認連接至T11、T12端子的配線。 (2) 請確認連接至Y1端子的配線。 (3) 請更換產品。
D4GS-N		T2閃爍	安全輸入2的異常	(1) 安全輸入2的配線異常 (2) 短路監控切換輸入的配線異常 (3) 安全輸入2內部回路故障	(1) 請確認連接至T21、T22端子的配線。 (2) 請確認連接至Y1端子的配線。 (3) 請更換產品。
D4BS		NS閃爍	非接觸式安全門開關輸入的異常	(1) 非接觸式安全門開關輸入的配線異常 (2) 於串聯連接中非接觸式安全門開關的配線異常 (3) 非接觸式安全門開關輸入的內部回路故障 (4) 非接觸式安全門開關故障	(1) 請確認連接至D1、D2端子的配線。 (2) 請確認和D40A型之間的配線。 (3) 請更換產品。 (4) 請更換D40A型。
D4GL-SK10-LK		FB閃爍	回饋/復歸輸入的異常	(1) 回饋/復歸輸入的配線異常 (2) 回饋/復歸輸入的內部回路故障	(1) 請確認連接至T31、T32、T33端子的配線。 (2) 請更換產品。
D4JL		FB閃爍	增設模組的異常	(1) 增設模組的回饋異常 (2) 增設模組的電源異常 (3) 增設模組的繼電器安全輸出故障	(1) 請確認增設模組連接電纜線與終端連接器間的連接。 (2) 請確認增設模組的電源電壓。 ※請確認所有已連接的增設模組之電源指示燈。 (3) 請更換產品。
D4NL	亮燈	EI閃爍	安全瞬間輸出、邏輯連接輸出、輔助輸出(監視器輸出)的異常	(1) 安全瞬間輸出的配線異常 (2) 安全瞬間輸出的回路故障 (3) 邏輯連接輸出的配線異常 (4) 邏輯連接輸出的回路故障 (5) 輔助輸出(監視器)的配線異常 (6) 使用環境的溫度超出規定範圍之外	(1) 請確認連接至S14、S24端子的配線。 (2) 請更換產品。 (3) 請確認連接至L1端子的配線。 (4) 請更換產品。 (5) 請確認連接至X1端子的配線。 (6) 請確認G9SX型的環境溫度以及安裝空間。
D4NH		ED閃爍	安全OFF延遲輸出之相關異常	(1) 安全OFF延遲輸出的配線異常 (2) OFF延遲時間的設定異常 (3) 安全OFF延遲輸出的回路故障 (4) 使用環境的溫度超出規定範圍之外	(1) 請確認連接至S44、S54端子的配線。 (2) 請確認OFF延遲時間設定開關的設定內容。 (3) 請更換產品。 (4) 請確認G9SX型的環境溫度及安裝空間。
D40A G9SX-NS		AND閃爍	邏輯連接輸入的異常	(1) 邏輯連接輸入的配線異常 (2) 邏輯連接輸入的設定異常 (3) 邏輯連接輸入之內部回路故障	(1) 請確認連接至T41、T42端子的配線。 ※連接至T41、T42端子的配線之最大長度為100m。 ※邏輯連接1輸出的平均邏輯連接輸入之可能最大連接台數為4台。 (2) 請確認邏輯連接有效設定開關的設定內容。 (3) 請更換產品。
D4NS-SK D4JL-SK		PWR之外的所有指示燈閃爍	電源電壓的異常	(1) 電源電壓過高或不足	(1) 請確認模組的電源電壓。

另外，錯誤以外的指示燈閃爍時，請依照下表進行因應對策。

ERR指示燈	ERR以外的指示燈	內容	原因	對策
熄燈	T1 T2 閃爍	安全輸入不一致	因為安全輸入的接點不良、短路故障或配線短路等狀況而導致安全輸入1與安全輸入2的輸入狀態不一致。	請確認與安全輸入之間的配線。 或是確認安全輸入的輸入序列。於異常狀態解除後，請將安全輸入1、2兩者均設為OFF狀態。

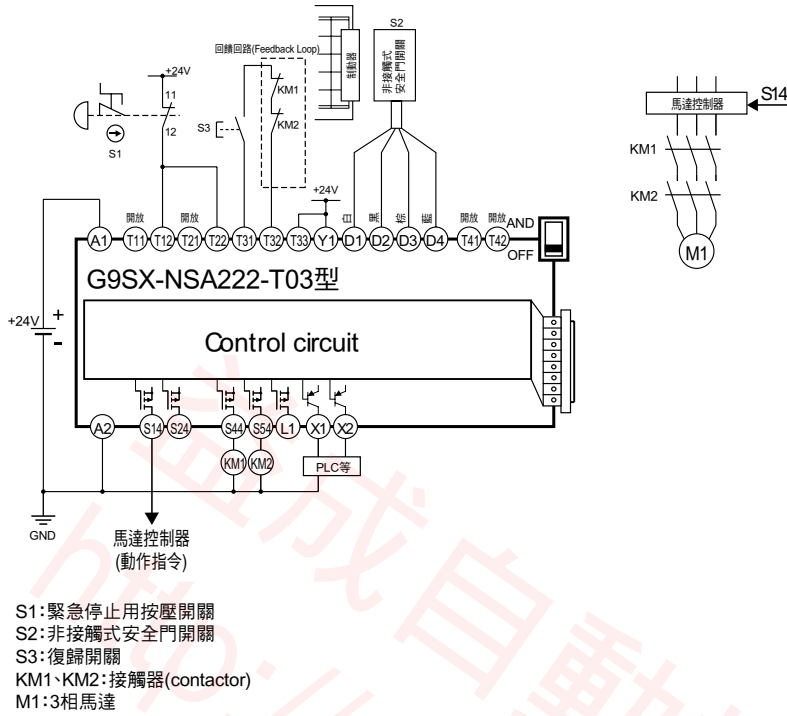
<增設模組>

ERR指示燈	ERR以外的指示燈	內容	原因	對策
亮燈	—	增設模組安全繼電器的輸出故障	(1) 繼電器接點熔化 (2) 內部回路故障	請更換產品。

使用用途之範例

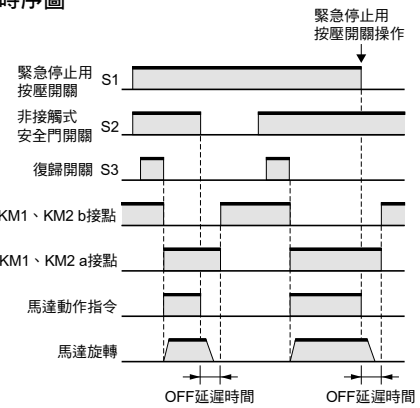
G9SX-NSA222-T03-□型(DC24V)<緊急停止用按壓開關1ch輸入+非接觸式安全門開關/手動復歸>

安全門開關

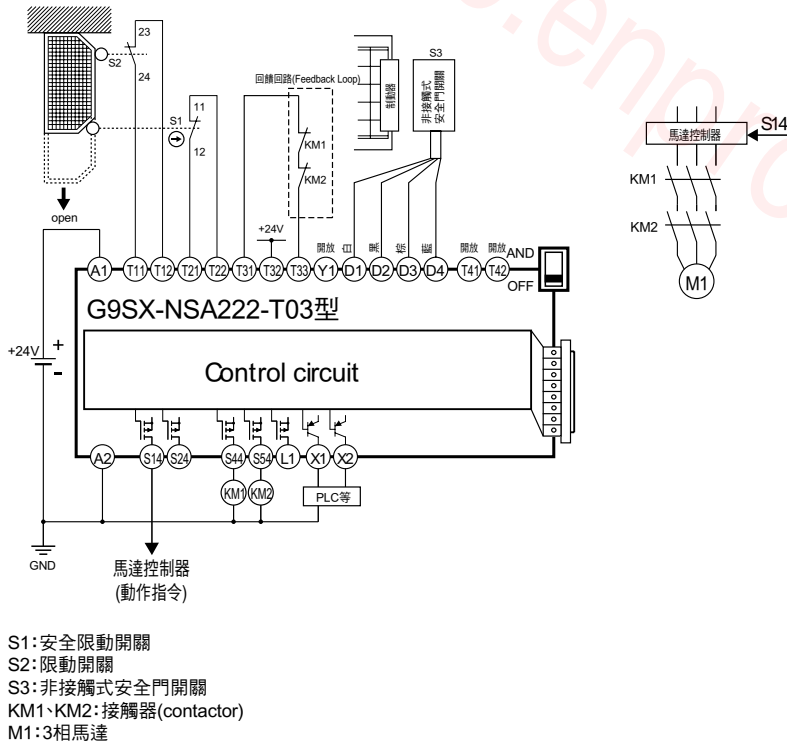


- 註1. 本回路的範例相當於類別2。
- 註2. 關於非接觸式安全門開關的配線，請參考第116~117頁或使用說明書。

時序圖

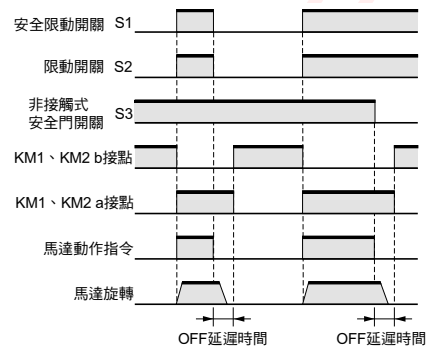


G9SX-NSA222-T03-□型(DC24V)<安全限動開關2ch輸入+非接觸式安全門開關/自動復歸>



- 註1. 本回路的範例相當於類別3。
- 註2. 關於非接觸式安全門開關的配線，請參考第116~117頁或使用說明書。

時序圖



通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

D40A
G9SX-NS

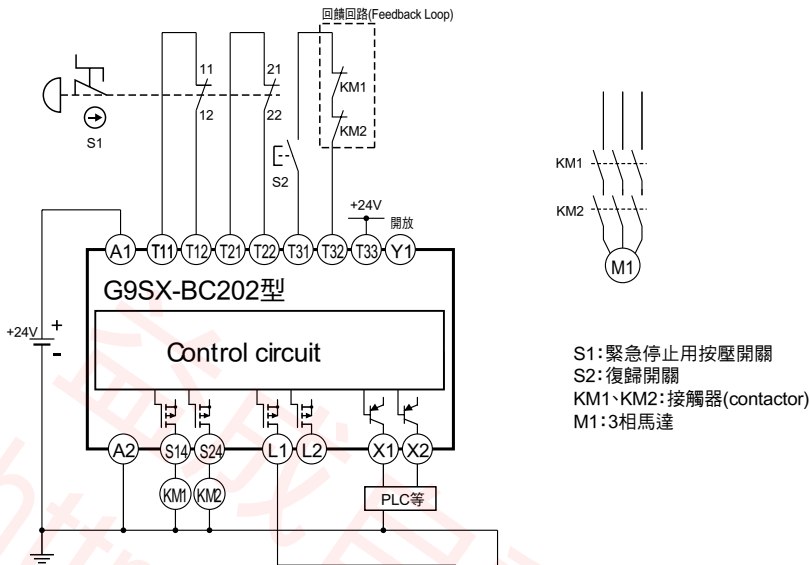
D40B

D4NS-SK
D4JL-SK

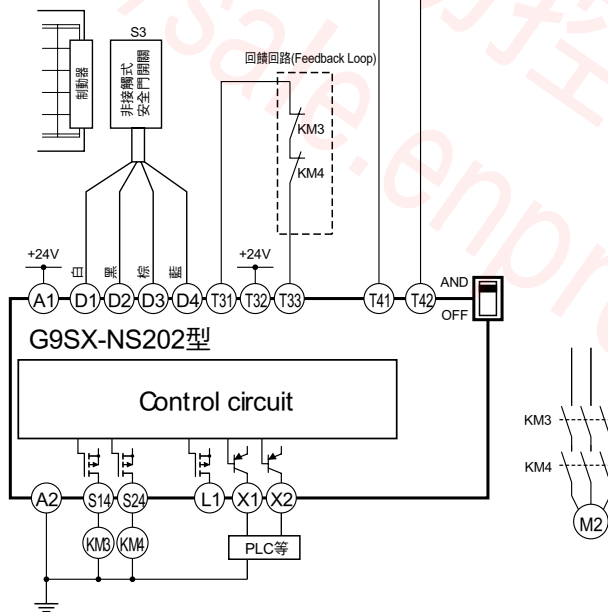
安全門開關

G9SX-BC202型(DC24V)<緊急停止用按壓開關2ch輸入/手動復歸>+
G9SX-NS202-□型(DC24V)<非接觸式安全門開關輸入/自動復歸>

- 通用注意事項
- D4NS
- D4GS-N
- D4BS
- D4GL
- D4GL-SK10-LK
- D4JL
- D4NL
- D4BL
- D4NH
- D40A
G9SX-NS
- D40B
- D4NS-SK
- D4JL-SK



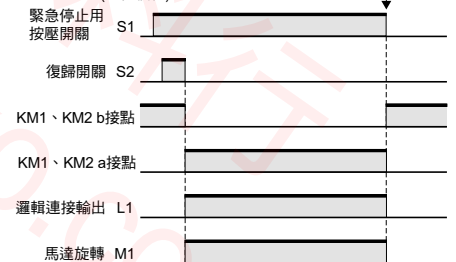
S1: 緊急停止用按壓開關
S2: 復歸開關
KM1・KM2: 接觸器(contactor)
M1: 3相馬達



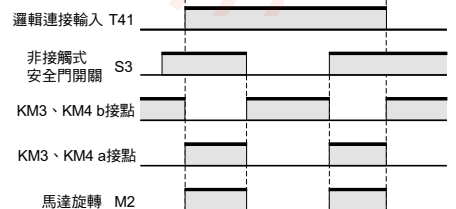
S3: 非接觸式安全門開關
KM3・KM4: 接觸器(contactor)
M2: 3相馬達

時序圖

<G9SX-BC202型(上位模組)>



<G9SX-NS202-□型(下層模組)>



註1. 本回路的範例相當於類別3。
註2. 關於非接觸式安全門開關的配線，請參考第116~117頁或使用說明書。

正確使用須知

●詳細說明請參閱「安全商品總合型錄」(型錄編號：X001-TW5-02)中的「switch (開關)之共通注意事項」及「安全繼電器之共通注意事項」。

警告

輸出故障時，可能會對人體造成嚴重的傷害。
絕不可使用超出安全輸出的額定值之負載。



安全功能損壞時，可能會對人體造成嚴重的傷害。
配線時請注意安全輸出不可對電源以及負載電源造成短路。



輸出故障時，可能會對人體造成嚴重的傷害。
在安全輸出上連接電感負載時，請附加逆起電力保護回路。



安全功能損壞時，可能會對人體造成嚴重的傷害。
請依下表適當使用控制機器。



請勿在防護門開啟的狀態下，將調節器靠近開關，否則有可能會因為機器啟動，因而造成人身嚴重的傷害，



控制設備	必要事項
緊急停止用 按壓開關	請使用符合IEC/EN60947-5-1直接開路動作機構之要求事項，且通過認證的規格商品。
安全門開關 安全限動開關	請使用符合IEC/EN60947-5-1直接開路動作機構之要求事項，且通過認證的規格商品。 並請使用適用於微小負載(DC24V·5mA)的開關。
非接觸式安全門 開關	請與OMRON小型非接觸式門把開關D40A型搭配使用。
安全繼電器	請使用符合EN50205強制牽引機構之要求事項且通過認證的規格商品。 回饋用的接點，請使用可適用於微小負載(DC24V·5mA)之產品。
接觸器(contactor)	為偵測接觸器(contactor)接點無法開離的情形，請使用強制牽引式的接觸器，將接觸器的b接點連接在回饋/復歸輸入處。 回饋用的接點，請使用可適用於微小負載(DC24V·5mA)之產品。 即使將非強制式的接觸器之b接點連接於回饋/復歸輸入上，也無法偵測接觸器(contactor)無法開離的情形。
其他的控制裝置	請確實檢查是否已經符合要求的的安全類別後再使用。

安全上的要點

- (1) 請務必在電源切斷的狀態下進行配線作業。
 1. 請在負載電源切斷的狀態下進行配線作業，否則將可能造成觸電的危險。
 2. 連接於本裝置的外部裝置可能會有無法預期的動作發生。
- (2) 請勿於有引燃性氣體、爆炸性氣體的環境中使用，電流閉開時的電弧(Arc)或繼電器發熱時，可能會有造成火災或爆炸的危險。
- (3) 輸出入端子應正確配線，並在運轉前進行動作的確認。若配線產生錯誤，將可能會損害到安全功能。
- (4) 輔助輸出並非安全輸出，請勿將輔助輸出當做安全輸出使用，否則一旦D40A型或周邊裝置發生故障時，將會損壞安全功能。
- (5) D40A型的設置、檢查、維修等相關作業的實施是否正確，必須由「負責人」進行確認。
所謂的「負責人」係指在機械的設計、裝置、運用、維修、廢棄的各階段中具有確保安全資格以及權限與責任者。
- (6) D40A型的設置與設置後的確認應由完全瞭解所設置的機械之「負責人」進行。
- (7) 請確實實施D40A型的日常檢查，以及每6個月一次的檢查。否則將可能導致系統無法正常動作，而導致人員受到重傷。
- (8) 選擇連接至D40A型以及安全功能之相關機器、零件時，必須根據所要求的安全性等級以及安全類別，選用適合的規格品，評估系統的安全性及安全類別的適用性時，必須以整個系統進行系統評估，判定安全類別的適用性時，必須實際諮詢具有權限的第三者認證機構。
- (9) 請勿進行分解、修理或改造。否則將可能會喪失原本之安全功能。
- (10) G9SX型請在IP54 (IEC/EN60529)以上的隔離範圍內使用。
- (11) 請勿將額定值以上的 DC 電源輸出或 AC 電源輸出連接於 G9SX-NS□型的電源輸入上。
- (12) 否則可能會有造成觸電的危險。
DC電源裝置必須符合以下項目。
 - 具有IEC/EN60950、EN50178等所規定的雙重絕緣或強化絕緣的DC電源裝置，或IEC/EN61558所規定之變壓器。
 - 符合UL508中所定義的等級(Categor) 2回路或限制電壓電源回路的輸出特性要求
- (13) 請於輸入端子上正確加上規定的電壓。
若增加電壓的方式不正確的話，將無法發揮出原有的功能，並因而導致安全功能降低，或造成商品的損壞或燒毀。
- (14) 錯誤輸出、補助輸出並非安全輸出。
請勿作為安全輸出使用。
如此可能會損耗G9SX型或周邊機器故障時的安全功能。
此外，邏輯連接輸出不可使用於G9SX-□型間的邏輯連接以外之用途。
- (15) 「負責人」必須確認 G9SX-NS □型設置、檢修及維護之相關事項是否已經正確地完成，所謂「負責人」係指在機械的設計、裝置、運用、維修、廢棄的各階段中具有確保安全資格以及權限與責任者。

安全門開關

通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

D40A
G9SX-NS

D40B

D4NS-SK
D4JL-SK

安全門開關

- (16) G9SX-NS □型的設置與設置後的確認應由完全瞭解所設置的機械之「負責人」進行。
- (17) 請確實實施G9SX-NS □型的日常檢查，以及每6個月一次的檢查。否則將可能導致系統無法正常動作，而導致人員受到重傷。
- (18) 關於連接G9SX-NS □型的安全功能相關機器、零件，應配合要求的安全性等級，以及安全類別(Category)來使用適當規格的商品。
- (19) 關於系統整體的規格適當性，應由客戶負責採取因應措施。
- (20) 安裝端子台時，請注意勿夾到手指。
- (21) 壽命因關閉條件而有所不同。因此使用時，請務必進行實際使用條件上的確認，並在不會發生性能問題的關閉次數範圍內使用。

通用注意事項

D4NS

系統的安全性以及對安全類別的適合程度，必須以系統整體進行評估。符合安全類別的判斷之相關事項，請向第三者認定機構等提出具體的諮詢。

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

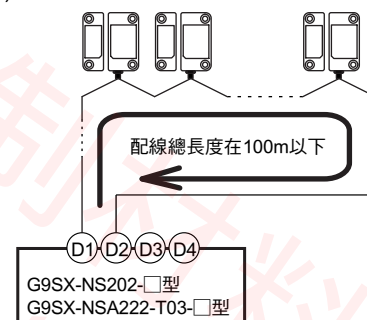
D40A
G9SX-NS

D40B

D4NS-SK
D4JL-SK

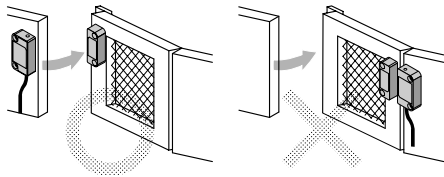
使用注意事項

- (1) 連接非接觸式門把開關時
非接觸式門把開關的連接輸入必須在G9SX-NS □型與小型非接觸式門把開關D40A型之間正確地配線，並且必須在啟動前進行動作確認。
- (2) D40A型必須和專用的制動器及專用控制器G9SX-NS □型搭配使用。
- (3) 關於操作事項
請勿放任產品掉落，或施加異常的震動、衝擊，否則可能導致產品故障或產生錯誤動作。
- (4) 保管、設置場所
以下場所可能會導致故障或誤動作的情況發生，因此請勿設置於下列場所。
1. 直接受到陽光照射的場所。
2. 周圍溫度超過-10~+50°C的範圍。
3. 相對濕度超過25~85%RH範圍的場所，因溫度的劇烈變化而結露的場所。
4. 具有腐蝕性或易燃氣體的場所。
5. 可能會讓本體承受額定值以上之震動或衝擊的場所。
6. 有水氣、油分、藥品等飛沫散佈的場所。
7. 塵埃、鹽分、鐵屑較多的場所。
8. 鐵屑或鐵粉會直接散落的場所。
- (5) 配線時，必須將D40A型的配線總長度限制在100m以下。

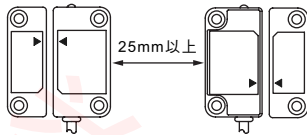


- (6) 更換開關時，請務必在關閉控制器電源的狀態下進行，否則連接至控制器的外部裝置有可能會出現無法預料的動作。
- (7) 請勿在1.5Mt以上的磁場內使用D40A，否則有可能會造成該產品無法正常動作。
- (8) 請避免在水中或是經常會噴濺的水的環境下使用，否則有可能會造成水侵入產品內部。(本開關所使用的保護機構IP67係指將本產品放置在水中一段時間後，再確認水侵入的情形。)
- (9) 安裝防護檔板及防護閘門時，請避免撞擊到D40A型的非接觸式門把開關。
- (10) 請勿將開關本體當作檔板使用。
請設置檔板，以保護開關及制動器，安裝時必須讓開關及制動器保持1m以上的間隔。

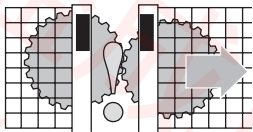
(11) 請正確安裝制動器及開關，以便讓安全門的開口區域能夠在可確保安全的距離內進行檢測。



(12) 將複數個開關並列連接時，必須保持至少 25mm 以上的間隔。



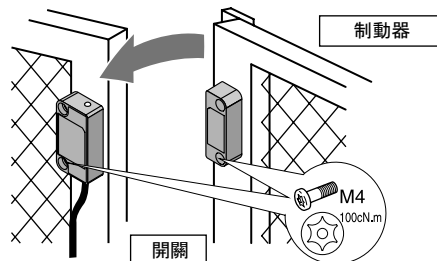
(13) 當互鎖防護閘門開啟時，請確認機器是否處於停止狀態。



(14) 請勿將開關及制動器安裝在磁性物體上，否則有可能會對操作距離造成不良的影響，會影響動作距離的參考值如下。

和磁性物體表面之間的距離	動作距離
0~5mm	較原本的數值減少約90%
5mm	並無影響

(15) 安裝開關·制動器時，請使用 M4 螺絲及墊圈，並且依照規定的鎖合扭力加以安裝，一旦完成安裝及試運轉後，請使用預防變更的攀立水 (varnish) 或具有同等效果的防鏽膏，以避免制動器及開關的固定螺絲鬆脫，當固定螺絲用的防鏽膏接觸到外殼時，有可能會造成塑膠殼損壞。



(16) 配線方式

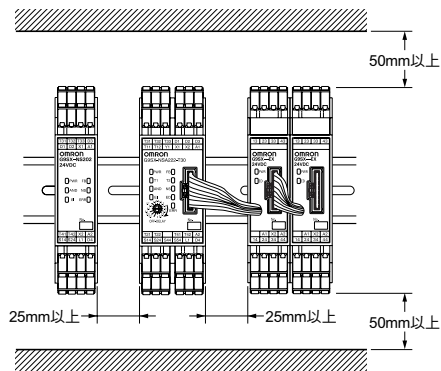
- 配線用電線尺寸請使用以下產品。
絞線 (Flexible wire) : 0.2~2.5 mm² AWG 24~12
單線 (Steel Wire) : 0.2~2.5 mm² AWG 24~12
- 若未使用輔助輸出時，請將未使用的導線切斷並將絕緣膠帶捲起等處理方式，以避免接觸到其他的端子。

(17) 關於安裝

與 G9SX-NS□ 型之寬度相比，若 DIN 軌道之寬度過窄時，則可能會發生因震動而從 DIN 軌道脫落的情形。請使用端板 (End Plate) (PFP-M 型之另售)，將 G9SX 型固定於 DIN 軌道上。

(18) 請確保以下空間，以達到通風以及配線、或輸出額定之要求。

- G9SX-NS□ 型的側面和相鄰的組件之間應相隔 25mm 以上
- 組件的上下應相隔 50mm 以上



(19) 配線方式

1. G9SX-NS□-RT 型 (螺絲式端子台型)

- 配線用電線尺寸請使用以下產品。

單線 (steel wire)	0.2~2.5mm ² AWG24~12
絞線 (flexible wire)	0.2~2.5mm ² AWG24~12

- 請以規定的鎖緊扭力旋緊螺絲，以免造成端子螺絲有錯誤動作或發熱等情形。

端子螺絲的鎖緊扭力：0.5~0.6N·m

- 電線的剝線長度請設為 7 mm 以下。

2. G9SX-NS□-RC 型 (彈簧式端子台型)

- 配線用電線尺寸請使用以下產品。

單線 (steel wire)	0.2~2.5mm ² AWG24~12
絞線 (flexible wire)	0.2~2.5mm ² AWG24~12

- 電線為絞線時，建議以附絕緣套的棒型端子 (符合 DIN 46228-4 規格型) 處理尾端之後再進行連接。

3. 邏輯連接之配線

- 請使用 2 芯的橡膠絕緣電纜線或隔離纜線作為組件間的邏輯連接之配線。

(20) 與增設組件 (G9SX-EX□-□ 型) 相連接時之相關事項

- 請拆除 G9SX-NSA222-T03-□ 的終端接頭，並插入增設組件之連接纜線接頭後，再加以連接。
 - 請將終端接頭插入由 G9SX-NSA222-T03-□ 型所見最終端的增設組件。
不實施增設組件的連接作業時，請勿拔下 G9SX-NSA222-T03-□ 型的終端接頭。
 - 系統運轉中請勿拔下終端接頭與增設組件之連接纜線的接頭。
 - 通電前，請確認接頭處是否已鎖定。
 - G9SX-NSA222-T03-□ 型的電源啟動後，請在 10 秒以內將所有連接的增設組件之電源啟動。
若增設組件的電源啟動時間超過 10 秒，連接的 G9SX-NSA222-T03-□ 型位置將會檢測出增設組件的電源異常。
- (21) 安全輸入、回饋/復歸輸入、邏輯連接輸入輸出間的配線，請各別在 100m 以內配線。
- (22) OFF 延遲時間應設定在不會損害到安全控制系統的安全性時間內。

通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

D40A
G9SX-NS

D40B

D4NS-SK
D4JL-SK

安全門開關

通用注意事項

D4NS

D4GS-N

D4BS

D4GL

D4GL-SK10-LK

D4JL

D4NL

D4BL

D4NH

D40A
G9SX-NS

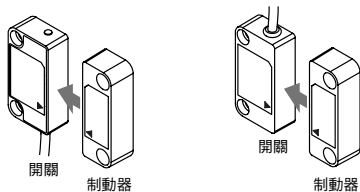
D40B

D4NS-SK
D4JL-SK

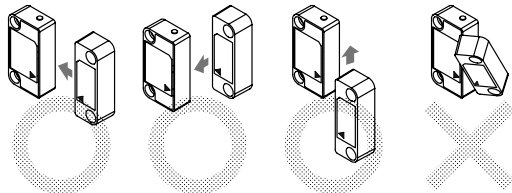
- (23) 組件間的邏輯連接之相關事項(參閱第118頁的「**■功能**」)
1. 使用邏輯連接輸入時，請將接受輸入的G9SX-NS□型之邏輯連接輸入設定調整為「有效」。
 2. 請將邏輯連接輸入和 G9SX-□型的邏輯連接輸出採取正確的配線。
 3. 架構線路時，請確實考量邏輯連接時的延遲回應時間，以避免影響安全控制系統的安全性。(參閱第111頁的「**●關於反應時間以及動作時間**」)
 4. 組件間的邏輯連接之配線時，請使用 2 芯的橡膠絕緣電纜線或防護罩電纜線。
- (24) 決定和危險來源之間的安全距離時，請將以下的時間所導致安全輸出延遲納入考量。
1. 安全輸入的回應時間
 2. 非接觸式門把開關(D40A型)輸入之回應時間
 3. 邏輯連接輸入的回應時間
(參閱第111頁的「**●關於反應時間以及動作時間**」)
 4. OFF延遲時間的設定值
 5. OFF延遲時間的精準度
- (25) 請在G9SX-□型的電源導入過後約5秒再開始運轉控制系統。
- (26) 為預防干擾所造成的誤動作，請務必將電源的A2端子連接至地線，又，請將突波吸收器連接至誘導負載的兩端，以避免發生干擾的情形，若和光柵共用電源時，請使用能夠耐受20ms瞬間停電的DC電源。
- (27) 請務必在電源切斷的狀態下進行模組交換作業。
連接於本裝置的外部裝置可能有無法預期的動作發生。
- (28) 溶劑附著的相關事項
請勿讓商品沾附著到酒精、稀釋劑、三氯乙烷、汽油等溶劑，否則可能導致標記消失或零件劣化。
- (29) 請勿以1台的G9SX-EX□-□型之接點輸出混合使用AC回路與DC回路。使用AC回路與DC回路時，請連接2台以上的G9SX-EX□-□型，並分別做為DC回路專用接點輸出、AC回路專用接點輸出使用。

■關於開關及制動器的動作

●開關及制動器的安裝方向



●開關及制動器的動作方向



■安全類別(Category)相關事項(EN954-1)

將D40A型和G9SX-NS□型搭配使用後，即可適用於歐洲規格EN954-1所要求的安全類別(Category) 3之環境，但該設定乃是以本公司所提示的回路範例做為判斷基準，因使用狀況不同，可能會出現不適用的情形。
由於安全類別(Category)以安全控制系統整體進行判斷，因此使用時請務必充分地確認。

符合安全類別3 (EN954-1)的條件

1. 對外部輸出(T11-T12、T21-T22)請使用2ch輸入。
2. 外部輸出(T11-T12、T21-T22)請使用直接開路動作的開關進行輸入。
使用限動開關時，請至少以一個直接開路動作的開關進行輸入。
3. 請將非接觸式門把開關的輸入端子(D1、D2、D3、D4)連接至D40A型。
4. 請將接觸器(contactor)連接器的b接點訊號輸入T31-T32之間(手動復歸時)、T31-T33之間(自動復歸時)。(請參閱第121頁的「**使用用途範例**」。)
5. A2端子請務必與接地線連接。

■已取得的海外規格

D40A-□型/G9SX-NS□型/G9SX-NSA□型

- TÜV產品服務認證
EN50178
IEC/EN60204-1
EN954-1 Cat.3
IEC/EN61508 SIL3
IEC/EN60947-5-2
IEC/EN60947-5-3 PDF-M
- UL508
- CAN/CSA C22.2 No.14
- 韓國(KOSHA)認證



Conforms to EN292, EN60204-1, EN954-1, EN1088, EN60947-5-3, EN947-5-3, EN50081, EN50082, EN61000-6-2
UL and C-UL listed, TUV certified

■ **Description**

The CM switches are tamper resistant non-contact safety interlock switches that operate with their own control units except for the CM-S221 switch. The CM-S221 switch will work with many safety monitoring relays accepting 2 N/C safety inputs. The CM control units will monitor one to four CM switches to category 3 in accordance with EN954-1.

The CM-S4 controller is designed to work with with non-contact switches with dry contacts 1 N/C + 1 N/O. The CM-S21 and CM-S41 controllers and the CM-SE expansion module are designed to only accept CM-S11 and CM-S31 switches. These controllers sense voltage and current changes in the switch circuit when the actuator is presented to the switch.

The CM control units provide EDM (External Device Monitoring, also called MPCE monitoring) and an automatic reset function. This allows the CM control units to replace a safety relay in most applications.

The NEMA 6 encapsulated design of the CM Series switch makes it ideal for harsh environments.

Mechanical switches and CM Series switches may be used together with a single CM-S4 control unit for applications requiring both non-contact and mechanical safety interlock switches.

The CM Series switch and actuator are available in four sizes plus a stainless steel version to accommodate a variety of application requirements.

G
safety interlock switches

CM Series

Compact Coded Magnetic Safety Interlock Switch and Control Units

- A fully monitored system that meets Category 3 when 1 to 30 plus switches are used with the CM Control Units
- External Device Monitoring (EDM) with monitored manual or automatic reset
- NEMA 6 switch enclosures satisfy most application requirements
- Magnetically coded switches are tamper resistant to common magnets
- Misalignment tolerance of (5 and 9 mm) reduces nuisance tripping
- Dual channel N/C E-stop input is monitored by the CM-S41 control in addition to four CM switches
- Mechanical interlock switches may be used with the CM-S4 control unit
- CM control units may replace a safety relay in most applications
- CM-S221 switches with 2 N/C safety contacts and 1 N/O auxiliary contact may be used with many other safety monitoring relays accepting 2 N/C safety inputs including the SR103AM; CM-S221 switches are not compatible with Legacy Relay products or the SR203M/AM, SR208AD or SR209AD

Actual Size

CM-S31 Read Head



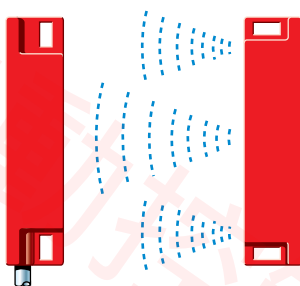
CM-S2 and CM-S221 Read Heads



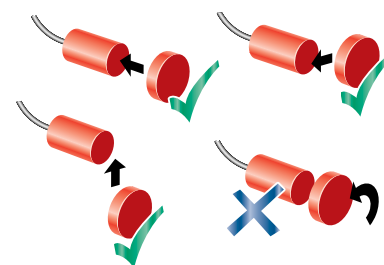
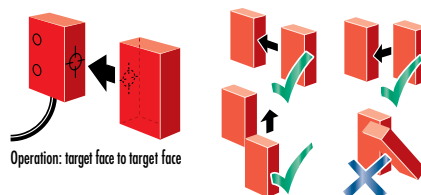
Operation

Operating Principle for Coded Magnetic Switch with Conventional Dry Contacts

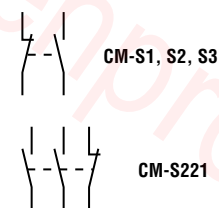
On presenting the actuator to the switch, the coded, high intensity magnetic field from the actuator causes the contacts to close. On removing the actuator (opening the door), the safety contacts open, isolating the machine.



Mounting Examples

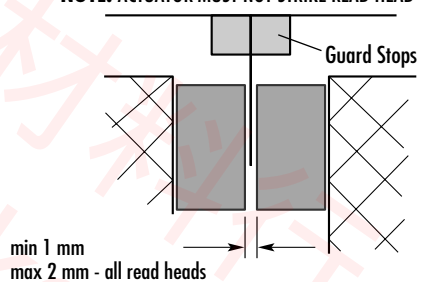


Contact Arrangements



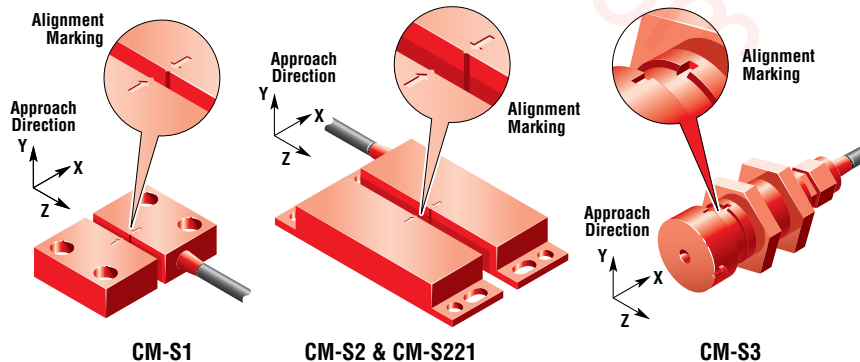
Note: The CM-S11 and CM-S31 switches are not conventional dry contacts.

NOTE: ACTUATOR MUST NOT STRIKE READ HEAD



Recommended gap between sensor and actuator.

Installation Alignments



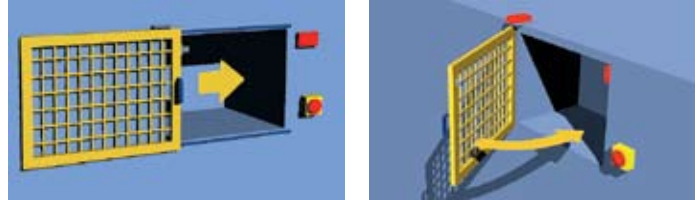
Universal Mounting Brackets can be used with this product. See page G241 for details.

G safety interlock switches

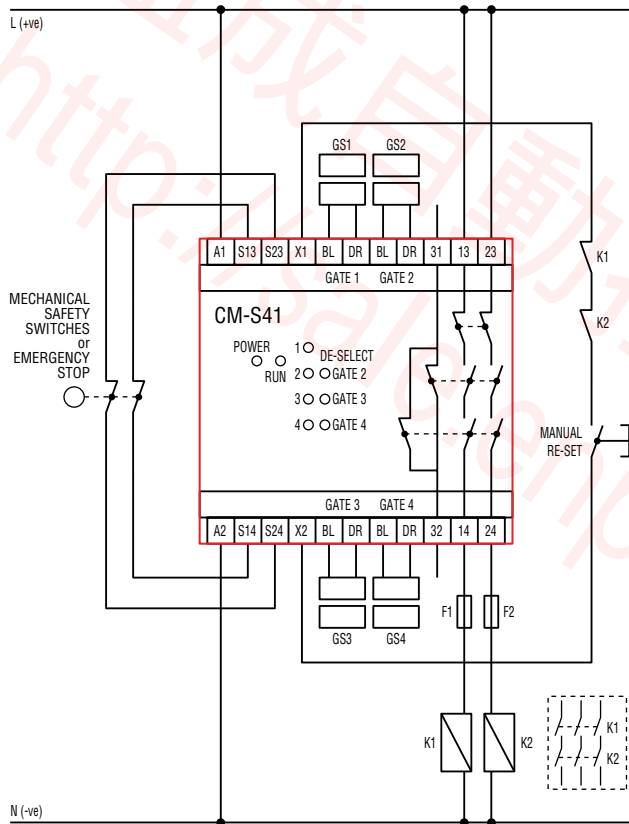


■ Applications

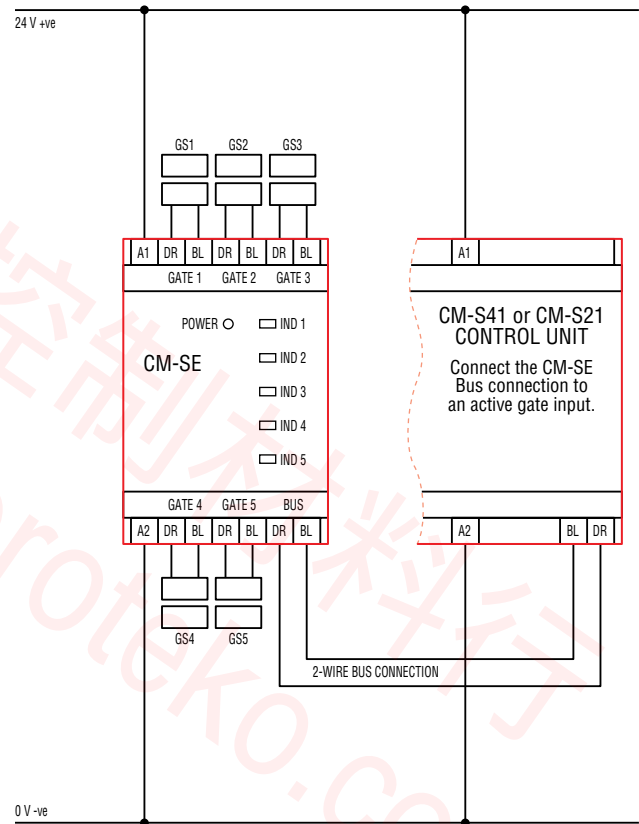
Typical applications are on sliding guard doors or swinging guard doors.



G
safety interlock switches



In the illustration above, the guard door is open and the machine is stopped. Machine will start when the guard door is closed, and the reset button is pressed.



In the illustration above, all of the guard doors are open and the machine is stopped. Machine will start when all the guard doors are closed, and the reset button is pressed.

A Go to the Engineering Guide
For in-depth information on safety standards and use.

N For More Guarding Products
See Section N for safeguarding cutting and turning machines

■ Control Unit Specifications

Electrical	CM-S4	CM-S41, CM-S21 & CM-SE
Power Supply:	24 VAC/DC ± 10%	CM-S41 — 24 VAC/DC, 110 VAC CM-S21 & CM-SE — 24 VAC/DC
Power Consumption:	2.4 VA typical	CM-S41 — 6 VA; CM-S21 & CM-SE — 3 VA
External Fuse (Operating Voltage):	0.25 A quick acting	—
Input Fuse (Supply Voltage):	—	500 mA resettable
Safety Inputs:	1 N/O + 1 N/C	CM-S41 — 4 CM-S11 or CM-S31 switches CM-S21 — 2 CM-S11 or CM-S31 switches CM-SE — 5 CM-S11 or CM-S31 switches
Max Cable Length:	—	100 m (328 ft.)
Max Input Resistance:	Contact factory	
Min. Approach Speed:	Contact factory	
Relay Outputs:	1 N/O safety + 1 N/O aux.	CM-S41 & CM-S21 — 2 N/O; CM-SE — N/A
Auxiliary Contact of Controls:	4 A, 24 VAC/DC	CM-S41 & CM-S21 — 1 N/C; CM-SE — N/A
Max Switched Current/Voltage:	4 A / 24 VAC/DC	4 A / 230 VAC; 2 A / 24 VDC (resistive)
Min Switched Current/Voltage:	4 mA / 12 V	10 V / 10 mA
Impulse Withstand Voltage:	250 V	
Max Drop-Out Time:	18 ms	Deactivation by sensor 13 mS
Max Output Fuse:	4 A quick acting	AC = 5 A; DC = 2.5 A; quick acting
Reset Mode:	Automatic	Monitored manual or automatic
External Device Monitoring:	N/C loop between Y1 and Y2	N/C loop between X1 and X2
Mechanical		
Mounting:	35 mm (1.38 in.) DIN rail	35 mm (1.38 in.) DIN rail
Case Material:	Polycarbonate	Polycarbonate
Max Wire Size:	2 x 2.5 mm ² (12 AWG)	1 x 2.5 mm stranded, 1 x 4 mm solid
Weight:	240 g (8.5 oz.)	CM-S41 — 575 g (20.3 oz.) CM-S21 — 183 g (6.5 oz.) CM-SE — 135 g (4.8 oz.)
Color:	Gray	Red
Indication:	U: Green = On Outputs Open: Red = On Outputs Closed: Green = On D11, D12, D21, D22: Green = Gate closed D31, D32, D41, D42: Red = Gate open	Power = Red Outputs Closed: Green = On Outputs Open: No Light = Off Gate Closed: Yellow = On Gate Open: No Light = Off
Mechanical Life:	30 x 10 ⁶	10 x 10 ⁶
Environmental		
Protection:	IP40 (NEMA 1)	Housing IP40, Terminals IP20
Operating Temperature:	0 to 50°C (32 to 122°F)	10 to 55°C (50 to 131°F)
Humidity:	95% RH at 55°C (131°F)	85% max
Compliance		
Standards:	EN292, EN60204-1, EN954-1, EN1088, EN60947-5-3, EN947-5-3, EN50081, EN50082, EN61000-6-2	
Approvals/Listings:	CE marked for all applicable directives, UL and C-UL, TUV	
Safety Category:	Cat 3 per EN954-1 (internal operation)	

Specifications are subject to change without notice.

Note: The safety contacts of the Omron STI switches are described as normally closed (N/C) i.e., with the guard closed, actuator in place, and the machine able to be started.

■ Switch Specifications

Electrical	CM-S1, CM-S2, CM-S3	CM-S221	CM-S11	CM-S31
Safety Contacts:	1 N/C + 1 N/O	2 N/C + 1 N/O	Current Sensing Circuit	Current Sensing Circuit
N/C Operating Distance:	CM-S1 — On = 3 mm; Off = 8 mm CM-S2 and CM-S3 — On = 6 mm; Off = 13 mm	On = 7 mm; Off = 12 mm	On = 5-7 mm; Off = 8-12 mm	On = 5-7 mm; Off = 8-12 mm
Minimum Gap:		1 mm	1 mm	1 mm
Max Switched Current/Voltage:	500 mA / 24 V	300 mA / 24 V		
Mechanical				
Mounting:	2 x M4 screws supplied	2 x M4 screws supplied	2 x M4 screws supplied	2 x M4 screws supplied
Case Material:	Glass filled SPS	ABS	ABS	316 stainless steel
Max Wire Size:	Pre-wired cable to 5 m	Pre-wired cable to 5 m	Pre-wired cable various lengths	Pre-wired cable various lengths
Weight:	230 g (8.1 oz.)	230 g (8.1 oz.)	207 g (7.3 oz.)	265 g (9.3 oz.)
Color:	Red	Red	Red	Stainless
Mechanical Life:	100 x 10 ⁶	10 x 10 ⁶		
Environmental				
Protection:	IP67 (NEMA 6)	IP67 (NEMA 6)	IP67 (NEMA 6)	IP67 (NEMA 6)
Operating Temperature:	-20 to 60°C (-4 to 140°F)	-10 to 55°C (14 to 131°F)	10 to 55°C (50 to 131°F)	10 to 55°C (50 to 131°F)
Humidity:	95% RH at 55°C (131°F)			
Compliance				
Standards:	EN292, EN60204-1, EN954-1, EN1088, EN60947-5-3, EN947-5-3, EN50081, EN50082, EN61000-6-2			
Approvals/Listings:	CE marked for all applicable directives, UL and C-UL, TUV (TUV pending for CM-S221)			

Specifications are subject to change without notice.

Note: The safety contacts of the Omron STI switches are described as normally closed (N/C) i.e., with the guard closed, actuator in place, and the machine able to be started.

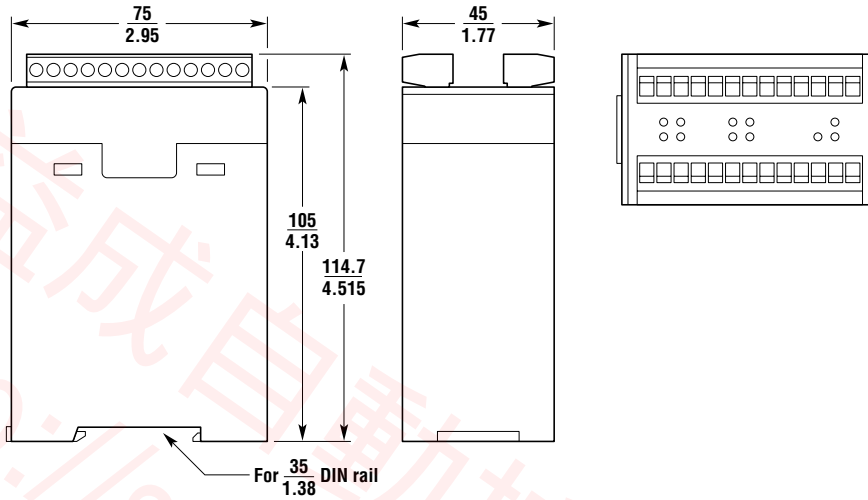
A **Go to the Engineering Guide**
For in-depth information on safety standards and use.

N **For More Guarding Products**
See Section N for safeguarding cutting and turning machines

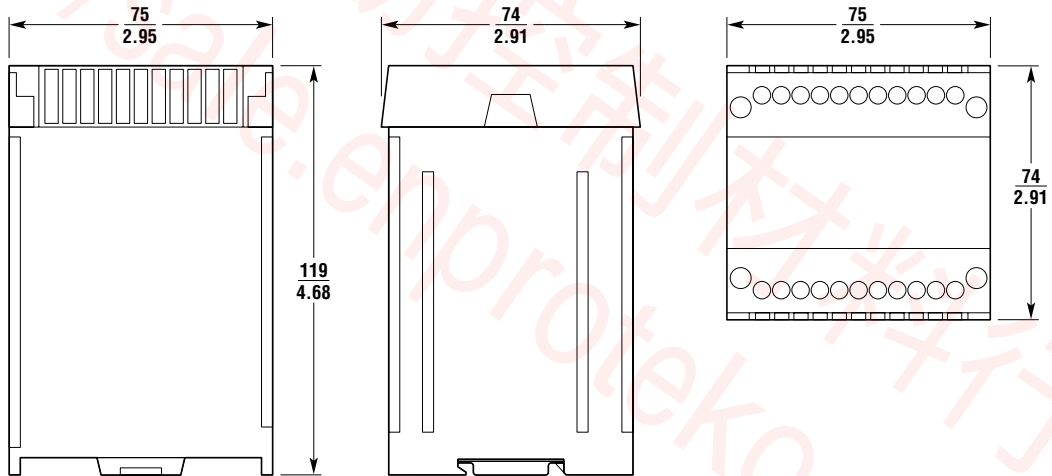
■ Dimensions — mm/in.

Control Units

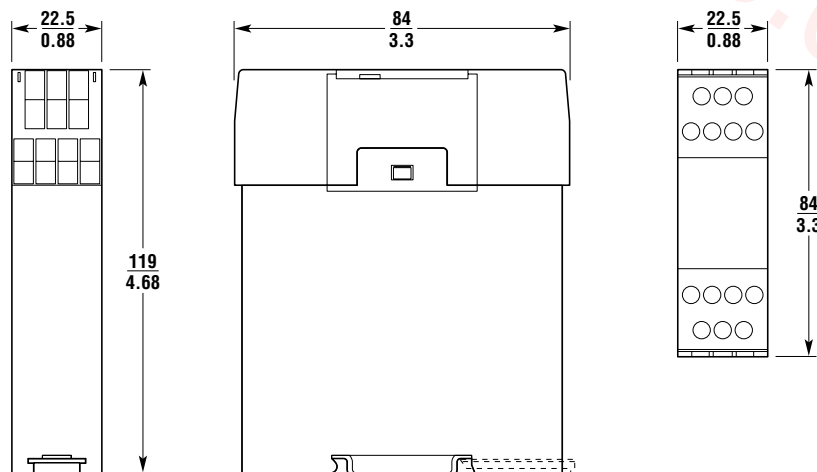
CM-S4



CM-S41



CM-S21/SE



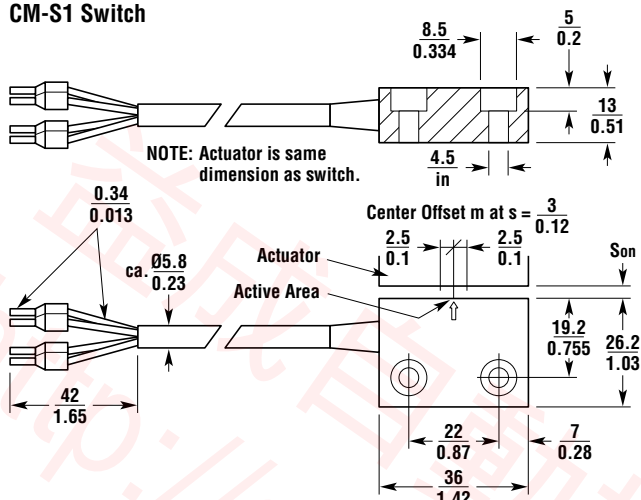
G
safety interlock switches

CM Series

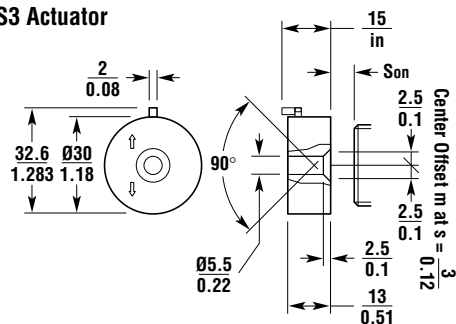
■ Dimensions — mm/in. (continued)

Switches

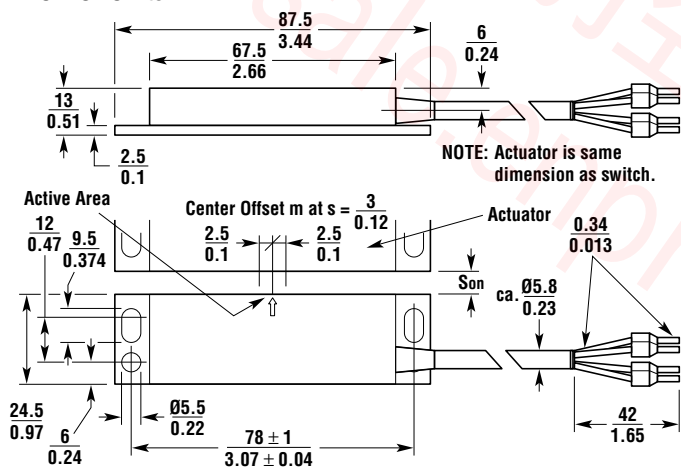
CM-S1 Switch



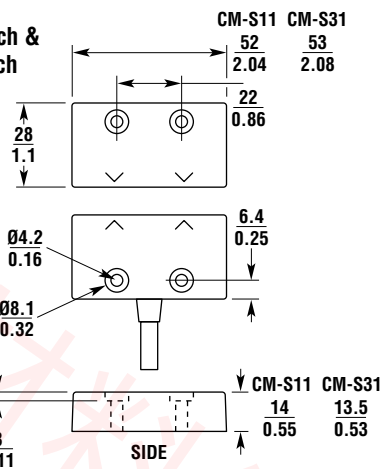
CM-S3 Actuator



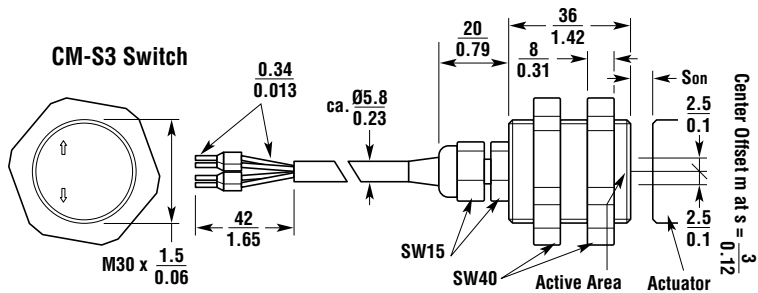
CM-S2 Switch



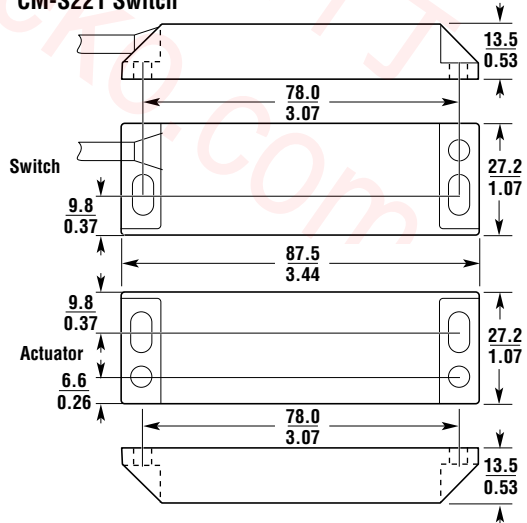
CM-S11 Switch & CM-S31 Switch



CM-S3 Switch



CM-S221 Switch



N For More Guarding Products
See Section N for safeguarding cutting and turning machines

G safety interlock switches



Conforms to EN954-1, EN1088, EN 60204-1
UL and C-UL listed, BG approved

■ Description

The EC Series consists of a uniquely coded actuator, a read head (switch), and a control unit capable of monitoring 1 to 4 read heads.

The uniquely coded actuator is a device known as a transponder (transmitter and responder) while the read head is a device known as a transceiver (transmitter and receiver). The actuator (transponder) receives an electromagnetic field from the read head (transceiver), processes it and sends data signals back to the read head which are read by the control unit. The data signals received by the control unit must match the known data signals of the control unit in order to close the safety outputs of the control unit.

Each actuator has a uniquely coded element within the actuator that can not be reprogrammed which makes the actuators secure against manipulation. The 'Teach-In Operation' is used to 'teach' the control unit the code of each of the 1 to 4 actuators that are to be used with the read heads connected to the control unit. No additional equipment is required to perform the teach-in operation and there is no limit to the number of teach-in operations that may be performed.

The EC-S2 and EC-S4 control units provide EDM (External Device Monitoring, also called MPCE monitoring) and may be



EC Series

Electrically Coded Interlock Switch and Control Unit

- The EC Series Control Units individually monitor one to four Read Heads to provide a Category 4 system for applications with up to four guard doors
- Uniquely coded actuators provide a high level of tamper resistance
- Misalignment of nearly 1/2 inch allows application on machine doors with a high level of vibration or alignment issues
- Manual or automatic start is switch selectable
- External Device Monitoring (EDM) allows the EC Series Control Unit to function as a safety monitoring relay
- The 6 A/24 VDC switching capability of the Control Unit allows connection directly to power contactors
- Individual guard door status may be monitored with the semiconductor outputs from the Control Unit; an additional output gives status of the Control Unit
- Guarding applications with more than four doors may be achieved by combining two or more Control Units in series while continuing to satisfy Category 4 according to EN954-1
- Approved for use in Class I, Div. 2 gas and dust applications

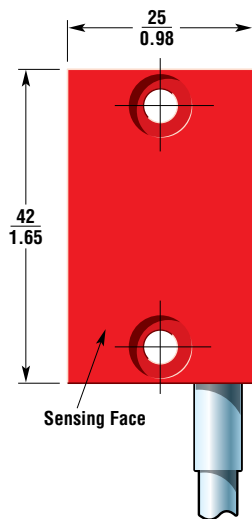
N For More Guarding Products
See Section N for safeguarding cutting and turning machines

operated in manual or automatic start mode allowing the control unit to function as a safety monitoring relay. There are also 2 or 4 solid state outputs on the control unit for individual monitoring of the status of each read head plus an additional output for the monitoring of the status of the control unit.

The EC-S1 switch is available with a wide variety of cable lengths to 25 meters or with an integral connector to accommodate a variety of application requirements.

■ **Actual Size**

EC-S1 Read Head

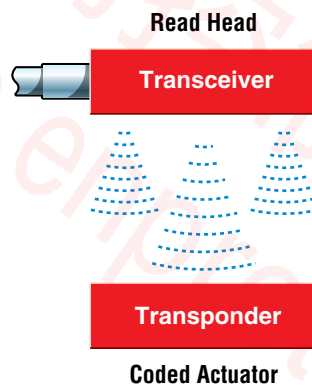


■ **Operation**

Operating Principle

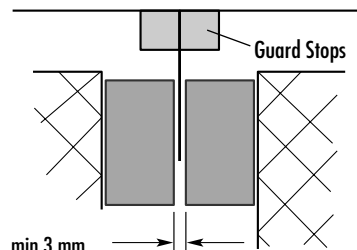
Upon moving the actuator within the operating distance of the read head, the actuator (transponder) receives an electromagnetic field from a read head (transceiver station), processes it and sends data signals back to the read head which are read by the control unit.

Every actuator is unique and secure against manipulation. The control unit must be taught the code of replacement actuators by using the “teach-in operation” that requires no additional equipment.



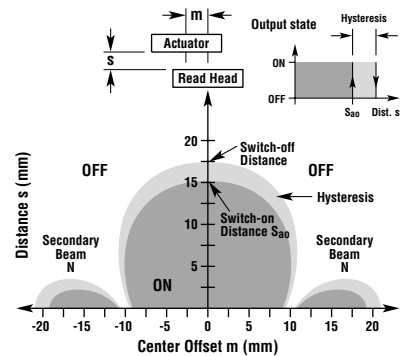
■ **Mounting**

NOTE: ACTUATOR MUST NOT STRIKE READ HEAD



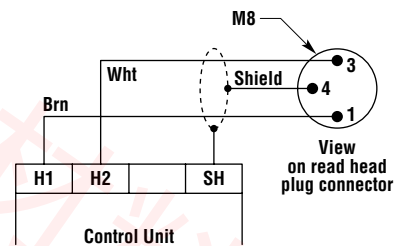
Recommended gap between read head and actuator.

Operating Range

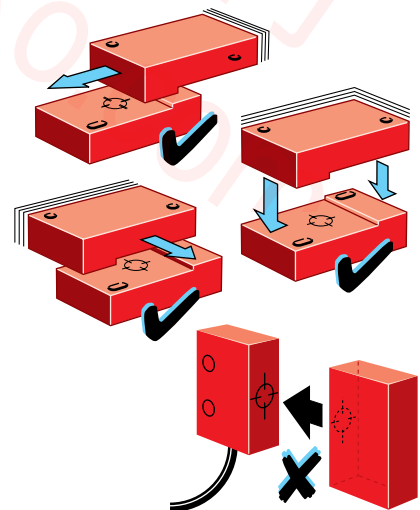


A minimum distance of $s = 3$ mm must be maintained in the case of lateral approach in order to prevent entry into the operating range of the secondary beams.

Connector Configuration



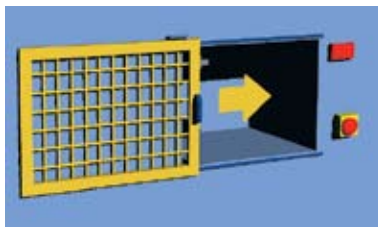
Installation Alignments



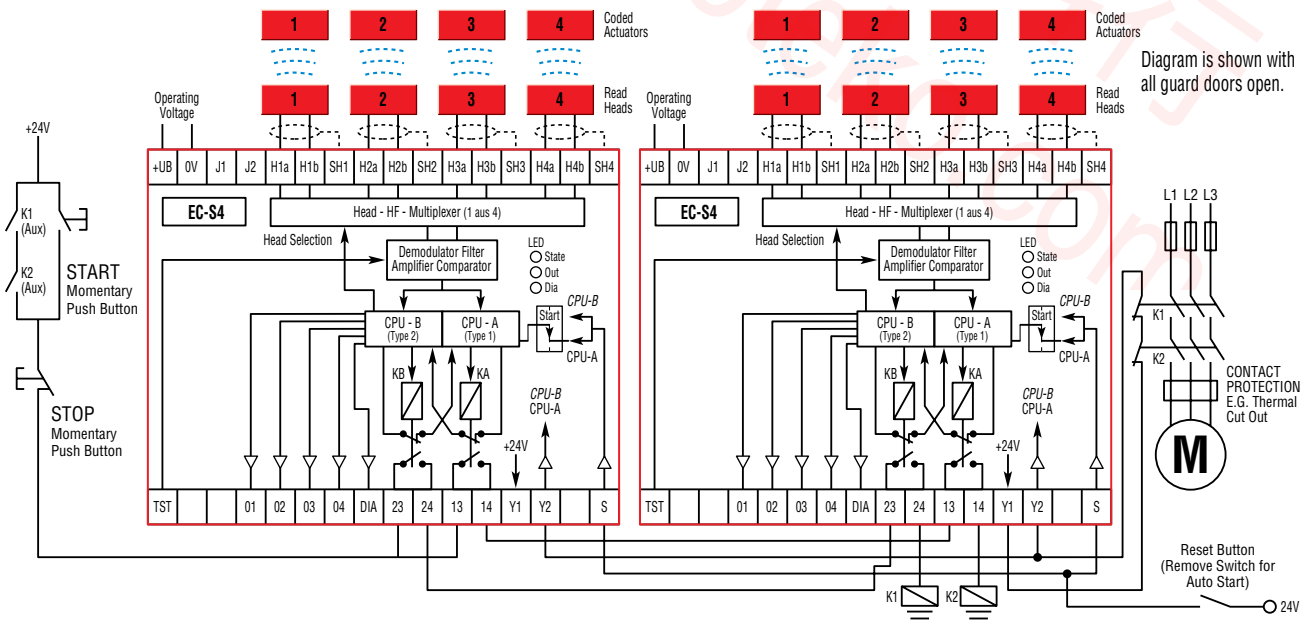
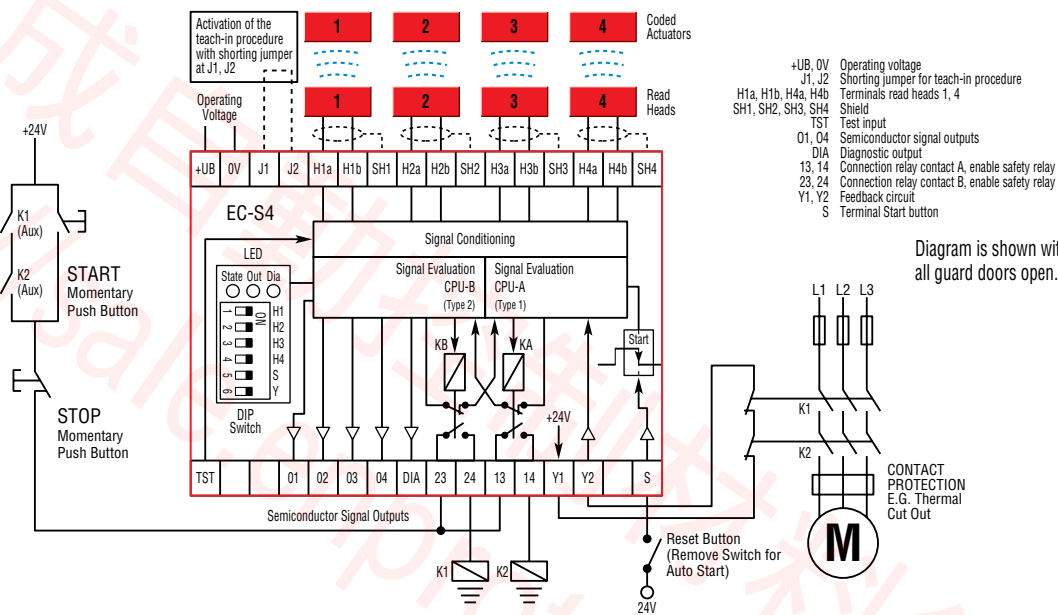
EC Series

Applications

Typical applications are on sliding guard doors or swinging guard doors.



G safety interlock switches



■ Specifications

Electrical	EC-S2 and EC-S4 Control Units	EC-S1 Switch
Power Supply:	24 V/DC ± 10%	—
External Fuse (Operating Voltage):	8 A max.	—
Current Consumption:	250 mA	—
Safety Inputs:	Max. 2 or 4 read heads	—
Max Input Resistance Y1/Y2:	600 ohms	—
Mode of Operation:	—	Inductive
Data Transfer to Control Unit:	—	2 K bit/s
Relay Outputs:	2 N/O	—
Auxiliary Contact of Controls:	2 or 4 solid state outputs for individual monitoring of each read head	—
N/C Operating Distance:	—	On = 10 to 15 mm; Off = 32 mm (25 m cable)
Max Switched AC:	1.5 A/230 VAC (inductive load)	—
Max Switched DC:	1.2 A/24 VDC (inductive load)	—
Min Switched Current/Voltage:	1 mA/1 VAC/DC	—
Impulse Withstand Voltage:	4000 V	—
Max Drop-Out Time:	500 m/sec	—
Max Output Fuse:	6.3 A quick acting	—
Reset Mode:	Automatic/Manual	—
External Device Monitoring:	N/C loop between Y1 and Y2	—
Mechanical		
Mounting:	35 mm (1.38 in.) DIN Rail	4 x M4 screws
Case Material:	Fiber-filled polyamide PA6.6	Glass-filled Fortron plastic
Max Wire Size:	2 x 2.5 mm (12 AWG) 3-pin M8 connector	Pre-wired PVC cable to 10 m (50 m max. cable length)
Weight:	250 g (8.8 oz.)	300 g (10.6 oz.) with 10 m cable
Color:	Gray	Red
Indication:	State LED: Green = Status with blink modes Out LED: Yellow = Safety outputs closed Dia LED: Red = Error indication	— — —
Mechanical Life:	10 x 10 ⁶	—
Environmental		
Protection:	IP20 (NEMA 1)	IP67/P69K
Operating Temperature:	0 to 55°C (32 to 131°F)	-25 to 70°C (-13 to 158°F)
Compliance		
Standards:	EN954-1, EN1088, EN60204-1	
Approvals/Listings:	CE marked for all applicable directives, UL, C-UL, BG, and TUV to ATEX 100a for Ex zone 2 and 22	
Safety Category:	Cat. 4 per EN954-1	

Specifications are subject to change without notice.

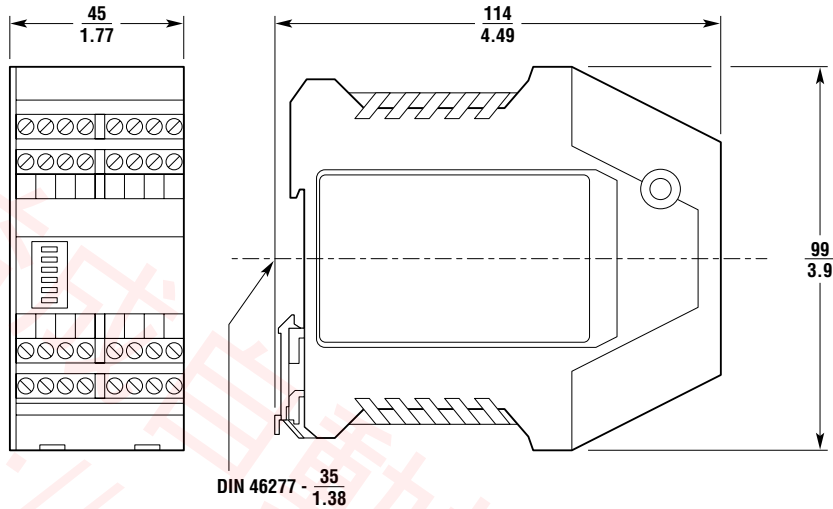
Note: The safety contacts of the Omron STI switches are described as normally closed (N/C) i.e., with the guard closed, actuator in place, and the machine able to be started.

G

safety interlock switches

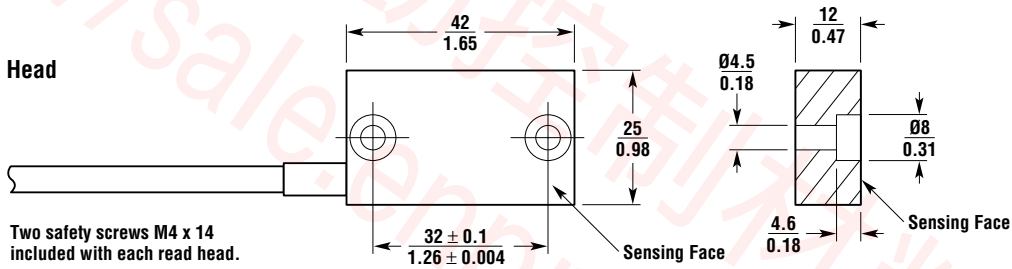
■ Dimensions — mm/in.

EC-S2 and EC-S4 Control Unit



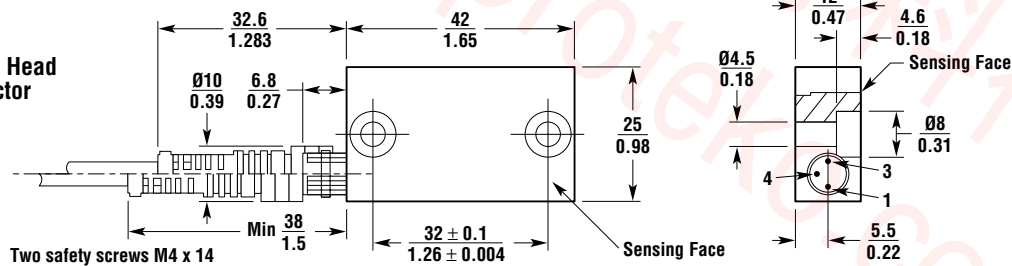
G
safety interlock switches

EC-S1 Read Head with Cable



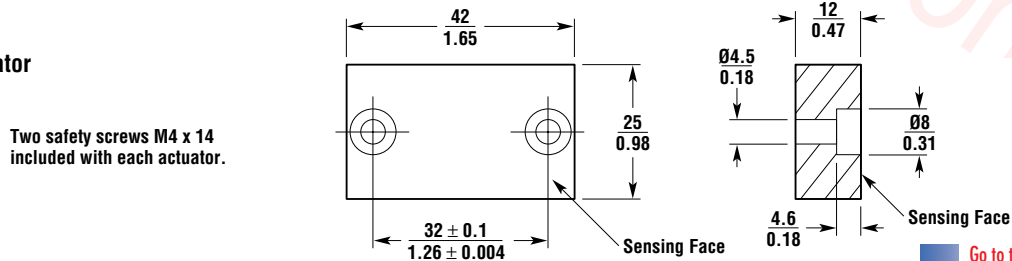
Two safety screws M4 x 14 included with each read head.

EC-S1 Read Head with Connector



Two safety screws M4 x 14 included with each read head.

EC-S1 Actuator



Two safety screws M4 x 14 included with each actuator.

A Go to the Engineering Guide
For in-depth information on safety standards and use.

N For More Guarding Products
See Section N for safeguarding cutting and turning machines



Conforms to EN1088, EN292, EN60204-1
CSA approved



G

safety interlock switches

MA Series

Magnetically Actuated Safety Interlock Switches

- Large selection—choose from a large selection of contact configurations housed in plastic to satisfy most application requirements
- NEMA 6 enclosure enables the MA Series switches to satisfy most application requirements (MA 3, 4, 5 are NEMA 4)
- Misalignment tolerant—the non-contact actuation of the MA Series switches makes them very tolerant to misalignment of up to 10 mm (0.39 in.)
- Variety of terminations—select from various cable lengths or terminal strip termination for easy installation. Cable connector available on selected models.
- Long life—the MA Series safety interlock switches are designed for a minimum of one million actuations

A

Go to the Engineering Guide
For in-depth information on safety standards and use.

N

For More Guarding Products
See Section N for safeguarding cutting and turning machines



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USA Tel. 1/888/510-4357 Canada Tel. 1/866/986-6766



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On the Internet: www.sti.com or www.omron.ca

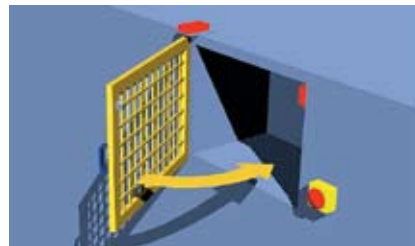
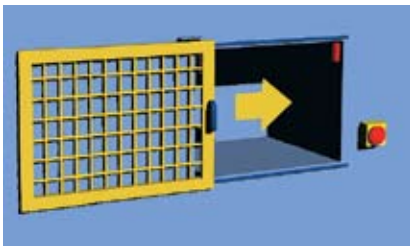
Actual Size



G
safety interlock switches

Applications

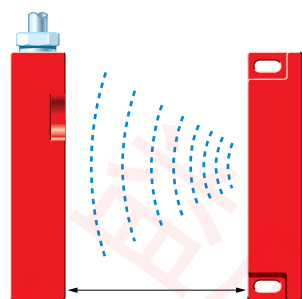
Typical applications are on sliding guard doors or swinging guard doors.



MA Series

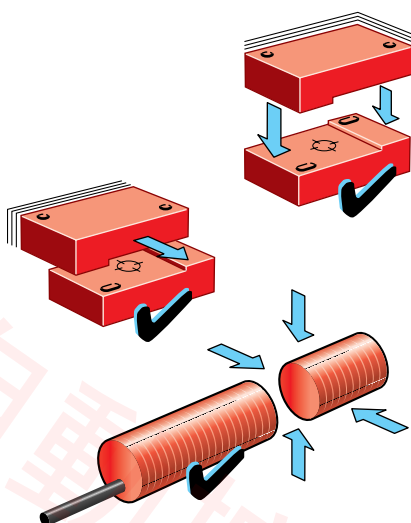
■ Operation

Operating Principle

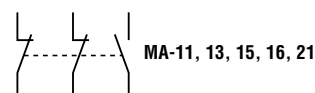
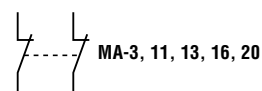
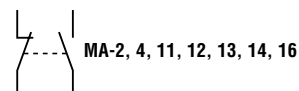
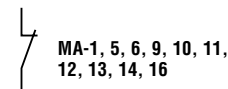


Encapsulated in the MA Series is a unique high-power industrial reed which is de-rated by a non-resettable overload protection circuit depending on switch type. On presenting the actuator to the switch, the high intensity magnetic field from the actuator causes the contacts to close. On removing the actuator (opening the door), the safety contacts open, isolating the machine.

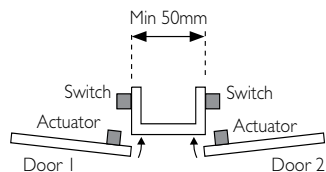
Mounting Examples



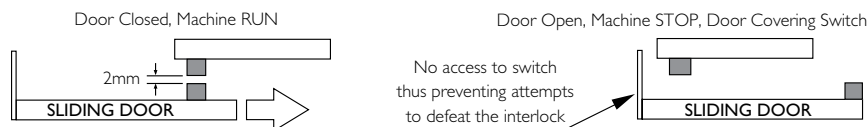
Contact Arrangement



G safety interlock switches



It is advisable, where possible, to mount the switch and actuator on non-ferrous materials otherwise it may affect the operating distances.



Wherever possible the units should be mounted so that no access can be obtained to the switch when the guard door is open, thus preventing attempts to defeat the safety system.

Universal Mounting Brackets can be used with this product. See page G241 for details.

A **Go to the Engineering Guide**
For in-depth information on safety standards and use.

N **For More Guarding Products**
See Section N for safeguarding cutting and turning machines

■ Specifications

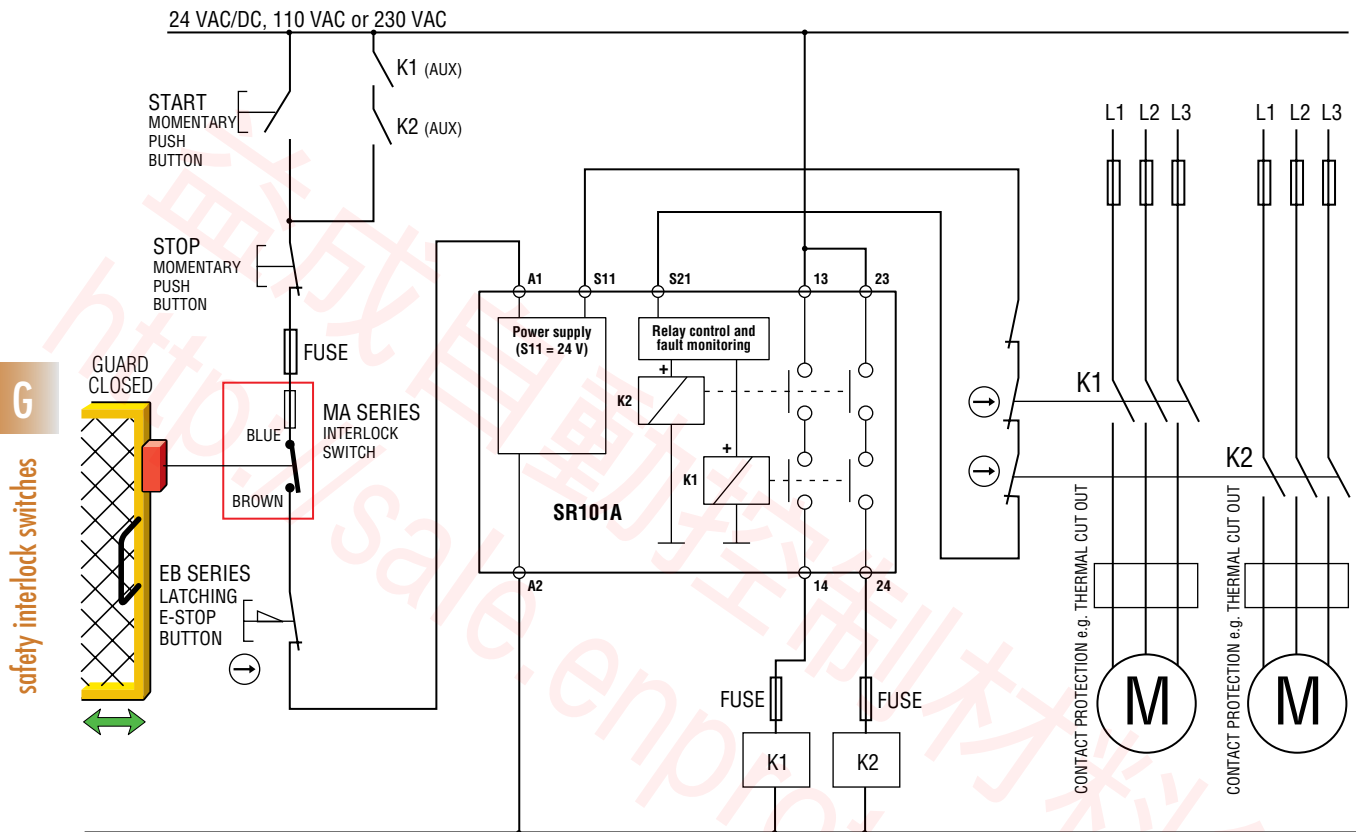
Electrical		All Models Unless Indicated	
Safety Contacts:	AC models	MA-1 thru 6, 10, 11, 12, 13, 16 — 1 N/C	MA-11, 13, 16, 21 — 2 N/C
	DC models	MA-9, 11, 12, 13, 14, 16 — 1 N/C	MA-11, 13, 15, 16, 20, 21 — 2 N/C
Safety Contact Operating Distance:	Make 7-12 mm (0.28-0.47in.); Break 12-25 mm (0.47-0.98 in.)		
Auxiliary Contacts:	MA-2, 4, 11, 12, 13, 14, 15, 16, 21	1 N/O	
	MA-3	1 N/C	
Aux. Contact Operating Distance:	MA-2, 4, 16, 21	Make 8-13 mm (0.39-0.51 in.); Break 8-10 mm (0.31-0.39 in.)	
	MA-3	Make 21 mm (0.83 in.); Break 24 mm (0.94 in.)	
Safety Rated Voltage:	AC models: All except MA-10	230 VAC	
	AC model: MA-10	110 VAC	
	DC models	30 VDC	
Safety Rated Current:	AC models: All except MA-3	2 A, fuse externally 1.6 A quick acting	
	AC model: MA-3	3 A, fuse externally 2.5 A quick acting	
	DC models: All except MA-15	1 A, fuse externally 800 mA quick acting	
	DC model: MA-15	0.3 A max., fuse externally 0.2 A quick acting	
Internal Fuse	AC models	2 A fast acting	
	DC models	1 A fast acting	
External Fuse (Customer Supplied)	AC models	1.6 A fast acting	
	DC models: All except MA-15	0.8 A fast acting	
Electrical Life:	1 x 10 ⁶		
Mechanical—Special Safety Reed		Safety	Aux.
Closing Time:	3.0 mS		0.5 mS
Drop-Out Time:	2.1 mS		0.3 mS
Bounce Time:	0.7 mS		0.7 mS
Shock:	10 G		10 G
Vibration:	10 G, 50 to 100 Hz		
Mechanical			
Mounting:	Any position		
Case Material:	Molded ABS		
Actuator Material:	Molded ABS		
Wiring Connection:	Various lengths or male M12 micro connector		
Weight:	384 g (14 oz.)		
Color:	Red		
Mechanical Life:	10 x 10 ⁶		
Environmental			
Protection:	MA-3, 4, 5	IP65 (NEMA 4)	
	All models except MA-3, 4, 5	IP67 (NEMA 6)	
Operating Temperature:	MA-11, 12, 13, 14, 15, 16	-10 to 55°C (14 to 131°F)	
	All models except: MA-11, 12, 13, 14, 15	-10 to 65°C (14 to 149°F)	
Compliance			
Standards:	EN1088, EN292, EN60204-1		
Approvals/Listings:	CE marked for all applicable directives		
	MA-1, 2, 3, 4, 5, 6, 9, 10, 20, 21	cCSAus (UL and C-UL pending)	
	MA-11, 12, 13, 14, 15, 16	(UL and C-UL pending)	

Specifications are subject to change without notice.

Note: The safety contacts of the Omron STI switches are described as normally closed (N/C)—i.e., with the guard closed, actuator in place, and the machine able to be started.

Application Diagram

Typical Application of MA Series with a Safety Monitoring Relay



For a full explanation of the circuit operating principle and fault detection, see "Common Circuit Examples" in the Engineering Section of this catalog.

Pin Assignments with Connector Option

MA-2

Pin 1 same as Red lead	N/C Safety
Pin 3 same as Blue lead	N/C Safety
Pin 2 same as Green lead	N/O Auxiliary
Pin 4 same as Yellow lead	N/O Auxiliary

MA-6 and MA-9

Pin 1 same as Brown lead	N/C Safety
Pin 3 same as Blue lead	N/C Safety
Pins 2 & 4 not used	

MA-15, 21

Pin 1 same as Red/Blue lead	N/C Safety
Pin 3 same as Red lead	N/C Safety
Pin 2 same as Red/Black lead	N/C Safety
Pin 4 same as Red/White lead	N/C Safety
Pin 5 same as Red/Yellow lead	N/O Auxiliary
Pin 6 same as Green lead	N/O Auxiliary

MA-20

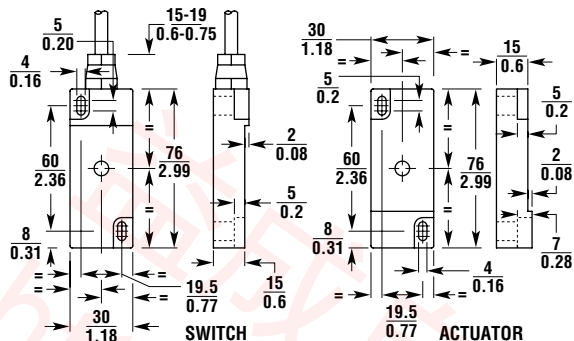
Pin 1 same as Brown lead	N/C Safety
Pin 3 same as Blue lead	N/C Safety
Pin 2 same as White lead	N/C Safety
Pin 4 same as Black lead	N/C Safety

A **Go to the Engineering Guide**
For in-depth information on safety standards and use.

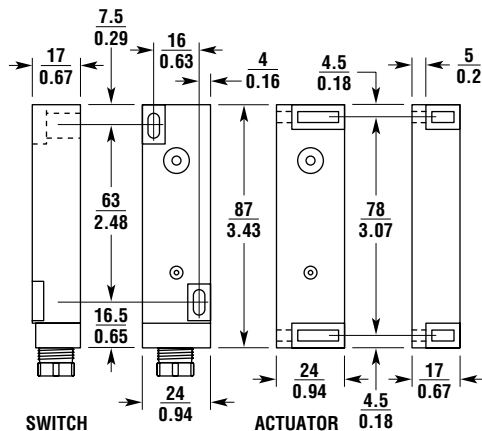
N **For More Guarding Products**
See Section N for safeguarding cutting and turning machines

■ Dimensions — mm/in.

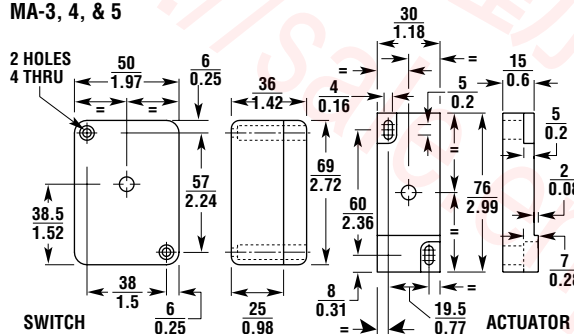
MA-1, 2, 20, 21



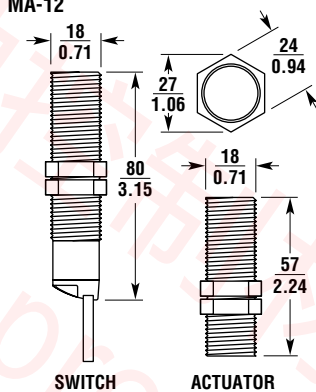
MA-11



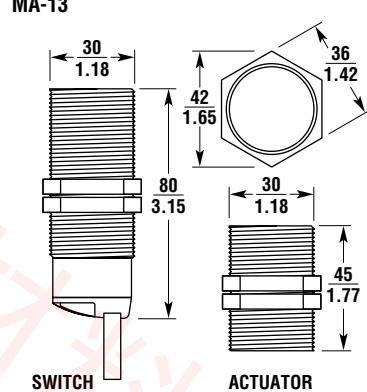
MA-3, 4, & 5



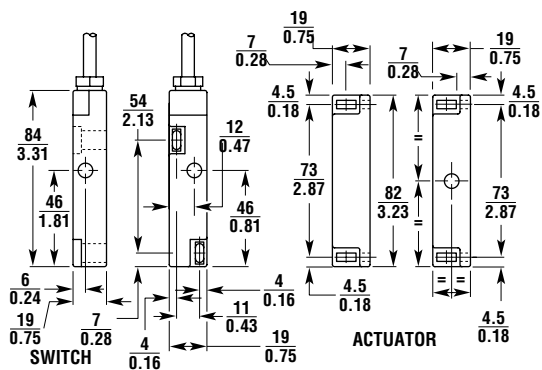
MA-12



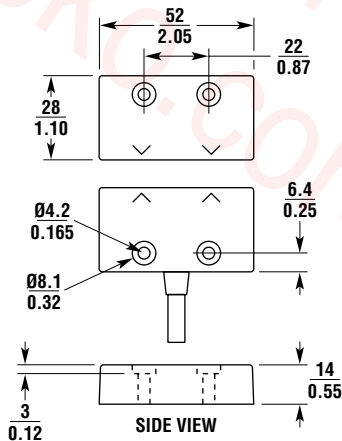
MA-13



MA-6, 9, 10, 16



MA-14 / MA-15



G

safety interlock switches



Conforms to EN1088, EN292, EN60204-1

UL and C-UL listed (pending on MA-34, 35, 36)



G

safety interlock switches

MA-S Series

Stainless Steel Magnetically Actuated Safety Interlock Switches and Actuators

- Stainless steel cases—both switch and actuator are housed in stainless steel for applications that require the use of this robust and corrosion resistant material
- Large selection—choose from a variety of contact configurations housed in stainless steel to satisfy the most demanding applications
- NEMA 6 enclosure enables the MA-S Series switches to satisfy most application requirements
- Misalignment tolerant—the non-contact actuation of the MA-S Series switches makes them very tolerant to misalignment of up to 10 mm (0.39 in.)
- High temperature—the MA-S switches and cables are designed to operate in temperatures up to 125°C (257°F)
- Long life—the MA-S Series safety interlock switches are designed for a minimum of one million actuations

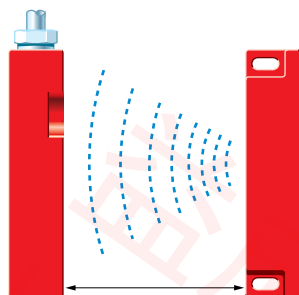
A **Go to the Engineering Guide**
For in-depth information on safety standards and use.

N **For More Guarding Products**
See Section N for safeguarding cutting and turning machines



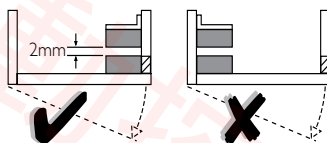
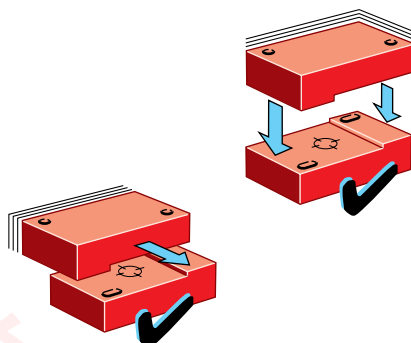
■ Operation

Operating Principle

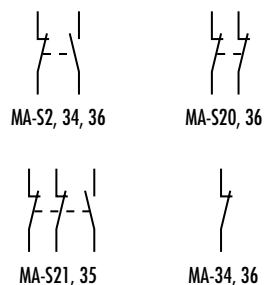


Encapsulated in the MA Series is a unique high-power industrial reed which is de-rated by a non-resettable overload protection circuit depending on switch type. On presenting the actuator to the switch, the high intensity magnetic field from the actuator causes the contacts to close. On removing the actuator (opening the door), the safety contacts open, isolating the machine.

Mounting Examples

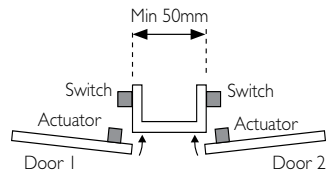


Contact Arrangements

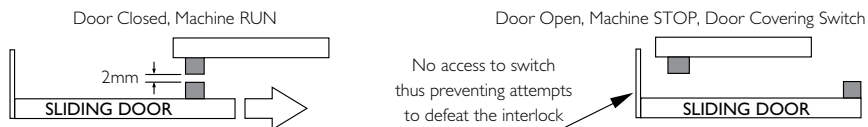


G

safety interlock switches



It is advisable, where possible, to mount the switch and actuator on non-ferrous materials otherwise it may affect the operating distances.

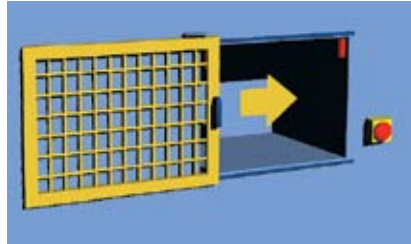


Wherever possible the units should be mounted so that no access can be obtained to the switch when the guard door is open, thus preventing attempts to defeat the safety system.

 Universal Mounting Brackets can be used with this product. See page G241 for details.

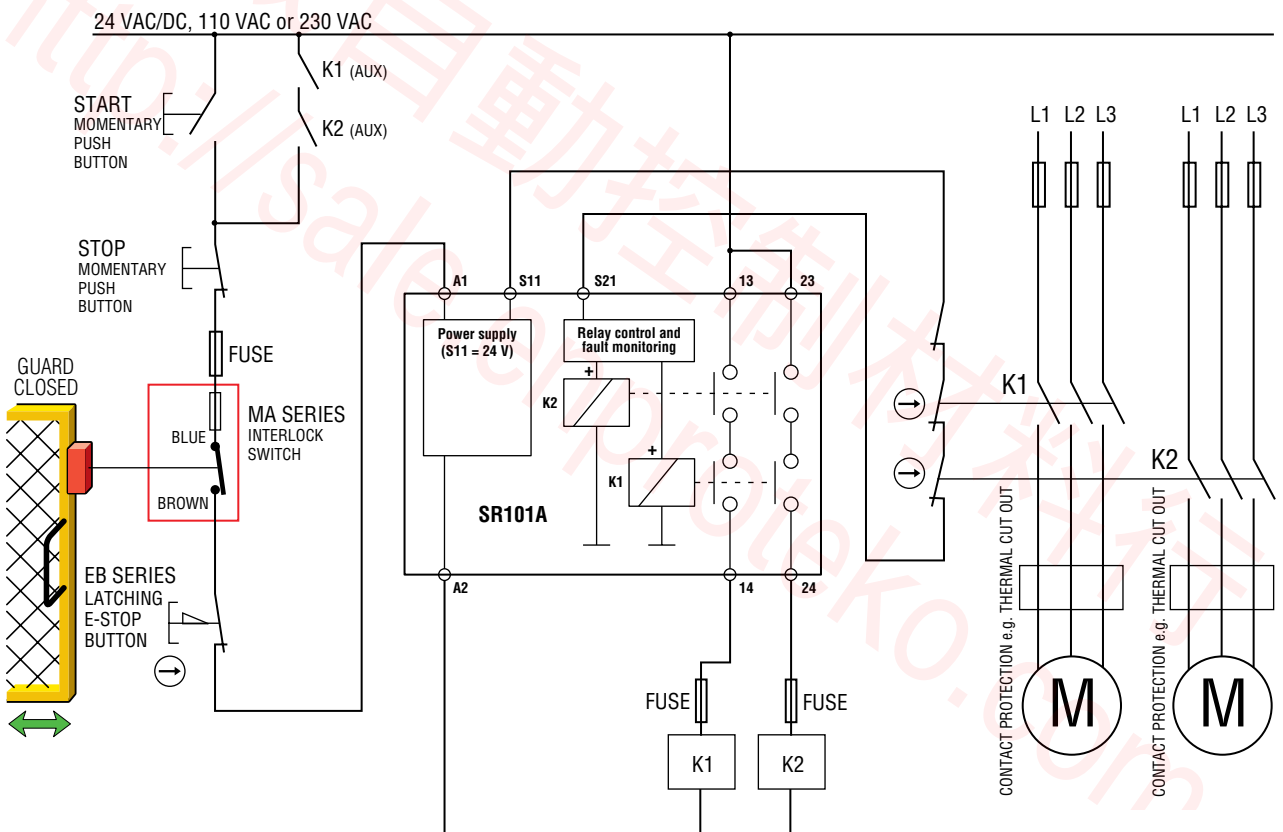
■ Applications

Typical applications are on sliding guard doors or swinging guard doors.



Typical Application of MA Series with a Safety Monitoring Relay

G
safety interlock switches



For a full explanation of the circuit operating principle and fault detection, see "Common Circuit Examples" in the Engineering Section of this catalog.

A **Go to the Engineering Guide**
For in-depth information on safety standards and use.

N **For More Guarding Products**
See Section N for safeguarding cutting and turning machines

■ Specifications

Electrical	All Models Unless Indicated		
Safety Contacts:	AC models	MA-S2, 36 — 1 N/C	MA-S20, S21 — 2 N/C
	DC models	MA-S2, 34, 36 — 1 N/C	MA-S20, S21, 35, 36 — 2 N/C
Safety Contact Operating Distance:	Make 7-12 mm (0.28-0.47 in.); Break 12-25 mm (0.47 to 0.98 in.)		
Auxiliary Contacts:	MA-S2, S21, 34, 35, 36	1 N/O	
Aux. Contact Operating Distance:	MA-S2, S21, 34, 35, S36	Make 10-13 mm (0.39-0.51 in.); Break 8-10 mm (0.31-0.39 in.)	
Safety Rated Voltage:	AC models	230 VAC	
	DC models	30 VDC	
Safety Rated Current:	AC models	2 A max., fuse externally 1.6 A quick acting	
	DC models: All except MA-35	1 A, fuse externally 800 mA quick acting	
	DC model: MA-35	0.3 A max., fuse externally 0.2 A quick acting	
Internal Fuse	AC models	2 A fast acting	
	DC models: All except MA-35	1 A fast acting	
External Fuse (Customer Supplied)	AC models	1.6 A fast acting	
	DC models	0.8 A fast acting	
Electrical Life:	1 x 10 ⁶		
Mechanical—Special Safety Reed	Safety	Aux.	
Closing Time:	3.0 mS	0.5 mS	
Drop-Out Time:	2.1 mS	0.3 mS	
Bounce Time:	0.7 mS	0.7 mS	
Shock:	10 G	10 G	
Vibration:	10 G, 50 to 100 Hz		
Mechanical			
Mounting:	Any position		
Case Material:	Stainless steel		
Actuator Material:	Stainless steel		
Wiring Connection:	Various lengths or male M12 micro connector		
Weight:	600 g (1 lb. 5 oz.)		
Color:	Stainless steel		
Mechanical Life:	10 x 10 ⁶		
Environmental			
Protection:	IP67 (NEMA 6)		
Operating Temperature:	MA-S2, S20, S21	-10 to 125°C (14 to 257°F)	
	MA-34, 35, 36	-10 to 55°C (14 to 131°F)	
Compliance			
Standards:	EN1088, EN292, EN60204-1		
Approvals/Listings:	CE marked for all applicable directives		
	MA-S2, S20, S21	UL and C-UL	
	MA-34, 35, 36	UL and C-UL	

Specifications are subject to change without notice.

Note: The safety contacts of the Omron STI switches are described as normally closed (N/C)— i.e., with the guard closed, actuator in place, and the machine able to be started.

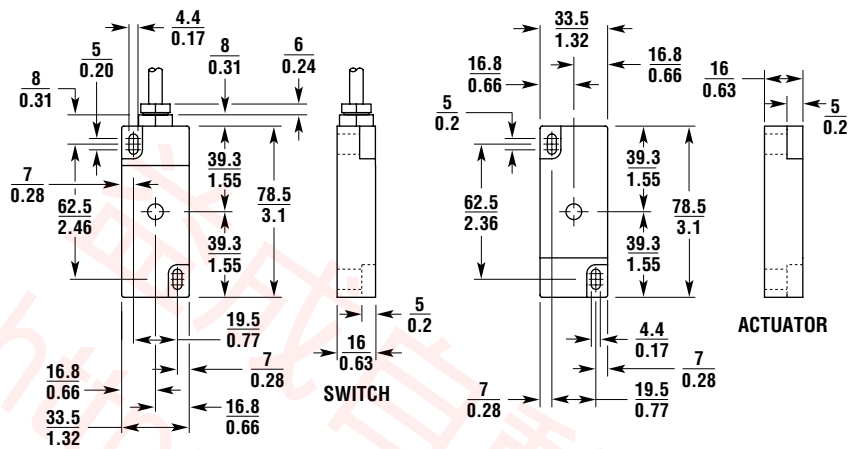
G

safety interlock switches

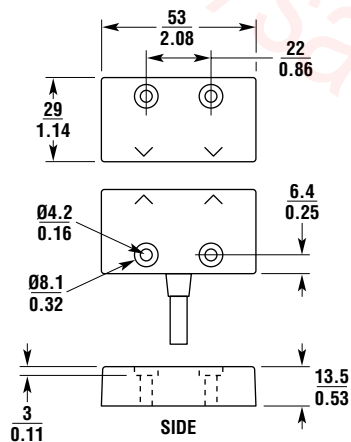
MA-S Series

■ Dimensions — mm/in.

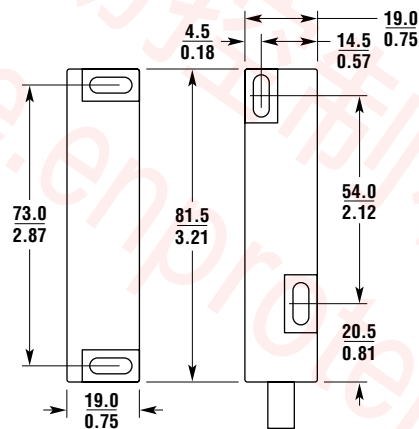
MA-S2, S20, S21



MA-34, 35



MA-36



G safety interlock switches

A Go to the Engineering Guide
For in-depth information on safety standards and use.

N For More Guarding Products
See Section N for safeguarding cutting and turning machines



Conforms to EN954-1, EN1088, EN60204-1
UL and C-UL listed

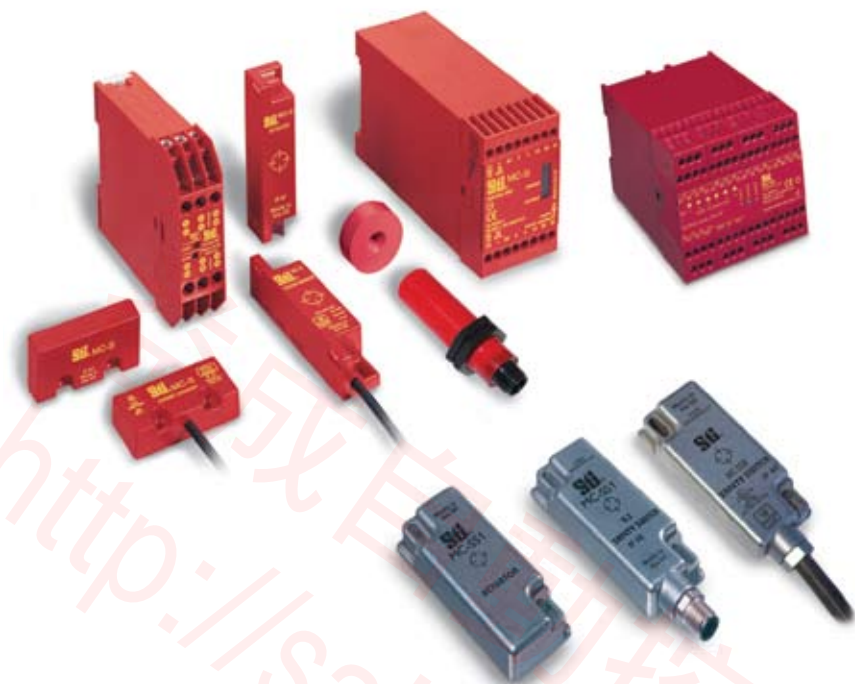
■ Description

The MC-S Series is a tamper resistant non-contact safety interlock switch that operates with its own control unit. As a fully monitored dual channel system, a single MC-S Series switch and MC-S Series control units 1 or 2 combine to fulfill Category 3 requirements. Control Unit 6 with 2 to 6 MC-S switches fulfills Category 4 requirements for the 3 N/O outputs and Category 3 for the N/O delayed output.

The MC-S Series control units provide EDM (External Device Monitoring, also called MPCE monitoring) with an automatic or manual reset. This allows the MC-S Series control units to replace a safety relay in some applications.

The NEMA 6 encapsulated design of the MC-S Series switch makes it ideal for harsh environments.

The MC-S Series control units can be used with a large number of MC-S Series switches for applications with multiple guard doors. The MC-S6 control unit provides individual monitoring and LED indication for up to six MC-S Series switches. Mechanical switches and MC-S Series switches may be used together with a single MC-S Series control unit for applications requiring both non-contact and mechanical safety interlock switches.



G

safety interlock switches

MC-S Series

Compact Coded Magnetic Safety Interlock Switch and Control Unit

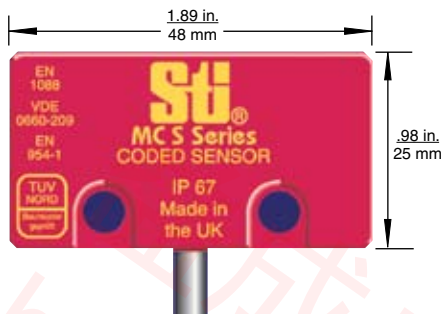
- Dual channel, fully monitored system; meets Category 3 when single MC-S Series switch and control unit are used; MC-S6 meets Category 4
- External Device Monitoring (EDM) with automatic or manual reset
- NEMA 6 switch enclosures in plastic or stainless steel with connector satisfy most application requirements
- Magnetically coded switches are tamper resistant to common magnets
- Misalignment tolerance of (5 and 9 mm) reduces nuisance tripping
- A large number of switches may be used with a MC-S Series control unit
- MC-S6 control unit provides individual monitoring and indication for up to 6 switches and a N/O delayed output
- Mechanical interlock switches may be used with a MC-S Series control
- MC-S Series controls may replace a safety relay in some applications
- Auxiliary contacts available for individual guard door monitoring on MC-S switches

A **Go to the Engineering Guide**
For in-depth information on safety standards and use.

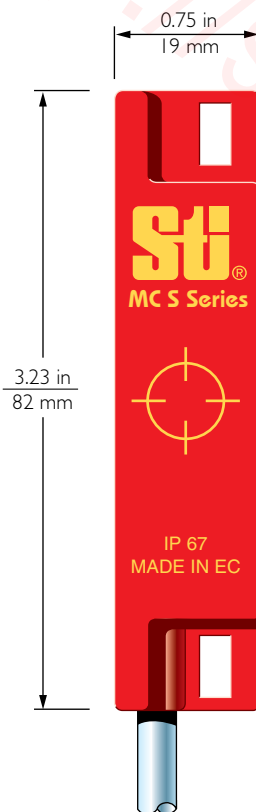
N **For More Guarding Products**
See Section N for safeguarding cutting and turning machines

Actual Size

Type 1 Sensor



Type 2 Sensor



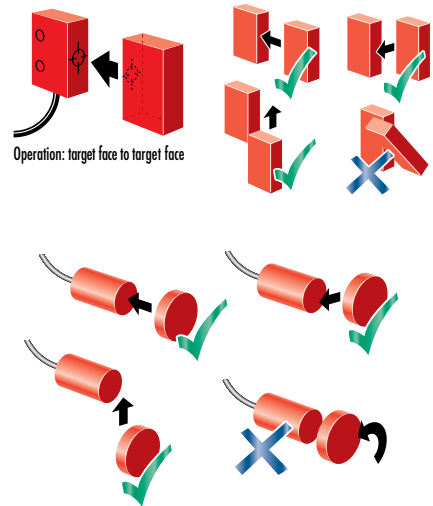
Operation

Operating Principle

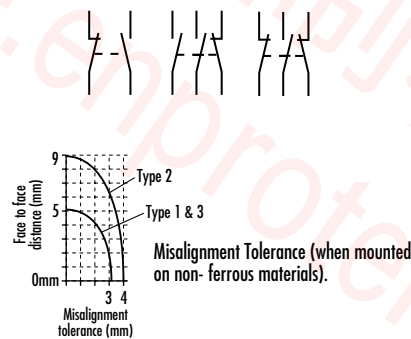
On presenting the actuator to the switch, the coded, high intensity magnetic field from the actuator causes the contacts to close. On removing the actuator (opening the door), the safety contacts open, isolating the machine.



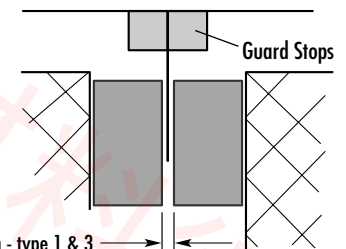
Mounting Examples



Contact Arrangements



NOTE: ACTUATOR MUST NOT STRIKE SENSOR



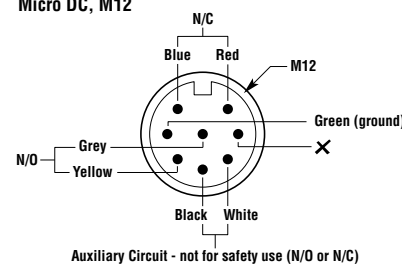
min 1mm
max 3mm - type 1 & 3
max 4mm - type 2

Recommended gap between sensor and actuator.

Connector Configurations

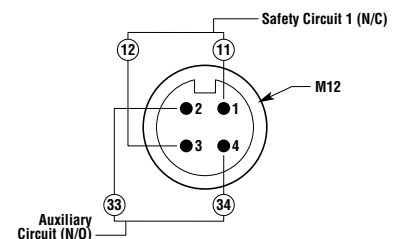
MC-SS2 Stainless Steel

8-Pin Male,
Micro DC, M12



MC-S3

4-Pin Male,
Micro DC, M12

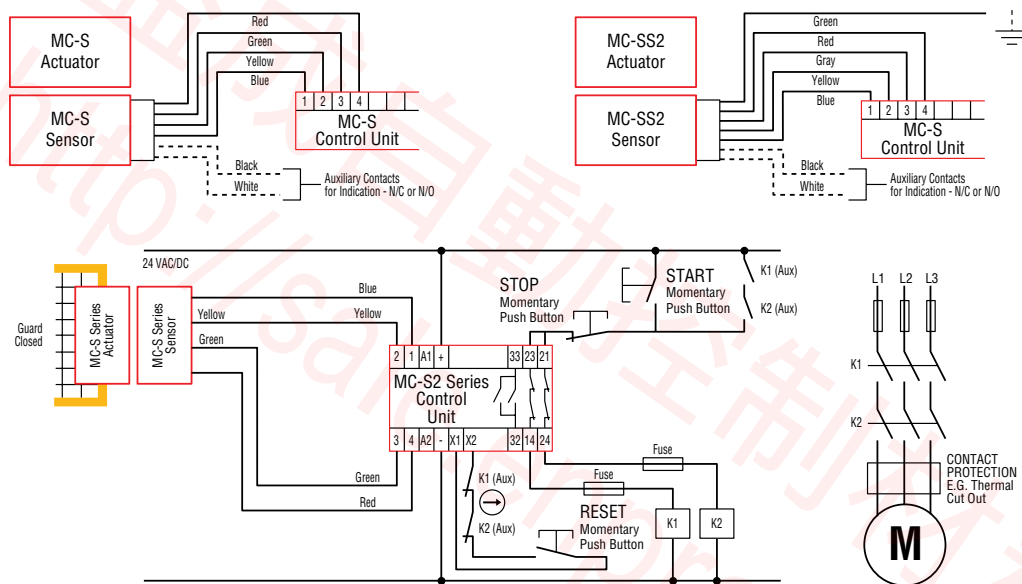
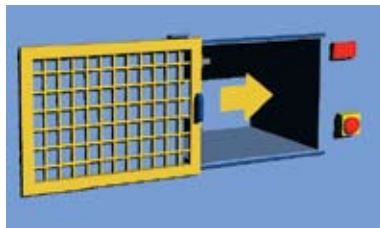


Universal Mounting Brackets can be used with this product. See page G241 for details.

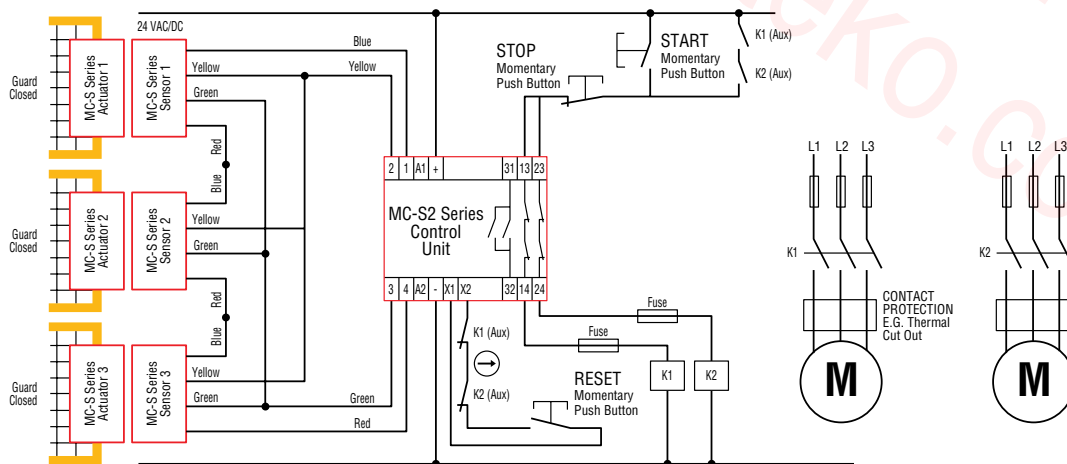
MC-S Series

Applications

Typical applications are on sliding guard doors or swinging guard doors.



Single sensor and two contactors with manual reset and EDM (External Device Monitoring). Machine will start when guard is closed, auxiliary contacts at K1 and K2 are closed (i.e. both contactors are off), reset button is pressed and then start button is pressed.



Three sensors and two contactors with manual reset and EDM (External Device Monitoring). Machine will start when all guards are closed, reset button is pressed and then start button is pressed. NOTE: The use of multiple sensors connected to a single control unit is only suitable in applications where each guard door is always opened and then shut individually. Otherwise some single faults may not be detected and unintentional lockout reset may occur if two or more guard doors are open at the same time.

N For More Guarding Products
See Section N for safeguarding cutting and turning machines

■ Specifications

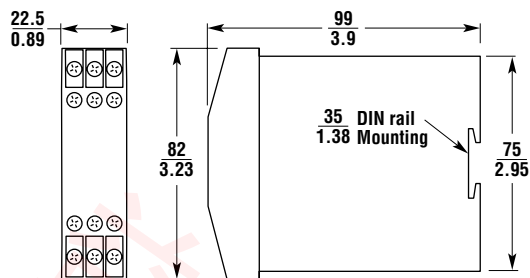
Electrical	MC-S Series Control Units	MC-S Series Switches
Power Supply:	24 VAC/DC \pm 10% - Control 1 24 VDC \pm 10% or 24/110/220 VAC - Control 2 & 6	—
Power Consumption:	< 2 VA Control 1; < 4 VA - Control 2 & 6	—
Safety Inputs:	1 N/O + 1 N/C for controls 1 & 2 (x6 for Control 6)	—
Max Input Resistance:	Red/Blue - 200 Ω ; Green/Yellow - 150 Ω	—
Min. Approach Speed:	Typically 10-17 mm/sec.	—
Safety Contacts:	—	1 N/C + 1 N/O
Auxiliary Contacts:	—	1 N/C or 1 N/O
Auxiliary Contact Rating:	—	100 mA, 24 VDC and 230 VAC
Relay Outputs:	1 N/O + 1 Semi Aux. - Control 1 2 N/O + 1 N/C Aux. - Control 2	Control 6 Delayed Output (0.6-30 s) 3 N/O + 1 N/O Delayed, 1 N/C Aux. - Control 6
Auxiliary Contact of Controls:	100 mA, 24 VDC and 230 VAC - Control 1 2 A, 24 VDC and 230 VAC - Control 2 and 6	—
N/C Operating Distance:	—	On = 5 mm; Off = 11 mm Type 1 and Type 3 On = 9 mm; Off = 12 mm Type 2 On = 10 mm; Off = 13 mm Type 2 stainless
Max Switched AC:	4 A/250 VAC	100 mA/230 VAC
Max Switched DC:	2 A/30 VDC	100 mA/24 VDC
Min Switched Current/Voltage:	10 mA/10 V AC/DC	—
Impulse Withstand Voltage:	2500 V	—
Max Drop-Out Time:	25 m/sec	—
Max Output Fuse:	5 A quick acting on AC, 3 A quick acting on DC (3 A quick acting on AC/DC control 6)	—
Reset Mode:	Automatic/Manual	—
External Device Monitoring:	N/C loop between x_1 and x_2	—
Mechanical		
Mounting:	35 mm (1.38 in.) DIN Rail	4 x M4 screws, M18 x 1 mm pitch for MC-S3
Case Material:	Polycarbonate	ABS plastic - Type 1 & 2; nylon - Type 3; stainless steel - Type 2 stainless
Max Wire Size:	2 x 1 mm (20 AWG) stranded 2 x 1.5 mm (15 AWG) solid	Pre-wired cable to 10 m MC-S1, S2, Connector MC-SS2, MC-S3
Weight:	147 g (5.2 oz.) - Control 1, 590 g (21 oz.) - Control 2, 990 g (35 oz.) - Control 6	100 g (3.5 oz.) plastic, 600 g (1-lb. 5-oz.) steel
Color:	Red	Red or Stainless steel
Indication:	LED 1: Green = Output Closed LED 2: Red = Power On Controls 1 & 2 LED 2: Green = Power on Control 6	— —
Mechanical Life:	1 x 10 ⁶	1 x 10 ⁶
Environmental		
Protection:	IP40 (NEMA 1)	IP67 (NEMA 6); (IP68 for stainless)
Operating Temperature:	-10 to 55°C (14 to 131°F)	-10 to 55°C (14 to 131°F) Plastic -25 to 125°C (-13 to 257°F) Stainless
Humidity:	90% RH at 50°C (122°F)	90% RH at 50°C (122°F)
Compliance		
Standards:	EN954-1, EN1088, EN60204-1	
Approvals/Listings:	CE marked for all applicable directives, UL and C-UL	

Specifications are subject to change without notice.

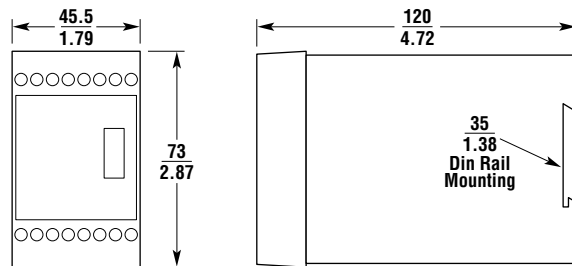
Note: The safety contacts of the Omron STI switches are described as normally closed (N/C) i.e., with the guard closed, actuator in place, and the machine able to be started.

MC-S Series

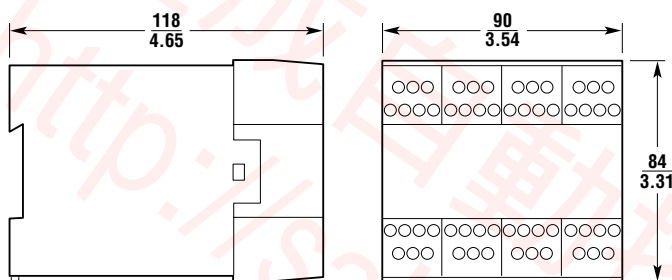
■ Dimensions — mm/in.



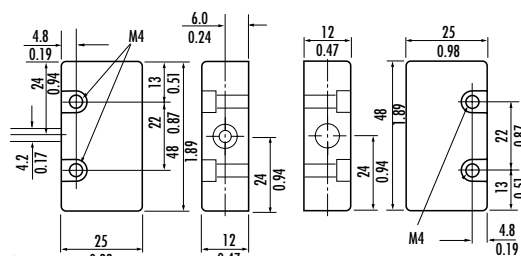
Control Unit 1



Control Unit 2

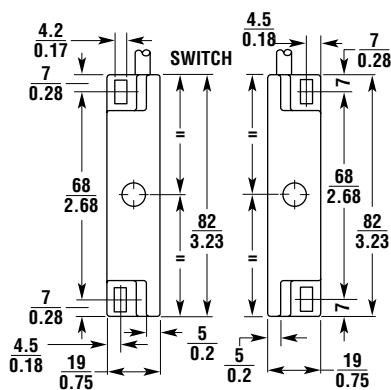


Control Unit 6

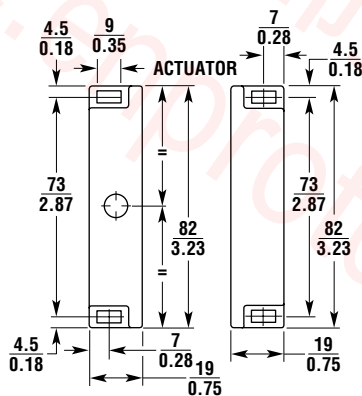


Switch - Type 1

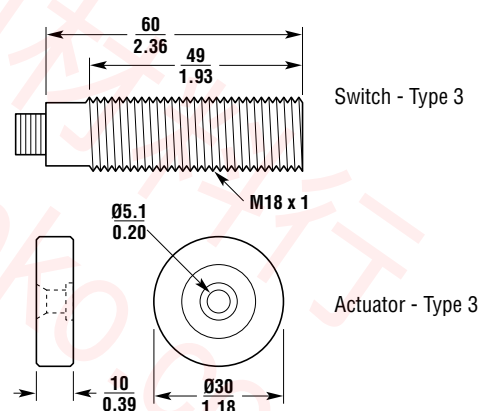
Actuator - Type 1



Switch - Type 2

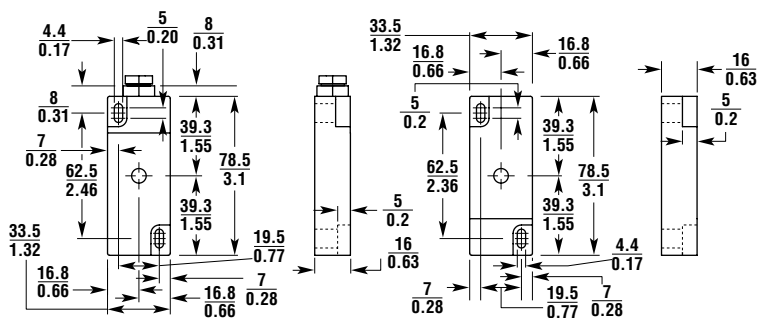


Actuator - Type 2



Switch - Type 3

Actuator - Type 3



Switch - Type 2
Stainless steel

Actuator - Type 2
Stainless steel

A Go to the Engineering Guide
For in-depth information on
safety standards and use.

N For More Guarding Products
See Section N for safeguarding
cutting and turning machines

G safety interlock switches

MF Series

Rev. 1.08

G

safety interlock switches

MF Series

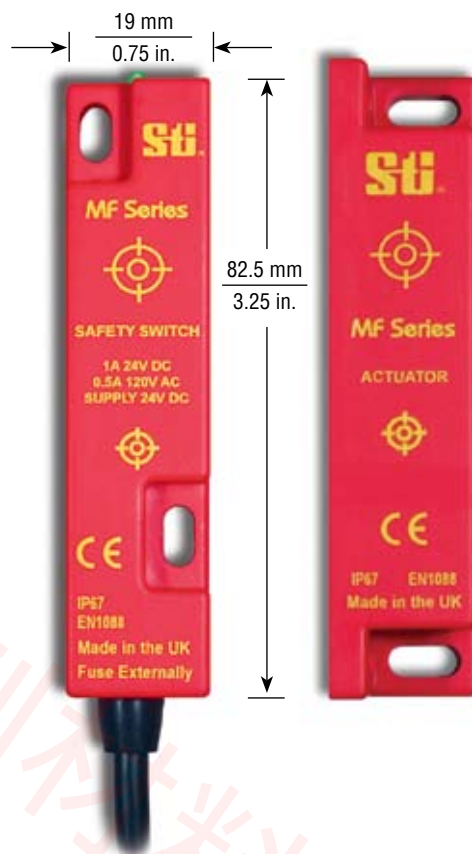
Tamper-Resistant Ferroresonant Safety Interlock Switch

- Tamper resistant—the combination of magnetic and ferroresonant signals required to close the safety contacts makes the MF Series switch very tamper resistant. Fulfills the requirements of category 3 (EN 954-1).
- Compact size—the MF Series switch is pre-wired and mounts easily on 1-in. square tubing
- Misalignment tolerant—actuator misalignment of up to 0.27 in. is tolerated by the MF Series switch
- Color LED Status Indicator on the MF Series switch makes it easy to determine the status of the switch
- NEMA 6 enclosure enables the MF Series switch to withstand high pressure steam cleaning
- Expandable system—the MF Series switches can be wired in Series/Parallel so that multiple doors may be guarded. The safety monitoring relay or control unit must accept 1 NC/1 NO inputs. See wiring diagram example.
- Long life—the MF Series switch is designed for a minimum of one million actuations.

CE

Conforms to EN292, EN60204, EN954-1, EN1088, EN60947-5-3

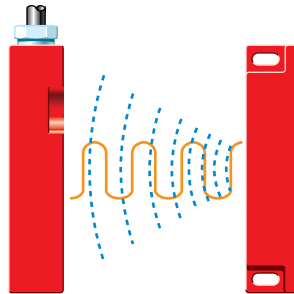
Actual Size



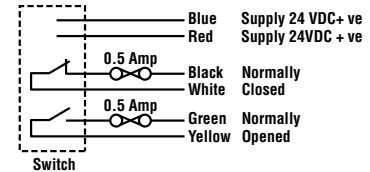
■ Operation

Operating Principle

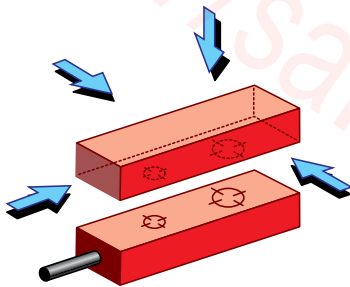
On presenting the actuator to the switch, the high intensity magnetic field, together with a resonant frequency signal, causes the contacts to close. On removing the actuator (opening the door), the safety contacts open, isolating the machine. The switch can not be overridden by magnets, tools, etc.



Switch Contacts and Connections



Mounting Examples



■ Specifications

Electrical	All Models
Power Supply:	24 VDC
Power Consumption:	2 VA/2 W
Internal Fuse:	1 A on switch contacts
External Fuse (Customer Supplied):	0.5 A
Contact Configuration:	1 N/O + 1 N/C
Contact Operating Distance:	9 mm ON/10 mm OFF
Max Switched AC:	0.5 A/120 VAC
Max Switched DC:	0.5 A/24 VDC
Min Switched Current/Voltage:	10 mA/10 V
Cable Length:	100 m max.
Mechanical	
Mounting:	4 x M4 screws
Case Material:	ABS plastic
Weight:	270 g (9.5 oz.)
Color:	Red
Dual Indicator:	Green = Guard Closed; Red = Guard Open
Environmental	
Protection:	IP67 (NEMA 6)
Operating Temperature:	-10 to 55°C (14 to 131°F)
Humidity:	90% RH at 50°C (122°F)
Compliance	
Standards:	EN292, EN60204, EN954-1, EN1088, EN60947-5-3
Approvals/Listings:	CE marked for all applicable directives, UL and cULus pending

Specifications are subject to change without notice.

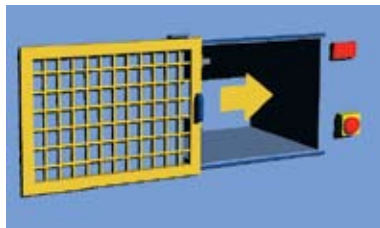
Note: The safety contacts of the Omron STI switches are described as normally closed (N/C)—i.e., with the guard closed, actuator in place, and the machine able to be started.

 Universal Mounting Brackets can be used with this product. See page G241 for details.

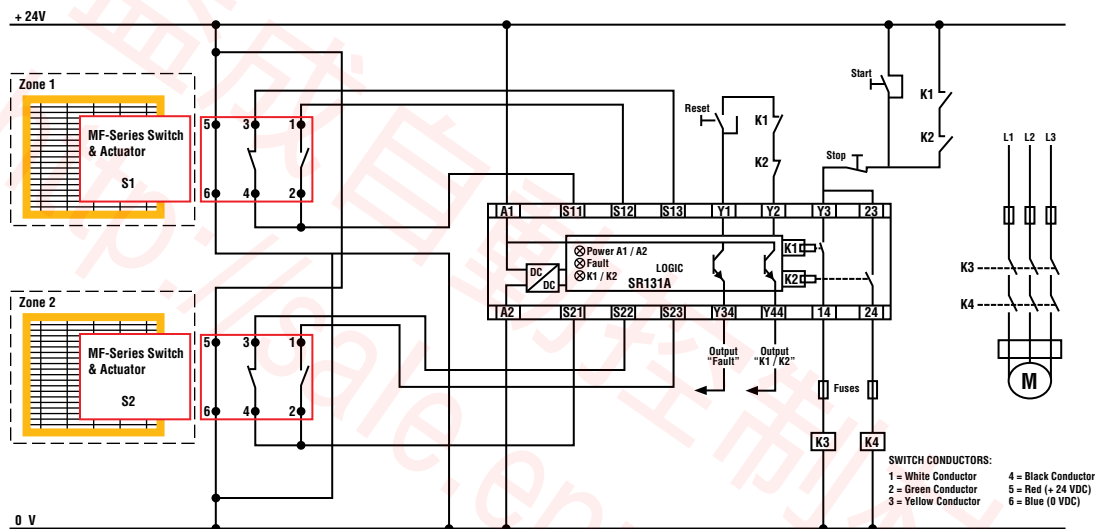
MF Series

■ Applications

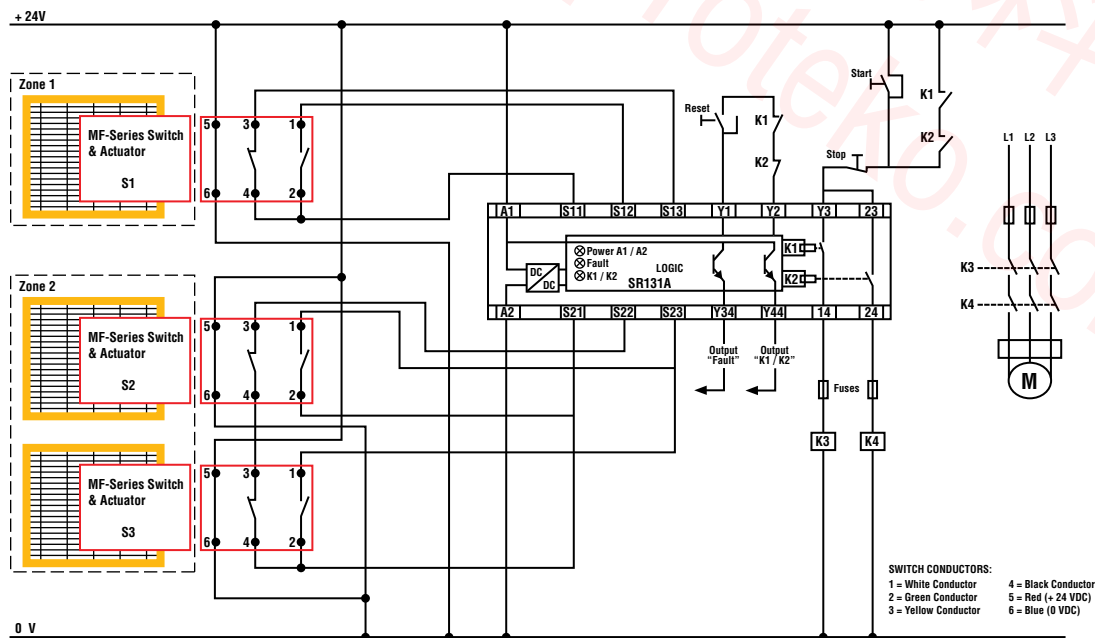
Typical applications are on sliding guard doors or swinging guard doors.



G safety interlock switches

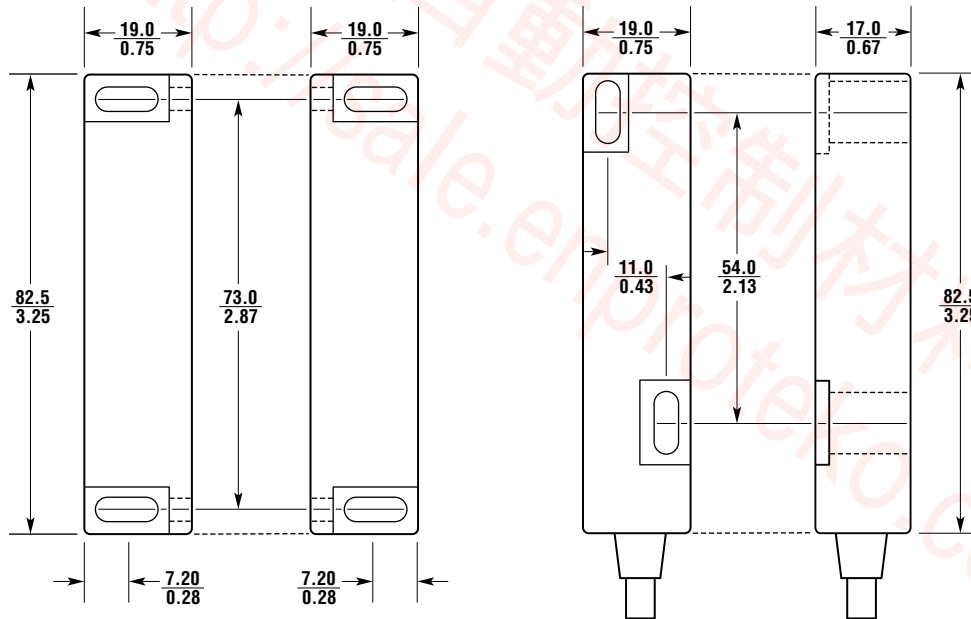


The MF Series switch and actuators are integrated with an SR131A safety monitoring relay. Each sensor has a dedicated channel for the highest level of safety.



The MF Series switch and actuators are integrated with an SR131A safety monitoring relay. The safety contacts of the MF switches for zone 2 are wired in Series/Parallel. This method allows multiple gates or switches to be wired to a single channel on the safety monitoring relay or control unit.

■ Dimensions — mm/in.





Conforms to EN1088, EN292, EN60204-1, EN954-1, EN947-5-3,
EN60947-5-1, EN50081, EN50082, EN61000-6-2
UL and C-UL listed



G

safety interlock switches

MFS

Magnetic Ferroresonant Stand-Alone Safety Interlock Switch

- Tamper resistant—the combination of magnetic and ferro-resonant signals required to close the safety contacts makes the MFS very tamper resistant
- Stand-alone—use for lower risk applications as a stand-alone safety switch allowing direct switching of relays and contactors up to 2 A at 230 VAC
- LED on switch provides visible indication of switch status; green light indicates guard is closed
- Compact size—the MFS is pre-wired and mounts easily on 1-in. square tubing
- Use with safety monitoring relays in applications requiring a higher level of safety reliability
- NEMA 4 enclosure enables the MFS to withstand water wash-down cleaning
- Long life—the MFS is designed for ten million actuations

A **Go to the Engineering Guide**
For in-depth information on safety standards and use.

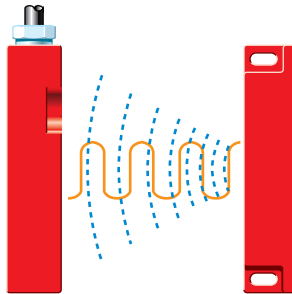
N **For More Guarding Products**
See Section N for safeguarding cutting and turning machines



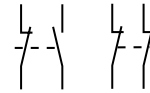
■ **Operation**

Operating Principle

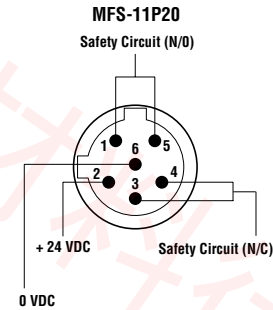
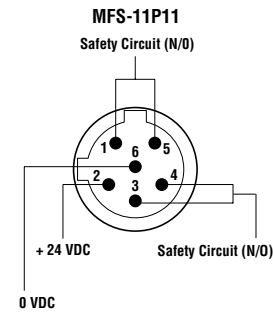
On presenting the actuator to the switch, the high intensity magnetic field, together with a resonant frequency signal, causes the contacts to close. On removing the actuator (opening the door), the safety contacts open, isolating the machine. The required combination of magnetic and ferroresonant signals makes the MFS very tamper resistant.



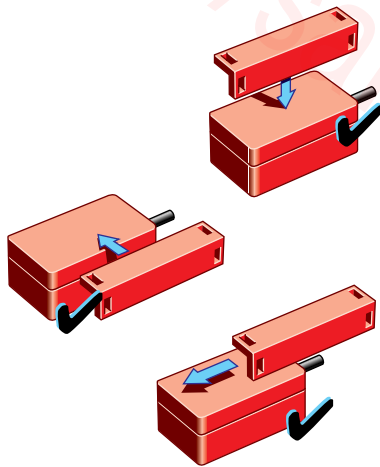
Contact Arrangements



Connector Configurations



Mounting Examples



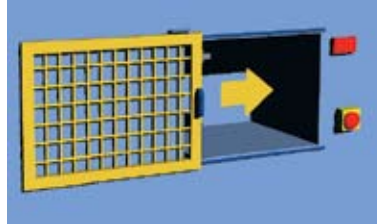
G

safety interlock switches

 Universal Mounting Brackets can be used with this product. See page G241 for details.

■ Applications

Typical applications are on sliding guard doors or swinging guard doors.



■ Specifications

Electrical	All Models
Power Supply:	24 VDC
Power Consumption:	2 VA
Max Cable Length:	100 m
Safety Outputs:	1 N/C or 2 N/C
Auxiliary Contact:	1 N/O
Operating Distance:	ON = 6-9 mm; OFF = 10-12 mm
Minimum Gap:	2 mm
Safety Max Switched Current/Voltage:	2 A / 230 VAC; 2 A / 30 VDC
Aux. Max. Switched Current/Voltage:	2 A / 230 VAC; 2 A / 30 VDC
Max. Output Fuse:	2 A quick acting
Mechanical	
Mounting:	2 x M4 screws, supplied
Case Material:	ABS
Weight:	198 g (7 oz.)
Color:	Blue
Indication:	Green = Guard Closed
Mechanical Life:	10 x 10 ⁶
Environmental	
Protection:	IP67
Operating Temperature:	-10 to 55°C (-14 to 131°F)
Vibration/Shock:	50-100 Hz / 10 g
Compliance	
Standards:	EN1088, EN292, EN60204-1, EN954-1, EN947-5-3, EN60947-5-1, EN50081, EN50082, EN61000-6-2
Approvals/Listings:	CE marked for all applicable directives, UL and C-UL
Safety Category:	Cat. 3 per EN954-1 when used with an appropriate safety monitoring relay

Specifications are subject to change without notice.

Note: The safety contacts of the Omron STI switches are described as normally closed (N/C)—i.e., with the guard closed, actuator in place, and the machine able to be started.

A **Go to the Engineering Guide**
For in-depth information on safety standards and use.

N **For More Guarding Products**
See Section N for safeguarding cutting and turning machines

■ Dimensions — mm/in.

