

# Standalone Coded Non Contact Switches Types: PSA & MSA

## FEATURES & APPLICATION:



IDEM's PSA and MSA Non Contact Coded switches have been developed as stand alone mountable devices to provide a high level of fault detection and functional safety.

They can be mounted to guard doors to provide and maintain a high level of functional safety without the need to connect to external safety evaluators.

They have their own internal monitoring system and use force guided mechanical contacts and will maintain PLe (ISO13849-1) even when the switches are connected in series.

They are offered in high specification plastic or stainless steel 316 (mirror polished finish to Ra4) housings and can be used in almost any environment including where the requirement for high pressure cleaning following contamination from foreign particles exists. The housings are compact and easy to fit on frame sections of less than 40mm.

The PSA (Plastic) and the MSA (Stainless Steel 316) both have IP69K ingress protection and are suitable for most detergent washdown applications. The MSA Stainless Steel 316 version has a mirror polished (Ra4) surface finish and is suitable for CIP and SIP process applications.

Dual Actuator versions are available for use with "double door" guards

The typical sensing distance "on" is 12mm with wide tolerance to guard misalignment after setting.



Tested to ingress protection degree IP69K (high pressure hosing with detergent at 80C and 100psi)

## SAFETY RELIABILITY:

All standalone switches employ Two Force Guided Mechanical Relays and incorporate internal checking to ensure both relays are operational after each safety demand. If one relay fails to open or becomes inoperative the switch will lock out safe. Switches can be connected in series to maintain PLe to ISO13849-1.

## MAIN USER BENEFITS:

- A standalone mountable device able to provide interlocking control without the need for special additional controllers.
- Feedback circuit check option is included for use when incorporating reset buttons and external contactor feedback checks.
- Maintains PLe by internally checking the internal mechanical relays at each safety demand.
- Connect up to 20 switches in series.
- Ability to connect other switches and E Stops in series.
- Output contacts will switch up to 230Vac 3A.

## FUNCTIONAL SPECIFICATION:

High Functional Safety to ISO13849-1 - up to PLe Conformance to EN60947-5-3 PDF-M.

Coded actuation to provide high tamper proof interlock security on Guard Doors.

Two Diagnostic LED's:

- LED1 Green Indication of Safety Circuits Closed (Guard Closed, Actuator present, Feedback Circuit checked)
- LED2 Yellow Indication of Safety Circuits Open (Actuator removed)

One Auxiliary circuit for indication of door open.

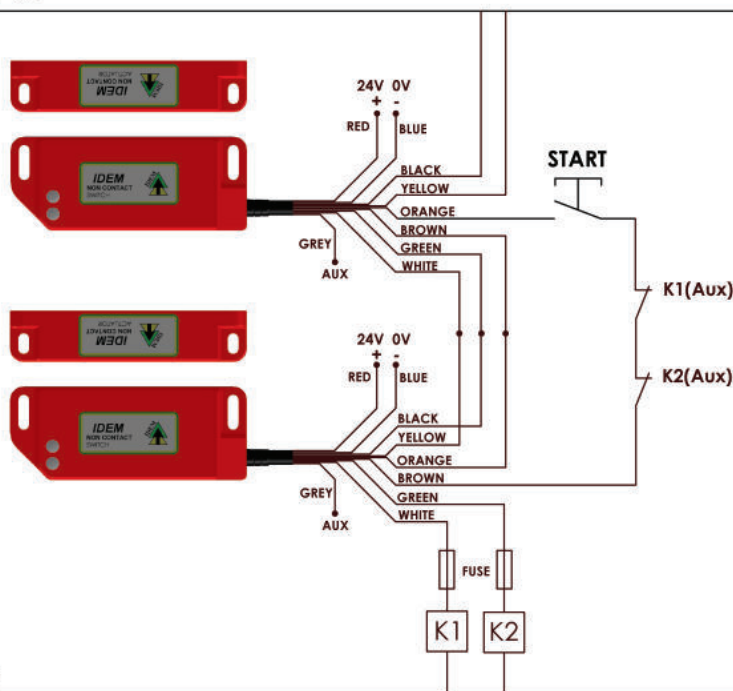
M12 Male 8-way Quick Connector versions available (Flying Lead 250mm (10")) and also optional series pluggable connectors.

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## CONNECTION EXAMPLE: Switches in Series - Manual Start PLd



24V dc



Two switches connected in series to give dual circuit safety outputs to machine contactors.

Safety Circuit 1 (Black/White) utilises internally checked force guided relay contacts and is connected in series with the corresponding Safety Circuit 2 (Yellow/Green) of the next switch.

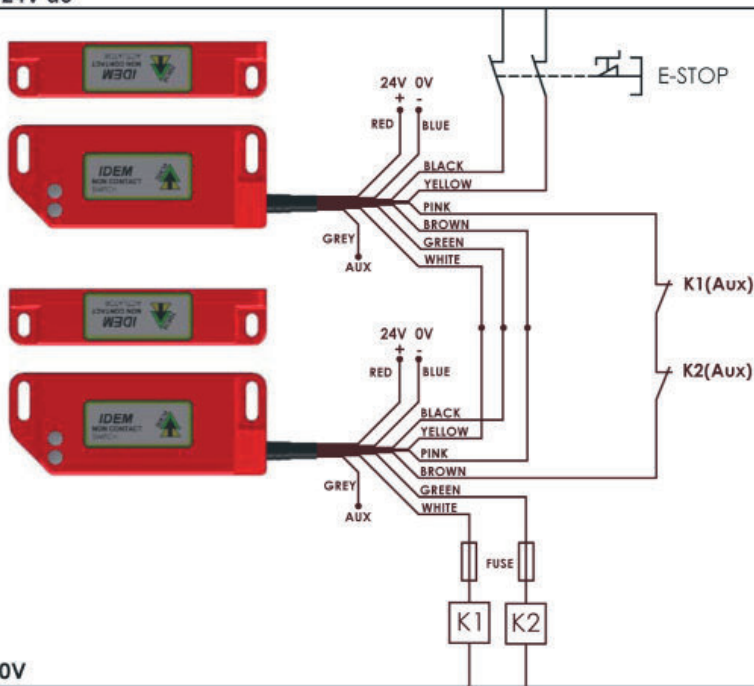
Allows minimal wiring and higher current switching to K1 and K2 contactors.

A manual start and contactor feedback check is achieved by connecting K1(Aux) and K2(Aux) feedback contacts and momentary start button through the orange and brown feedback check.

0V

## CONNECTION EXAMPLE: Switches in Series - Automatic Start PLd/Cat3

24V dc



Two switches connected in series to give dual circuit safety outputs to machine contactors.

Safety Circuit 1 (Black/White) utilises internally checked force guided relay contacts and is connected in series with the corresponding Safety Circuit 2 (Yellow/Green) of the next switch.

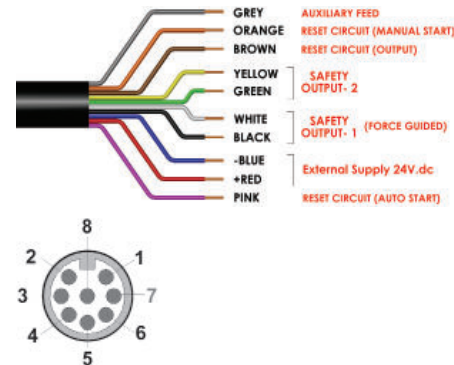
Allows minimal wiring and higher current switching to K1 and K2 contactors.

An automatic start with contactor feedback check is achieved by connecting K1(Aux) and K2(Aux) feedback contacts through Pink and Brown feedback check circuit.

A mechanical E-Stop button is connected in series with the safety outputs (PLd).

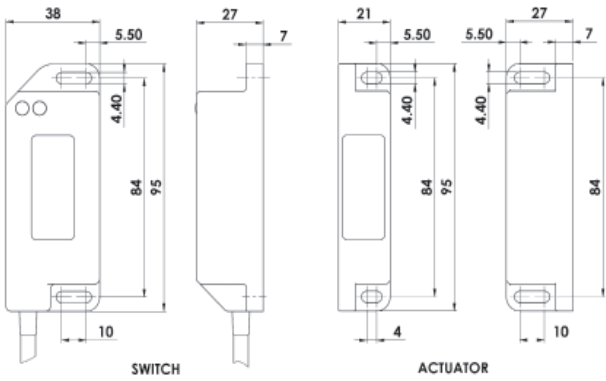
0V

Quick Connect QC Flying Lead 250mm (10") M12 8 Way Male Plug Pin view from Switch	Flying Lead Colour	Circuit	
2	Red	Supply +24Vdc	24Vdc +/-10%
3	Blue	Supply 0Vdc	
1	White	Safety Output 1 (Force Guided Relay)	AC15 250Vac 3A
7	Black	Safety Output 1 (Force Guided Relay)	DC13 24Vdc 3A
4	Yellow	Safety Output 2	AC15 250Vac 3A
6	Green	Safety Output 2	DC13 24Vdc 3A
8	Brown	Reset/Check Circuit - Output	
5	Orange	Reset/Check Circuit - Manual Start version (see Part Number)	
5	Pink	Reset/Check Circuit - Automatic Start version (see Part Number)	
Not Used	Grey	Auxiliary Feed	Electronic +24Vdc 0.2A



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## DIMENSIONS:



### Characteristic Data according to IEC62061 (used as a sub system):

Safety Integrity Level	SIL3
PFH (1/h)	3.95E-10 Corresponds to 4.0% of SIL3
PFD	3.46E-05 Corresponds to 3.5% of SIL3
Proof Test Interval T1	20a

### Characteristic Data according to EN ISO13849-1:

Performance Level	E
Category	Cat4
MTTFd	446a
Diagnostic Coverage DC	99% (high)

The calculation of the above values is based on the following assumptions:

No. of operating days per year:	$d_{op} = 365d$
No of operating hours per day:	$h_{op} = 24h$
No of operating cycles per day:	$n_{cyc} = 1/d$
B10d	$= 150,000 \text{ AC1 Load } 3A$ $= 2,000,000 \text{ AC1 Load } 0.5A$

When the product is used deviant from these assumptions (different load, operating frequency, etc) the values have to be adjusted accordingly.



SALES NUMBER	SINGLE ACTUATOR SENSING	BODY MATERIAL	CABLE LENGTH
130002	MSA	S/Steel 316	5M
130003	MSA	S/Steel 316	10M
130004	MSA (Automatic Start)	S/Steel 316	QC-M12
130005	MSA (Manual Start)	S/Steel 316	QC-M12



SALES NUMBER	SINGLE ACTUATOR SENSING	BODY MATERIAL	CABLE LENGTH
117002	PSA	Plastic	5M
117003	PSA	Plastic	10M
117004	PSA (Automatic Start)	Plastic	QC-M12
117005	PSA (Manual Start)	Plastic	QC-M12

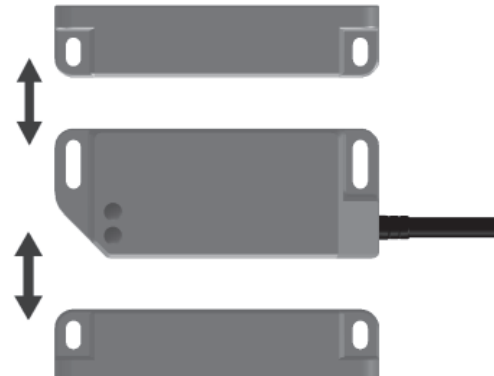
140101	Female QC Lead	M12 Female 5m. 8 way
140102	Female QC Lead	M12 Female 10m. 8 way



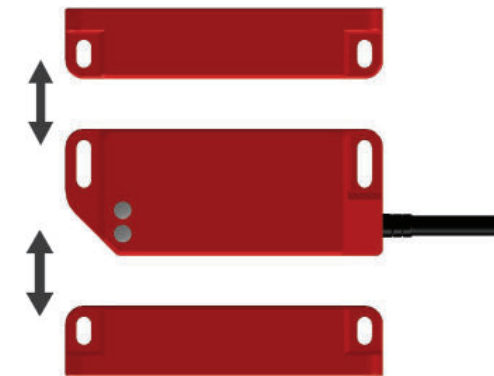
**Standards:** ISO14119 EN60947-5-3 EN60947-5-1 UL508 EN60204-1 ISO13849-1 EN62061

### Safety Classification and Reliability Data:

Power Supply	24Vdc +/-10% (Consumption 150mA max.)
Safety Output Maximum Rating	240V 3A ac/dc (2A - QC version)
Auxiliary Output Maximum Rating	24Vdc 0.5A
Dielectric Withstand	4k Vac
Insulator Resistant	100 Mohms
Recommended Setting Gap	5mm
Switching Distance (Target to Time)	Sao 10mm Close Sar 15mm Open
Tolerance to Misalignment	5mm in any direction from 5mm setting gap
Approach Speed	600mm/m to 1000mm/s
Body Material	PSA High Specification Polyester MSA Stainless Steel 316
Temperature	-25C/45C
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55Hz 1mm
Enclosure Protection	IP69K/IP67
Cable Type	PVC 10 core 7mm OD Conductors 0.25mm <sup>2</sup>
Mounting Bolts	2 x M4



SALES NUMBER	DUAL ACTUATOR SENSING (both actuators are required to be present to close the safety contacts)	BODY MATERIAL	CABLE LENGTH
130102	MSA - D	S/Steel 316	5M
130103	MSA - D	S/Steel 316	10M
130104	MSA - D (Automatic Start)	S/Steel 316	QC-M12
130105	MSA - D (Manual Start)	S/Steel 316	QC-M12



SALES NUMBER	DUAL ACTUATOR SENSING (both actuators are required to be present to close the safety contacts)	BODY MATERIAL	CABLE LENGTH
117102	PSA - D	Plastic	5M
117103	PSA - D	Plastic	10M
117104	PSA - D (Automatic Start)	Plastic	QC-M12
117105	PSA - D (Manual Start)	Plastic	QC-M12

130200	MSA Replacement Actuator
117200	PSA Replacement Actuator

For all IDEM switches the normally closed (NC) circuits are closed when the guard is closed and the actuator is present.