



SIL 3



D5000 - D5200

INTRINSICALLY SAFE ISOLATORS AND SAFETY RELAYS

DIN-RAIL, POWER BUS, TERMINATION BOARD MOUNTING



D5000 SERIES

SIL 3 CERTIFIED

INTRINSICALLY SAFE ISOLATORS AND SAFETY RELAYS

D5000 Modules provide the most simple and cost effective means of implementing Intrinsic Safety for Hazardous Areas / Locations applications.

A complete line of Isolators and Safety Relays.

HIGH INTEGRITY

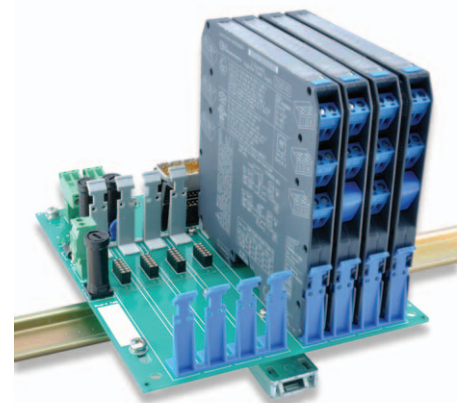
- ◆ SIL 3 according IEC 61508 - 61511
- ◆ Certified life duration: 20 years
- ◆ No electrolytic capacitors
- ◆ Three port galvanic isolation
- ◆ Safety Relay contacts rated for 4 A or 10 A

ENHANCED PACKING

- ◆ Space saving 12mm enclosure: 160 channels into just 1m DIN-Rail
- ◆ Reduced power consumption
- ◆ Power Bus and DIN-Rail mounting
- ◆ All modules can be mounted on DIN-Rail, Power Bus and Termination Boards.
- ◆ Detachable transparent front panel

ADVANCED FEATURES

- ◆ Short and open circuit detection reflected on PLC
- ◆ EMC compatibility for safety systems
- ◆ AI, AO, DI, DO, Temperature applications
- ◆ Signal converter, Encoders



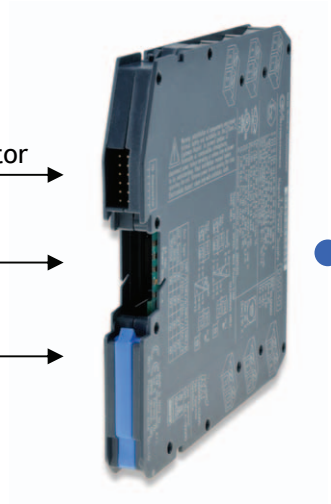
D5000 SERIES

CHARACTERISTICS

Universal mounting enclosure

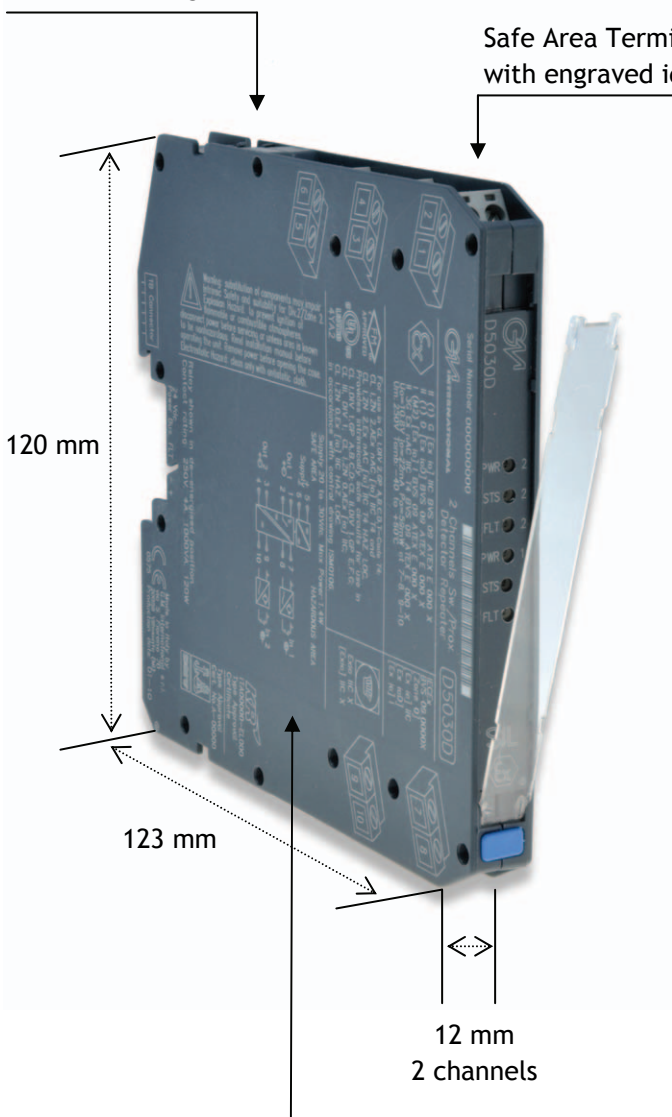
All D5000 Modules can be mounted on **DIN-Rail, Power Bus and Termination Boards.**

- Termination Board connector
- Power Bus connector
- DIN-Rail lock



Guides for Termination board mounting

Safe Area Terminal blocks with engraved identification



Lexan detachable front cover

LEDs for power, status and fault indication are visible through the transparent cover

Modules are SIL 3 certified

Hazardous Area Terminal Blocks indicator

Laser engraving on entire enclosure and terminal blocks to provide accurate, safe and permanent marking of Intrinsic Safety parameters, schematic diagrams, connections and instructions.

D5000

D5000 - D5200 SERIES

HIGH INTEGRITY

INTRINSICALLY SAFE ISOLATORS & SAFETY RELAYS

High performance

- ◆ High signal transfer accuracy and repeatability.
- ◆ Advanced circuitry provides very low heat dissipation, ensuring modules run cool despite their high density and functionality.
- ◆ SMD manufacturing to maximize long, reliable life.
- ◆ Complete absence of electrolytic capacitors ensures minimum 20 years lifetime.

Wide functionality

- ◆ Wide range of digital and analog I/O.
- ◆ SIL 3 Safety Relay contacts rated for 4 A or 10 A for direct switching of high loads.
- ◆ Three port galvanic isolation to eliminate noise, ground loop problems and to provide Intrinsic Safety without a high integrity safety earth connection.
- ◆ Line fault alarm detects open or short circuit of field cables.
- ◆ Optional power bus DIN-Rail connector.
- ◆ Standard Termination Board, custom connectors for integration into customized Boards.
- ◆ EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1, EN61326-3-1 for safety system.

Save up to 50% space



6 mm per channel + Ultra-low power consumption

General features

- ◆ More than 25 modules suitable for SIL 3 applications according to IEC 61508, IEC 61511.
- ◆ Independent power supply circuit for each channel.
- ◆ Double units are equivalent to two single units because of the absence of common circuitry.
- ◆ Single channel versions available if required, to provide single loop integrity on Emergency Shut Down and Fire & Gas applications.
- ◆ Configuration components are easily accessed by removing cover.
- ◆ DIP switch configurability for easy field setup.
- ◆ LED indication for power, signal status and line fault conditions.
- ◆ Modules accept DC power supply over a wide range for 24 Vdc (20-30 Vdc) applications.
- ◆ Wide operating temp. range: -40 to +60/+70 °C.
- ◆ Installation in Zone 2 / Division 2.
- ◆ Certified for Offshore and Marine applications.

High packing density

- ◆ 35 mm (Top Hat) DIN-Rail.
- ◆ Ultra slim 2 channels 12 mm wide DIN-Rail and Termination Board mounting modules.
- ◆ Power and fault on bus connectors.
- ◆ 6 mm per channel means 50% space reduction



Up to 160 I/O channels per 1m of DIN-Rail as shown in the configuration above.

APPROVALS AND CERTIFICATIONS

Intrinsically Safe products



G.M. International

has obtained IS certificates from the most credited Notified bodies in the world for its D1000 Series. D5000 and D5200 Series will be applied for certification in 2010.



Applied for:



SIL Certifications according IEC 61508 and IEC 61511



G.M. International

offers a wide range of products that have been proved to comply with the most severe quality and safety requirements. IEC 61508 and IEC 61511 standards represent a milestone in the progress of industry in the achievement of supreme levels of safety through the entire instrumented system lifecycle.

Marine Type Approval (Applied For)



G.M. International

offers Type Approval Certificates for its line of Intrinsically Safe Isolators D1000 Series and Power Supplies for use in Marine and Offshore applications. Certificates have been released both by Korean Register of Shipping and Det Norske Veritas. The D5000 and D5200 Series will be applied for soon.



Company Quality System



G.M. International's

Production Quality System is certified by Det Norske Veritas (Norway) to be compliant with ATEX 94/9/EC Directive and ISO 9001/2008. This means our production facilities are periodically re-assessed throughout the whole manufacturing process, to ensure that the highest quality standards are met.

Note: For complete details please refer to Data sheets or www.gmintsr.com

D5000 SERIES

FEATURES

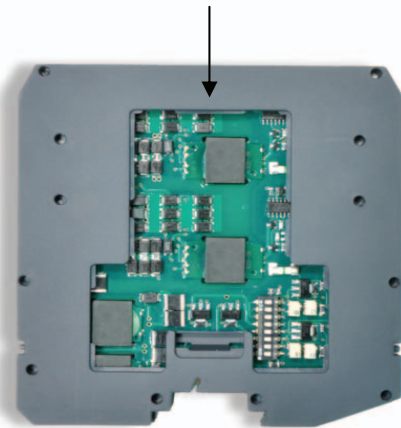
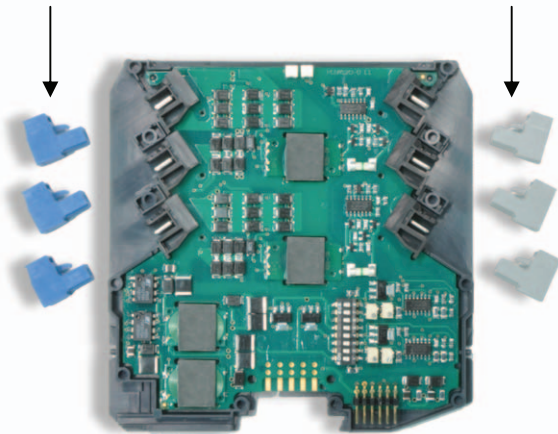
Enclosure Characteristics

- ◆ High channel density result from innovative circuit design using advanced surface mount components.
- ◆ Plug-in screw terminal blocks to secure termination up to 2.5 mm².
- ◆ Configuration components are easily accessed by removing side cover.

Blue terminal blocks for Hazardous Area connections

Grey terminal blocks for Safe Area connections

Detachable cover for access to configuration component



Enhanced Power Bus mounting

Power Supply Voltage 24 Vdc can be applied to the module, by connecting directly the voltage to the plug-in Terminal Block of each module, or via the Power Bus System.

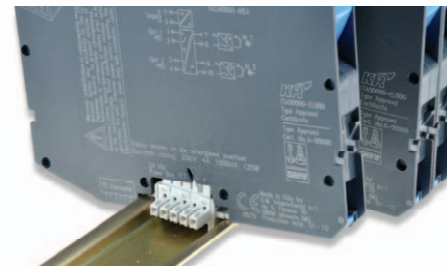
The system consists of standard DIN-Rail modules mounted on standard DIN-Rail Bus connectors. The maximum allowed powering capacity is 8 A.

It is always possible to remove modules, without disconnecting the bus connector which remains attached to the DIN-Rail.

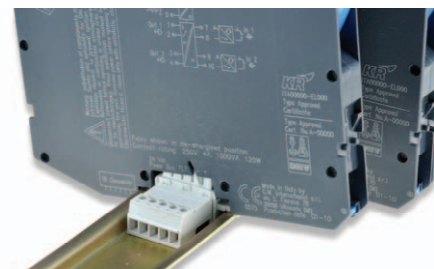
Cumulative Fault Alarm indication is provided on the Bus connection.

This signal is fed to a common unit (D5001S) which provides: 1 SPST Relay contact for common faults and 1 SPST Relay contact for power good (supply within operating range).

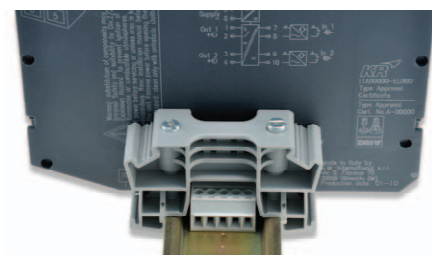
The D5002S is capable of operating also as redundant 4 A supply module for the system.



Bus plug-in connector



Bus connector terminal



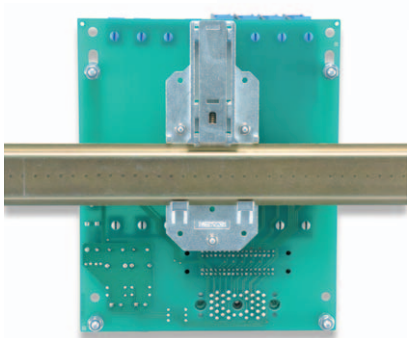
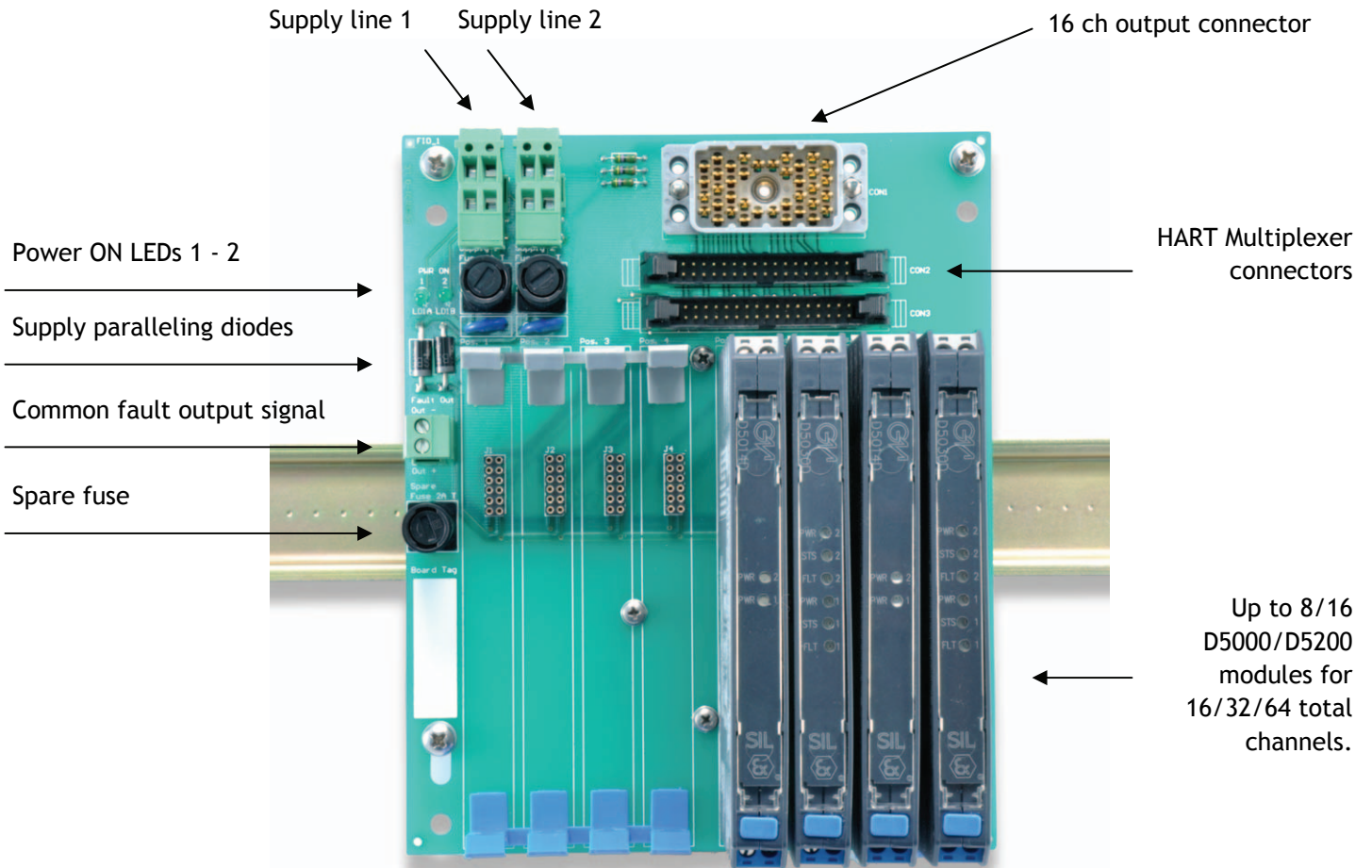
DIN-Rail stopper

D5000 SERIES

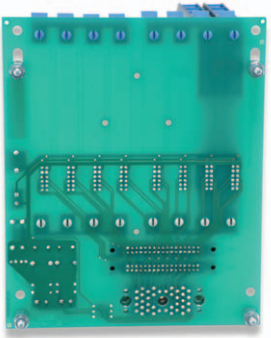
TERMINATION BOARDS

Characteristics

- ◆ Suitable to accept up to 8/16 D5000 or D5200 SIL 3 modules 12mm/22mm wide, which can be single or double channel.
- ◆ AI - AO - DI - Temperature: double channels.
- ◆ DO - Signal converter, Encoders, Safety Relay: single channel.
- ◆ 24 Vdc Power supply terminal blocks can be disconnected from the board without disconnecting the power to other boards connected in series.
- ◆ Boards are available with custom connectors for any system / PLC / DCS.
- ◆ Boards are available also for 8/16+2 modules:
the extra 2 modules (D5001S) provide separated fault signal relay contacts for power supply fault and input/output lines open and short circuit detection.
Two D5001S modules can be paralleled for 1oo2 redundancy, to increase availability on fault detection.




DIN-Rail mounting



Wall mounting

Field device	Model	Hazardous Area	Safe Area	Ch. per unit	Supply	SIL level
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ANALOG IN		D5011S	4-20 mA		1	20-30 Vdc	SIL 3
		D5011D	2-Wires Tx only Smart compatible	4-20 mA (source only)	2		SIL 3
		D5014S	4-20 mA		1	20-30 Vdc	SIL 3
		D5014D	2-Wires Active or Passive Tx Smart compatible	4-20 mA (source or sink)	2		SIL 3
		D5014D		Two duplicated outputs	1	SIL 3	
		D5212Q 		4-20 mA	4	SIL 3	
		D5212Q 	4-20 mA	Two duplicated outputs	2	20-30 Vdc	SIL 3
		D5212Q 	2-Wires Passive Tx	One Triplicated + One single outputs	2		SIL 3
		D5212Q 		One Quaduplicated output	1	SIL 3	
		D5254S 	4-20 mA 2-Wires Tx Active or Passive Smart compatible	4-20 mA 2 Trip Amplifiers each whit 1 SPST (relay contact)	1	20-30 Vdc	SIL 2
ANALOG OUT		D5020S	4-20 mA	4-20 mA	1	20-30 Vdc	SIL 3
		D5020D	Analog Signal to I/P Converters, Electrovalves, Actuators and Displays Smart compatible	Bus powered signal from DCS, PLC or other control devices. Two duplicated outputs.	2		SIL 3

 Configurable via PPC5092 with Software SWC5090

Field device	Model	Hazardous Area	Safe Area	Ch. per unit	Supply	SIL level
	D5030S		1 SPDT (relay contact) + LED (fault status)	1		SIL 3
	D5030D	Voltage free Contact, Proximity Switch	1 SPST (relay contact) + 1 SPST (alarm or duplicator) + LED (fault status)	1	20-30 Vdc	SIL 3
	D5030D	Line fault detection Isolated inputs	2 SPST (relay contact) + LED (fault status)	2		SIL 3
	D5031S		1 Open Collector + LED (fault status)	1		SIL 3
	D5031D	Voltage free Contact, Proximity Switch	2 Open Collectors + LED (fault status)	1	20-30 Vdc	SIL 3
	D5031D	Line fault detection Isolated inputs	1 Open Collector + 1 O.C. (alarm duplicator) + LED (fault status)	2		SIL 3
	D5231Q		4 Open Collectors + LED (fault status)	4	20-30 Vdc	SIL 2
	D5231E	Voltage free Contact, Proximity Switch	8 Open Collectors + LED (fault status)	8		SIL 2
	D5032S		1 SPDT (relay contact) + LED (fault status)	1		SIL 3
	D5032D	Voltage free Contact, Proximity Switch	1 SPST (relay contact) + 1 SPST (alarm or duplicator) + LED (fault status)	1	20-30 Vdc	SIL 3
	D5032D	Line fault detection Isolated inputs	2 SPST (relay contact) + LED (fault status)	2		SIL 3
	D5034S	Voltage free Contact, Proximity Switch	Transparent repeater of input status	1	20-30 Vdc	SIL 3
	D5034D	Line fault detection Isolated inputs	0 to 8 mA range	2		SIL 3

DIGITAL IN

Field device	Model	Hazardous Area	Safe Area	Ch. per unit	Supply	SIL level
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DIGITAL OUTPUT DRIVER		D5048S	NE solenoid valve, other control devices. Line open/short fault detection reflected on PLC.	Loop Powered control signal from safety PLC, DCS	1	Loop + 20-30 Vdc	SIL 3
		D5049S	NE solenoid valve, other control devices. Line open/short fault detection. High Availability (1oo2)	Bus Powered control signal from safety PLC, DCS	1	20-30 Vdc	SIL 3
		D5247S	F&G solenoid valve, other control devices. Line open/short fault detection.	Loop Powered control signal from safety PLC, DCS	1	Loop + 20-30 Vdc	SIL 3
		D5280S	NE 12W 'Ex d' solenoid valve, other control devices. Line open/short fault detection.	Loop Powered control signal from safety PLC, DCS	1	Loop + 20-30 Vdc	SIL 3
		D5281S	F&G 12W 'Ex d' solenoid valve, other control devices. Line open/short fault detection High Availability (1oo2)	Loop Powered control signal from safety PLC, DCS	1	Loop + 20-30 Vdc	SIL 3
SIGNAL CONV.		D5060S	0-50 KHz Magnetic Pickup or Proximity Switch	mA (source) or V Out, Pulse repeater Output	1	20-30 Vdc	SIL 2
ENCODER		D5265S	Intrinsically Safe Encoder	Transparent repeater	1	20-30 Vdc	
TEMPERATURE CONVERTERS AND TRIP AMPLIFIERS		D5072S	Universal TC, 3/4-Wires RTD, Potentiometer, mV	4-20 mA (source) 1 Independent set point via 1 Solid State Relay	1	20-30 Vdc	SIL 2
		D5072D	Universal TC, 3-Wires RTD, Potentiometer, mV	4-20 mA (source)	2	20-30 Vdc	SIL 2
		D5072D		4-20 mA (source) Duplicator		20-30 Vdc	SIL 2
		D5074S	2 inputs in 1oo2 Universal TC, 3-Wires RTD, Pot, mV	4-20 mA (source)	1	20-30 Vdc	SIL 3

Configurable via PPC5092 with Software SWC5090

SAFETY RELAY SERIES



FEATURES

Applications

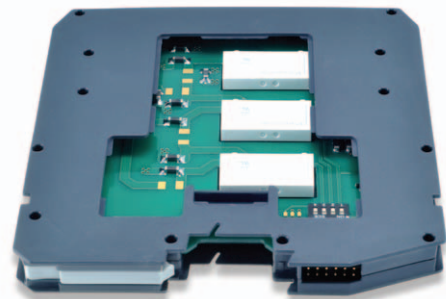
When a load, such as valve or motor, cannot be driven directly by a safety PLC or by an emergency push button an interposing relay becomes a necessity. In example, when the power required to switch the load is greater than what can be provided by the PLC or when multiple contacts are required to be driven by the same signal, the use of a relay is a must.

In today's high integrity applications a standard relay is no longer acceptable. Whether it is for a ESD, F&G, BMS or for any other critical application a Safety (SIL 3) Relay must be used.

GMI SIL 3 Relays are available in various contact configurations and rating to cover the majority of applications; they are available with standard DC but as well as with AC coil.

The typical application are shut down or relief valves control, Fire & Gas valve control, Turbine shut down motors, etc. For each application the specific Safety Function must be determined to select the correct Safety Relay. The Safety Function determines the operating condition of the SIF, therefore of the Safety Relay. Safety Functions can be basically divided in four types starting from the following operating conditions:

- ◆ NE Relay Coil - NC Relay Contacts (Load Normally Energized)
- ◆ NE Relay Coil - NO Relay Contacts (Load Normally De-Energized)
- ◆ ND Relay Coil - NO Relay Contacts (Load Normally De-Energized)
- ◆ ND Relay Coil - NC Relay Contacts (Load Normally Energized)



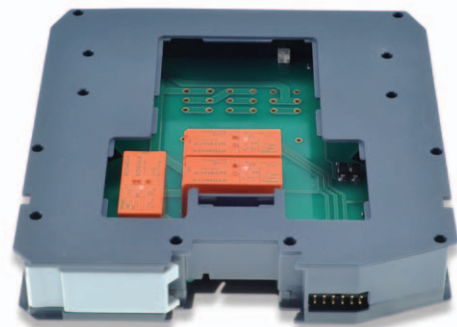
Where with Relay Coil NE we mean an High condition (power on) at the relay coil terminals and with Relay Coil ND we mean the exact opposite (power off).

NC or NO Relay Contacts determine whether power is available to the load under normal operating conditions or not; so that a NC contact will also mean a load Normally Energized and a NO contact will means a load Normally De-Energized.


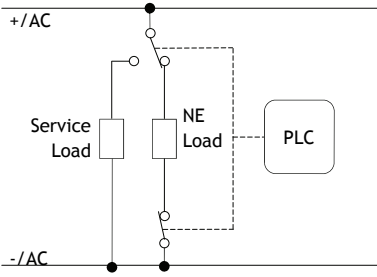
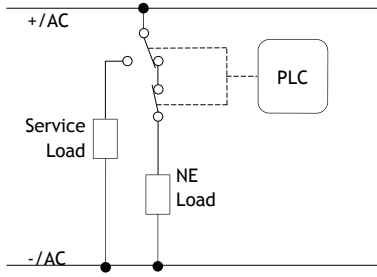

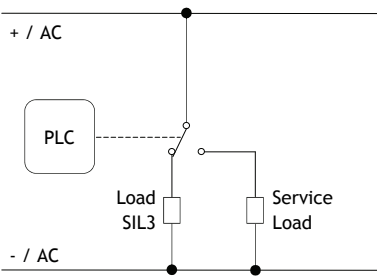
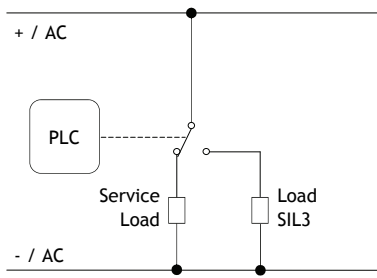

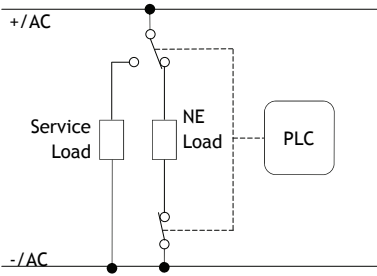
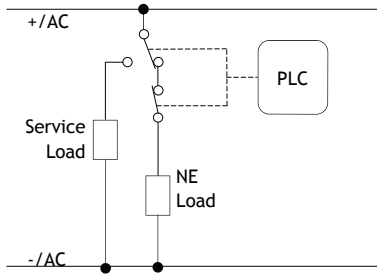

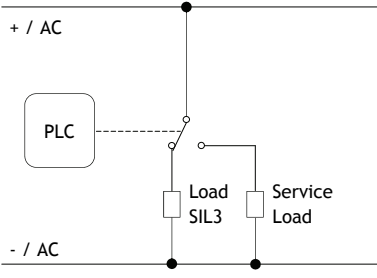
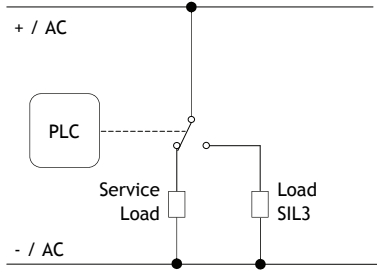
The Safety Function is to revert the above operating conditions; for example in case of NE relay coil and NC relay contacts, it is to disconnect power at the relay coil (Power Off) and consequently disconnect power to the load by opening the relay contacts; This is the most typical SIL 3 relay function for a NE Load.

Other aspects in selecting the safety relay are: the load contacts rating; the number of contacts required to be driven by the same control signal; if a single line or if both line of the load must be switched on or off.


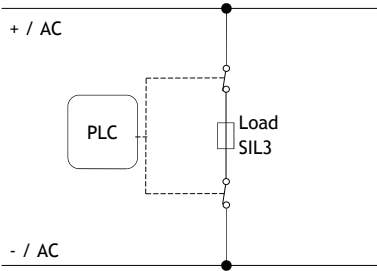
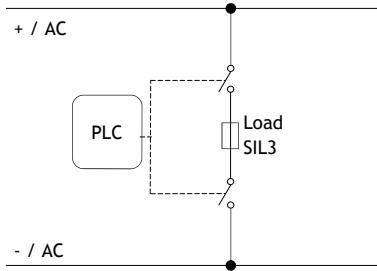

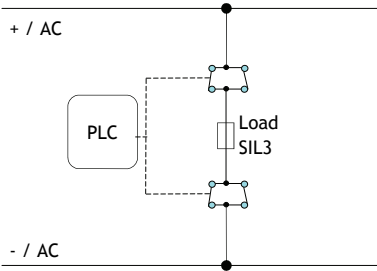
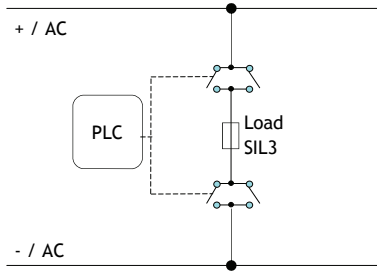

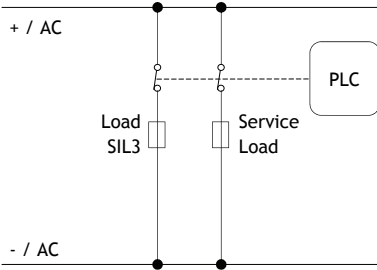
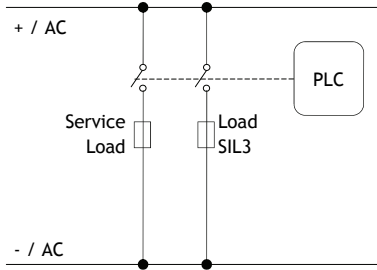

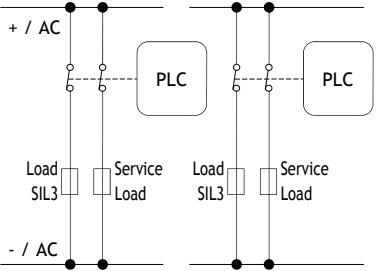
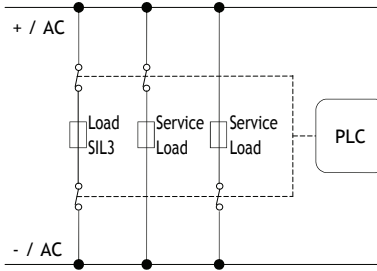
For each of the GMI Safety Relay a data sheet containing schematics of all possible applications as well as coil and contacts rating are available.


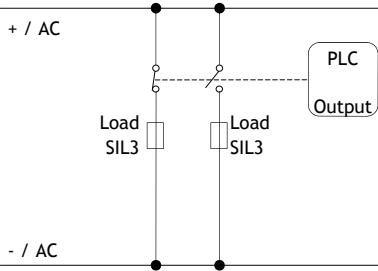
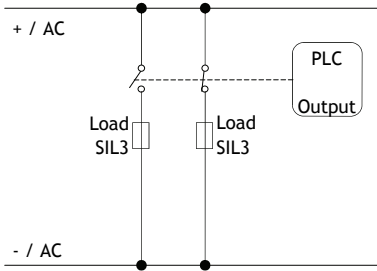

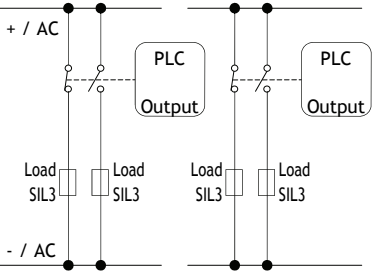
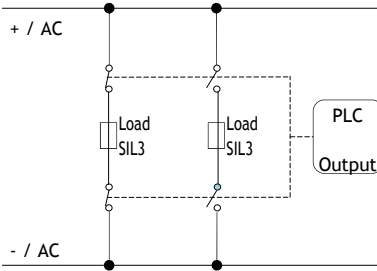

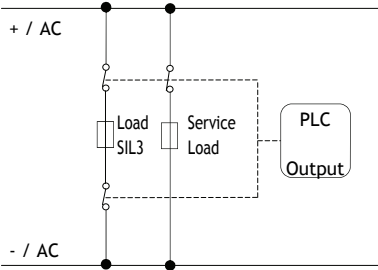
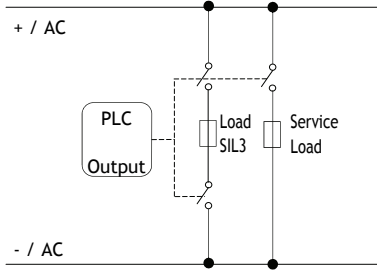


SAFETY RELAYS

Field device	Model	Connections	Connections	Rating	SIL level
	D5090S			4 A 250 Vac 1000 VA 4 A 250 Vdc 120 W	SIL 3
		Relay with NE Coil and Load (1-1). SIL 3 function: disconnect Load by disconnecting input (0-0). Can be used to disconnect one or both supply lines (see figures).		24 Vdc Coil	
	D5091S			4 A 250 Vac 1000 VA 4 A 250 Vdc 120 W	SIL 3
		Relay with ND Coil and ND or NE Load (0-0 or 0-1). SIL 3 function: connect Load by connecting input (1-1) or disconnect Load by connecting input (1-0) (see figures). To disconnect both supply lines, use two D5091S units in parallel.		24 Vdc Coil	
	D5290S			10 A 250 Vac 2500 VA 10 A 250 Vdc 300 W	SIL 3
		Relay with NE Coil and Load (1-1). SIL 3 function: disconnect Load by disconnecting input (0-0). Can be used to disconnect one or both supply lines (see figures).		24 Vdc Coil	
	D5291S			10 A 250 Vac 2500 VA 10 A 250 Vdc 300 W	SIL 3
		Relay with ND Coil and ND or NE Load (0-0 or 0-1). SIL 3 function: connect Load by connecting input (1-1) or disconnect Load by connecting input (1-0) (see figures). To disconnect both supply lines, use two D5091S units in parallel.		24 Vdc Coil	

Field device	Model	Connections	Connections	Rating	SIL level
	D5290S /SA			10 A 250 Vac 2500 VA 10 A 250 Vdc 300 W 24 Vdc Coil	SIL 3
<p>Relay with NE Coil and Load (1-1). SIL 3 function: disconnect Load by disconnecting input (0-0). Can be used to disconnect one or both supply lines (see figures). Installation in safe area only and not compatible with pulse diagnostic.</p>					
	D5290S -078			5 A 250 Vac 1250 VA 5 A 250 Vdc 175 W 24 Vdc Coil	
<p>Relay for NE/ND Load with NE/ND Coil for interrupting up to 4 loads. SIL 3 function: configurable via external wiring. Can be used to disconnect one or both supply lines (see data sheet).</p>					
	D5290S -079			5 A 250 Vac 1250 VA 5 A 250 Vdc 175 W 115 Vac Coil	
<p>Relay for NE/ND Load with NE/ND Coil for interrupting up to 4 loads. SIL 3 function: configurable via external wiring. AC Coil. Can be used to disconnect one or both supply lines (see data sheet).</p>					
	D5290S -080			10 A 250 Vac 2500 VA 10 A 250 Vdc 300 W 115 Vac Coil	
<p>Relay with NE Coil and Load (1-1). AC Coil. SIL 3 function: disconnect Load by disconnecting input (0-0). Can be used to disconnect one or both supply lines (see figures).</p>					

Field device	Model	Load Contacts	Connections	Rating	SIL level		
SAFETY RELAYS		D5293S			10 A 250 Vac 2500 VA 10 A 250 Vdc 300 W	SIL 3	
	Relay with NE Coil and Load (1-1). SIL 3 function: disconnect Load by disconnecting input (0-0). Can be used to disconnect both supply lines (see figures). With smart line and load diagnostic function. RS-485 output.		24 Vdc Coil				
		D5294S			10 A 250 Vac 2500 VA 10 A 250 Vdc 300 W		SIL 3
	Relay with ND Coil and Load (0-0). SIL 3 function: disconnect Load by disconnecting input (0-0). Can be used to disconnect both supply lines (see figures). With smart line and load diagnostic function. RS-485 output.		24 Vdc Coil				
	D1092S			3 A 250 Vac 750 VA 3 A 125 Vdc 120 W	SIL 3		
Relay with NE and ND Coil and Load (1-1 , 0-0). SIL 3 function NE: connect Load by connecting input (1-1). SIL 3 function ND: disconnect Load by disconnecting input (0-0).		24 Vdc Coil					
	D1092D			3 A 250 Vac 750 VA 3 A 125 Vdc 120 W	SIL 3		
Dual channel Relay with NE and ND Coil and Load (1-1 , 0-0). SIL 3 function NE: connect Load by connecting input (1-1). SIL 3 function ND: disconnect Load by disconnecting input (0-0). Can be used to disconnect two loads or both supply lines.		24 Vdc Coil					

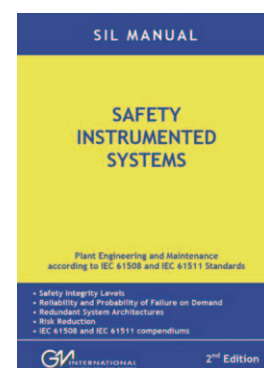
Field device	Model	Load Contacts	Connections	Rating	SIL level	
SAFETY RELAYS		D1092S-069			3 A 250 Vac 750 VA 3 A 125 Vdc 120 W	SIL 3
	Relay with NE Coil and Load (1-1) and ND Coil and NE Load (0-1). SIL 3 function NE: connect Load by connecting input (1-1). SIL 3 function ND: disconnect Load by connecting input (0-1).		24 Vdc Coil			
		D1092D-069			3 A 250 Vac 750 VA 3 A 125 Vdc 120 W	
Relay with NE Coil and Load (1-1) and ND Coil and NE Load (0-1). SIL 3 function NE: connect Load by connecting input (1-1). SIL 3 function ND: disconnect Load by connecting input (0-1). Can be used to disconnect two loads or both supply lines.		24 Vdc Coil				
	D1093S			3 A 250 Vac 750 VA 3 A 125 Vdc 120 W	SIL 3	
Dual channel Relay with NE and ND Coil and Load (1-1 , 0-0). SIL 3 function NE: connect Load by connecting input (1-1). SIL 3 function ND: disconnect Load by disconnecting input (0-0). With line and load diagnostic function.		24 Vdc Coil				

“Safety Instrumented Systems”

The experience in safety and electronics acquired during the years has lead us to the writing of a comprehensive manual on IEC61508 and IEC 61511.

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