# Mark* VIeS Functional Safety Relay Contact Output Module Summary Sheet

The Mark* VIeS Functional Safety Relay Contact Output module provides an interface between the discrete process actuators (12 discrete outputs), relay contact outputs, and the Mark VIeS Safety control logic. The Relay Contact Output module consists of two orderable parts: the discrete output I/O pack and the relay contact output terminal board. All safety discrete/contact output modules use the same I/O pack, IS420YDOAS1B. Multiple DIN-rail mounted terminal boards and I/O contact wetting/fusing daughterboards are available to provide the necessary contact voltages, contact wetting and fusing configurations, redundancy, and terminal block styles.

The Relay Contact Output module is available in both Simplex and Triple Modular Redundant (TMR) configurations. Users can select the configuration that best addresses their needs for availability and SIL level. This document discusses the Simplex Relay Contact Output (SRLY) terminal board and optional daughterboards for contact wetting and fusing, and the Contact Output (TRLY) terminal board. The TRLY terminal board offers TMR capability, but it can also be used in a Simplex configuration using a single YDOA I/O pack. In a TMR I/O configuration, the I/O terminal board performs 2-out-of-3 voting on the discrete outputs.

Simplex Relay Contact Output (SRLY) Terminal Board
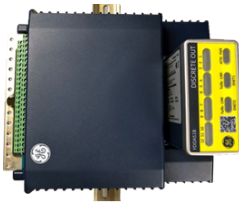
Simplex Relay Contact Output Module

The SRLY terminal board is a simplex S-type terminal board that provides 12 Form-C relay output circuits through 48 customer terminals. The YDOA mounts directly on the SRLY terminal board. The SRLYS2A is available to meet customer safety requirements and there are three available optional daughterboards for contact wetting (WROx) that connect to the SRLYS2A. The *SRLY Terminal Board with YDOA I/O Pack Specifications table* provides the specifications for the SRLYS2A terminal board and daughterboard versions available for use in the Mark VIeS Functional Safety System.

Contact Output (TRLY) Terminal Board

Simplex Relay Contact Output Module

TMR Relay Contact Output Module

The TRLY terminal board is a relay output terminal board used for Simplex or TMR configurations. The TRLY provides integrity feedback on each relay circuit. The YDOA I/O pack(s) mount directly on the TRLY terminal board. The TRLY is available in multiple versions to meet customer requirements. The *TRLY Terminal Board with YDOA I/O Pack Specifications table* provides the specifications for the TRLY versions available for use in the Mark VIeS Functional Safety System.

For more information on the YDOA I/O pack, the SRLY terminal board and optional daughterboards, and the TRLY terminal board, refer to the *Mark VIeS Functional Safety Systems for General Market Volume II System Guide for General-purpose Applications* (GEH-6855_Vol_II), the chapter *YDOA Discrete Output Modules*.

SRLY Terminal Board with YDOA I/O Pack Specifications

Item	Terminal Board	Optional Daughterboard for Relay Contact Wetting/Fusing		
	IS410SRLYS2A	IS400WROBH1A	IS400WROFH1A	IS400WROGH1A
Product Name	Mark VIeS Form-C relay Output	Contact Wetting Daughterboard	Contact Wetting Daughterboard	Contact Wetting Daughterboard
Life-cycle Status	Active	Active	Active	Active
I/O Pack Redundancy	Simplex	—	—	—
I/O Pack	IS420YDOAS1B (qty 1) (order separately)	—	—	—
Number of Channels	12 Form-C relays (12 DO)	—	—	—
Contact Ratings	0.6 A at 125 V dc 1.2 A at 48 V dc 2.25 A at 24 V dc 2.25 A at 120 / 240 V ac	—	—	—
I/O Contact Wetting & Fusing Configuration	Form-C contacts, dry, no fusing	Contacts 1-6 wetted & dual-fused for Solenoids; Contacts 7-11 dry Form-C, Contact 12 separate I/O wetting	Form-C, no wetting, single fuse in series with each relay common	All 12 relays contacts wetted, single fuse in series with each relay common
I/O Wetting Power Connector	No wetting plug, dry contacts without WROx	Mate-N-Lok receptacle (AMP 350766-1)		
Field Wiring Terminal Block	Euro style box-type terminal blocks	—	—	—
Field Wiring	24 AWG min, 12 AWG max	—	—	—
I/O Scan Time	Configured frame rate of the controller determines I/O scan rate for control	—	—	—
Sequence of Events (SOE)	Configurable for SOE of relay feedbacks	—	—	—
Diagnostic Fault Detection	Power-up self test, I/O pack health, checks commanded output vs feedback, loss of wetting voltage and open fuse detection with WROx, and incorrect terminal board check	Open fuse monitoring via I/O pack diagnostics		
Output Line Monitoring	No	—	—	—
I/O Pack DC Control Power	24 / 28 V dc, 19.8 W max, includes power to drive output relay coils	—	—	—
I/O Pack DC Power Connector	Micro Mate-N-Lok receptacle (AMP 1445022-3)	—	—	—
I/O Pack Construction	Aluminum case	—	—	—
I/O Pack Health	Visual status LEDs, circuit health variables available to control logic	—	—	—
Termination Module Dimensions (includes cover and I/O pack) (H x W x D)	17.0 x 24.9 x 15.3 cm (6.7 x 9.4 x 6.0 in)	Mounts inside IS410SRLYS2A module		
Safety Rated	Yes, compliant with IEC 61508	Non-interferring I/O wetting distribution		
Hazardous Locations Capability	Class 1, Div 2 / Class 2, Zone 2 / ATEX For ratings and further details, refer to the *Mark VIeS Functional Safety System Equipment in Hazardous Locations (HazLoc) Instruction Guide* (GEH-6861).			

Item	Terminal Board	Optional Daughterboard for Relay Contact Wetting/Fusing		
	IS410SRLYS2A	IS400WROBH1A	IS400WROFH1A	IS400WROGH1A
G3 Compliant	Yes			
Ambient Operational Temperature	-40 to 70°C (-40 to 158 °F)			
Storage Temperature	-40 to 85°C (-40 to 185 °F)			
Mounting Method	DIN-rail mounted	Daughterboard		
I/O Pack Replacement Part Number	IS420YDOAS1B			
Terminal Board Part Number	IS410SRLYS2A			
Wetting Daughterboard Replacement Part Number	—	IS400WROBH1A	IS400WROFH1A	IS400WROGH1A
Module Cover Replacement Part Number	151X1202YE04PP05BL	—	—	—

IS420YDOAS1B I/O Pack

IS410SRLYS2A Terminal Board

IS400WROBH1A Daughterboard

IS400WROFH1A Daughterboard

IS400WROGH1A Daughterboard

TRLY Terminal Board with YDOA I/O Pack Specifications

Item	Terminal Board		
	IS410TRLYS1B	IS410TRLYS1D	IS410TRLYS1F / S2F
Product Name	Mark VIeS Relay Output with Coil Sensing	Mark VIeS Relay Output with Solenoid Integrity Sensing	Mark VIeS Relay Output with TMR Contact Voting
Life-cycle Status	Active	Active	Active
I/O Pack Redundancy	Simplex or TMR	Simplex or TMR	TMR
I/O Pack	IS420YDOAS1B (qty 3 or 1) (order separately)	IS420YDOAS1B (qty 3 or 1) (order separately)	IS420YDOAS1B (qty 3) (order separately)
Number of Channels	12 Form-C relays (12 DO)	6 NO relays, with load integrity monitoring	S1F - 12 NO Relays (Form-A), TMR voted contacts S2F - 12 NC Relays (Form-B), TMR voted contacts
Contact Ratings	0.6 A at 125 V dc 1.2 A at 48 V dc 8 A at 24 V dc 3 A at 120 / 240 V ac	0.5 A at 125 V dc 2.25 A at 24 V dc	2.25 A at 24 V dc
I/O Contact Wetting & Fusing Configuration	Contacts 1-6 wetted & dual fused for solenoids, Contacts 7-11 dry Form-C, Contact 12 separate I/O wetting	6 NO solenoid contacts, dual fused	Dry Contacts
I/O Wetting Power Connector	Mate-N-Lok receptacle (AMP 350766-1)		
Field Wiring Terminal Block	Barrier-type terminal blocks		

Item	Terminal Board		
	IS410TRLYS1B	**IS410TRLYS1D**	**IS410TRLYS1F / S2F**
Field Wiring	24 AWG min, 12 AWG max		
I/O Scan Time	Configured frame rate of the controller determines I/O scan rate for control		
Sequence of Events (SOE)	Configurable for SOE of relay feedbacks		
Diagnostic Fault Detection	Power-up self test, I/O pack health, checks commanded output vs feedback, loss of contact wetting voltage, open fuse detection, and incorrect terminal board check	Power-up self test, I/O pack health, solenoid resistance measured to detect open and short circuits, loss of contact wetting voltage, open fuse detection, and incorrect terminal board check	Power-up self test, I/O pack health, checks commanded output vs feedback, and incorrect terminal board check
Contact Output Line Monitoring	No	Solenoid integrity sensing; refer to GEH-6855_Vol_II, the section *TRLYS1D Relay Output with Solenoid Integrity Sensing*.	No
I/O Pack DC Control Power	24 / 28 V dc, 19.8 W max, includes power to drive output relay coils		
I/O Pack DC Power Connector	Micro Mate-N-Lok receptacle (AMP 1445022-3)		
I/O Pack Construction	Aluminum case		
I/O Pack Health	Visual status LEDs, circuit health variables available to control logic		
Termination Module Dimensions (includes cover and I/O pack) (H x W x D)	34.0 x 24.9 x 15.3 cm (13.4 x 9.4 x 6.0 in)		
Safety Rated	Yes, compliant with IEC 61508		
Hazardous Locations Capability	Class 1, Div 2 / Class 2, Zone 2 / ATEX For ratings and further details, refer to the *Mark VIeS Functional Safety System Equipment in Hazardous Locations (HazLoc) Instruction Guide* (GEH-6861).		
G3 Compliant	Yes		
Ambient Operational Temperature	-40 to 70°C (-40 to 158 °F)		
Storage Temperature	-40 to 85°C (-40 to 185 °F)		
Mounting Method	DIN-rail mounted		
I/O Pack Replacement Part Number	IS420YDOAS1B		
Terminal Board Part Number	IS410TRLYS1B	IS410TRLYS1D	IS410TRLYS1F / IS410TRLYS2F
Module Cover Replacement Part Number	151X1202YE08PP18BL	151X1202YE08PP18BL	151X1202YE08PP14BL / 151X1202YE08PP14BL

IS420YDOAS1B I/O Pack

IS410TRLYS1B Terminal Board

IS410TRLYS1D Termination Board

IS410TRLYS1F Termination Module