SOLENOID / ALARM DRIVER

- **Universal Ex driver for solenoids, acoustic alarms and LEDs**
- **Extended self-diagnostics**
- **1 or 2 channels**
- **Can be supplied separately or installed on power rail, PR 9400**
- **SIL 2-certified via Full Assessment**

Advanced features

- Universal Ex driver for the control of solenoids etc. with various Ex data by way of three built-in Ex barriers.
- Two hardware versions make it possible to choose either Low (35 mA) or High (60 mA) current output.
- Configuration and monitoring by way of detachable display front (PR 4501).
- Selection of direct or inverted function for each channel via PR 4501 and the possibility of reducing the output current to the hazardous area to suit the application.
- Optional monitoring of the output current to the hazardous area by way of PR 4501.
- Optional redundant supply via power rail and/or separate supply.

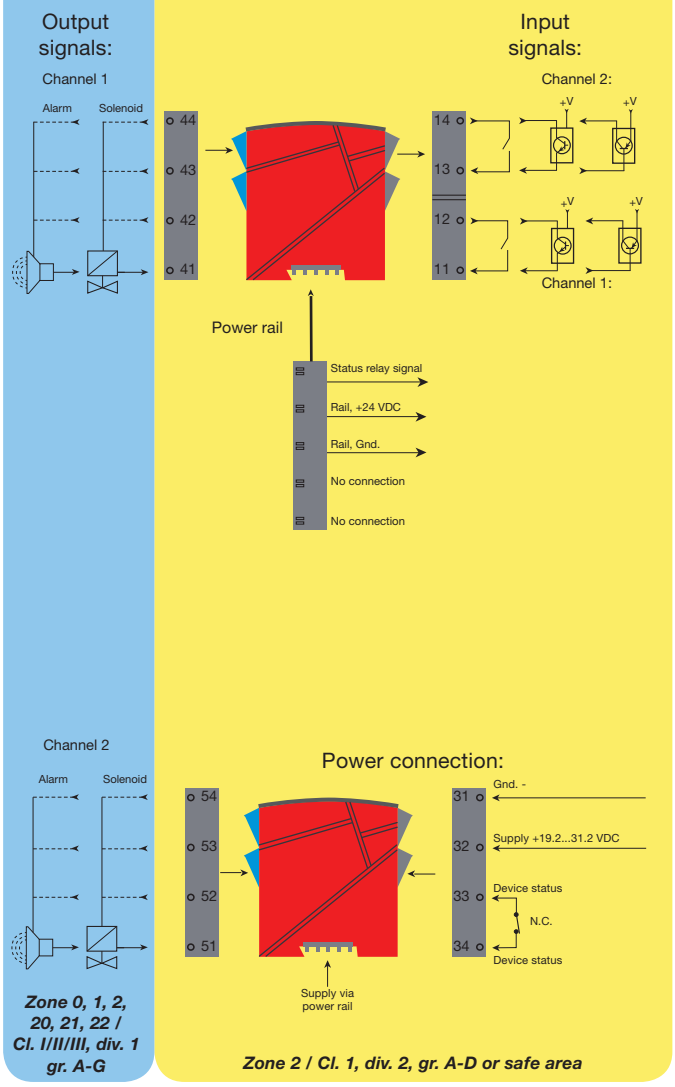
Application

- The device can be mounted in the safe area and in zone 2 / div. 2 and transmit signals to zone 0, 1, 2, 20, 21 and 22.
- Ex driver for the control of ON / OFF solenoids, acoustic alarms and LEDs mounted in the hazardous area.
- The 9203 is controlled by an NPN/PNP signal or a switch signal.
- Monitoring of internal error events via the individual status relay and/or a collective electronic signal via the power rail.
- The 9203 has been designed, developed and certified for use in SIL 2 applications according to the requirements of IEC 61508.

Technical characteristics

- 1 green and 2 yellow/red front LEDs indicate operation status and malfunction.
- 2.6 kVAC galvanic isolation between input, output and supply.

APPLICATIONS



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Order 9203B

Type	Ex barrier [Ex ia]	Channels
9203B	Low current . . . : 1	Single . . . : A Double . . : B
	High current.. . . . : 2	Single . . . : A

Order codes:

4501 = Display / programming front
9400 = Power rail

PR 4501 Display / programming front

Application

- Communications interface for modification of operational parameters in 9203.
- When mounted in the process, the display shows process values and device status.

Technical characteristics

- LCD display with 4 lines; Line 1 (H=5.57 mm) shows status for each channel (OK or error). Line 2 (H=3.33 mm) shows output for channel 1 (ON / OFF), line 3 (H=3.33 mm) shows output for channel 2 (ON / OFF), and line 4 shows whether the device is SIL-locked. Static dot = SIL-locked and flashing dot = not SIL-locked. Line 4 also indicates if the outputs is active.
- In order to protect the configuration against unauthorised changes, access to the menus can be blocked by a password.

Mounting / installation

- Click 4501 onto the front of 9203.

Electrical specifications:

Specifications range ..... -20...+60°C
Storage temperature ..... -20...+85°C

Common specifications:

Supply voltage ..... 19.2...31.2 VDC
Max. consumption ..... ≤ 3.5 W (2 channels)
Fuse ..... 1.25 AT SB / 250 VAC
Isolation voltage, test / operation:
Input / output / supply ..... 2.6 kVAC / 250 VAC
Output 1 to output 2 ..... 1.5 kVAC / 150 VAC reinforced
Status relay to supply ..... 1.5 kVAC / 150 VAC reinforced
Communications interface ..... Programming front 4501
Calibration temperature ..... 20...28°C

EMC immunity influence ..... < ±0.5% of span
Extended EMC immunity:
NAMUR NE 21, A criterion, burst ..... < ±1% of span

Wire size (min....max.) ..... 0.13...2.08 mm² / AWG 14...26 stranded wire
Screw terminal torque ..... 0.5 Nm
Relative humidity ..... < 95% RH (non-cond.)
Dimensions, without 4501 (HxWxD) .. 109 x 23.5 x 104 mm
Dimensions, with 4501 (HxWxD) ..... 109 x 23.5 x 116 mm
Protection degree IP20
Weight ..... 170 g / 185 g with 4501

NPN and mechanical switch:

Trig level LOW ..... ≤ 2.0 VDC
Trig level HIGH ..... ≥ 4.0 VDC
Max. external voltage ..... 28 VDC
Input impedance ..... 3.5 kΩ

PNP:

Trig level LOW ..... ≤ 8.0 VDC
Trig level HIGH ..... ≥ 10.0 VDC
Max. external voltage ..... 28 VDC
Input impedance ..... 3.5 kΩ

Outputs:

Output ripple ..... < 40 mV RMS

Relay output:

Status relay in safe area:
Max. voltage ..... 125 VAC / 110 VDC
Max. current ..... 0.5 A AC / 0.3 A DC
Max. power ..... 62.5 VA / 32 W

Ex / I.S. approvals:

IECEx certificate ..... KEM 09.0001X
ATEX certificate ..... KEMA 07ATEX0147 X
FM certificate ..... 3035277 / 3035277C

Marine approval:

Det Norske Veritas, Ships & Offshore .. Pending

GOST R approval:

VNIIFTRI, Cert No. ..... Pending

SIL certification:

exida, Cert. No ..... PREI 070902 P0002 C04

Observed authority requirements:	**Standard:**
EMC 2004/108/EC	EN 61326-1
LVD 2006/95/EC	EN 61010-1
ATEX 94/9/EC	EN 60079-0, -11, -15 , -26 and EN 61241-0, -11
IECEx	IEC 60079-0, -11, -15, -26 IEC 61241-0 and -11
c FM us	FM 3600, 3611, 3810 CSA E60079-0, -15 CSA 22.2 -25, -142, -213 ANSI/ISA-12.00.01 / 12.12.02
UL, Standard for Safety	UL 61010-1
SIL	IEC 61508

	9203B1A / 9203B1B									**9203B2A**								
	Terminal 41-42 / 51-52			Terminal 41-43 / 51-53			Terminal 41-44 / 51-54			Terminal 41-42			Terminal 41-43			Terminal 41-44		
Uo	28 V			28 V			28 V			28 V			28 V			28 V		
Io	93 mA			100 mA			110 mA			115 mA			125 mA			135 mA		
Po	0.65 W			0.70 W			0.77 W			0.81 W			0.88 W			0.95 W		
Vout. no load	Min. 24 V			Min. 24 V			Min. 24 V			Min. 24 V			Min. 24 V			Min. 24 V		
Vout. with load	Min. 12.5 V			Min. 13.5 V			Min. 14.5 V			Min. 11.5 V		Min. 9 V	Min. 12.5 V		Min. 10 V	Min. 13.5 V		Min. 11 V
Iout. max	35 mA			35 mA			35 mA			50 mA		60 mA	50 mA		60 mA	50 mA		60 mA
	IIC	IIB	IIA	IIC	IIB	IIA	IIC	IIB	IIA	IIC	IIB	IIA	IIC	IIB	IIA	IIC	IIB	IIA
Co	80 nF	640 nF	2.1 µF	80 nF	640 nF	2.1 µF	80 nF	640 nF	2.1 µF	80 nF	640 nF	2.1 µF		640 nF	2.1 µF		640 nF	2.1 µF
Lo	4.2 mH	16.8 mH	32.6 mH	3.5 mH	14.2 mH	27.6 mH	2.9 mH	11.8 mH	22.8 mH	2.69 mH	10.8 mH	20.8 mH		9.1 mH	17.6 mH		7.8 mH	15.1 mH
Lo/Ro	54 µH/Ω	218 µH/Ω	436 µH/Ω	50 µH/Ω	201 µH/Ω	402 µH/Ω	46 µH/Ω	184 µH/Ω	369 µH/Ω	44 µH/Ω	176 µH/Ω	353 µH/Ω		163 µH/Ω	327 µH/Ω		150 µH/Ω	301 µH/Ω

			IEC 61326		NAMUR NE21 : 2007		IEC 61326-3-1		PR standard specifications	
Port	Phenomenon	Test standard	Test value	Criterion	Test value	Criterion	Test value for safety funtions	Criterion	Test value	Criterion
Enclosure	ESD input terminals	IEC 61000-4-2	4 kV Contact	B	6 kV Contact	B	6 kV Contact	FS	6 kV Contact	B
	ESD	IEC 61000-4-2	4 kV/8 kV Contact/Air	B	6 kV / 8 kV Contact / Air	A	6 kV / 8 kV Contact / Air	FS	6 kV / 8 kV Contact / Air	A 1%
	HF field	IEC 61000-4-3	10 V/m, 80...1000 MHz 3 V/m, 1.4...2 GHz 1 V/m, 2...2.7 GHz	A	10 V/m, 80...1000 MHz 3...10 V/m, 1.4...2 GHz	A	20 V/m, 80...1000 MHz 10 V/m, 1.4...2 GHz 3 V/m, 2...2.7 GHz	FS	20 V/m, 80...1000 MHz 10 V/m, 1.4...2 GHz 3 V/m, 2...2.7 GHz	A 0.5%
	Magnetic field	IEC 61000-4-8	30 A/m	A	100 A/m	A	30 A/m	FS	30 A/m	A 0.5%
DC power	Burst	IEC 61000-4-4	2 kV	B	2 kV	A	4 kV	FS	4 kV	A 1.0%
	Surge	IEC 61000-4-5	1 kV / 2 kV, Diff./Comm. 0 Ω/10 Ω	B	0.5 kV / 1 kV, Diff. / Comm. 0 Ω/10 Ω	A	1 kV / 2 kV, Diff. / Comm. 0 Ω/10 Ω	FS	1 kV / 2 kV, Diff. / Comm. 0 Ω / 10 Ω	A 1.0%
	Conducted RF	IEC 61000-4-6	3 V, 150 kHz...80 MHz	A	10 V, 10 kHz...80 MHz Covers RF + LF	A	10 V, 150 kHz...80 MHz	FS	10 V, 150 kHz...80 MHz	A 0.5%
	Interruptions	IEC 61000-4-29	60% for 10 ms 100% for 20 ms	B	100% for 20 ms	B	60% for 10 ms 100% for 20 ms	FS	60% for 10 ms 100% for 20 ms	B
	Conducted LF	IEC 61000-4-16	Not required		Not required		1,5...15 kHz, 1...10 V 15....150 kHz, 10 V 50/60 Hz, 100 V	FS	15 Hz....150 kHz, 10 V 50 Hz, 300 Ω, 230 V	A 0.5%
I/O signal	Burst	IEC 61000-4-4	2 kV	B	2 kV	A	15....150 kHz, 10 V	FS	2 kV	A 1.0%
	Surge input	IEC 61000-4-5	1 kV / 2 kV, Diff. / Comm. 40 Ω	B	0.5 kV / 1 kV, Diff. / Comm. 40 Ω	B	50/60 Hz, 100 V	FS	1 kV / 2 kV Diff. / Comm. 40 Ω	B
	Surge output	IEC 61000-4-5	1 kV / 2 kV, Diff. / Comm. 40 Ω	B	0.5 kV / 1 kV, Diff. / Comm. 40 Ω	B	2 kV Comm. 40 Ω	FS	1 kV / 2 kV Diff. / Comm. 40 Ω	A 1.0%
	Conducted RF	IEC 61000-4-6	3 V	A	10 V, 10 kHz...150 kHz	A	10 V, 150 kHz...80 MHz	FS	10 V 150 kHz...100 MHz	A 0.5%
	Conducted LF	IEC 61000-4-16	Not required		Not required		1,5...15 kHz, 1...10 V 15....150 kHz, 10 V 50/60 Hz, 100 V	FS	15 Hz....150 kHz, 10 V 50 Hz, 300 Ω, 230 V	A 0.5%

9000 EMC specifications - immuninty:

	Essential operation (functional safety)	Continuous unmonitored operation	Continuous monitored operation	Non-continuous operation
ESD IEC 61000-4-2	A	B	B	C
EM IEC 61000-4-3	A	A	A	B
Burst IEC61000-4-4	A	B	B	B
Surge IEC 61000-4-5	A	B	B	C
Conducted RF IEC 61000-4-6	A	A	A	C
Voltage interrupts IEC 61000-4-11	A	B	C	C
Note For type testing, it is highly recommended that performance criteria A be chosen for all phenomena and all tests. However, performance criteria B and/or C may be accepted provided that both the specification and the test report highlight such deviation(s) for the relevant combination(s) of function and test.				

Specified function	Normal test level	Increased test level
Normal function	Normal specification (performance criteria A; B; C)	May fail
Safety function	Performance criteria - A, or - B + observed deviation + recovery time to be documented in the data sheet, or - C + observed behaviour documented in the data sheet	Performance criteria FS (i.e. no effect outside the specification, or defined state)

A: During testing, normal performance within the specification limits.

B: During testing, temporary degradation, or loss of function or performance which is self recovering.

C: During testing, temporary degradation, or loss of function or performance which requires operator intervention or system reset occurs.

9000 EMC specifications - emission:

Class B equipment		Standard CISPR 22	
Disturbance	Test method	Frequency range	Limits
Radiated	Quasi-peak	30 to 230 MHz	30 dB (µV/m)
		230 to 1000 MHz	37 dB (µV/m)
Conducted	Quasi-peak	0.15...0.50 MHz	40 to 30 dB (µA)
	Average		30 to 20 dB (µA)
	Quasi-peak	0.50 to 30 MHz	30 dB (µA)
	Average		20 dB (µA)