

■ GENERAL

ProSafe-SLS is a Safety Instrumented System specially designed for applications which require the highest Safety Integrity Levels (SIL 3 and SIL 4)

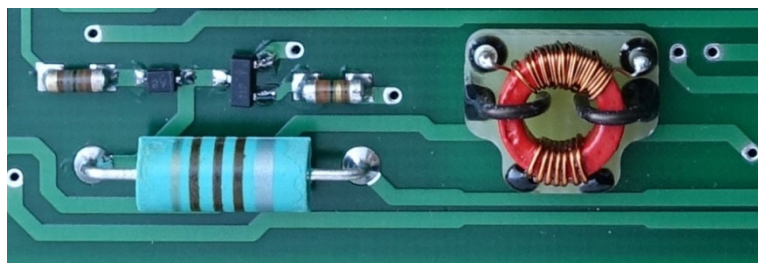
The SLS (Solid State Logic Solver) System was designed with the objective of establishing an uncompromising safeguarding system: one which would meet the highest Safety Integrity Levels, and whose performance could be verified.



The SLS magnetic core technology

The effect of this unique technology is to render ProSafe-SLS inherently fail-safe – the self-testing nature of the basic circuit means it will always be fail safe, without the need for additional test or diagnostic circuits. The logical signal status, which reflects the 'safe' condition of critical process parameters, is represented by pulse-trains. In this way all the circuits remain dynamic continuously, during normal operation.

Logic functions are processed by bi-stable magnetic core elements, which have inherent fail-safe characteristics. Amplifying transistors serve only to restore any energy lost by the pulse-train as they pass through these magnetic logic elements



■ General Specifications

Item		Specifications	Remarks
Mechanical	Board size	Single Euro (160 x 100 mm)	Except the SR-508
	Width	3HP or 6HP (15.24 or 30.48 mm)	AI-917 is 4HP (20.32 mm)
	Connector	IEC 60603-2 (DIN 41612) Type F 48 contacts	SR-508 connection through screw terminals
	Identification	On front panel and more detailed on connector label	SR-508 label on housing
Environmental	Operating temperature	-20 to +70 °C	Except the AI-917 ¹
	Transportation and storage temperature	-25 to +85 °C	
	Humidity	Max. 95%, no condensation	Except the AI-917 ²
	Static immunity	Air up to 8000 V Contact up to 4000 V	
	Field immunity	10 V/m 80 MHz – 1 GHz 3 V/m 1.4 GHz – 2.0 GHz 1 V/m 2.0 GHz – 2.7 GHz	
	Electrical immunity Power input	2000 V fast transient 500 V surge immunity 3 V 0.15 MHz – 80 MHz RF conducted	
	Vibration	Frequency: 10 – 55 Hz Displacement: 0.35mm Sweep rate: 1 octave / min. 3 axis	
	Shock	Acceleration: 10g Pulse length: 16 msec. 1000 pulses, positive and negative direction	
	Altitude	2000 meters above sea level or less	
Electrical	External Power supply	24 Vdc ± 10%	
	Internal 24V supply	24 Vdc ± 1%	Front panel adjustable
	Internal Logic supply	20 Vdc ± 1%	Front panel adjustable
	Internal COM supply	8 Vdc ± 0.5 V	
	System Clock	A and B Voltage Pulse ³	Difference between A and B pulse is the phase relation
	High Level	16 – 20 V	
	Frequency	998 – 999 Hz	
	Pulse width	3.5 – 3.8 µsec.	
	Pulse rise time	150 – 450 nsec.	
	Phase relation	180°	
	Withstanding voltage	500 V DC	Between galvanic isolated parts. ^{4 5}
Maximum allowed dissipation	3HP	2.5 W	
	6HP	10 W	

¹ Above 60 °C lowered accuracy (add 0.2 %) and above 50 °C loss of LCD display functionality. LCD display recovers below 50 °C

² Maximum is 75 %, 95 % allowed for 30 days/year, AI-917 is tested at 95 %

³ Values depend on the clock load

⁴ The SR-508 withstanding voltage is higher.

⁵ To prevent ESD build-up some boards have a 1 MΩ resistor between galvanic isolated parts.

■ Applicable Standards

	Standard	Description
Functional Safety	IEC 61508:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems
EMC	IEC 61326-1:2013	Equipment for measurement, control and laboratory use (immunity Table 2 industrial, emission CISPR 11, group 1, Class A Industrial)
	IEC 61000-6-7:2014	Generic standards – Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations
	EN 55011:2009 EN 55011+A1:2010	Emission – Industrial, Scientific and Medical (ISM) equipment
	TR CU 020/2011	Electromagnetic compatibility of technical equipment
Immunity	IEC 61000-4-2:2009	Electrostatic discharge immunity test
	IEC 61000-4-3:2006 IEC 61000-4-3+A1:2008 IEC 61000-4-3+A2:2010	Radiated RF electromagnetic field immunity test
	IEC 61000-4-4:2012	Electrical fast transient/burst immunity test
	IEC 61000-4-5:2014	Surge immunity test
	IEC 61000-4-6:2014	Immunity to RF conducted disturbances
	IEC 61000-4-8:2010	Power frequency magnetic field immunity test
	IEC 61000-4-29:2000	Voltage dips, short interruptions and voltage variations on d.c. input power port immunity test
Environmental	IEC 60068-2-30:2005	Damp heat test
	IEC 60068-2-52:1996	Dry heat test
	IEC 60068-2-1:2007	Low temperature test
	IEC 60068-2-6:2007	Vibration test according
	IEC 60068-2-27:2008	Shock test according
Explosion protection	IECEX IEC 60079-0:2011 ed.6.0 IEC 60079-15:2010 ed. 4	Ex nA IIC T4 Gc
	ATEX EN 60079-0:2012 EN 60079-15:2010	II 3 G Ex nA IIC T4 Gc
	TR CU 012/2011	Safety of equipment in explosion hazardous environment

■ Contact information

Yokogawa Europe B.V.
Euroweg 2, 3825 HD, Amersfoort.
PO Box 163, 3800 AD, Amersfoort.
The Netherlands
Tel: +31 (0) 88 464 1000
Fax: +31 (0) 88 464 1111
Email: info@nl.yokogawa.com

For more information:
www.yokogawa.com