NOVARIS

Surge Protection for Hazardous Areas

(0009-V5V5)

Intrinsic Safety (Ex ia)

When instrumentation is installed in a potentially explosive environment steps must be taken to ensure that there is no possible way a spark could cause ignition and hence an explosion of the gas, powder or dust that makes up the explosive atmosphere.

One way of ensuring this is to limit the available electrical energy in the explosive environment to levels below which ignition can take place. This technique is called intrinsic safety (IS). This is achieved by placing an energy limiting IS barrier at the boundary between the safe area (non-explosive) and hazardous area (explosive). Then all equipment in the hazardous area must be approved for connection or be defined as simple apparatus.

IS barriers and field instruments are just like any other piece of electronics susceptible to damage from surges and transients due to power faults or nearby lightning strikes.

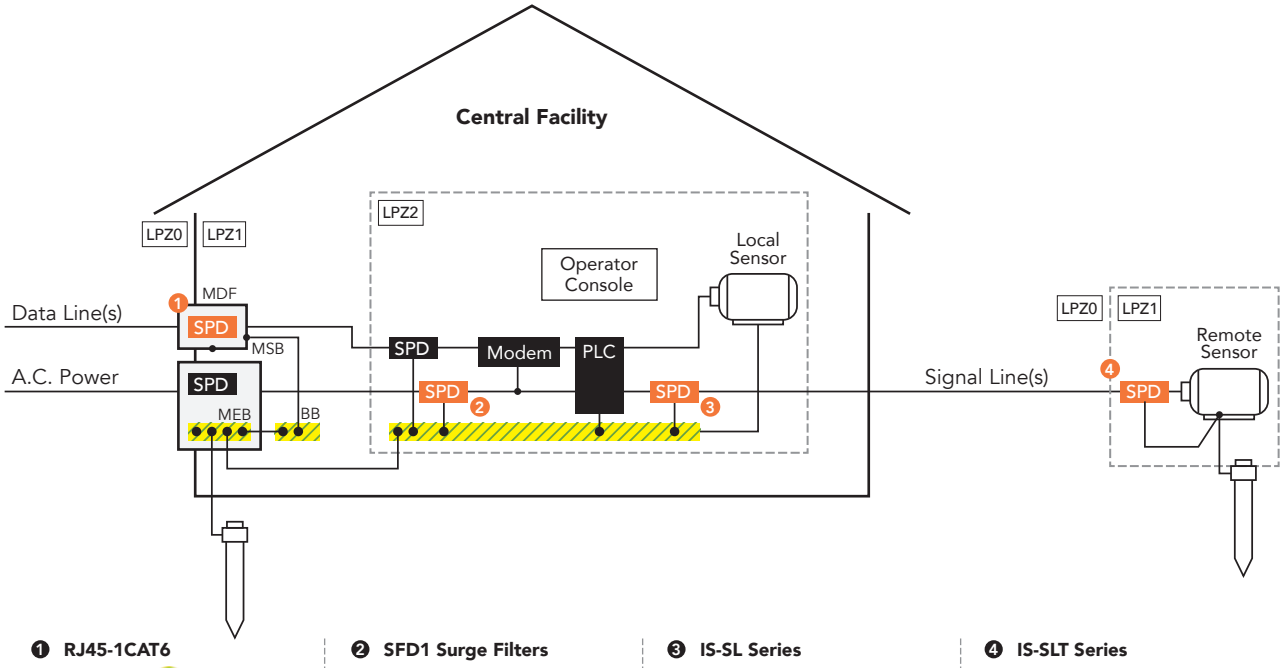
The Novaris range of IS surge protectors and IS instrument protectors are certified for connection to IS circuits on the hazardous side of the IS barrier and directly to instruments located in hazardous or explosive environments. They provide surge protection to the IS barriers and field instruments.

Flameproof Equipment (Ex d)

Flameproof equipment refers to an apparatus designed to ensure that internal ignition within a flammable atmosphere will not transmit outside the protective enclosure. Flameproof equipment prevents the ignition of surrounding flammables in the hazardous area. Flameproof is a preferred protection method when electrical equipment potentially contains high energy arcing or sparking components in standard operation. Furthermore, these high-energy components form explosions that are difficult to avoid.

The terms 'explosion-proof' and 'flameproof' are often interchangeable. Although there are subtle differences, engineers and the safety market generally use both terminologies to refer to the same thing.

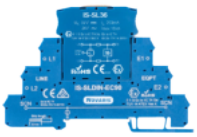
Novaris IS-SLT instrument surge protectors are certified both intrinsically safe (Ex ia) and explosion-proof (Ex d). An IS-SLT instrument protector screwed into an Ex d enclosure will not compromise the enclosure's Ex d rating.



❶ RJ45-1CAT6

❷ SFD1 Surge Filters

❸ IS-SL Series



❹ IS-SLT Series

Placement of SPDs

SPDs are placed at lightning protection zones boundaries (LPZ). Lightning protection zone zero (LPZ0) indicates any area that may be exposed to a direct lightning strike, hence the SPD placed at a main switchboard with the incoming service line passing through LPZ0 is at the boundary of LPZ0/1.

Services in LPZ1 are only likely to experience induced surge voltages. To further reduce these voltages SPDs are placed at the boundary of LPZ1/2 which may be a distribution switchboard or the power entry to a server room.

Final stage SPDs are placed in equipment cabinets where both power and signal cables terminate. It is essential that the protective earths (PE) of all SPDs whether power or signal, are common as the figure above indicates.

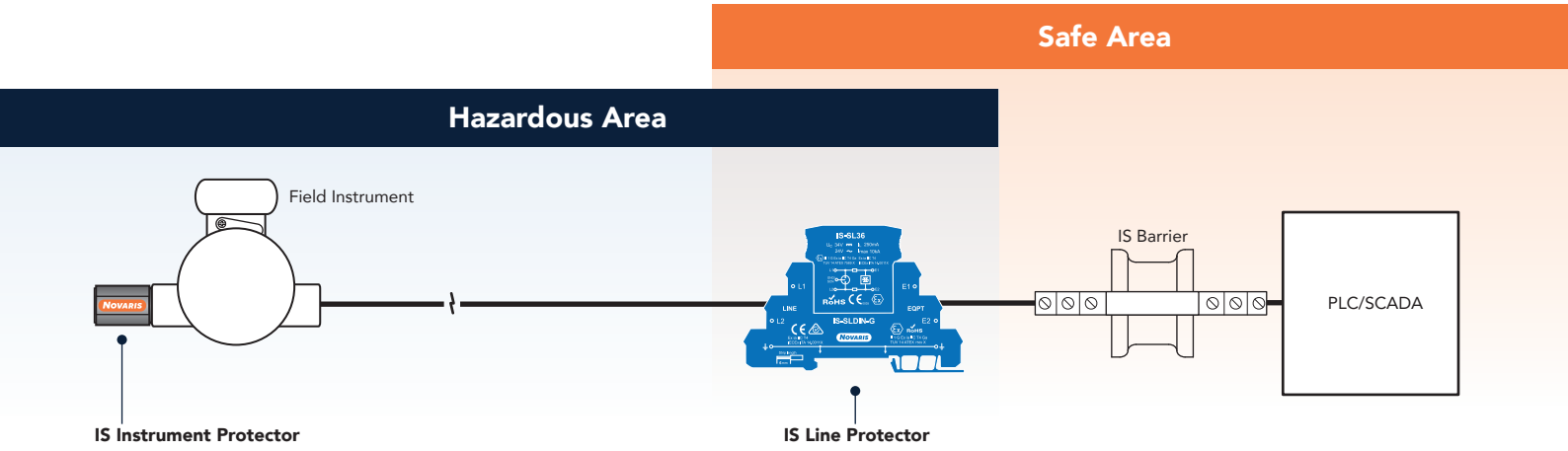
Intrinsically Safe Surge Protection

Surge protection is often overlooked during the design and installation phases of process control systems. Experience shows that emphasis is often placed on the installation of structural lightning protection with the philosophy that this protects not only the structure, but the process control hardware. This has frequently been disproved by failure and damage to equipment.

The most sensitive equipment, namely the low-level signal and communications ports, fail first. The solution is to install surge protection on these ports and their corresponding field instruments.

Novaris Intrinsically Safe Surge Protection

Novaris has designed surge protection devices specifically for Intrinsically Safe (IS) applications. Novaris products with the "IS-" prefix have been certified in accordance with the requirements of both the IEC Ex and ATEX schemes by an authorised certification body. Every Novaris intrinsically safe SPD device has group IIC T4 certification making it acceptable for use with all gas/air mixtures. Novaris IS SPDs provide surge protection on IS circuits. They do not take the place of IS barriers.

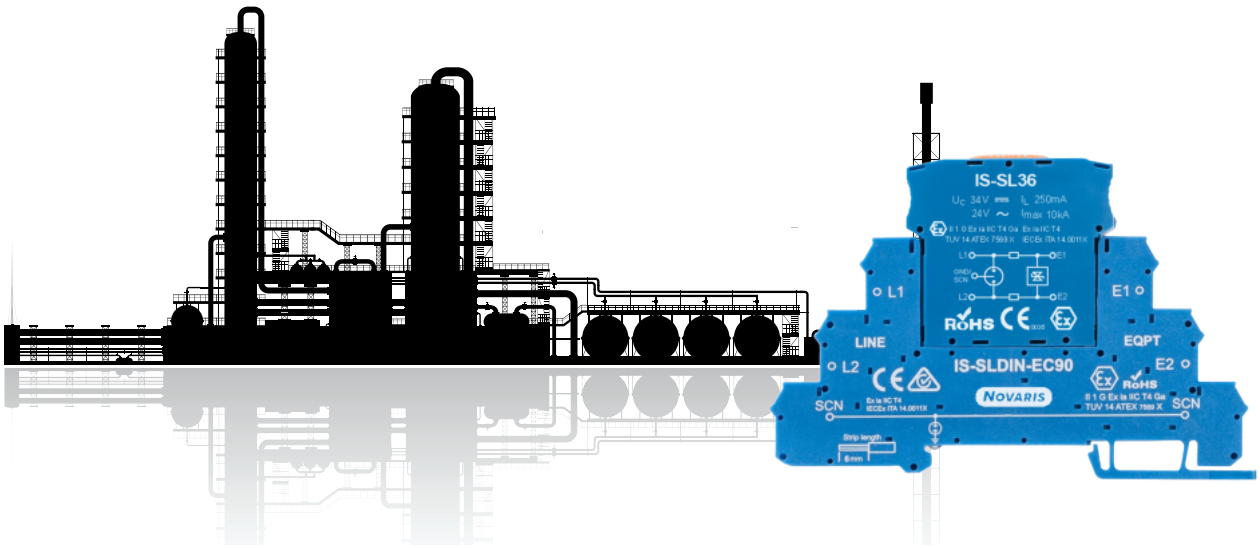


For complete technical specifications or to view the certificate of conformity for the Novaris intrinsically safe range of surge protection devices please visit www.novaris.com.au.

Intrinsically Safe Signal Line Protector

Novaris Intrinsically Safe Surge Protection

Novaris slimline surge protection devices (SPDs) provide surge protection for most twisted pair signaling schemes. Certified to be intrinsically safe Novaris IS SPDs can be installed in the hazardous zone, namely on the field side of the IS barrier. This not only provides protection for the PLC or RTU I/O, it also provides protection for the IS barrier.



The multistage, failsafe design features a high energy gas discharge tube (GDT) as primary protection plus series impedance and secondary components that provide robust surge protection with high transient suppression offering low let-through voltages.

At 7mm wide, the Novaris IS-SL series offers ease of retrofit by conveniently replacing an existing pair of standard 4mm terminals with room to spare. Without needing extra space this greatly simplifies installation into marshalling cubicles.

The plug-in design of the Novaris slimline SPDs provides simple and rapid replacement and testing - no rewiring needed. This also provides a convenient method of field equipment isolation.

Novaris slimline SPDs clip onto standard 35mm DIN rail. The base provides a secure, low impedance earth connection to the DIN rail, essential for effective surge protection. In addition, screw terminals are also provided for an additional earth connection.

Two base options are available:

G base

- Connects directly to the mounting DIN rail for the most effective, low impedance earth connection.

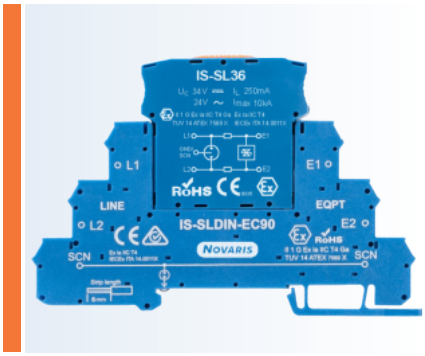
EC90 base

- Connects to the mounting DIN rail through a high-energy gas discharge tube (GDT) connected to provide cable screen isolation under normal conditions. During a surge, the GDT provides equipotential bonding between the earth/screen terminals and DIN rail earth. This avoids possible earth loops and the potential interference they can cause.

Intrinsically Safe Signal Line Protectors

IS-SL Intrinsically Safe Signal Line Protectors

The IS-SL range provides protection for most analogue and digital interfaces. Analogue inputs and outputs are the most susceptible to damage from surge and transients induced onto signal lines. The IS-SL range is designed exclusively for low current applications less than 250mA. For applications requiring a higher current rating Novaris recommends the IS-SSP6A range. The Novaris IS-SL range is suitable for both input and output ports.

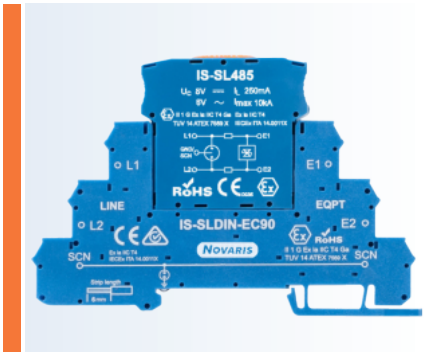


		IS-SL7v5	IS-SL18	IS-SL36
Electrical Specifications				
Maximum continuous voltage (DC)	U_c	7V	16V	34V
Maximum continuous voltage (AC)	U_c	5V	11V	24V
Primary GDT rating 8/20µs		10kA		
Maximum load current	I_L	250mA		

Electrical Specifications	Marshalling Cubicle#	Remote#
0-5V analogue	IS-SL7v5-G	IS-SL7v5-EC90
0-10V analogue	IS-SL18-G	IS-SL18-EC90
5V digital	IS-SL7v5-G	IS-SL7v5-EC90
12V digital	IS-SL18-G	IS-SL18-EC90
24V digital	IS-SL36-G	IS-SL36-EC90
0-20mA analogue	IS-SL36-G / IS-SL420-G	IS-SL36-EC90 / IS-SL420-EC90
4-20mA analogue	IS-SL36-G / IS-SL420-G	IS-SL36-EC90 / IS-SL420-EC90

High-speed data applications are catered for with the IS-SL485 and IS-SL-DH models featuring operation up to 60MHz. The IS-SL485 is ideal for applications such as RS485 serial communication and protocols such as Profibus and CAN. IS-SL-DH is designed for other high-speed protocols such as Data Highway and Data Highway Plus. These models are used in conjunction with the EC90 base to provide screen isolation from earth.

The IS-SL-RTD is suitable for 2 and 3 wire resistance temperature detectors (RTDs). Two units are required for 4 wire RTDs.



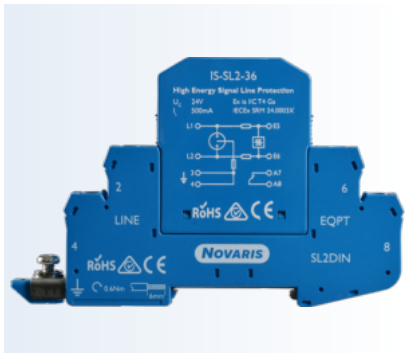
		IS-SL485	IS-SL-DH	IS-SL-RTD
Electrical Specifications				
Maximum continuous voltage (DC)	U_c	8V	34V	7V
Maximum continuous voltage (AC)	U_c	6V	24V	5V
Primary GDT rating 8/20µs		10kA		
Maximum load current	I_L	250mA		

Intrinsically Safe High Energy Signal Line Protectors

IS-SL2

The Novaris SL2 range provides 20kA high energy surge protection for balanced pair signaling circuits with line currents up to 500mA. Following the primary GDT is a series coordinating impedance followed by a high- speed clamping diode circuit providing a safe voltage protection level for the connected equipment.

The protection circuitry is contained within a removable top module. The SL2 range utilizes a base which can be locked to the DIN rail by a screw that also provides an earth termination. In the event of excessive surge current, the failsafe design will prevent an ongoing short circuit to earth shown by a red indicating flag A normally closed contact will open providing remote monitoring.



Electrical Specifications		IS-SL2-7v5	IS-SL2-18	IS-SL2-36	IS-SL2-68	IS-SL2-485
Maximum continuous voltage (DC)	U_c	7V	16V	34V	65V	8V
Maximum continuous voltage (AC)	U_c	5V	11V	24V	46V	6V
Maximum Surge Rating	I_{max}	20kA				
Maximum load current	I_L	500mA				

Electrical Specifications	Marshalling Cubicle#	Field / Remote#
0-5V analogue	IS-SL2-7v5	IS-SL2-7v5-EC90
0-10V analogue	IS-SL2-18	IS-SL2-18-EC90
5V digital	IS-SL2-7v5	IS-SL2-7v5-EC90
12V digital	IS-SL2-18	IS-SL2-18-EC90
24V digital	IS-SL2-36	IS-SL2-36-EC90
0-20mA analogue	IS-SL2-36	IS-SL2-36-EC90
4-20mA analogue	IS-SL2-36	IS-SL2-36-EC90

High-speed data applications are catered for with the IS-SL2-485 models feature operation up to 60MHz. The IS-SL2-485 is ideal for applications such as RS485 serial communication and protocols such as Profibus and CAN. These models are used in conjunction with the EC90 base to provide screen isolation from earth.

Intrinsically Safe High Energy Signal Line Protectors

IS-SL4

The Novaris SL4 range provides 20kA high energy surge protection for two balanced pair signaling circuits with line currents up to 500mA. Alarm flag operation is similar to the IS-SL2.

Electrical Specifications		IS-SL4-7v5	IS-SL4-18	IS-SL4-36	IS-SL4-68	IS-SL4-RTD
Maximum continuous voltage (DC)	U_c	7V	16V	34V	65V	8V
Maximum continuous voltage (AC)	U_c	5V	11V	24V	46V	6V
Maximum Surge Rating	I_{max}	20kA				
Maximum load current	I_L	500mA				

IS-SLC-36

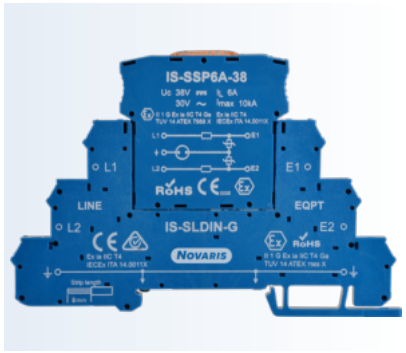
The Novaris IS-SLC-36 range provides surge protection for a single 36V, 20kA high energy balanced pair signal and a single 10A, 24VDC power supply. This combined protector is compact at 12mm wide, allowing for easy installation. Applications include SCADA, PLC, fire and security systems, telecommunications and railway signaling. Alarm flag operation is similar to the IS-SL2.

Electrical Specifications		IS-SLC-36
Maximum continuous voltage (DC)	U_c	36V
Maximum continuous voltage (AC)	U_c	24V
Maximum Surge Rating	I_{max}	20kA
Maximum load current power	I_L	10A
Maximum load current signal	I_L	500mA

Intrinsically Safe Series Surge Protectors

IS-SSP6A Intrinsically Safe Series Surge Protectors

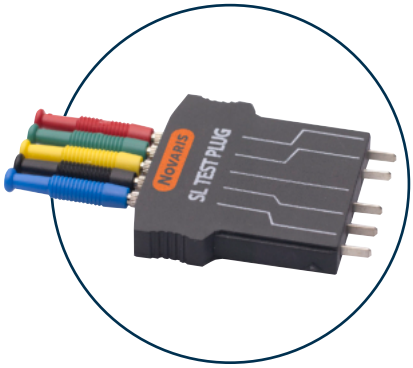
The IS-SSP6A series of IS SPDs complement the IS-SL range for applications requiring current ratings up to 6A. Typical applications include power supplies, digital outputs and other low voltage applications. The design of the Novaris IS-SSP6A range is based upon high energy metal oxide varistors. The series connected design eliminates the effect of connection lead inductance encountered with shunt connected surge protectors. The IS-SSP6A has zero earth leakage.

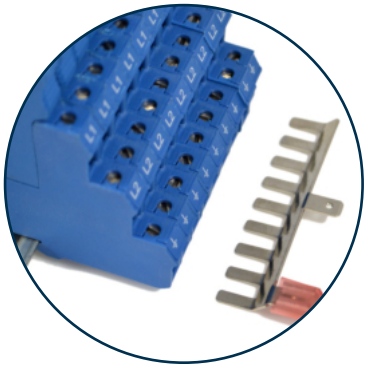


Electrical Specifications		IS-SSP6A-14	IS-SSP6A-26	IS-SSP6A-38
Maximum continuous voltage (DC)	U_c	14V	26V	38V
Maximum continuous voltage (AC)	U_c	11V	20V	30V
Maximum discharge current 8/20µs	I_{max}	10kA		
Maximum load current	I_L	6A		

Electrical Specifications	Marshalling Cubicle#	Field / Remote#
12VDC	IS-SSP6A-14-G	IS-SSP6A-14-EC90
24VDC	IS-SSP6A-26-G	IS-SSP6A-26-EC90
36VDC	IS-SSP6A-38-G	IS-SSP6A-38-EC90

Accessories





SL-TEST

The Novaris SLTest Plug provides access to all field and equipment terminals via sockets mounted in the top face of the test plug. This is defined as a simple apparatus and needs no special Exia approval.

SL-COMB

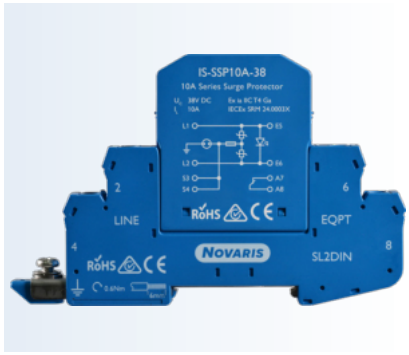
The Novaris SL Terminal Comb provides a means of connecting common terminals. The comb contains nine contacts, allowing banks of 8 terminals to be connected together with one overlapping contact. The comb can be cut to provide a lesser number of points. The comb contains two 6.3mm spade terminals.

Visit Novaris website for complete and updated technical specification sheets.

Intrinsically Safe Series Surge Protectors

IS-SSP10A Intrinsically Safe Series Surge Protectors

The Novaris IS-SSP10A is a surge protection device designed to protect AC and DC low voltage power supplies. The SSP10A has zero earth leakage current and will prevent the tripping of supply fuses down to 2A should a transient overvoltage occur. Like the IS-SSP6A the IS-SSP10A has zero earth leakage. Its operation is similar to the IS-SL2.



Electrical Specifications		IS-SSP10A-14	IS-SSP10A-26	IS-SSP10A-38	IS-SSP10A-65
Maximum continuous voltage (DC)	U_c	14V	26V	38V	65V
Maximum continuous voltage (AC)	U_c	11V	20V	30V	50V
Maximum discharge current 8/20µs	I_{max}	20kA			
Maximum load current	I_L	10A			

Intrinsically Safe Instrument Protectors

Novaris threaded instrument protectors provide surge protection for most twisted pair signalling schemes. Certified to be intrinsically safe, Ex ia, and explosion proof, Ex d, Novaris threaded instrument protectors are designed to be installed directly at the field equipment providing protection against induced surges and transients.

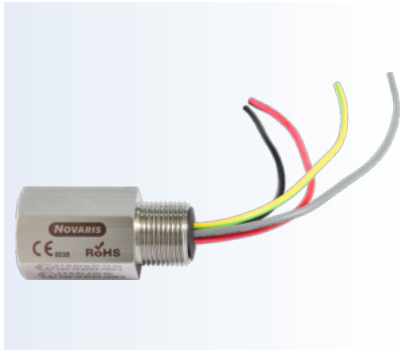
The multistage design provides a high energy gas discharge tube (GDT) as primary protection for common mode disturbances, commonly associated with lightning strikes and power system earth faults and a secondary metal-oxide varistor clamping stages across the signal lines. This combination provides very robust surge protection with high transient suppression and low let-through voltages where needed. In addition, protection is provided for cable screens which may be open circuit at the instrument. All SLT models have zero earth leakage.

The threaded enclosure provides for easy installation by directly screwing into a free cable entry on the instrument. Thread types M20 x 1.5, M25 x 1.5, ½" NPT and ¾" NPT are available. All Novaris threaded instruments are certified intrinsically safe and their enclosures explosion proof so may be installed in Ex d rated instruments without loss of integrity

Intrinsically Safe Instrument Protectors

IS-SLT1 Intrinsically Safe Instrument Protector

The IS-SLT1 range provides protection for most single twisted pair signalling schemes. The units are shunt connected to the terminals and hence do not interrupt or interfere with the signal. The IS-SLT1 range can be adapted to most instruments. Typical applications are analogue and digital instrument transmitters



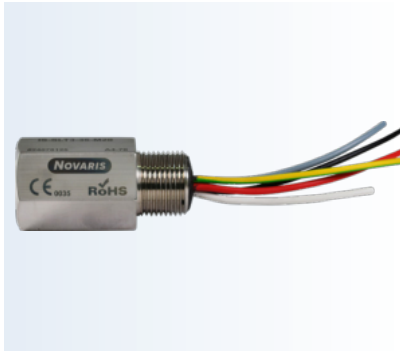
Electrical Specifications		IS-SLT1-7v5	IS-SLT1-18	IS-SLT1-36
Maximum continuous voltage (DC)	U_c	7V	18V	36V
Maximum continuous voltage (AC)	U_c	5V	14V	30V
Primary GDT rating 8/20µs		10kA		

Electrical Specifications	Novaris Product
0-5V analogue	IS-SLT1-7v5
0-10V analogue	IS-SLT1-18
5V digital	IS-SLT1-7v5
12V digital	IS-SLT1-18
24V digital	IS-SLT1-36
0-20mA analogue	IS-SLT1-36
4-20mA analogue	IS-SLT1-36

IS-SLT3 and IS-SLT4 Intrinsically Safe Instrument Protectors

The IS-SLT3 range provides protection for most three-wire signaling schemes. Like the IS-SLT1 these units are shunt connected to the terminals and hence do not interrupt or interfere with the signal. Applications include instruments which are field powered with a single wire control signal.

The IS-SLT4-RTD is designed for resistive temperature detectors (RTD) such as PT100 types. This unit caters for all two, three and four wire RTDs.



Electrical Specifications		IS-SLT3-7v5	IS-SLT3-18	IS-SLT3-36	IS-SLT4-RTD
Maximum continuous voltage (DC)	U_c	7V	18V	36V	8V
Maximum continuous voltage (AC)	U_c	5V	14V	30V	6V
Primary GDT rating 8/20µs		10kA			

Visit Novaris website for complete and updated technical specification sheets.

Intrinsically Safe Series Surge Protectors

SLT-Y Adapter

Where a field instrument has no free cable entry Novaris can supply a Y-piece adapter to accommodate the threaded instrument protector and cable gland. The SLT-Y is available with M20 threads. Other threads are available upon request or thread adaptors can also be supplied.

Thread Type	Novaris Product
M20 x 1.5	SLT-Y-M20

IS-LCP Intrinsically Safe Load Cell Protector

The IS-LCP provides protection for both 4-wire and 6-wire loadcells as well as the measuring instrument. The LCP is contained within an IP65 enclosure. As well as having IS certification the IS-LCP is certified for installation into a loadcell circuit without affecting calibration.

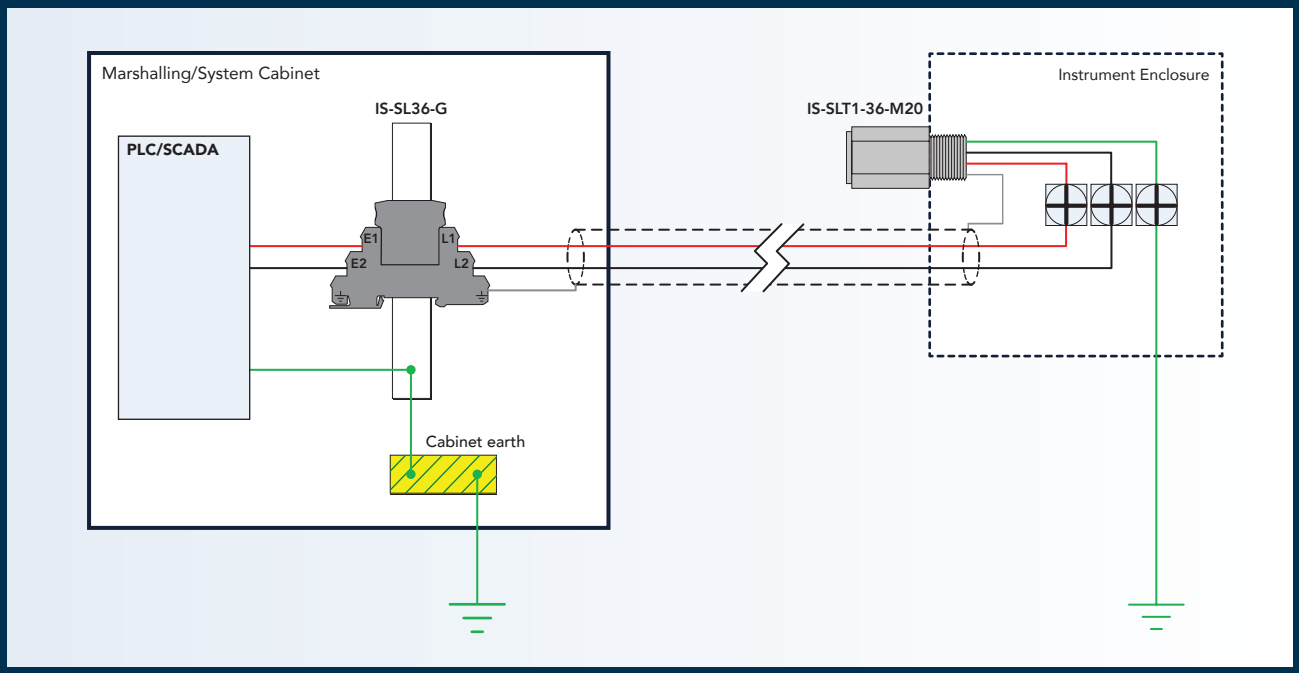
Electrical Specifications		IS-LCP-18	IS-LCP-36
Maximum continuous voltage (DC)	U_c	18V	36V
Maximum discharge current 8/20µs	I_{max}	250A	
Lines protected		4 or 6	

Visit Novaris website for complete and updated technical specification sheets.

Intrinsically Safe Series Surge Protectors

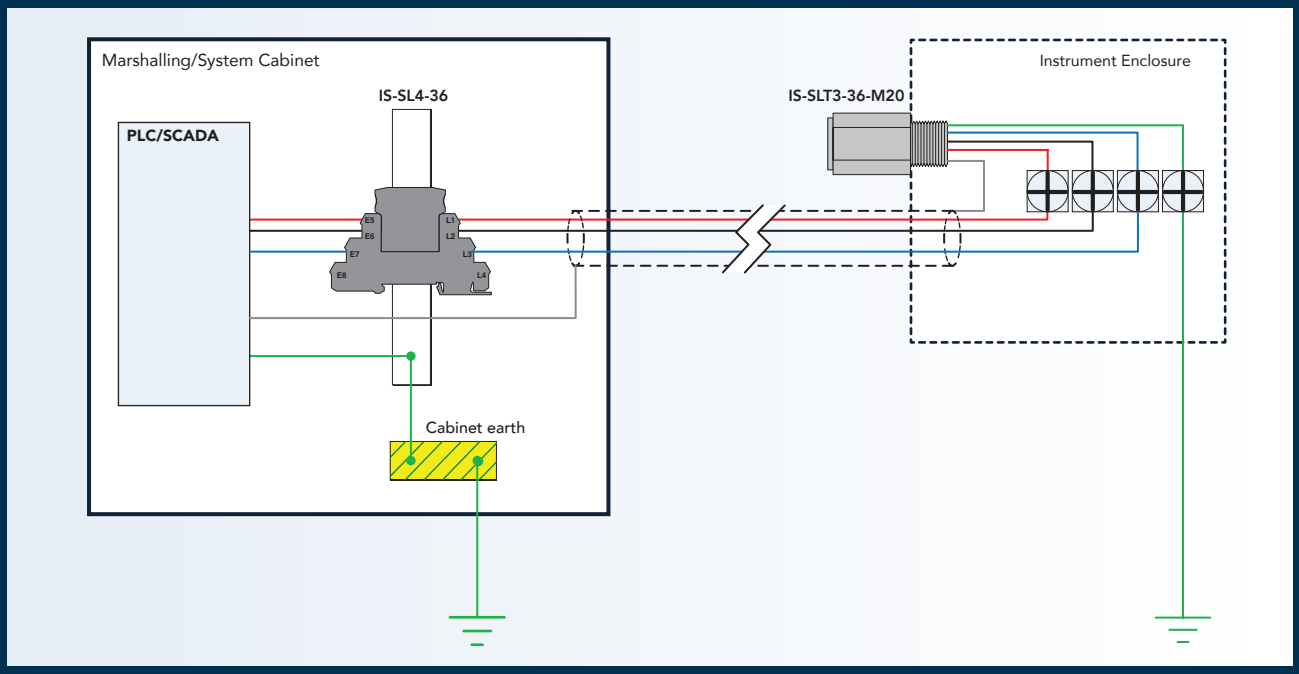
Analogue and Digital Inputs / Outputs – 2 wire

Surge protection requirements for analogue and digital inputs / outputs are almost identical. Figure below shows how to protect 24V digital inputs and outputs with a current less than 250mA.



Analogue and Digital Inputs / Outputs – 3 wire

Surge protection requirements for analogue and digital inputs / outputs are almost identical. Figure below shows how to protect 3 wire 24V digital inputs and outputs with Intrinsically Safe requirements with a current less than 500mA.



Surge and Lightning Protection

Novaris provides a wide range of surge protection solutions to suit most industrial applications. All Novaris products comply with the relevant International and Australian standards.

We manufacture shunt connected surge diverters (one port SPDs) and series connected surge filters (two port SPDs) that may be configured for any LV power distribution system worldwide.

Novaris manufactures a wide range of surge protection devices for signal processing, data transmission, and telecommunications applications.

We specialise in the design, manufacture and installation of specialised protection solutions. Our team of experienced engineers can provide advice across a wide range of industries.

For a complete listing of all Novaris products refer to The Novaris Product Handbook or visit our website at www.novaris.com.au.

> Due to the Novaris policy of continuing product development, specifications are subject to change without notice.

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