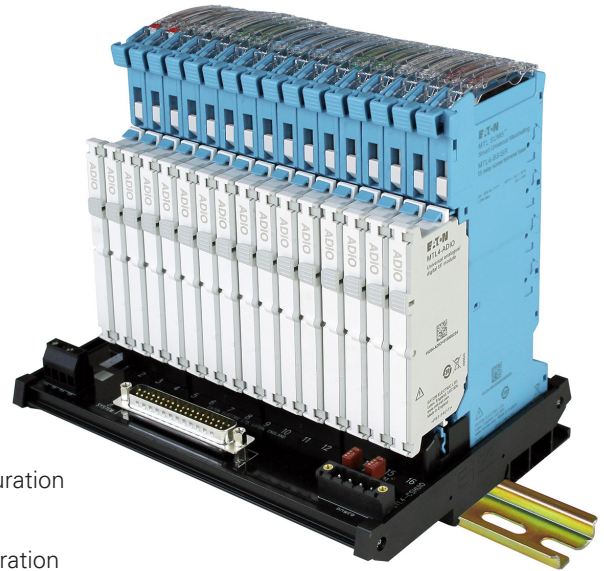


MTL SUM5™

Smart Universal Marshalling

- **Intrinsically safe isolators**
- **Signal conditioning**
- **Relay interfaces**
- **Surge protection**
- **Loop disconnect**

- ALL modes of operation
- Fully configurable
- HART compatible
- Line diagnostics
- High packing density
- Hot swappable
- PC or manual configuration
- Zone 2 mounting
- Control system integration



Eaton's new generation of IS and general purpose signal conditioning is the perfect choice for use with all generations of control systems from traditional dedicated IO types to the latest universal interfaces. System cabinet design can be standardised with the knowledge that ALL signal types can be handled by this truly universal interface.

The backplane mounting MTL SUM5 range is the perfect choice for all control systems allowing direct integrated cable connections and removing the need for additional signal conditioning. Each channel can be configured as an input or an output with a choice of operating modes to directly match those of the system. When used with universal control cards, these channels may be changed to another function at any time if desired.

Signal and system diagnostics are a key feature offering the user fast and precise identification of faults with the system or the field equipment.

The modular approach offers the user the ability to fully standardise the cabinet design with the highest possible packing density saving costs for control rooms and infrastructure. With up to 768 loops possible in a double sided 800x800mm cabinet, significant space savings can be achieved.

The integrated surge protection removes the need for extra space and wiring and can be fitted only on the loops where it is required, either before or after the system is installed and commissioned, saving upfront costs where surge requirements are not known.

Field wiring is landed directly on the interface terminals. The built in loop disconnect feature, with the universal signal handling, eliminates the need for marshalling panels. Spare wiring can also be landed without the electronics fitted, to provide for future expansion.

MTL4-ADIO Configurable Isolator

1 channel for analogue and digital inputs and outputs

The MTL4-ADIO can be configured for input and output applications with a wide selection of signal types and ranges. It is the perfect choice when used with universal IO system cards where the IO type is assigned on a channel by channel basis. Configuration is carried out using the mode selection switch on the module or using the MTL4-PCS configuration tool via the MTL4-PCL USB link.

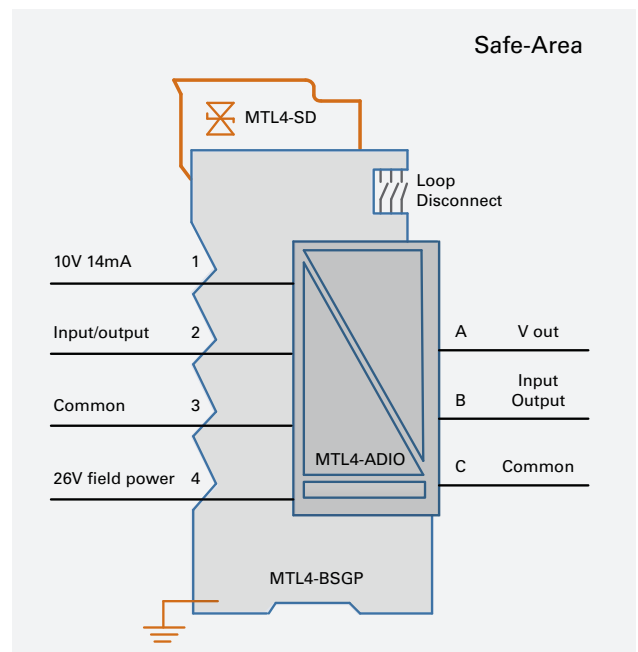
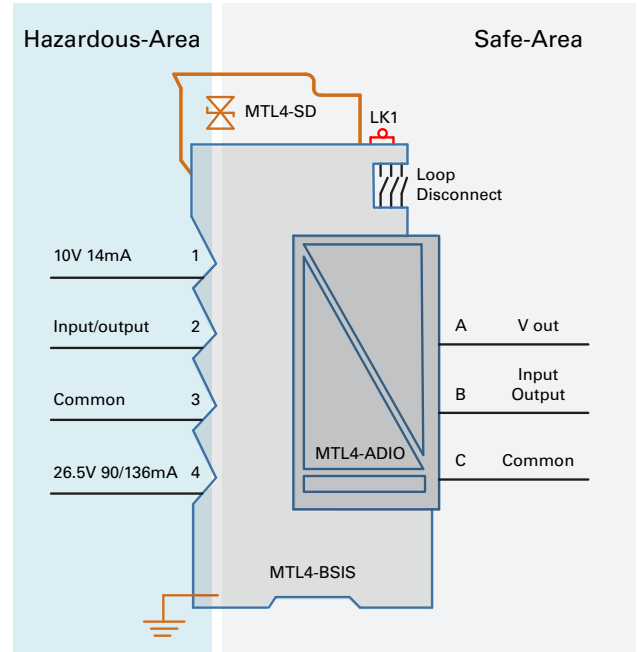
The MTL4-BSIS terminal base unit is required for IS applications. This contains the safety components for explosion protection. Fitting LK1 offers the user an increased power setting for suitably certified devices.

The MTL4-BSGP terminal base is used for safe area applications.

For high level surge protection on channels the MTL4-SD module option is plugged into the top of the base unit. When the surge module is fitted, the carrier provides a high integrity earth (ground) connection.

A range of 16 way carriers are available for these modules. In addition to a screw terminal version for general use there are models to support multicore cable connections for control system integration. Each carrier also offers facilities for module configuration with process and diagnostic alarm outputs.

Terminal	Current Source Mode
1	Field signal + 10V 14mA
2	Input / Output
3	Field Common
4	Field Power + 26.5V 90mA
A	Signal +
B	Input / Output-
C	System Common

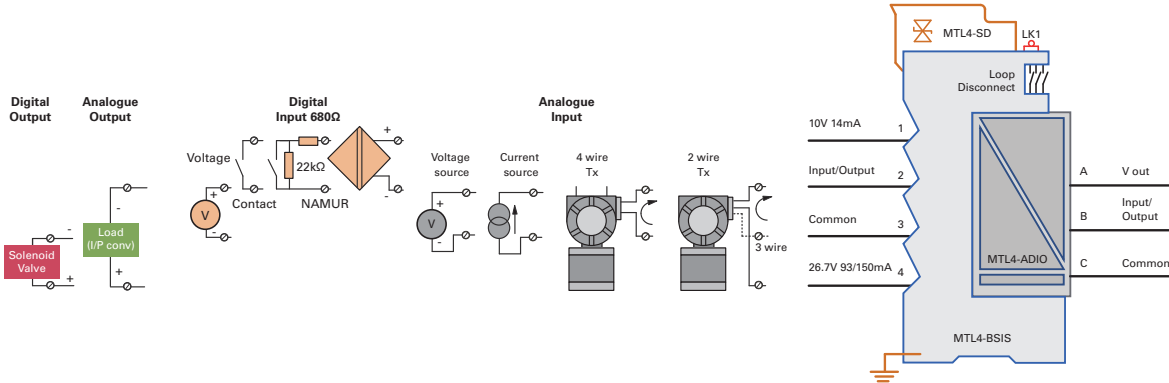


SPECIFICATION	MTL4-BSIS IS terminal base	MTL4-BSGP General purpose terminal base
Number of channels	One with fully floating input and output	One with fully floating input and output
Location of field equipment	Zone 0, IIC, T4-6 hazardous area if suitably certified	Hazardous area if suitably certified Safe-area
Input signal from Field	0-22mA, 4-20mA, 0-5V, 0-10V, switch, NAMUR prox.	0-22mA, 4-20mA, 0-5V, 0-10V, switch, NAMUR prox.
Output signal to System	0-22mA, 4-20mA, sink/source, 0-5V, 0-10V, switch, N+1 repeat	0-22mA, 4-20mA, sink/source, 0-5V, 0-10V, switch, N+1 repeat
Output signal to Field	4-20mA, 48mA, 1-5V, 0-10V	4-20mA, 48mA, 1-5V, 0-10V
Input signal from System	4-20mA, 0-5V, 0-10V, contact input, 24V logic	4-20mA, 0-5V, 0-10V, contact input, 24V logic
Communication supported	HART on analogue 4-20mA	HART on analogue 4-20mA
Analogue Input (Field device to cont. system)	0-22mA, 25mA over-range 3.8mA to 20.5mA if NAMUR selected Input impedance for HART signals >230Ω Passive input impedance (terminals 2 and 3) 100ohms or 230Ω if HART configured. Transmitter voltage 13.2V @ 20mA HART mode (-40°C to + 70°C) Transmitter voltage 15.2V @ 20mA LK1 fitted non-HART mode Safe area output load resistance source mode 0 to 420Ω Safe area output load resistance sink mode 0 to 600Ω Safe area output impedance >1MΩ	0-22mA, 25mA over-range 3.8mA to 20.5mA if NAMUR selected Input impedance for HART signals >230Ω Passive input impedance (terminals 2 and 3) 100ohms or 230Ω if HART configured. Transmitter voltage 17.2V @ 20mA HART mode Safe area output load resistance source mode 0 to 420Ω Safe area output load resistance sink mode 0 to 600Ω Safe area output impedance >1MΩ
Analogue Output	Range 0-25mA Maximum load resistance 660Ω(13.2V@20mA) -40°C to +70°C Output resistance >1MΩ Transfer accuracy <±20µA (1-22mA) Temperature drift <1µA/°C Input characteristics Normal <6V, open circuit <0.5mA Response time – settles within 200µA of final value <100ms Communication supported- HART 4-20mA	Range 0-25mA Maximum load resistance 860Ω(17.2V@20mA) Output resistance >1MΩ Transfer accuracy <±20µA Temperature drift <1µA/°C Input characteristics Normal <6V, open circuit <0.5mA Response time – settles within 200µA of final value <100ms Communication supported- HART 4-20mA
Digital Input	Sensor voltage 8.5V through 1kΩ Normal phase Output closed if input>2.1mA, (<2kΩ in input circuit) Output open if <1.2mA, , (>10kΩ in input circuit) Hysteresis 200µA Max switching frequency 5kHz Channel status Yellow LED on when output energised Line fault detection (LFD), when selected Open circuit alarm if on lin<50µA Open circuit alarm off if lin>250µA Short circuit alarm on R in <100Ω Short circuit alarm off R in >360Ω LFD alarm indication, Yellow flashing status LED when in alarm	Sensor voltage 8.5V through 1kΩ Normal phase Output closed if input>2.1mA, (<2kΩ in input circuit) Output open if <1.2mA, , (>10kΩ input circuit) Hysteresis 200µA Max switching frequency 5kHz Channel status Yellow LED on when output energised Line fault detection (LFD), when selected Open circuit alarm if on lin<50µA Open circuit alarm off if lin>250µA Short circuit alarm on R in <100Ω Short circuit alarm off R in >360Ω LFD alarm indication, Yellow flashing status LED when in alarm
Pulse Input	Input signals 0 – 25kHz p-p, Min pulse width 20µs 0.1-10kHz pulse to analogue NAMUR / contact, voltage pulse, current pulse Voltage switch threshold 0.5V, 1V, 5V Current pulse 4-20mA, 12mA threshold Output signals Solid state switch, voltage 0/24V, 4-20mA ranged output	Input signals 0 – 25kHz p-p, Min pulse width 20µs 0.1-10kHz pulse to analogue NAMUR / contact, voltage pulse, current pulse Voltage switch threshold 0.5V, 1V, 5V Current pulse 4-20mA, 12mA threshold Output signals Solid state switch, voltage 0/24V, 4-20mA ranged output

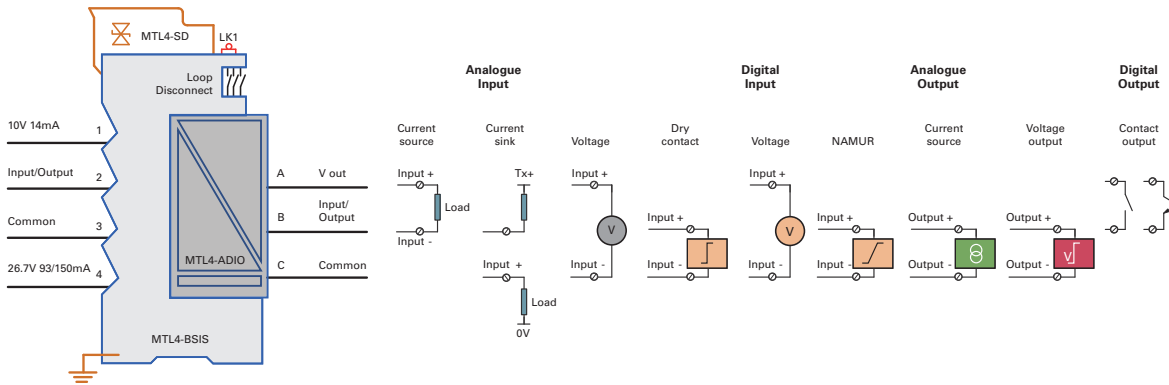
SPECIFICATION	MTL4-BSIS IS terminal base	MTL4-BSGP General purpose terminal base
Digital Output	Control Input- Switch contact or Voltage Switch input – Voltage source 10V, 1mA max Output On – voltage at input <2V Output Off – Voltage at input >3V Voltage input – 0 / 5-24V Output On – voltage at input >3V Output Off – voltage at input <2V Minimum Output voltage- 22.5V open circuit 7V @ 48mA 90mA safety setting 12.8V @48mA 136mA safety setting – LK1 fitted Minimum Output current- 48mA LFD detection signal(when enabled) 24V 0.5ms pulse test every 10s LFD signal to safe side – high impedance input >100kΩ, LFD clear 1.5mA max load on system	Control Input - Switch contact or Voltage Switch input – Voltage source 10V, 1mA max Output On – voltage at input <2V Output Off – Voltage at input >3V Voltage input – 0 / 5-24V Output On – voltage at input >3V Output Off – voltage at input <2V Minimum Output voltage- 22.5V open circuit 22.5V @ 48mA Minimum Output current - 48mA LFD detection signal(when enabled) 24V 0.5ms pulse test every 10s LFD signal to safe side – high impedance input > 100kΩ, LFD clear 1.5mA max load on system
Response time	<1ms	<1ms
Transfer accuracy analogue modes at 20°C	Current ±20µA 5V±20mV, 10V±30mV	Current ±20µA 5V±20mV, 10V±30mV
LED indication	2, module status and signal status	2, module status and signal status
Temperature drift	<0.01 % /°C	<0.01 % /°C
Power supply voltage	20V to 30Vdc Power supply approved to IEC/EN60950, IEC/EN61010 or other technical equivalent standard (i.e. providing SELV or PELV supply)	20V to 30Vdc Power supply approved to IEC/EN60950, IEC/EN61010 or other technical equivalent standard (i.e. providing SELV or PELV supply)
Power supply current	45mA @ 24V, with 20mA signal in analogue mode 100mA @ 24V, in digital output mode	45mA @ 24V, with 20mA signal in analogue mode 100mA @ 24V, in digital output mode
Maximum power dissipation within unit	<0.5W AO, DI modes, 1W AI, DO mode	<0.5W AO, DI modes, 1W AI, DO mode
Safety description (using MTL4-BSIS)	Terminals 4 to 2 & 3 U _o 26.5V, I _o 90mA, P _o 0.6W, Um 30Vdc Terminals 4 to 2 & 3 U _o 26.5V, I _o 136mA, P _o 0.9W, Um 30Vdc LK1 fitted Terminals 1 to 2 U _o 10V, I _o 14mA, P _o 35mW, Um 30Vdc	
Isolation	253V ac or dc between field and system circuits/power (tested to 1500V) 50V ac or dc between system circuits and power	253V ac or dc between field and system circuits/power (tested to 1500V) 50V ac or dc between system circuits and power
Mechanical	MTL4-BSIS + MTL4-UDIO W10mm, H156mm, D95mm (H = 190mm with MTL4-SD fitted) Terminals, screw clamp 2.5mm ² wire maximum MTL4-Cx W138mm, L195mm, D25mm DIN rail mounting 35mm top hat rail Earth- M4 ring terminal	MTL4-BSGP + MTL4-UDIO W10mm, H156mm, D95mm (H = 190mm with MTL4-SD fitted) Terminals, screw clamp 2.5mm ² wire maximum MTL4-Cx W138mm, L195mm, D25mm DIN rail mounting 35mm top hat rail Earth- M4 ring terminal
Environmental	Operating temperature -40°C to +70°C (carrier on horizontal rail) -40°C to +60°C (carrier on vertical rail) Note: carrier choice and orientation may limit operating temperature specification. Storage-40°C to +80°C Altitude- 3000m asl Humidity – 5 to 95%RH, non-condensing	Operating temperature -40°C to +70°C (carrier on horizontal rail) -40°C to +60°C (carrier on vertical rail) Storage-40°C to +80°C Note: carrier choice and orientation may limit operating temperature specification. Altitude- 3000m asl Humidity – 5 to 95%RH, non-condensing

Connections

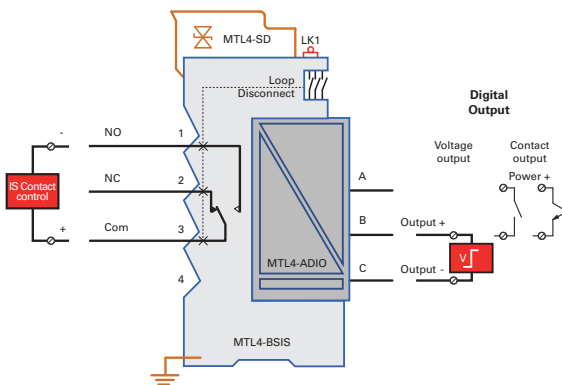
FIELD side connections



SYSTEM side connections



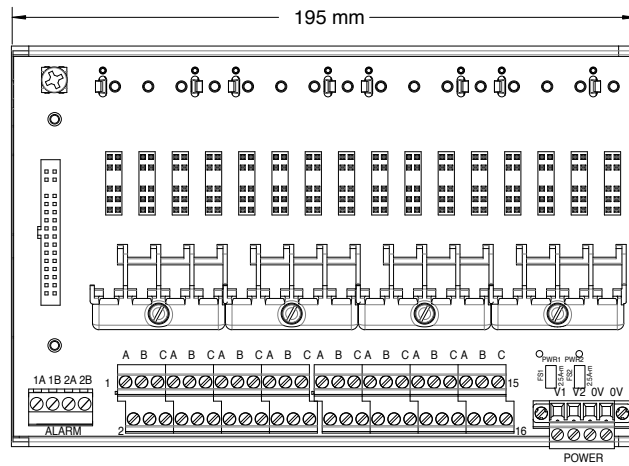
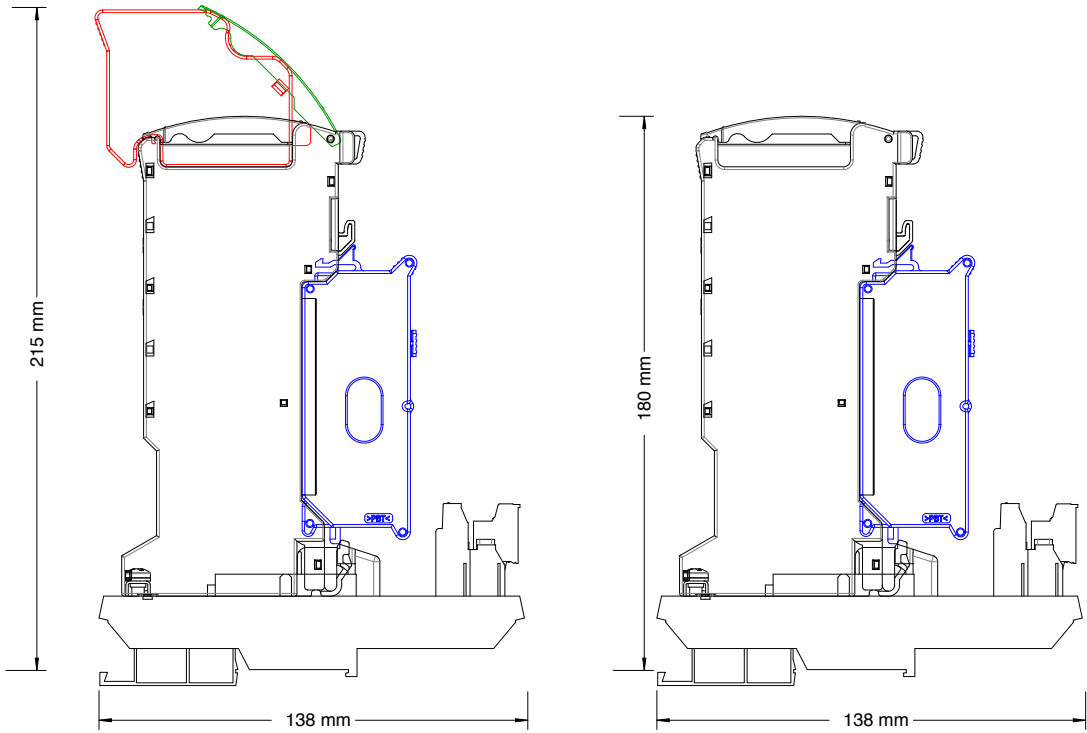
MTL4- Digital Output Relay



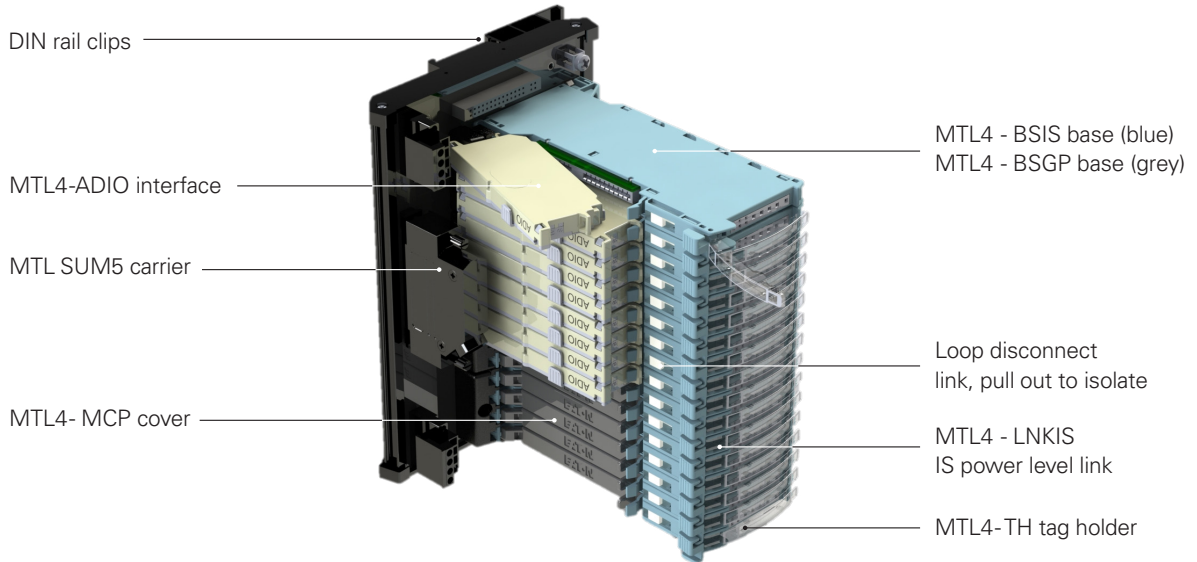
The MTL4-BSISR, for IS field devices or MTL4-BSGPR, for non-IS field devices, is used with the MTL4-ADIO isolator for digital output applications where a relay contact is required. Normally open (NO) and normally closed (NC) contacts are provided Inductive loads must be suppressed.

SPECIFICATION	MTL4-BSISR IS terminal base	MTL4-BSGPR General purpose terminal base
Digital Relay Output	Control Input - Switch contact or Voltage Switch input – Voltage source 10V, 1mA max Output On – voltage at input <2V Output Off – Voltage at input >3V Voltage input – 0 / 5-24V Output On – voltage at input >3V Output Off – voltage at input <2V Relay contacts- 30V, 100mA max	Control Input - Switch contact or Voltage Switch input – Voltage source 10V, 1mA max Output On – voltage at input <2V Output Off – Voltage at input >3V Voltage input – 0 / 5-24V Output On – voltage at input >3V Output Off – voltage at input <2V Relay contacts- 125Vac/dc, 0.3A max

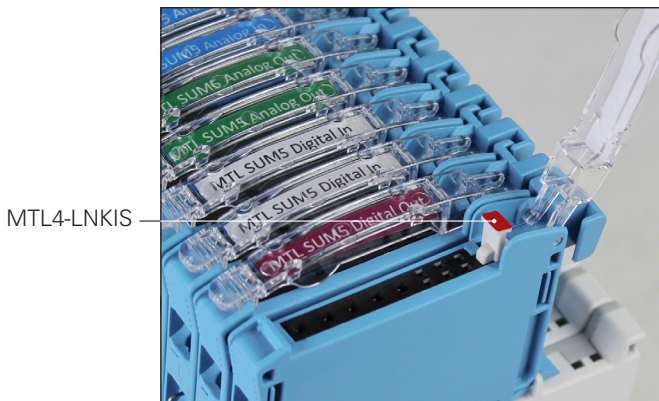
Dimensions



MTL4 - Universal Isolator assembly



MTL4-LNKIS Jumper link, increased output power



Link LK1, referred to in the safety parameter specification and shown on the module schematic, is the MTL4-LNKIS link and is primarily used to increase the output power from the MTL4-ADIO when being used in Digital Output mode with solenoid valves. If the valves are suitably certified this link may be fitted to increase the available power and voltage to the valve. It may also be used for analogue input and analogue output applications, if required, where the field device is suitably certified.

MTL4-SD surge protection

Surge protection can be added to any loops without disturbing the wiring. The MTL4-SD module is mounted onto the top of the terminal unit by rotating the tag holder out of the way and plugging it in. The tag holder can now be clipped back onto the surge module.

When using surge protection a short earth cable must be fitted between the Surge Earth terminals on the carrier and a good quality earth bar in the cabinet with a solid connection to the plant earth.

The MTL4-SD module can be removed and replaced without interrupting the process signal.

Note: The MTL4-SDR is used when surge protection is required when the MTL4-BSISR or MTL4-BSGPR terminal bases are fitted.



Surge specification

Protection

- Full hybrid line to line
- Each line to screen/ground

Max discharge surge current (I_{max}) (8/20 μ s)

20kA (8/20 μ s)

Nominal discharge surge current (i_{sn})

3kA (8/20 μ s)

Lightning impulse current (I_{imp}) (10/350 μ s)

2.8kA

Impulse durability (8/20 μ s)

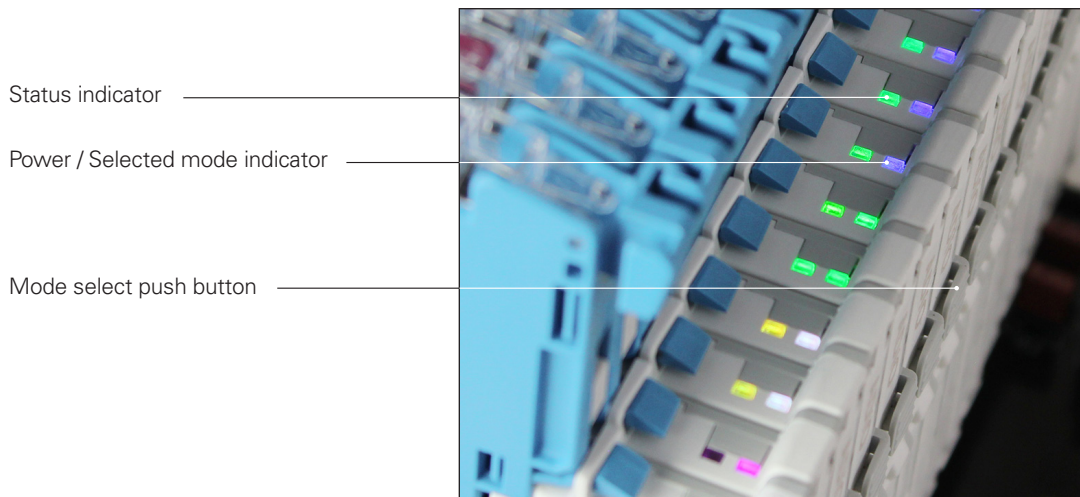
10kA

Model	Nominal voltage+(Un) (Vdc) (Vac)		Nominal current (In)(mA)	Series resistance (Ω /line)	Max.leakage current (μ A)	Rated voltage *MCOV)(Uc)	Voltage protection level (Up)@1kV/ μ s(V)	Residual voltage @ isn(V)	Bandwidth (frequency) (fG)
MTL4-SD	32	22	400	10	5	36	<45	60	50MHz

Module configuration

The Universal Isolator is configured to select the required mode of operation for a specific channel and to provide a compatible interface to the field device and the system input/output. Mode selection is best achieved using the MTL configuration application on a PC via the configuration port on the UI carrier. For basic default mode selection a push button on the electronics module is provided without the need for a PC.

Please refer to manual for configuration options



Ordering information

Interface modules	
MTL4-ADIO	Universal analogue/digital interface module
MTL4-ADIO-50	Universal analogue/digital interface module (Pk 50)
MTL4-BYP*	Bypass module
MTL4-BYP-50*	Bypass module (Pack 50)
MTL4-TI*	Temperature converter module
MTL4-TI-50*	Temperature converter module (Pack 50)

Carriers with terminal bases	
MTL4-CS16IS	16ch universal IS carrier, screw terminals, 16 x MTL4-BSIS fitted
MTL4-CS16GP*	16ch universal GP carrier, screw terminals, 16 x MTL4-BSGP fitted

Carrier only	
MTL4-CS16	16ch carrier, no interface bases fitted, screw terminals

Terminal bases	
MTL4-BSIS	Terminal base IS
MTL4-BSISR*	Terminal base IS relay
MTL4-BSGP*	Terminal base GP
MTL4-BSGPR*	Terminal base GP relay

Surge modules	
MTL4-SD	Plug-in surge module
MTL4-SDR*	Plug-in surge relay module
MTL4-SDT*	Plug in surge for temperature

Accessories	
MTL4-GND*	Grounding module
MTL4-LNKIS-50	IS power jumper link (Pack50)
MTL4-TH-50	Spare UI tag holders (Pack 50)
MTL4-ICC-50*	Interface connector cover, for spare module bases (Pack 50)
MTL4-PCS*	Configuration software
MTL4-PCL*	Configuration adaptor link
MTL4-SMK-10	Carrier surface mounting kit (Pack 10 pairs)

* For future release, consult MTL sales channel for availability

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