



technical datasheet

# MTL4600 Series

Isolating interfaces

- 3-port isolation as standard
- Highest module/channel packing densities
- Low power dissipation
- Quick install and release mechanism
- Multi-channel I/O modules
- Broken line and earth-fault protection



## Isolation—protecting your system

**Designing your plant with good clean earth systems is not always possible.** Poor ground conductivity, large process areas and heavy electrical machinery, all contribute to increased noise. This noise is induced or conducted into adjacent wiring, which in turn degrades the quality of the signals passing through the cables. Without isolation this noise is superimposed on the process signal causing a loss of accuracy, poor control and possibly failures or false trips.

**Many control systems**, PLCs and safety systems do not have full isolation between channels. In compact well defined plant layouts this is acceptable, but these are not always guaranteed. To avoid interference between channels, isolation is the solution.

**The MTL4600 series isolators** offer reduced risk and greater protection to the system, with all the advantages of a common design approach for both IS and non-IS signals.

## System Solutions

**Building on the base of the MTL4500 series** solutions, the MTL4600 offers a high level of signal isolation for installations where multiple loops on a common connection are not desirable.

**Signal isolation provides excellent protection** against surges, common faults and noisy environments. It also eliminates the risk of earth loops between different areas of the plant, which, if not isolated, can cause significant errors or failures under fault conditions.

**MTL4600 isolators are fully compatible** with all existing backplanes used with MTL4500 series and many control systems. The form factor and signal types offer the user a common approach for both IS and non-IS signals.

**The backplane mounting MTL4600 Series** is designed with system vendors in mind for "project-focussed" applications such as Distributed Control System (DCS), Emergency Shutdown Systems (ESD) and Fire and Gas monitoring (F&G).

**The reduced power consumption and high efficiency** enable high signal density to be achieved together with improved freedom in cabinet layout and design. Easy integration with the input/output assemblies of control or safety instrumentation systems not only simplifies project engineering but also reduces installation and maintenance costs.

**A multiway connector** to the backplane provides safe-area and power supply connections, while hazardous-area connections plug into the front of the module, simplifying installation and maintenance and reducing time, cost, and the risk of errors.

**Line fault detection (LFD)** facilities are provided across the range of I/O functions; on the switch/proximity detectors, the MTL4623 solenoid/alarm drivers and the isolating drivers. Analogue input units such as the MTL4641 provide line fault detection by repeating o/c or s/c currents to the control system.

**Status LEDs, configuration switches** and ports are located on the top or side of individual modules, as appropriate, for easy access.

EPS4600 Rev 4 040414

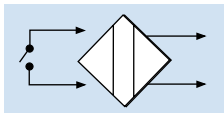
The logo for COOPER Crouse-Hinds, featuring the word "COOPER" in a bold, black, sans-serif font, followed by "Crouse-Hinds" in a smaller, black, sans-serif font. A red diagonal bar is positioned above the "O" in "COOPER".

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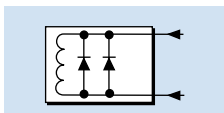
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# ISOLATOR FUNCTION SELECTOR

## Digital Input

		Channels	Function
MTL4604		1	switch/prox input, phase reversal + LFD
MTL4610		4	switch/prox input, solid-state output
MTL4611		1	switch/prox input, c/o relay output
MTL4613		2	switch/prox input, solid-state output
MTL4614		1	switch/prox input, relay + LFD alarm
MTL4614D		1	switch/prox input, dual output relay
MTL4616		2	switch/prox input, relay
MTL4617		2	switch/prox input, relay + LFD alarm

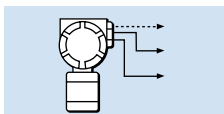
## Digital Output

MTL4621		1	loop powered solenoid driver
MTL4623		1	solenoid driver with LFD alarm
MTL4623L		1	loop powered solenoid driver with LFD alarm
MTL4623R		1	solenoid driver with reverse LFD alarm
MTL4624		1	switch operated solenoid driver
MTL4624S		1	switch operated solenoid driver, 24V override
MTL4626		2	switch operated relay

## Pulse Output

MTL4632		1	pulse isolator, digital or analogue output
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## Analogue Input

MTL4641		1	2/3 wire transmitter repeater
MTL4641A		1	transmitter repeater, passive input
MTL4641AS		1	transmitter repeater, passive input, current sink
MTL4641S		1	2/3 wire transmitter repeater, current sink
MTL4644		2	2/3 wire transmitter repeater
MTL4644A		2	transmitter repeater, passive input
MTL4644AS		2	transmitter repeater, passive input, current sink
MTL4644S		2	2/3 wire transmitter repeater, current sink
MTL4644D		1	2/3 wire transmitter repeater, dual output

## Analogue Output

MTL4646		1	4-20mA smart isolating driver + LFD
MTL4646Y		1	4-20mA smart isolating driver + oc LFD
MTL4649		2	4-20mA smart isolating driver + LFD
MTL4649Y		2	4-20mA smart isolating driver + oc LFD

## Temperature Input

MTL4675		1	temperature converter, THC or RTD
MTL4676-RTD		2	temperature converter, RTD
MTL4676-THC		2	temperature converter, THC



# MTL4604

## SWITCH/ PROXIMITY DETECTOR INTERFACE

1-channel with LFD and phase reversal

The MTL4604 enables a load to be controlled, through a relay, by a proximity detector or switch. Line faults are signalled through a separate relay and indicated on the top of the module. MTBF information for the LFD relay is available from MTL to allow the failure rate for the LFD relay to be calculated when used in the critical path with the output relay for safety critical applications. Switches are provided to select phase reversal and to enable the line fault detection.

### SPECIFICATION

See also common specification

#### Number of channels

One

#### Inputs

Inputs conforming to BS EN60947-5-6:2001 standards for proximity detectors (NAMUR)

#### Voltage applied to sensor

7 to 9V dc from  $1k\Omega \pm 10\%$

#### Input/output characteristics

Normal phase

Outputs closed if input  $> 2.1mA$  ( $< 2k\Omega$  in input circuit)

Outputs open if input  $< 1.2mA$  ( $> 10k\Omega$  in input circuit)

Hysteresis:  $200\mu A$  ( $650\Omega$ ) nominal

#### Line fault detection (LFD) (when selected)

User-selectable via switches on the side of the unit. Line faults are indicated by an LED. Line fault relay is de-energised and channel output relay de-energised if input line-fault detected

Open-circuit alarm on if  $I_{in} < 50\mu A$

Open-circuit alarm off if  $I_{in} > 250\mu A$

Short-circuit alarm on if  $R_{in} < 100\Omega$

Short-circuit alarm off if  $R_{in} > 360\Omega$

Note: Resistors must be fitted when using the LFD facility with a contact input  
 $500\Omega$  to  $1k\Omega$  in series with switch  
 $20k\Omega$  to  $25k\Omega$  in parallel with switch

#### Output

Channel: Single pole relay with changeover contacts

LFD: Single pole relay with changeover contacts

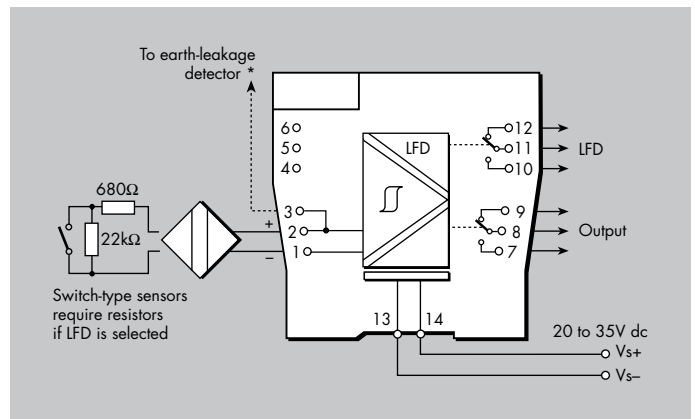
Note: reactive loads must be adequately suppressed

#### Relay characteristics

Response time: 10ms maximum

Contact rating: 10W, 0.5A, 35V dc

### MTL4604



#### LED indicators

Green: power indication

Yellow: channel status, on when output energised

Red: LFD indication, on when line fault detected

#### Maximum current consumption

25mA at 24V dc

#### Power dissipation within unit

0.6W at 24V

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EPS4604 Rev2 050314

# MTL4610

## SWITCH/ PROXIMITY DETECTOR INTERFACE

4-channel, digital input

The MTL4610 enables four solid-state outputs to be controlled by up to four switches or proximity detectors. Each pair of output transistors shares a common terminal and can switch +ve or -ve polarity signals. A range of module configurations is available (see Table 1) through the use of selector switches. When proximity detector modes are selected, LFD is enabled and the output switches to OFF if a line fault is detected.

### SPECIFICATION

See also common specification

#### Number of channels

4, configured by switches

#### Inputs

Inputs conforming to BS EN60947-5-6:2001 standards for proximity detectors (NAMUR)

#### Voltage applied to sensor

7 to 9V dc from  $1k\Omega \pm 10\%$

#### Input/output characteristics

Normal phase

Outputs closed if input  $> 2.1mA$  ( $< 2k\Omega$  in input circuit)

Outputs open if input  $< 1.2mA$  ( $> 10k\Omega$  in input circuit)

Hysteresis:  $200\mu A$  ( $650\Omega$ ) nominal

#### Line fault detection (LFD) (when selected)

User-selectable via switches on the side of the unit.

Open-circuit alarm on if  $I_{in} < 50\mu A$

Open-circuit alarm off if  $I_{in} > 250\mu A$

Short-circuit alarm on if  $R_{in} < 100\Omega$

Short-circuit alarm off if  $R_{in} > 360\Omega$

Note: Resistors must be fitted when using the LFD facility with a contact input  
 $500\Omega$  to  $1k\Omega$  in series with switch  
 $20k\Omega$  to  $25k\Omega$  in parallel with switch

#### Outputs

Floating solid-state outputs compatible with logic circuits

Operating frequency: dc to 500Hz

Max. off-state voltage:  $\pm 35V$

Max. off-state leakage current:  $\pm 50\mu A$

Max. on-state resistance:  $25\Omega$

Max. on-state current:  $\pm 50mA$

#### LED indicators

Green: power indication

Yellow: four: on when output active

Red: LFD indication + faulty channel's yellow LED flashes

#### Maximum current consumption

40mA at 24V (with all output channels energised)

#### Power dissipation within unit

0.96W at 24V, with 10mA loads

### MTL4610

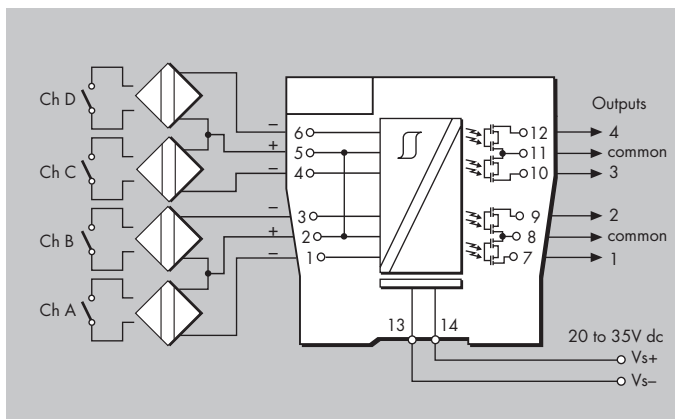


Table 1 - Mode options

MODE	o/p 1	o/p 2	o/p 3	o/p 4	i/p type
0	chA	chB	chC	chD	switch
1	chA rev.	chB	chC	chD	
2	chA	chB rev.	chC	chD	
3	chA	chB	chC rev.	chD	
4	chA	chB	chC	chD rev.	
5	chA rev.	chB	chC rev.	chD	
6	chA	chB rev.	chC	chD rev.	
7	chA rev.	chB rev.	chC rev.	chD rev.	
8	chA	chB	chC	chD	prox. detector + LFD
9	chA rev.	chB	chC	chD	
10	chA	chB rev.	chC	chD	
11	chA	chB	chC rev.	chD	
12	chA	chB	chC	chD rev.	
13	chA rev.	chB	chC rev.	chD	
14	chA	chB rev.	chC	chD rev.	
15	chA rev.	chB rev.	chC rev.	chD rev.	

See Instruction Manual INM4500 for further mode information.

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EPS4610 Rev1 201210

# MTL4611

## SWITCH/ PROXIMITY DETECTOR INTERFACE

1-channel, with line fault detection

The MTL4611 enables a load to be controlled by a switch or proximity detector. When selected, open or short circuit conditions in the field wiring are detected by the line-fault-detect (LFD) facility and also indicated on the top of the module. Phase reversal for the channel is selected by a switch on the side of the module and output is provided by changeover relay contacts.

### SPECIFICATION

See also common specification

#### Number of channels

One

#### Inputs

Inputs conforming to BS EN60947-5-6:2001 standards for proximity detectors (NAMUR)

#### Voltage applied to sensor

7 to 9V dc from  $1k\Omega \pm 10\%$

#### Input/output characteristics

Normal phase

Outputs closed if input  $> 2.1mA$  ( $< 2k\Omega$  in input circuit)

Outputs open if input  $< 1.2mA$  ( $> 10k\Omega$  in input circuit)

Hysteresis:  $200\mu A$  ( $650\Omega$ ) nominal

#### Line fault detection (LFD) (when selected)

User-selectable via switches on the side of the unit. A line fault is indicated by an LED. The channel output relay is de-energised if an input line fault is detected.

Open-circuit alarm on if  $I_{in} < 50\mu A$

Open-circuit alarm off if  $I_{in} > 250\mu A$

Short-circuit alarm on if  $R_{in} < 100\Omega$

Short-circuit alarm off if  $R_{in} > 360\Omega$

Note: Resistors must be fitted when using the LFD facility with a contact input  
 $500\Omega$  to  $1k\Omega$  in series with switch  
 $20k\Omega$  to  $25k\Omega$  in parallel with switch

#### Output

Single pole relay with changeover contacts

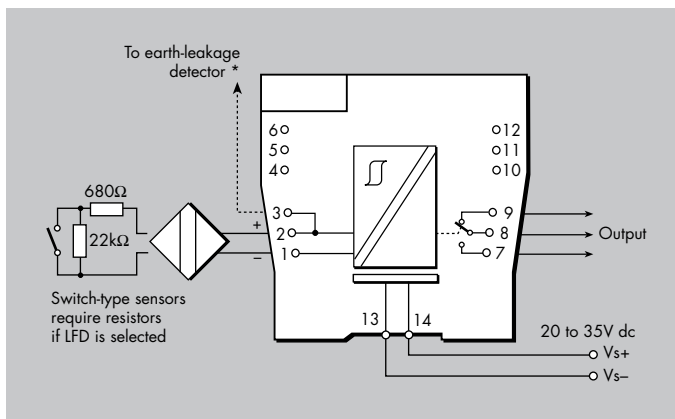
Note: reactive loads must be adequately suppressed

#### Relay characteristics

Response time: 10ms maximum

Contact rating: 10W, 0.5A, 35V dc

### MTL4611



#### LED indicators

Green: power indication

Yellow: channel status, on when output energised

Red: LFD indication, on when line fault detected

#### Maximum current consumption

25mA at 24V

#### Power dissipation within unit

0.6W at 24V

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EPS4611 Rev2 050314

# MTL4614

## SWITCH/ PROXIMITY DETECTOR INTERFACE

1-channel, line fault detection, phase reversal

The MTL4614 enables a load to be controlled, through a relay, by a proximity detector or switch. Line faults are signalled through a separate relay and indicated on the top of the module. Switches are provided to select phase reversal and to enable the line fault detection.

### SPECIFICATION

See also common specification

#### Number of channels

One

#### Inputs

Inputs conforming to BS EN60947-5-6:2001 standards for proximity detectors (NAMUR)

#### Voltage applied to sensor

7 to 9V dc from  $1k\Omega \pm 10\%$

#### Input/output characteristics

Normal phase

Outputs closed if input  $> 2.1mA$  ( $< 2k\Omega$  in input circuit)

Outputs open if input  $< 1.2mA$  ( $> 10k\Omega$  in input circuit)

Hysteresis:  $200\mu A$  ( $650\Omega$ ) nominal

#### Line fault detection (LFD) (when selected)

User-selectable via switches on the side of the unit. Line faults are indicated by an LED. Line fault relay is energised and channel output relay de-energised if input line-fault detected

Open-circuit alarm on if  $I_{in} < 50\mu A$

Open-circuit alarm off if  $I_{in} > 250\mu A$

Short-circuit alarm on if  $R_{in} < 100\Omega$

Short-circuit alarm off if  $R_{in} > 360\Omega$

Note: Resistors must be fitted when using the LFD facility with a contact input  
 $500\Omega$  to  $1k\Omega$  in series with switch  
 $20k\Omega$  to  $25k\Omega$  in parallel with switch

#### Output

Channel: Single pole relay with changeover contacts

LFD: Single pole relay with changeover contacts

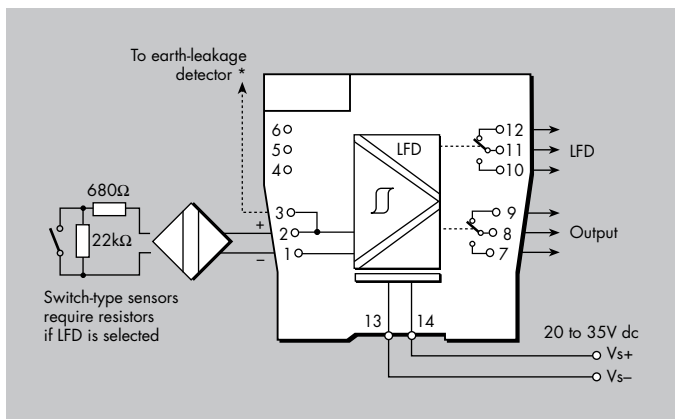
Note: reactive loads must be adequately suppressed

#### Relay characteristics

Response time: 10ms maximum

Contact rating: 10W, 0.5A, 35V dc

### MTL4614



#### LED indicators

Green: power indication

Yellow: channel status, on when output energised

Red: LFD indication, on when line fault detected

#### Maximum current consumption

25mA at 24V dc

#### Power dissipation within unit

0.6W at 24V

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# MTL4614D

## SWITCH/ PROXIMITY DETECTOR INTERFACE

1-channel, dual output, LFD, phase reversal

The MTL4614D enables two safe-area loads to be controlled, through relays, by a proximity detector or switch. When selected, open or short circuit conditions in the field wiring are detected by the line fault detect (LFD) facility and indicated on the top of the module. Switches are provided to select phase reversal and to enable the line fault detection.

### SPECIFICATION

See also common specification

#### Number of channels

One

#### Inputs

Inputs conforming to BS EN60947-5-6:2001 standards for proximity detectors (NAMUR)

#### Voltage applied to sensor

7 to 9V dc from  $1k\Omega \pm 10\%$

#### Input/output characteristics

Normal phase

Outputs closed if input  $> 2.1mA$  ( $< 2k\Omega$  in input circuit)

Outputs open if input  $< 1.2mA$  ( $> 10k\Omega$  in input circuit)

Hysteresis:  $200\mu A$  ( $650\Omega$ ) nominal

#### Line fault detection (LFD) (when selected)

User-selectable via switches on the side of the unit. Line faults are indicated by an LED. The channel output relays are de-energised if an input line-fault is detected

Open-circuit alarm on if  $I_{in} < 50\mu A$

Open-circuit alarm off if  $I_{in} > 250\mu A$

Short-circuit alarm on if  $R_{in} < 100\Omega$

Short-circuit alarm off if  $R_{in} > 360\Omega$

Note: Resistors must be fitted when using the LFD facility with a contact input  
 $500\Omega$  to  $1k\Omega$  in series with switch  
 $20k\Omega$  to  $25k\Omega$  in parallel with switch

#### Output

Two, single pole relays with normally-open contacts

Note: reactive loads must be adequately suppressed

#### Relay characteristics

Contact rating: 10W, 0.5A, 35V dc

#### LED indicators

Green: power indication

Yellow: channel status, on when output energised

Red: LFD indication, on when line fault detected

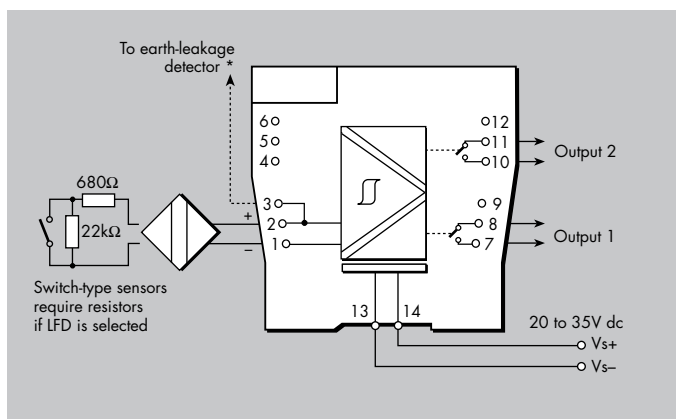
#### Maximum current consumption

29mA at 24V dc

#### Power dissipation within unit

0.7W at 24V

### MTL4614D



\* Signal plug SAF1-3 is required for access to this function

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EPS4614D 010414

# MTL4616

## SWITCH/ PROXIMITY DETECTOR INTERFACE

2-channel, with line fault detection

The MTL4616 enable two loads to be controlled by a switch or proximity detector. When selected, open or short circuit conditions in the field wiring are detected by the line-fault-detect (LFD) facility and also indicated on the top of the module. Phase reversal for each channel is selected by a switch on the side of the module and output is provided by changeover relay contacts.

### SPECIFICATION

See also common specification

#### Number of channels

Two

#### Inputs

Inputs conforming to BS EN60947-5-6:2001 standards for proximity detectors (NAMUR)

#### Voltage applied to sensor

7 to 9V dc from  $1k\Omega \pm 10\%$

#### Input/output characteristics

Normal phase

Outputs closed if input  $> 2.1mA$  ( $< 2k\Omega$  in input circuit)

Outputs open if input  $< 1.2mA$  ( $> 10k\Omega$  in input circuit)

Hysteresis:  $200\mu A$  ( $650\Omega$ ) nominal

#### Line fault detection (LFD) (when selected)

User-selectable via switches on the side of the unit. Line faults are indicated by an LED for each channel. The channel output relay is de-energised if an input line fault is detected.

Open-circuit alarm on if  $I_{in} < 50\mu A$

Open-circuit alarm off if  $I_{in} > 250\mu A$

Short-circuit alarm on if  $R_{in} < 100\Omega$

Short-circuit alarm off if  $R_{in} > 360\Omega$

Note: Resistors must be fitted when using the LFD facility with a contact input  
 $500\Omega$  to  $1k\Omega$  in series with switch  
 $20k\Omega$  to  $25k\Omega$  in parallel with switch

#### Output

Two single-pole relays with changeover contacts

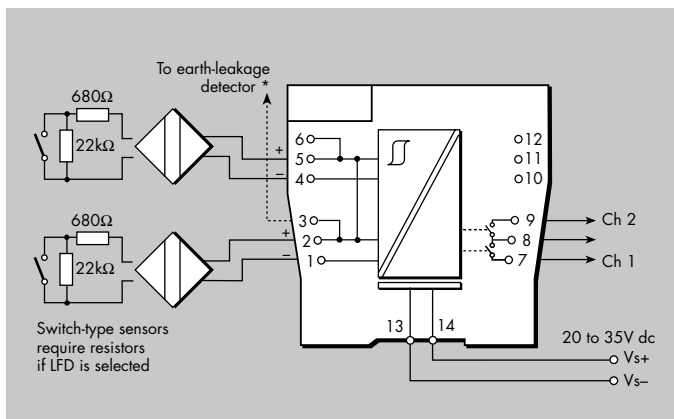
Note: reactive loads must be adequately suppressed

#### Relay characteristics

Response time: 10ms maximum

Contact rating: 10W, 0.5A, 35V dc

### MTL4616



#### LED indicators

Green: power indication

Yellow: two: channel status, on when output energised

Red: two: LFD indication, on when line fault detected

#### Maximum current consumption

35mA at 24V

#### Power dissipation within unit

0.84W at 24V

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EPS4616 Rev2 050314



# MTL4617

## SWITCH/ PROXIMITY DETECTOR INTERFACE

2-channel, line fault detection, phase reversal

The MTL4617 enables two loads to be controlled, through a relay, by proximity detectors or switches. Line faults are signalled through a separate relay and indicated on the top of the module. Switches are provided to select phase reversal and to enable the line fault detection.

### SPECIFICATION

See also common specification

#### Number of channels

Two

#### Inputs

Inputs conforming to BS EN60947-5-6:2001 standards for proximity detectors (NAMUR)

#### Voltage applied to sensor

7 to 9V dc from  $1k\Omega \pm 10\%$

#### Input/output characteristics

Normal phase

Outputs closed if input  $> 2.1mA$  ( $< 2k\Omega$  in input circuit)

Outputs open if input  $< 1.2mA$  ( $> 10k\Omega$  in input circuit)

Hysteresis:  $200\mu A$  ( $650\Omega$ ) nominal

#### Line fault detection (LFD) (when selected)

User selectable by switches on the side of the module.

Line faults are indicated by the LED for each channel.

Line fault relay is energised and channel output relay de-energised if input line-fault detected

Open-circuit alarm on if  $I_{in} < 50\mu A$

Open-circuit alarm off if  $I_{in} > 250\mu A$

Short-circuit alarm on if  $R_{in} < 100\Omega$

Short-circuit alarm off if  $R_{in} > 360\Omega$

Note: Resistors must be fitted when using the LFD facility with a contact input  
 $500\Omega$  to  $1k\Omega$  in series with switch  
 $20k\Omega$  to  $25k\Omega$  in parallel with switch

#### Output

Channel: Two single-pole relays with normally open contacts

LFD: Single pole relay with changeover contacts

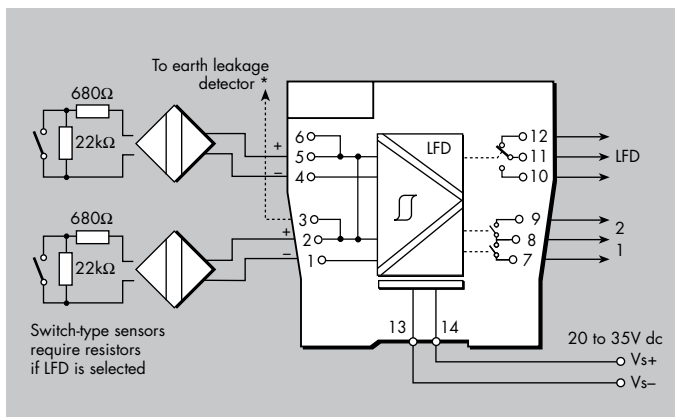
Note: reactive loads must be adequately suppressed

#### Relay characteristics

Response time: 10ms maximum

Contact rating: 10W, 0.5A, 35V dc

### MTL4617



#### LED indicators

Green: power indication

Yellow: two: channel status, on when output energised

Red: two: LFD indication, on when line fault detected

#### Maximum current consumption

35mA at 24V

#### Power dissipation within unit

0.84W at 24V

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EPS4617 Rev2 050314

# MTL4621

## SOLENOID/ALARM DRIVER

loop-powered

The MTL4621 is a loop-powered module that can drive a low-power load as well as apparatus such as an LED. The unit's input/output isolation allows the control switch to be connected into either side of the 24V dc supply circuit.

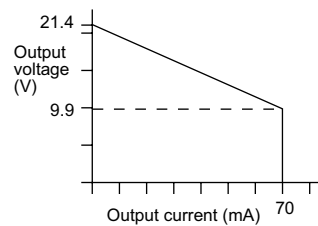
### SPECIFICATION

See also common specification

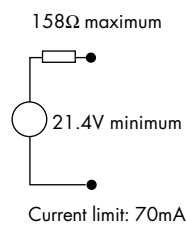
#### Number of channels

One

#### Minimum output voltage



#### Equivalent output circuit



#### Input voltage

20 to 35V dc

#### Output

Minimum output voltage: 9.9V at 70mA  
 Maximum output voltage: 24V from 158Ω  
 Current limit: 70mA

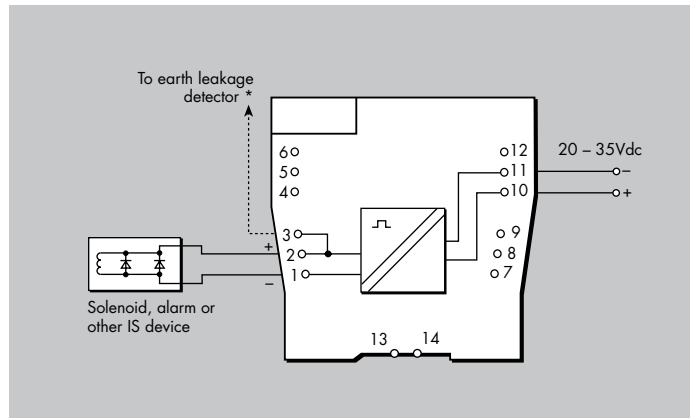
#### Output ripple

< 0.5% of maximum output, peak to peak

#### Response time

Output within 10% of final value within 100ms

### MTL4621



#### LED indicator

Yellow: output status, on when output active

#### Maximum current consumption

125mA (typ.) at 24V

#### Power dissipation within unit

1.4W at 24V

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EPS4621 Rev2 050314

# MTL4623/R

## SOLENOID/ALARM DRIVER

with line fault detection, IIC

With the MTL4623 interface, an on/off device can be controlled by a volt-free contact or logic signal. It is suitable for driving loads such as solenoids. Line fault detection (LFD), which operates irrespective of the output state, is signalled by a solid-state switch which de-energises MTL4623, or energises MTL4623R, if a field line is open or short-circuited. Earth fault detection can be provided by connecting an MTL4220 earth leakage detector to terminal 3.

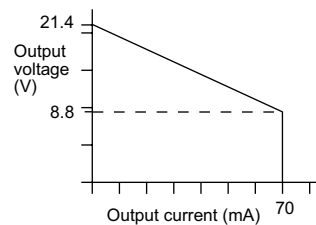
### SPECIFICATION

See also common specification

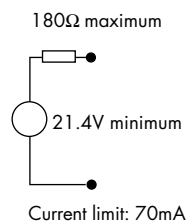
#### Number of channels

One

#### Minimum output voltage



#### Equivalent output circuit



#### Output

Minimum output voltage: 8.8V at 70mA  
Maximum output voltage: 24V from 180Ω  
Current limit: 70mA

#### Output ripple

< 0.5% of maximum output, peak to peak

#### Control input

Suitable for switch contacts, an open collector transistor or logic drive.  
(Internal contact wetting voltage 12V @ 0.2mA contact closed.  
Not suitable for voltage control via series diode.)

Output turns on if input switch closed, transistor on or < 1.4V applied across control input  
Output turns off if input switch open, transistor off or > 4.5V applied across control input

#### Response time

Output within 10% of final value within 100ms

#### Line fault detection (LFD)

Open or short circuit in field cabling *de-energises*\* solid state line-fault signal.

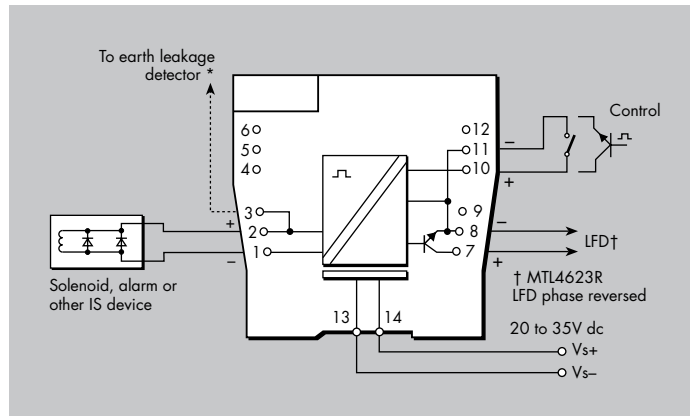
LFD transistor is switched *on*\*, provided that the field circuit impedance is > 55Ω and < 4kΩ.

\* These conditions are reversed for the MTL4623R. This is to permit parallel connection of alarms between modules to provide a group alarm output.

#### Line fault signal characteristics

Maximum off-state voltage: 35V  
Maximum off-state leakage current: 10μA  
Maximum on-state voltage drop: 2V  
Maximum on-state current: 50mA

### MTL4623 / MTL4623R



#### LED indicators

Green: power indication  
Yellow: output status, on when output active  
Red: LFD indication, on when line fault detected

#### Maximum current consumption

125mA at 24V dc

#### Power dissipation within unit

1.4W with typical solenoid valve, output on  
2.0W worst case

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EPS4623/R Rev3 050314

# MTL4623L

## SOLENOID/ ALARM DRIVER

loop-powered with line fault detection

With the MTL4623L interface, an on/off device can be controlled by a voltage signal. It is suitable for driving loads such as solenoids. Line fault detection (LFD), which operates when the output is energised, is signalled by a solid-state switch which energises if a field line is open or short-circuited. Earth fault detection can be provided by connecting an MTL4220 earth leakage detector to terminal 3.

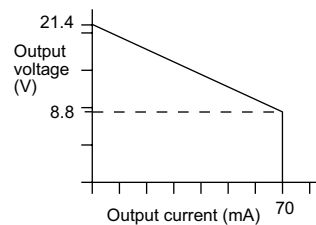
### SPECIFICATION

See also common specification

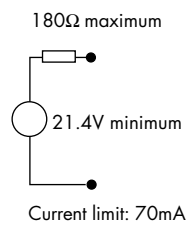
#### Number of channels

One

#### Minimum output voltage



#### Equivalent output circuit



#### Input voltage

20 to 35V dc

#### Output

Minimum output voltage: 8.8V at 70mA  
Maximum output voltage: 24V from 180Ω  
Current limit: 70mA

#### Output ripple

< 0.5% of maximum output, peak to peak

#### Response time

Output within 10% of final value within 100ms

#### Line fault detection (LFD)

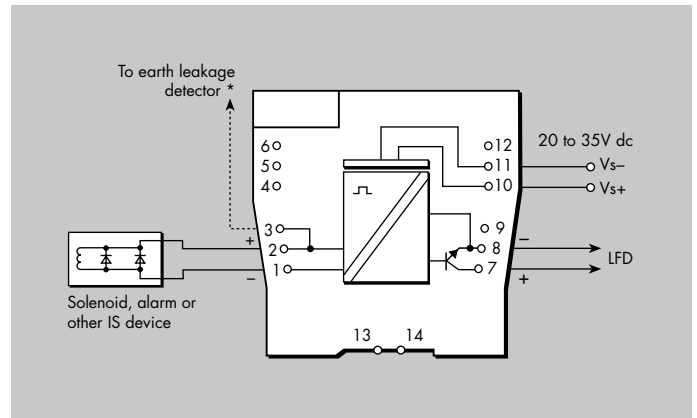
Open or short circuit in field cabling energises solid state line fault signal  
LFD transistor is switched on, provided that the field circuit impedance is > 55Ω and < 4kΩ.

#### Line fault signal characteristics

Maximum off-state voltage: 35V  
Maximum off-state leakage current: 10μA  
Maximum on-state voltage drop: 2V  
Maximum on-state current: 50mA

Note: LFD signal is Zener-diode protected against inductive loads

### MTL4623L



#### LED indicators

Yellow: output status, on when output active  
Red: LFD indication, on when line fault detected

#### Maximum current consumption

125mA at 24V dc

#### Power dissipation within unit

1.4W with typical solenoid valve, output on

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EPS4623L Rev2 050314

# MTL4624

## SOLENOID/ALARM DRIVER

switch operated with override

The MTL4624 enables an on/off device to be controlled by a volt-free contact or logic signal. It can drive loads such as solenoids, alarms, LEDs and other low power devices.

The MTL4624 allows a second switch or logic signal to be connected enabling the output to be disabled to permit, for example, a safety system to override a control signal.

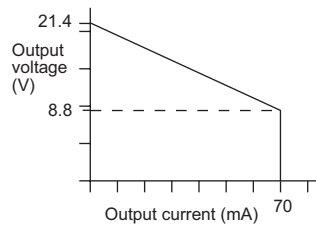
### SPECIFICATION

See also common specification

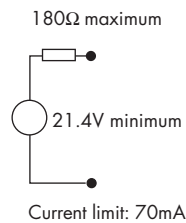
#### Number of channels

One

#### Minimum output voltage



#### Equivalent output circuit



#### Output

Minimum output voltage: 8.8V at 70mA  
 Maximum output voltage: 24V from 180Ω  
 Current limit: 70mA

#### Output ripple

< 0.5% of maximum output, peak-to-peak

#### Control input

Suitable for switch contacts, an open collector transistor or logic drive  
 0 = input switch closed, transistor on or <1.4V applied  
 1 = input switch open, transistor off or >4.5V applied

#### Override input

An open collector transistor or a switch connected across the terminals can be used to turn the output off whatever the state of the control input  
 0 = transistor on or switch closed  
 1 = transistor off or switch open

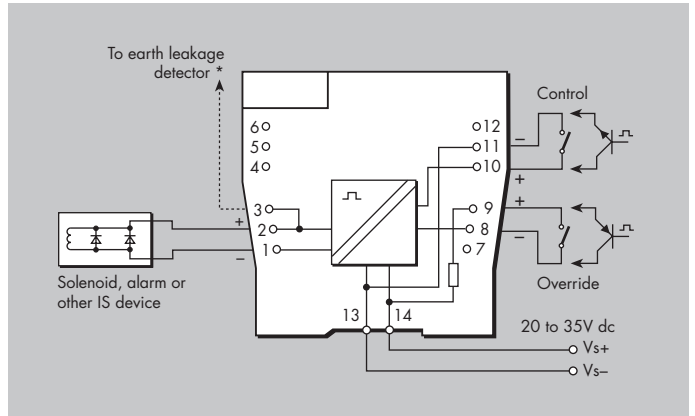
#### Control and override inputs

Control input	Override input	Output state
0	0	off
0	1	on
1	0	off
1	1	off

#### Response time

Output within 10% of final value within 100ms

### MTL4624



#### LED indicators

Green: power indication  
 Yellow: output status, on when output active

#### Maximum current consumption

125mA at 24V dc

#### Power dissipation within unit

1.4W with typical solenoid valve, output on  
 1.9W worst case

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EPS4624 Rev1 201210

# MTL4624S

## SOLENOID/ALARM DRIVER

switch operated with 24V override

The MTL4624S enables an on/off device to be controlled by a volt-free contact or a floating logic signal. It can drive loads such as solenoids, alarms, LEDs and other low power devices. By connecting a second voltage, the output can be disabled to permit, for example, a safety system to override a control signal.

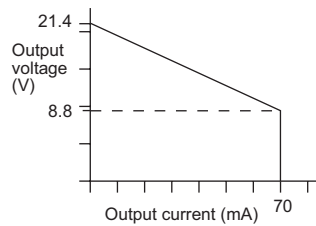
### SPECIFICATION

See also common specification

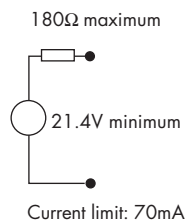
#### Number of channels

One

#### Minimum output voltage



#### Equivalent output circuit



#### Output

Minimum output voltage: 8.8V at 70mA  
Maximum output voltage: 24V from 180Ω  
Current limit: 70mA

#### Output ripple

< 0.5% of maximum output, peak-to-peak

#### Control input (must be fully-floating)

Suitable for switch contacts or an opto-isolator

0 = input switch closed, transistor on or < 1.4V applied  
1 = input switch open, transistor off or > 4.5V applied

#### Override input

A 24V logic signal applied across the terminals allows the solenoid/alarm to be operated by the control input. If it is disconnected, the solenoid/alarm is off.

0 = < 2.0V applied across terminals 8 & 9  
1 = > 9.0V applied across terminals 8 & 9  
(nominal switching point 4.5V)

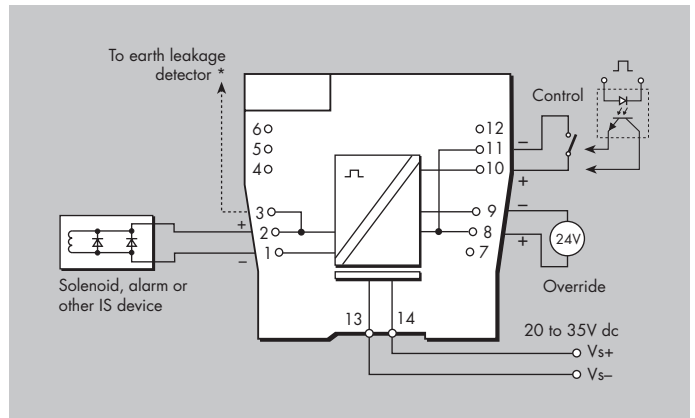
#### Control and override inputs

Control input	Override input	Output state
0	0	off
0	1	on
1	0	off
1	1	off

#### Response time

Output within 10% of final value within 100ms

### MTL4624S



#### LED indicators

Green: power indication

Yellow: output status, on when output active

#### Maximum current consumption

125mA at 24V dc

#### Power dissipation within unit

1.4W with typical solenoid valve, output on  
1.9W worst case

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EPS4624S Rev1 201210

# MTL4626

## SWITCH-OPERATED RELAY

### 2-channel switched output

The MTL4626 enables two separate circuits to be contact controlled by one or two, on/off, control inputs. Applications include the calibration of strain-gauge bridges; changing the polarity (and thereby the tone) of a sounder; the testing of fire alarms; and the transfer of signals into an annunciator with input terminals not segregated from each other.

## SPECIFICATION

See also common specification

### Number of channels

Two, fully floating

### Input/output characteristics

#### Contact/Logic mode

(Inputs suitable for switch contacts, an open-collector transistor or logic drive)

Relay energised if  $< 450\Omega$  or  $< 1V$  applied

Relay de-energised if  $> 5k\Omega$  or  $> 2V$  applied (35V max.)

#### Loop powered mode

Relay energised if  $> 20V$

Relay de-energised if  $< 17V$

### Power supply failure protection

Relays de-energised if supply fails

### Response time

25ms nominal

### Contacts

1-pole changeover per channel

### Contact rating

250V dc, 2A

(reactive loads must be suppressed)

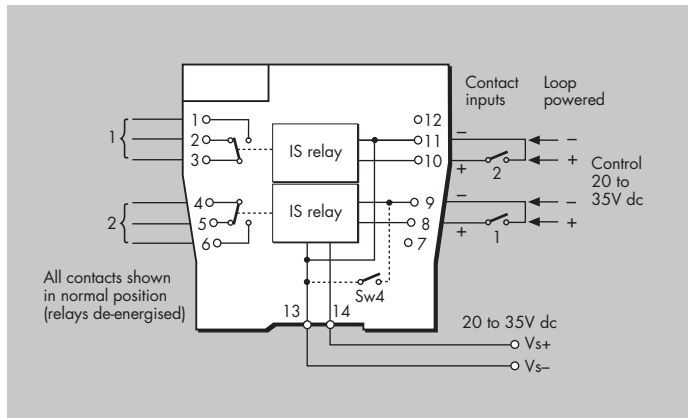
### Contact life expectancy

$10 \times 10^6$  operations at maximum load

### Relay drive (see switch setting table)

Choice of "loop-powered" or "contact/logic" control, for both channels, by switch selection. A further switch option ("1in2out") enables either input, in contact/logic mode, to activate *both* outputs.

## MTL4626



### LED indicators

Green: power indication

Yellow: two: output status, on when relay energised

### Power requirement, Vs

41mA at 20V dc

44mA at 24V dc

60mA at 35V dc

### Power dissipation within unit

1.1W maximum at 24V

### User switch settings for operating mode

Mode	Function	SW1	SW2	SW3	SW4
Contact/Logic	2 ch	Off	On	On	On
	1in2out	On	On	On	On
Loop Powered	2 ch	Off	Off	Off	Off

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EPS4626 Rev3 241111

# MTL4632

## PULSE ISOLATOR

pulse & 4/20mA current outputs

The MTL4632 isolates pulses from a switch, proximity detector, current pulse transmitter or voltage pulse transmitter. It is ideal for applications involving high pulse rates and fast response times, by repeating the pulses into an isolated circuit. An analogue output proportional to frequency is also provided, together with a relay output, which may be configured to act as an alarm. Configuration is carried out with a personal computer.

### SPECIFICATION

See also common specification

#### Number of channels

One, fully floating

#### Sensor type

Switch or proximity detector (NAMUR/BS EN 60947-5-6:2001)  
2- or 3-wire voltage or pulse transmitter

#### Input

##### Switch input:

Output ON if switch is closed

##### Proximity detector input:

Excitation: 7.0 to 9.0V dc from 1k $\Omega$  nominal

Output ON if input > 2.1mA\* (< 2k $\Omega$ )

Output OFF if input < 1.2mA\* (> 10k $\Omega$ )

Switching hysteresis: 0.2mA (650 $\Omega$ ) nominal

\*NAMUR and BS EN 60947-5-6:2001 standards

##### Current pulse input:

Transmitter supply: 16.5V dc at 20mA

Short circuit current: 24mA

Output:  $I_{in} > 9.0mA = ON$ ,  $I_{in} < 7.0mA = OFF$

Switching hysteresis: 0.5mA

##### Voltage pulse input

Input impedance: > 10k $\Omega$

Switching point voltage ( $V_{sp}$ ): 3, 6, or 12V nominal

(User selectable by switches on the side of the module)

Output:  $V_{in} > V_{sp} = ON$ ,  $V_{in} < V_{sp} = OFF$

Switching hysteresis: 100mV + (0.1 x  $V_{sp}$ ) typical

#### Pulse output

Maximum off-state voltage: 35V

Maximum off-state leakage current: 10 $\mu$ A

Maximum on-state resistance: 25 $\Omega$

Maximum on-state current: 50mA

Output OFF if supply fails

Note: LFD signal is Zener-diode protected against inductive loads

#### Current output

Signal range: 4 to 20mA

Under/over range: 0 to 22mA

Load resistance: 0 to 450 $\Omega$  @20mA

Output resistance: >1M $\Omega$

Ripple: < 50 $\mu$ A peak-to-peak

Accuracy: better than 20 $\mu$ A at 20 $^{\circ}$ C

Temperature drift: < 1 $\mu$ A/ $^{\circ}$ C

Response delay: TBA ms

#### Alarm output

Relay ON in alarm, 0.5A @ 35Vdc max.

#### Pulse width

High: 10 $\mu$ s min

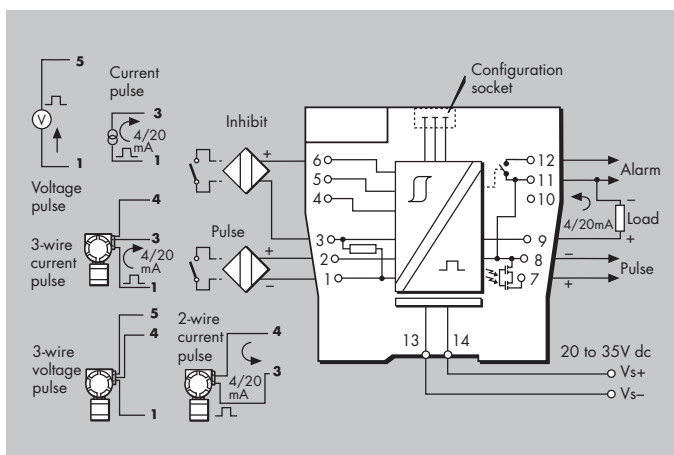
Low: 10 $\mu$ s min

#### Frequency range

0 – 50kHz - pulse output mode

0 – 10KHz - for analogue output

### MTL4632



#### LED indicators

Green: power indication

Yellow: on when output circuit is on

Red: flashing when line fault or error

#### Power requirement

65mA at 24V dc

70mA at 20V dc

55mA at 35V dc

#### Power dissipation within unit

1.35W maximum at 24V

1.75W maximum at 35V

#### Configurator

A personal computer running MTL PCS45 software with a PCL45USB serial interface.

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ESP4632 Rev1 201210



# MTL4641/S

## REPEATER POWER SUPPLY

4/20mA, HART®, 2- or 3-wire transmitters

The MTL4641 provides a fully-floating dc supply for energising a conventional 2- or 3-wire 4/20mA transmitter and repeating the current in another floating circuit to drive a load. For HART 2-wire transmitters, the unit allows bi-directional communications signals superimposed on the 4/20mA loop current. Alternatively, the MTL4641S acts as a current sink rather than driving a current into the load.

### SPECIFICATION

See also common specification

#### Number of channels

One

#### Output

Signal range:	4 to 20mA
Under/over-range:	0 to 24mA
Load resistance (MTL4641)	
@ 24mA:	0 to 375Ω
@ 20mA:	0 to 465Ω
Load (MTL4641S)	
Current sink:	600Ω max.
Maximum voltage source:	24V dc
Circuit output resistance:	> 1MΩ

#### Circuit ripple

< 50µA peak-to-peak

#### Input

Signal range:	0 to 24mA (including over-range)
Transmitter voltage:	20V at 20mA (MTL4641)
	16.5V at 20mA (MTL4641S)

#### Transfer accuracy at 20°C

Better than 20µA 4-20mA (Terminals 1 & 2)  
 Better than 30µA 4-20mA (Terminals 1 & 3)

#### Temperature drift

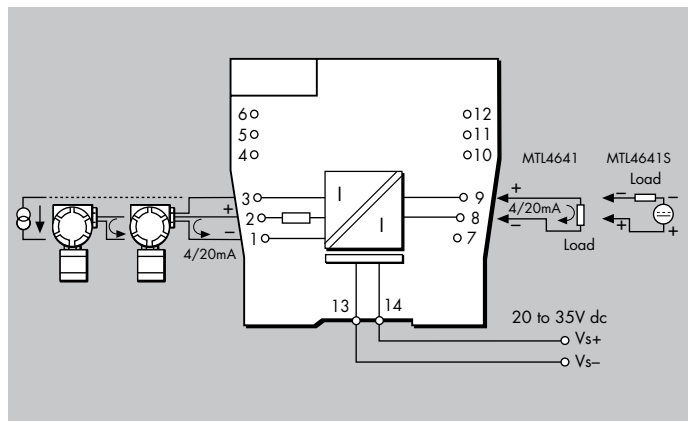
< 0.8µA/°C

#### Response time

Settles to within 10% of final value within 50µs

#### Communications supported

### MTL4641 / MTL4641S



HART (terminals 1 & 2 only)

#### LED indicator

Green: power indication

#### Maximum current consumption (with 20mA signal)

53mA at 24V

#### Power dissipation within unit (with 20mA signal)

MTL4641	0.8W @ 24V dc
MTL4641S	1.0W @ 24V dc

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EPS4641/S Rev4 060314

# MTL4641A/AS

## CURRENT REPEATER

4/20mA passive i/p for HART® transmitters

The MTL4641A provides an input for separately powered 4/20mA transmitters and also allows bi-directional transmission of HART communication signals superimposed on the 4/20mA loop current. Alternatively, the MTL4641AS acts as a current sink rather than driving a current into the load.

### SPECIFICATION

See also common specification

#### Number of channels

One

#### Input

Signal range: 4 to 20mA  
Under/over-range: 1.0 to 21.5mA

#### Input impedance for HART signals

at terminals 1, 2: > 230Ω

#### Maximum input volt drop

at terminals 1, 2: < 6.6V  
i.e. a transmitter load of 330Ω at 20mA

#### Output

Signal range: 4 to 20mA  
Under/over-range: 1.0 to 21.5mA  
Load resistance (MTL4641A)  
Conventional transmitters: 0 to 360Ω  
Smart transmitters: 250Ω ±10%  
Load (MTL4641AS)  
Current sink: 600Ω max.  
Maximum voltage source: 24V DC  
Circuit output resistance: > 1MΩ

#### Circuit ripple

< 50μA peak-to-peak up to 80kHz

#### Transfer accuracy at 20°C

Better than 20μA

#### Temperature drift

< 1μA/°C

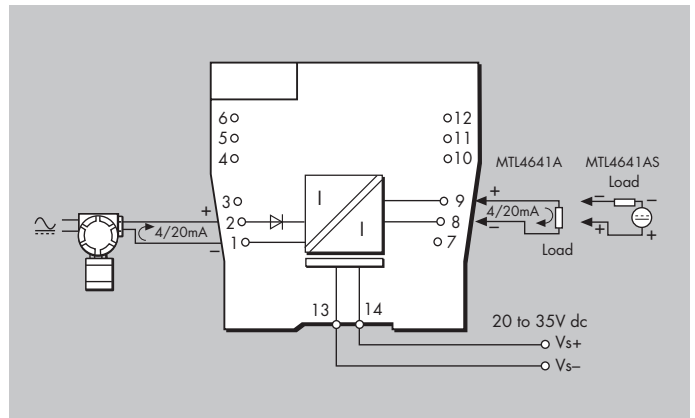
#### Response time

Settles within 200μA of final value after 20ms

#### Communications supported

HART

### MTL4641A / MTL4641AS



#### LED indicator

Green: power indication

#### Power requirement (with 20mA signal)

50mA at 20V  
45mA at 24V  
35mA at 35V

#### Power dissipation within unit (with 20mA signals)

MTL4641A 0.8W @ 24V dc  
MTL4641AS 1.1W @ 24V dc

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EPS4641A/AS Rev2 280311

# MTL4644/S

## REPEATER POWER SUPPLY

2-channel, 4/20mA, HART®, 2- or 3- wire transmitters

The MTL4644 provides fully-floating dc supplies for energising two conventional 2-wire or 3-wire 4/20mA or HART transmitters, and repeats the current in other circuits to drive two loads. For smart transmitters, the unit allows bi-directional transmission of digital communication signals superimposed on the 4/20mA loop current. Alternatively, the MTL4644S acts as a current sink rather than driving a current into the load.

### SPECIFICATION

See also common specification

#### Number of channels

Two

#### Output

Signal range: 4 to 20mA  
 Under/over-range: 0 to 24mA  
 Load resistance (MTL4644)  
 @ 24mA: 0 to 375Ω  
 @ 20mA: 0 to 465Ω  
 Load (MTL4644S)  
 Current sink: 600Ω max.  
 Maximum voltage source: 24V dc  
 Circuit output resistance: > 1MΩ

#### Circuit ripple

< 50μA peak-to-peak

#### Input

Signal range: 0 to 24mA (including over-range)  
 Transmitter voltage: 20V at 20mA

#### Transfer accuracy at 20°C

Better than 20μA 4-20mA (Terminals 1 & 2 / 4 & 5)  
 Better than 30μA 4-20mA (Terminals 1 & 3 / 4 & 6)

#### Temperature drift

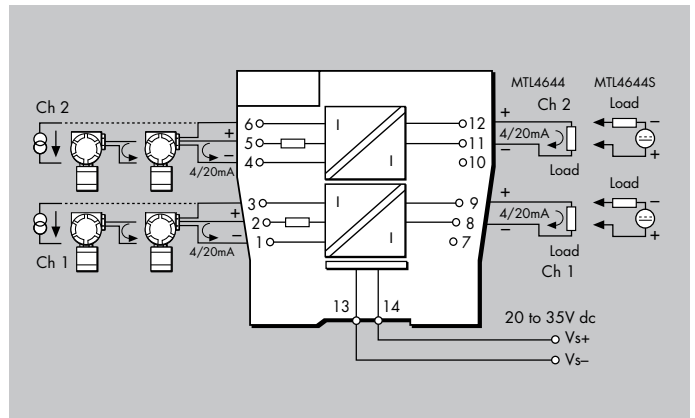
< 0.8μA/°C

#### Response time

Settles to within 10% of final value within 50μs

#### Communications supported

### MTL4644 / MTL4644S



HART (terminals 1 & 2 and 4 & 5 only)

#### LED indicator

Green: power indication

#### Maximum current consumption (with 20mA signals)

100mA at 24V dc

#### Power dissipation within unit (with 20mA signals)

MTL4644 1.5W @ 24V dc  
 MTL4644S 2.0W @ 24V dc

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EPS4644/S Rev3 060314

# MTL4644A/AS CURRENT REPEATER

4/20mA passive i/p for HART® transmitters

The MTL4644A provides an input for separately powered 4/20mA transmitters and also allows bi-directional transmission of HART communication signals superimposed on the 4/20mA loop current, so that the transmitter can be interrogated either from the operator station or by a hand-held communicator (HHC). Alternatively, the MTL4644AS acts as a current sink rather than driving a current into the load.

## SPECIFICATION

See also common specification

### Number of channels

Two

### Input

Signal range: 4 to 20mA  
Under/over-range: 1.0 to 21.5mA

### Input impedance for HART signals

at terminals 1, 2 and 4, 5: > 230Ω

### Maximum input volt drop

at terminals 1, 2 and 4, 5: < 6.6V  
i.e. a transmitter load of 330Ω at 20mA

### Output

Signal range: 4 to 20mA  
Under/over-range: 1.0 to 21.5mA  
Load resistance (MTL4644A)  
Conventional transmitters: 0 to 360Ω  
Smart transmitters: 250Ω ±10%  
Load (MTL4644AS)  
Current sink: 600Ω max.  
Maximum voltage source: 24V DC  
Circuit output resistance: > 1MΩ

### Circuit ripple

< 50μA peak-to-peak up to 80kHz

### Transfer accuracy at 20°C

Better than 20μA

### Temperature drift

< 1μA/°C

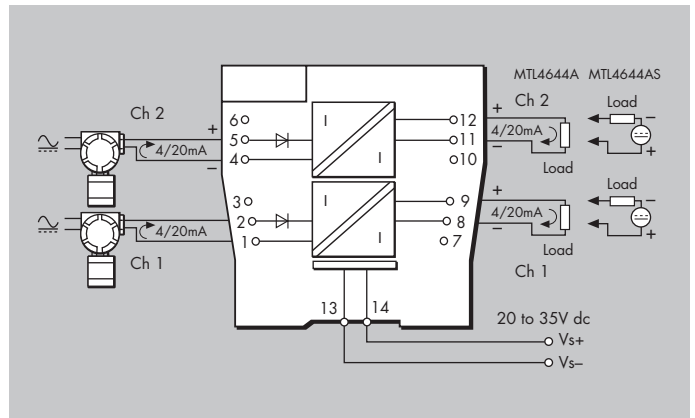
### Response time

Settles within 200μA of final value after 20ms

### Communications supported

HART

## MTL4644A / MTL4644AS



### LED indicator

Green: power indication

### Power requirement (with 20mA signal)

70mA at 24V  
85mA at 20V  
50mA at 35V

### Power dissipation within unit (with 20mA signals)

MTL4644A 1.5W @ 24V dc  
MTL4644AS 2.0W @ 24V dc

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EPS4644A/AS Rev2 280311

# MTL4644D

## REPEATER POWER SUPPLY

single channel, 4/20mA, HART®  
for 2- or 3-wire transmitters, two outputs

The MTL4644D provides a fully-floating dc supply for energising a conventional 2- or 3-wire 4/20mA transmitter and repeating the current in other circuits to drive two loads. For HART 2-wire transmitters, the unit allows bi-directional transmission of digital communication signals superimposed on the 4/20mA loop current.

### SPECIFICATION

See also common specification

#### Number of channels

One

#### Output

Signal range: 4 to 20mA  
Under/over-range: 0 to 24mA  
Load resistance  
@ 24mA: 0 to 360Ω  
@ 20mA: 0 to 450Ω

Circuit output resistance: > 1MΩ

#### Circuit ripple

< 50μA peak-to-peak

#### Input

Signal range: 0 to 24mA (including over-range)  
Transmitter voltage: 16.5V at 20mA

#### Transfer accuracy at 20°C

Better than 15μA

#### Temperature drift

< 0.8μA/°C

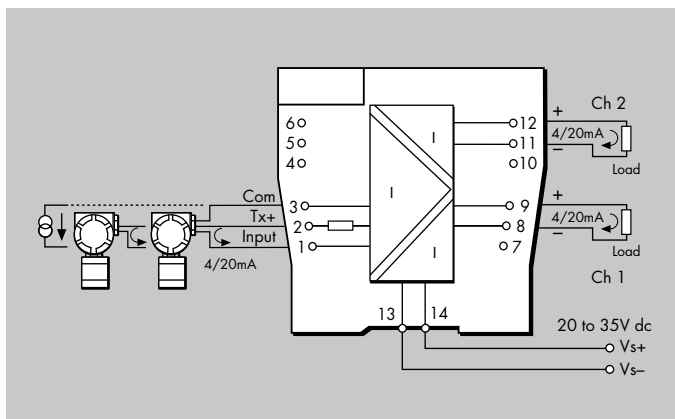
#### Response time

Settles to within 10% of final value within 50μs

#### Communications supported

HART (terminals 1 & 2, output Ch 1 only)

### MTL4644D



#### LED indicator

Green: power indication

#### Maximum current consumption (with 20mA signals)

96mA at 24V dc

#### Power dissipation within unit (with 20mA signals)

1.4W @ 24V dc

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EPS4644D Rev2 050314

# MTL4646/Y ISOLATING DRIVER

for 4–20mA HART® valve positioners  
with line fault detection

The MTL4646 accepts a 4/20mA floating signal from a safe-area controller to drive a current/pressure converter (or any other load up to 800Ω). For HART valve positioners, the module also permits bi-directional transmission of digital communication signals. Process controllers with a readback facility can detect open or short circuits in the field wiring: if these occur, the current taken into the terminals drops to a preset level. The MTL4646Y is very similar except that it provides open circuit detection only (i.e. no short-circuit detection).

## SPECIFICATION

See also common specification

### Number of channels

One

### Working range

4 to 20mA

### Digital signal bandwidth

500Hz to 10kHz

### Maximum load resistance

800Ω (16V at 20mA)

### Minimum load resistance

90Ω (short-circuit detection at < 50Ω)

### Output resistance

> 1MΩ

### Under/over range capability

Under range = 1mA

Over range = 24mA (load ≤ 520Ω)

### Input and output circuit ripple

< 40μA peak-to-peak

### Transfer accuracy at 20°C

Better than 20μA

### Temperature drift

< 1.0μA/°C

### Input characteristics

Field wiring state	MTL4646	MTL4646Y
Normal	< 6.0V	< 6.0V
Open-circuit	< 0.9mA	< 0.5mA
Short-circuit	< 0.9mA	N.A.

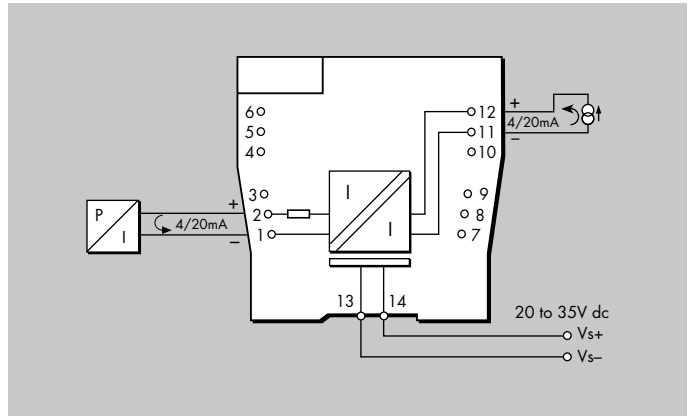
### Response time

Settles within 200μA of final value within 100ms

### Communications supported

HART

## MTL4646 / MTL4646Y



### LED indicator

Green: power indication

### Maximum current consumption (with 20mA signals into 250Ω load)

35mA at 24V dc

### Power dissipation within unit (with 20mA signals into 250Ω load)

0.8W at 24V

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EPS4646/Y Rev2 050314

# MTL4649/Y

## ISOLATING DRIVER

two-channel, for 4–20mA, HART®  
valve positioners with line fault detection

The MTL4649 accepts 4/20mA floating signals from a controller to drive 2 current/pressure converters (or any other load up to 800Ω). For HART valve positioners, the module also permits bi-directional transmission of digital communication signals. Process controllers with a readback facility can detect open or short circuits in the field wiring: if these occur, the current taken into the terminals drops to a preset level. The MTL4649Y is very similar except that it provides open circuit detection only (i.e. no short-circuit detection).

### SPECIFICATION

See also common specification

#### Number of channels

Two

#### Working range

4 to 20mA

#### Digital signal bandwidth

500Hz to 10kHz

#### Maximum load resistance

800Ω (16V at 20mA)

#### Minimum load resistance

90Ω (short-circuit detection at < 50Ω)

#### Output resistance

> 1MΩ

#### Under/over range capability

Under range = 1mA

Over range = 24mA (load ≤ 520Ω)

#### Input and output circuit ripple

<40μA peak-to-peak

#### Communications supported

HART

#### Transfer accuracy at 20°C

Better than 20μA

#### Temperature drift

< 1.0μA/°C

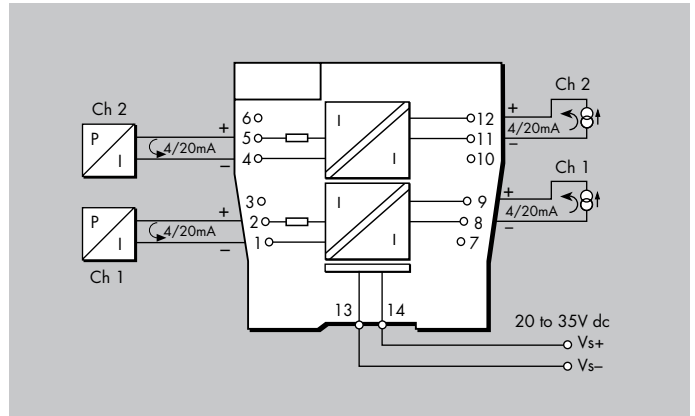
#### Input characteristics

Field wiring state	MTL4649	MTL4649Y
Normal	< 6.0V	< 6.0V
Open-circuit	< 0.9mA	< 0.5mA
Short-circuit	< 0.9mA	N.A.

#### Response time

Settles within 200μA of final value within 100ms

### MTL4649 / MTL4649Y



#### LED indicator

Green: power indication

#### Maximum current consumption (with 20mA signals into 250Ω load)

70mA at 24V dc

#### Power dissipation within unit (with 20mA signals into 250Ω load)

1.6W at 24V

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EPS4649/Y Rev2 050314

# MTL4675

## TEMPERATURE CONVERTER

THC or RTD input + Alarm

The MTL4675 converts a low-level dc signal from a temperature sensor mounted into a 4/20mA current for driving a load. Software selectable features include linearisation, ranging, monitoring, testing and tagging for all thermocouple types and 2-, 3- or 4-wire RTDs. (For thermocouple applications the SAF-CJC plug on terminals 1-3 includes an integral CJC sensor). Configuration is carried out using a personal computer. A single alarm output is provided and may be configured for high or low process alarm or to provide notice of early thermocouple failure.

### SPECIFICATION

See also common specification

#### Number of channels

One

#### Signal source

THC types J, K, T, E, R, S, B or N to BS 60584 and XK  
mV input  
RTDs 2/3/4-wire platinum to BS 60751  
Pt 100, Pt 500, Pt 1000  
Cu-50 & Cu-53  
Ni 100/500/1000 DIN 43760

#### Input signal range

-75 to +75mV, or 0 to 400Ω (0 to 1000Ω Pt & Ni sensors)

#### Input signal span

3 to 150mV, or 10 to 400Ω (10 to 1000Ω Pt & Ni sensors)

#### RTD excitation current

200μA nominal

#### Cold junction compensation

Automatic or selectable

#### Cold junction compensation error

≤ 1.0°C

#### Common mode rejection

120dB for 240V at 50Hz or 60Hz (500ms response)

#### Series mode rejection

40dB for 50Hz or 60Hz

#### Calibration accuracy (at 20°C)

(includes hysteresis, non-linearity and repeatability)

##### Inputs: (500ms response)

mV/THC: ± 15μV or ± 0.05% of input value  
(whichever is greater)

RTD: ± 80mΩ

**Output:** ± 11μA

#### Temperature drift (typical)

##### Inputs:

mV/THC: ± 0.003% of input value/°C

RTD: ± 7mΩ/°C

**Output:** ± 0.6μA/°C

#### Example of calibration accuracy and temperature drift

##### (RTD input - 500ms response)

Span: 250Ω

Accuracy: ± (0.08/250 + 11/16000) × 100%  
= 0.1% of span

Temperature drift: ± (0.007/250 × 16000 + 0.6) μA/°C  
= ±1.0μA/°C

#### Safety drive on sensor failure

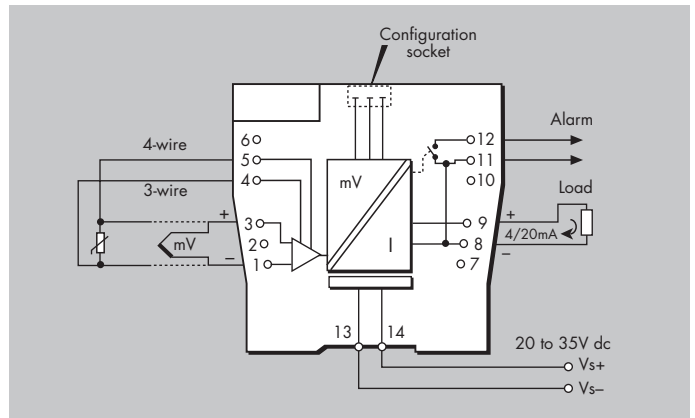
Upscale, downscale, or off

#### Early burnout

Early burnout detection for thermocouples (when selected)

Alarm trips when loop resistance increase is > 50Ω

### MTL4675



#### Output range

4 to 20mA nominal into 600Ω max. (direct or reverse)

#### Alarm output (configurable)

Relay ON in alarm, 250mA @ 35V max

#### Maximum lead resistance (THC)

600Ω

#### Response time

Configurable - 500 ms default  
(Accuracy at 100/200ms - contact MTL)

#### LED indicator

Green: power and status indication  
Yellow: alarm indication, on when contacts are closed

#### Maximum current consumption (with 20mA signal)

50mA at 24V

#### Power dissipation within unit (with 20mA signal)

1.2W at 24V

#### Configurator

A personal computer running MTL PCS45 software with a PCL45USB serial interface.

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EPS4675 Rev1 201210



# MTL4676-RTD

## TEMPERATURE CONVERTER

RTD/potentiometer input, 2-channel

The MTL4676-RTD converts signals from resistance temperature detectors (RTDs) into 4/20mA currents. Software selectable features include input type and characterisation, ranging, monitoring, testing and tagging. Configuration is carried out using a personal computer. The MTL4676-RTD is compatible with 2- and 3-wire RTD inputs.

### SPECIFICATION

See also common specification

#### Number of channels

Two

#### Signal source

2-/3-wire RTDs to BS 60751  
Pt 100, Pt 500, Pt 1000  
Cu-50 & Cu-53  
Ni 100/500/1000 DIN 43760

#### Input signal range

0 to 400Ω (0 to 4000Ω Pt & Ni sensors)

#### Input signal span

10 to 400Ω (10 to 1000Ω Pt & Ni sensors)

#### RTD excitation current

200μA nominal

#### Common mode rejection

120dB for 240V at 50Hz or 60Hz

#### Series mode rejection

40dB for 50Hz or 60Hz

#### Calibration accuracy (at 20°C)

(includes hysteresis, non-linearity and repeatability)

**Input:** ± 80mΩ

**Output:** ± 16μA

#### Temperature drift (typical)

**Input:** ± 7mΩ/°C

**Output:** ± 0.6μA/°C

#### Example of calibration accuracy and temperature drift (RTD input)

Span: 250Ω

Accuracy: ± (0.08/250 + 16/16000) x 100%  
= 0.13% of span

Temperature drift: ± (0.007/250 x 16000 + 0.6) μA/°C  
= ±1.0μA/°C

#### Safety drive on sensor failure

Upscale, downscale, or off

#### Output range

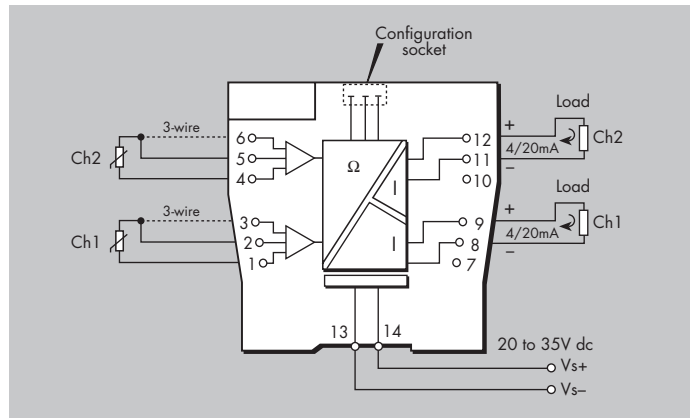
4 to 20mA nominal into 300Ω max. (direct or reverse)

#### Response time

Configurable - 500 ms default

(Accuracy at 100/200ms - contact MTL)

### MTL4676-RTD



#### LED indicator

Green: power and status indication  
Yellow: one provided for channel status  
Red: alarm indication

#### Power requirement, Vs with 20mA signal

60mA at 24V

#### Power dissipation within unit with 20mA signal

1.4W at 24V

#### Isolation

Functional channel-channel isolation for safe and hazardous-area circuits

#### Configurator

A personal computer running MTL PCS45 software with a PCL45USB serial interface.

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EPS4676R Rev1 201210

# MTL4676-THC

## TEMPERATURE CONVERTER

mV/THC input, 2-channel

The MTL4676-THC converts low-level dc signals from temperature sensors mounted in a hazardous-area into 4/20mA currents. Software selectable features include linearisation for standard thermocouple types, ranging, monitoring, testing and tagging. Configuration is carried out using a personal computer. The field connections include cold-junction compensation and do not need to be ordered separately.

### SPECIFICATION

See also common specification

#### Number of channels

Two

#### Signal source

THC types J, K, T, E, R, S, B or N to BS 60584 and XK mV input

#### Input signal range

-75 to +75mV

#### Input signal span

3 to 150mV

#### Cold junction compensation

Automatic or selectable

#### Cold junction compensation error

≤ 1.0°C

#### Common mode rejection

120dB for 240V at 50Hz or 60Hz

#### Series mode rejection

40dB for 50Hz or 60Hz

#### Calibration accuracy (at 20°C)

##### (includes hysteresis, non-linearity and repeatability)

**Input:** ±15µV or ±0.05% of input value (whichever is greater)

**Output:** ±16µA

#### Temperature drift (typical)

**Input:** ±0.003% of input value/°C

**Output:** ±0.6µA/°C

#### Safety drive on sensor burnout

Upscale, downscale, or off

#### Output range

4 to 20mA nominal into 300Ω max. (direct or reverse)

#### Maximum lead resistance

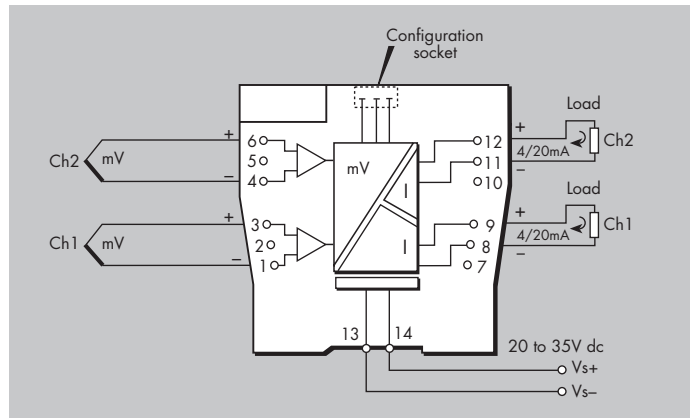
300Ω

#### Response time

Configurable - 500 ms default

(Accuracy at 100/200ms - contact MTL)

### MTL4676-THC



#### LED indicator

Green: power and status indication  
Yellow: one provided for channel status  
Red: alarm indication

#### Power requirement, Vs with 20mA signal

60mA at 24V

#### Power dissipation within unit with 20mA signal

1.4W at 24V

#### Isolation

Functional isolation channel-channel for input and output circuits.

#### Configurator

A personal computer running MTL PCS45 software with a PCL45USB serial interface.

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EPS4676T Rev1 201210

# MTL4600 SERIES COMMON SPECIFICATIONS

Please go to our website at [www.mtl-inst.com](http://www.mtl-inst.com) for the latest information regarding safety approvals, certificates and entity parameters.

## Connectors

Each unit is supplied with signal connectors, as applicable.  
When using crimp ferrules for the signal connectors the metal tube length should be 12mm and the wire trim length 14mm.

## Isolation

1500V rms minimum, between system and field terminals.  
50V between system circuits and power supply

## Supply voltage

20 – 35V dc

## Terminals

Accepts conductors of up to 2.5mm<sup>2</sup> stranded or single-core

## Mounting

MTL4500/4600 series backplanes

## Ambient temperature limits

-20 to +60°C (-6 to +140°F) operating  
-40 to +80°C (-40 to +176°F) storage

## Humidity

5 to 95% relative humidity

## Weight

140g

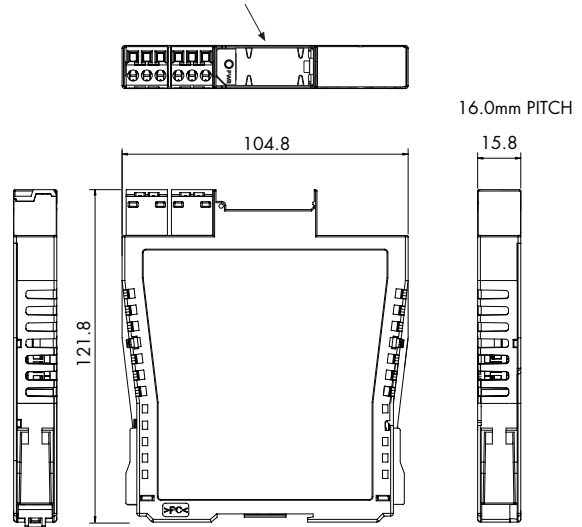
Approximate (except where indicated)

HART® is a registered trademark of HART Communication Foundation

## DIMENSIONS (MM)

### MTL4600

Optional TH5000 tag holder for individual isolator identification.  
Accepts tag label 25 x 12.5 ±0.5mm, 0.2mm thick



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EPS46CS Rev1 201210

# CUSTOM, STANDARD AND UNIVERSAL BACKPLANES FOR EASY DCS INTEGRATION

- Total flexibility
- Reduce wiring
- Simplify installation
- Special functions
- Signal conditioning
- HART® integration

The MTL4500/MTL4600 Series backplanes, enclosures and other accessories provide comprehensive, flexible and remarkably compact mounting facilities for system vendors, original equipment manufacturers and end users alike.

## CUSTOMISED BACKPLANES

MTL provides a complete design and manufacturing service for customised backplanes. Customised backplanes give the vendors and users of process control and safety systems the opportunity to integrate MTL4500/MTL4600/HART® modules directly into their system architecture. As there are no hazardous-area circuits on the backplanes, customised versions can be produced without the need for IS certification, so simplifying design and lowering costs.

## UNIVERSAL CUSTOM BACKPLANES

The 'universal' backplane allows a fast and economic approach to providing a custom interface. Where tight time schedules exist, the backplane can be installed to allow the panel building and wiring to be completed. The customised adapter card can then be plugged in at any time up to integrated test.

## ADAPTER CARDS

Adapter cards already exist for many of the DCS companies. In addition there is a range of general purpose cards that offer reduced wiring for use with specific MTL modules. These are also available in left- and right-hand versions to ease panel wiring.

## STANDARD MTL BACKPLANES

Standard MTL backplanes are available to accommodate 4, 8, 16, or 24 modules using screw-clamp connectors for the safe-area circuits. On an individual backplane, any module can be plugged into any position and module types can be mixed. For 8-, 16- and 24-way backplanes, screw-clamp connectors which plug into the backplanes provide primary and secondary 24V dc power supplies. Power to several 8- or 16-way backplanes can be interconnected to reduce and simplify wiring – see instruction manual INM4500/INM4600 for details.

## MTL CPS STANDARD BACKPLANES

Backplane model no.	Number of modules	Safe-area connections	MOUNTING KITS			ACCESSORIES		
			Surface	DIN-rail (T or G)	19-inch rack	Earth-rail kit	Tagging strip kit	Spare fuse pack
CPS04	4	Screw-clamp	SMS01	DMK01	–	–	–	FUS1.0ATE5
CPS08	8	Screw-clamp	SMS01	DMK01	–	ERK08	TSK08	FUS1.0ATE5
CPS16	16	Screw-clamp	SMS01	DMK01	–	ERK16	TSK16	FUS2.0ATE5
CPS24	24	Screw-clamp	SMS01	DMK01	HMP24	–	TSK24	FUS4.0ATE5



## OPTIONAL ACCESSORIES

Optional accessories include tagging strip kits for all three sizes of backplane and earth rail kits for 8 and 16-way versions. Mounting accessories are available for surface (all backplanes), T-section and G-section DIN-rail (8- and 16-way versions), and a horizontal plate for mounting 24-way backplanes in 19-inch racks.

## WEATHERPROOF ENCLOSURES

Weatherproof enclosures are available for applications where separate safe-area enclosures are required for backplanes with modules. Available to accommodate one 4-way or one 8-way backplane, they are manufactured from GRP giving protection against dust and water to IEC529:IP65. The lids are made from transparent high-strength polycarbonate so that LEDs, etc, on the tops of the modules are easy to see.

## DCS VENDORS/SYSTEMS SUPPORTED:

<b>ABB Automation</b> S100, INFI90, S800	<b>Emerson</b> M Series, S Series
<b>Rockwell Automation</b>	<b>HIMA</b> HIMax
<b>Bently-Nevada</b>	<b>Schneider</b> Modicon
<b>Foxboro</b> IA FBM & FBM2xx	
<b>Siemens</b> ET200, S7	
<b>Honeywell</b> PMIO, C200, C300	
<b>Honeywell-SMS</b> Safety Manager, RUSIO	
<b>ICS</b> Triplex, Plantguard	
<b>Triconex</b> Tricon, Trident	
<b>Yokogawa</b> Centum R3, VF, Prosafe RS	

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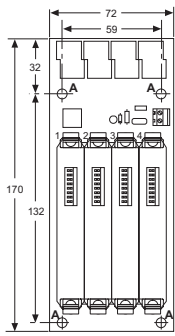
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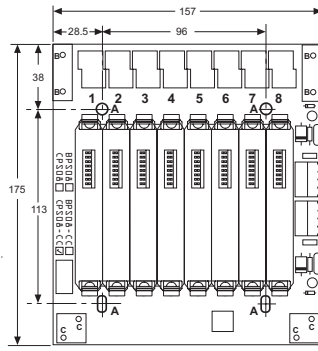
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EPS45-46backplane Rev3 080512

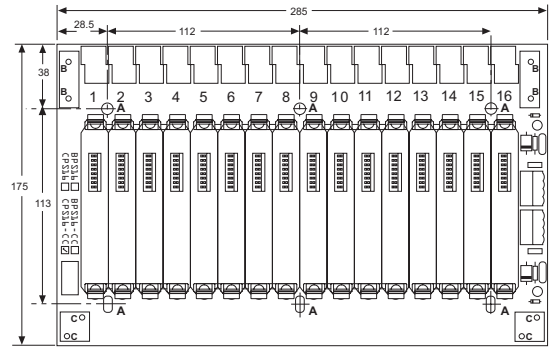
## CPS BACKPLANE DIMENSIONS (mm)



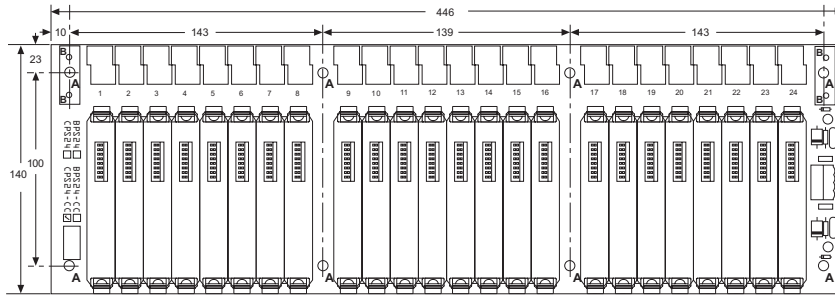
CPS04



CPS08



CPS16



CPS24

### Power requirements, Vs

21V dc to 35V dc through plug-in connectors

### Safe-area connections

CPS: 2.5mm<sup>2</sup> screw-clamp terminals – 6 positions per module

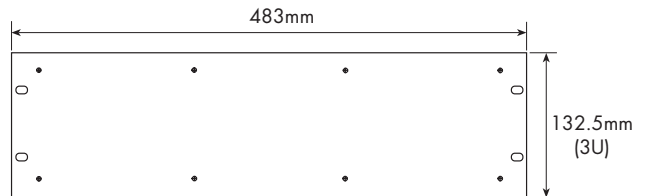
### Power sense

Through separate plug-in crimp connector

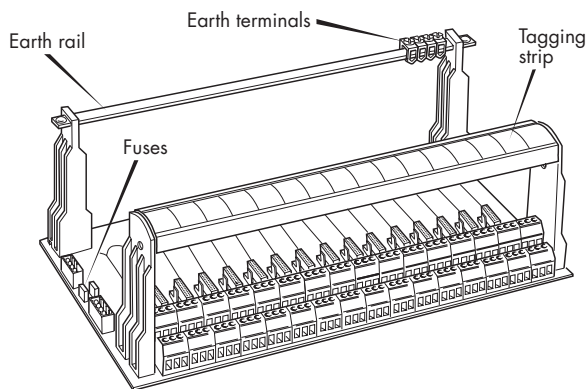
### Weight (without modules or accessories)

CPS04:	96g
CPS08:	225g
CPS16:	419g
CPS24:	592g

### HMP24 MOUNTING PLATE FOR 19 INCH RACK



## BACKPLANE ACCESSORIES



### SCK45 - backplane clips



10 x strip of four

### MCK45 - backplane clips



16 x strip of two

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sales.mtsing@cooperindustries.com

EPS45backplane Rev3 080512

## ORDERING INFORMATION



### MTL4600 Series isolators

Specify part number: eg, **MTL4611**

#### Individual isolator identification

**TH5000** Tag holder (Pack of 20)

#### Connectors - MTL4600

**SAF-CJC** Field plug, terminals 1 and 3 with cold-junction sensor

**SAF-CJC2** Field plug, terminals 4 and 6 with cold-junction sensor

**SAF1-3** System plug, terminals 1, 2 and 3

**SAF4-6** System plug, terminals 4, 5 and 6



### MTL4500/4600 Standard Backplanes

**CPS04** 4-way backplane screw-clamp connector

**CPS08** 8-way backplane screw-clamp connector

**CPS16** 16-way backplane screw-clamp connector

**CPS24** 24-way backplane screw-clamp connector

### MTL4500/4600 Custom Backplanes

Contact MTL for options and advice



### MTL4500/4600 Backplane mounting accessories

**DMK01** DIN-rail mounting kit, T- or G-section (pack of 40)

8-way backplanes require 4,  
16-way backplanes require 6

**SMS01** Surface mounting kit (pack of 40)  
4- and 8-way backplanes require 4,  
16-way backplanes require 6,  
24-way backplanes require 8

**HMP24** Horizontal mounting plate and screws for  
19-inch rack mounting  
24-way backplanes only

**BMK08** Mounting kit for one 4- or 8-way backplane

**BMK16** Mounting kit for one 16-way backplane

### MTL4600 Backplane accessories

**ERK08** Earth rail kit for CPS08 backplane

**ERK16** Earth rail kit for CPS16 backplane

**TSK08** Tagging strip kit for CPS08 backplane

**TSK16** Tagging strip kit for CPS16 backplane

**TSK24** Tagging strip kit for CPS24 backplane

**FUS1.0ATE5** Fuse kit for 4- and 8-way backplanes,  
(10 per pack)

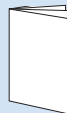
**FUS2.0ATE5** Fuse kit for 16-way backplane,  
(10 per pack)

**FUS4.0ATE5** Fuse kit for 24-way backplanes,  
(10 per pack)

**MCK45** MTL4000 backplane conversion kit  
(16 clip pairs per pack)

**SCK45** Module 4-clip strips  
(10 strips + 40 rivets per pack)

**MPL01** Module position label (blank)  
(50 per pack)



### Literature

**INM4500** MTL4600 Series instruction manual

### Configurator and software

**PCL45USB** Configurator, PC interface and software

**PCS45** PC software

Please go to our website at [www.mtl-inst.com](http://www.mtl-inst.com) for the latest information.

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