

# MTL4851 and MTL4852

## HART® connection systems

- Designed to mount directly to a range of general purpose HART® connection units and IS backplanes
- Provides a simple interface to smart devices in the field
- Connect up to 7936 HART® devices on a single RS485 network
- LED indication for fault diagnosis
- Auto baud rate detection
- Connectivity to HART® configuration and Instrument Management software (IMS)



The MTL4851 and MTL4852 HART connection system provides a simple interface between smart devices in the field, control systems and HART instrument management software run on a pc.

The system is based on 16-channel modularity to provide a compact, easily configurable and expandable system. Using a standard RS485 serial link up to 7936 HART devices can be connected on a single network.

For the optimum solution, choose from a range of general purpose and IS termination boards. For maximum flexibility the HMM64 HART backplane locates an MTL4851 master communications module and up to three MTL4852 secondary interface modules, with each module connecting to 16 field devices. General purpose HART connection units and IS backplanes are available fitted with an cable interface connection to the HMM64. This system can be extended with further HMS64 HART backplanes linked to the master, each carrying up to four MTL4852 secondary interface modules.

The MTL4851 and MTL4852 modules can also be located on HTP-SC16x termination boards for general purpose applications. HART loops are simply wired through these HART Termination Panels and may be grounded or floating circuits. The HTP boards offer a compact and cost-effective solution for general applications. CPH-SC16x backplanes are ideal for signal loops requiring intrinsic safety (IS) protection, combining multiplexer and IS isolator mounting. This offers considerable simplification in wiring when compared to DIN-rail based solutions.

The HCU16 HART units connect to 16 general purpose field instruments while maintaining channel to channel isolation. Resistor conditioning options are compatible with all types of I/O cards. It allows pass-through connections for transmitter power supply, input signal and common.

The HCU16AO unit includes HART filters for use with I/O cards that are incompatible with HART communication signals.

Customised backplanes and connection units are available to provide direct connection from DCS I/O cables, replacing the standard termination boards.

See also the MTL4850 datasheet for alternative HART solutions using a 32 channel multiplexer module ideally suited for use in conjunction with emergency shutdown and safety systems.

### Connectivity to HART Configuration and Instrument Management Software :

The online access to the information contained within HART devices allows users to diagnose field device troubles before they lead to costly problems. Software can capture and use diagnostic data from HART field instruments via the MTL HART connection hardware. This allows users to realise the full potential of their field devices to optimise plant assets, which results in significant operations improvement and direct maintenance savings.

IMS products provide essential configuration, calibration, monitoring and maintenance history functions for conventional analogue (4-20 mA) and HART protocol compatible smart process instruments and field devices. They deliver powerful tools to meet the need for standardised instrument maintenance procedures and record keeping mandated by some quality standards and regulatory bodies.

### The benefits of utilising these powerful software packages online include:

- Reduced commissioning time and costs
- Reduced maintenance costs
- Reduced documentation
- Reduced process downtime

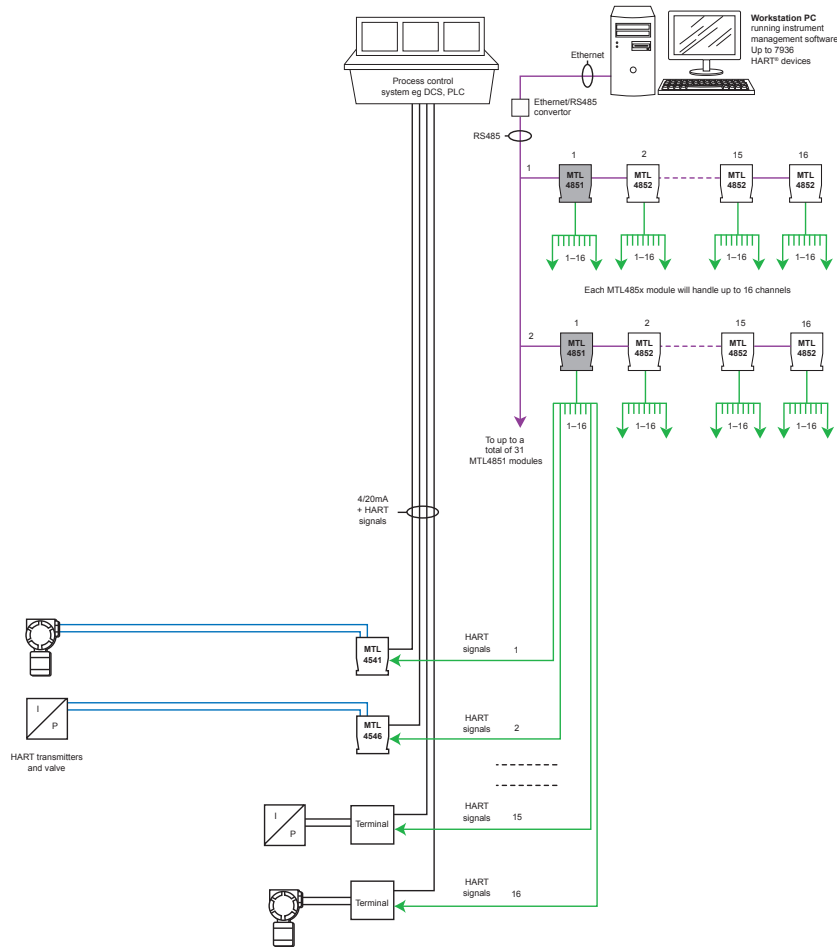
The MTL485x offers connectivity to a comprehensive range of FDT based software packages via the comms Device Type Manager (DTM). The DTM can be downloaded from [www.mtl-inst.com](http://www.mtl-inst.com). Other software packages, such as AMS from Emerson, work with the MTL485x through custom software drivers or by the inclusion of the device description (DD) file for the MTL multiplexers.

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# MTL4851 and MTL4852 HART® Connection Systems

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## SYSTEM OVERVIEW (TYPICAL INSTALLATION)



### LED INDICATORS - MTL4851 module

| LED   | Colour | State                  | Description   |
|-------|--------|------------------------|---|
| PWR   | green  | Off                    | Multiplexer is not receiving power  |
|       |        | On                     | Multiplexer is receiving power  |
| FAULT | red    | Off                    | Multiplexer is in the running state   |
|       |        | Pulsing                | Multiplexer build/rebuild is in progress  |
|       |        | Blinking               | No HART loops found   |
|       |        | On (steady)            | A fault was detected and multiplexer operation has halted   |
| HOST  | yellow | Off                    | No communication on the RS485 channel   |
|       |        | Short flash (0.25 sec) | Correctly framed message received by the multiplexer  |
|       |        | Long flash (1 sec)     | Response transmitted—this is re-triggerable so repeated transmissions will leave the indicator permanently on |
| HART  | yellow | Off                    | No communication on the channel   |
|       |        | Short flash (0.25 sec) | Message transmitted   |
|       |        | Long flash (1 sec)     | Response received- this is re-triggerable so repeated transmissions will leave the indicator permanently on   |

### LED INDICATORS - MTL4852 module

| LED  | Colour | State   | Description                      |
|------|--------|---------|----------------------------------|
| PWR  | green  | Off     | Unit is not receiving power      |
|      |        | On      | Unit is receiving power          |
| HART | yellow | Pulsing | Indicating a channel is selected |
|      |        | On      | Channel continuously selected    |

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# MTL4851 and MTL4852 HART® Connection Systems

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## SPECIFICATION

### MTL4851 Master Communications Module

#### Number of HART channels

16 (ch1 to ch16)

#### Channel device type

HART rev 5-7

#### Channel interface

2 connections to each channel

#### Host system interface

RS485 2-wire multidrop

(up to 31 MTL4851 modules can be connected to one host)

RS485 baud rate

38400, 19200, 9600, 1200 baud- auto detected

Address selection

up to 31 addresses, set on backplane

#### Alarm output

Open-collector transistor, referenced to 0V

$V_{max} = 35V$ ,  $I_{max} = 5mA$ ,  $P_{max} = 100mW$

### MTL4852 Secondary Interface Module

#### Number of HART channels

16 (ch17 to ch256 in 16 channel groups)

#### Channel device type

HART rev 5-7

#### Channel interface

2 connections to each channel

#### MTL systems interface

Up to 15 off MTL4852 modules per MTL4851

Total length of interface bus, 4m max.

#### Power requirements

Powered from MTL4851 module

## ISOLATION

#### Channel-to-channel isolation

50V dc

#### Field loop isolation

50V dc

Module is coupled to loops via capacitor in each connection leg (i.e. 2 capacitors per channel)

#### RS485 interface isolation (Between module and interface)

50V dc

#### Alarm output isolation (Between module and output)

50V dc

#### PSU isolation (Between module and PSU input)

50V dc

## POWER SUPPLY, MTL4851 (from backplane)

#### Supply voltage

19V to 35V dc

#### Current consumption

42mA at 24V  $\pm$ 10% for MTL4851, plus 2mA for each MTL4852

#### Power dissipation (MTL4851 + 15 MTL4852)

<1.6W at 24V  $\pm$ 10%

#### PSU protection

Reversed polarity protected

## ENVIRONMENTAL

#### Temperature range

Operating:  $-40^{\circ}C$  to  $+60^{\circ}C$

Non-operating:  $-40^{\circ}C$  to  $+85^{\circ}C$

#### Relative humidity

5% to 95% - non-condensing

## MECHANICAL

#### Dimensions

See drawing

#### Weight

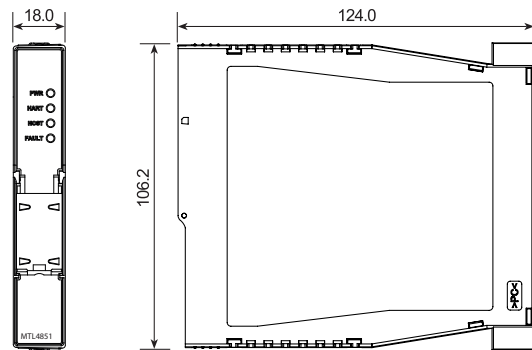
MTL4851 95gm

MTL4852 75gm

#### Approvals

For the latest certificate information, see [www.mtl-inst.com/certificates](http://www.mtl-inst.com/certificates)

## DIMENSIONS (mm)



## INSTRUMENT MANAGEMENT SOFTWARE

The MTL HART Connection System offers connectivity to a comprehensive range of both general instrument management software packages and dedicated software packages for optimising Valve positioner performance and maintenance including-

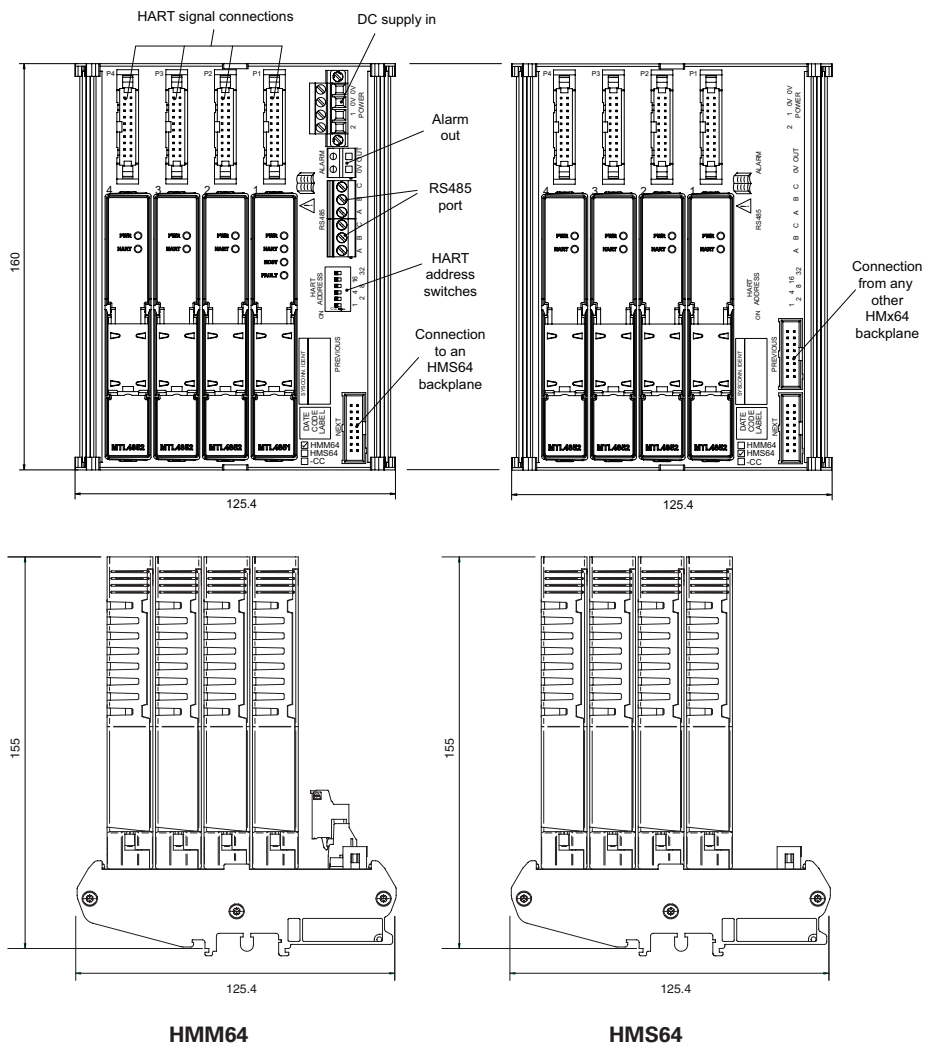
|                                  |                                   |
|----------------------------------|-----------------------------------|
| <b>AMS Device Manager</b>        | Emerson Process Management        |
| <b>Cornerstone</b>               | ASTEC                             |
| <b>DAT200 Asset Vision Basic</b> | ABB                               |
| <b>FDM</b>                       | Honeywell                         |
| <b>FDT Container</b>             | M&M Software                      |
| <b>FieldCare</b>                 | Endress & Hauser/Metso Automation |
| <b>Fieldmate</b>                 | Yokogawa                          |
| <b>HART OPC Server</b>           | HART Communication Foundation     |
| <b>PACTware</b>                  | PACTware Consortium               |
| <b>PDM</b>                       | Siemens                           |
| <b>SoftTools</b>                 | Flowserve                         |
| <b>ValveLink</b>                 | Emerson Process Management        |
| <b>Valvue</b>                    | Masoneilan                        |



For software packages that are based on a FDT frame i.e FieldCare, PACTware etc communication with the MTL HART multiplexer system requires the MTL Generic Communications DTM. This can be downloaded Free of Charge from the MTL website.

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## BACKPLANES FOR MTL4851/MTL4852 GENERAL PURPOSE VERSIONS



### HMM64/HMS64 BACKPLANE

#### Capacity

HMM64 1xMTL4851, 3xMTL4852

HMS64 4xMTL4852

Max. 3xHMS64 connected to 1xHMM64

#### Maximum power requirements

1.9W for fully equipped HMM64, plus  
3 HMS64 backplanes.

#### HART interface connectors

4xDIN41651 20-way HART signal cables  
(16 HART signal connections + 4 common returns)  
For use with HM64RIB20 cables

#### Backplane inter-connect

HMM64 1x DIN41651 16-way socket  
HMS64 2x DIN41651 16-way socket  
For use with HMRIB16 cables

#### Weight (excl. modules)

215g approx.

#### Power requirements, Vs

21 to 35V dc through plug-in connectors, screw-secured  
4 terminals for dual power supplies

#### RS485 port

2 terminals for bus, plus screen terminal  
6 terminals in total to enable chained bus connection.  
HART address switch, five poles active in six position switch

#### Alarm connectors

2 terminals for alarm output and alarm clear

#### Conductor terminals

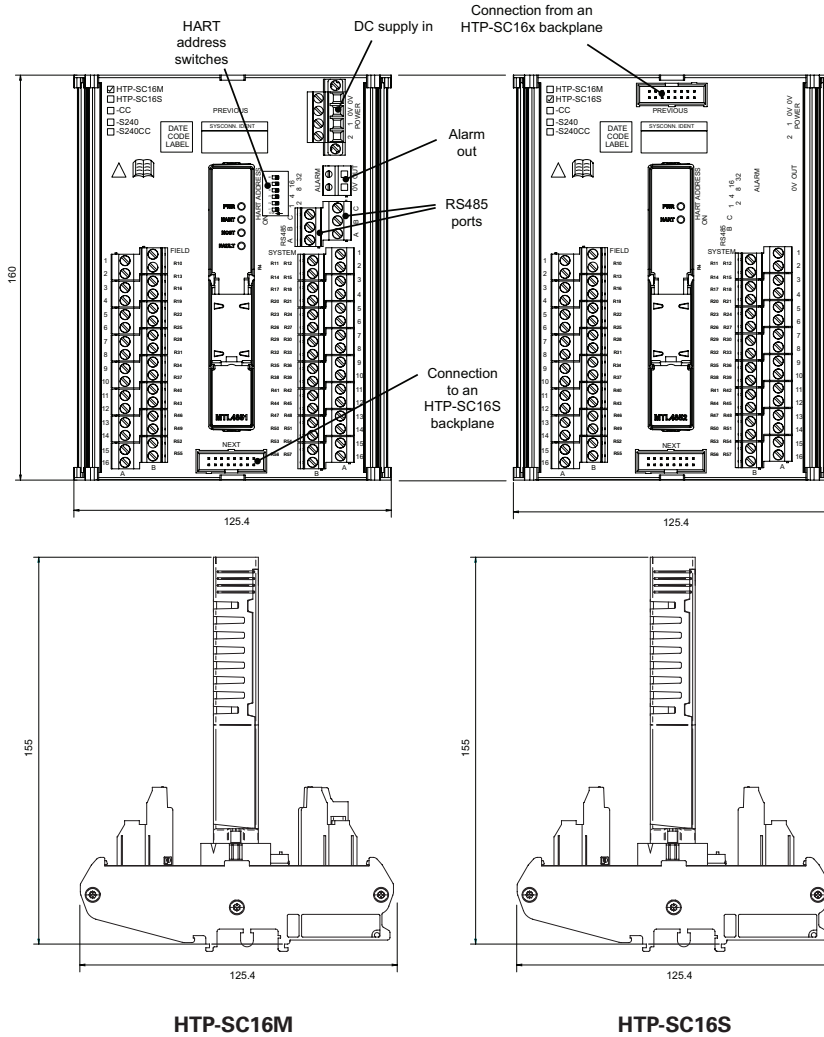
Accept conductors of up to 2.5mm<sup>2</sup> stranded or single-core

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## BACKPLANES FOR MTL4851/MTL4852 GENERAL PURPOSE VERSIONS



### HTP-SC16M/HTP-SC16S BACKPLANE \*

#### Capacity

HTP-SC16M 1xMTL4851  
HTP-SC16S 1xMTL4852  
Max. 4xHTP-SC16S connected to 1xHTP-SC16M

#### Maximum power requirements

1.3W for HTP-SC16M, plus  
4 HTP-SC16S backplanes.

#### Signal connectors

2.5mm<sup>2</sup> screw-clamp terminals  
2 terminals per channel for field and system

#### Backplane inter-connect

HTP-SC16M 1x DIN41651 16-way socket  
HTP-SC16S 2x DIN41651 16-way socket  
For use with HMRIB16 cables

#### Weight (excl. modules)

300g approx.

#### Power requirements, Vs

21 to 35V dc through plug-in connectors, screw-secured  
4 terminals for dual power supplies

#### RS485 port

2 terminals for bus, plus screen terminal  
6 terminals in total to enable chained bus connection.  
HART address switch, five poles active in six position switch

#### Alarm connectors

2 terminals for alarm output and alarm clear

#### Conductor terminals

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

\* for further details of the model options refer to the Instruction Manual INM4851 - available from the MTL website.

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# MTL4851 and MTL4852 HART® Connection Systems

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## BACKPLANES FOR MTL4851/MTL4852 GENERAL PURPOSE VERSIONS

### HCU16 HART CONNECTION UNIT\*

**Accuracy (HCU16-P250 only)**

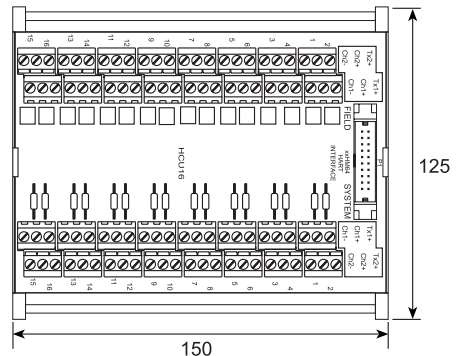
250Ω ±0.05%

**Connectors**

- 2.5mm<sup>2</sup> screw-clamp terminals
- 3 terminals per channel
- 20-way HART signal cable (to HMM64/HMS64)

**Weight**

383g approx.



HCU16

### HCU16AO CONNECTION UNIT WITH FILTERS

**Series impedance**

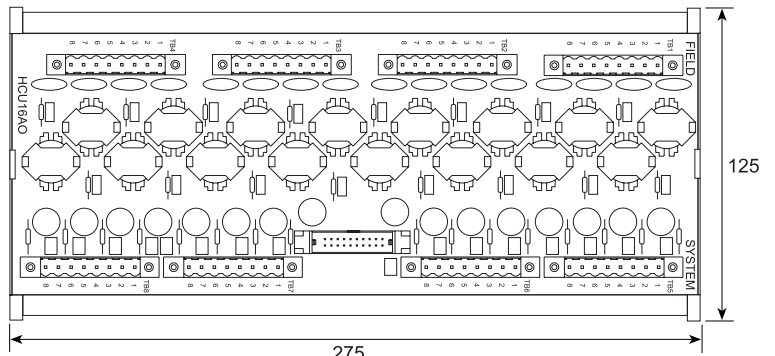
- dc < 2Ω
- HART signal > 240Ω

**Connectors**

- 2.5mm<sup>2</sup> removable, screw-clamp terminals
- 2 terminals per channel in groups of 4 channels
- 20-way HART signal cable (to HMM64/HMS64)

**Weight**

768g approx.



HCU16AO

### COMMON SPECIFICATION HCU16 & HCU16AO

**Capacity**

16 channels

**Isolation**

Channel-to-channel 50V dc

**Mounting**

Supplied fitted in DIN-rail (T- or G- section) carrier

\* for further details of the model options refer to the Instruction Manual INM4851 - available from the MTL website.

## CUSTOMISED CONNECTION UNITS

Eaton offers a range of general purpose and IS interfaces providing direct connection with control system I/O cables as well as HART® connectivity. For general purpose signals, a number of custom HART® interface termination units are available for most DCS and PLC I/O cards. These replace the existing DCS termination units, saving space and allowing easy upgrading.

**Typical system examples are:**

|                  |  |
|------------------|--|
| <b>Emerson</b>   | DeltaV and DeltaV SIS systems                              |
| <b>HIMA</b>      | HiMax  |
| <b>Honeywell</b> | Experion C300, Safety Manager, Process Manager I/O systems |
| <b>Invensys</b>  | Foxboro FBM systems, Triconex Tricon & Trident systems     |
| <b>Siemens</b>   | ET200M   |
| <b>Yokogawa</b>  | Centum R3, Prosafe RS systems                              |

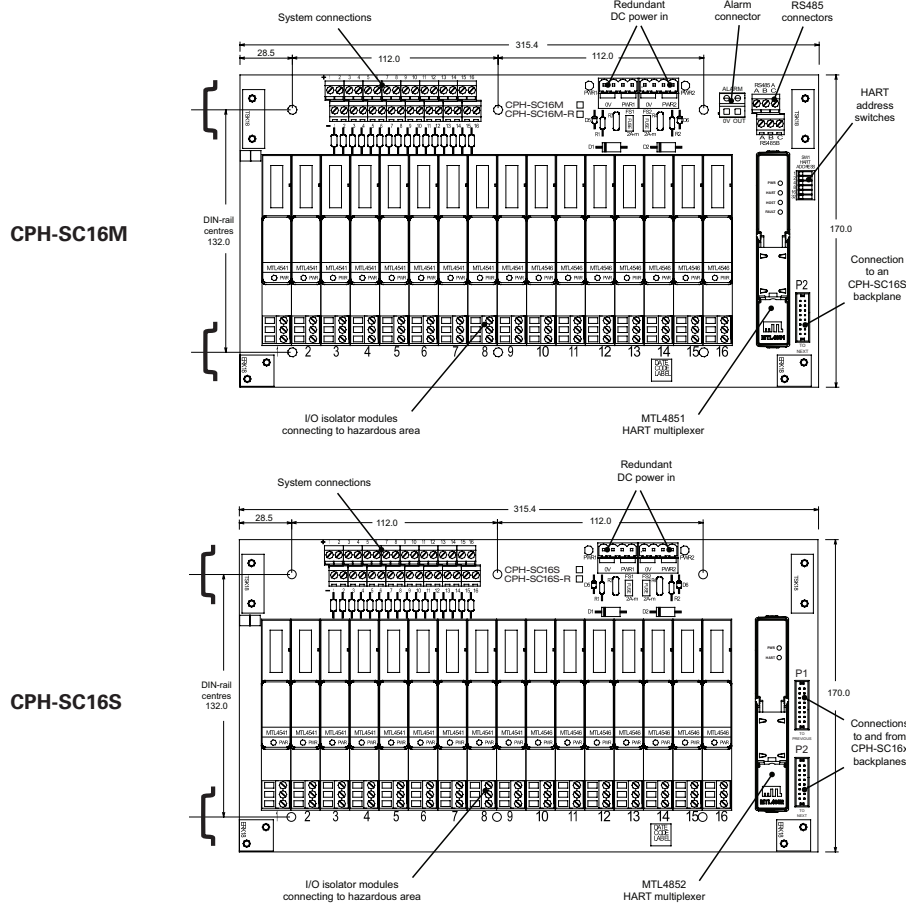
Contact Eaton's MTL product line with details of your specific requirements.

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# MTL4851 and MTL4852 HART® Connection Systems

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## BACKPLANES FOR MTL4851/MTL4852 INTRINSIC SAFETY VERSIONS



### CPH-SC16M/CPH-SC16S BACKPLANES

#### Capacity

CPH-SC16M 1xMTL4851  
 CPH-SC16S 1xMTL4852  
 16 x MTL4541/A/S/AS, MTL4546/Y isolators  
 Max. 4xCPH-SC16S connected to 1xCPH-SC16M

#### Power requirements, Vs

21 to 35V dc through plug-in connectors,  
 2 x 4 terminals for dual power supplies and power chain  
 Dual 2.5A medium blow TE5 fuses

#### Maximum power requirements

CPH-SC16M 0.65A  
 CPH-SC16S 0.6A

#### Safe-area signal connectors

2.5mm<sup>2</sup> screw-clamp terminals  
 2 terminals per channel for system connections

#### Backplane inter-connect

CPH-SC16M 1x DIN41651 16-way socket  
 CPH-SC16S 2x DIN41651 16-way socket  
 For use with HMRIB16 cables

#### RS485 port

2 terminals for bus, plus screen terminal  
 6 terminals in total to enable chained bus connection.  
 HART address switch, five poles active in six position switch

#### Alarm connectors

2 terminals for alarm output and alarm clear

#### Accuracy

CPH-SC16xR: 250 Ω ±0.05% conditioning resistors  
 (note: MTL4541/41A only)

#### Weight (excl. modules and accessories)

410g approx.

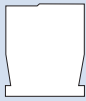
\* for further details of the model options refer to the Instruction Manual INM4851 - available from the MTL website.

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# MTL4851 and MTL4852 HART® Connection Systems

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## HART multiplexer

|                |                                   |
|----------------|-----------------------------------|
| <b>MTL4851</b> | HART multiplexer primary module   |
| <b>MTL4852</b> | HART multiplexer secondary module |

## Multiplexer accessories

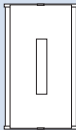
|               |                                    |
|---------------|------------------------------------|
| <b>TH5000</b> | Tag holder (Pack of 20)            |
| <b>ET-485</b> | Serial RS485 to Ethernet converter |

## General purpose connection units



|                     |  |
|---------------------|--|
| <b>HMM64</b>        | 64ch HART backplane for 1xMTL4851 & 3xMTL4852      |
| <b>HMS64</b>        | 64ch HART backplane for 4xMTL4852                  |
| <b>HCU16 †</b>      | HART connection unit, 16ch                         |
| <b>HCU16-P250 †</b> | HART connection unit, 16ch                         |
| <b>HCU16-S150 †</b> | HART connection unit, 16ch                         |
| <b>HCU16-S200 †</b> | HART connection unit, 16ch                         |
| <b>HCU16AO</b>      | HART connection unit, 16ch o/p (With HART filters) |

## Integrated connection units

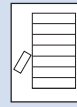


|                       |   |
|-----------------------|---|
| <b>HTP-SC16M</b>      | Integrated HART connection unit, primary, 16ch              |
| <b>HTP-SC16M-S240</b> | Integrated HART connection unit, 16ch, 240Ω series resistor |
| <b>HTP-SC16S</b>      | Integrated HART connection unit, secondary, 16ch            |
| <b>HTP-SC16S-S240</b> | Integrated HART connection unit, 16ch, 240Ω series resistor |

## HART Backplane accessories

|                     |   |
|---------------------|---|
| <b>RIB-CLIP16</b>   | Retaining clip for ribbon cable connector (pack of 10)                        |
| <b>HM64RIB20-xx</b> | 20-way HART signal cable xx = 0.5, 1.0, 1.5, 2.0, 3.0, 4.0, 4.5, 6.0 (metres) |
| <b>HMRIB16-xx</b>   | 16-way backplane linking cable xx = 0.5, 1.0, 2.0 (metres)                    |

† See Notes



## MTL4500 range of backplanes

|                    |  |
|--------------------|--|
| <b>CPH-SC16M</b>   | 16ch backplane, primary                      |
| <b>CPH-SC16M-R</b> | 16ch backplane, (250Ω conditioning resistor) |
| <b>CPH-SC16S</b>   | 16ch backplane, secondary                    |
| <b>CPH-SC16S-R</b> | 16ch backplane, (250Ω conditioning resistor) |

## Backplane accessories for MTL4500 range

|                   |  |
|-------------------|--|
| <b>DMK01</b>      | DIN-rail mounting kit, T- or G-section (pack of 40)              |
| <b>SMS01</b>      | Surface mounting kit (pack of 40)<br>16-way backplanes require 6 |
| <b>ERK18</b>      | Earth rail kit   |
| <b>TSK18</b>      | Tagging strip kit  |
| <b>FUS2.5ATE5</b> | Fuse kit, pack of 10, 2.5A                                       |

## Literature

|                |                            |
|----------------|----------------------------|
| <b>INM4851</b> | MTL4851 Instruction manual |
| <b>INA485x</b> | ATEX safety instructions   |

## Notes:

|                  |  |
|------------------|--|
| <b>no suffix</b> | No parallel resistor, 0Ω link in series - for use with current inputs with 250Ω input impedance or HART compatible outputs |
| <b>-P250</b>     | 250Ω parallel resistor, 0Ω link in series - for use with 1-5V system inputs  |
| <b>-S150</b>     | 150Ω series link, no parallel resistor - for use with current inputs with 100Ω input conditioning                          |
| <b>-S200</b>     | 200Ω series link, no parallel resistor - for use with current inputs with 50Ω or 63.5Ω input conditioning                  |
| <b>-S240</b>     | 240Ω series link, no parallel resistor - for use with isolators connected to field terminals.                              |



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