



MTL4500 Intrinsic Safety for HIMA HIMax

COOPER Crouse-Hinds



SAFETY
NONSTOP



HIMax®

Introduction

A range of dedicated backplanes and connections units designed to interface with MTL4500 series intrinsically safe isolator modules with the HIMA HIMax safety system.

Connections to the IS interfaces are made via standard HIMA cables. These provide a plug/socket interface for easy connection and assembly. A choice of single and dual channel IS interfaces are provided to suit the application.

For price and availability please contact

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HIMax I/O module	Backplane	Function	MTL module	SIL
X-AI 32 01	CPHX-AI320101	32ch AI	MTL4544	2 AI
X-AI 32 01 + repeat	CPHX-AI-RM320102 CPHX-AI-RS320103	16ch AI 16ch AI	MTL4541 / MTL4544D	2 AI
X-DI 32 01	CPHX-DI-M320102 CPHX-DI-S320103	16ch DI 16ch DI	MTL4511 / MTL4514	2
X-DI 32 01	CPHX-2DI320101	32ch DI	MTL4516 / MTL4517	2
X-DI 32 01	CPHX-SDI-M320104 CPHX-SDI-S320105	16ch DI 16ch DI	MTL4501-SR	3
X-AO 16 01	CPHX-AO160101	16ch AO	MTL4546Y/ MTL4549Y	2
X-DO 32 01	CPHX-DO-M320101 CPHX-DO-S320102	16ch DO 16ch DO	MTL4521	3
X-AI 32 01	HMU-HX-AI320104	32ch AI	MTL4850	3

General Specifications

Power Supply	20-35Vdc, (dual power feeds) volt free status monitor contacts. Isolation between module power, system signals and field signals.
Fusing	2.0A TE5 replaceable fuses. (2.5A on CPHX-AI320101) Isolators internally fused at <250mA. Not user serviceable.
Mounting	Surface mounting, SMS01 kit Dual DIN rail mounting, DMK01 kit (40 clips) Single DIN rail mounting kits DMK-16W
Circuit Board	2mm FR4 laminate, colour Black
Dimensions	160mm x 280mm
HART Interface	20 way DIN41651 0.05in flat cables, bump polarised, with clips. Maximum recommended cable length to HART mux. 6m
Interconnecting Backplane cables	34 way DIN41651 0.05in flat cables, bump polarised, with clips, Length 20cm (Max length allowed 1m)
Accessories	
DMK01	Pack of 40 DIN rail clips (6 required per backplane)
FUS2.0ATE5	Spare 2A TE5 fuse kit (10 fuses)
HM64RIBxx	Cables for HART interfaces
SMS01	Pack of 40 pillars (6 required per backplane)

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CPHX-AI320101 32ch Analogue Input

Technical Data

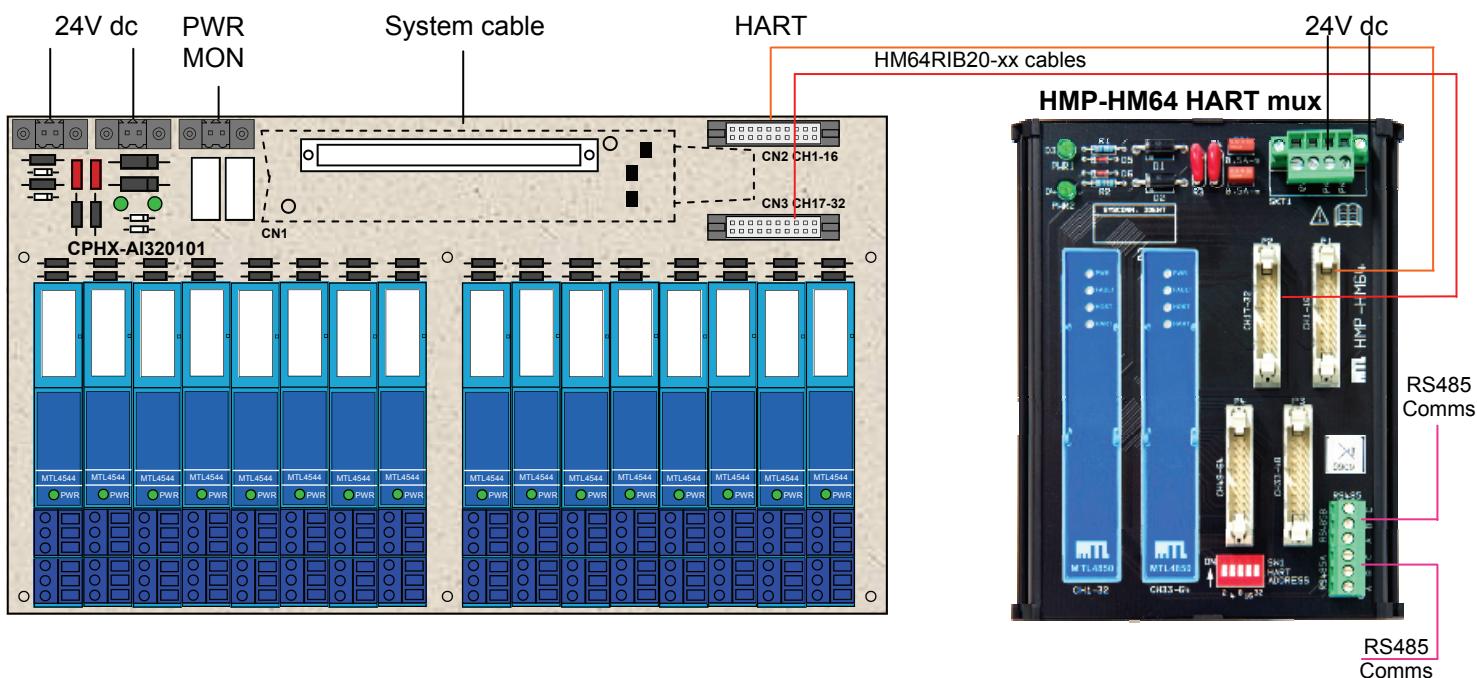
System Card	X-AI 32 01	Power monitor	LED and relay alarm contacts for both inputs
MTL Isolator	MTL4544	Field Connections	Via top connectors on MTL4500 series modules
System Cable	HIMax standard	Mounting	Dual DIN rail or single DIN rail options
Power Connections	24V redundant Fuse 2.5A each feed		

Description

MTL4544 - 4-20mA 2/4 wire transmitter inputs.
A 47Ω resistor is added in series with each isolator output for HART compatibility.

HART connection, when required, is provided by using the MTL4850 HART multiplexor on an external interface (shown below). Connection between the HART multiplexors and the IO signals is via HM64RIB20xx flat cables.

FTA layout and connections



CPHX-AI-RM320102 / CPHX-AI-RS320103 32ch Analogue Input

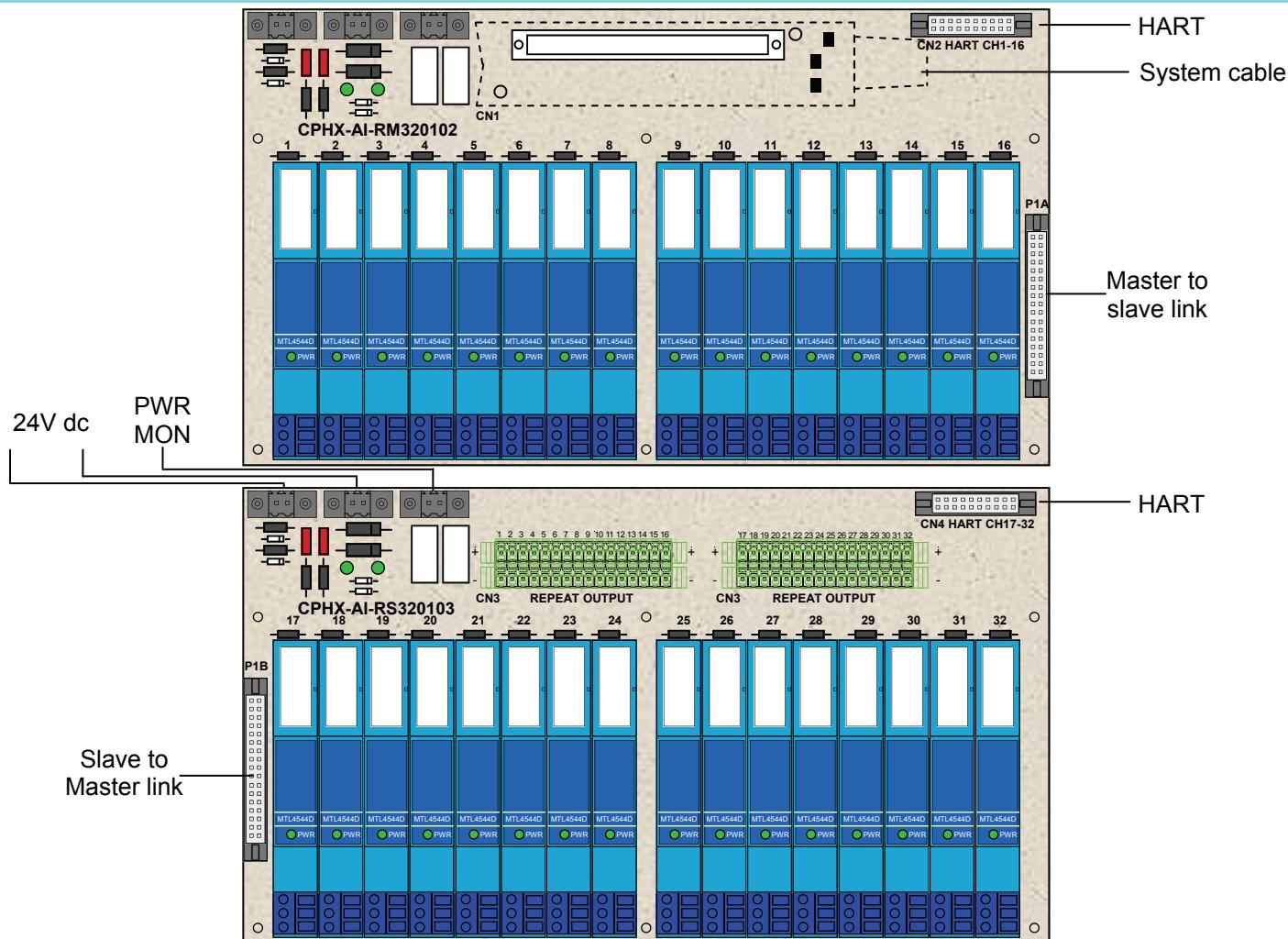
Technical Data

System Card	X-AI 32 01	Power monitor	LED and relay alarm contacts for both inputs
MTL Isolator	MTL4541 / MTL4544D	Field Connections	Via top connectors on MTL4500 series modules
System Cable	HIMax standard		
Power Connections	24V redundant Fuse 2.0A each feed	Mounting	Dual DIN rail or single DIN rail options

Description

MTL4541/4544D single channel isolators for 4-20mA 2/4 wire transmitter inputs. A 47Ω resistor is added in series with each isolator output for HART compatibility. When the MTL4544D is used a repeat current output is provided on the slave backplane.

HART connection, when required, is provided by using the MTL4850 HART multiplexor on an external interface. Connection between the HART multiplexors and the IO signals is via HM64RIB20xx flat cables.

FTA layout and connections

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CPHX-DI-M320102 / CPHX-DI-S320103 32ch Digital Input

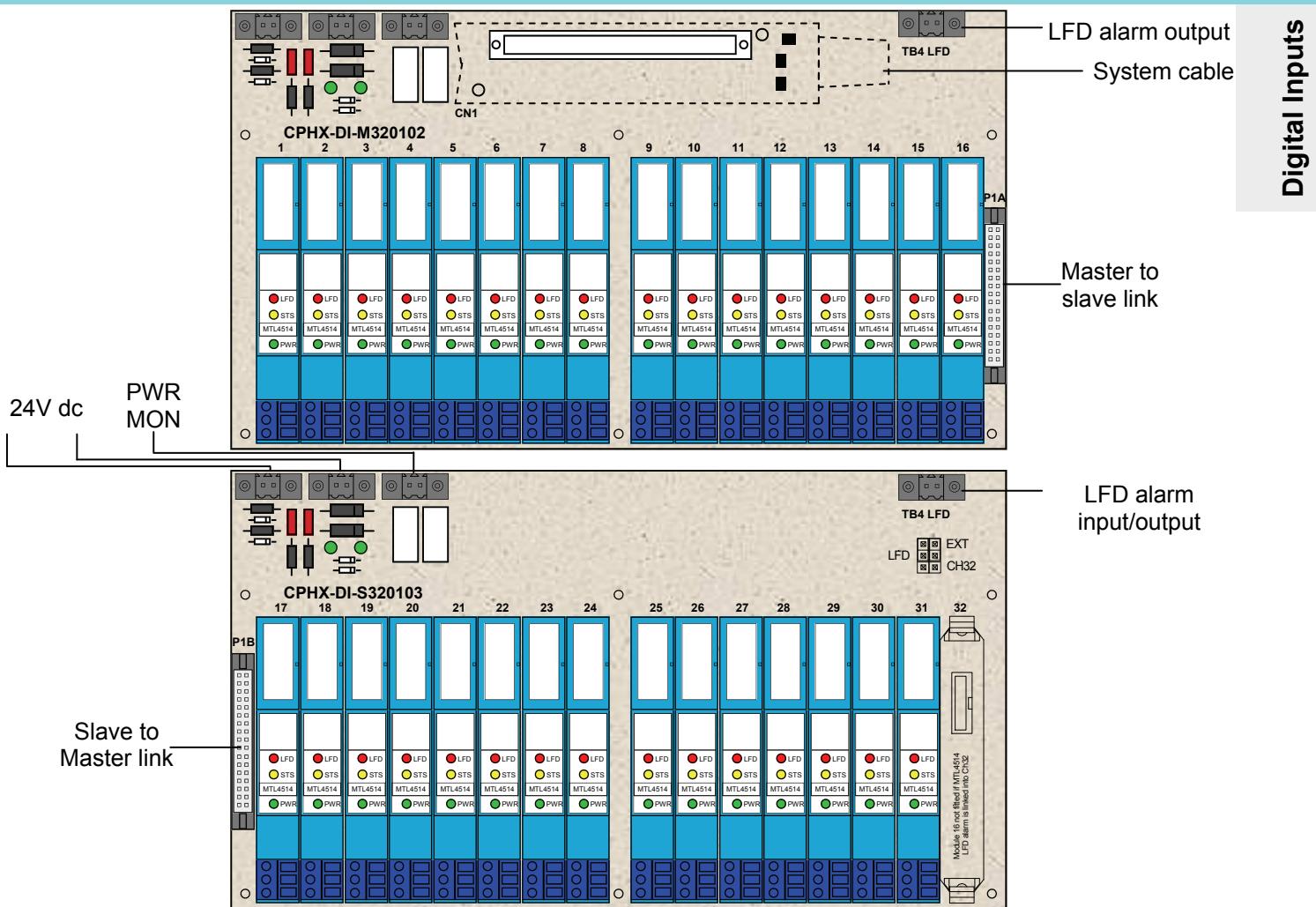
Technical Data

System Card	X-DI 32 01	Power monitor	LED and relay alarm contacts for both inputs
MTL Isolator	MTL4511 / MTL4514	Field Connections	Via top connectors on MTL4500 series modules
System Cable	HIMax standard		
Power Connections	24V redundant Fuse 2.0A each feed	Mounting	Dual DIN rail or single DIN rail options

Description

MTL4511/4514 single channel isolators for switch / proximity detector inputs. A grouped LFD alarm output is provided when using the MTL4514. This may be connected to an external alarm circuit or routed back into channel 32 of

the HIMax card. When routed back into the HIMax card the last module position (32) cannot be used for field input.

FTA layout and connections

CPHX-2DI320101 32ch Digital Input

Technical Data

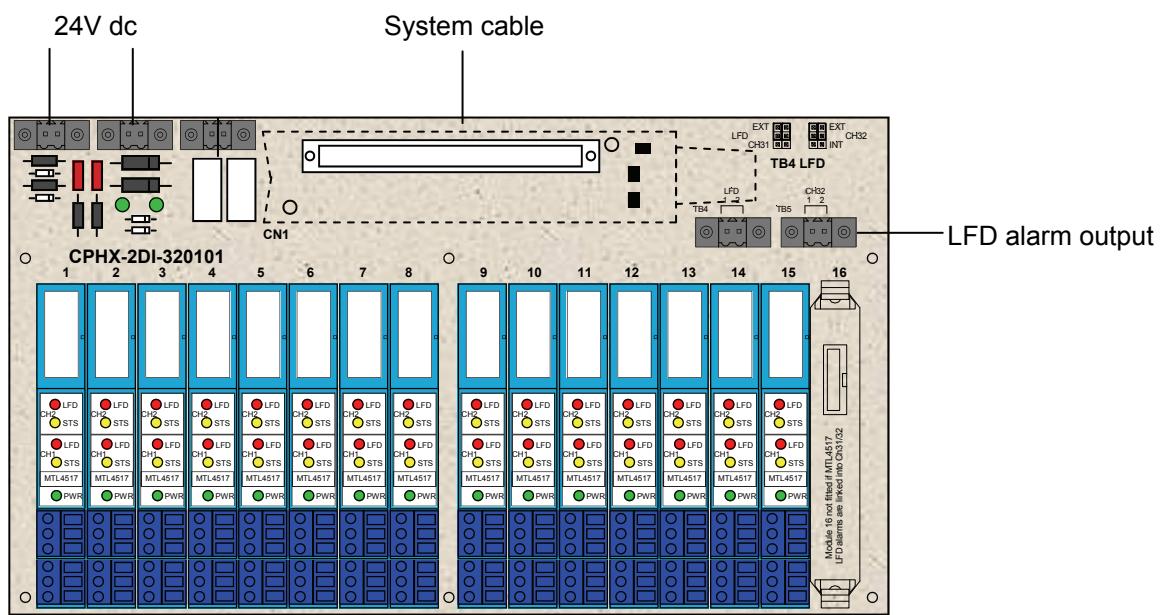
System Card	X-DI 32 01	Power monitor	LED and relay alarm contacts for both inputs
MTL Isolator	MTL4516 / MTL4517	Field Connections	Via top connectors on MTL4500 series modules
System Cable	HIMax standard		
Power Connections	24V redundant	Mounting	Dual DIN rail or single DIN rail options

Description

MTL4516 / MTL4517 single channel isolators for switch / proximity detector inputs. A grouped LFD alarm output is provided on TB4 when using the MTL4517. This may be connected to an external alarm circuit or routed back into

channel 31 of the HIMax card. When routed back into the HIMax card the last module position (16) cannot be used for field inputs. TB5 is provided to allow another alarm to be connected to Ch32. Module 16 is not fitted if either external alarm is connected.

FTA layout and connections



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CPHx-SDI-M320104 / CPHx-SDI-S320105 32ch Safety Digital Input

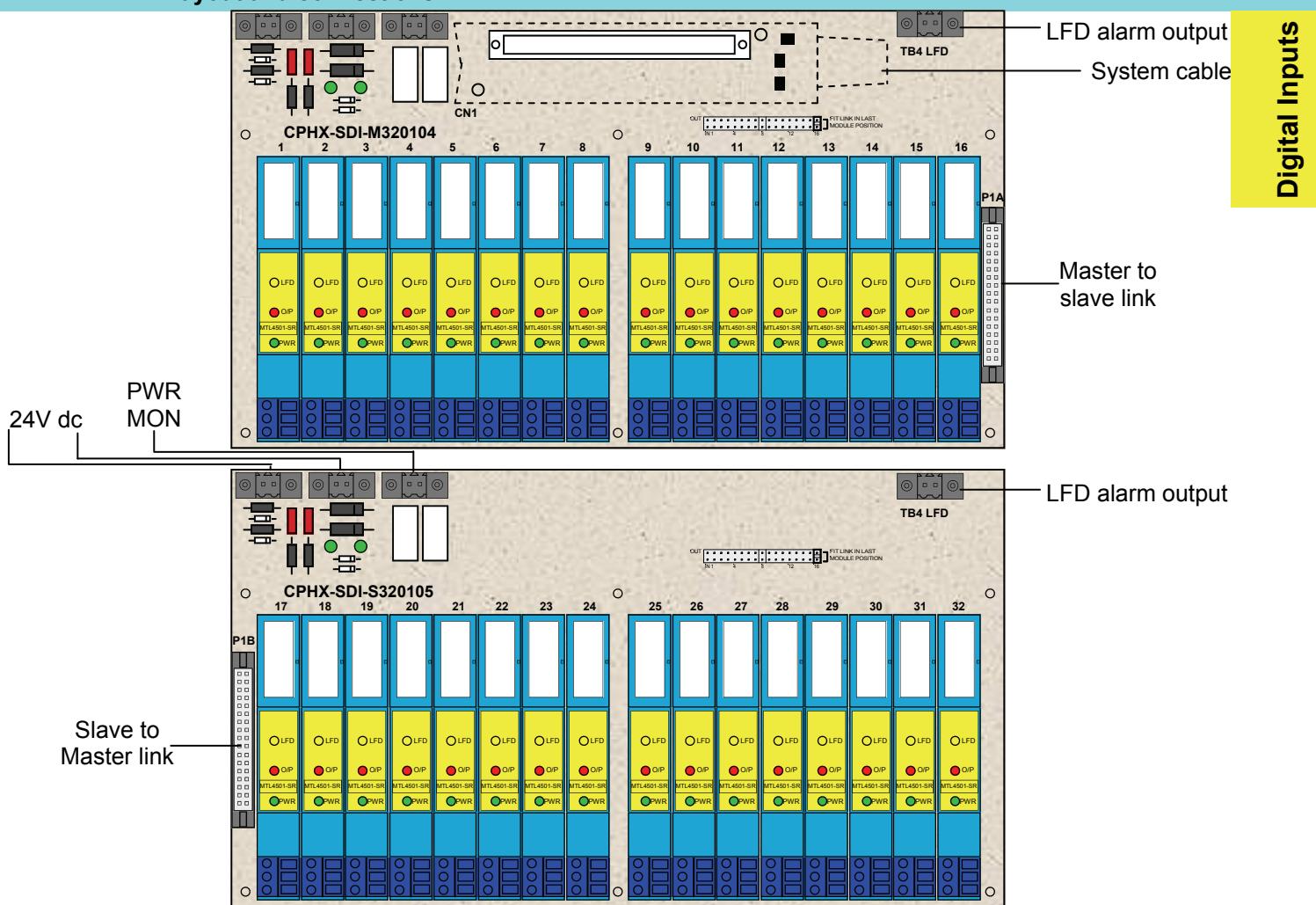
Technical Data

System Card	X-DI 32 01	Power monitor	LED and relay alarm contacts for both inputs
MTL Isolator	MTL4501-SR	Field Connections	Via top connectors on MTL4500 series modules
System Cable	HIMax standard		
Power Connections	24V redundant Fuse 2.0A each feed	Mounting	Dual DIN rail or single DIN rail options

Description

MTL4501-SR single channel isolators for switch / safety proximity detector inputs. A grouped LFD alarm output is provided.

FTA layout and connections



CPHX-AO160101 16ch Analogue Output

Technical Data

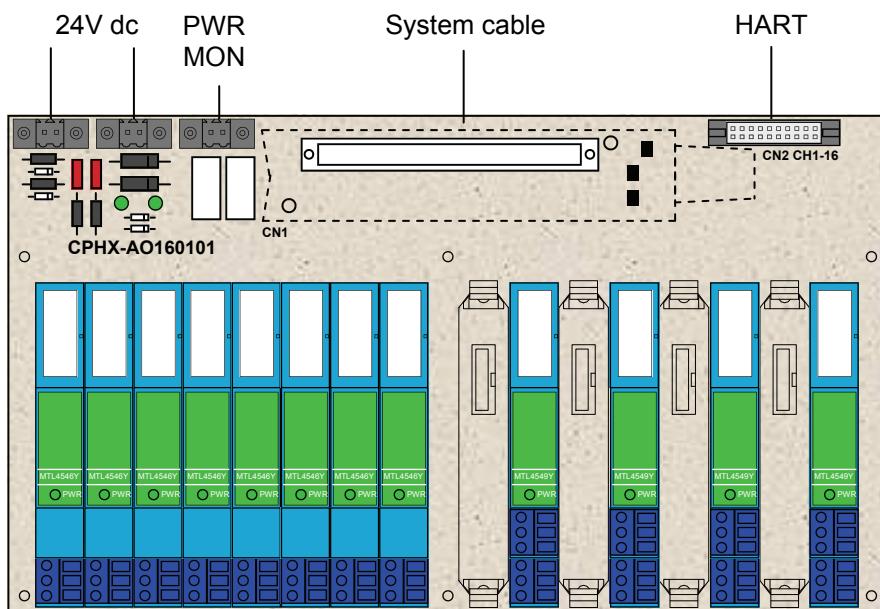
System Card	X-AO 16 01	Field Connections	Via top connectors on MTL4500 series modules
MTL Isolator	MTL4546Y / MTL4549Y		
System Cable	HIMax standard	Mounting	Dual DIN rail or single DIN rail options
Power Connections	24V redundant Fuse 2.0A each feed		

Description

MTL4546Y single channel or MTL4549Y dual channel isolators for 4-20mA analogue outputs may be used. When using the MTL4549Y only the 'even' module positions are populated.

HART connection, when required, is provided by using the MTL4850 HART multiplexor on an external interface. Connection between the HART multiplexors and the IO signals is via HM64RIB20-xx flat cables.

FTA layout and connections

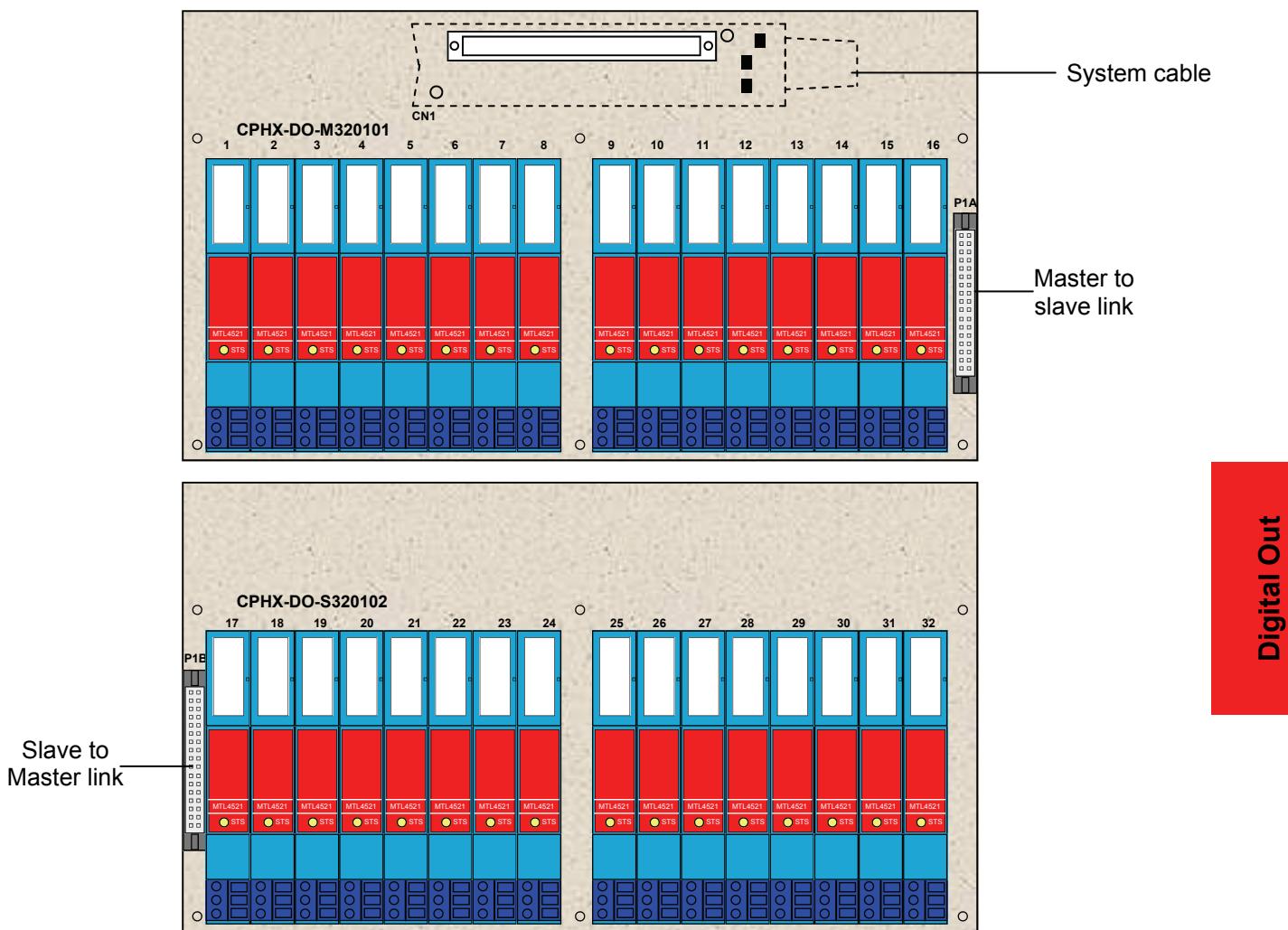


CPHX-DO-M320101 / CPHX-DO-S320102 32ch Digital Output**Technical Data**

System Card	X-DO 32 01	Field Connections	Via top connectors on MTL4500 series modules
MTL Isolator	MTL4521		
System Cable	HIMax standard	Mounting	Dual DIN rail or single DIN rail options
Power Connections	None		

Description

MTL4521 single channel isolators for solenoid / alarm applications. The MTL4521 is loop powered from the HIMax output so provides a failsafe interface for IS circuits

FTA layout and connections

HMU-HX-AI320104 HART multiplexor

Technical Data

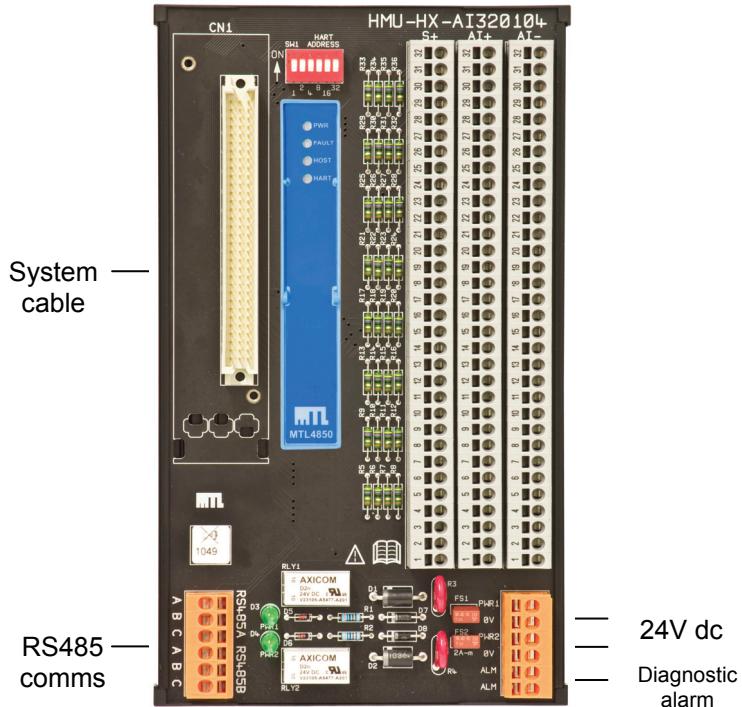
System Card	X-AI 32 01
MTL HART mux.	MTL4850
System Cable	HIMax standard
Power Connections	24V redundant
Field Connections	Spring clamp 2.5mm ² max.
Mounting	DIN rail
Dimensions	128mm x 220mm

Description

This interface provides an interface to an external HART monitoring system via the MTL4850 32 channel HART multiplexor.

The power supply inputs are only for the MTL4850. Field power is provided by the system card via the field terminals as on the standard HIMax termination unit.

Dual RS485 terminals allow units to be daisy chained together on the RS485 bus back to the computer.



Accessories

Fuse Kits

FUS2.0ATE5	Pack of 10 x 2A fuses
FUS2.5ATE5	Pack of 10 x 2.5A fuses

Spare field connectors

Blue plugs, for hazardous area applications, and grey plugs, for non-hazardous field equipment.

HAZ1-3	Blue top plug for terminals 1-3
HAZ4-6	Blue top plug for terminals 4-6
SAF1-3	Grey top plug for terminals 1-3
SAF4-6	Grey top plug for terminals 4-6

Temperature Converter configuration

PCL45USB	USB Serial Link cable for MTL4575, MTL4576 and MTL4532
PCS45	Software, free of charge download via MTL web site www.mtl-inst.com

HART multiplexor interfaces

<u>MTL4850 system</u>	64ch HART interface DIN rail mounting
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<u>MTL4840 system</u>	64ch HART interface DIN rail mounting
BPHM64	Communications module
MTL4841	HART multiplexor

HART connection cables

<u>MTL4840 system</u>	10 way Communication Bus
HM64RIB10-0.5	0.5m
HM64RIB10-1.0	1.0m
HM64RIB10-2.0	2.0m
HM64RIB10-3.0	3.0m
HM64RIB10-4.0	4.0m
HM64RIB10-5.0	5.0m

MTL4840 and MTL4850 systems

<u>MTL4840 and MTL4850 systems</u>	20 way HART signal cables
HM64RIB20-0.5	0.5m
HM64RIB20-1.0	1.0m
HM64RIB20-1.5	1.5m
HM64RIB20-2.0	2.0m
HM64RIB20-3.0	3.0m
HM64RIB20-4.0	4.0m
HM64RIB20-4.5	4.5m
HM64RIB20-6.0	6.0m

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Terminal assignments

	Terminal	1	2	3	4	5	6
	MTL4501-SR	Input -ve	Input +ve				
	MTL4511	Input -ve	Input +ve				
	MTL4514	Input -ve	Input +ve				
	MTL4516	Input 1 -ve	Input 1/2 +ve		Input 2-ve	Input 1/2+ve	
	MTL4517	Input 1 -ve	Input 1/2 +ve		Input 2-ve	Input 1/2+ve	
	MTL4521	Input -ve	Input +ve				
	MTL4541	Current input	Tx supply	Common			
	MTL4544D	Current input 1	Tx supply 1	Common 1			
	MTL4544	Current input 1	Tx supply 1	Common 1	Current input 2	Tx supply 2	Common 2
	MTL4546Y	Current output -	Current output +				
	MTL4549Y	Current output 1-	Current output 1+		Current output 2-	Current output 2+	

Functional Safety Data summary

		λ_{DD}	λ_{DU}	λ_{SD}	λ_{SU}				Subsystem
	Product	1 x 10 ⁻⁹ hours				SFF	HFT	SIL limit	type
	MTL4501-SR	0	7.4	0	1270	99.4%	0	3	A
	MTL4511/14	0	16	0	414	96.2%	0	2	A
	MTL4516/17	0	16	0	414	96.2%	0	2	A
	MTL4521	0	0	0	436	100%	0	3	A
	MTL4541	378	29	0	205	95.1%	0	2/3	A
	MTL4544D	400	41	0	253	94.1%	0	2/3	A
	MTL4544	425	42	0	165	93.4%	0	2/3	A
	MTL4546Y	0	337	0	289	46.0%	0	1	A
	MTL4549Y	0	390	0	288	43.0%	0	1	A

N.B. The data above is an extract from the data declarations. The full declaration must be consulted prior to any decision on suitability in a functional safety system.

λ_{DD} —estimated rate of detected dangerous failures

λ_{DU} —estimated rate of undetected dangerous failures

λ_{SD} —estimated rate of detected safe failures

λ_{SU} —estimated rate of undetected safe failures

SFF—safe failure fraction

HFT—Hardware fault tolerance

SIL limit—Safety Integrity level limit for a safety function in which the product is used in a single channel (1oo1/2oo1) architecture

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MTL4500 series
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