

TN-4500A 系列

符合 EN 50155 標準、多至 20 個 PoE 連接埠的 12+4G/24+4G 連接埠千兆乙太網路交換器



特色與優點

- 最多 4 個具有 PoE 功能的千兆連接埠
- 隔離式電源，電源供應範圍為 24 至 110 VDC
- 光纖型號具備 2 個千兆光纖連接埠，內建多模 Q-ODC® 介面
- 旁路型號具有 2 個包含旁路繼電器功能的千兆連接埠
- 符合所有 EN 50155 強制性測試項目¹
- -40 至 75°C 工作溫度範圍
- Turbo Ring 與 Turbo Chain (250 台交換器下，斷線復連時間小於 20 毫秒)，以及 STP/RSTP/MSTP 網路備援
- 最多 20 個 IEEE 802.3at/af 複合組合 PoE 及乙太網路連接埠
- 每個 PoE 連接埠供電功率最高 30 瓦

認證



EN 50155



EN 50121-4



簡介

ToughNet TN-4500A 系列 M12 網管型乙太網路交換器專為鐵路應用所設計，適用於軌道車輛及軌道沿線等應用。此系列交換器採用 M12 及其他圓形連接器，可確保緊密、耐用的連線，保障在振動和衝擊常見的工業環境中可靠運作。TN-4500A 系列乙太網路交換器提供 12 或 24 個快速乙太網路 M12 連接埠，包含或不包含 IEEE 802.3at/af 相容 PoE 功能，而千兆型號擁有 4 個千兆乙太網路介面，具有 PoE 和選購的旁路繼電器功能。此外，光纖型號還提供 2 個千兆光纖介面連接埠，內建 2 公里多模光纖收發器。PoE 交換器被分類為電源設備 (PSE)。

此系列交換器的每個連接埠最高可提供 30 瓦的電力，可向符合 IEEE 802.3at/af 標準的耗電裝置 (PD) 供電，例如 IP 攝影機、無線存取點和 IP 電話等。交換器支援 24 至 110 VDC 的寬範圍電源輸入並具備隔離式雙電源輸入，不僅便於用戶在全球各地使用相同類型的電源，還能提高通訊系統的可靠性。此外，交換器的工作溫度範圍為 -40 至 75°C，可確保它們能夠承受嚴苛環境。TN-4500A 系列乙太網路交換器符合 EN 50155 標準中有關工作溫度、電源輸入電壓、突波、ESD 和振動的強制要求，而且採用保形塗層和電力絕緣技術，因此非常適合各種工業應用。

其他特色與優點

- 每個 PoE 連接埠最高可提供 30 瓦，每個交換器的總功率上限為 120 瓦
- IPv6 認證標誌 (獲得 IPv6 標誌委員會認證)
- 交換器符合 EN 50155 標準的強制性測試項目，以確保適合軌道車輛應用
- DHCP 選項 82 適用於以不同原則指派 IP 位址
- Turbo Ring 與 Turbo Chain (250 台交換器下，斷線復連時間小於 20 毫秒)，以及 STP/RSTP/MSTP 網路備援
- IGMP 窺探和 GMRP，用於篩選多點傳送流量
- 支援 EtherNet/IP 和 Modbus TCP 工業乙太網路通訊協定
- 可基於連接埠實現 VLAN、IEEE 802.1Q VLAN 以及 GVRP，以簡化網路規劃
- QoS (IEEE 802.1p/1Q 和 ToS/DiffServ) 可實現即時流量分類和優先順序
- IEEE 802.3ad、LACP 提供最佳頻寬使用率
- SNMPv1/v2c/v3，適用不同層級的網路管理
- TACACS+、SNMPv3、IEEE 802.1X、HTTPS 及 SSH 加強網路安全性
- RMON 提供主動且有效率的網路監控
- 頻寬管理可防止無法預測的網路狀態
- 鎖定連接埠，僅由授權的 MAC 位址進行存取
- 連接埠鏡像可用於線上偵錯
- 發生例外狀況時透過電子郵件和繼電器輸出自動發出警告
- 線路交換快速恢復
- LLDP 適用於在網路管理軟體中進行自動拓撲探索
- 可透過網頁瀏覽器、Telnet/序列主控台、CLI 和 Windows 公用程式進行設定
- 迴圈保護可防止網路迴圈
- 面板安裝能力

1. 本產品適用於鐵路應用，符合 EN 50155 標準的定義。如需更詳細的聲明，請按一下此處：www.moxa.com/doc/specs/EN_50155_Compliance.pdf

規格

Input/Output Interface

Alarm Contact Channels	2 x relay output in one M12 A-coded 5-pin male connector with current carrying capacity of 1 A @ 30 VDC
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Ethernet Interface

10/100/1000BaseT(X) Ports (M12 A-coded 8-pin female connector)	TN-4516A-4GTX-WV-T: 4 TN-4516A-4GTX-WV-CT-T: 4
10/100BaseT(X) Ports (M12 D-coded 4-pin female connector)	TN-4516A Series non-PoE models: 12 TN-4524A/4528A Series: 8
PoE Ports (10/100BaseT(X), M12 D-coded 4-pin female connector)	TN-4516A Series PoE models: 12 TN-4524A/4528A Series: 16
PoE Ports (10/100/1000BaseT(X), M12 A-coded 8-pin female connector)	TN-4500A Series PoE models: 4 TN-4500A Series PoE models with Fiber or Bypass: 2
10/100/1000BaseT(X) Ports (M12 X-coded 8-pin female connector with bypass relay)	TN-4516 A-4GTXBP Series: 4 TN-4516A-12PoE-2GPoE-2GTXBP Series: 2 TN-4528A-16PoE-2GPoE-2GTXBP Series: 2
10/100/1000BaseT(X) Ports, Q-ODC Fiber Connector	TN-4516A-12PoE-2GPoE-2GODC Series: 2 TN-4528A-16PoE-2GPoE-2GODC Series: 2
Standards	IEEE 802.1D-2004 for Spanning Tree Protocol IEEE 802.1p for Class of Service IEEE 802.1Q for VLAN Tagging IEEE 802.1s for Multiple Spanning Tree Protocol IEEE 802.1w for Rapid Spanning Tree Protocol IEEE 802.1X for authentication IEEE 802.3 for 10BaseT IEEE 802.3ab for 1000BaseT(X) IEEE 802.3ad for Port Trunk with LACP IEEE 802.3af/at for PoE/PoE+ Output: TN-4500A Series PoE models IEEE 802.3u for 100BaseT(X) and 100BaseFX IEEE 802.3x for flow control IEEE 802.3z for 1000BaseSX/LX/LHX/ZX

Ethernet Software Features

Broadcast Forwarding	IP directed broadcast, broadcast forwarding
Configuration Options	Command Line Interface (CLI), Command Line Interface (CLI) through Serial/Telnet/SSH, Web Console (HTTP/HTTPS), Windows Utility
Filter	802.1Q, GMRP, GVRP, IGMP v1/v2/v3, Port-based VLAN, Static Multicast
Industrial Protocols	EtherNet/IP Adapter (Slave), Modbus TCP Server (Slave)
Management	Back Pressure Flow Control, DHCP Option 66/67/82, DHCP Server/Client, Flow control, HTTP, IPv4/IPv6, LLDP, Port Mirror, QoS/CoS/ToS, RARP, RMON, SMTP, SNMP Inform, SNMP Trap, Syslog, Telnet, Account Management
MIB	Bridge MIB, Ethernet-like MIB, MIB-II, P-BRIDGE MIB, Q-BRIDGE MIB, RMON MIB Groups 1, 2, 3, 9, RSTP MIB
Redundancy Protocols	Link Aggregation, MSTP, RSTP, STP, Turbo Chain, Turbo Ring v1/v2, Turbo Ring with DRC
Security	Broadcast storm protection, HTTPS/SSL, Local Account Accessibility, TACACS+, Port Lock, RADIUS, Rate Limit, SSH
Time Management	IEEE 1588 PTP v1/v2, NTP Server/Client, SNTP

Switch Properties

IGMP Groups	256
Max. No. of VLANs	64
VLAN ID Range	VID 1 to 4094

LED Interface

LED Indicators	STATE, PWR1, PWR2, FAULT, 10/100/1000M
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Serial Interface

Console Port	M12 A-coded male connector
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Power Parameters

Input Current	TN-4516A Series non-PoE models: Max. 0.7 A @ 24 VDC TN-4516A Series PoE models: Max. 7.0 A @ 24 VDC TN-4524A Series: Max. 6.5 A @ 24 VDC TN-4528A Series: Max. 7.2 A @ 24 VDC
Input Voltage	24/36/48/72/96/110 VDC
No. of Power Inputs	2
Operating Voltage	16.8 to 137.5 VDC
Overload Current Protection	Supported
Power Connector	M23 connector
Reverse Polarity Protection	Supported
Total PoE Power Budget	TN-4500A Series PoE models: 120 W

Physical Characteristics

Housing	Metal
IP Rating	IP42
Dimensions	TN-4516A Series: 229.8 x 132 x 122.3 mm (9.05 x 5.20 x 4.81 in) TN-4524A/4528A Series: 347.8 x 132 x 122.3 mm (13.70 x 5.20 x 4.81 in)
Weight	TN-4516A Series non-PoE models: 1,965 g (4.32 lb) TN-4516A Series PoE models: 2,607 g (5.74 lb) TN-4516A Series Fiber models: 2,705 g (5.96 lb) TN-4524A Series: 3,063 g (6.74 lb) TN-4528A Series: 3,304 g (7.27 lb) TN-4528A Series Fiber models: 3,375 g (7.44 lb)
Installation	DIN-rail mounting (optional), Wall mounting
Protection	TN-4500A Series -CT models: PCB Conformal Coating

Environmental Limits

Operating Temperature	-40 to 75°C (-40 to 167°F)
Storage Temperature (package included)	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (non-condensing)
Altitude	2000 m

Standards and Certifications

EMC	EN 55032/24
EMS	IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 20 V/m IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV IEC 61000-4-6 CS: 10 V IEC 61000-4-8 PFMF
Freefall	IEC 60068-2-31
Radio Frequency	FCC
Railway	EN 50121-4, EN 50155, IEC 60571
Railway Fire Protection	EN 45545-2
Safety	IEC 60950-1, UL 61010-2-201
Shock	IEC 60068-2-27, IEC 61373, EN 50155
Vibration	IEC 60068-2-64, IEC 61373, EN 50155

Declaration

Green Product	RoHS, CRoHS, WEEE
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MTBF

Standards	Telcordia SR332
Time	TN-4516A-4GTX Series: 599,164 hrs TN-4516A-4GTXBP Series: 589,421 hrs TN-4516A-12PoE-4GPoE Series: 428,680 hrs TN-4516A-12PoE-2GPoE-2GTXBP Series: 427,322 hrs TN-4516A-12PoE-2GPoE-2GODC Series: 421,432 hrs TN-4524A-16PoE Series: 429,402 hrs TN-4528A-16PoE-4GPoE Series: 393,894 hrs TN-4528A-16PoE-2GPoE-2GTXBP Series: 392,746 hrs TN-4528A-16PoE-2GPoE-2GODC Series: 387,767 hrs

Warranty

Warranty Period	5 years
Details	See www.moxa.com/tw/warranty

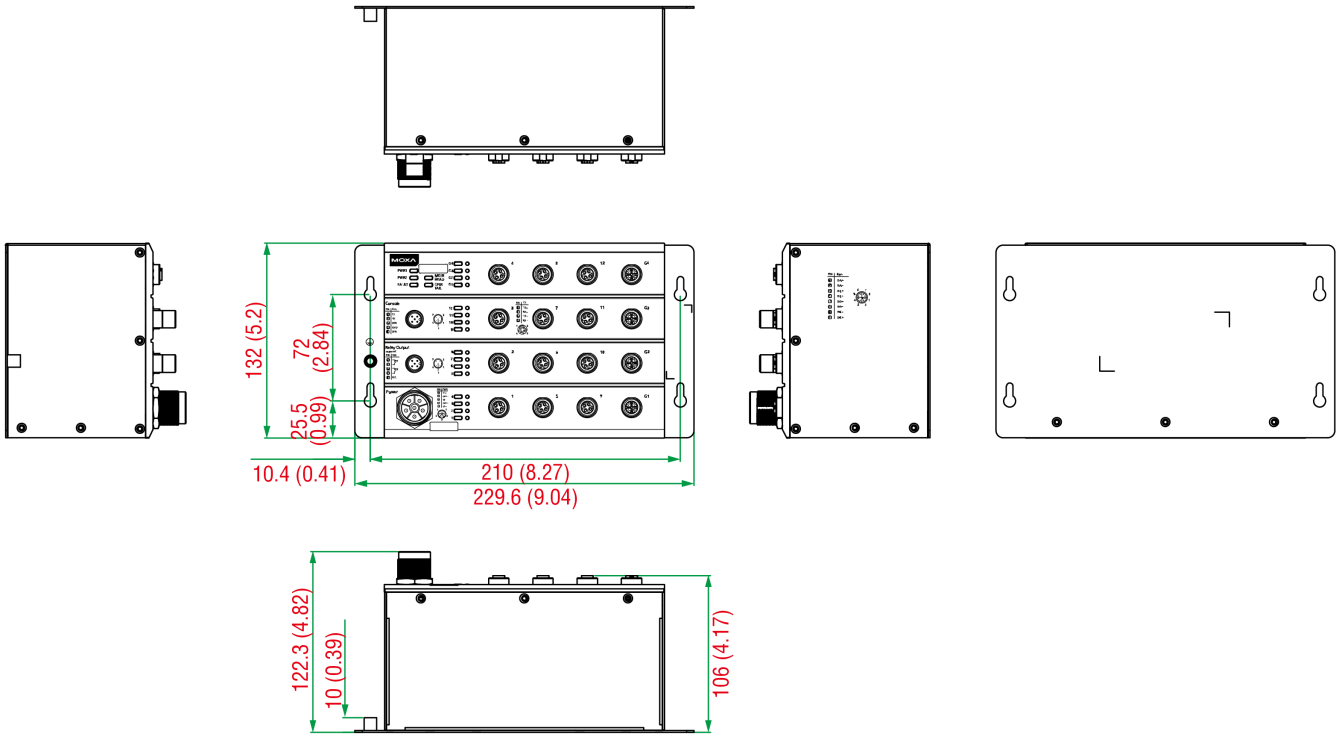
Package Contents

Device	1 x TN-4500A Series switch
Cable	1 x M12-to-DB9 console port
Installation Kit	2 x cap, female, metal, for M12 port 1 x wall-mounting kit
Documentation	1 x document and software CD 1 x quick installation guide 1 x warranty card

尺寸

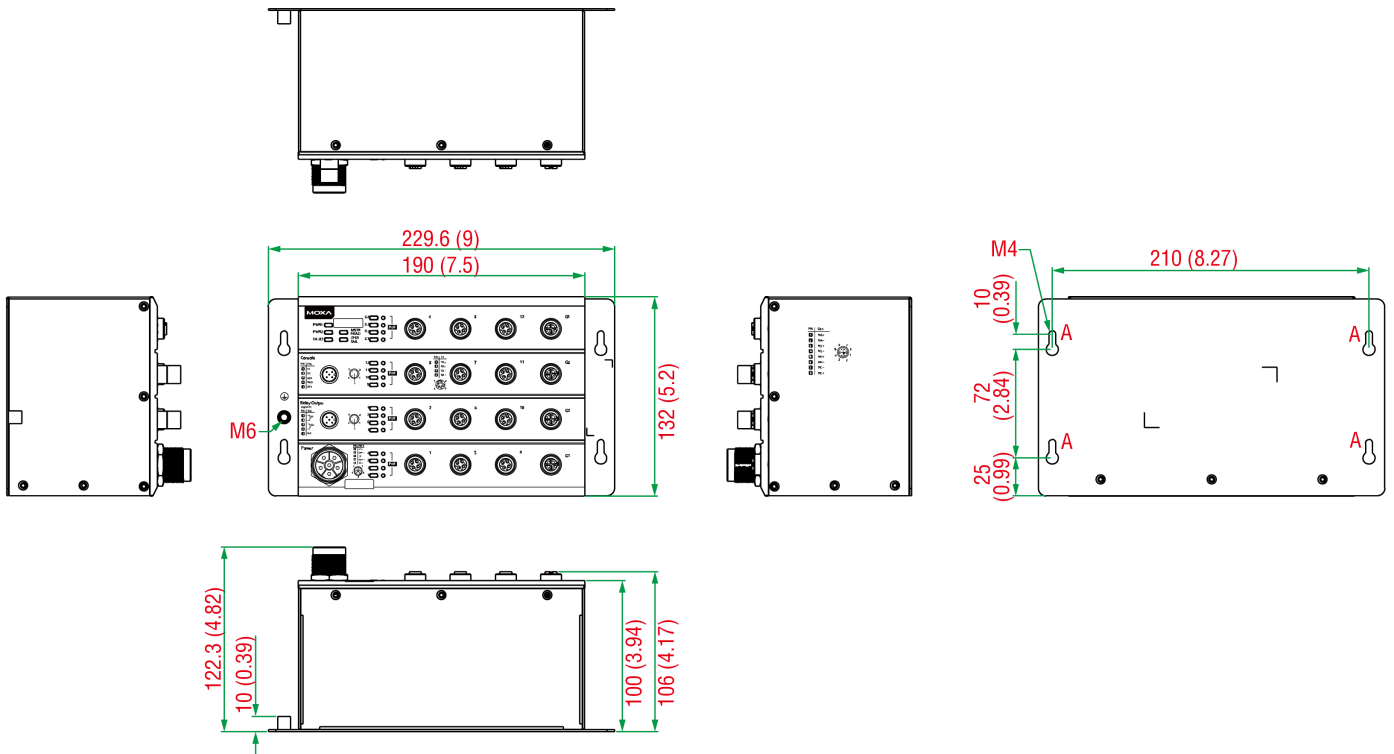
TN-4516A non-PoE 系列

單位：公釐 (英吋)



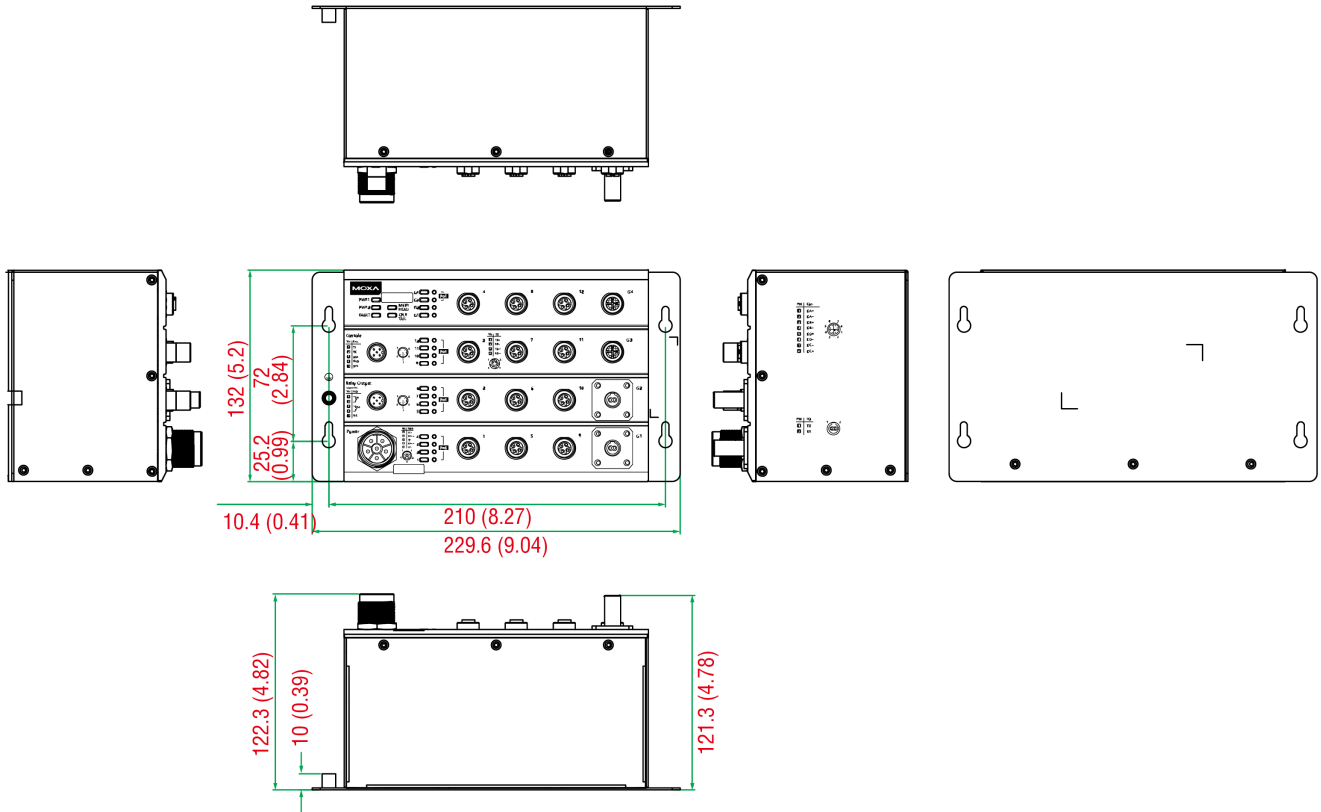
TN-4516A PoE 系列

單位：公釐 (英吋)



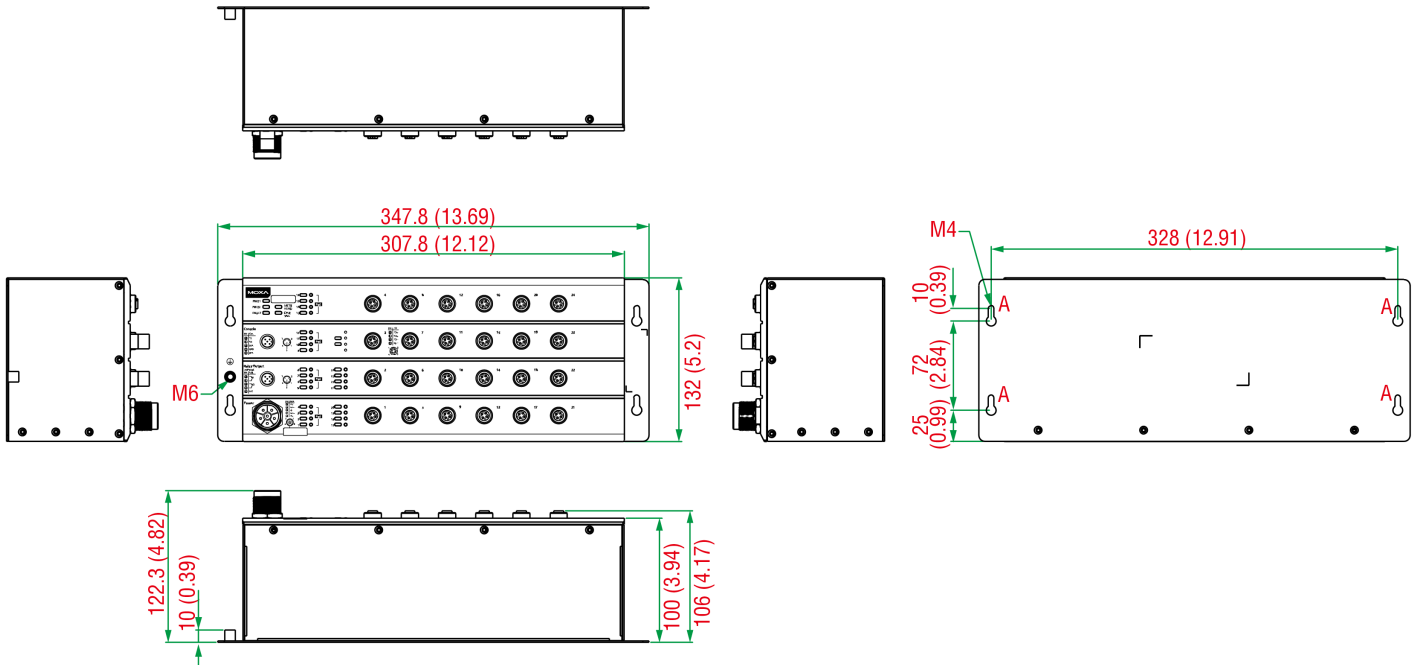
TN-4516A-12PoE-2GPoE-2ODC-WV-T

單位：公釐（英吋）



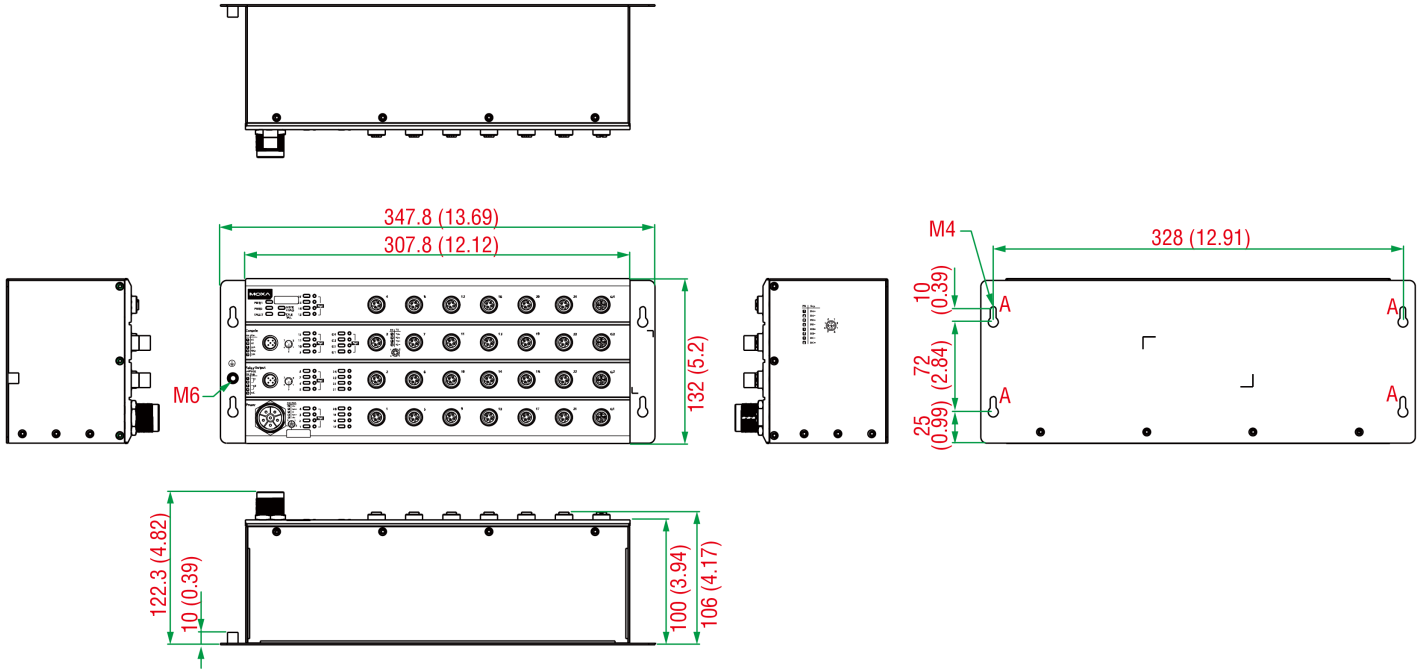
TN-4524A PoE 系列

單位：公釐（英吋）



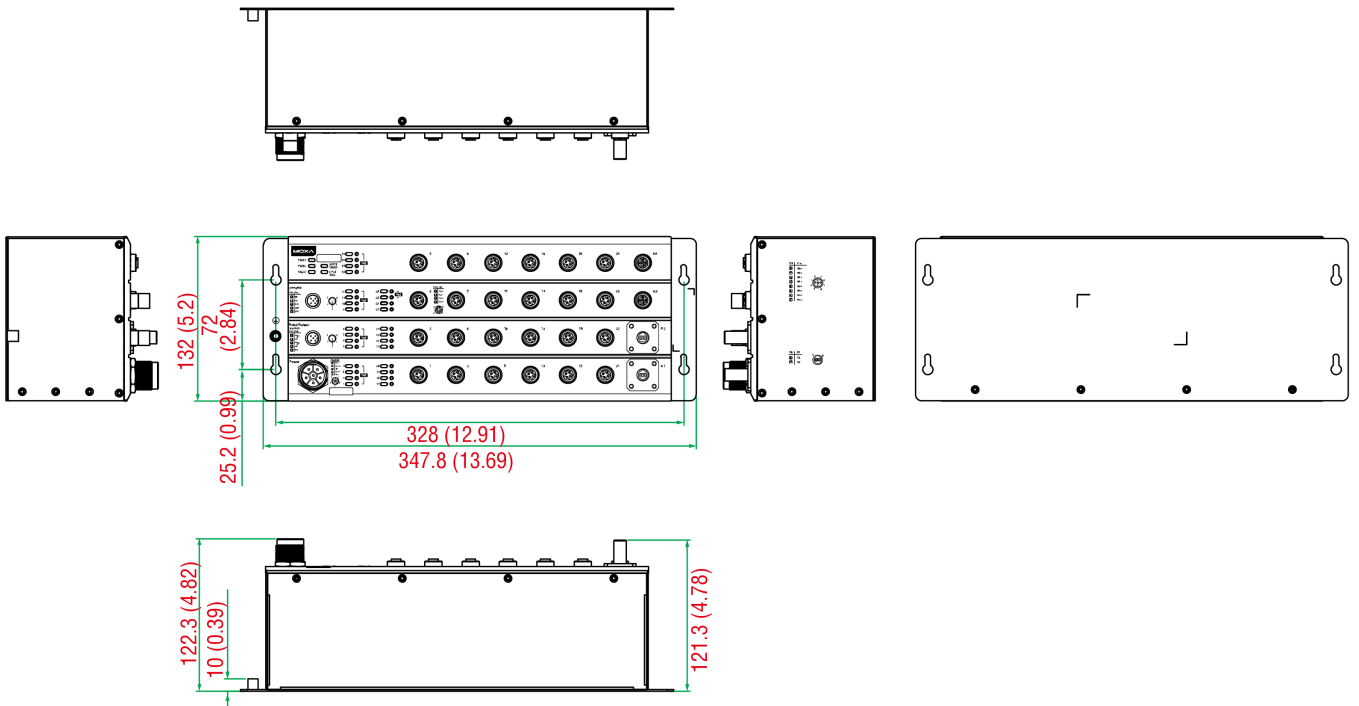
TN-4528A PoE 系列

單位：公釐 (英吋)



TN-4528A-16PoE-2GPoE-2ODC-WV-T

單位：公釐 (英吋)



訂購資訊

Model Name	10/100/1000BaseT(X) Ports Q-ODC Fiber Connector	10/100/1000BaseT(X) Ports M12 X-Coded 8-Pin Female Connector	10/100/1000BaseT(X) Ports M12 X-Coded 8-Pin Female Connector with Bypass Relay	10/100BaseT(X) Ports M12 D-Coded 4-Pin Female Connector	PoE Ports 10/100BaseT(X), M12 D-Coded 4-Pin Female Connector	PoE Ports 100/1000BaseT(X), M12 X-Coded 8-Pin Female Connector	Conformal Coating
TN-4516A-4GTX-WV-T	-	4	-	12	-	-	-
TN-4516A-4GTXBP-WV-T	-	-	4	12	-	-	-
TN-4516A-4GTX-WV-CT-T	-	4	-	12	-	-	P
TN-4516A-4GTXBP-WV-CT-T	-	-	4	12	-	-	P
TN-4516A-12PoE-4GPoE-WV-T	-	-	-	-	12	4	-
TN-4516A-12PoE-4GPoE-WV-CT-T	-	-	-	-	12	4	P
TN-4516A-12PoE-2GPoE-2GTXBP-WV-T	-	-	2	-	12	2	-
TN-4516A-12PoE-2GPoE-2GTXBP-WV-CT-T	-	-	2	-	12	2	P
TN-4516A-12PoE-2GPoE-2GODC-WV-T	2	-	-	-	12	2	-
TN-4516A-12PoE-2GPoE-2GODC-WV-CT-T	2	-	-	-	12	2	P
TN-4524A-16PoE-WV-T	-	-	-	8	16	-	-
TN-4524A-16PoE-WV-CT-T	-	-	-	8	16	-	P
TN-4528A-16PoE-4GPoE-WV-T	-	-	-	8	16	4	-
TN-4528A-16PoE-4GPoE-WV-CT-T	-	-	-	8	16	4	P
TN-4528A-16PoE-2GPoE-2GTXBP-WV-T	-	-	2	8	16	2	-
TN-4528A-16PoE-2GPoE-2GTXBP-WV-CT-T	-	-	2	8	16	2	P
TN-4528A-16PoE-2GPoE-2GODC-WV-T	2	-	-	8	16	2	-
TN-4528A-16PoE-2GPoE-2GODC-WV-CT-T	2	-	-	8	16	2	P

配件 (選購)

Storage Kits

ABC-01-M12

Configuration backup and restoration tool with M12 connector for managed Ethernet switches and wireless APs/Bridges/Clients, 0 to 60°C operating temperature

Cables

CBL-M12D(MM4P)/RJ45-100 IP67	M12-to-RJ45 cable, IP67-rated, 1 m
CBL-M23(FF6P)/OPEN-BK-100 IP67	M23 to 6-pin power cable, IP67-rated female 6-pin M23 connector, IP67, 1 m
CBL-M12DMM4PM12DMM4P-BK-100-IP67	M12-to-M12 Cat-5E STP Ethernet cable, 4-pin D-coded M12 connector, IP67, 1 m
CBL-M12XMM8P-Y-100-IP67	M12-to-M12 Cat-5 UTP Ethernet cable, 8-pin male X-coded crimp type M12 connector, IP67, 1 m Applicable Models: TN-4516A-4GTX-WV-T TN-4516A-4GTX-WV-CT-T TN-4516A-4GTXBP-WV-T TN-4516A-4GTXBP-WV-CT-T TN-4516A-12PoE-2GPoE-2GODC-WV-T TN-4516A-12PoE-2GPoE-2GODC-WV-CT-T TN-4516A-12PoE-2GPoE-2GTXBP-WV-T TN-4516A-12PoE-2GPoE-2GTXBP-WV-CT-T TN-4516A-12PoE-4GPoE-WV-T TN-4516A-12PoE-4GPoE-WV-CT-T TN-4528A-16PoE-2GPoE-2GODC-WV-T TN-4528A-16PoE-2GPoE-2GODC-WV-CT-T TN-4528A-16PoE-2GPoE-2GTXBP-WV-T TN-4528A-16PoE-2GPoE-2GTXBP-WV-CT-T TN-4528A-16PoE-4GPoE-WV-T TN-4528A-16PoE-4GPoE-WV-CT-T
CBL-M12XMM8P-Y-300-IP67	M12-to-M12 Cat-5 UTP Ethernet cable, 8-pin male X-coded crimp type M12 connector, IP67, 3 m Applicable Models: TN-4516A-4GTX-WV-T TN-4516A-4GTX-WV-CT-T TN-4516A-4GTXBP-WV-T TN-4516A-4GTXBP-WV-CT-T TN-4516A-12PoE-2GPoE-2GODC-WV-T TN-4516A-12PoE-2GPoE-2GODC-WV-CT-T TN-4516A-12PoE-2GPoE-2GTXBP-WV-T TN-4516A-12PoE-2GPoE-2GTXBP-WV-CT-T TN-4516A-12PoE-4GPoE-WV-T TN-4516A-12PoE-4GPoE-WV-CT-T TN-4528A-16PoE-2GPoE-2GODC-WV-T TN-4528A-16PoE-2GPoE-2GODC-WV-CT-T TN-4528A-16PoE-2GPoE-2GTXBP-WV-T TN-4528A-16PoE-2GPoE-2GTXBP-WV-CT-T TN-4528A-16PoE-4GPoE-WV-T TN-4528A-16PoE-4GPoE-WV-CT-T
CBL-M12XMM8PRJ45-Y-200-IP67	M12-to-RJ45 Cat-5 UTP Ethernet cable, 8-pin male X-coded crimp type M12 connector, IP67, 2 m Applicable Models: TN-4516A-4GTX-WV-T TN-4516A-4GTX-WV-CT-T TN-4516A-4GTXBP-WV-T TN-4516A-4GTXBP-WV-CT-T TN-4516A-12PoE-2GPoE-2GODC-WV-T TN-4516A-12PoE-2GPoE-2GODC-WV-CT-T TN-4516A-12PoE-2GPoE-2GTXBP-WV-T TN-4516A-12PoE-2GPoE-2GTXBP-WV-CT-T TN-4516A-12PoE-4GPoE-WV-T TN-4516A-12PoE-4GPoE-WV-CT-T TN-4528A-16PoE-2GPoE-2GODC-WV-T TN-4528A-16PoE-2GPoE-2GODC-WV-CT-T TN-4528A-16PoE-2GPoE-2GTXBP-WV-T TN-4528A-16PoE-2GPoE-2GTXBP-WV-CT-T TN-4528A-16PoE-4GPoE-WV-T TN-4528A-16PoE-4GPoE-WV-CT-T

Connectors

M12A-5P-IP68	A-coded screw-in sensor connector, female, IP68, 4.05 cm
M12D-4PMM-IP67	M12 D-coded connector, QUICKON type, 4-pin male, IP67
M12D-4P-IP68	M12 D-coded screw-in sensor connector, male, IP68

A-PLG-WPM23-01-IP67	M23 cable connector, female 6-pin, crimp type, IP67
M12X-8PMM-IP67-HTG	X-coded screw-in Gigabit Ethernet connector, 8-pin male M12 connector, IP67 Applicable Models: TN-4516A-4GTX-WV-T TN-4516A-4GTX-WV-CT-T TN-4516A-4GTXBP-WV-T TN-4516A-4GTXBP-WV-CT-T TN-4516A-12PoE-2GPoE-2GODC-WV-T TN-4516A-12PoE-2GPoE-2GODC-WV-CT-T TN-4516A-12PoE-2GPoE-2GTXBP-WV-T TN-4516A-12PoE-2GPoE-2GTXBP-WV-CT-T TN-4516A-12PoE-4GPoE-WV-T TN-4516A-12PoE-4GPoE-WV-CT-T TN-4528A-16PoE-2GPoE-2GODC-WV-T TN-4528A-16PoE-2GPoE-2GODC-WV-CT-T TN-4528A-16PoE-2GPoE-2GTXBP-WV-T TN-4528A-16PoE-2GPoE-2GTXBP-WV-CT-T TN-4528A-16PoE-4GPoE-WV-T TN-4528A-16PoE-4GPoE-WV-CT-T

DIN-Rail Mounting Kits

DK-DC50131-01	DIN-rail mounting kit, 6 screws
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M12 Connector Caps

A-CAP-M12F-M	Metal cap for M12 female connector
A-CAP-M12M-M	Metal cap for M12 male connector

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