

ALLEGATO


01

1727327	Din Rail box loaded 12 x SC Simplex
1727328	Din Rail box loaded 12 x SC
1727329	Din Rail box loaded with 6 x LC
1727331	Din Rail box loaded with 6 x LC
1727332	Din Rail box loaded with 12 x ST
1727333	Din Rail box loaded with 12 x ST
1727334	Din Rail box loaded with 12 x FC
1727335	Din Rail box loaded with 12 x FC Multi

Din Rail Demarcation Box



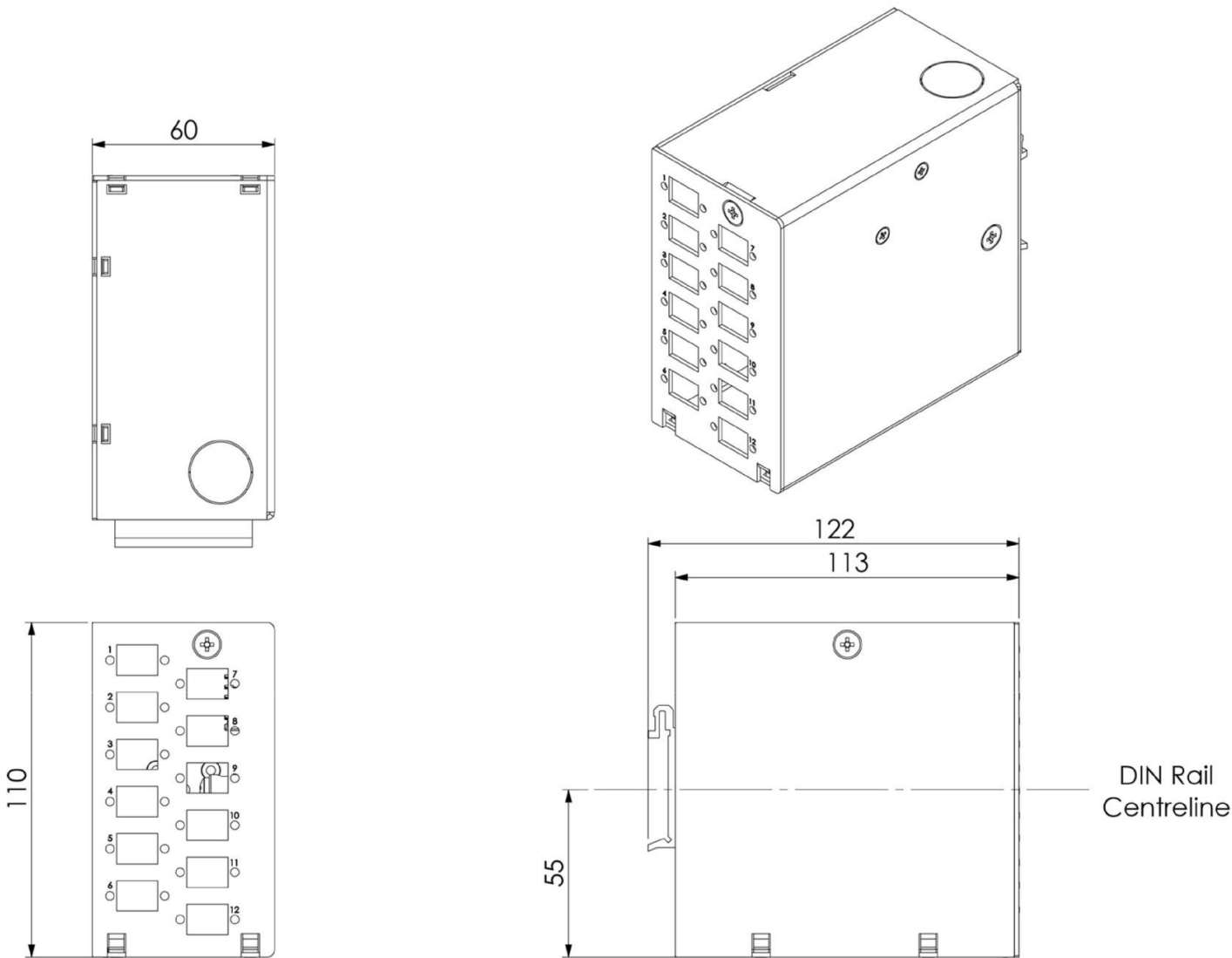
Our Din Rail splice box offers a wide range of flexibility to the end user. The standard enclosure includes a hinged splice holder house up to 12 splice protectors, and 1 cable gland for incoming.

- 
- Din Rail mounting
 - Top and bottom cable entry points (1 x Cable gland Included)
 - Strength member tie position x 1
 - Splice Holder for 12 splice protectors or splice holder for 12 metal crimp splice protectors
 - Suitable for pre-terminated cables, splicing, or pass through
 - IP20
 - Internal application
 - Data Centre or telecommunications networks
 - For use in multi dwelling units or demarcation points within a network



Height	110mm
Width	60mm
Depth	113mm
Net weight	522g
Packaged weight	579g
Packaged dimensions	157mm x 122mm x 67mm
Suitable for adapter type	ST, FC, SC Simplex, LC Duplex, E2000
Number of fibers	Up to 12 fibers
Material	Cold-rolled steel
Material thickness	1.5mm
Material coating	Powder coating
Colour	Grey RAL 7035
Operating temperature	-40°C to +60°C
Designed in accordance with Compliant to	TIA/EIA 568.C, ISO/IEC 11801, EN50173, IEC60304, IEC61754, RoHS, Reach/SVHC

TECHNICAL DRAWING



ALLEGATO

02

CASSETTO OTTICO 19" - 1U



Per giunzione o ripartizione
Facile apertura
1 Unità

CASSETTO OTTICO 19" - 1U

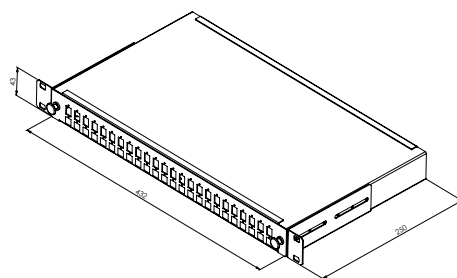
Il patch panel 19" 1U è il prodotto adatto per la giunzione e connessione di cavi ottici all'interno dei rack. Fornito di vassoio estraibile con apertura easy clip, consente di alloggiare fino a 48 fibre.



CARATTERISTICHE TECNICHE

ALTEZZA	44 mm		
LARGHEZZA	470 mm		
PROFONDITA'	200 mm		250 mm
TIPOLOGIA ADAPTER	SC, LC, ST, FC Simplex	SC, LC Duplex	MTRJ
NUMERO INGRESSI CAVI	4		
CONNESSIONI	Fino a 48		
MATERIALE	Acciaio		
COLORE	Nero RAL 9005		

DETTAGLIO PRODOTTO



ALLEGATO

03

Industrial Managed Gigabit Ethernet Media Converter with Wide Operating Temperature (-30~75 degrees C)



Distance Extension and High Performance

PLANET IGT-905A Industrial Managed Gigabit Media Converter extends communication distance with highly Gigabit performance via fiber optical wire, in which the distance could be extended up to 120km. The IGT-905A is specifically designed with durable components and strong housing to operate reliably in electrically harsh and climatically demanding environments. The IGT-905A provides a high level of immunity to electromagnetic interference and heavy electrical surges which are usually found on plant floors or traffic control cabinets in sidewalk. Being able to operate under the temperature range from **-30 to 75 degrees C**, the IGT-905A can be placed in almost any difficult environment.

Robust Switching Performance

PLANET IGT-905A Industrial Managed Media Converter efficiently supports conversion between 10/100/1000BASE-T and 100/1000BASE-X Ethernet, and offers remote management and monitoring capabilities. The IGT-905A provides the flexibility of operation made possible with all kinds of 10/100/1000Mbps Ethernet media on RJ45 port and offers highly-stable Gigabit SFP fiber performance. It also delivers the dynamic status report and real-time alarm messages that help the network administrator to easily monitor and manage the entire industrial networks.

User-friendly Centralized Web Management Interface

For efficient management, the IGT-905A is equipped with remote Web/SNMP (simple network management protocol) interface. With the built-in Web-based management interface, the IGT-905A acts as an easy-to-use, platform-independent management and configuration facility. It also can be managed via any standard-based management software by supporting the SNMP. Moreover, the IGT-905A can manage the remote client devices by the TS-1000/802.3ah OAM (operation, administration, and maintenance) protocol.

Interface

- 1-port 10/100/1000BASE-T RJ45 with auto negotiation and auto-MDI/MDI-X function
- 1 100/1000X SFP slot

Industrial Conformance

- 12V to 48V DC, redundant power
- -30 to 75 degrees C operating temperature
- IP-30 metal case
- Relay alarm for port breakdown
- Supports 6KV DC Ethernet ESD protection
- Free fall, shock-proof and vibration-proof
- DIN-rail and wall mounting

Layer 2 Features

- Store-and-Forward mechanism
- Prevents packet loss with back pressure (half-duplex) and IEEE 802.3x pause frame flow control (full-duplex)
- Maximum frame size of 9216 bytes
- Loop detection, and broadcast, multicast and unicast storm control
- Supports VLANs
 - IEEE 802.1Q tag-based VLAN
 - Up to 16 VLANs groups, out of 4K VLAN IDs
 - Management VLAN

Quality of Service

- Ingress/egress bandwidth control on TP/fiber port
- 4 priority queues, strict priority and weighted round robin (WRR)
- Traffic classification by:
 - IEEE 802.1p Class of Service
 - IP DSCP priority
 - IP address priority

Management

- Built-in IP-based Web interface for remote management
- SNMP v1/v2c and 4 RMON groups, event trap and SNMP trap support
- Manual IP address setting/DHCP client for IP address assignment

Enhanced Management Features

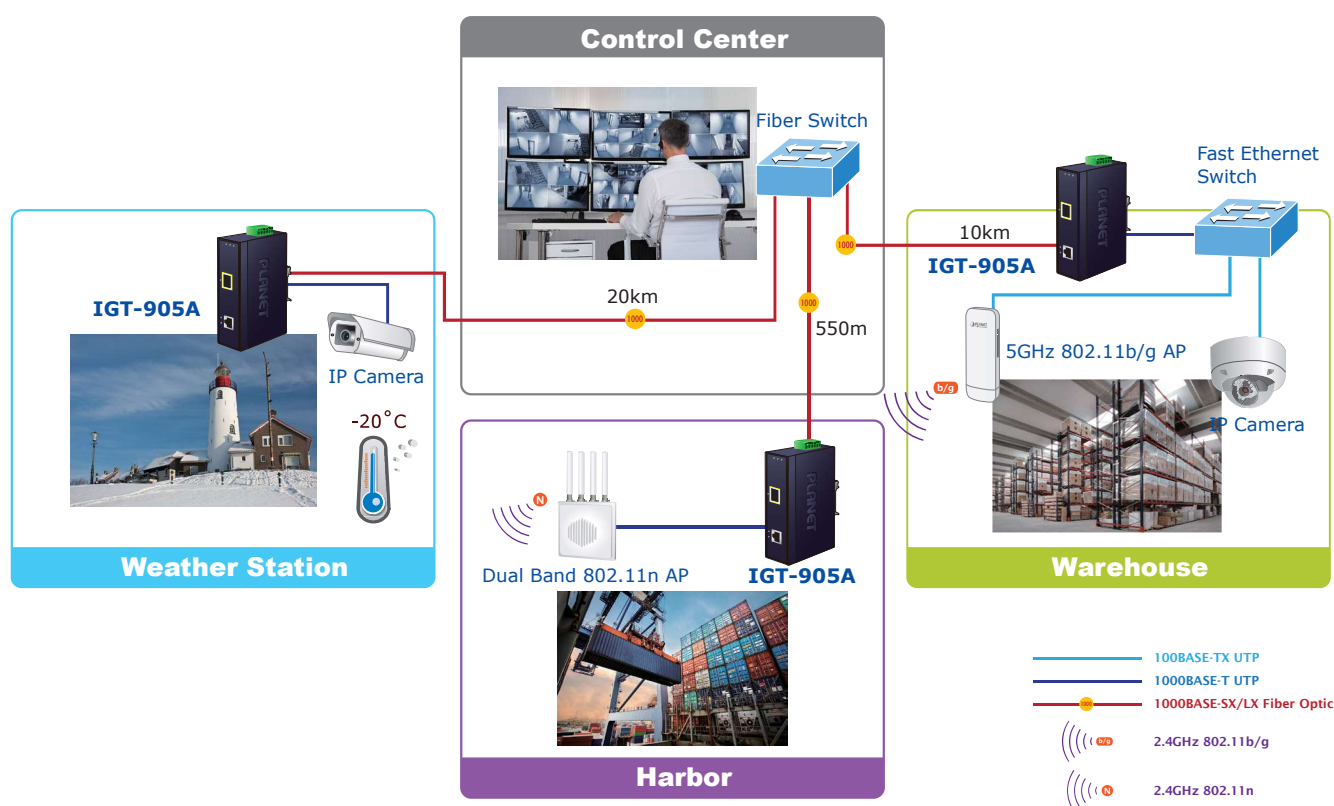
The IGT-905A can be programmed for advanced management functions such as IP address configuration, DHCP client function, port configuration, converter configuration, 802.1Q tag VLAN, Q-in-Q VLAN, QoS, OAM control, Layer 2 protocol filter, broadcast storm control and Ingress/Egress bandwidth control to enhance bandwidth utilization. The enhanced management features offered by the IGT-905A make it ideally suited for mission-critical and real-time control applications in the Industrial Ethernet networks.

- TS-1000 OAM/IEEE 802.3ah OAM/Loop Back Test
- 16 TCP/UDP filter groups
- Password setting, IP setting and device status via Planet Smart Discovery utility
- Firmware upgrade via remote Web interface
- Reset button for the factory default reset
- Display of current operating temperature

Applications

Transportation Networking

The IGT-905A offers high reliability and security to make sure the industrial operation in harsh environments such as **traffic control cabinet areas, factory floors** and establishments with **extremely low or high temperatures** can operate stably. In the industrial networking environments, each networked device is required to keep running continuously in the hazardous status. If industrial equipment fails to connect to the network, it might influence the entire operation of industrial systems, thus causing incredible financial losses. With the IGT-905A, which complies with all the requirements of industrial applications, customers can expect high reliability, fast recovery capability, and safe Ethernet network operation..



Fiber-optic Networking for ISPs and Enterprises

With high-speed data transmission and easy installation, the IGT-905A can build FTTH (Fiber to the Home) and FTTC (Fiber to the Curb) for ISPs, and FTTB (Fiber to the Building) for enterprises. The IGT-905A enables network administrators to easily monitor operations via the Web management interface.

Specifications

Product		IGT-905A
Hardware Specifications		
Copper Interface		1 x 10/100/1000BASE-T RJ45 Auto-MDI/MDI-X ports
Optic Interface		SFP
Optical Mode		Vary on module
Speed	Twisted-pair	10/20Mbps for half/full duplex 100/200Mbps for half/full duplex 2000Mbps for full duplex
	Fiber-optic	200/2000Mbps for full duplex
Cable	Twisted-pair	10BASE-T: 2-pair UTP Cat. 3,4,5, up to 100 m 100BASE-TX: 2-pair UTP Cat. 5, up to 100 m 1000BASE-T: 4-pair STP Cat 5,6 up to 100m
	Fiber-optic Cable	• 50/125µm or 62.5/125µm multi-mode fiber cable, up to 220/550m. • 9/125µm single-mode cable, extending long distance to 10/20/40/60/80/120km (vary on fiber transceiver or SFP module)
LED indicator		• Power: P1, P2, Fault • TP: LNK/ACT, 1000 • Fiber: LNK/ACT
Power Input		DC 12V to 48V Redundant power with reverse polarity protection
Power Consumption		7.9 watts/27BTU (maximum)
Operating Environment		Temperature: -30~75 degrees C Humidity: 5~90% non-condensing
Storage Environment		Temperature: -40~85 degrees C Humidity: 5~90% non-condensing
Dimensions (W x D x H)		135 x 85 x 32 mm
Weight		423g
Installation		DIN-rail kit and wall-mount ear
Management and Layer 2 Features		
Management Interface		Web/SNMP v1, v2c
Port Configuration		Port disable/enable Auto negotiation 10/100/1000Mbps full and half duplex mode selection. Flow control disable/enable. Bandwidth control on each port.
VLAN		IEEE 802.1q tag-based VLAN , 4K VLAN ID, up to 16 VLAN groups Q-in-Q VLAN
QoS		Traffic classification based on : • 802.1p priority • IP DSCP field in IP Packet • IP Address
Bandwidth Control		Ingress/Egress bandwidth control • Rate range: 512kbps to 500Mbps Storm control • Broadcast/Multicast/Unknown Unicast packet
Standard Conformance		
Emissions		FCC Class A, CE Class A
Standard		IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX/100BASE-FX IEEE 802.3z Gigabit SX/LX IEEE 802.3ab Gigabit 1000BASE-T IEEE 802.3x Flow Control and Back pressure IEEE 802.1p Class of service IEEE 802.1Q VLAN Tagging IEEE 802.3ah OAM
Stability		IEC60068-2-32 (Free fall) IEC60068-2-27 (Shock-proof) IEC60068-2-6 (Vibration-proof)

Ordering Information

IGT-905A	10/100/1000BASE-T to 100/1000BASE-X Industrial Managed Media Converter
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Available 1000Mbps Modules for IGT-905A

Gigabit Ethernet Transceiver (1000BASE-X SFP)

Model	DDM	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (nm)	Operating Temp.
MGB-GT	--	1000	Copper	--	100m	--	0 ~ 60 degrees C
MGB-SX(V2)	YES	1000	LC	Multi Mode	550m	850nm	0 ~ 60 degrees C
MGB-SX2(V2)	YES	1000	LC	Multi Mode	2km	1310nm	0 ~ 60 degrees C
MGB-LX(V2)	YES	1000	LC	Single Mode	20km	1310nm	0 ~ 60 degrees C
MGB-L40	YES	1000	LC	Single Mode	40km	1310nm	0 ~ 60 degrees C
MGB-L80	YES	1000	LC	Single Mode	80km	1550nm	0 ~ 60 degrees C
MGB-L120(V2)	YES	1000	LC	Single Mode	120km	1550nm	0 ~ 60 degrees C
MGB-TGT	--	1000	Copper	--	100m	--	-40 ~ 75 degrees C
MGB-TSX	YES	1000	LC	Multi Mode	550m	850nm	-40 ~ 75 degrees C
MGB-TSX2	YES	1000	LC	Multi Mode	2km	1310nm	-40 ~ 75 degrees C
MGB-TLX(V2)	YES	1000	LC	Single Mode	20km	1310nm	-40 ~ 75 degrees C
MGB-TL40	YES	1000	LC	Single Mode	40km	1310nm	-40 ~ 75 degrees C
MGB-TL80	YES	1000	LC	Single Mode	80km	1550nm	-40 ~ 75 degrees C

Gigabit Ethernet Transceiver (1000BASE-BX, Single Fiber Bi-directional SFP)

Model	DDM	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (TX)	Wavelength (RX)	Operating Temp.
MGB-LA10(V2)	YES	1000	WDM(LC)	Single Mode	10km	1310nm	1550nm	0 ~ 60 degrees C
MGB-LB10(V2)		1000	WDM(LC)	Single Mode	10km	1550nm	1310nm	0 ~ 60 degrees C
MGB-LA20(V2)	YES	1000	WDM(LC)	Single Mode	20km	1310nm	1550nm	0 ~ 60 degrees C
MGB-LB20(V2)		1000	WDM(LC)	Single Mode	20km	1550nm	1310nm	0 ~ 60 degrees C
MGB-LA40(V2)	YES	1000	WDM(LC)	Single Mode	40km	1310nm	1550nm	0 ~ 60 degrees C
MGB-LB40(V2)		1000	WDM(LC)	Single Mode	40km	1550nm	1310nm	0 ~ 60 degrees C
MGB-LA80	YES	1000	WDM(LC)	Single Mode	80km	1490nm	1550nm	0 ~ 60 degrees C
MGB-LB80		1000	WDM(LC)	Single Mode	80km	1550nm	1490nm	0 ~ 60 degrees C
MGB-TLA10(V2)	YES	1000	WDM(LC)	Single Mode	10km	1310nm	1550nm	-40 ~ 75 degrees C
MGB-TLB10(V2)		1000	WDM(LC)	Single Mode	10km	1550nm	1310nm	-40 ~ 75 degrees C
MGB-TLA20	YES	1000	WDM(LC)	Single Mode	20km	1310nm	1550nm	-40 ~ 75 degrees C
MGB-TLB20		1000	WDM(LC)	Single Mode	20km	1550nm	1310nm	-40 ~ 75 degrees C
MGB-TLA40	YES	1000	WDM(LC)	Single Mode	40km	1310nm	1550nm	-40 ~ 75 degrees C
MGB-TLB40		1000	WDM(LC)	Single Mode	40km	1550nm	1310nm	-40 ~ 75 degrees C
MGB-TLA80	YES	1000	WDM(LC)	Single Mode	80km	1490nm	1550nm	-40 ~ 75 degrees C
MGB-TLB80		1000	WDM(LC)	Single Mode	80km	1550nm	1490nm	-40 ~ 75 degrees C

Available 100Mbps Modules for IGT-905A

Fast Ethernet Transceiver (100BASE-X SFP)

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (nm)	Operating Temp.
MFB-FX	100	LC	Multi Mode	2km	1310nm	0 ~ 60 degrees C
MFB-F20	100	LC	Single Mode	20km	1310nm	0 ~ 60 degrees C
MFB-F40	100	LC	Single Mode	40km	1310nm	0 ~ 60 degrees C
MFB-F60	100	LC	Single Mode	60km	1310nm	0 ~ 60 degrees C
MFB-F120	100	LC	Single Mode	120km	1310nm	0 ~ 60 degrees C
MFB-TFX	100	LC	Multi Mode	2km	1310nm	-40 ~ 75 degrees C
MFB-TF20	100	LC	Single Mode	20km	1310nm	-40 ~ 75 degrees C

Fast Ethernet Transceiver (100BASE-BX, Single Fiber Bi-directional SFP)

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (TX)	Wavelength (RX)	Operating Temp.
MFB-FA20	100	WDM(LC)	Single Mode	20km	1310nm	1550nm	0 ~ 60 degrees C
MFB-FB20	100	WDM(LC)	Single Mode	20km	1550nm	1310nm	0 ~ 60 degrees C
MFB-TSA	100	WDM(LC)	Multi Mode	2km	1310nm	1550nm	-40 ~ 75 degrees C
MFB-TSB	100	WDM(LC)	Multi Mode	2km	1550nm	1310nm	-40 ~ 75 degrees C
MFB-TFA20	100	WDM(LC)	Single Mode	20km	1310nm	1550nm	-40 ~ 75 degrees C
MFB-TFB20	100	WDM(LC)	Single Mode	20km	1550nm	1310nm	-40 ~ 75 degrees C
MFB-TFA40	100	WDM(LC)	Single Mode	40km	1310nm	1550nm	-40 ~ 75 degrees C
MFB-TFB40	100	WDM(LC)	Single Mode	40km	1550nm	1310nm	-40 ~ 75 degrees C

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IGT-905A

ALLEGATO

04

Pluggable Transceivers

Small Form-Factor Pluggable Transceivers



- MSA compliant, fiber optic or electrical hot-pluggable transceiver units
- Wide selection of products supporting data rates from 10Mbps to 100Gbps and various distances

SFP (Small Form-factor Pluggable) transceivers (SFPs) are hot-swappable optical and electrical transceiver units, each providing a different interface according to known compliance standards and pre-determined specifications. The units are plugged into host platforms to provide the required interface, thus enabling optimal combination of CAPEX and OPEX reduction, due to ease of network planning, management, maintenance, and stock flexibility.

RAD's SFP transceivers are fully compliant with the Multisource Agreement (MSA) specifications, and are interoperable with third-party standards-based devices.

On account of their small size, SFPs allow higher port densities than with other transceivers, resulting in more efficient host device design.

Built-in digital diagnostic monitoring (DDM) functionality is available for designated SFP types, allowing users to monitor the unit's transmitter optical output power, receiver input optical power, internal temperature, supply voltage and transmitter bias current levels in real-time.

The XFP (10 Gigabit Small Form-factor Pluggable) and SFP+ (Enhanced Small Form-factor Pluggable) are transceivers designed for 10G network applications.

XFP/SFP+ support built-in digital diagnostic monitoring (DDM) functionality allowing users to monitor the unit's transmitter optical output power, receiver input optical power, internal temperature, supply voltage and transmitter bias current levels in real-time.

QSFP28 transceiver modules are designed for use in 100 Gigabit Ethernet links over multimode or single-mode fibers. Digital diagnostics functions are available via the I2C interface, as specified by the QSFP28.



Pluggable Transceivers

Small Form-Factor Pluggable Transceivers

Specifications

FIBER OPTIC INTERFACES

Notes:

- Commercial Pluggable Transceivers are designed to withstand temperatures between 0–70°C (32–158°F).
- Some of RAD's Pluggable Transceivers are available with extended temperature range between -20–85°C (-4–185°F) or in industrially hardened versions, designed to withstand temperatures between -40–85°C (-40–185°F).
- The specified typical range may vary according to the specific product in which the SFP/XFP/SFP+/QSFP28 is used. For more information, refer to the data sheet of the specific product.

Table 1. Fiber Optic Fast Ethernet/STM-1/STM-4 SFPs

Ordering Name, Interface, Connector	Wavelength, Fiber Type [nm], [μm]	Standards	Transmitter Type	Input Power [dBm]		Output Power [dBm]		Typical Max. Range	
				[min]	[max]	[min]	[max]	[km]	[miles]
SFP-1, SFP-1D* Fast Ethernet/STM-1, LC	1310, 62.5/125 multimode	100BASE-FX, IEEE 802.3 (FE) ANSI T1 646-1995 (STM-1)	LED	-30	-14	-20	-14	2	1.2
SFP-2, SFP-2D*, SFP-2DH*, SFP-2H* Fast Ethernet/STM-1, LC	1310, 9/125 single mode	100BASE-LX10, IEEE 802.3 (FE), G.957 S1.1 (STM-1)	Laser	-28	-8	-15	-8	15	9.3
SFP-3D*, SFP-3H* Fast Ethernet/STM-1, LC	1310, 9/125 single mode	G.957 L1.1 (STM-1)	Laser	-34	-10	-5	0	40	24.8
SFP-4, SFP-4D* Fast Ethernet/STM-1, LC	1550, 9/125 single mode	G.957 L1.2 (STM-1)	Laser	-34	-10	-5	0	80	49.7
SFP-10AD*, SFP-10ADH* Fast Ethernet/STM-1, LC	Tx – 1310/Rx – 1550, 9/125 single mode (single fiber)	100BASE-BX10, IEEE 802.3 (FE) G.957 (STM-1)	Laser (WDM)	-28	-8	-14	-8	20	12.4
SFP-10BD*, SFP-10BDH* Fast Ethernet/STM-1, LC	Tx – 1550/Rx – 1310, 9/125 single mode (single fiber)	100BASE-BX10, IEEE 802.3 (FE) G.957 (STM-1)	Laser (WDM)	-28	-8	-14	-8	20	12.4
SFP-14D* STM-4, LC	1310, 62.5/125 multimode	–	Laser	-28	-14	-20	-14	0.5	0.3
SFP-15, SFP-15DH* STM-4, LC	1310, 9/125 single mode	G.957 S4.1	Laser	-28	-8	-15	-8	15	9.3

* **Legend:** **D** – internal DDM calibration; **H** – industrially hardened SFP -40–85°C (-40–185°F); **ED** – external DDM calibration

Table 1. Fiber Optic Fast Ethernet/STM-1/STM-4 SFPs (cont.)

Ordering Name, Interface, Connector	Wavelength, Fiber Type [nm], [μm]	Standards	Transmitter Type	Input Power [dBm]		Output Power [dBm]		Typical Max. Range	
				[min]	[max]	[min]	[max]	[km]	[miles]
SFP-16 STM-4, LC	1550, 9/125 single mode	G.957 L4.2	Laser	-28	-8	-3	+2	80	49.7
SFP-18A, SFP-18AED* Fast Ethernet/STM-1, LC	Tx - 1310/Rx - 1550, 9/125 single mode (single fiber)	-	Laser (WDM)	-28	-8	-5	0	40	24.8
SFP-18B, SFP-18BED* Fast Ethernet/STM-1, LC	Tx - 1550/Rx - 1310, 9/125 single mode (single fiber)	-	Laser (WDM)	-28	-8	-5	0	40	24.8
SFP-24 Fast Ethernet/STM-1, LC	850, 50/125 multimode	-	VCSEL	-25	-2	-10	-4	2	1.2
	850, 62.5/125 multimode	-	VCSEL	-25	-2	-10	-4	1	0.6
SFP-75D STM-4, LC	1550, 9/125 single mode		Laser	-34	-8	0	+5	120	74.5

* **Legend:** *D* – internal DDM calibration; *H* – industrially hardened SFP -40–85°C (-40–185°F); *ED* – external DDM calibration

Pluggable Transceivers

Small Form-Factor Pluggable Transceivers

Table 2. Fiber Optic Gigabit Ethernet SFPs

Ordering Name, Interface, Connector	Wavelength, Fiber Type	Standards	Transmitter Type	Input Power [dBm]		Output Power [dBm]		Typical Max. Range	
				[min]	[max]	[min]	[max]	[km]	[miles]
SFP-5D*, SFP-5DH*, SFP-5H* Gigabit Ethernet, LC	850, 50/125 multimode	1000BASE-SX, IEEE 802.3 (GbE)	VCSEL	-17	0	-9.5	0	0.55	0.3
SFP-6DH* Gigabit Ethernet, LC	1310, 9/125 single mode	1000BASE-LX10, IEEE 802.3 (GbE)	Laser	-20	-3	-9.5	-3	10	6.2
SFP-7, SFP-7D*, SFP-7DH* Gigabit Ethernet, LC	1550, 9/125 single mode	–	Laser	-22	-3	0	+5	80	49.7
SFP-8D*, SFP-8DH* Gigabit Ethernet, LC	1310, 9/125 single mode	–	Laser	-21	-3	-4	+4	40	24.8
SFP-17AD*, SFP-17AH* Gigabit Ethernet, LC	Tx – 1310/Rx – 1490, 9/125 single mode (single fiber)	1000BASE-BX10, IEEE 802.3 (GbE)	Laser (WDM)	-20	-3	-9	-3	10	6.2
SFP-17BD*, SFP-17BH* Gigabit Ethernet, LC	Tx – 1490/Rx – 1310, 9/125 single mode (single fiber)	1000BASE-BX10, IEEE 802.3 (GbE)	Laser (WDM)	-20	-3	-9	-3	10	6.2
SFP-20, SFP-20EDH* Gigabit Ethernet, LC	1550, 9/125 single mode	–	Laser	-32	-8	+1	+5	120	74.5
SFP-21A, SFP-21AED*, SFP-21AH* Gigabit Ethernet, LC	Tx – 1310/Rx – 1490, 9/125 single mode (single fiber)	–	Laser (WDM)	-24	-3	-5	0	40	24.8
SFP-21B, SFP-21BED*, SFP-21BH* Gigabit Ethernet, LC	Tx – 1490/Rx – 1310, 9/125 single mode (single fiber)	–	Laser (WDM)	-24	-3	-5	0	40	24.8
SFP-22A, SFP-22AH* Gigabit Ethernet, LC	Tx – 1490/Rx – 1570, 9/125 single mode (single fiber)	–	Laser (WDM)	-24	-3	0	+5	80	49.7
SFP-22B, SFP-22BH* Gigabit Ethernet, LC	Tx – 1570/Rx – 1490, 9/125 single mode (single fiber)	–	Laser (WDM)	-24	-3	0	+5	80	49.7
SFP-23A, SFP-23AED* Gigabit Ethernet, LC	Tx – 1310/Rx – 1550, 9/125 single mode (single fiber)	–	Laser (WDM)	-24	-3	-5	0	40	24.8
SFP-23B, SFP-23BED* Gigabit Ethernet, LC	Tx – 1550/Rx – 1310, 9/125 single mode (single fiber)	–	Laser (WDM)	-24	-3	-5	0	40	24.8
SFP-28A, SFP-28AD* Gigabit Ethernet, LC	Tx – 1310/Rx – 1550 9/125 single mode (single fiber)	–	Laser (WDM)	-20	-3	-9	-3	10	6.2
SFP-28B, SFP-28BD* Gigabit Ethernet, LC	Tx – 1550/Rx – 1310, 9/125 single mode (single fiber)	–	Laser (WDM)	-20	-3	-9	-3	10	6.2

* **Legend:** **D** – internal DDM calibration; **H** – industrially hardened SFP -40–85°C (-40–185°F); **ED** – external DDM calibration

Table 2. Fiber Optic Gigabit Ethernet SFPs (cont.)

Ordering Name, Interface, Connector	Wavelength, Fiber Type [nm], [μm]	Standards	Transmitter Type	Input Power [dBm]		Output Power [dBm]		Typical Max. Range	
				[min]	[max]	[min]	[max]	[km]	[miles]
SFP-27DH* Gigabit Ethernet, LC	1270, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-28	-3	0	+5	60	37.3
SFP-29DH* Gigabit Ethernet, LC	1290, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-28	-3	0	+5	60	37.3
SFP-31DH* Gigabit Ethernet, LC	1310, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-28	-3	0	+5	60	37.3
SFP-33DH* Gigabit Ethernet, LC	1330, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-28	-3	0	+5	60	37.3
SFP-35DH* Gigabit Ethernet, LC	1350, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-28	-3	0	+5	60	37.3
SFP-37DH* Gigabit Ethernet, LC	1370, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-28	-3	0	+5	60	37.3
SFP-39DH* Gigabit Ethernet, LC	1390, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-28	-3	0	+5	60	37.3
SFP-41DH* Gigabit Ethernet, LC	1410, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-28	-3	0	+5	60	37.3
SFP-43DH* Gigabit Ethernet, LC	1430, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-28	-3	0	+5	60	37.3
SFP-45DH* Gigabit Ethernet, LC	1450, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-28	-3	0	+5	60	37.3
SFP-47DH* Gigabit Ethernet, LC	1470, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-24	-3	0	+5	80	49.7
SFP-49DH* Gigabit Ethernet, LC	1490, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-24	-3	0	+5	80	49.7
SFP-51DH* Gigabit Ethernet, LC	1510, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-24	-3	0	+5	80	49.7
SFP-53DH* Gigabit Ethernet, LC	1530, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-24	-3	0	+5	80	49.7
SFP-55DH* Gigabit Ethernet, LC	1550, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-24	-3	0	+5	80	49.7
SFP-57DH* Gigabit Ethernet, LC	1570, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-24	-3	0	+5	80	49.7
SFP-59DH* Gigabit Ethernet, LC	1590, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-24	-3	0	+5	80	49.7
SFP-61DH* Gigabit Ethernet, LC	1610, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-24	-3	0	+5	80	49.7

* **Legend:** *D* – internal DDM calibration; *H* – extended temperature range -20–85°C (-4–185°F)

Pluggable Transceivers

Small Form-Factor Pluggable Transceivers

Table 2. Fiber Optic Gigabit Ethernet SFPs (cont.)

Ordering Name, Interface, Connector	Wavelength, Fiber Type [nm], [μm]	Standards	Transmitter Type	Input Power [dBm]		Output Power [dBm]		Typical Max. Range	
				[min]	[max]	[min]	[max]	[km]	[miles]
SFP-70DH-27* Gigabit Ethernet, LC	1270, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	80	49.7
SFP-70DH-29* Gigabit Ethernet, LC	1290, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	80	49.7
SFP-70DH-31* Gigabit Ethernet, LC	1310, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	80	49.7
SFP-70DH-33* Gigabit Ethernet, LC	1330, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	80	49.7
SFP-70DH-35* Gigabit Ethernet, LC	1350, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	80	49.7
SFP-70DH-37* Gigabit Ethernet, LC	1370, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	80	49.7
SFP-70DH-39* Gigabit Ethernet, LC	1390, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	80	49.7
SFP-70DH-41* Gigabit Ethernet, LC	1410, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	80	49.7
SFP-70DH-43* Gigabit Ethernet, LC	1430, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	80	49.7
SFP-70DH-45* Gigabit Ethernet, LC	1450, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	80	49.7
SFP-70DH-47* Gigabit Ethernet, LC	1470, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	120	74.5
SFP-70DH-49* Gigabit Ethernet, LC	1490, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	120	74.5
SFP-70DH-51* Gigabit Ethernet, LC	1510, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	120	74.5
SFP-70DH-53* Gigabit Ethernet, LC	1530, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	120	74.5
SFP-70DH-55* Gigabit Ethernet, LC	1550, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	120	74.5
SFP-70DH-57* Gigabit Ethernet, LC	1570, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	120	74.5
SFP-70DH-59* Gigabit Ethernet, LC	1590, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	120	74.5
SFP-70DH-61* Gigabit Ethernet, LC	1610, 9/125 single mode	G.694.2, CWDM grid compliant	Laser (CWDM)	-32	-8	0	+5	120	74.5
SFP-GPON-1DH* Gigabit Ethernet, GPON ONT Class B+, SC, industrially hardened	Tx – 1310/Rx – 1490 9/125 single mode (single fiber) (Tx:1244.16Mb/s Rx:2488.32Mb/s)	G.984.2	Laser (WDM)	-28	-8	0.5	+5	20	12.4

* **Legend:** *D* – internal DDM calibration; *H* – industrially hardened SFP -40–85°C (-40–185°F)

Table 2. Fiber Optic Gigabit Ethernet SFPs (cont.)

Ordering Name, Interface, Connector	Wavelength, Fiber Type [nm], [μm]	Standards	Transmitter Type	Input Power [dBm]		Output Power [dBm]		Typical Max. Range	
				[min]	[max]	[min]	[max]	[km]	[miles]
SFP-76DH* Gigabit Ethernet, LC	1550, 9/125 single mode	-	Laser	-34	-8	+2	+7	140	87.0
SFP-77ADH* Gigabit Ethernet, LC	Tx – 1310/Rx – 1490 9/125 single mode (single fiber)	-	Laser (WDM)	-26	-3	0	+5	60	37.3
SFP-77BDH* Gigabit Ethernet, LC	Tx – 1490/Rx – 1310 9/125 single mode (single fiber)	-	Laser (WDM)	-26	-3	0	+5	60	37.3

Table 3. Copper STM-1/Fast Ethernet/Gigabit Ethernet/10 Gigabit Ethernet SFP/XFP

Ordering Name, Interface, Connector	Standards	Cable Type	Impedance		Typical Max. Range (Attenuation)	
			[Ω]		[m]	[ft]
SFP-9G, SFP-9-GH* Gigabit Ethernet, RJ-45, SerDes interface	1000BASE-T, IEEE 802.3	UTP, CAT.5	100		100	
SFP-11 STM-1E, mini BNC**, DIN 1.0/2.3	G.703, supports CMI encoder/decoder	Coaxial	75		135 (12.7 dB)***	
SFP-11PP STM-1E, Push-Pull mini BNC**, DIN 1.0/2.3	G.703, supports CMI encoder/decoder	Coaxial	75		135 (12.7 dB)***	
SFP-30H* Gigabit Ethernet, RJ-45, SGMII Interface	10/100/1000BASE-T, IEEE 802.3	UTP, cat. 5	100		100	

* **Legend:** **D** – internal DDM calibration; **H** – industrially hardened SFP -40–85°C (-40–185°F)

** For the cable specifications, refer to Supplied Accessories.

*** With SFP-11/SFP-11PP, a 135m range is attainable when using RG59 B/U (at 78 MHz, in accordance with the square root of frequency law).

Pluggable Transceivers

Small Form-Factor Pluggable Transceivers

Table 4. Fiber Optic Multirate SFPs

Ordering Name, Interface, Connector	Wavelength, Fiber Type [nm], [μm]	Standards	Transmitter Type	Input Power [dBm]		Output Power [dBm]		Typical Max. Range	
				[min]	[max]	[min]	[max]	[km]	[miles]
SFP-26D* multirate 100 Mbps – 2.67 Gbps, Gigabit Ethernet/Fiber Channel/ Fast Ethernet/STM-16/STM-4/ STM-1, LC	1310, 9/125 single mode	-	Laser	-18 (2.67 Gbps/ OC-48/FE) -21 (2 x FC/GbE/1x FC, STM-4/STM-1)	0	-5	0	15	9.3
SFP-74ED-17 to SFP-74ED-61* multirate 155Mbps – 2.67 Gbps Gigabit Ethernet/Fiber Channel/ STM-16/ STM-4/ STM-1, LC	C-Band, Channels 17 to 61, 9/125 single mode	ITU Grid, 100 Ghz spacing, C-Band Channels	Laser [DWDM]	-30	-8	0	+4	120	74.5

Table 5. Fiber Optic 10 Gigabit Ethernet XFPs

Ordering Name, Interface, Connector	Wavelength, Fiber Type [nm], [μm]	Standards	Transmitter Type	Input Power [dBm]		Output Power [dBm]		Typical Max. Range	
				[min]	[max]	[min]	[max]	[km]	[miles]
XFP-1D*, XFP-1DH* 10 Gigabit Ethernet, LC	1310, 9/125 single mode	10GBASE-LR/LW IEEE 802.3	Laser	-14.4	+0.5	-8.2	+0.5	10	6.2
XFP-2D*, XFP-2DH* 10 Gigabit Ethernet, LC	1550, 9/125 single mode	10GBASE-ZR/ZW IEEE 802.3	Laser	-24	-7	0	+4	80	49.7
XFP-3D*, XFP-3DH* 10 Gigabit Ethernet, LC	1550, 9/125 single mode	10GBASE-ER/EW IEEE 802.3	Laser	-15.8	-1	-4.7	+4	40	24.8
XFP-4D* 10 Gigabit Ethernet, LC	850, 50/125 multimode	10GBASE-SR/SW IEEE 802.3	VCSEL	-9.9	-1	-7.3	-1	0.3	0.186
XFP-5D-17 to XFP-5D-61* 10 Gigabit Ethernet, LC	C-Band, Channels 17 to 61, 9/125 single mode	10GBASE-ER/EW IEEE 802.3 ITU grid, 100 Ghz spacing, C-Band channels	Laser [DWDM]	-15.8	-1	-4.7	+4	40	24.8
XFP-7D-17 to XFP-7D-61* 10 Gigabit Ethernet, LC	C-Band, Channels 17 to 61, 9/125 single mode	10GBASE-ZR/ZW ITU grid, 100 Ghz spacing, C-Band channels	Laser [DWDM]	-24	-7	-1	+4	80	49.7

Notes:

* **Legend:** *D* – internal DDM calibration; *H* – industrially hardened SFP -40–85°C (-40–85°F); *ED* – external DDM calibration

Table 6. Fiber Optic 10 Gigabit Ethernet SFP+

Ordering Name, Interface, Connector	Wavelength, Fiber Type [nm], [μm]	Standards	Transmitter Type	Input Power [dBm]		Output Power [dBm]		Typical Max. Range	
				[min]	[max]	[min]	[max]	[km]	[miles]
SFP-P-1DH* 10 Gigabit Ethernet, LC	1310nm, 9/125 single mode	10GBASE-LR/LW IEEE 802.3	Laser	-14.4	+0.5	-8.2	+0.5	10	6.2
SFP-P-2DH* 10 Gigabit Ethernet, LC	1550nm, 9/125 single mode	10GBASE-ZR/ZW	Laser	-24	-7	0	+4	80	49.7
SFP-P-3DH* 10 Gigabit Ethernet, LC	1550nm, 9/125 single mode	10GBASE-ER/EW IEEE 802.3	Laser	-15.8	-1	-4.7	+4	40	24.8
SFP-P-4DH* 10 Gigabit Ethernet, LC	850nm, 50/125 multimode	10GBASE-SR/SW IEEE 802.3	VCSEL	-9.9	-1	-7.3	-1	0.3	0.186
SFP-P-5ADH* 10 Gigabit Ethernet, LC	Tx – 1330 Rx – 1270 9/125 single mode (single fiber)	10GBASE-LR/LW IEEE 802.3	Laser (WDM)	-14	+0.5	-8.2	+0.5	10	6.2
SFP-P-5BDH* 10 Gigabit Ethernet, LC	Tx – 1270 Rx – 1330 9/125 single mode (single fiber)	10GBASE-LR/LW IEEE 802.3	Laser (WDM)	-14	+0.5	-8.2	+0.5	10	6.2
SFP-P-6DH* multirate, 10 Gigabit Ethernet, Gigabit Ethernet, LC	1310nm, 9/125 single mode	10GBASE-LR/LW 1000BASE-LX10 IEEE 802.3	Laser	-14.4 -20	+0.5 -3	-8.2 -9.5	+0.5 -3	10 10	6.2 6.2
SFP-P-6ADH* 10 Gigabit Ethernet, LC	Tx - 1330nm, Rx – 1270nm 9/125 single mode (single fiber)	-	Laser (WDM)	-15	+0.5	0	+6	40 (max. 15db link budget)	24.8 (max. 15db link budget)
SFP-P-6BDH* 10 Gigabit Ethernet, LC	Tx – 1270 nm, Rx - 1330nm, 9/125 single mode (single fiber)	-	Laser (WDM)	-15	+0.5	0	+6	40 (max. 15db link budget)	24.8 (max. 15db link budget)

* **Legend:** *D* – internal DDM calibration; *H* – industrially hardened SFP -40–85°C (-40–185°F)

Pluggable Transceivers

Small Form-Factor Pluggable Transceivers

Table 7. Fiber Optic 100 Gigabit Ethernet QSFP28

Ordering Name, Interface, Connector	Wavelength, Fiber Type [nm], [μm]	Standards	Transmitter Type	Input Power [dBm]		Output Power [dBm]		Typical Max. Range	
				[min]	[max]	[km]	[miles]	[km]	[miles]
QSFP28-1D* 100 Gigabit Ethernet, LC, Internal Calibration	LAN-WDM wavelengths 1295.56nm, 1300.05nm, 1304.58nm, 1309.14nm, 9/125 Single mode	100GBASE-LR4 IEEE 802.3	Laser EML	-10.6 **	+4.5	-4.3	+4.5	10	6.2
QSFP28 -2D* 100 Gigabit Ethernet, MPO12	850nm, 50/125 Multi mode	100GBASE-SR4 IEEE 802.3	VCSEL	-10.3 **	+2.4	-8.4	+2.4	0.1 Over OM4 fiber 0.07 Over OM3 fiber	0.06 0.04

* **Legend:** *D* – internal DDM calibration; *H* – industrially hardened SFP -40–85°C (-40–185°F)

** - Average input power, each lane (min) is informative and not the principal indicator of signal strength.

Pluggable Transceivers

Small Form-Factor Pluggable Transceivers

Ordering

To order an SFP/XFP/SFP+/QSFP28 unit, use its ordering name as listed in *Tables 1–7*.

Note: *It is strongly recommended to order RAD products with original RAD SFPs/XFPs/SFP+s/QSFP28 installed. This will ensure that prior to shipping, RAD has performed comprehensive functional quality tests on the entire assembled unit, including the SFP/XFP/SFP+/QSFP28 devices.*

RAD cannot guarantee full compliance to product specifications for products using non-RAD SFPs/XFPs/SFP+s/QSFP28.

SUPPLIED ACCESSORIES

CBL-MINIBNC-BNC

Two adapter cables for converting mini BNC connectors to regular BNC coaxial connectors (for SFP-11)

CBL-MINIBNC/PP-BNC

Two adapter cables for converting mini BNC Push-Pull connectors to regular BNC coaxial connectors (for SFP-11/PP)

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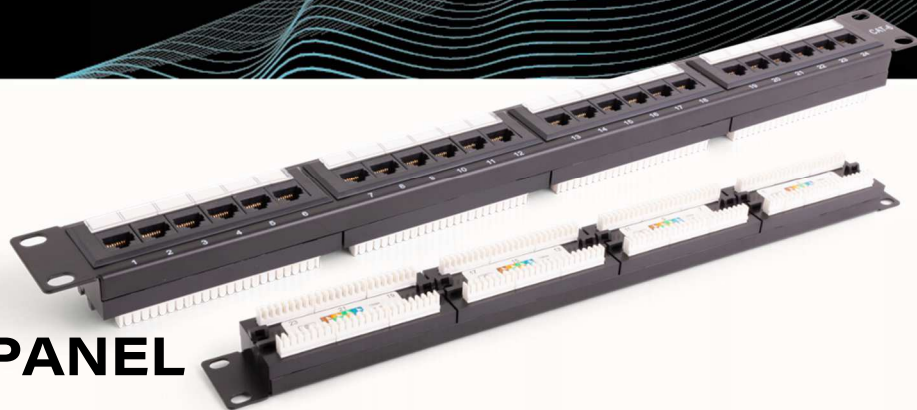


Your Network's Edge®

ALLEGATO

05

COPPER Cat. 6



COPPER PATCH PANEL CAT. 6 - UTP



Description

ORCA Category 6 Density Patch Panels provide excellent performance for high speed LANs from 10 Mb to Gigabit Ethernet 100BASETx, token ring, 155 Mbps ATM, 100 Mbps TP-PMD, ISDN, analogue (broadband, baseband) and digital video and analog and digital (VoIP) voice applications. 1U 19" standard format is ideal for rack installation.

High quality components and innovative IDC connection techniques with rear utilities colour coded for correct connection of UTP cable, and planar ring cable clips. Front of the panel features easy to use slide in labels.

Material Specification e Feature:

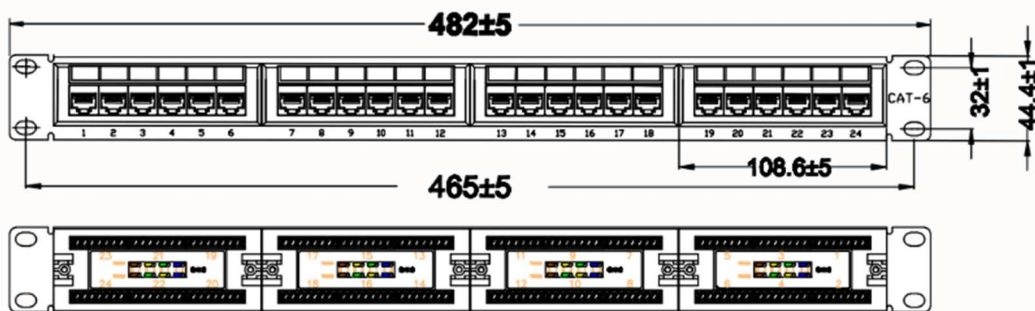
Main body	Material	Metal
	Dimension	1U
	Color	Black
PIN	Material	Phosphor Bronze
	Life	≥750 times
	TYPE	Dual Identity
IDC	Life	200 times of repeated threading
	AWG range:	22-26
	Number	24 - numbered and with label holder
Port	Type	RJ45 - Cat. 6
	Shield	UTP
Operation Temperature		-20 to 68 °C

Reference Standard:

ANSI/TIA-568-C

ISO/IEC 11801

RoHS Directive 2011/65/EU compliant



Ordering Information code:

OC-PP6-273120-24

ORCA - PATCH PANEL CAT. 6 UTP, 1U, 24P LOADED

ALLEGATO

06



PowerFlow-2

Managed Ruggedized Ethernet Switch with Power over Ethernet

- Compact Industrial and ruggedized Ethernet switches with up to 16 10/100/1000BaseT, and 8x100/1000BaseFX SFPs
- Flexible deployment scenarios using xSTP, ERPS and ultra-fast recovery with PF-Ring and PF-chain
- Advanced L2 functionality like policing and traffic management, as well as security features to assure User Authentication and Device Connection Control
- Variety of input voltage and POE feeding options including POE++
- Wide Operating Temperature

PowerFlow-2 are managed and unmanaged industrial grade Gigabit Ethernet devices designed to build packet-based operational networks of Critical Infrastructure verticals. The family includes six managed switches and two unmanaged injectors (see *Ordering*).

MARKET SEGMENTS AND APPLICATIONS

PowerFlow-2 applications include power utilities, railways, traffic controllers, and safe city applications, which require advanced Layer 2 functionality and in many cases are PoE intensive. PowerFlow-2 provide a variety of redundant functions to increase the reliability and deployment flexibility of the communications system, including variety of Ethernet functions, such as xSTP, G.8032 and ultra-fast recovery using PS-ring and PF-chain unique features. Dual DC inlets and variety of isolated power supply options address a wide range of installation scenarios.

PowerFlow-2 systems are fully compliant with the requirement of EN 50121-4 for railways. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. The wide operating temperature range models (-40°C to 75°C) fulfill the special needs of industrial applications.

INTEROPERABILITY

PowerFlow-2 is compatible with SecFlow-2 (RSTP, ERPS), Airmux, and PowerFlow-2-10G.

RESILIENCY

Ethernet Ring Protection

PowerFlow-2 supports STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS), and PF-Ring for redundant cabling.

PowerFlow-2 provides five Ring instances, while each can support G.8032, PF-Ring, PF-Chain or Sub-Ring type for flexible uses. (Refer to *Installation and Operation manual* for more details).

PF-Ring can be established for Redundant Ethernet Ring, having recovery time <10ms with up to 250 units.

MANAGEMENT AND SECURITY

PowerFlow-2 can be managed using user-friendly web interface and CLI with textual database. It supports SNMPv3 and SSH using IPv4 or IPv6. Advanced L2 Ethernet functions (IGMP, VLAN, QoS) and security features (ACL, 802.1X) provide reliable secure communication. PowerFlow-2 can be conveniently managed centrally by RADview or other third-party SNMP managers.



Specifications

CAPACITY

Switching Capacity	Up to 22 Gbps
Forwarding Rate	16.368 Mpps
Max. Frame Size	Jumbo Frame: 9.6 KB
MAC Address Table	8K

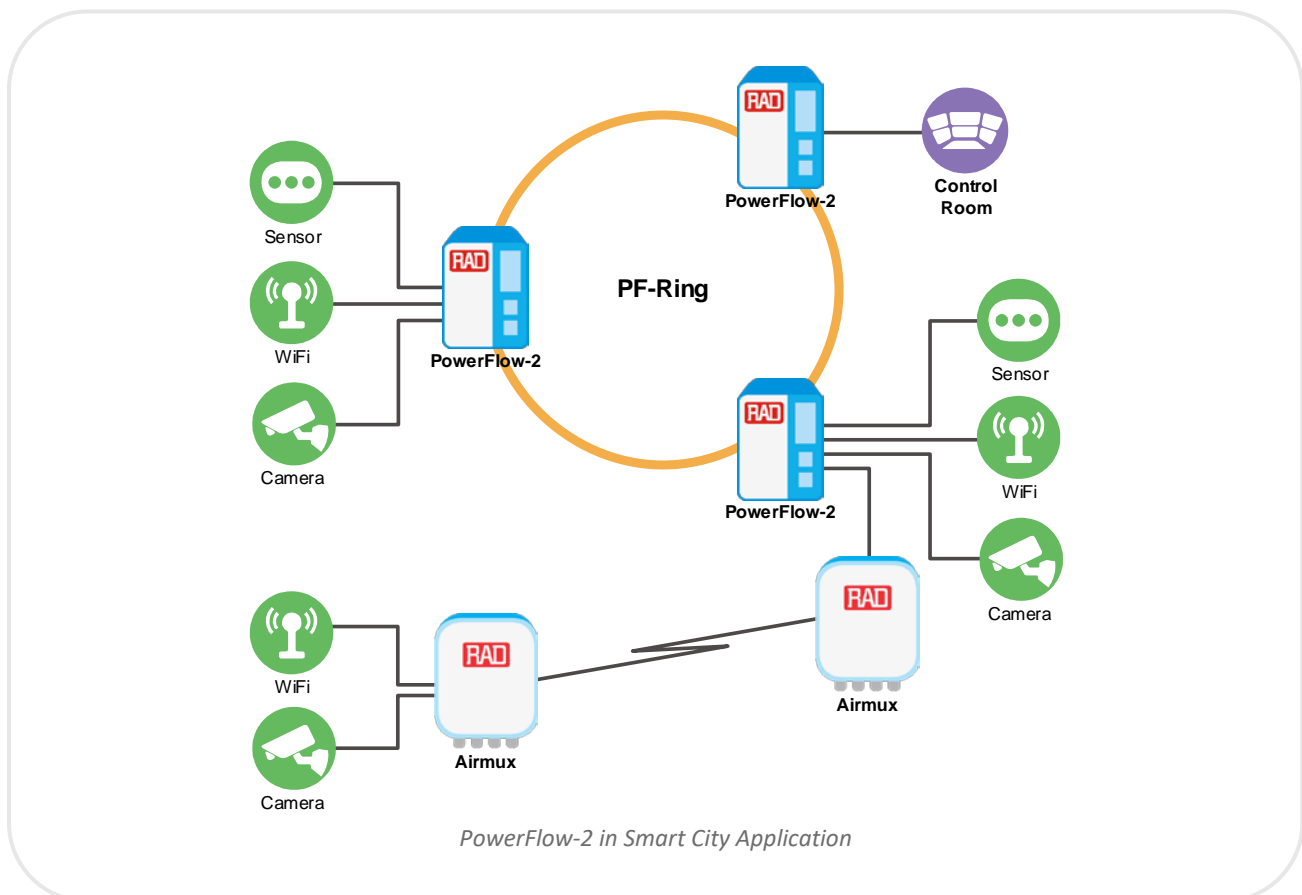
ETHERNET INTERFACES

Ports	See Table 1
Power over Ethernet (PoE)	PoE (15.4W per port): 802.3af
	PoE+ (30W per port): 802.3at
	PoE++ (60W per port): 802.3bt
	PoE for Airmux (Alternative-B, Passive)

VLAN	IEEE 802.1q VLAN, up to 4094 ID
	IEEE 802.1q VLAN, up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN, up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	MVR (Multiple VLAN Registration)
	GVRP (GARP VLAN Registration Protocol)

MANAGEMENT

Control Port	RS-232 interface, RJ-45 connector
Options	CLI with password-protected access
	Web-based
	SNMP
	Modbus/TCP



TIMING*

Clients	NTP client
	SNTP client

IEEE1588 PTP V2 Transparent Clock

*Not applicable for PF-2/ETR/WRDC/1UTP/1PU ordering option

SECURITY*

ACL	L2: MAC address SA/DA/VLAN
	L3: IP address SA/DA, Subnet
	L4: TCP/UDP

TACACS+

RADIUS

HTTPS, HTTP

SSL/SSH v2

IEEE 802.1X	Port-based
	MAC-based

*Not applicable for PF-2/ETR/WRDC/1UTP/1PU ordering option

QUALITY OF SERVICE (QOS)*

Class of Service	IEEE802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS
	QCL (QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI
	QCE (QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
Bandwidth Control	Ingress:
	<ul style="list-style-type: none"> Rate in steps: 1 kbps / Mbps / fps / kfps Range: 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit: bit or frame
	Egress:
	<ul style="list-style-type: none"> Rate in steps: 1 kbps / Mbps Range: 100 kbps to 1Gbps Rate Unit: bit Per queue / Per port shaper
DiffServ (RF 2474)	
Remarking	
Storm Control	Unicast, Broadcast, Multicast

GOOSE Message(for PF-2/ETR/WR/3SFP/8UTP/H)	Complies with IEC61850 standard to achieve zero packet loss
IGMP/MLD/DHCP	(Not applicable for PF-2/ETR/WDC/1UTP/1PU ordering option)
	IGMP Snooping v1, v2, v3
	MLD Snooping v1, v2
	Port Filtering Profile
	Throttling
	Fast Leave
	DHCP client/Relay/Snooping/Snooping option 82/Relay option 82

*Not applicable for PF-2/ETR/WRDC/1UTP/1PU ordering option

RESILIENCY

ERPS v2	Convergence time <50ms
	Single Ring, Sub-Ring, and Multiple ring topology network
	Up to 5 instances of PF-Ring. PF-Chain or Sub-Ring
Link Aggregation	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group

DIAGNOSTICS

Alarm Relay	Relay outputs with current carrying capacity of 1 A @24VDC
Indicators	LED indicators
Syslog	See Table 1

Environment

Housing	Rugged Metal
	IP30 Protection
	Fanless
	For the rest, see Table 3

Physical

See Table 2

Power

See Tables 3, 4, 5, 6, 7

Table 1. PowerFlow-2 Features (Switches)

Specifications		PF-2/ETR/48VDC/ 3SFP/8PH PF-2/ETR/WDC/ 3SFP/8PH	PF-2/ETR/48VDC/ 3SFP/4PH4PAM	PF-2/ETR/48VDC/ 2SFP/4PU	PF-2/ETR/48VDC/ 8SFP/8UTP/8PH	PF-2/ETR/WR/ 3SFP/8UTP/H
Interfaces	Switching Capacity, non-blocking	22 Gbps	22	12	48 Gbps	22
	Forwarding Rate	16.37 Mpps	16.37	8.93	35.7 Mpps	16.37
	10/100/1000Base-T interfaces	-	-	4	8	8
	FE/GbE SFP interfaces	3	3	2	8	3
	PoE+ (30W per port)	8	4	-	8	-
	PoE++ (60W per port)	-	-	4	-	-
OAM/CFM and Diagnostics	Airmux PoE	-	4	-	-	-
	Event Syslog	Syslog server	Syslog server	Syslog server	Syslog server	Syslog server
	Port Mirroring	+	+	+	+	+
	RMON I, RMON II	+	+	+	+	+
	Modbus/TCP	+	+	+	+	-
	IEEE 802.1ag CFM	+	+	+	+	+
Management	ITU-T Y.1731 performance monitoring (PM)	+	+	+	+	+
	CLI	+	+	+	+	+
	Web-based	+	+	+	+	+
IPv6 Management		Telnet Server/ICMP v6, SNMP, HTTP, SSH, NTP/SNTP, TFTP, QoS, ACL, DHCP				

Table 2. PowerFlow-2 Features (Injectors)

Specifications		PF-2/ETR/48VDC/ 1UTP/1PAM	PF-2/ETR/WDC/ 1UTP/1PU
Interfaces	10/100/1000Base-T interfaces	1	1
	FE/GbE SFP interfaces	-	-
	POE++ (60W per port)	-	1
	Airmux PoE	1	-

Table 3. Power, Physical, and Environmental Specifications

Specifications	PF-2/ETR/48VDC/ 3SFP/8PH PF-2/ETR/WDC/ 3SFP/8PH PF-2/ETR/48VDC/ 3SFP/4PH4PAM	PF-2/ ETR/48VDC/ 8SFP/8UTP/8PH	PF-2/ ETR/48VDC/ 2SFP/4PU	PF-2/ETR/WRDC/ 1UTP/1PU	PF-2/ETR/ 48VDC/ 1UTP/1PAM	PF-2/ETR/WR/ 3SFP/8UTP/H	
Power	Power Supply*	Dual inlet 48 VDC or WDC		Dual inlet 12/24/48VDC	Single inlet 48VDC	Wide range dual inlet 48VDC or single 110/220VAC/VDC	
	Power Consumption	See Table 7		See Table 4	See Table 6	See Table 5	
	Negative voltage power input support**	+	+	+	+	-	+
Size	Height / cm(inch)	15.2 (5.9)	15.7 (6.2)	13.5 (5.3)	14.2 (5.6)	10.3 (4.1)	15.2 (5.9)
	Width / cm(inch)	7.2 (2.9)	9.1 (3.6)	6.25 (2.5)	3.16 (1.24)	3.0 (1.2)	8.2 (3.2)
	Depth / cm(inch)	10.6 (4.2)	11.6 (4.6)	10.6 (4.2)	10.6 (4.17)	7.0 (2.8)	10.6 (4.17)
	Weight / kg (lb)	1.0 (2.2)	2.06 (4.54)	0.7 (1.54)	0.425 (0.93)	0.215 (0.48)	1.085 (2.39)
Storage Temperature			-40 to +85°C (-40 to 185°F)				
Operating Temperature		-40 to +65°C (-40 to 149°F)		- 40 to +75°C (-40 to 167°F)***			
Humidity			5% to 95% (non-condensing)				

*Since PoE is not isolated from the power supply, it is recommended to check grounding polarity along the line or to use isolated (In-Out) or floating power source

** In some telecom applications, users may need to use negative DC power to prevent wire corrosion. One power supply is enough to power up the device. In case of power source redundancy, when two negative DC power supplies are needed ("+" poles are connected together to ground), an additional kit (PF-2-48V-DUAL-INPUTS-KIT, ordered separately) should be used for protecting the batteries in case of power level difference between the 2 sources.

*** Up to +85°C for model PF-2/ETR/WR/3SFP/8UTP/H for up to 12 hours

Table 4. PF-2/ETR/WRDC/1UTP/1PU Power Consumption

Input Voltage	Mode	Input Power Consumption	Device Power Consumption	PoE Power Budget	Boost Efficiency
24VDC	30W (2 Pair)	33W	1.4W	30W	94.90%
48VDC	30W (2 Pair)	33.2W	1.9W	30W	95.80%
24VDC	60W (4 Pair)	65.2W	1.4W	60W	94.10%
48VDC	60W (4 Pair)	64.7W	1.9W	60W	95.50%

Table 5. PF-2/ETR/WR/3SFP/8UTP/H Power Consumption

Input Voltage	Consumption
110VAC	9.3W
220VAC	9.2W
24VDC	9.6W
48VDC	11.1W

Table 6. PF-2/ETR/48VDC/1UTP/1PAM Power Consumption

Input Voltage	Consumption
48VDC (2 pairs)	1.1W
48VDC (4 pairs)	2.8W

Ordering

RECOMMENDED CONFIGURATIONS

PF-2/ETR/48VDC/3SFP/8PH

Dual inlet 48VDC, three 100/1000Base-X SFP ports, eight 10/100/1000Base-T PoE+(240W)

PF-2/ETR/48VDC/8SFP/8UTP/8PH

Dual inlet 48VDC, eight 100/1000Base-X SFP ports, eight 10/100/1000Base-T ports, eight 10/100/1000Base-T PoE+ (240W) ports

PF-2/ETR/48VDC/2SFP/4PU

Dual inlet 48VDC, two 100/1000Base-X SFP ports, four PoE++ 10/100/1000Base-T ports, supporting up to 240W on the device

PF-2/ETR/WR/3SFP/8UTP/H

Wide range dual inlet 48VDC or single 110/220 VAC/VDC, three 100/1000Base-X SFP ports, eight 10/100/1000Base-T ports, compliant IEC61850-3 and IEEE1613

PF-2/ETR/WDC/3SFP/8PH

Dual inlet 24/48VDC, three 100/1000Base-X SFP ports, eight 10/100/1000Base-T PoE+(180W)

PF-2/ETR/48VDC/3SFP/4PH4PAM

Dual inlet 48 VDC, three 100/1000Base-X SFP ports, four 10/100/1000Base-T PoE+ ports, four 10/100/1000BaseT Airmux PoE (240W) ports

PF-2/ETR/WRDC/1UTP/1PU

Unmanaged, 12/24/48 VDC, one 10/100/1000Base-T port, one 10/100/1000Base-T PoE++ (72W) port

PF-2/ETR/48VDC/1UTP/1PAM

Unmanaged, 48VDC, one 10/100/1000Base-T port, one 10/100/1000Base-T PoE+ port (30W, Airmux support)

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options

Table 7. Power Consumption for other Options

Device	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget
PF-2/ETR/48VDC/3SFP/8PH	48 VDC	255.2W	15.2W	240W
PF-2/ETR/48VDC/8SFP/8UTP/8PH				
PF-2/ETR/48VDC/3SFP/4PH4PAM				
PF-2/ETR/WDC/3SFP/8PH	24 VDC	194.2W	10.8W	180W
	48 VDC	196.0W	11.5W	180W
PF-2/ETR/48VDC/2SFP/4PU	48 VDC	249.6W	9.6W	240W

SUPPLIED ACCESSORIES

PF-CBL-RJ45-DB9

Console cable RJ-45 to DB-9

PF-2-TB

Terminal block for power input connector as per specific device

Mounting kits for installing PowerFlow devices on a DIN rail (depending on the device type):

PF-2-DIN-RAIL-KIT-50.5x30mm

Mounting kit for installing a PF-2/ETR/WRDC/1UTP/1PU or PF-2/ETR/48VDC/1UTP/1PAM device on a DIN rail – 50.5 x 30 mm with 3 screws

PF-2-DIN-RAIL-KIT-50.5x54mm

Mounting kit for installing a PF-2/ETR/48VDC/3SFP/8PH, PF-2/ETR/WDC/3SFP/8PH, PF-2/ETR/48VDC/3SFP/4PH4PAM, PF-2/ETR/WR/3SFP/8UTP/H or PF-2/ETR/48VDC/2SFP/4PU device on a DIN rail – 50.5 x 54 mm with 3 screws

PF-2-DIN-RAIL-KIT-130x52mm

Mounting kit for installing a PF-2/ETR/48VDC/8SFP/8UTP/8PH device on a DIN rail – 130 x 52mm with 8 screws, Phoenix Contact

OPTIONAL ACCESSORIES

PF-CBL-RJ45-DB9

Console cable RJ-45 to DB9 for all devices

Mounting Kits

PF-2-WALL-MOUNT-KIT-184X30MM

Mounting kit for installing PF-2/ETR/WRDC/1UTP/1PU or PF-2/ETR/48VDC/1UTP/1PAM on a wall – 184 x 30 mm with 2 screws

PF-2-WALL-MOUNT-KIT-184X50MM

Mounting kit for installing PF-2/ETR/48VDC/3SFP/8PH, PF-2/ETR/WDC/3SFP/8PH, PF-2/ETR/48VDC/3SFP/4PH4PAM, PF-2/ETR/WR/3SFP/8UTP/H or PF-2/ETR/48VDC/2SFP/4PU on a wall – 184 x 50 mm with 2 screws

PF-2-WALL-MOUNT-KIT-76X75MMX2

Mounting kit for installing PF-2/ETR/48VDC/8SFP/8UTP/8PH on a wall – 2 x 76 x 75 mm with 4 screws

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RM-DIN-SINGLE

Mounting kit for installing a DIN rail device in a 19/23-inch rack

RM-DIN-19

Mounting kit for installing multiple DIN rail devices in a 19-inch rack

External Power Supplies and Accessories

SF-AC-48VDC-40W (to be used with non-POE options)

External DIN rail AC to 48 VDC power supply, 40 W, -20 to 60°C (-4 to 140°F); 20 W at 60°C (140°F) and above

SF-AC-48VDC-120W

External DIN rail AC to 48 VDC power supply, 120 W, -20 to 60°C (-4 to 140°F); 60 W at 65°C (149°F) and above

SF-24VDC-48VDC-240W

24 VDC to 48 VDC power supply, 240 W, -40 to 50°C (-40 to 122°F); 120 W at 65°C (149°F) and above

SF-AC-12VDC-40W

AC to 12 VDC power supply, 40 W, -20 to 60°C (-4 to 140°F); 20 W at 65°C (149°F) and above

PF-2-48V-DUAL-INPUTS-KIT

Protection kit (needed for installation of two negative -48 VDC power supplies)

PF-2-TB2

PowerFlow Terminal Block connector 2PIN for PF-2/ETR/WR/3SFP/8UTP/H

PF-2-TB6

PowerFlow Terminal Block connector 6PIN for all DIN rail type devices

SFP Transceivers

SFP-2DH

Fast Ethernet/STM 1, DDM, internal calibration, industrially hardened, 1310 nm, single mode, laser, 15 km (9.3 mi)

SFP-6DH

Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1310 nm, single mode, laser, 10.0 km (6.2 mi)

SFP-30H

Multirate 10/100/1000 copper SFP, industrially hardened, 100m (328 f)

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ALLEGATO

07

PowerFlow-2-10G

Industrial 10G Core Switch



- Flexible deployment scenarios using xSTP, ERPS and ultra-fast recovery with PF-ring and PF-chain
- L2 with security features
- Variety of input voltage and POE feeding options including POE+
- Ethernet switching
- Wide Operating Temperature

PowerFlow-2-10G are industrial grade Ethernet switches equipped with 4 10G SFP+ ports with two combinations of UNI ports. The first includes 20 GbE SFP ports plus 4 combo GbE ports, and the second supports 24 GbE copper ports with up to 400W PoE and 4 GbE SFP ports. The devices have fanless design with redundant, isolated power supplies and can be mounted in 19-inch EIA standard rack. PowerFlow-2-10G offers various L2 Ethernet functions (IGMP, VLAN, QoS, ACL, Security, IPv6 for management, bandwidth control, and port mirroring) and also supports PF-Ring redundancy protocol. The switches can also be centrally managed by RADview.

MARKET SEGMENTS AND APPLICATIONS

PowerFlow-2-10G applications include power utilities, railways, traffic controllers, and safe city applications which require advanced Layer 2 functionality and which in many cases are PoE intensive or need to aggregate multiple 1GbB rings. PowerFlow-2-10G systems are fully compliant with the requirement of 50121-4 for railways. The switches provide a variety of redundant functions to increase the reliability and deployment flexibility of the communications system, including variety of Ethernet functions, such as xSTP, G.8032 and ultra-fast recovery using PS-ring and PF-chain unique features. Dual DC (dual AC or combination) power supplies address a wide range of installation scenarios.

INTEROPERABILITY

PowerFlow-2-10G devices are compatible with PowerFlow-2 and SecFlow-2 (RSTP, ERPS).

ETHERNET

PowerFlow-2-10G support IEEE802.1q, IEEE802.1d and relevant parts of IEEE802.3.

RESILIENCY

Ethernet Ring Protection

PowerFlow-2-10G support STP, RSTP, MSTP, ITU-T G.8032v1, G.8032v2 Ethernet Ring Protection Switching (ERPS), and PF-Ring for redundant cabling.

PowerFlow-2-10G provide 14 ring instances, while each can support the PF-Ring, PF-Chain or Sub-Ring type for flexible networking applications.

PF-Ring can be established for Redundant Ethernet Ring, having recovery time < 10ms with up to 250 units.

LAG

The full Gigabit capability supports Link Aggregation (Dynamic IEEE 802.3ad LACP) with up to 14 trunk group (maximum 8 ports per group) to increase bandwidth, thus providing high-performance quick transfer of large amounts of video, voice and data across a network.

TIMING AND SYNCHRONIZATION

PowerFlow-2-10G support IEEE1588 PTPv2 for precise time synchronization to operate in Transparent Clock mode by each port.

MONITORING AND DIAGNOSTICS

Diagnostic features include RMON (1, 2, 3, 9 group), RMON II, RFC1213 MIB II, IP Source Guard, and Port Mirroring.

MANAGEMENT AND SECURITY

PowerFlow-2-10G can be managed via:

- CLI
- Web-based application
- SNMPv1, SNMPv2c, SNMPv3

PowerFlow-2-10G

Industrial 10G Core Switch

Specifications

CAPACITY

Max. Frame Size

Jumbo frame 10K

MAC Address Table

32K

Memory Buffer

4MB for packet buffer

Multiple PF-Ring

Up to 250 devices

ETHERNET

VLAN

IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID

IEEE 802.1ad Q-in-Q

MAC-based VLAN, up to 256 entries

IP Subnet-based VLAN, up to 128 entries

Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries

VLAN Translation, up to 256 entries

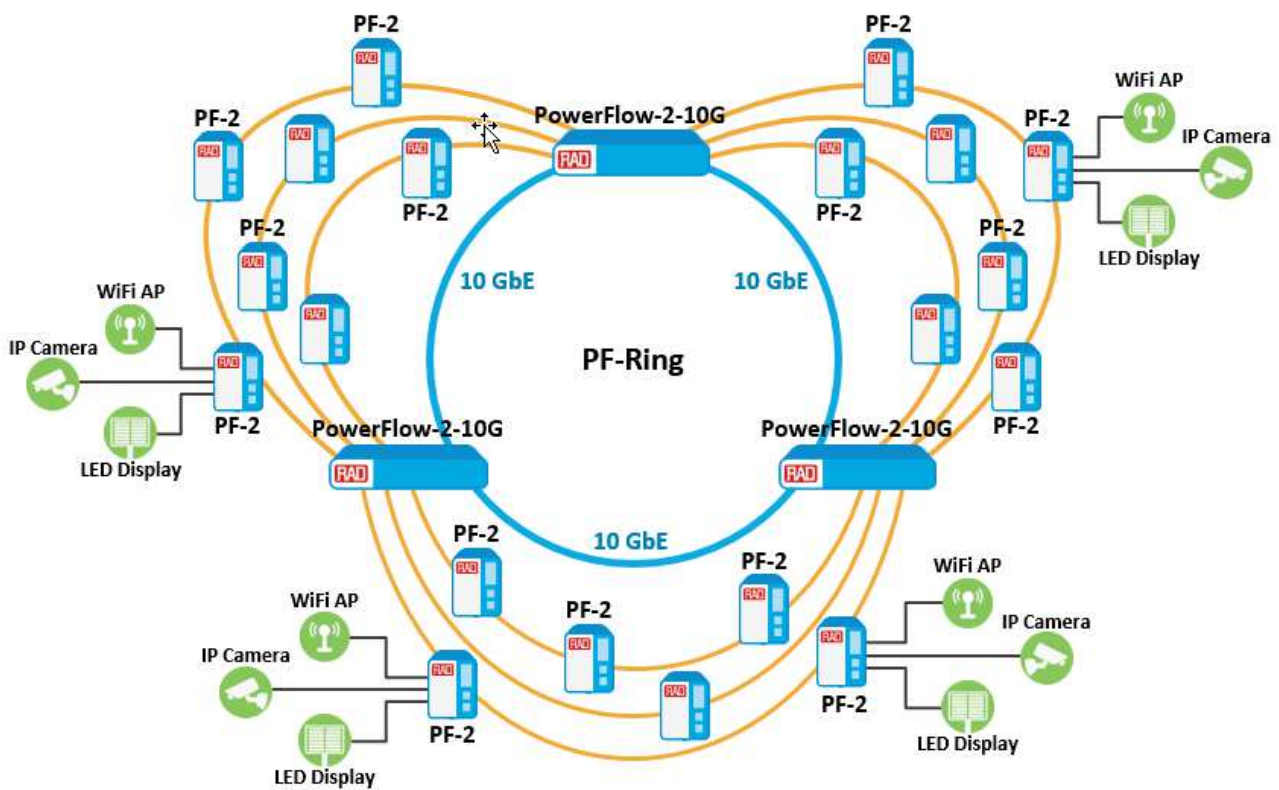


Figure 1. 10GbE Backbone Application

PowerFlow-2-10G

Industrial 10G Core Switch

QUALITY OF SERVICE (QOS)

Traffic Classification QoS

IEEE802.1p based CoS

IP Precedence based CoS

IP DSCP based CoS

QCL (QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI

QCE (QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number

Bandwidth Control

Ingress

Port-based

Egress

- Port-based
- Per queue / per port shaper

DiffServ (RF 2474) Remarking

Storm Control

Unicast, Broadcast, Multicast

MANAGEMENT

Control Port

RS-232 (RJ-45)

Management Port

SFP Model: dedicated MGMT port

UTP model: any of the UTP ports (1-24)

Management Options

- CLI
- Web
- SNMPv1, SNMPv2c, SNMPv3

Table 1. PowerFlow-2-10G Product Options, Feature Comparison

Specification	PF-2-10G/ETR/48R/ 4SFPP/4SFP/24PH	PF-2-10G/48R/ 4SFPP/4ETH/20SFP	PF-2-10G/ACR/ 4SFPP/4ETH/20SFP	PF-2-10G/ACDC/ 4SFPP/4ETH/20SFP
Interfaces	10/100/1000 Base-T(x) RJ-45 interfaces	24	-	-
	GbE UTP/SFP Combo	-	4	4
	FE/GbE SFP interfaces	4	20	20
	1G/2.5G/10GBase-X SFP+ interfaces	4	4	4
	PoE interfaces	24	-	-
	Total	32	28	28
Management	CLI	+	+	+
	Web-based	+	+	+
	Modbus/TCP	+	-	-
	IPv6 Management	+	+	+
	IEEE 802.1ag CFM	+	+	+
	ITU-T Y.1731 performance monitoring (PM)	+	+	+
	Advanced PoE Management	+	-	-

PowerFlow-2-10G

Industrial 10G Core Switch

SECURITY

RADIUS

TACACS+

HTTPS, HTTP

SSL / SSH v2

IEEE 802.1X

- Port-based
- MAC-based

ACL

- L2: MAC address SA/DA/VLAN
- L3: IP address SA/DA, Subnet
- L4: TCP/UDP

TIMING

NTP, SNTP client

IEEE1588 PTP V2

Transparent Clock

RESILIENCY

Ethernet Ring Protection Switching (ERPS)

Recovery time <50ms

Single Ring, Sub-Ring, and Multiple ring topology network

Up to 14 instances of PF-Ring. PF-Chain or Sub-Ring with up to 250 nodes in a ring

Link Aggregation

Static (Hash with SA, DA, IP, TCP/UDP port), up to 14 trunk groups

Dynamic (IEEE 802.3ad LACP), up to 14 trunk groups

Up to 8 ports per group

DIAGNOSTICS

Alarm Relay

Relay outputs with current carrying capacity of 1 A @24VDC, 2-Pin removable terminal block

Syslog

Syslog server

Warning messages

IGMP/MLD Snooping

- IGMP Snooping v1, v2, v3
- MLD Snooping v1, v2
- Port Filtering Profile
- Throttling
- Fast Leave
- Maximum Multicast Group: up to 1022 entries
- Query/Static Router Port

Indicators

LED indicators for power and link activity

PowerFlow-2-10G

Industrial 10G Core Switch

Table 2. Power, Physical, and Environmental Specifications – PowerFlow-2-10G Product Options

Specifications		PF-2-10G/ETR/48R/ 4SFPP/4SFP/24PH	PF-2-10G/48R/ 4SFPP/4ETH/20SFP	PF-2-10G/ACR/ 4SFPP/4ETH/20SFP	PF-2-10G/ACDC/ 4SFPP/4ETH/20SFP
Compliance	Hi-pot protection	+	-	-	-
	4KV surge protection	+	-	-	-
Power	Power Supply	Dual redundant 48 VDC	Dual redundant 48 VDC	Dual redundant wide range AC/HVDC (100 – 240V)	1x48 VDC and Wide range AC/HVDC (100– 240 V)
	Power Consumption	30.4W	See Table 3	See Table 3	See Table 3
	PoE Power Budget	400W	-	-	-
	Total Power Consumption	430.4W	-	-	-
	Negative voltage power input support	+	+	+	+
Size	Height, cm (inch)	4.4 (1.73)	4.4 (1.73)	4.4 (1.73)	4.4 (1.73)
	Width, cm (inch)	44 (17.3)	44 (17.3)	44 (17.3)	44 (17.3)
	Depth, cm (inch)	31.5 (12.4)	31.5 (12.4)	31.5 (12.4)	31.5 (12.4)
	Weight, kg (lb)	4.46 (9.8)	4.2 (9.3)	4.76 (10.5)	4.51 (9.9)
Storage Temperature			-40 to +85°C (-40 to 185°F)		
Operating Temperature			-10 to +60°C (14 to 140°F)		
Humidity			5% to 95% (non-condensing)		

PowerFlow-2-10G

Industrial 10G Core Switch

Ordering

RECOMMENDED CONFIGURATIONS

PF-2-10G/ETR/48R/4SFPP/4SFP/24PH

Dual redundant 48 VDC power supply, four 1G/2.5G/10G SFP+ ports, four 100/1000Base-X SFP ports, 24 10/100/1000 Base-T(X) ports, PoE+ (400W)

PF-2-10G/48R/4SFPP/4ETH/20SFP

Dual redundant 48 VDC power supply, redundant 48VDC power supply, four 1G/2.5G/10G SFP+ ports, four 100/1000Base Combo (UTP/SFP) ports, 20 x 100/1000Base-X SFP ports

PF-2-10G/ACR/4SFPP/4ETH/20SFP

Dual redundant wide-range AC/HVDC power supply, four 1G/2.5G/10G Base-X SFP+ ports, four 100/1000Base Combo (UTP/SFP) ports, 20 x 100/1000Base-X SFP ports

PF-2-10G/ACDC/4SFPP/4ETH/20SFP

48 VDC and wide-range AC/HVDC power supplies, four 1G/2.5G/10G Base-X SFP+ ports, four 100/1000Base Combo (UTP/SFP) ports, 20 x 100/1000Base-X SFP ports

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options

SUPPLIED ACCESSORIES

PF-CBL-RJ45-DB9

Console cable RJ-45 to DB9

PF-2-TB

Terminal block for power input connector as per specific device

PF-2-10G-RM-KIT

Rack-mount kit for mounting the unit into 19-inch rack

OPTIONAL ACCESSORIES

SFP Transceivers

SFP-2DH

Fast Ethernet/STM 1, DDM, internal calibration, industrially hardened, 1310 nm, single mode, laser, 15 km (9.3 mi)

SFP-6DH

Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1310 nm, single mode, laser, 10.0 km (6.2 mi)

SFP-30H

Multirate 10/100/1000 copper SFP, industrially hardened, 100m (328 f)

External Power Supplies

SF-AC-48VDC-40W (to be used with non-POE options)

External DIN rail AC to 48 VDC power supply, 40 W, -20 to 60°C (-4 to 140°F); 20 W at 60°C (140°F) and above

SF-AC-48VDC-120W

External DIN rail AC to 48 VDC power supply, 120 W, -20 to 60°C (-4 to 140°F); 60 W at 65°C (149°F) and above

SF-24VDC-48VDC-240W

24 VDC to 48 VDC power supply, 240 W, -40 to 50°C (-40 to 122°F); 120 W at 65°C (149°F) and above

SF-AC-12VDC-40W

AC to 12 VDC power supply, 40 W, -20 to 60°C (-4 to 140°F); 20 W at 65°C (149°F) and above

Table 3. PF-2-10G/***/4SFPP/4ETH/20SFP Power Consumption

Input Voltage	Consumption
110VAC/VDC	34.4W
220VAC/VDC	34.4W
48VDC	33.4W

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ALLEGATO

08

Cisco Industrial Ethernet 4010 Series Switches

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Product overview

Cisco® Industrial Ethernet (IE) 4010 Series Switches with 28 Gigabit Ethernet interfaces are high-performance ruggedized Layer2/3 switches with high-density Power-over-Ethernet (PoE) capabilities, making them an ideal choice for use as access switches in industrial environments. The 4010 delivers comprehensive Cisco IOS® Software security features and high-availability ring protocols. The switch is ideal for outdoor enclosures or harsh environments while adhering to overall IT network design, compliance, and performance requirements.

The IE 4010 has a comprehensive software feature set, developed from manufacturing, utility, and enterprise switching products making it excellent for extended temperature range locations, such as smart buildings, utility, process control, Intelligent Transportation Systems (ITS), and city surveillance programs. The IE4010 has built-in SW image verification to ensure authenticity of the Cisco Software. The IE 4010 complements the existing Cisco IE 2000, IE 2000U, IE 3200, IE 3300, IE 3400, IE 4000, and IE 5000 Series Switching families, as well as the Cisco CGS 2520 Switch.

The IE 4010 Series can also be used to easily and securely extend the enterprise network to harsh environments with a software-defined access extension for the Internet of Things (IoT) enabling connectivity in outdoor areas, warehouses, distribution centers, roadways etc. using powerful enterprise-grade intent-based network management platform such as Cisco DNA™ Center.

The IE 4010 supports a GUI-based web user Interface, and Express Setup for the switch provides easy out-of-box configuration to deliver advanced security, data, video, and voice services over industrial networks.

Features and benefits

Table 1 lists the features and benefits of Cisco IE 4010 Series Switches.

Table 1. Features and benefits of Cisco IE 4010 Series Switches

Feature	Benefit
Robust industrial design	<ul style="list-style-type: none">• A utility grade, fully managed 1 RU rack mount Ethernet access switch with PoE capabilities.• Fanless, convection cooled with no moving parts.• Extended operational temperature range (-40 to 75C).• Hardened for vibration, shock, surge, and electrical noise immunity.• Complies with multi-industry specifications for industrial automation, ITS, and electrical substation environments.• Improves uptime, performance, and safety of industrial systems and equipment.• IEEE 1588v2 PTP (both power profile for utility and default profile for manufacturing are supported).• Alarm I/O for monitoring and signaling to external equipment.
User-friendly GUI device manager	<ul style="list-style-type: none">• Allows easily configuration and monitoring via a web browser.• Eliminates the need for terminal emulation programs.• Multiple Language Support - English, Chinese (Traditional), Chinese (Simplified), French, German, Japanese, Spanish (LATAM)
Swap drive: zero - config replacement	<ul style="list-style-type: none">• Simple switch replacement in case of a failure.• No networking expertise required.• Helps ensure fast recovery.

Feature	Benefit
High-density industrial Power over Ethernet (PoE/PoE+)	<ul style="list-style-type: none"> • Supports up to 24 total PoE/PoE+ ports with power budget up to 385W available with two power supplies. • Enables ready-to-use PoE devices, such as High Definition (HD) IP cameras, wireless access points, and IP phones.
Complete Gigabit Ethernet switch	<ul style="list-style-type: none"> • Total of 28 Gigabit Ethernet ports provide multiple resilient design options. • Connects new wireless access point (802.11n and 802.11ac). • Enables new HD IP cameras and future proof Gigabit speed automation devices. • Allows IP-based Supervisory Control And Data Acquisition (SCADA) connectivity. • Supports very-delay-sensitive applications and time-sensitive networks. • Delivers multiple rings; redundant ring topology for new network configurations. • Extends geographical scalability where longer distance connectivity is required.

Cisco Industrial Ethernet (IE) 4010 Series Switches offer:

- Bandwidth and capacity to grow with your networking needs: high performance nonblocking switching capacity with 28 Gigabit Ethernet ports per switch
- High-density Power over Ethernet – 24 ports of PoE of 12 ports of PoE+ capable ports to connect IP cameras, IP phones, badge readers, wireless access points, etc.
- Cisco IOS Software features for easy IT integration and management consistency
- Cisco DNA Center management and support for software-defined access extension for IoT
- Robust resiliency enabled by dual ring design through 4x Gigabit Ethernet uplink ports, Resilient Ethernet Protocol (REP), Parallel Redundancy Protocol (PRP), PROFINET – Media Redundancy Protocol(MRP) ring, High Availability Seamless Redundancy (HSR) ring, EtherChannel and Flexlink support, integrated redundant power supplies, dying gasp, etc.
- True zero-touch replacement for middle-of-night or middle-of-nowhere failure
- Line-rate, low-latency forwarding with advanced hardware assist features (such as NAT, IEEE1588)
- Simplified software upgrade path with universal images
- Support of Industrial automation protocols EtherNet/IP (CIP) and Profinet

Cisco ONE Software

Cisco ONE Software offers a simplified consumption model, centered on common customer scenarios in the industrial automation and extended enterprise environments. Cisco ONE Software and services provide customers with four primary benefits:

- Software suites that address typical customer use scenarios at an attractive price
- Investment protection for their software purchase through software services-enabled license portability
- Access to ongoing innovation and new technology with Cisco Software Support Service (SWSS)
- Flexible licensing models to smoothly distribute customers' software spending over time

Figure 1 shows switch models, Table 2 shows all the available 4010 models, Table 3 lists the power supplies and Table 4 shows the available power budget for PoE/PoE+ for Cisco IE 4010 Series Switches



Figure 1.
Cisco IE 4010 series model

Table 2. Cisco IE 4010 Series switch models

Product number	Total ports	SFP Uplinks	SFP fiber ports (S)	Copper PoE/PoE+ Ports ² (P)	Default software
IE-4010-16S12P	28	4 FE/GE	12 FE/GE	12 FE/GE	LAN Base ¹
IE-4010-4S24P	28	4 FE/GE		24 FE/GE	LAN Base ¹

¹ Can be upgraded to IP Services license with the license product number in Table 15

² All copper Gigabit Ethernet interfaces support speed negotiation to 10/100/1000 Mbps and duplex negotiation

Table 3. Power supplies for Cisco IE 4010 Series Switches

Product number	Wattage	Rated nominal input operating range	Supported input voltage operating range	PoE/PoE+ support	Use case scenario
PWR-RGD-AC-DC-H	150W	AC 100-240V/2.0A 50-60Hz or DC 100-250V/2.0A	AC 85-264V or DC 88-300V	Yes	High voltage AC or DC power source, for hazardous locations PoE power application
PWR-RGD-LOW-DC-H	150W	DC 24-60V/10A	DC 18-75V	Yes	Low voltage DC power source, for hazardous locations PoE power application
PWR-RGD-AC-DC-250	250W	AC 100-240V 3.3A 50-60Hz or DC 100-250V 3.3A	AC 85-264V or DC 88-300V	Yes	High voltage AC or DC power source, for hazardous locations PoE power application

Table 4. Available power budget for PoE/PoE+ with different power supply wattage

Product number	150W	150W (dual)	250W	250W + 150W	250W (dual)
IE-4010-16S12P	80	200	180	285	360
IE-4010-4S24P	80	200	180	285	385

Product specifications

Table 5 lists specifications, Table 6 lists information about switch's physical specifications, Table 7 lists information about switch performance and scalability, Tables 8 and 9 list important software license features. Tables 10-11 list the Cisco DNA Essentials and Advantage license features. Table 12 lists compliance specifications, and Table 13 lists information about management and standards and Table 14 lists the supported SFPs on Cisco IE 4010 Series Switches

Table 5. Product specifications

Description	Specification
Hardware	<ul style="list-style-type: none">• 1 GB DRAM• 128 MB onboard flash memory• 1-GB removable SD flash memory card (Included)• Mini-USB and traditional RJ-45 console connector
Alarm	Alarm I/O: four alarm inputs to detect dry contact open or closed, one Form C alarm output relay
Accessories	<ul style="list-style-type: none">• SD-IE-1GB= - Spare SD card• L-IE4000-RTU= - Electronic RTU IP services software license for 4010 switches• 21-in. and 23-in. ETSI rack mount brackets

Table 6. Physical specifications

Description	IE-4010-4S24P	IE-4010-16S12P
Dimensions, (H x W x D)	<ul style="list-style-type: none">• 1.75 x 17.5 x 14.0 in. (4.45 x 44.5 x 35.6 cm) with PWR-RGD-AC-DC-H / PWR-RGD-LOW-DC-H• 1.75 x 17.5 x 15.18 in. (4.45 x 44.5 x 38.56 cm) with PWR-RGD-AC-DC-250	
System Weight	Without power supply: 12.1 lb (5.46 kg)	Without power supply: 12.7 lb (5.78 kg)
Power Supply Weight	<ul style="list-style-type: none">• PWR-RGD-AC-DC-H: 2.55 lb (1.16 kg)• PWR-RGD-LOW-DC-H: 2.5 lb (1.13 kg)• PWR-RGD-AC-DC-250: 3.1 lb (1.4 kg)	
Power consumption	Maximum of 70W not including PoE consumption	

Table 7. Switch performance and scalability

Description	Specification
Forwarding bandwidth	28 Gbps (line rate/non-blocking)
Switching bandwidth	56 Gbps(Switching bandwidth is full-duplex capacity)
Forwarding rate	41.67 mpps with 64 byte packets (line rate for all ports and packet sizes)
Number of queues	4 egress
Unicast MAC addresses	16,000
IGMP multicast groups	1000
Number of VLANs	1000
IPv4 MAC security ACEs	1000 with default TCAM template
NAT translation	Bidirectional, 128 unique subnet NAT translation entries, which can expand to tens of thousands of translated entries if designed properly

Table 8. Cisco IE 4010 LAN base license: Key software features

LAN base license (default)	Features
Layer 2 switching	IEEE 802.1, 802.3, 802.3at, 802.3af standard, VTPv2, NTP, UDLD, CDP, LLDP, Unicast Mac filter, Flexlink, VTPv3, EtherChannel, Voice VLAN, QinQ tunneling
Security	SCP, SSH, SNMPv3, TACACS+, RADIUS Server/Client, MAC Address Notification, BPDU Guard, Port-Security, Private VLAN, DHCP Snooping, Dynamic ARP Inspection, IP Source Guard, 802.1x, Guest VLAN, MAC Authentication Bypass, 802.1x Multi-Domain Authentication, Storm Control, Trust Boundary, Cisco TrustSec® security, FIPS 140-2, ACT2, Secure Boot, Full flexible Netflow ¹
Layer 2 multicast	IGMPv1, v2, v3 Snooping, IGMP filtering, IGMP Querier
Management	Fast Boot, Express Setup, HTTP Web Config, SmartPort, MIB, SNMP, syslog, Storm Control—Unicast, Multicast, Broadcast, SPAN Sessions, RSPAN, DHCP Server, Energywise, PnP, Customized TCAM/SDM size configuration, DOM (digital optical management), Port-based DHCP
Industrial Ethernet	CIP Ethernet/IP, Profinet v2, IEEE 1588 PTP v2 Default Profile
Quality of Service (QoS)	Ingress Policing, Rate-Limit, Egress Queueing/shaping, AutoQoS, Modular QoS CLI (MQC),PROFINET QoS
Layer 2 IPv6	IPv6 Host support, HTTP over IPv6, SNMP over IPv6
Layer 3 routing	IPv4 Static Routing

LAN base license (default)	Features
Industrial management	Layer 2 switching with 1:1 static Network Address Translation (NAT)
Utility	IEEE 1588v2 PTP Power Profile 2011 and 2017, dying gasp, GOOSE messaging, SCADA protocol classification, MODBUS TCP/IP Memory Maps, utility SmartPort macro, BFD, Ethernet OAM, IEEE 802.3ah, CFM (IEEE 802.1ag)
Redundancy	Redundancy Ethernet Protocol ring (REP) Parallel Redundancy Protocol (PRP) High Availability Seamless Redundancy (HSR), PTP over HSR Media Redundancy Protocol (MRP) ring, MRP Auto Manager (MAM)

¹ Full flexible Netflow is included on all IE-4010 Switches and requires either one of the following licenses per switch:

- Cisco ONE™ Foundation Perpetual license
- Cisco DNA Essentials license
- Cisco IP Services license

Table 9. Cisco IE 4010 IP Services license: Key software features

IP services license	Additional features
IP multicast	PIM Sparse Mode (PIM-SM), PIM Dense Mode (PIM-DM), and PIM sparse-dense mode
Industrial management	Embedded Event Manager (EEM)
IP unicast routing protocols	OSPF, EIGRP, BGPv4, IS-IS, RIPv2, Policy-Based Routing (PBR), HSRP
IPv6 routing	RIPng, OSPFv6, and EIGRPv6 support
Security	IEEE 802.1AE MACsec (including PSK based MKA support), Cisco TrustSec®, SGT inline tagging and SGACL, Full flexible Netflow
Virtualization	VRF-lite

Table 10. Cisco IE 4010 Cisco DNA Essentials license features

Feature	Description
Element Management	Discovery, topology, inventory, software image management
Basic Assurance	Health Dashboards – Network, Client Basic Switch and Wired Client Health Monitoring
Basic	Cisco Network Plug-and-Play application

Table 11. Cisco IE 4010 Cisco DNA Advantage license features

Feature	Description
Cisco DNA Essentials	All Cisco DNA Essentials features
Advanced Automation	SDA, IE 4010 can function as an SDA extended node REP ring Workflow
Assurance and Analytics	Compliance, Custom Reports, Device 360 and Wired Client 360

Table 12. Compliance specifications

Type	Standards
Electromagnetic emissions	FCC 47 CFR Part 15 Class A EN 55032 Class A VCCI Class A AS/NZS CISPR 22 Class A CISPR 11 Class A CISPR 32 Class A ICES 003 Class A EN 300 386 CNS 13438 Class A
Electromagnetic immunity	EN55024 CISPR 24 AS/NZS CISPR 24 EN 61000-4-2 Electro Static Discharge EN 61000-4-3 Radiated RF EN 61000-4-4 Electromagnetic Fast Transients EN 61000-4-5 Surge EN 61000-4-6 Conducted RF EN 61000-4-8 Power Frequency Magnetic Field EN 61000-4-9 Pulse Magnetic Field EN 61000-4-11 AC Power Voltage EN 61000-4-18 Damped Oscillatory Wave EN-61000-4-29 DC Voltage Dips
Industry standards	EN 61000-6-1 Light Industrial EN 61000-6-2 Industrial EN 61000-6-4 Industrial EN 61326 Industrial Control EN 61131-2 Programmable Controllers IEEE 1613 Electric Power Stations Communications Networking IEC 61850-3 Communication networks for power utility automation EN 50121-4 Railway - Signaling and Telecommunications Apparatus EN 50121-3-2 Railway - Apparatus for Rolling Stock PROFINET conformance B IP30 NEMA TS-2 (EMC, environmental, mechanical)

Type	Standards
Safety standards and certifications	<p>Information technology equipment:</p> <p>UL/CSA 60950-1</p> <p>UL/CSA 62368-1</p> <p>IEC 62368-1 CB with all country deviations</p> <p>EN 60950-1</p> <p>IEC 60950-1 CB with all country deviations</p> <p>NOM to NOM-019-SCFI (through partners and distributor)</p> <p>Industrial floor (control equipment):</p> <p>UL 508</p> <p>UL 61010-2</p> <p>CSA C22.2, No 142</p> <p>Hazardous locations:</p> <p>Class 1, Div2, gas groups IIC ANSI/ISA 12.12.01 CSA C22.2 No 213</p> <p>IEC 60079-0, -15 IECEx test report</p> <p>EN 60079-0, -15 ATEX certification (Class I Zone 2) (Cabinet enclosure required)</p>
Operating environment	<p>Operating Temperature: -40C to +75C</p> <ul style="list-style-type: none"> • -40C to +70C (Vented Enclosure - 40 LFM Air Flow) • -40C to +60C (Sealed Enclosure - 0 LFM Air Flow) • -34C to +75C (Fan or Blower equipped Enclosure - 200 LFM Air Flow) • -40C to +85C (IEC 60068-2-2 Environmental Type Testing, 16 hours) • Operating altitude: Up to 13,800ft • EN 60068-2-1, EN 61163
Storage environment	<p>Temperature: -40C to +85C</p> <p>Altitude: Up to 15,000 feet</p> <p>IEC 60068-2-14</p>
Humidity	<p>Relative humidity of 5% to 95% noncondensing</p> <p>IEC 60068-2-3</p> <p>IEC 60068-2-30</p>
Shock and vibration	<p>IEC 60068-2-27 (operational shock, 50G, 11ms, Half Sine)</p> <p>IEC 60068-2-27 (Non-Operational Shock, 65-80G, 9ms, Trapezoidal)</p> <p>IEC 60068-2-6, IEC 60068-2-64, EN 61373 (Operational Vibration)</p> <p>IEC 60068-2-6, IEC 60068-2-64, EN 61373 (Nonoperational Vibration)</p>

Type	Standards
Corrosion	ISO 9223: Corrosion class C3-Medium class C4-High IEC 60068-2-52 (Salt Mist) IEC 60068-2-60 (Flowing Mixed Gas)
Others	RoHS Compliance China RoHS Compliance TAA (Government) CE (Europe)
Warranty	Five-year limited hardware warranty on all IE-4010 PIDs and power supplies (see Table 3). See link that follows for more details on warranty.
Mean Time Between Failures (MTBF)	IE-4010-4S24P: 429,620 hours IE-4010-16S12P: 415,160 hours

Table 13. Management and standards

Description	Specification	
IEEE standards	<ul style="list-style-type: none"> • IEEE 802.1D MAC Bridges, STP • IEEE 802.1p Layer2 COS prioritization • IEEE 802.1q VLAN • IEEE 802.1s Multiple Spanning-Trees • IEEE 802.1w Rapid Spanning-Tree • IEEE 802.1x Port Access Authentication • IEEE 802.1AB LLDP • IEEE 802.3ad Link Aggregation (LACP) • IEEE 802.3af Power over Ethernet provides up to 15.4W DC power to each end device • IEEE 802.3at Power over Ethernet provides up to 25.5W DC power to each end device 	<ul style="list-style-type: none"> • IEEE 802.3af Power over Ethernet • IEEE 802.3at Power over Ethernet Plus • IEEE 802.3ah 100BASE-X SMF/MMF only • IEEE 802.3x full duplex on 10BASE-T • IEEE 802.3 10BASE-T specification • IEEE 802.3u 100BASE-TX specification • IEEE 802.3ab 1000BASE-T specification • IEEE 802.3z 1000BASE-X specification • IEEE 1588v2 PTP Precision Time Protocol
RFC compliance	<ul style="list-style-type: none"> • RFC 768: UDP • RFC 783: TFTP • RFC 791: IPv4 protocol • RFC 792: ICMP • RFC 793: TCP • RFC 826: ARP • RFC 854: Telnet • RFC 951: BOOTP • RFC 959: FTP • RFC 1157: SNMPv1 • RFC 1901,1902-1907 SNMPv2 • RFC 2273-2275: SNMPv3 • RFC 2571: SNMP Management 	<ul style="list-style-type: none"> • RFC 1305: NTP • RFC 1492: TACACS+ • RFC 1493: Bridge MIB Objects • RFC 1534: DHCP and BOOTP interoperation • RFC 1542: Bootstrap Protocol • RFC 1643: Ethernet Interface MIB • RFC 1757: RMON • RFC 2068: HTTP • RFC 2131, 2132: DHCP • RFC 2236: IGMP v2 • RFC 3376: IGMP v3 • RFC 2474: DiffServ Precedence • RFC 3046: DHCP Relay Agent Information Option

Description	Specification	
	<ul style="list-style-type: none"> • RFC 1166: IP Addresses • RFC 1256: ICMP Router Discovery 	<ul style="list-style-type: none"> • RFC 3580: 802.1x RADIUS • RFC 4250-4252 SSH Protocol
SNMP MIB objects	<ul style="list-style-type: none"> • BRIDGE-MIB • CALISTA-DPA-MIB • CISCO-ACCESS-ENVMON-MIB • CISCO-ADMISSION-POLICY-MIB • CISCO-AUTH-FRAMEWORK-MIB • CISCO-BRIDGE-EXT-MIB • CISCO-BULK-FILE-MIB • CISCO-CABLE-DIAG-MIB • CISCO-CALLHOME-MIB • CISCO-CAR-MIB • CISCO-CDP-MIB • CISCO-CIRCUIT-INTERFACE-MIB • CISCO-CLUSTER-MIB • CISCO-CONFIG-COPY-MIB • CISCO-CONFIG-MAN-MIB • CISCO-DATA-COLLECTION-MIB • CISCO-DHCP-SNOOPING-MIB • CISCO-EMBEDDED-EVENT-MGR-MIB • CISCO-ENTITY-ALARM-MIB • CISCO-ENTITY-VENDORTYPE-OID-MIB • CISCO-ENTITY-SENSOR-MIB • CISCO-ENVMON-MIB • CISCO-ERR-DISABLE-MIB • CISCO-FLASH-MIB • CISCO-FTP-CLIENT-MIB • CISCO-IGMP-FILTER-MIB • CISCO-IMAGE-MIB • CISCO-IP-STAT-MIB • CISCO-LAG-MIB • CISCO-LICENSE-MGMT-MIB • CISCO-MAC-AUTH-BYPASS-MIB • CISCO-MAC-NOTIFICATION-MIB • CISCO-MEMORY-POOL-MIB • CISCO-PAE-MIB • CISCO-PAGP-MIB • CISCO-PING-MIB • CISCO-PORT-QOS-MIB • CISCO-PORT-SECURITY-MIB • CISCO-PORT-STORM-CONTROL-MIB • CISCO-PRIVATE-VLAN-MIB • CISCO-PROCESS-MIB • CISCO-PRODUCTS-MIB • CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB 	<ul style="list-style-type: none"> • CISCO-SNMP-TARGET-EXT-MIB • CISCO-STACK-MIB • CISCO-STACKMAKER-MIB • CISCO-STP-EXTENSIONS-MIB • CISCO-SYSLOG-MIB • CISCO-TCP-MIB • CISCO-UDLD-MIB • CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB • CISCO-VLAN-MEMBERSHIP-MIB • CISCO-VTP-MIB • ENTITY-MIB • ETHERLIKE-MIB • HC-RMON-MIB • IEEE8021-PAE-MIB • IEEE8023-LAG-MIB • IF-MIB • IP-FORWARD-MIB • LLDP-EXT-MED-MIB • LLDP-EXT-PNO-MIB • LLDP-MIB • NETRANGER • NOTIFICATION-LOG-MIB • OLD-CISCO-CHASSIS-MIB • OLD-CISCO-CPU-MIB • OLD-CISCO-FLASH-MIB • OLD-CISCO-INTERFACES-MIB • OLD-CISCO-IP-MIB • OLD-CISCO-MEMORY-MIB • OLD-CISCO-SYS-MIB< • OLD-CISCO-SYSTEM-MIB • OLD-CISCO-TCP-MIB • OLD-CISCO-TS-MIB • RMON-MIB • RMON2-MIB • SMON-MIB • SNMP-COMMUNITY-MIB • SNMP-FRAMEWORK-MIB • SNMP-MPD-MIB • SNMP-NOTIFICATION-MIB • SNMP-PROXY-MIB • SNMP-TARGET-MIB • SNMP-USM-MIB • SNMP-VIEW-BASED-ACM-MIB

Description	Specification	
	<ul style="list-style-type: none"> • CISCO-RTTMON-ICMP-MIB • CISCO-RTTMON-IP-EXT-MIB • CISCO-RTTMON-MIB • CISCO-RTTMON-RTP-MIB 	<ul style="list-style-type: none"> • SNMPv2-MIB • TCP-MIB • UDP-MIB

Table 14. SFP support

Part number	Specification	SFP type	Max distance	Cable type	Temp range*	DOM support
GLC-FE-100FX-RGD=	100BASE-FX	FE	2 km	MMF	IND	Yes
GLC-FE-100LX-RGD=	100BASE-LX10	FE	10 km	SMF	IND	Yes
GLC-FE-100FX=	100BASE-FX	FE	2 km	MMF	COM	No
GLC-FE-100LX=	100BASE-LX10	FE	10 km	SMF	COM	No
GLC-FE-100EX=	100BASE-EX	FE	40 km	SMF	COM	No
GLC-FE-100ZX=	100BASE-ZX	FE	80 km	SMF	COM	No
GLC-FE-100BX-D=	100BASE-BX10	FE	10 km	SMF	COM	No
GLC-FE-100BX-U=	100BASE-BX10	FE	10 km	SMF	COM	Yes
GLC-SX-MM-RGD=	1000BASE-SX	GE	550 m	MMF	IND	Yes
GLC-LX-SM-RGD=	1000BASE-LX/LH	GE	550 m/10 km	MMF/SMF	IND	Yes
GLC-ZX-SM-RGD=	1000BASE-ZX	GE	70 km	SMF	IND	Yes
GLC-BX-U-I=	1000BASE-BX	GE	10 km	SMF	IND	Yes
GLC-BX-D-I=	1000BASE-BX	GE	10 km	SMF	IND	Yes
GLC-BX40-U-I=	1000BASE-BX40	GE	40 km	SMF	IND	Yes
GLC-BX40-D-I=	1000BASE-BX40	GE	40 km	SMF	IND	Yes
GLC-BX40-DA-I=	1000BASE-BX40	GE	40km	SMF	IND	Yes
GLC-BX80-U-I=	1000BASE-BX80	GE	80km	SMF	IND	Yes
GLC-BX80-D-I=	1000BASE-BX80	GE	80km	SMF	IND	Yes
GLC-SX-MMD=	1000BASE-SX	GE	550m	MMF	EXT	Yes
GLC-LH-SMD=	1000BASE-LX/LH	GE	550m/10km	MMF/SMF	EXT	Yes
GLC-EX-SMD=	1000BASE-EX	GE	40 km	SMF	EXT	Yes
GLC-ZX-SMD=	1000BASE-ZX	GE	70 km	SMF	EXT	Yes
GLC-BX-D=	1000BASE-BX10	GE	10 km	SMF	COM	Yes

Part number	Specification	SFP type	Max distance	Cable type	Temp range*	DOM support
GLC-BX-U=	1000BASE-BX10	GE	10 km	SMF	COM	Yes
CWDM-SFP-xxxx= (8 freq)	CWDM 1000BASE-X	GE		SMF	COM	Yes
DWDM-SFP-xxxx= (40 freq)	DWDM 1000BASE-X	GE		SMF	COM	Yes
SFP-GE-S=	1000BASE-SX	GE	550 m	MMF	EXT	Yes
SFP-GE-L=	1000BASE-LX/LH	GE	550 m/10 km	MMF/SMF	EXT	Yes
SFP-GE-Z=	1000BASE-ZX	GE	70 km	SMF	EXT	Yes
GLC-SX-MM=	1000BASE-SX	GE	550 m	MMF	COM	No
GLC-LH-SM=	1000BASE-LX/LH	GE	550 m/10 km	MMF/SMF	COM	No
GLC-ZX-SM=	1000BASE-ZX	GE	70 km	SMF	COM	Yes
GLC-TE=	1000BASE-T	GE	100 m	Copper	EXT	NA
GLC-T=	1000BASE-T	GE	100 m	Copper	COM	NA
GLC-T-RGD=	1000BASE-T	GE	100 m	Copper	IND	NA

Note:

Not all SFPs are supported in all software versions. For the first software release supporting SFP, visit https://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html.

Not all SFPs are supported in PROFINET GSD, SIMATIC STEP7/TIA Portal, please visit https://www.cisco.com/c/en/us/td/docs/switches/lan/industrial/software/configuration/guide/b_sfp_TIA.html

*If nonindustrial (that is, EXT, COM) SFPs are used, the switch operating temperature must be derated.

MMF = multimode fiber SMF = single-mode fiber

Ordering information

Table 15 lists the ordering information for Cisco IE 4000 system.

Table 15. Ordering information

Product ID	Description
Cisco IE 4010 Hardware PIDs	
IE-4010-16S12P	IE4010 with 12GE SFP, 12GE Copper PoE+ and 4GE SFP uplink ports
IE-4010-4S24P	IE4010 with 24GE Copper PoE+ ports and 4GE SFP uplink ports
Cisco IE 4010 software licenses and accessories PIDs	
IE-LICENSE-SPARE	Spare license for software upgrade (L2 to L3 features or MRP ring)
L-IE4000-RTU=	IE4010 Electronic software license upgrade from LAN base L2 to IP Services L3 features
LIC-MRP-Manager=	MRP ring manager license
LIC-MRP-Client=	MRP ring client license
SD-IE-1GB=	IE 1GB SD Memory Card - Spare
Cisco ONE™ Licenses	
C1F1PIE4K5K1K9	Cisco ONE Foundation Lite Perpetual Includes Prime Infrastructure (LF and AS), Identity Services Engine - Base
C1F1PIE40001K9	Cisco ONE Foundation Perpetual Includes Full flexible Netflow, Stealthwatch, Prime Infrastructure, and Identity Services Engineer - Base
C1A1PIE40001K9	Cisco ONE Advanced Perpetual Includes IP Services
C1-FLOW-IE4K	Cisco ONE Netflow IE4000
C1A1AIE40001K9	Cisco ONE Advanced Perpetual - IE 4000
C1F1AIE40001K9	Cisco ONE Foundation Perpetual - IE 4000, BROWNFIELD
C1F1AIE4K5K1K9	Cisco ONE Foundation Lite Perpetual - IE 4000/5000
C1F1PIE40001K9	Cisco ONE Foundation Perpetual - IE 4000
Cisco IE 4010 Cisco DNA licenses	
IE4010-DNA-E-H	Cisco DNA Essentials license
IE4010-DNA-E-H-3Y	Cisco DNA Essentials 3-year term license option
IE4010-DNA-E-H-5Y	Cisco DNA Essentials 5-year term license option

Product ID	Description
IE4010-DNA-E-H-7Y	Cisco DNA Essentials 7-year term license option
IE4010-DNA-A-H	Cisco DNA Advantage license
IE4010-DNA-A-H-3Y	Cisco DNA Advantage 3-year term license option
IE4010-DNA-A-H-5Y	Cisco DNA Advantage 5-year term license option
IE4010-DNA-A-H-7Y	Cisco DNA Advantage 7-year term license option

Warranty information

Warranty information for the IE 4010 switch is available at <http://www.cisco-servicefinder.com/warrantyfinder.aspx>.

Cisco environmental sustainability

Information about Cisco's environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the "Environment Sustainability" section of Cisco's [Corporate Social Responsibility](#) (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the "Environment Sustainability" section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

Reference links to product-specific environmental sustainability information that is mentioned in relevant sections of this data sheet are provided in the following table:

Sustainability Topic	Reference
Power	
Power specifications and consumption	Table 6. Physical specifications
Environmental Characteristics	
Operating temperature, industry standards, EMC emissions	Table 12. Compliance specifications
Material	
Unit Weight	Table 6. Physical specifications

Cisco makes the packaging data available for informational purposes only. It may not reflect the most current legal developments, and Cisco does not represent, warrant, or guarantee that it is complete, accurate, or up to date. This information is subject to change without notice.

Cisco and Partner Services

At Cisco, we're committed to minimizing our customers' TCO, and we offer a wide range of services programs to accelerate customer success. Our innovative programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco Services helps you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. Here are some of the key benefits our customers can get from Cisco Services:

- Mitigating risks by enabling proactive or expedited problem resolution
- Lowering TCO by taking advantage of Cisco expertise and knowledge
- Minimizing network downtime
- Supplementing your existing support staff so they can focus on additional productive activities

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Document history

New or Revised Topic	Described In	Date
Updated Power Profile, footnote to Marine DNV Certification, updated standards, CISCO-ENTITY-SENSOR-MIB, Cisco ONE Licenses, Cisco environmental sustainability information	Table 8, 12, 13, 15, Cisco environmental sustainability	29/10/2021

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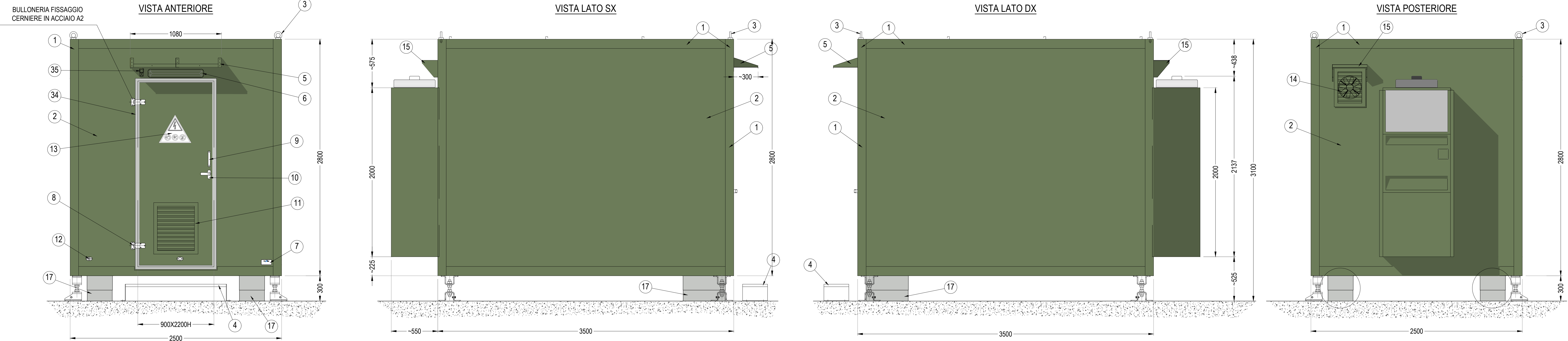
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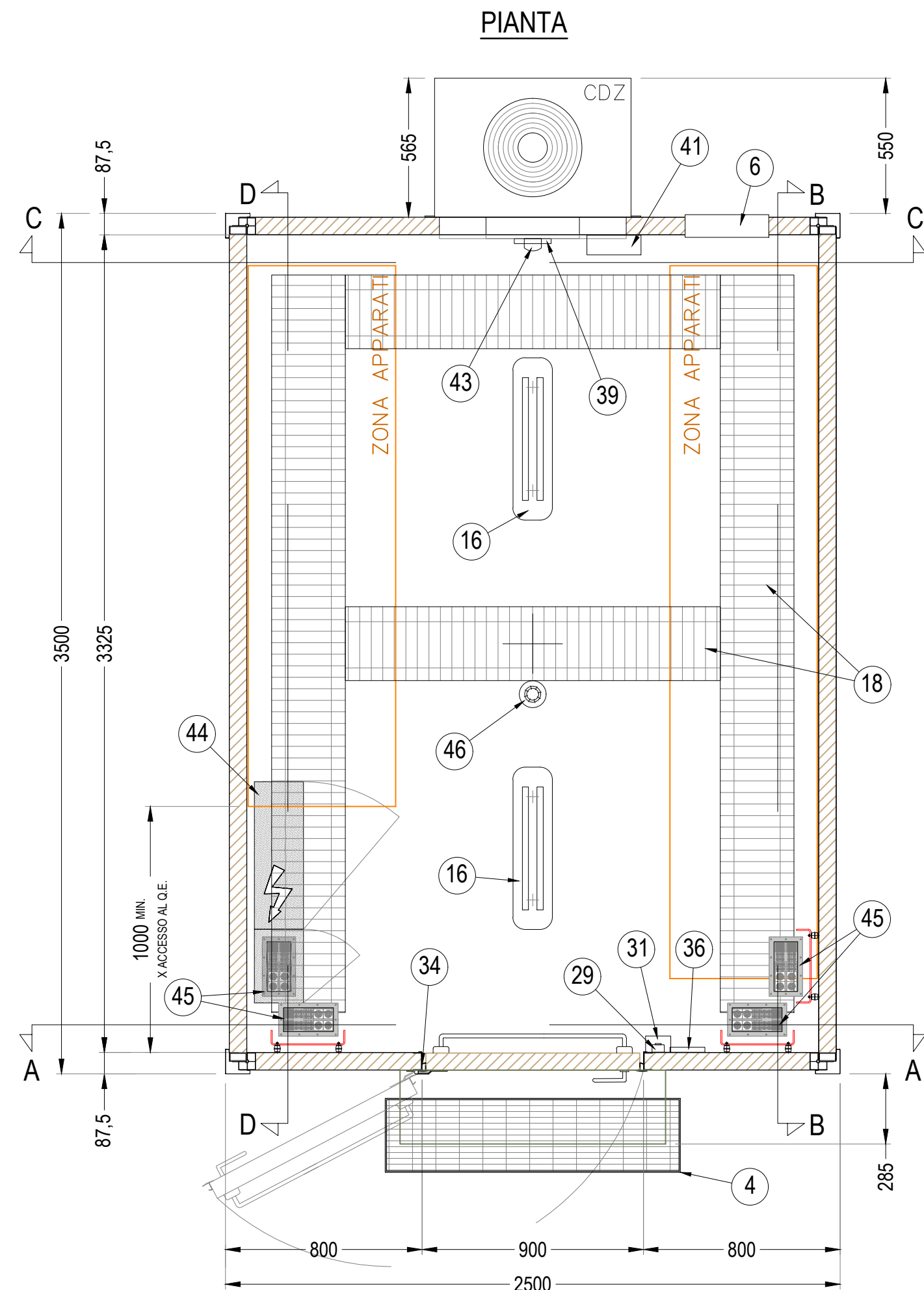
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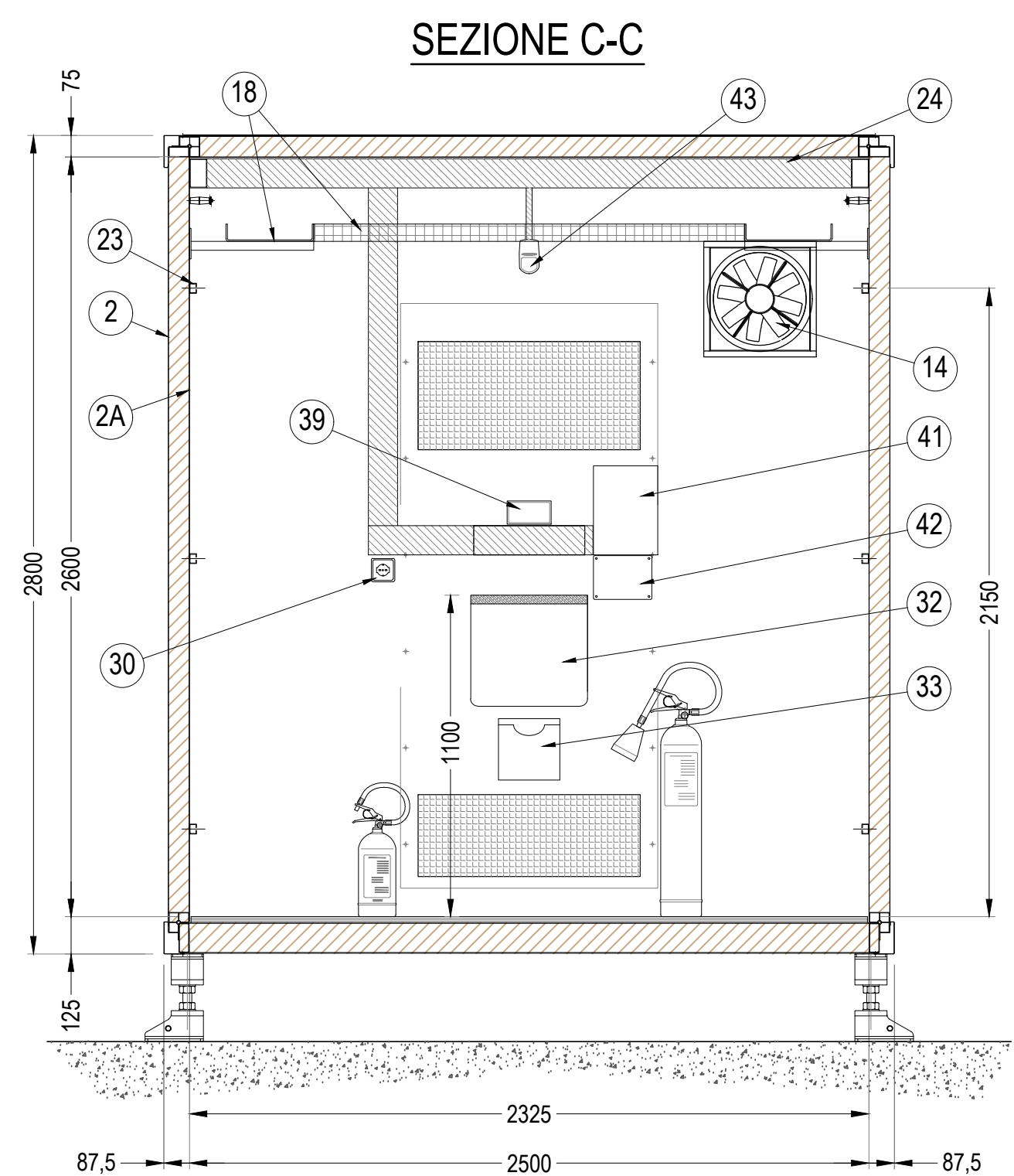
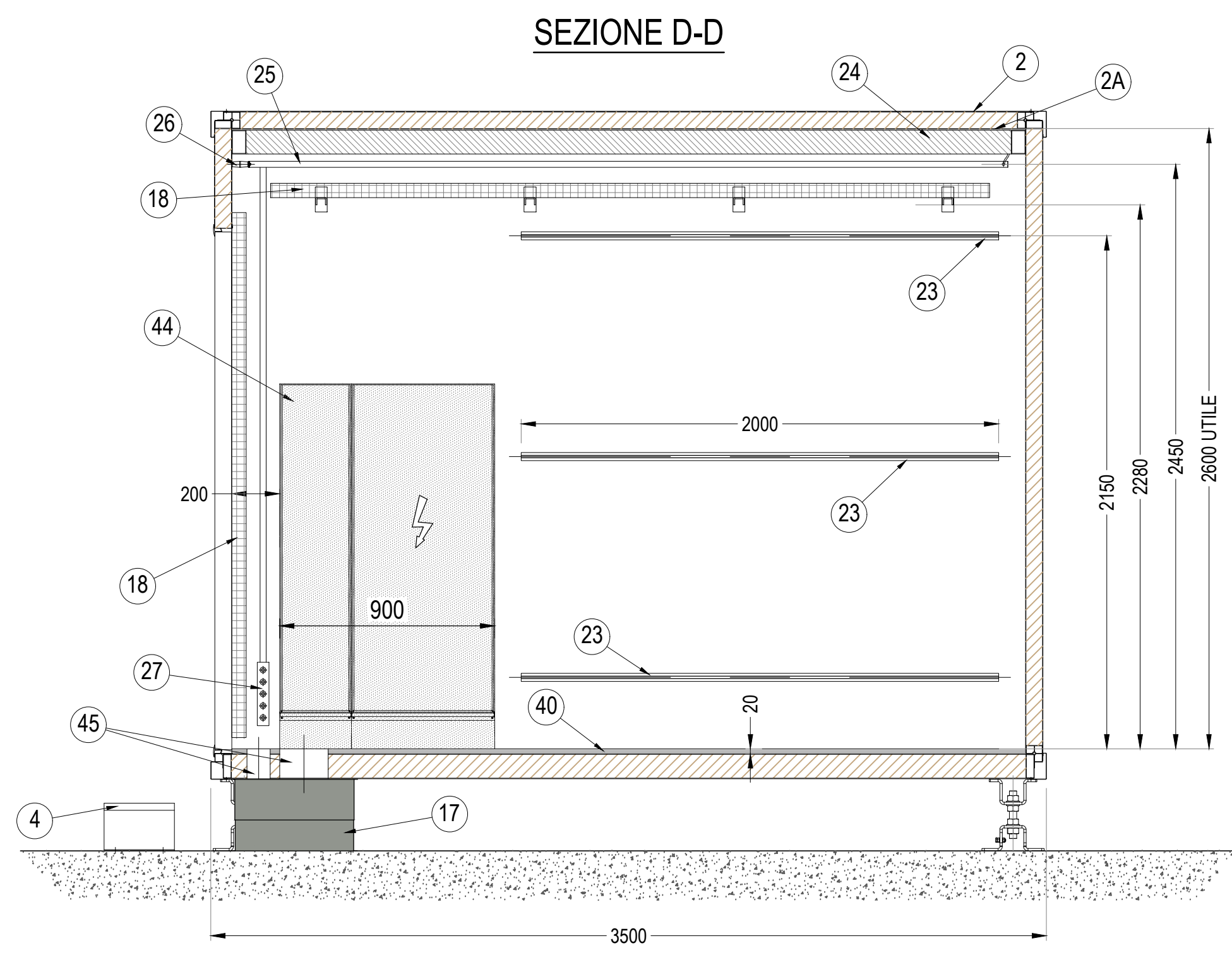
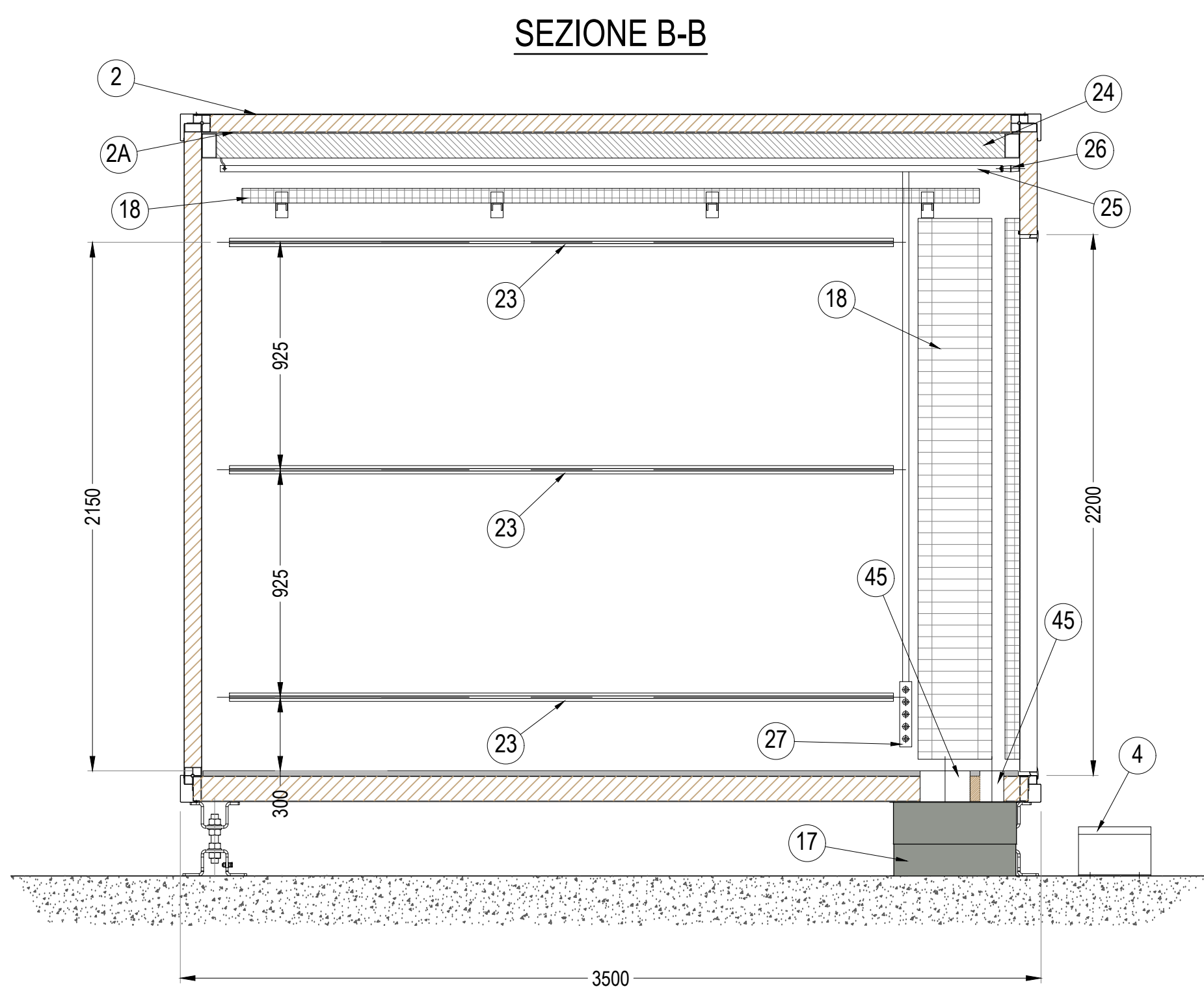
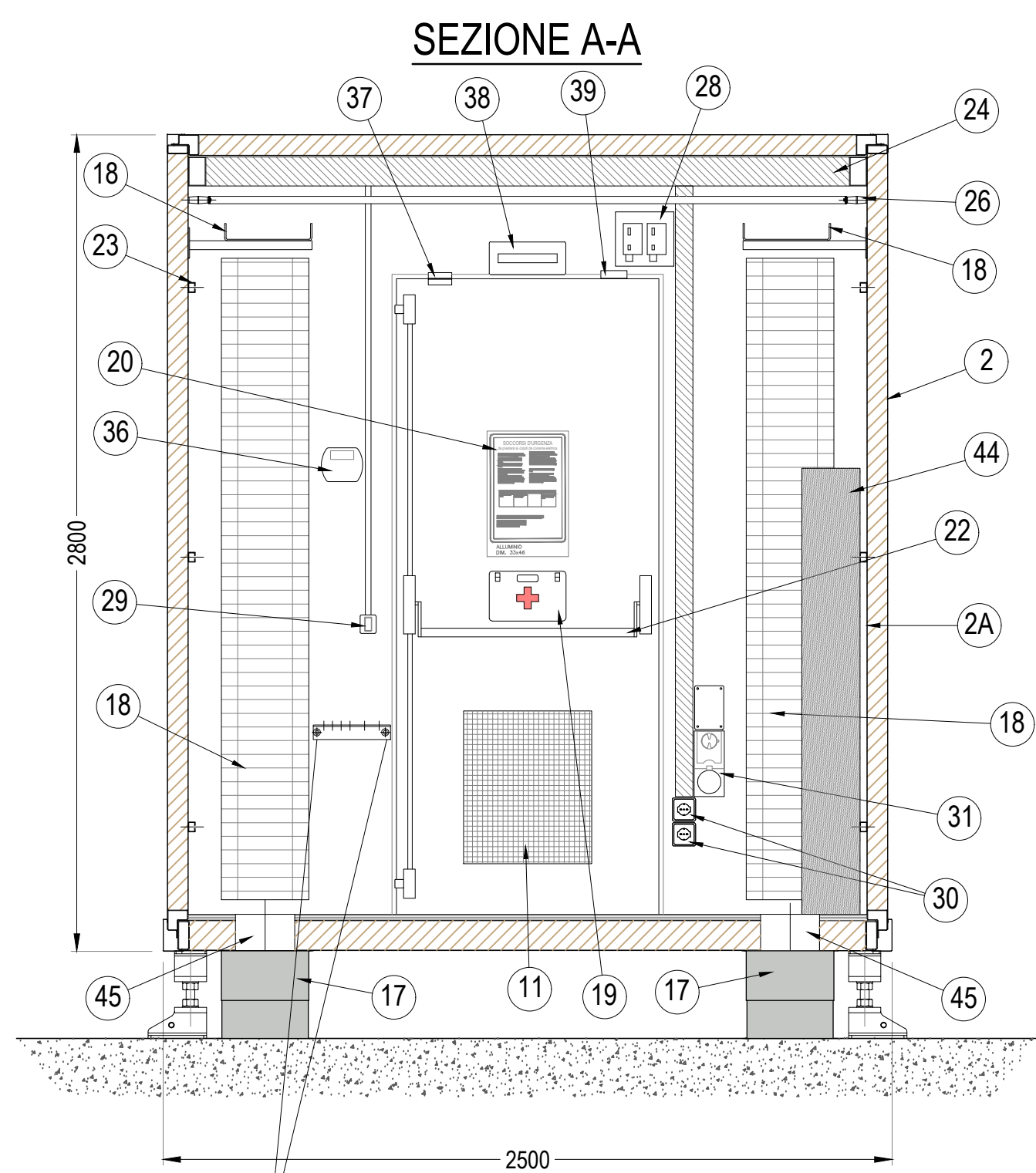
09



POS.	DENOMINAZIONE	UM.	Q.TA'
1	COPRIFILO IN ACCIAIO INOX AISI 304	N°	-
2	LAMIERA IN ACCIAIO INOX AISI 304	N°	-
2A	LAMIERA IN ACCIAIO ZINCATO	N°	-
3	GOLFARI DI SOLLEVAMENTO IN ACCIAIO ZINCATO A CALDO	N°	4
4	GRADINO DI ACCESSO IN ACCIAIO ZINCATO A CALDO	N°	1
5	TETTOIA PARAPIGGIA IN ACCIAIO INOX AISI 304	N°	1
6	PLAFONIERA DI ILLUMINAZIONE ESTERNA CON SENSORE DI PRESENZA	N°	1
7	TARGHETTA METALLICA IDENTIFICATIVA	N°	1
8	PERNO DI SICUREZZA	N°	-
9	MANIGLIA FISSA PER APERTURA PORTA	N°	1
10	MANIGLIA CON CHIAVE A CIFRATURA UNIFICATA PER APERTURA PORTA	N°	1
11	GRIGLIA IN ACCIAIO INOX AISI 304 INGRESSO ARIA CON RETE ANTINSETTO E FILTRO	N°	1
12	DISPOSITIVO PER BLOCCO PORTA	N°	1
13	CARTELLI MONITORI ESTERNI	N°	-
14	ELETTROVENTILATORE CON SERRANDA	N°	1
15	TETTuccio SOPRA VENTILATORE	N°	4
16	PLAFONIERA DI ILLUMINAZIONE INTERNA	N°	1
17	CARTER PER PROTEZIONE CAVI	N°	1
18	PASSERELLA PORTACAVI A FILO IN ACCIAIO ZINCATO DIM. 300x60mm	N°	-
19	CASSETTA PRONTO SOCCORSO	N°	1
20	CARTELLI MONITORI INTERNI	N°	1
21	ESTINTORE	N°	2
22	MANIGLIONE ANTIPANICO	N°	1
23	PROFILO A "C" PER FISSAGGIO ARMADI - APPARECCHIATURE	N°	6

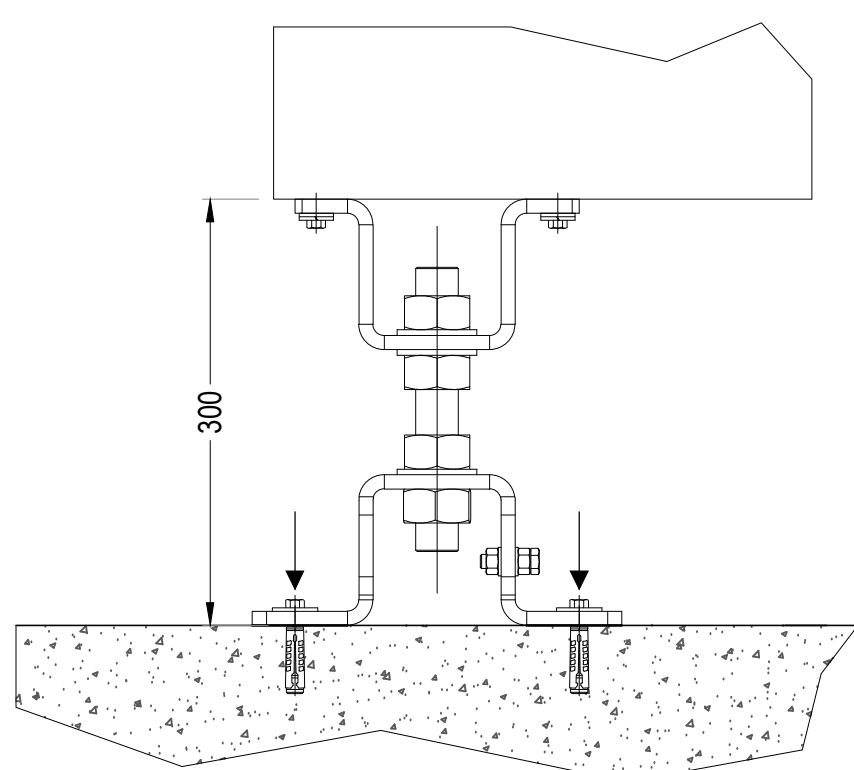


POS.	DENOMINAZIONE	UM.	Q.TA'
24	CANALINA PVC PERIMETRALE	N°	-
25	BARRA DI RAME PER EQUIPOTENZIALITA'	N°	1
26	ISOLATORE	N°	1
27	COLLETTORE DI TERRA	N°	1
28	TERMOSTATO AMBIENTE DI SICUREZZA - SONDA	N°	1+1
29	INTERRUTTORI ACCENSIONE ILLUMINAZIONE INTERNA ED ESTERNA	N°	2
30	PRESA DI CORRENTE UNIVERSALE SCHUKO BIPASSO 2P+T 10/16A	N°	3
31	PRESA DI CORRENTE INTERBLOCCATA 2P+TT 16A	N°	1
32	TAVOLINO DI LAVORO RIBALTABILE	N°	1
33	TASCA PORTADOCUMENTI	N°	1
34	PERNI ANTEFFRAZIONE	N°	2
35	SENSORE DI PRESENZA	N°	1
36	TASTIERA CON DISPLAY	N°	1
37	CONTATTO MAGNETICO IN ALL. DI POTENZA	N°	1
38	LAMPADA DI EMERGENZA	N°	1
39	UNITA' DI CONTROLLO CDZ	N°	1
40	PANNELLO LEGNO OSB. RIVESTITO IN PVC ANTISTATISTICO/ANTISIVOLO	mq	7,8
41	CENTRALINA CONTROLLO ACCESSI COMPLETA DI: SCHEDA INTERACCIA ETHERNET, BATTERIA 7Ah e n.4 SCHEDE RELE	N°	1
42	SCATOLA RELÉ	N°	1
43	RILEVATORE VOLUMETRICO	N°	1
44	QUADRO ELETTRICO SERVIZI AUSILIARI mm 44x161x(822+622)H	N°	1
45	PASSANTE PER INGRESSO/USCITA CAVI DIM. 203x97mm	N°	2
46	RILEVATORE OTTICO DI FUMO E TEMPERATURA	N°	1

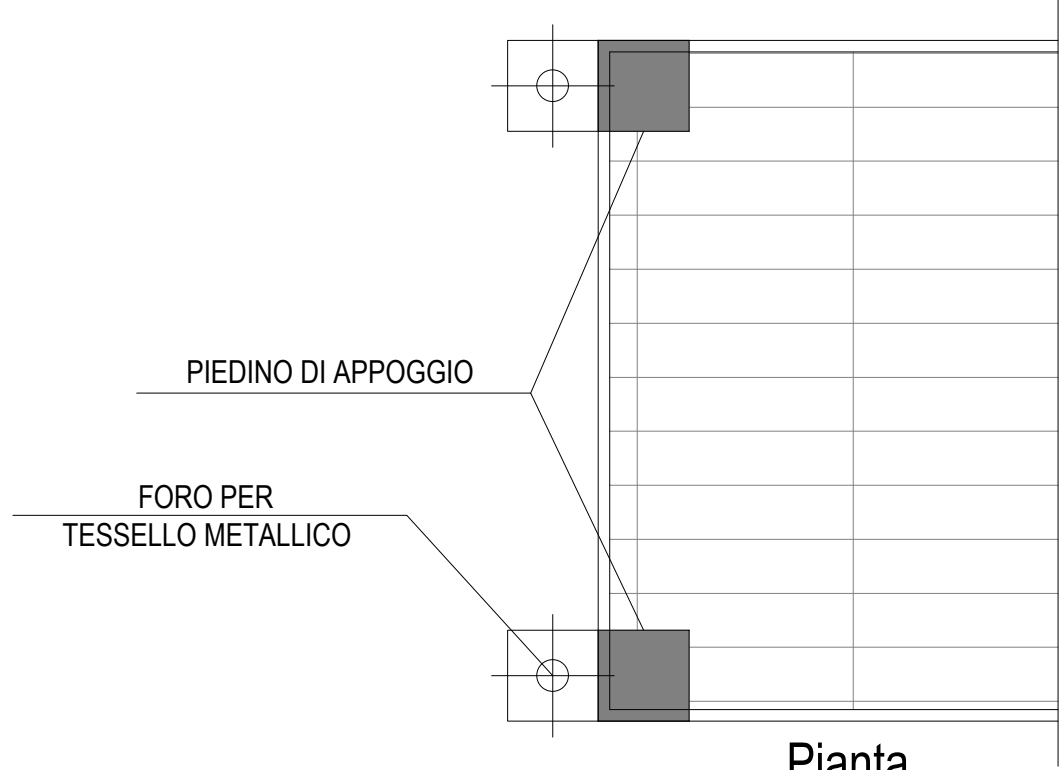


PREDISPORRE N. 2
ISOLATORI M6 H=30
IN POSIZIONE DA CONCORDARE

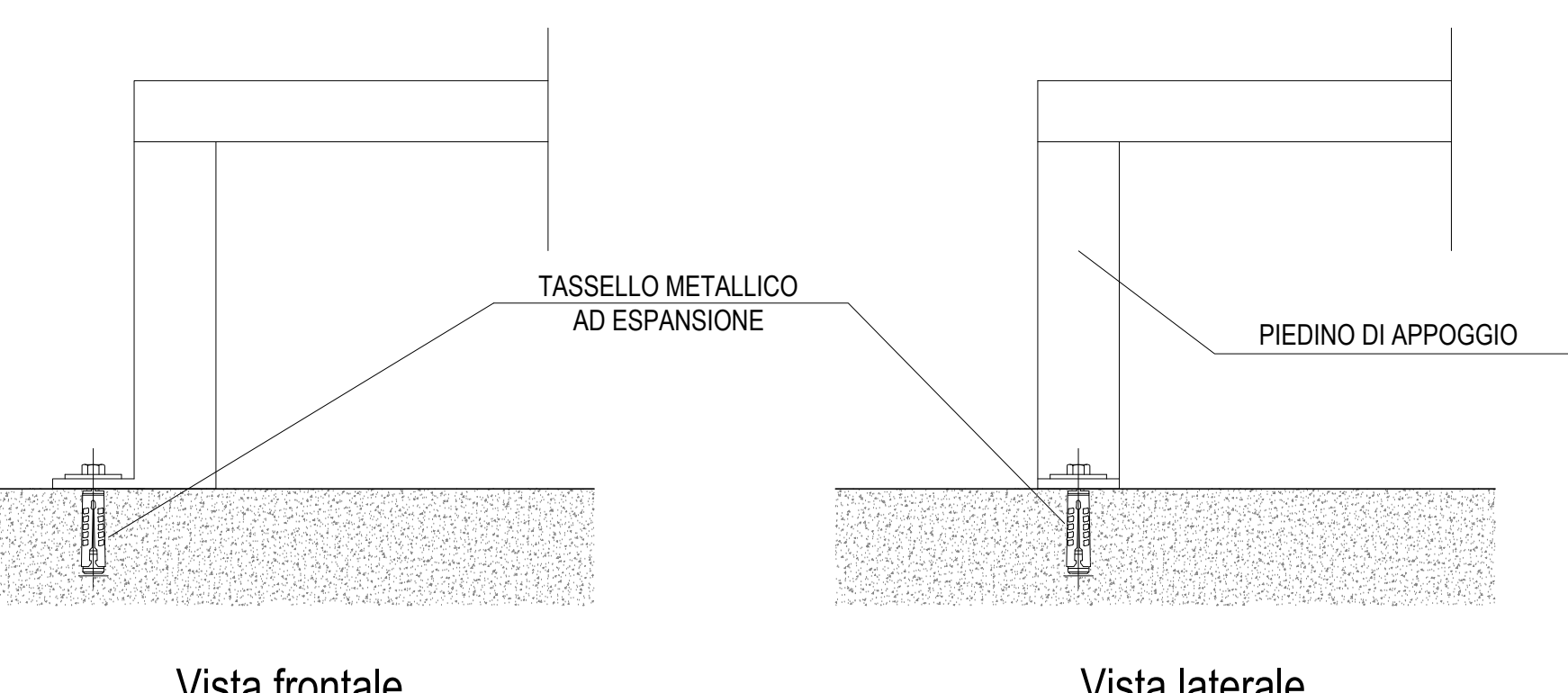
**PARTICOLARE PIASTRA DI APPOGGIO E
ATTACCO A PLATEA IN CLS ARMATO**



**PARTICOLARE GRADINO DI ACCESSO E
ATTACCO A PLATEA IN CLS ARMATO**



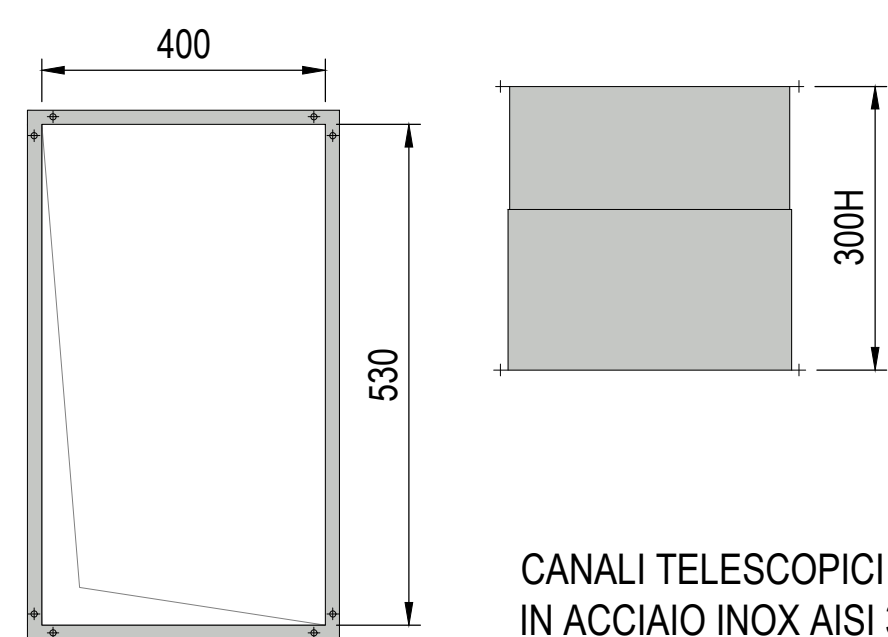
Pianta



Vista frontale

Vista laterale

PARTICOLARE CARTER PER PROTEZIONE CAVI



CANALI TELESCOPICI
IN ACCIAIO INOX AISI 304
sezionabili verticalmente in 2 parti
tassellati su platea in cls

**PARTICOLARI
CONSTRUTTIVI
SHELTER**