Industrial 1-Port BNC/RJ11 to 4-Port Gigabit Ethernet Extender

Physical Port
- Four 10/100/1000BASE-T RJ45 ports with auto MDI/MDI-X function (IVC-234GT)
- Four 10/100/1000BASE-T RJ45 ports with IEEE 802.3af/802.3at PoE Injector function (IVC-234GPT)
- One RJ11 female phone jack and one BNC female connector for VDSL2 Transmission

Power over Ethernet (IVC-234GPT)
- Complies with IEEE 802.3at/af PoE Plus end-span PSE
- Up to 4 ports of IEEE 802.3af/at devices powered
- Supports PoE power up to 30.8 watts per PoE port
- Provides DC 12-54V power over RJ45 Ethernet cable to PD with Ethernet port
- Up to 120-watt PoE budget
- Auto-detects IEEE 802.3at/af equipment and protects devices from being damaged by incorrect installation
- Remote power feeding up to 100m
- IEEE 802.3at/af splitter devices compatible

VDSL2 Features
- ITU-T G.993.2 **VDSL2 Profile 17a/30a/35b**
- ITU-T G.993.5 G.vectoring and G.INP
- DMT-based coding technology
- CO/CPE mode selectable via DIP switch
- Selectable target band plan and SNR margin
- Up to 200/200Mbps bandwidth (in **G.INP, Sym, 8dB** modes)
- Voice and data communication can be shared simultaneously based on the existing RG59/RG6 coaxial cable and telephone wire
- Used in pairs to extend Point-to-Point connection up to 1.4km

Layer 2 Features
- Complies with IEEE 802.3, 10BASE-T, IEEE 802.3u, 100BASE-TX, IEEE 802.3ab and 1000BASE-T Ethernet standards
- High-performance Store and Forward architecture, broadcast storm control and runt/CRC filtering eliminate erroneous packets to optimize the network bandwidth
- Integrated address look-up engine, supporting 1K absolute MAC addresses
- 1522bytes packet size
- Automatic address learning and address aging
- IEEE 802.1Q VLAN transparency

200/200Mbps Downstream/Upstream, High-performance Gigabit Ethernet over Coaxial/Phone Wire Solution

To fulfill the needs of long distance and higher speed required Ethernet over Coaxial or phone wire applications, PLANET Technology offers the IVC-234GT and IVC-234GPT, the new-generation and high-performance Gigabit Ethernet-over-VDSL2 Extenders with the brand-new **VDSL2 Super Vector 35b** profile.

Model Name	IVC-234GT	IVC-234GPT
Description	Industrial 1-Port BNC/RJ11 to 4-Port Gigabit Ethernet Extender	Industrial 4-Port 10/100/1000T 802.3at PoE+ to VDSL2 Extender
VDSL2 BNC Port	1	1
VDSL2 RJ11 Port	1	1
10/100/1000T Copper Ports	4	4
802.3at PoE+ Ports	---	4

In the following contents, the term **"Industrial Ethernet Extender"** means the IVC-234GT and IVC-234GPT.

The Industrial Ethernet Extender is based on the coaxial and two-core networking technologies, **Gigabit Ethernet** and **VDSL2** (Very-high-data-rate Digital Subscriber Line 2). The VDSL2 technology offers distance extension and signal conversion by transmitting the Ethernet data from the coaxial cable to another 100-meter UTP cable for various IP network devices such as HD IP cameras, wireless access points, NVRs and digital signage. It also offers the fastest data transmission speed over the existing copper telephone lines without the need of rewiring.

The Industrial Ethernet Extender works well with a pervasive coaxial or telephone line network with **downstream/upstream data rate of up to 200/200Mbps symmetric and 300/100Mbps asymmetric over a distance of 300m**, making a maximum VDSL2 distance reach of up to **1.4km**.

High-performance Ethernet over VDSL2 Transmission

Via the latest VDSL2 technology, PLANET Industrial Ethernet Extender offers high-speed access to Internet, up to 200Mbps for both upstream and downstream data transmissions. With integrated support for the ITU-T's new G.993.5 vectoring technology, the Industrial Ethernet Extender offers a stable yet high-speed point-to-point network access up to a duplex data transmission rate of 300Mbps. It provides 2 selective transmission modes -- asymmetric mode or symmetric mode -- for the transmission of upstream and downstream signals.

- Asymmetric mode – downstream up to 300Mbps and upstream up to 100Mbps
- Symmetric mode – downstream up to 200Mbps and upstream up to 200Mbps

The symmetric mode provides similar transmission rate on both downstream and upstream while the asymmetric mode performs higher transmission quality in short range. In all, when the Industrial Ethernet Extender is in the symmetric mode, it provides a better upstream performance, and when it is in the asymmetric mode, it gives a better downstream performance. It also works in conjunction with vectoring-enabled DSLAMs to remove crosstalk interference and improve maximum line bandwidth across the existing copper infrastructure.

Industrial Case and Installation

- Slim IP30 metal case (IVC-234GT)
- IP30 metal case (IVC-234GPT)
- DIN-rail, wall-mount or side wall-mount design for redundant power design
  – 9 to 48V DC, redundant power with reverse polarity protection (IVC-234GT)
  – AC 24V power adapter acceptable (IVC-234GT)
  – 12 to 54V DC, redundant power with reverse polarity protection (IVC-234GPT)
- Supports 6000 VDC Ethernet ESD protection
- -40 to 75 degrees C operating temperature
- Advantage of minimum installation time (Simply by Plug-and-Play)
- Supports extensive LED indicators for network diagnosis
- Free fall, shock-proof and vibration-proof for industries

Delivering High-demanding Service Over Long Distance Connectivity

The Industrial Ethernet Extender is also a **Long Reach Ethernet (LRE)** solution which provides a quick replacement and smooth migration solution from the existing analog system to full digital system. It features two types of VDSL2 transmission, the VDSL2 coaxial cable and VDSL2 RJ11 telephone wire. A normal UTP cable can only be extended up to 100 meters, but with the Industrial Ethernet Extender, the distance for Ethernet networking can be extended up to **1,400 meters (4,593ft.)**.

The Industrial Ethernet Extender provides an excellent bandwidth demand for the triple play devices for entertainment and communication. With the asymmetric data transmission up to **316/56Mbps (G.INP, Asym, 8dB)**, the Industrial Ethernet Extender enables many multi-media services to work on the local Internet, such as VoD (video on demand), voice over IP, video phone, IPTV, Internet caching server, distance education, and so on, which is ideal for the following network applications:

- Long-distance IP network devices
- IP digital signage
- Cable TV to IPTV
- Distance video education
- Electronic billboards
- Other applications

If you have coaxial cable or RJ11 telephone wire in your existing environment, you can install a pair of the Industrial Ethernet Extender very simply without the need to build additional network wires, thus saving costs for network construction.

VDSL2, BNC and RJ11 Connection Diagrams
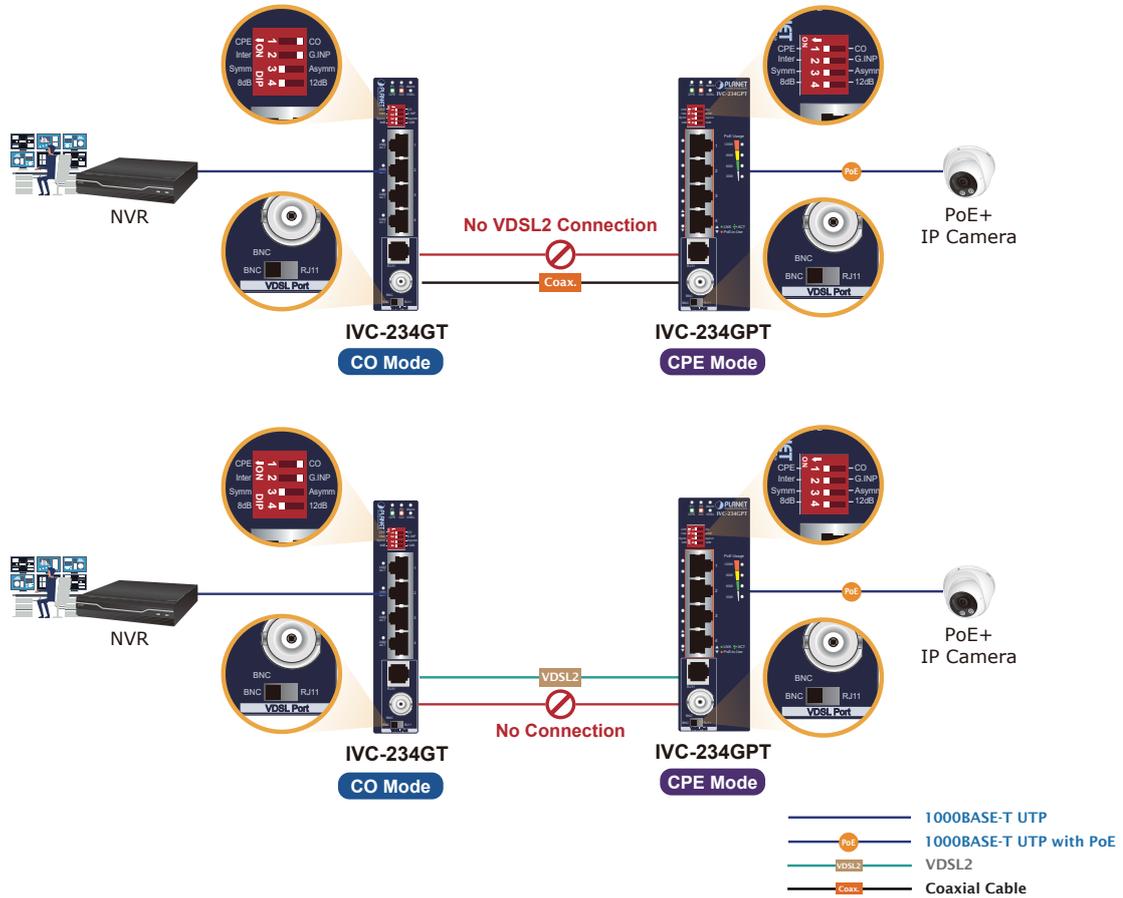
Easy and Flexible Installation

The Industrial Ethernet Extender comes with a plug-and-play design and is fully compatible with all kinds of network protocols. Moreover, the operating status of each individual port and the whole system can be watched via the rich diagnostic LEDs on the front panel. The Industrial Ethernet Extender offers two modes, **CPE** and **CO**, for application -- CPE mode is used at client side and CO mode is at central side. The CPE or CO mode can be adjusted by using a built-in DIP switch. For point-to-point connection, one Industrial Ethernet Extender in the CPE mode and the other in the CO mode must be set up as one pair of VDSL2 Extenders to perform the connection. This enables the administrator to efficiently manage the network over coaxial cable or RJ11 telephone wire, making long-distance transmission better.

Selectable Target Band Plan via DIP Switch

Stable Operating Performance under Difficult Environments

The Industrial Ethernet Extender is the perfect solution for extended data with VDSL2 transmission for warehouses, parking lots, campuses, casinos, and many more. It can operate stably under temperature range from **-40 to 75 degrees C**, which enables the users to conveniently apply the device in any harsh environment.

ADSL2+ Fallback

For those ISPs providing ADSL broadband service, the Industrial Ethernet Extender can support transmission rates up to 24Mbps downstream and 1Mbps upstream with the ADSL2+ technology. The Industrial Ethernet Extender establishes a connection with an ISP and can be also directly switched over to VDSL2 after the ISP network upgrade.

IEEE 802.3at Power over Ethernet Plus (IVC-234GPT)

The IVC-234GPT forwards the Ethernet data and provides a maximum of **30-watt** power output over an additional 100m Cat.5E/6 Ethernet cable to a remote IP device complied with **802.3af/at PoE** PD (powered device) for network deployment, such as PoE IP camera, PoE wireless AP, or PoE IP VoIP phone/door phone. The IVC-234GPT provides more flexibility in power requirements for all kinds of PDs at affordable installation costs.

Convenient and Reliable Power System (IVC-234GPT)

To facilitate the 802.3at PoE+ usage with the commonly-used 12~54V DC power input for transportation and industrial-level applications, the IVC-234GPT adopts the **12~54V DC to 54V DC power boost technology** to solve power source issue but does not require special power supplies. Its wide-ranging voltages design is suitable for worldwide operability with high- availability applications requiring dual or backup power inputs.
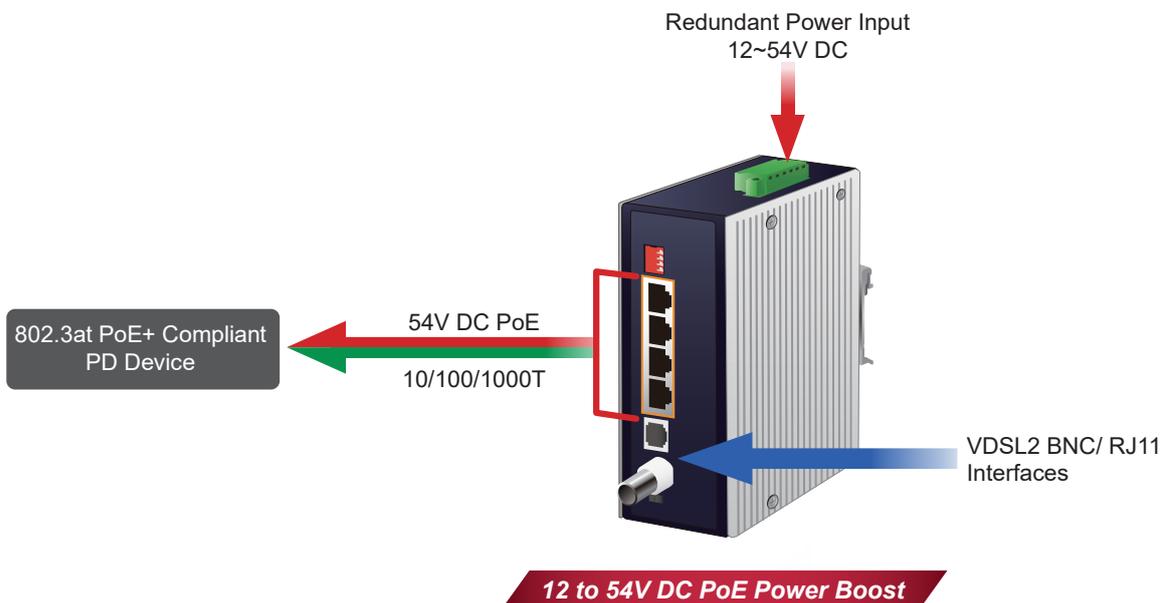
Applications

Point-to-Point Application -- LAN to LAN Connection

One set of the Industrial Ethernet Extender could be used to link two local Area networks that are located in different places. Through the VDSL2 coaxial cable and VDSL2 RJ11 telephone wire, it could set up a 300/100Mbps asymmetric backbone, but one Industrial Ethernet Extender must be **Master** (**CO** mode) and the other one is **Slave** (**CPE** mode).
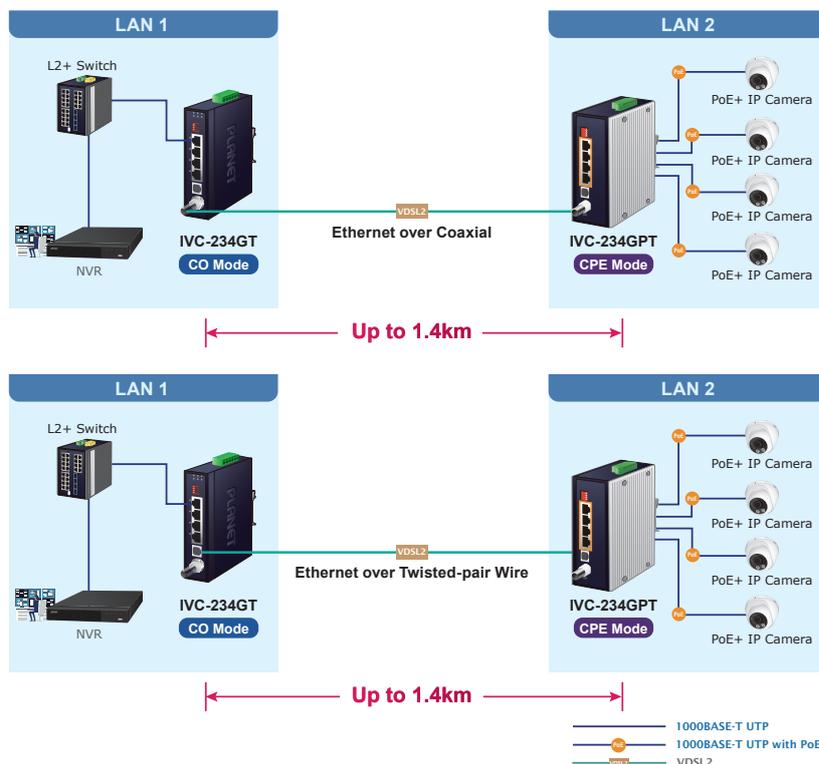
Point-to-Point: LAN to LAN Connection
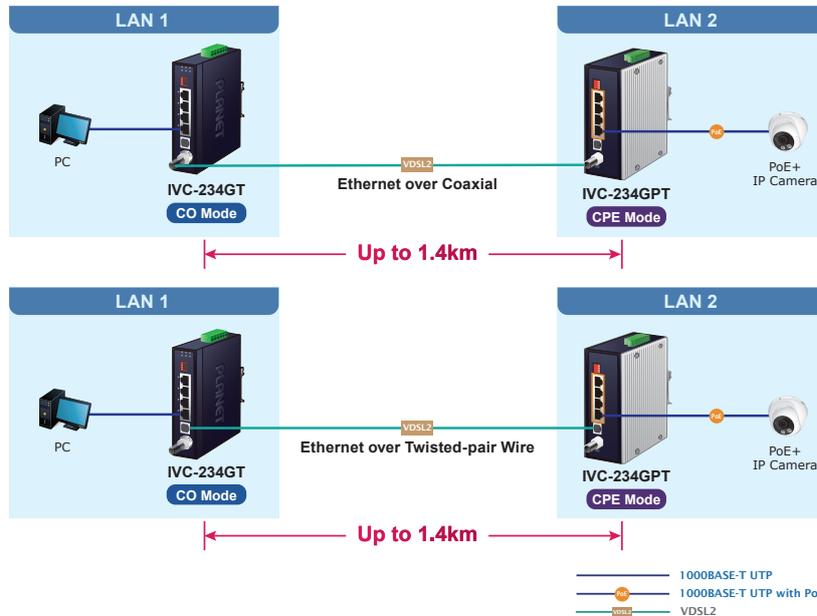
Community/Campus Surveillance and Security over IP

To take advantage of digital surveillance system and keep the benefits of VDSL2 coaxial cable/RJ11 telephone wire of the Industrial Ethernet Extender, communities, campuses and enterprises can upgrade analog camera system to 802.3at PoE+ IP camera surveillance system without deploying additional new wires with IVC-234GPT. As the IVC-234GPT comes with one RJ11 and one BNC Ethernet over RJ11 and Coaxial port, just plug in the UTP cables of IP camera to the 802.3at PoE+ injector Ethernet ports, use the existing RJ11 or coaxial cable to the RJ11 or BNC connector to easily deploy and extend the distance with signal conversion by transmitting the Ethernet data.

VDSL2 Cabling for IP Surveillance

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Specifications

Product	IVC-234GT	IVC-234GPT
Hardware Specifications		
Hardware Version	2	1
LAN Ports	4 10/100/1000BASE-T RJ45 auto-MDI/MDI-X ports	
802.3at PoE Ports	NA	4
VDSL Port — BNC	1 BNC female Ethernet over Coaxial port	
	Coaxial cable: 75 ohm	
	RG-6/U cable, less than12Ω/1000 ft.	
	RG-59/U cable, less than 30Ω/1000 ft.	
	Max. 1400m with data transmission (4,593ft.)	
VDSL Port — RJ11	1 VDSL2 RJ11 female phone jack	
	Twisted-pair telephone wires (AWG-24 or better)	
	Max. 1400m with data transmission (4,593ft.)	
DIP Switch & Functionality — DIP-1	Select CO or CPE mode.	
DIP-2	Select G.INP or Interleaved mode.	
DIP-3	Select Band Profile (Asymmetric or Symmetric).	
DIP-4	Select SNR of 12dB or 8dB.	
ESD Protection	6KV DC	
Dimensions (W x D x H)	32 x 87.8 x 135mm	56 x 86.1 x 135mm
Weight	452g	736g
Power Requirements	DC 9~48V or AC 24V Redundant power with reverse polarity protection	DC 12~54V Redundant power with reverse polarity protection
Power Consumption	DC 9V: 3.96watts/13.5BTU DC 48V: 3.36watts/11.4BTU AC 24V: 4.1watts/13.9BTU	DC 12V: 60 watts/204BTU DC 24V: 100 watts/341BTU DC 54V: 122 watts/416BTU
LED Indicators	3 x LED for System and Power: ■ **Green**: DC Power 1 ■ **Green**: DC Power 2 ■ **Red**: Alarm 3 x LED for VDSL2 interface: ■ **Green**: VDSL ■ **Green**: CO ■ **Green**: CPE 2 x LED for Per Copper Port (Port-1~Port-4): ■ **Green**: 10/100/1000 LNK/ACT ■ **Amber** PoE-in-Use (IVC-234GPT) 4 x LED for PoE Usage: (IVC-234GPT) ■ **Amber** 30W ■ **Amber** 60W ■ **Amber** 90W ■ **Amber** 120W	
Housing	IP30 Metal Case	
Power over Ethernet Specifications (IVC-234GPT)		
PoE Standard	-	IEEE 802.3af PoE PSE IEEE 802.3at PoE+ PSE
PoE Power Supply Type	-	End-span
Power PIN Assignment	-	1/2(+), 3/6(-)
PoE Power Output	-	Per port 54V DC, Max. 30.8 watts
PoE Power Output Budget	-	DC 12V, 60 watts maximum DC 24V, 100 watts maximum DC 48-54V, 120 watts maximum
Switch Specifications		
Switch Processing Scheme	Store-and-Forward	
Address Table	1K entries	
Maximum Packet Size	1522bytes	

Standards Conformance	
VDSL Compliance	■ VDSL-DMT ● ITU-T G.993.1 VDSL ● ITU-T G.997.1 ● ITU-T G.993.2 VDSL2 (Profile 17a/30a/35b support) ● ITU-T G.993.5 **G.vectoring** ● ITU-T G.998 ● G.INP
ADSL Compliance	■ Capable of **ADSL2/2+** standard ● ITU G.992.3 G.dmt.bis ● ITU G.992.5 G.dmt.bisplus ■ Data Rate: Up to 24Mbps
Standards Compliance	IEEE 802.3 Ethernet IEEE 802.3u Fast Ethernet IEEE 802.3ab Gigabit Ethernet IEEE 802.1p Class of Service ITU-T G.993.1 VDSL ITU-T G.997.1 ITU-T G.993.2 VDSL2 (Profile 17a/30a/35b support) ITU-T G.993.5 G.Vectoring & G.INP ITU-T G.998
Regulatory Compliance	FCC Part 15 Class A, CE
Environment	
Temperature	Operating: -40~75 degrees C Storage: -40~75 degrees C
Humidity	Operating: 5~95% (non-condensing) Storage: 5~95% (non-condensing)

VDSL2 Performance Table

IVC-234GT(V2)

IVC-234GT(V2) RJ11 Performance*				
Distance (meter)	Interleave (Downstream/Upstream: Mbps)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	253/56	260/53	181/173	172/164
400m	229/52	200/51	147/140	136/123
600m	112/42	99/39	95/78	77/64
800m	108/33	77/28	72/51	59/40
1000m	71/15	60/12	51/27	47/24
1200m	43/9	35/6	29/25	24/20
1400m	26/7	23/6	19/13	18/11
Distance (meter)	G.INP (Downstream/Upstream: Mbps)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	308/55	285/53	191/186	183/175
400m	246/55	211/52	143/141	140/124
600m	125/43	96/40	88/81	99/39
800m	108/33	77/28	72/51	59/40
1000m	71/15	60/12	51/27	47/24
1200m	43/9	35/6	29/25	24/20
1400m	33/6	35/4	24/15	20/17

* The performance data above is for reference only. The actual data rate will vary on the quality of the copper wire and environmental factors.

IVC-234GT(V2) Coaxial Performance*				
Distance (meter)	Interleave (Downstream/Upstream: Mbps)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	258/53	256/51	178/177	173/170
400m	252/51	238/50	152/151	145/143
600m	205/48	189/47	125/124	115/114
800m	166/47	141/46	108/101	91/89
1000m	121/45	96/39	81/79	71/70
1200m	83/38	63/34	62/60	54/51
1400m	32/21	30/19	28/25	18/15
Distance (meter)	G.INP (Downstream/Upstream: Mbps)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	316/56	299/55	183/181	179/178
400m	276/52	246/50	167/165	157/152
600m	218/50	196/49	136/129	124/114
800m	171/49	145/57	108/103	96/92
1000m	122/48	97/41	83/81	72/71
1200m	86/42	69/36	69/64	55/53
1400m	46/26	37/21	39/31	31/23

*As there are various resistance values in the category of RG-59/U or RG-6/U cable, the actual data rate will vary on the quality of the copper wire and environmental factors.

IVC-234GPT

IVC-234GPT RJ11 Performance*				
Distance (meter)	Interleave (Downstream/Upstream: Mbps)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	264/57	255/56	174/171	165/159
400m	212/53	182/49	140/131	125/114
600m	117/44	95/39	80/78	66/66
800m	92/32	76/25	66/52	55/40
1000m	40/29	33/19	42/29	33/25
1200m	30/19	33/19	28/27	26/18
1400m	29/11	25/7	29/11	21/12
Distance (meter)	G.INP (Downstream/Upstream: Mbps)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	306/60	279/58	186/186	174/171
400m	221/57	192/52	146/134	129/116
600m	118/45	95/40	81/80	62/54
800m	92/33	77/28	65/51	54/42
1000m	39/22	32/17	42/42	35/25
1200m	30/21	25/16	32/22	26/19
1400m	28/12	24/9	25/16	21/12

* The performance data above is for reference only. The actual data rate will vary on the quality of the copper wire and environmental factors.

IVC-234GPT Coaxial Performance*				
Distance (meter)	Interleave (Downstream/Upstream: Mbps)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	264/57	255/56	177/172	168/164
400m	256/56	213/55	153/150	143/141
600m	184/56	159/51	129/117	111/105
800m	144/52	121/47	101/96	87/86
1000m	94/44	84/39	79/75	68/63
1200m	77/37	63/32	60/60	50/49
1400m	32/21	30/19	28/25	18/15
Distance (meter)	G.INP (Downstream/Upstream: Mbps)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	302/60	277/59	187/182	176/171
400m	249/58	252/59	163/156	149/142
600m	191/58	167/56	133/121	118/107
800m	191/58	121/50	103/97	92/88
1000m	97/49	83/40	82/70	71/60
1200m	77/37	63/32	63/56	50/49
1400m	46/26	37/21	39/31	31/23

*As there are various resistance values in the category of RG-59/U or RG-6/U cable, the actual data rate will vary on the quality of the copper wire and environmental factors.
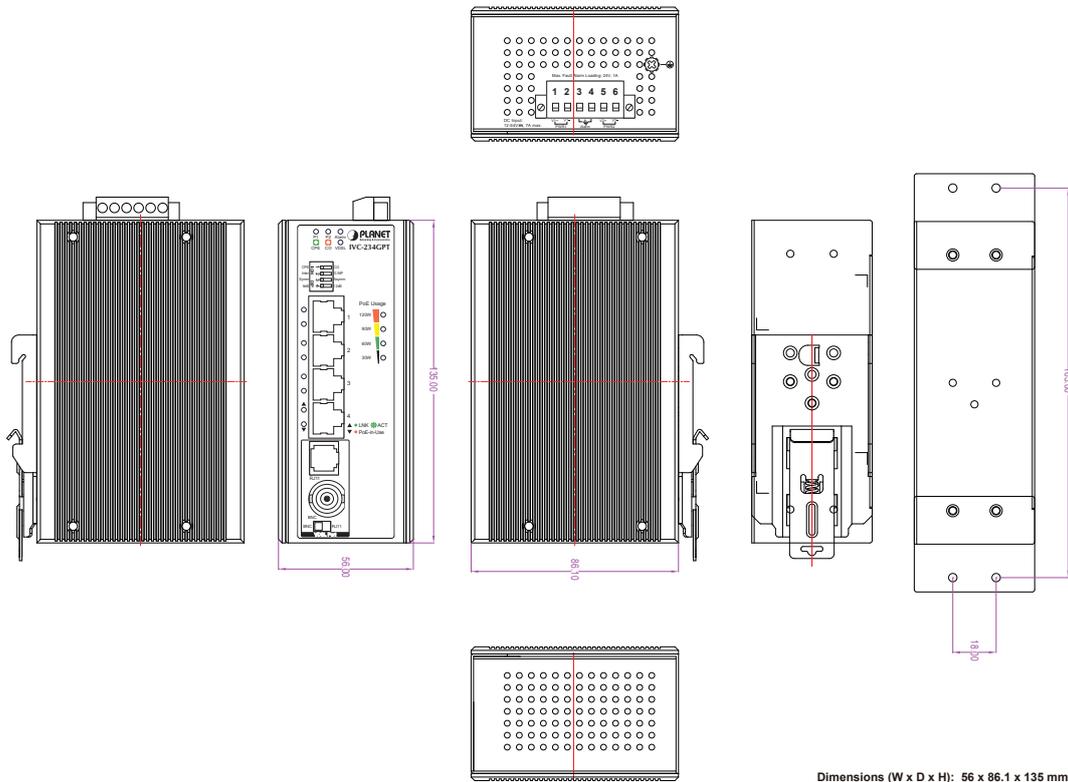
Dimensions

■ IVC-234GT(V2)
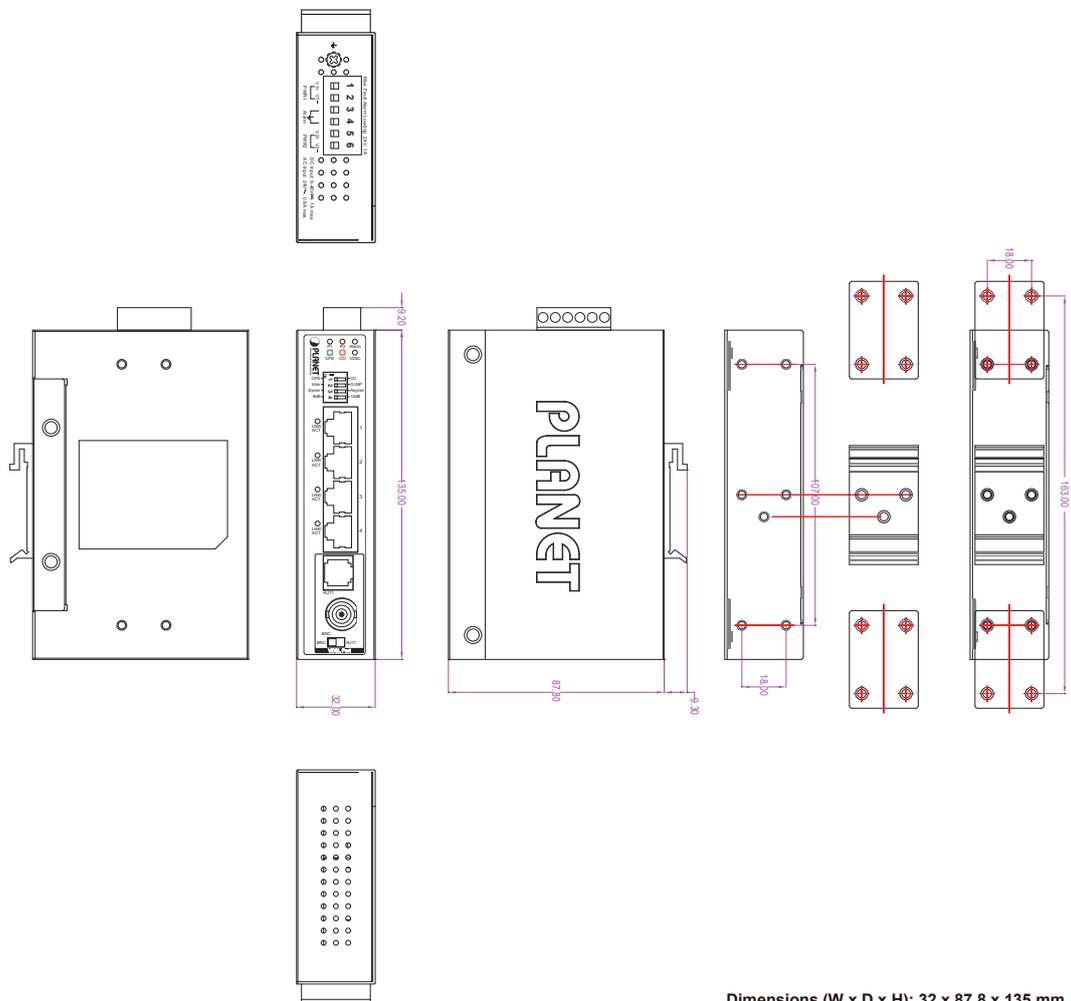
Dimensions (W x D x H): 32 x 87.8 x 135 mm

■ IVC-234GPT

Dimensions (W x D x H): 56 x 86.1 x 135 mm

Ordering Information

IVC-234GT	Industrial 1-Port BNC/RJ11 to 4-Port Gigabit Ethernet Extender (35b profile w/ G.vector)
IVC-234GPT	Industrial 4-Port 10/100/1000T 802.3at PoE+ to VDSL2 Extender (35b profile w/G.vectoring)

Related Products

VC-231	Ethernet over VDSL2 Converter (1 x RJ45, 1 x VDSL2/RJ11 - 30a)
VC-231G	1-Port 10/100/1000T Ethernet to VDSL2 Converter (35b profile w/ G.vectoring)
VC-231GP	1-Port 10/100/1000T 802.3at PoE+ Ethernet to VDSL2 Converter (35b profile w/G.vectoring)
VC-232G	1-Port 10/100/1000T Ethernet over Coaxial Converter (35b profile w/ G.vectoring)
VC-234	Ethernet over VDSL2 Bridge (4 x RJ45, 1 x VDSL2/RJ11, 1 x Phone - 30a)
VC-234G	Ethernet over VDSL2 Bridge (4 x RJ45, 1 x VDSL2/RJ11, 1 x Phone - 30a w/G.vectoring)

IVC-234GT/IVC-234GPT