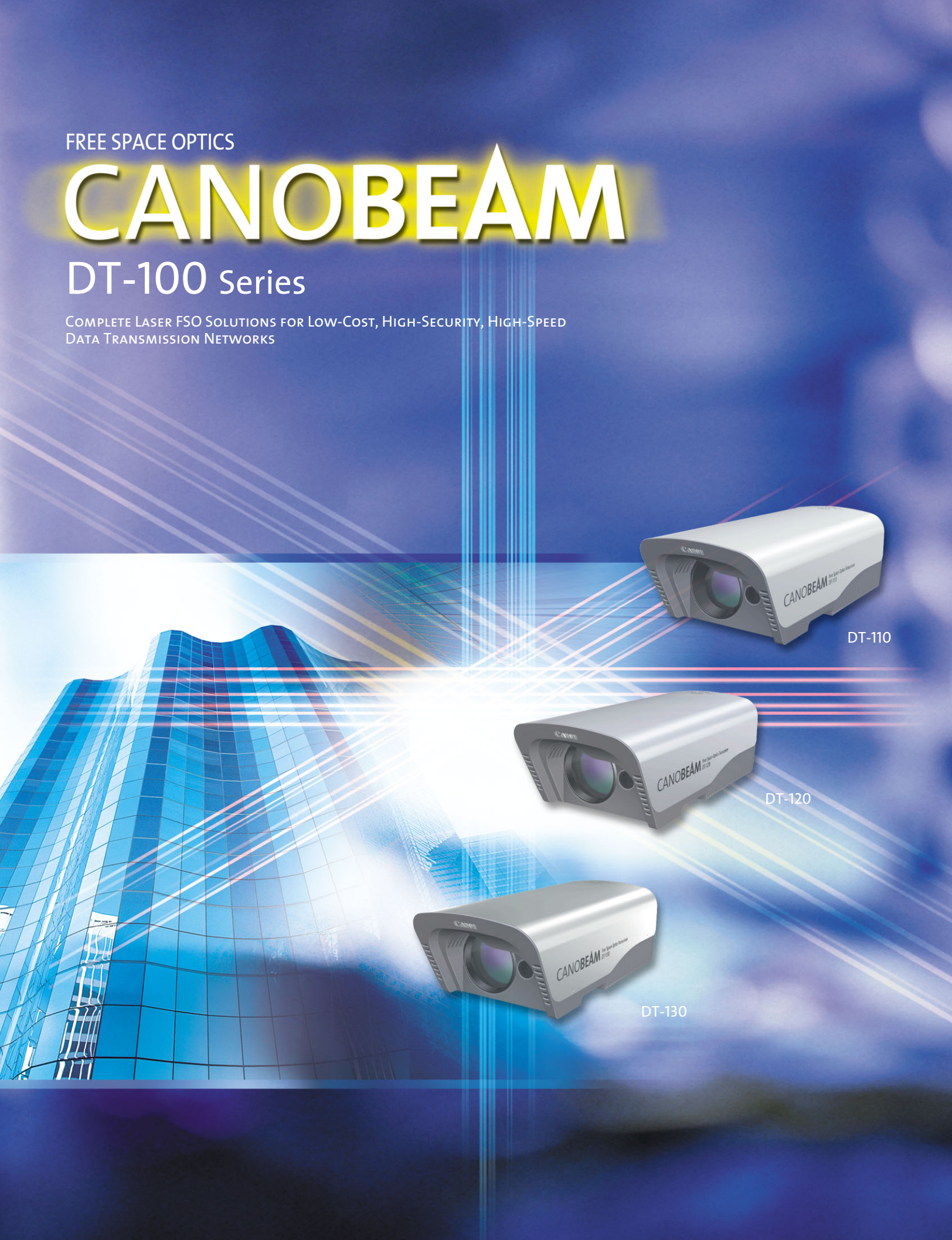
FREE SPACE OPTICS

CANOBEAM

DT-100 Series

Complete Laser FSO Solutions for Low-Cost, High-Security, High-Speed Data Transmission Networks



CANOBEAM

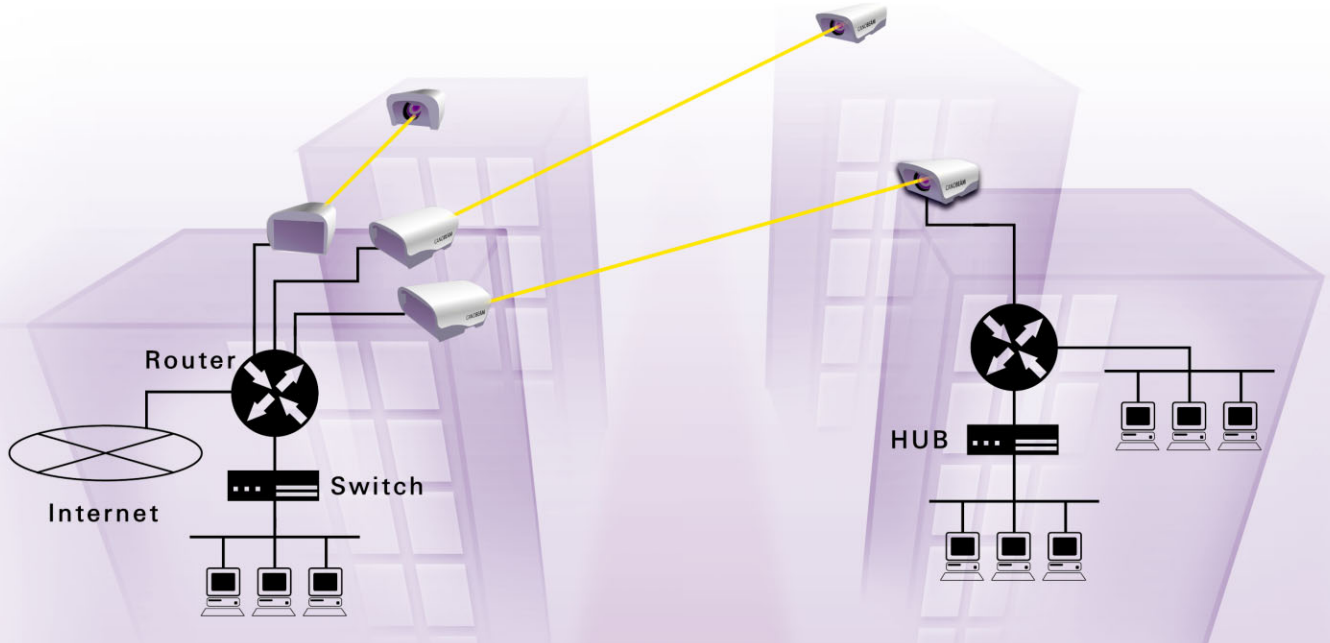
Free Space Optics Transceiver

DT-100 Series,
Next Generation Free Space Optics

Since Canobeam 1 was launched in 1993, Canon has been proudly leading the way in optical wireless transmission. With the communication network showing mass improvement in its speed by the rapid spread of the Internet, Free Space Optics have become imperative devices to meet the industry requirements.
Now in its latest generation, the Canobeam DT-100 series establishes itself as a versatile and solid performer, optimizing transmission even from the tops of buildings that are prone to sway and to vibrate.
All of the models within the CANOBEAM DT-100 series employ Canon's evolving and we believe, essential Automatic Tracking Function that maintains beam alignment, compensating for changes in the installation base due to temperature variations and vibration due to wind and other factors. Because this feature always provides maximum power to the receiver, the unit is capable of highly reliable and stable communications. Canon's latest and unique FSO technology, incorporating auto-tracking in all DT-100 series models, provides the most affordable, quick and flexible transmission solution possible while maintaining the highest communication quality.

Highlights of Canobeam DT-100 series include:

- **High speed economical transmission up to 1.25Gbps**
- **Provides high-quality, reliable wireless communications up to 2km with Auto Tracking**
- **Requires no radio frequency allocations, permits or licenses**
- **Highly secure data links**
- **Protocol independent, like fiber optic cable**
- **Installation and operating cost are much lower than installing fiber optic cable**



Accommodates a wide range of data transfer speeds

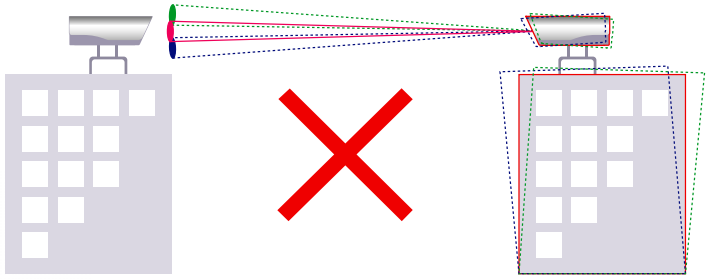
The DT-100 series can handle a wide range of data transfer speeds from 25Mbps to an ultra-fast 1.25Gbps.
The user can select the transfer speed according to the type of network in which the unit will be installed.

Model Name	Data Transfer Speed
DT-110	25Mbps – 156Mbps
DT-120	25Mbps – 156Mbps
DT-130	1.25Gbps

Auto Tracking provides stable communications

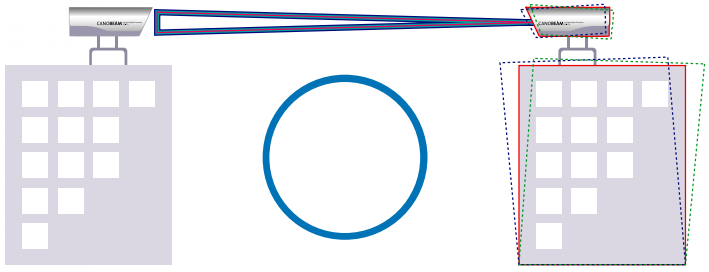
The DT-100 series is equipped with latest Auto Tracking function that adjusts the laser axis to compensate for slight movements in the building or installation base due to temperature variations, or vibration due to wind and other factors. A CPU calculates the point of maximum light input and controls the laser axis appropriately.

FSO without Auto Tracking



The optical beam axis will deviate with slight building or mounting device movement.

DT-100 series with Auto Tracking



The system will correct errors in the optical beam axis caused by slight building or mounting device movement

Provides high-quality, reliable wireless communications up to a standard of 2km*

If the units have an unobstructed line of sight, this laser network can provide instant, high-quality, highly reliable communications at a standard distance of up to 2km*.(in case of DT-120)

* For DT-130, the standard distance is up to 1 km.
For DT-110, the standard distance is up to 0.5 km
Longer transmission can be achieved but this is a function of weather conditions and acceptable link availability. Please see further information in the "Canobeam Q & A" section.

Installation and operating costs are much lower than installing fiber optic cable

A laser network can be installed for much lower costs, since construction is avoided. Also, operating costs are limited to electricity and simple, routine maintenance.

Optimized optical performance

As a world leader in optical design and laser transmission technology, Canon has been able to develop a group of optical lenses that are optimally designed for use in data transmission equipment.

High security

Point to point wireless transmission using an optical beam provides high security. It is virtually impossible to tap the beam due to its narrow footprint.

Requires no radio frequency allocations permits or licenses

Because this system uses lasers, it is not necessary to obtain radio frequency allocations, permits or licenses. In addition, the DT-100 series is not affected by, and does not cause, any radio frequency interference.

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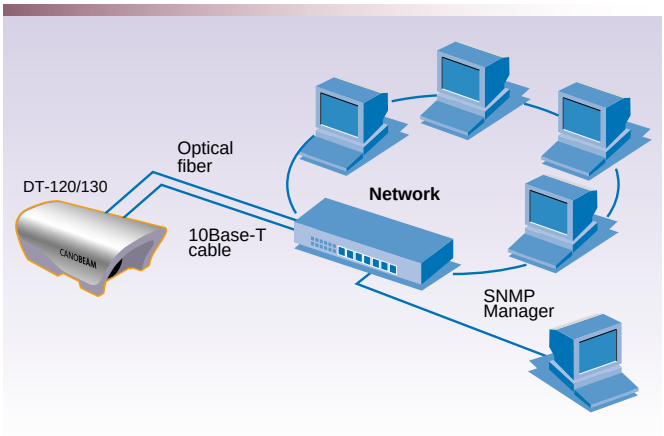
Free Space Optics Transceiver

Management capabilities via SNMP, Telnet, and FTP

Because DT-MNG100, Management Board is built-in as a standard feature with the DT-120/130, the status of the transceivers can be managed via SNMP (for monitoring) or Telnet (for monitoring and setting). Also diagnostic logs can be stored in a PC via FTP (for log data transmission).
For DT-110, DT-MNG100 is optionally available.

SNMP Connection Sample



Data Log Sample

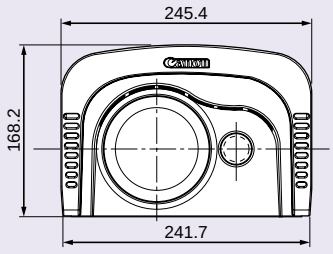
DATE	OPT RX	OPT TX	TEMP
May 28 2003 10:02:03	7	9	25
May 28 2003 10:03:03	8	9	25
May 28 2003 10:04:03	8	9	25
May 28 2003 10:05:03	8	9	25
May 28 2003 10:06:03	7	9	25
May 28 2003 10:07:03	7	9	25
May 28 2003 10:08:03	7	9	25
May 28 2003 10:09:03	7	9	25
May 28 2003 10:10:03	8	9	25
May 28 2003 10:11:03			25

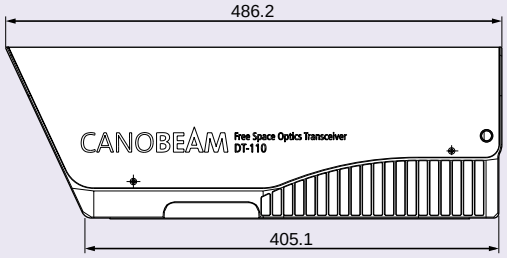
3R Function (Re-shaping, Re-timing, Re-generating) with DT-130

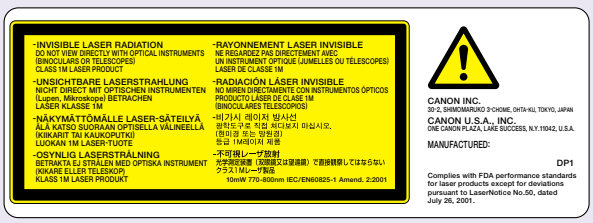
The 3R function with DT-130 can be used to normalize the signal waveform with Gigabit Ethernet, transmissions in order to permit relay transmissions without deterioration of signal quality between buildings that are more than 1km apart or that do not provide a good line of sight.

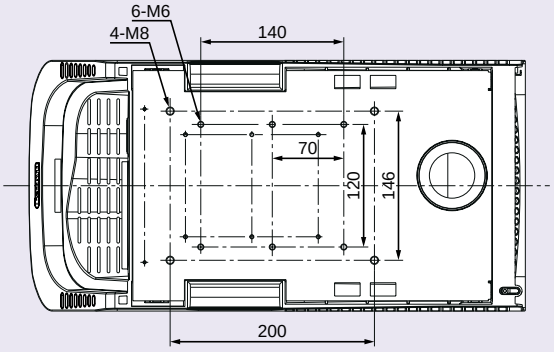
Dimensions

DT-110/120/130









(mm)

DT-110
- Economical FSO for data transmission from 20m to 500m
- Wide range of data speeds from 25Mbps to 156Mbps
- Auto Tracking Function
- DT-MNG100, Management Board optional

DT-120
- Provides high-quality, reliable wireless communications from 100m to 2km
- Wide range of data speeds from 25Mbps to 156Mbps
- Auto Tracking Function
- DT-MNG100, Management Board built-in

DT-130
- State-of-art data transmission at 1.25Gbps for Gigabit Ethernet network
- Transmission distance from 100m to 1000m
- 3R Function (Re-shaping, Re-timing, Re-generating)
- Auto Tracking Function
- DT-MNG100, Management Board built-in

Canobeam Q & A

Is performance affected by the weather?

It is unavoidable that an optical beam can be affected by weather conditions. Rain, fog or snow reduces visibility, scattering and attenuating the amount of laser light that passes between the two units. This can result in transmission errors, that is why a back up line is recommended. However, if it is possible to see approximately half way to the opposite site under bad weather conditions, the DT-100 series can transmit correctly.

Are the lasers safe?

The DT-100 series is rated as a class 1M laser. The laser light that is outputted by the DT-100 series is safe even if viewed with the naked eye at the point of output. Because the laser beam spreads out by the time it reaches the receiving side, it is even safer there than it is on the transmitting side. (It is not recommended to use magnifying optics such as binoculars at the point of output, as the effect on the eyes would be amplified). FDA Laser Notice No.50, IEC/EN60825-1/A2:2001 Class 1M

What happens if a bird flies across the path of the laser?

If a bird flies across the path of the laser, the amount of light that is received will be reduced, but will still be adequate enough for data transmission. However, if a bird flies near the source of the laser obstructing it completely, the data will be momentarily interrupted. But if you are using TCP/IP, the problem will be resolved by a retransmission of the data.

What is the maximum transmission distance?

Standard transmission distances of each model are shown in the specifications. However, maximum transmission distance is a function of weather conditions and acceptable link availability.

Is a relay setup possible?

If you want to set up a network connection between two buildings that are separated by more than 2km or that does not have a clear line of sight, you can connect pairs of CANOBEAM units to relay the signal. With the DT-130, the relay process will not damage the data, because the waveform is normalized by the 3R function at each relay point.

Is laser communication through glass windows possible?

Yes. The DT-100 series can be installed indoors for window to window or window to roof transmission as long as the two units are located with a direct line of sight. However, some glass windows scatter and attenuate the amount of laser light. Therefore, conducting a field test is recommended.

Specifications

DT-100 Series	DT-110	DT-120	DT-130
Standard Transmission Distance (*1)	20~500m	100~2000m	100~1000m
Data Transmission Speed	25~156Mbps	25~156Mbps	1.25Gbps
Transmission Device	Laser Diode		
Laser Wavelength	785±15nm		
Laser Output Power	Approx. 7mW	Approx. 11mW	
Safety Class of Laser	Class 1M		
Receiving Device	Si PIN-PD	Si APD	
Auto Tracking Adjustment	Yes (Horizontal: ±1.2° Vertical: ±1.2°)		
3R Function	–	–	Yes
Operation Temperature Range	−20°C~+50°C		
Power	AC100-240V 50/60Hz (DC-48V optional)		
Power Consumption	Approx. 20W		
Installation Environment	Indoor or outdoor (Weatherproof : IP56)		
Dimensions	246(W)×168(H)×487(D)mm		
Weight	Approx. 8Kg		

(*1) Longer transmission distances can be achieved but this is a function of weather conditions and acceptable link availability

Media Interface Diagram

Model Name	Type of Connector	Type of Cable	Applications
DT-110 Type MM	SC connector	Multi-Mode Fiber (MMF) 62.5/125µm or 50/125µm	SDH/ATM/FDDI/Fast Ethernet (100Base-FX)
DT-120 Type MM			
DT-110 Type SM	SC connector	Single-Mode Fiber (SMF) SI-9.5/125µm	SDH/ATM/FDDI/Fast Ethernet (100Base-FX)
DT-120 Type SM			
DT-110 Type TP*	RJ-45 connector	UTP Cat.5 Cable (100Base-T cable)	IEEE802.3u (100Base-TX)
DT-120 Type TP*			
DT-130 Type SX	SC connector	Multi-Mode Fiber (MMF) 62.5/125µm or 50/125µm	Gigabit Ethernet (1000Base-SX)
DT-130 Type LX	SC connector	Multi-Mode Fiber (MMF) 62.5/125µm or 50/125µm	Gigabit Ethernet (1000Base-LX)
		Single-Mode Fiber (SMF) SI-9.5/125µm	

* Fast Etherrnet requires Full Duplex interface.

Option For DT-110

Model Name	Description	Interface
DT-MNG100	Management Board	• SNMP for monitoring • Telnet for monitoring and setting • FTP for log data transmission

Classifications

	USA	Europe
Electrical	UL60950(CSA60950)	EN60950
Laser Safety	21 CFR1040 (FDA Laser Notice No.50)	IEC60825-1 IEC60825-2
EMC	FCC-Part 15 (ICES-003)	EN55022 EN55024

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