QKD
-Server

Quantum Key Distribution

The QKD server is a security device that utilizes the laws of quantum mechanics to generate unconditionally secure symmetric encryption keys.
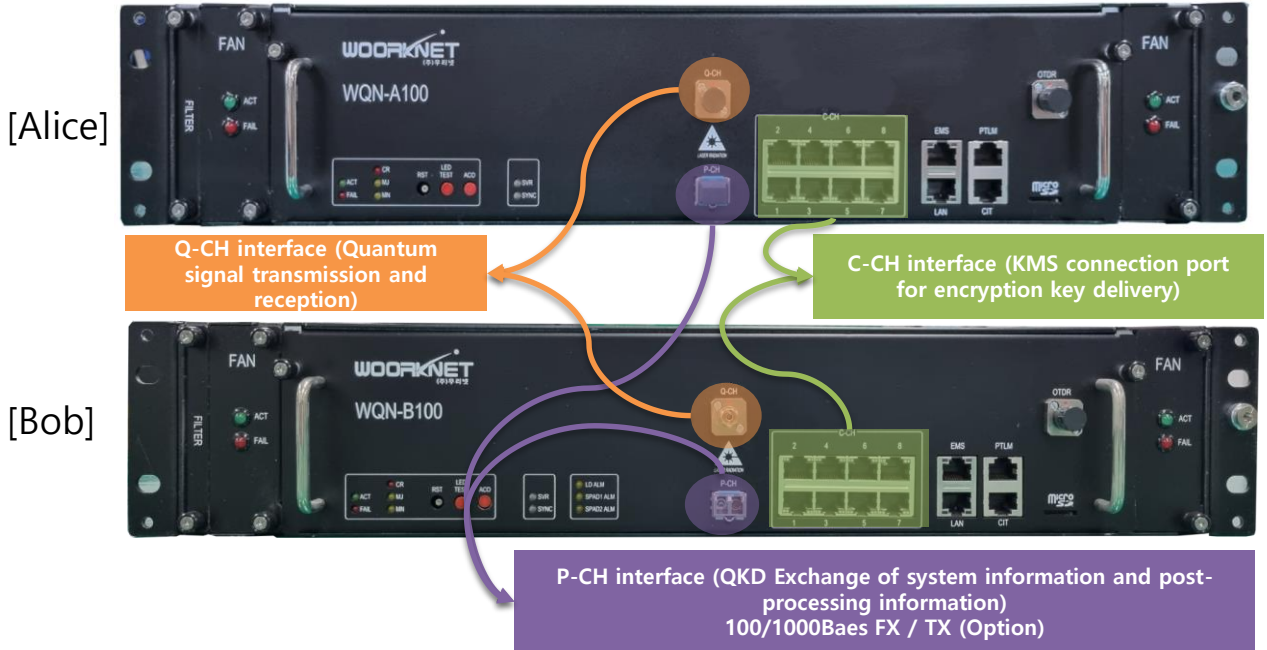
WQN-A100

WQN-B100

Specification

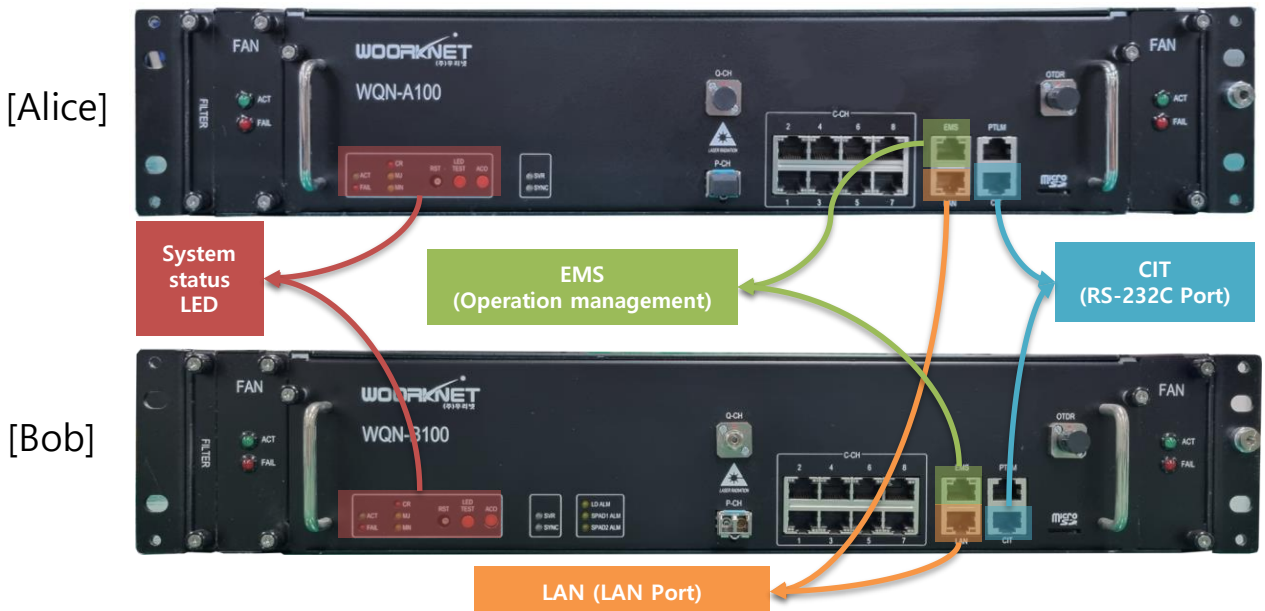| Model	WQN-A100	WQN-B100
Quantum Cryptography	Plug & Play (2-Way)	
Protocol	BB84 + Decoy	
Pulse Generation Rate	1MHz Pulse Repetition Rate	
Key Generation Speed	10bps ~ 20bps	
Maximum Transmission Loss	13dB	
Maximum Transmission Distance	50km (1550nm, 0.25dB/km)	
QBER	< 5% (Depends on distance and attenuation)	
Q-CH(Quantum Channel)	FC/APC Optical Connector	
P-CH(Public Channel)	SFP / SFP-T Type Module, 1 Port (100/1000Base-T/FX)	
C-CH(Crypto Channel)	100/1000Base-T RJ-45 x 8	
EMS / LAN Port	100/1000Base-T x 1 / RJ-45 x 1	
Debug Port	RS-232(115,2kbps) / RJ-45 x 1	
Power	DC -48V or AC 220V	
Redundancy	Power Supply & FAN	
Maximum Power Consumption	102W	115W
Maximum Weight	15kg	14kg
Size	19" 2U (W:441 X D:515.1 X H:88 mm)	
Management features	Provides alarm/performance/status display and statistics functions	

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Equipment shape and specifications

Parts	Unit	External shape	Specification	manufacturing company
Common part	WQN-x100 SHELF		■ System Chassis ■ W:441 / H:88 / D:515(mm) Front cover included (70 mm)	Woori Net Co., Ltd.
	WQN-x100 WQFAN		■ FAN Unit ■ W:30 / H:84 / D:322.2(mm)	Woori Net Co., Ltd.
	WQN-x100 WQPSU(AC)		■ Power AC(220V) ■ W:327.88 / H:41.9 / D:105(mm)	Woori Net Co., Ltd.
Control transmitter/receiver	WQN-B100 WQB100		■ Bob Unit(Receive) ■ W:365.47 / H:83.5 / D:322(mm)	Woori Net Co., Ltd.
	WQN-A100 WQA100		■ ALICE Unit(Transmit) ■ W:365.47 / H:83.5 / D:322(mm)	Woori Net Co., Ltd.

QKD(Quantum Key Distribution) Configuration

- ## Quantum key interface

[Alice]

[Bob]

Q-CH interface (Quantum signal transmission and reception)

C-CH interface (KMS connection port for encryption key delivery)

P-CH interface (QKD Exchange of system information and post-processing information) 100/1000Baes FX / TX (Option)

- ## Management control interface

[Alice]

[Bob]

System status LED

EMS (Operation management)

CIT (RS-232C Port)

LAN (LAN Port)

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QKD(Quantum Key Distribution) Configuration

• QKD consists of WQN-A100 (ALICE) and WQN-B100 (BOB) equipment.

• QKD consists of a transmitting device (ALICE) and a receiving device (BOB), and the final generated encryption key is delivered through the encryption key generation process between QKD devices.

• WQN-A100 and WQN-B100 are a quantum channel (Q-Channel) that transmits photons, and a public channel (P-Channel) for transmitting control information for quantum channel operation (Optical Processing) and information for key generation (Post-Processing). Channel), and the encryption key (Secure Key) is created and shared through QKD interface communication consisting of two devices. Additionally, the generated encryption key is delivered to the KMS (Key Management System) through the encryption key channel (C-Channel).

• Q-CH interface(Quantum channel interface) Responsible for quantum state input/output of the QKD system (WQN-A100 & WQN-B100). Connects the optical system inside the QKD system and the external quantum channel (SMF, Single Mode Fiber). Quantum signals are detected through Q-CH, and pre/post-processing functions are performed using P-CH based on the detected quantum signals. QKD When the device is in zero state or error state, output of all quantum signals is prohibited. Connector type uses FC/APC.

• P-CH interface(Public Channel interface) Bidirectional data input/output external interface between QKD systems (WQN-A100 & WQN-B100). The open channel can optionally use SFP/SFP-T type modules and provides 100/1000 Base-T/FX. Exchange system settings/inquiry information, authentication information between two devices, and information for pre-processing and post-processing. Data required for quantum key generation and post-processing between QKD devices is communicated through P-CH.

• C-CH interface(Crypto Channel interface) This is a data output interface between the QKD system (WQN-A100 & WQN-B100) and the KMS system. Uses 8 RJ-45 ports and provides Ethernet 100/1000Base-T. KMS provides secret keys, QBER information, and alarm status. Communicates using TLS1.2 with KMS.