



# Service News letter 2024 Collection

Service Operation Team 2024.Dec.01

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## PT(Pan/Tilt) limit of PTZ camera

Info. Type

☐ Quality☒ Settings☐ Repair☐ S/W☐ Etc

### ● PT (Pan/Tilt) limit

- It is a feature to set a excluding area of PT action, PT action only runs except the limited area
- It is a user convenience feature which to limit the area where does not require monitoring when using a Jog shuttle
- Default value is off, select [Enable] option to use the feature(Refer to Online Help)

#### Pan/Tilt limit

Where to find : Web page → Setting → PTZ → PT limit

Mode

☐ Enable

Pan limit

Action

Start

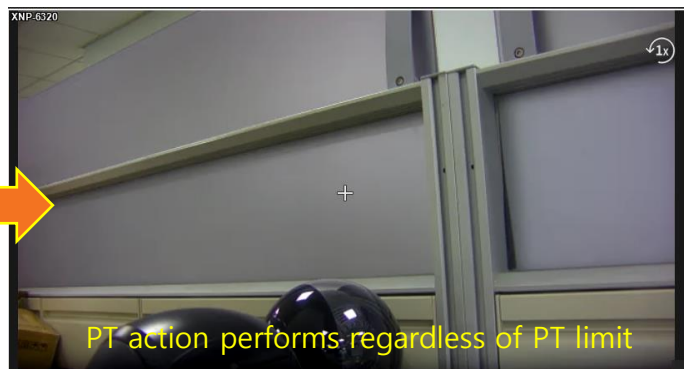
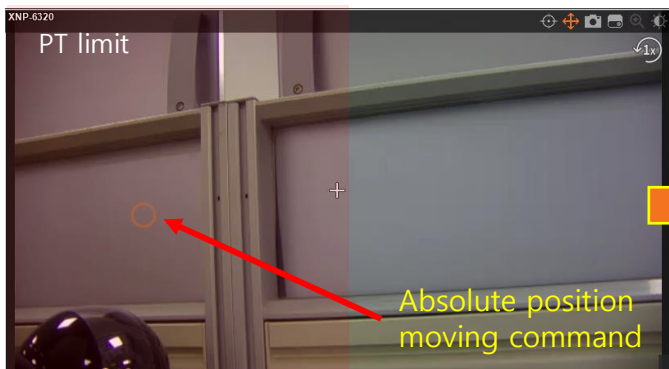
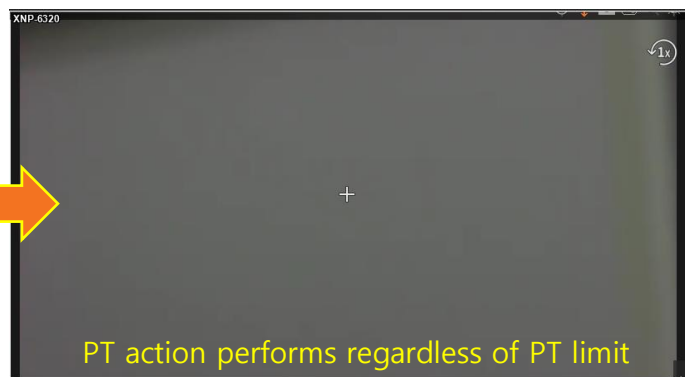
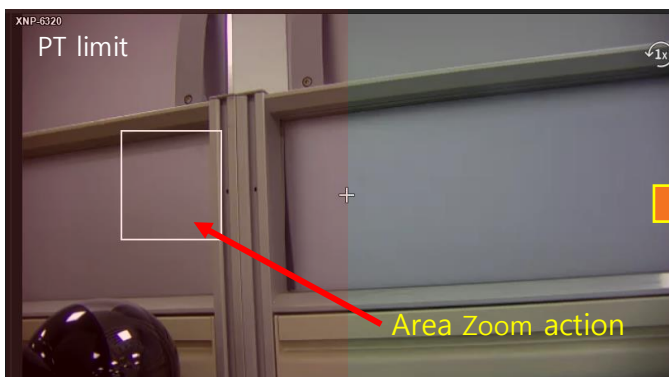
Enter

Exit

### ● Exceptional case of PT limit

- Sequence action(Preset, Swing, Group, Tour, Tracking, Auto run, Home)
- Area Zoom and Absolute position moving command(Mouse click to move from VMS and NVR)

### ● Examples of exceptional case



PT limit feature is used for a user convenience purpose, not for a privacy limit  
Please use 'Privacy Area' for area restriction for privacy security purpose

## SD card recommended specification guide

Info. Type

☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

● Model

- Network cameras (For SD card alarm, event recording supportive models)

● SD card operating specification

- Enable SD card status only in Device Record On state
- Overwrite Enable checked
  - . If free size is 20% or less of total capacity, secures free size by deleting the oldest data
- Overwrite Enable unchecked
  - . If free size is 20% or less of total capacity, it stops recording

[Example]

For SD card event recording, it uses only 93GB out of total 120GB and leaves 20% capacity as available space

	Device	Recording	Available	Total	Status
<input checked="" type="radio"/>	SD Card	On <input type="button" value="v"/>	26.20 GB	119.05 GB	Installed
<input type="radio"/>	NAS	Off <input type="button" value="v"/>	0 MB	0 MB	None



Leaving 20% capacity is not an error, it is an intended operating specification for stable operation

● SD card recommended specification guide

- Recommended use of an industrial grade (or higher) SD card for reliable operation

[SD card selection]

- . SD Type : MLC Type
- . Recommended manufacturer
  - : SanDisk, Transcend
- \* Grade
  - : Above or equal to High endurance grade



[High Endurance, Industrial grade SD cards]

## X/P AI series dongle support for installation convenience

Info. Type

☐Quality

☒Settings

☐Repair

☐S/W

☐Etc

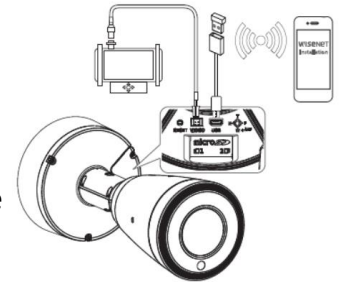
● Model : X series, P AI series network camera

### ● Purpose

- Dongle support is an installation convenience feature, which that users can view live video through mobile application during installation in order to set target angle
- It cannot be used for a monitoring purpose, it is only an installation solution

### ● How to connect Wifi dongle

- 1) Connect OTG adapter (5-pin) and Wi-Fi dongle to the micro USB terminal
- 2) Install the Wisenet Installation app, and select the camera SSID after turning on the WiFi
- 3) Log in to the camera, and check the video angle
- 4) Adjust angle of view while watching the video through smartphone



Supported model list<sub>As of April 2024</sub>

Brand	Model name	X series	P AI series
NETIS	WF2123 n300	Yes	Yes
EDIMAX	EW-7811Un	Yes	Yes
	EW-7811Un V2(New ver.)	Yes	Yes
IP Time	N100mini	Yes	Yes
	N150L	Yes	Yes
	TL-WN823N V1	Yes	Yes
TPLINK	TL-WN725N	Yes	Yes
	Archer T2U Nano	Yes	Yes
ASUS	USB N13	Yes	Yes
	USB N10 NANO	Yes	Yes
NETGEAR	WNA3100M	Yes	Yes
IODATA	WN-G150UMW	Yes	Yes
	WN-S150UM	Yes	Yes
TOTOLINK	N300UM	Yes	Yes



For 4CH/5CH AI MDC cameras(PNM-C32083RVQ, PNM-C16083RVQ, PNM-C34404RQPZ), TPLINK TL-WN725N is supported from **FW v 23.01.04\_20240417\_R929**



## Integrated front glass material for IR PTZ cameras

Info. Type

☐Quality ☐Settings ☒Repair ☐S/W ☐Etc

- Model : High Performance X-Series PTZ Cameras XNP-xx00RW/Cxx03RW
- Purpose
  - Informing integrated material for front glass repairment of high-performance IR PTZ

### ● Original materials by model

#### 1) XNP-XX00RW (X-Plus)

- . Material code : FC37-001073B
- . Front glass feature: No ink on IR area



[ No ink on IR area ]

#### 2) XNP-XX03RW (X-Plus AI)

- . Material code : FC37-001073A
- . Front glass feature: Black ink on all area



[ Black ink on all area ]

### ● Integrated material for front glass\_ **X-Plus & X-Plus AI PTZ** (From Apr. 2023)



- Material code: FC37-001103A
- Front glass feature: Black ink + IR ink on IR area
- Advantages of using integrated materials
  - . Ensure design uniformity and improve appearance through the use of compatible materials
  - . Black ink is strongly resistant to IR light which enhances reliability
  - . IR ink improves light transmittance in the IR area while keeping aesthetic unity

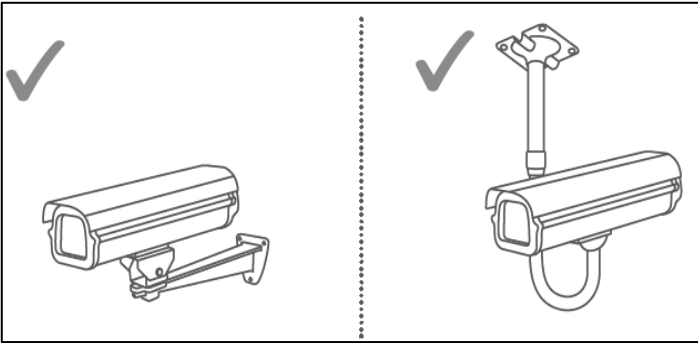
## Camera installation direction and bushing use method

Info. Type

☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

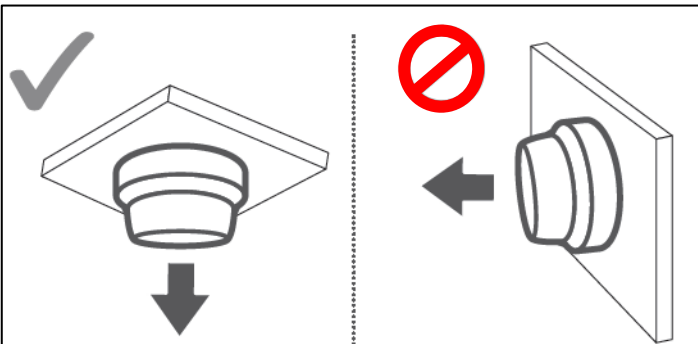
- Target cameras : PTZ camera , BOX camera , MDC (Multi Directional Camera)

- How to install the camera



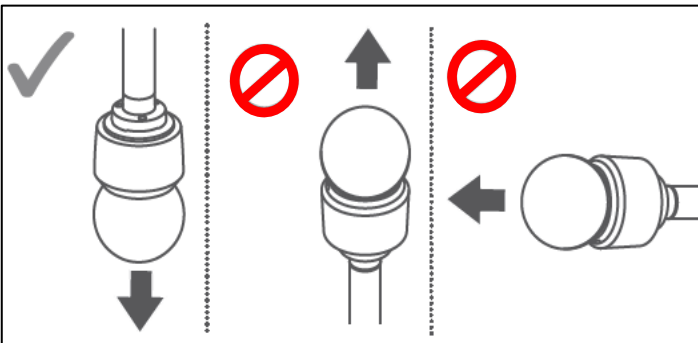
### [BOX Type Camera ]

- ※ Installation precautions :  
It is recommended to use camera housing (sold separately)



### [MDC Type Camera ]

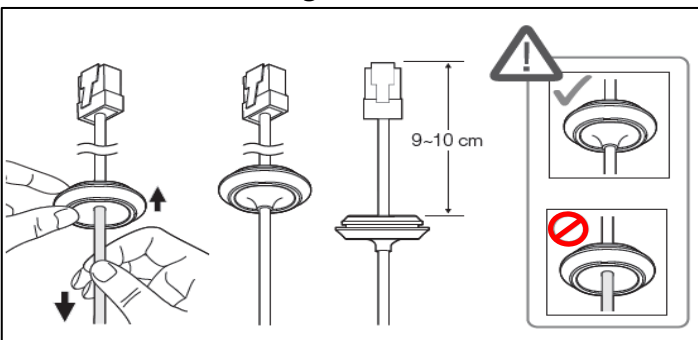
- ※ Installation precautions :  
Do not install it in horizontal direction.



### [PTZ Type Camera ]

- ※ Installation precautions :  
Do not install it in reverse/horizontal direction.

- How to use Bushings



### [ All models using bushings ]

- ※ Installation precautions :  
For waterproofing, pull the cable of the bushing downward and finish it in the shape shown in the figure.

# Network Camera Surge Protection Method

Info. Type

☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

## ● Target model : Network Cameras

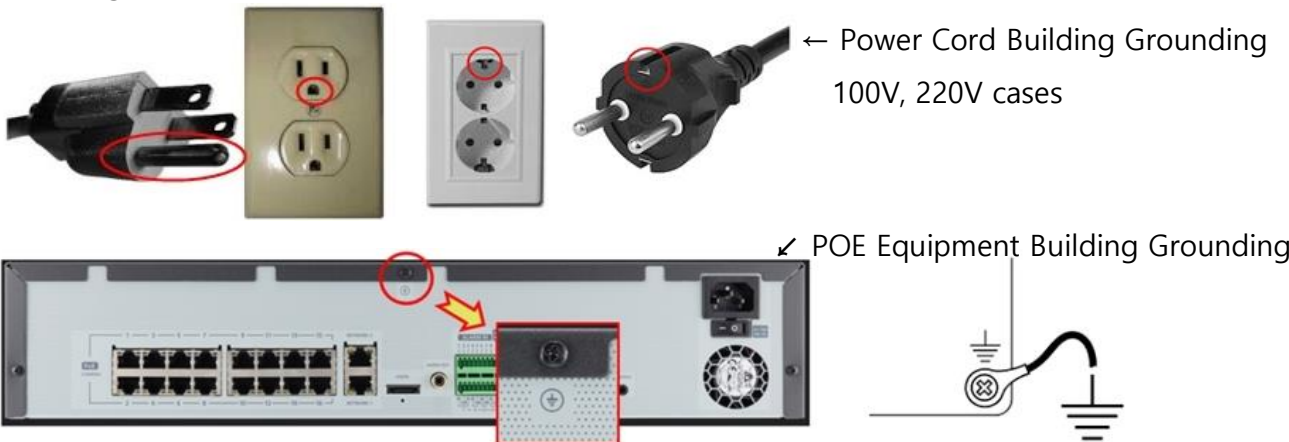
### ● Purpose

- To guide the Surge Protection method when installing network cameras on site
- . In the summer, lightning strikes are frequent; thus, there are frequent POE power supply and camera failures caused by electrical surges.

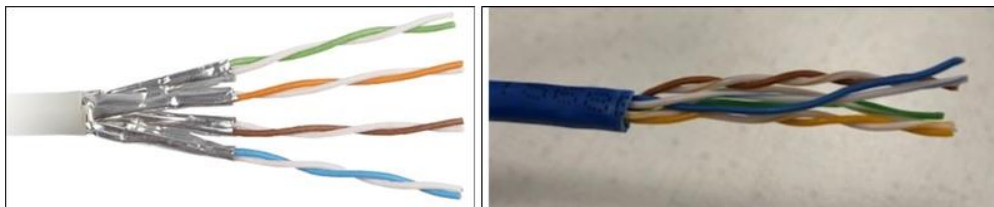
To prevent electrical surges, it is necessary to take measures such as grounding, using STP cables, and installing surge protectors.

## ● Instructions on how to install network camera Surge Protection

### ① Grounding outlets and POE equipment



### ② Recommended use of STP cables



[STP LAN Cable: Surge Protection(O)] [UTP LAN cable: Surge Protection(X)]

### ③ Recommended use of Surge Protectors





## Infomation on PoE power cable types and precautions

Info. Type

☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

### ● Purpose

- To guide you through the selection and installation considerations for PoE suitable for our cameras.

### ● PoE Power cable types

Type Name	Standard	Class	Switch Power Output(Watt)	Device Power Input(Watt)	PoE Type
PoE	IEEE 802.3af	3	15.4	12.95	1
PoE+	IEEE 802.3at	4	30	25.5	2
PoE++	IEEE 802.3bt	5	45	40	3
		6	60	51	
High-Power PoE		7	75	62	4
		8	90	73	

Example ) Recognizing the power specifications of the

Operating Environment & Power

Power

PoE++(IEEE802.3bt, Class6, Type3, Injector included)

( PoE Type : 3 )

( Class : 6 )

(Standard: IEEE802.3bt)

### ✓ Precautions for PoE Installation

- . Cable: Use a **CAT5e or higher**. Minimize the distance between the system and the PoE switch
- . Check system compatibility: Check if the PoE Class provided by the camera and switch matches .  

Check if the power provided by the PoE switch is sufficient.

\* For products with a PoE Injector, it is recommended to use the included Injector
- . Environmental conditions: Avoid using cables that are too long (100M) or cheap cables with thin cores.  

It is recommended to use shielded cables to minimize interference with other electronic devices.

## End of supply of card-type desi packs

Info. Type

Quality

Settings




Repair

S/W












Etc

- Desiccant Deletion Targets : All models with card-type desiccants attached
- Reasons for desiccant deletion
  - The basic absorbent has been changed from Desipak to Desikhan. As a result, the limited moisture absorption capacity has been greatly enhanced.
  - Since 'Moisture absorption quantity of Desikhan > Moisture absorption quantity of Desipak + Card-Type Desiccant', there is no need for card-type desiccants.

### Information on Desiccants

Type	Desipak	Card-Type Desiccant	Desikhan
Image			
Materials Code	PM02-003026A	TE15-000001A TE15-000002A	PM02-006173A
Moisture Absorption Limit	2.77g	(1A) 0.3g / (2A) 0.75g	9.84g

### Changes to the Installation Manual

Check the package items					Check the package items				
Make sure the package contains all of the following items:					Make sure the package contains all of the following items:				
Figure	Name	Qty	Use	Model	Figure	Name	Qty	Use	Model
	User's Manual	1		Commonly used for all models		User's Manual	1		Commonly used for all models
	Screw	2	For fixing when installing the product	Commonly used for all models		Screw	2	For fixing when installing the product	Commonly used for all models
	Spring Washers	2	For fixing when installing the product	Commonly used for all models		Spring Washers	2	For fixing when installing the product	Commonly used for all models
	Waterproof Washers	2	For fixing when installing the product	Commonly used for all models		Waterproof Washers	2	For fixing when installing the product	Commonly used for all models
	Waterproofing Gasket	1	Attached to the unused bracket installation hole	Commonly used for all models		Waterproofing Gasket	1	Attached to the unused bracket installation hole	Commonly used for all models
	Card-Type Desiccant	3	Attached when installing the product	QNB-2020RH/ QNB-2080RH/ QNB-5010RH/ QNB-5020RH/ ANB-2020RH/ ANB-5010RH/	<b>Delete</b>				



### Note

- Accessories may vary depending on the country in which the products are sold.
- Please contact our local technical representative for information on which models are subject to card-type desiccant removal.
- Effective: From February 2024

## Guide for stainless camera exterior corrosion management

Info. Type

☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

### ● Model

- Stainless housing camera(TNU-6322E, TNU-6322ER, TNO-6322ER, TNO-6321E and etc.)

### ● Does SUS stainless steel rust-proof?

- SUS is a material made more resistant to corrosion by mixing chromium-nickel with processed iron, but it is necessary to manage external pollution because corrosion may occur under harsh environmental conditions with external pollution

### ● Stainless Corrosion Protection guide

- Be careful not to damage the surface of the product
  - . Be careful not to contaminate the surface with foreign matter, grease, or human fingerprint
- Management to prevent chloride contamination such as salt water
- If rust has already occurred, clean up the area to prevent further carry of the rust

[Recommended care cycle]

Environment		Green area	City, Industrial, Costal area	
Location	External pollution		General condition	Corrosive condition (high-temperature, pollution)
Indoor	Contamination and sediment do not remain	1~2 times/yr	3~4 times/yr	4~5 times/yr
Outdoor (Exposed to moisture)		1~2 times/yr	2~3 times/yr	3~4 times/yr
	Contamination and sediment remains	2~3 times/yr	3~4 times/yr	4~5 times/yr

### ● Anti-corrosion products

- SUS RUST Cleaner
  - . Stainless steel surface carbonized marks and stain remover
  - . It is a viscous type which is also adhesive to vertical surface and it support the object to become passive state
  - . Follow manufacturer's guide when handling the product as it may contain substances that are harmful to human body
- SUS-Coat L-316
  - . External corrosion protection in spray form
  - Be aware of the industrial environment as it is a combustible product



[Rust Cleaner]

[SUS-Coat]

## How to repair thermal cameras by their fault locations

Info. Type

☐Quality ☐Settings ☒Repair ☐S/W ☐Etc

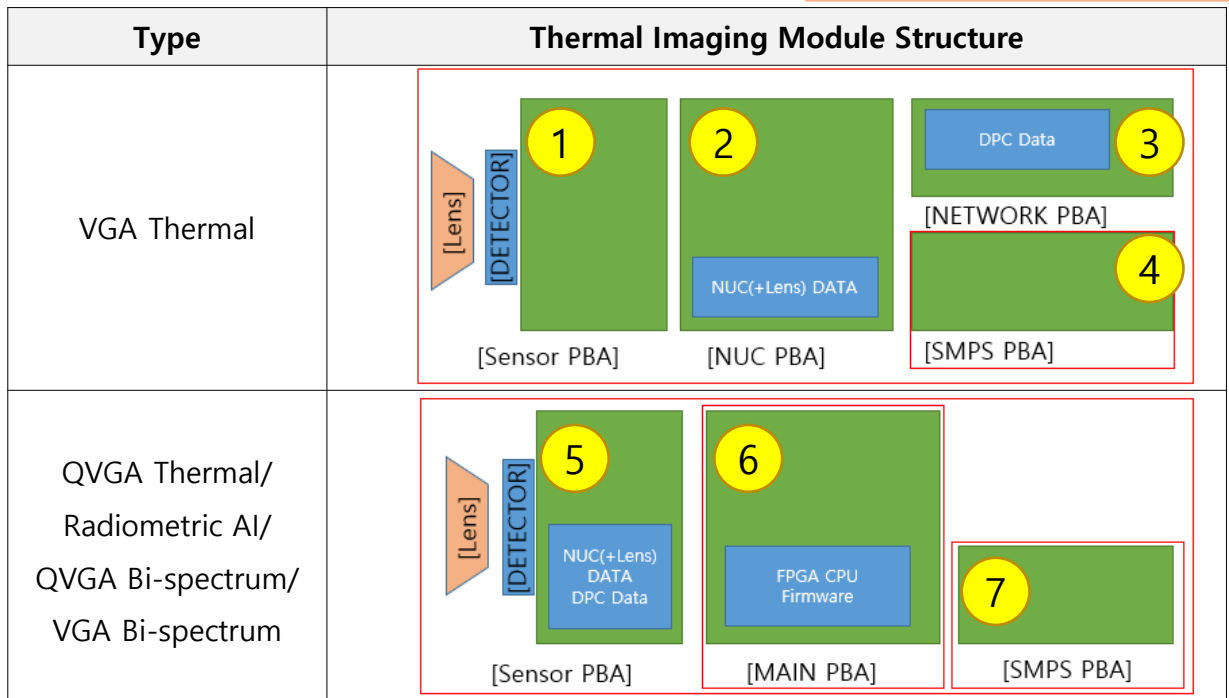
### ● Target Models

- VGA Thermal : TNO-4030T(R)/4040T(R)/4041T(R)/4050T/4051T/L4030T/L4030TR
- QVGA Thermal : TNO-3010T/3020T/3030T/L3030T/3040T/3050T
- Radiometric AI : TNO-3010TRA/C3012TRA/C3020TRA/C3022TRA/C3030TRA/C3032TRA
- QVGA Bi-spectrum : TNM-3620TDY/C3620TDR(Y)/C3622TDR/ANB-3620T
- VGA Bi-spectrum : TNM-C4940TD(R)/C4950TD/C4960TD/C4942TDR

### ● Purpose

- To provide a guideline on replacement by combining parts with sensor-specific information when repairing thermal imaging camera parts.

sensor-specific information ?  
NUC Data [Lens + Sensor Calibration Data]  
+ DPC Data [Defective pixel information]



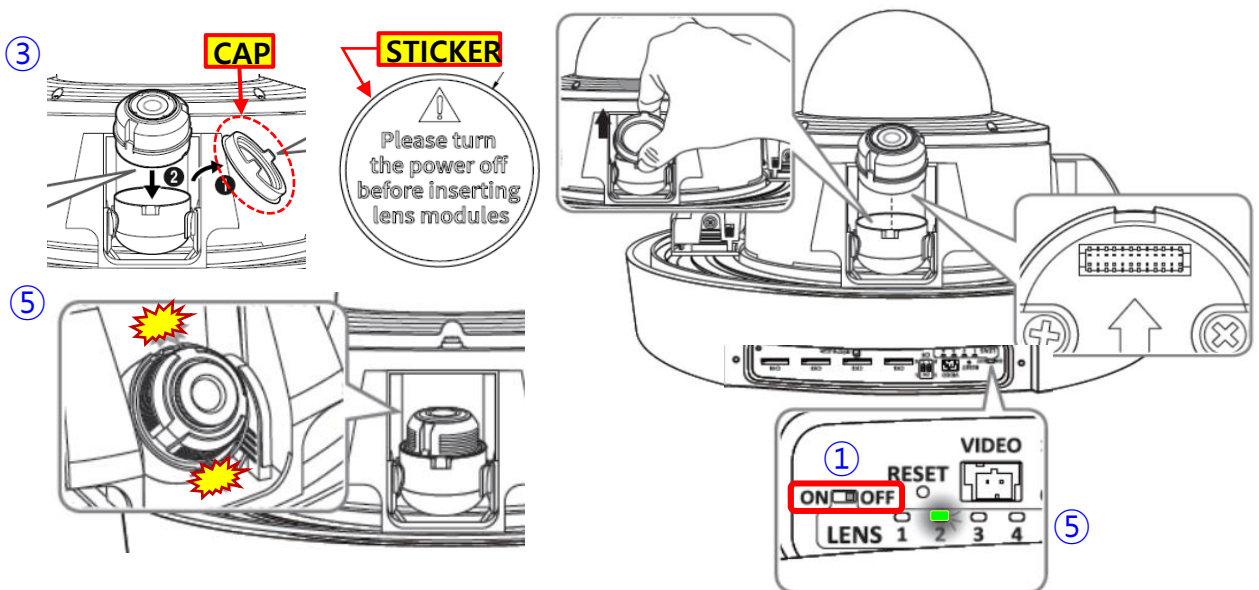
No	Parts Name	Single Replacement	Remark
①	Sensor PBA	Impossible	Replace the upper Ass'y set (①+②+③+ [Lens]) + sensor-specific information
②	NUC PBA		
③	NETWORK PBA		
④	SMPS PBA	Possible	
⑤	Sensor PBA	Impossible	Replace the upper Ass'y set (⑤ + [Lens]) + sensor-specific information
⑥	Main PBA	Possible	
⑦	SMPS PBA	Possible	

# Guide for multi-channel camera lens module replacement

Info. Type

☐Quality ☐Settings ☒Repair ☐S/W ☐Etc

- Model : 5CH, 4CH, 2CH Multi-channel camera (eg. PNM-9322VQP/9085QRZ/9000VD etc.)
- Purpose
  - To provide a guide for multi-channel camera lens module replacement without generating risk of PCB damage
- How to replace lens module
  - 1) Make sure power is not connected(HPoE) and the power switch is 'OFF'
  - 2) Remove defected lens module
  - 3) Remove the cap from the lens module and insert the lens module align with the connector until it hooks properly with 'Click' sound
    - Make sure all four channels are not flipped
  - 4) Turn the power switch 'ON' and connect power(HPoE)
  - 5) Check if lens module is attached correctly, the lens module status light will illuminate green
    - If the lens module is not attached correctly, the lens module status light will illuminate red



1. Removing and inserting the lens module without turning off the power may result in a board failure
2. PTZ calibration error occurs if any of all four lens is flipped
3. Avoid touching the lens separately, as it is shipped from the factory with the focus adjusted during the manufacturing inspection.



Safety Wire installation option for 5-Channel Multi-Cameras

Info. Type ☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

● Target Model

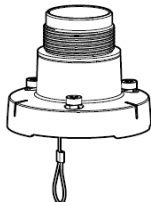



- PNM-C34404RQPZ

● Purpose

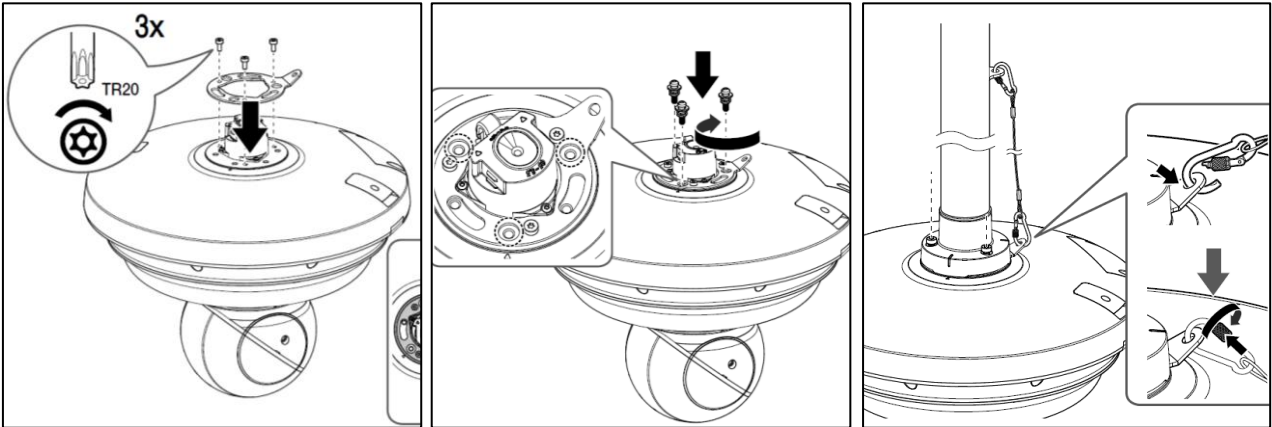
- Adding the option to secure the camera to an external pole for camera drop prevention

● Changes

- Products before Nov. 2024: The safety wire can be used after replacing the 4 accessories shown below.
- Products after Nov. 2024: The 4 accessories below are provided as standard.

Hanging Mount	Bracket	Screw	Safety Wire
			
FC39-007464A	FC09-015735A	FC18-006625B	FC14-0037071C

● How to install



● Effective From : Nov. 11, 2024

## Jello effect in camera video (Rolling shutter)

Info. Type

☐Quality

☒Settings

☐Repair

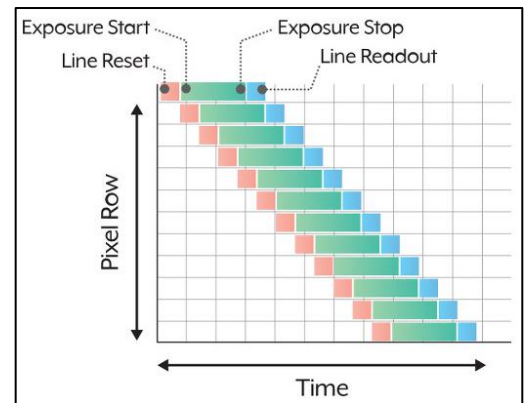
☐S/W

☐Etc

- Purpose : Providing information on distortions that can be seen intermittently in CCTV cameras and providing guidance on how to alleviate them.
- What is the Jello effect?
  - Parts of the frame become blurred, or straight lines appear crooked
  - In the video, it is expressed as a rising haze or a jelly-like vibration.



- Causes of the Jello effect
  - This is a phenomenon that inevitably occurs in cameras that use a rolling shutter type image sensor.
  - Rolling Shutter is a method of sequentially shooting the entire screen line by line when shooting individual frames. There is a time difference in the shooting of each line; thus, image distortion occurs in situations where there is a fast-moving subject or the camera is moving quickly.



- How to alleviate the Jello effect distortion
  - Lower the Shutter Maximum little by little and maintain the set value at the point when the phenomenon is alleviated.
  - However, if the exposure is prolonged by slowing down the shutter speed, diffraction or saturation may occur due to the influence of the aperture. Thus, caution is required.

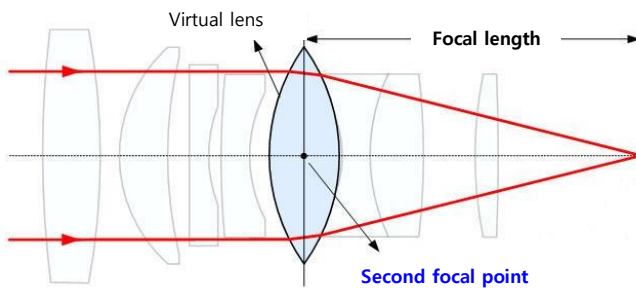
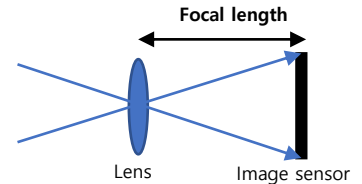
# Understanding camera lens focal length and magnification

Info. Type

☐ Quality ☐ Settings ☐ Repair ☐ S/W ☒ Etc

## ● Camera lens focal length

- Focal length means the distance from the lens to the image sensor
- The focal length of a compound lens, composed of a series of simple lenses, is the distance from the **second focal point** to the image sensor



### Second focal point?

It is a point on the principal axis, such that rays coming parallel to the principal axis after refraction through the lens actually meet here

## ● Focal length and magnification

- The lens magnification is determined as the ratio between the minimum and maximum focal lengths

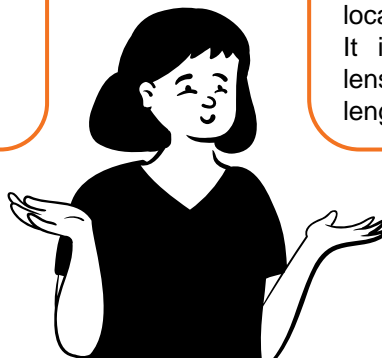
Eg.) 20-100mm For zoom lenses with variable focal lengths, it is expressed as "5x optical zoom"

**Q1. For 20x optical zoom camera, shouldn't it be like showing an object as 20x magnified?**

Zoom magnification is only an indicator of a camera's performance, and it does not mean that the subject appears to be zoomed in at magnification ratio. The actual size of the subject can be vary depending on outside factors.

**Q2. How come the focal length is longer than the camera body length?**

The second main point can also be located outside the lens. Telephoto lenses are designed in such a way that the second main point is located outside the lens. It is mostly applied to telephoto lenses because it can reduce the length of the lens.



## Information on specifications of NVR USB storage devices

Info. Type

☒ Quality ☐ Settings ☐ Repair ☐ S/W ☐ Etc

### ● Model name

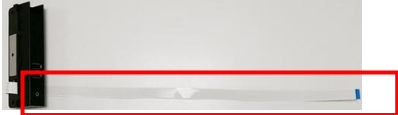

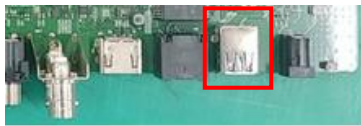
- XRN-Series / PRN-Series / HRX-Series

### ● Specifications of USB storage devices

- Front : USB 2.0 standard (5V, 500mA), Rear : USB 3.0 standard (5V, 900mA)

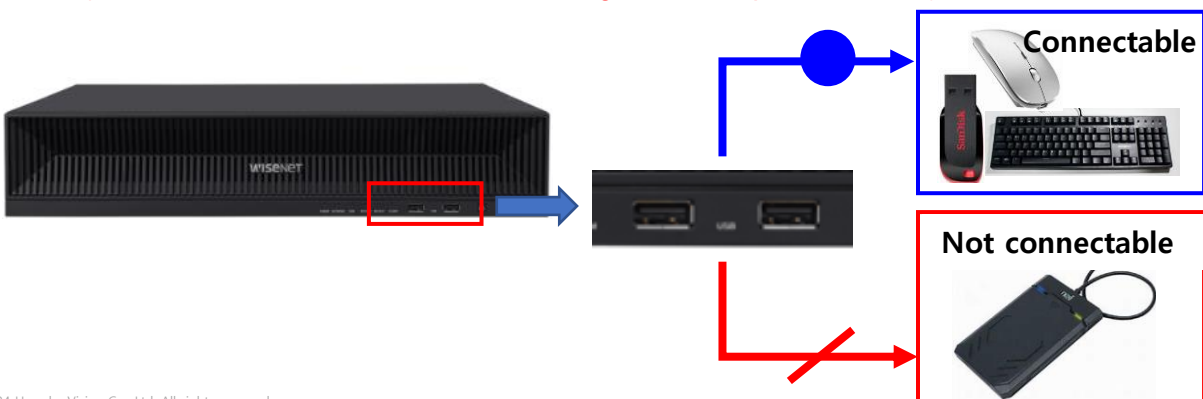
※ Please refer to the product manual for detailed model-specific USB specifications.

### ● Model series-specific USB ports

Category	XRN/PRN-Series	HRX-Series
Front USB (2.0)	For the front USB port, Use a F-type cable (low current margin) 	For the front USB port Use a thick wire (high current margin) 
Rear USB (3.0)	The USB port directly connected to the motherboard 	
Manual	500mA current limit stated	No 500mA current limit stated

● Note : Only mouse/keyboard/USB memory devices can be used for the front USB port of the products.

! Do not use external HDD that uses USB power supply  
(recommended to use it after connecting to its own power source)



# HDD file storage structure and types of format

Info. Type ☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

● Definition of file system

- A **structure** used by an operating system to organize and manage files on a storage device
- Structure or logical rules that name fragmented data and make it easier to identify the data
- The file system is divided into different types depending on the operating system and HDD capacity, and the act of configuring the file system to fit the environment for data storage is called '**format**'

● HDD Area structure



- HDD area can be divided into two, file system area and data storage area
- Depending on the type of format, the file system area and data storage area processing method can be differ

● Types of format

Types	Quick Format	<b>*Recommend*</b> High Level Format	Low Level Format
Method	<ul style="list-style-type: none"><li>* Reset only file system area</li><li>* Remain data storage area</li><li>* Existing data is deleted as new data is overwritten</li></ul>	<ul style="list-style-type: none"><li>* Reset only file system area</li><li>* Data storage area is Zero Fill</li></ul>	<ul style="list-style-type: none"><li>* Disk factory reset</li><li>* Initialize each sector on the disk one by one</li></ul>
Process	Proceeded in the operating system	Proceeded in the operating system	Require separate software
Note	<ul style="list-style-type: none"><li>* Formatting is very fast because it only resets the file system</li><li>* Because data storage area is preserved, most of past data can be recovered if it was formatted in recent time</li></ul>	<ul style="list-style-type: none"><li>* Able to detect bad sectors while performing disk inspection (Non-recoverable)</li><li>* Difficult to recover past data as it fills up the data storage area with '00'</li><li>* It takes quite a long time to fill up data storage with '00'</li></ul>	<ul style="list-style-type: none"><li>* Detects bad sectors and can recover if they are logical bad sectors</li><li>* Unable to recover past data as it becomes factory reset status</li><li>* Causes significant stress on HDDs as it reviews all sectors</li></ul>



If a bad sector is detected, it is recommended to replace the HDD.  
Low formatting does not allow physical bad sectors to recover, and can cause significant stress on the HDD to create a larger number of bad sectors.



# Installing Wisenet Wave server on Solidedge SSD


Info. Type

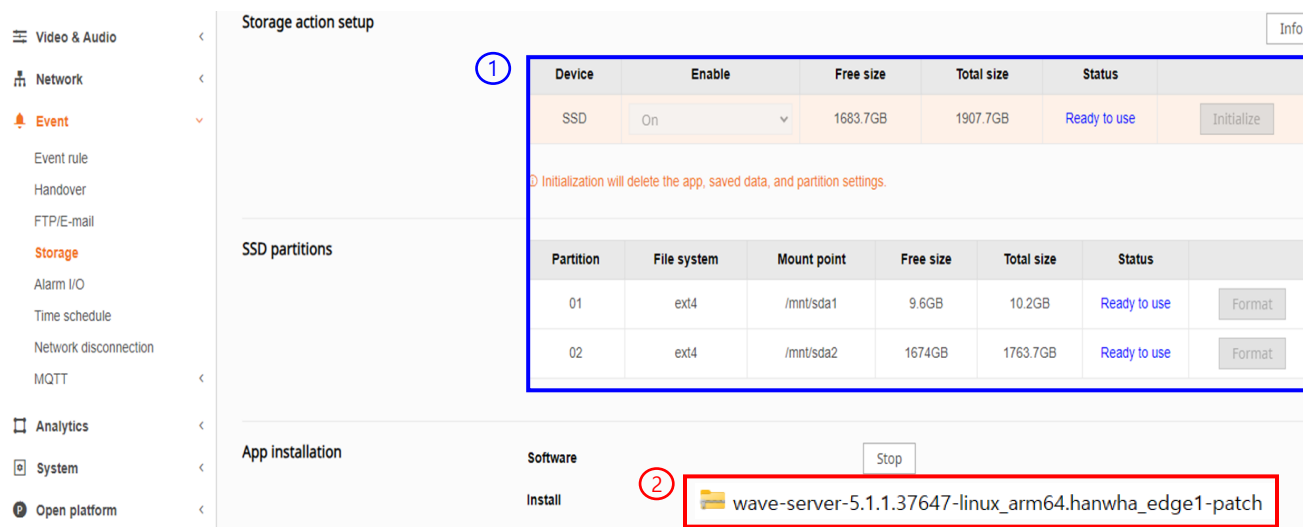
☐Quality ☐Settings ☒Repair ☐S/W ☐Etc

- Model : Solidedge camera PNV-A6081R-E2T, PNV-A6081R-E1T
- Purpose
  - To guide how to reinstall Wisenet Wave after SSD format/replacement of Solidedge camera
- How to re-install
  - WAVE server of Solidedge camera is embedded on SSD
  - WAVE server should be reinstalled after SSD format or replacement of SSD to repair
    - ① Check SSD capacity and status
    - ② Website → FW file download/decompress → find WAVE Server zip file (DO NOT decompress Zip) → Camera web → Event → Storage → App Installation → Install WAVE



WAVE Server should be installed as Zip format, DO NOT decompress


 wave-server-5.1.1.37647-linux\_arm64.hanwha\_edge1-patch



Device	Enable	Free size	Total size	Status	
SSD	On	1683.7GB	1907.7GB	Ready to use	Initialize

Initialization will delete the app, saved data, and partition settings.

Partition	File system	Mount point	Free size	Total size	Status	
01	ext4	/mnt/sda1	9.6GB	10.2GB	Ready to use	Format
02	ext4	/mnt/sda2	1674GB	1763.7GB	Ready to use	Format

Software	Install	Stop
 wave-server-5.1.1.37647-linux_arm64.hanwha_edge1-patch		

## ● Etc.

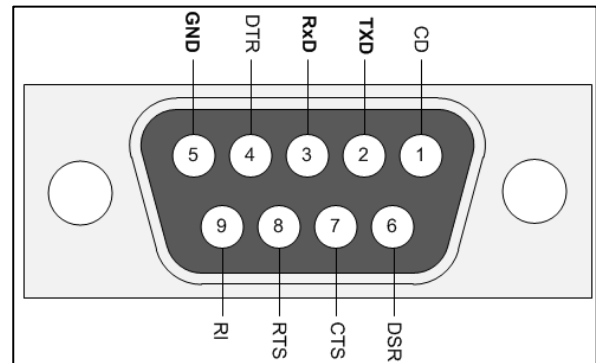
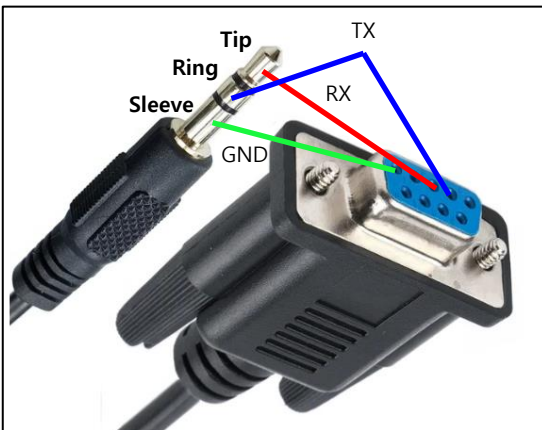
- Enter License Key after re-installing WAVE Server
- In case of missing License Key information, please contact HQ CS Tech support

## Guide for NVR console jig performance test (1/2)

Info. Type

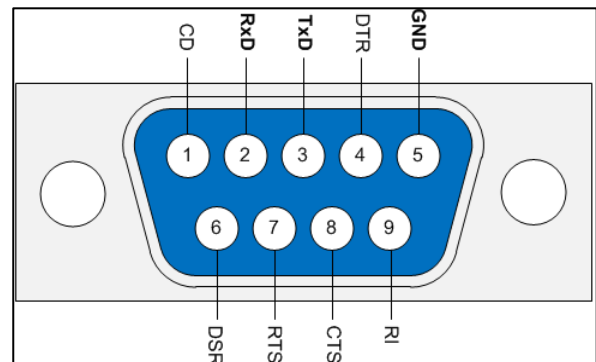
☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

- **Purpose of using Jigs** : To access NVR console log to perform remote review by a developer
- **JIG supportive model** : Models with 3.5mm Console terminal(Audio jack) on the back of the NVR
- **JIG 1** : Audio jack cable (RS232 (DCE) to 3.5mm) that is connected to the NVR console terminal
  - Precaution when purchasing
    - . RS232 should be purchased as a DCE (Female) type and needs to check the Tx and Rx arrangement of 3.5mm terminals
    - . 3.5mm terminals consist of Ring, Tip and Sleeve, and check the spec to see line alignment (Should be purchased Ring-Tx, Tip-Rx, Sleep-GND aligned product)



<RS232 DCE(Female) Pin alignment>

- **JIG 2** : Jig1 is connected to jig2, and jig 2 shall be connected to PC USB port (USB to RS232(DTE))
  - Precaution when purchasing
    - . Purchase as RS232 DTE(male) type
    - . Requires driver installation on PC: It is automatically installed on PC in most cases but sometimes it requires manual driver installation depending on the product



<RS232 DTE(male) Pin alignment>

## Guide for NVR console jig performance test (1/2)

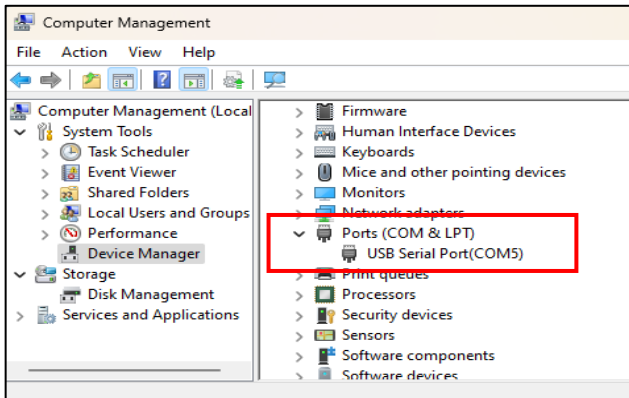
Info. Type

☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

### ● JIG setting test

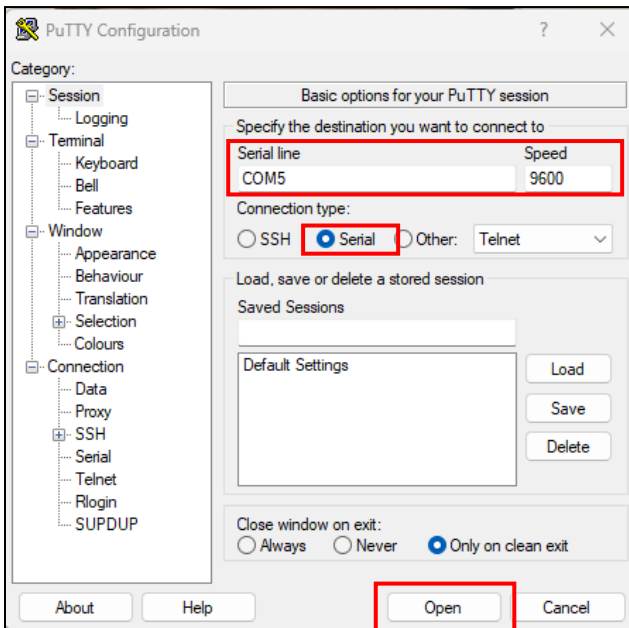
- Preparation: JIG 1, JIG 2, PC, Console connection terminal SW (Putty, Hyper-terminal, etc.)
- Test steps

1.



- Check the port connected to the PC:  
If the driver is installed normally, it can be checked in the device manager
- The COM port of the jig is set as #5

2.



- Open a connection window in the terminal SW
- Connection Type : Select serial
- Serial Line : Insert COM Port number
- Speed : Remain default setting  
. NVR : 115200
- Click 'Open' to open the terminal window

3.



- Make a short for Ring and Tip of the 3.5mm terminal
- Enter letters using keyboard while remain short  
. When letters appear : OK  
. When letters not appear : NG  
Need to check JIG and connection settings

# How to refer to the HDD compatibility list

Info. Type   ☐Quality   ☐Settings   ☐Repair   ☐S/W   ☒Etc

- Purpose : To encourage users to use the product with optimal recording performance by providing guidance on how to check model-specific HDDs available.
- Target Model : All models of our storage devices
- Download path : Hanwha Vision website → Support → Data Center → HDD compatibility list
- How to check compatibility : search for the representative model name in the NVR group to check compatibility.

<Example> For models corresponding to ✖, search for PRN-6410DB4, the group's representative model.

	Group	Model
NVR	PRN-6410DB4	PRN-6410B4, PRN-3210B4 PRN-6400DB4, PRN-6400B4, PRN-3200B4 PRN-6405DB4, PRN-6405B4, PRN-3205B4 XRN-6410DB4, XRN-6410B4, XRN-3210B4 ✖

NO		1	2	3	4	5	6	7
Capacity		8 TB	8 TB	8 TB	10 TB	10 TB	8TB	8TB
Series name		Sky Hawk	Sky Hawk AI	Sky Hawk AI	Sky Hawk AI	Sky Hawk AI	Sky Hawk	Sky Hawk
Model name		ST8000VX004	ST8000VE000	ST8000VE001	ST10000VE000	ST10000VE001	ST8000VX009	ST8000VX010
(Part Number)		(2M1101)	(3BZ101)	(3AU101)	(3AV101)	(3BX101)	(2ZP188)	(2ZR188)
Interface		SATA 6Gb/s	SATA 6Gb/s	SATA 6Gb/s	SATA 6Gb/s	SATA 6Gb/s	SATA 6Gb/s	SATA 6Gb/s
Buffer		256MB	256MB	256MB	256MB	256MB	256MB	256MB
ARN-1610S					N/A		Not Supported	Not Supported
QRN-1630S			✓	✓	✓	✓	✓	✓
✖ PRN-6410DB4	NON-RAID	✓					✓	✓
	RAID	Not Supported					Not Tested	Not Tested
XRN-6410RB2	NON-RAID	✓	✓	✓	✓	✓	✓	✓
	RAID	Not Supported					Not Tested	Not Tested
XRN-1620B2	NON-RAID	✓			✓	✓	✓	✓
XRN-6410B2	NON-RAID	✓	✓	✓	✓	✓	✓	✓

✓ : Available

**Not Supported** : The corresponding HDDs cannot be used in NVR due to its hardware limitations

**N/A** : Test result is not compatible.

**Blank / Not Tested** : No test results available

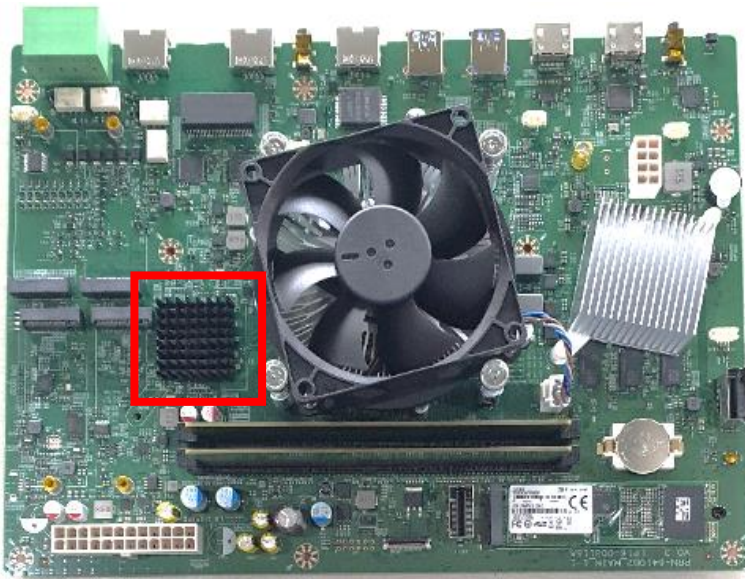
- Other precautions
  - In RAID mode, an enterprise-class HDD with guaranteed high reliability must be used.
  - Caution is required because there are cases where HDDs are not supported in RAID mode but supported in Non-RAID mode.

# Guide for attaching a heat sink when replacing mainboard

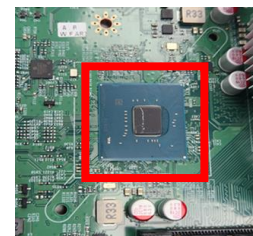
Info. Type

☐Quality ☐Settings ☒Repair ☐S/W ☐Etc

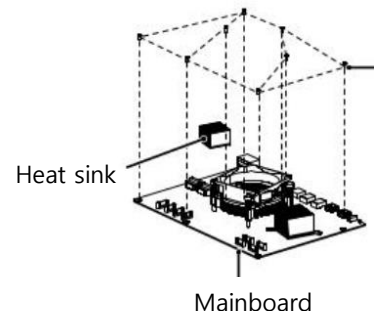
- Model : 64CH/32CH/16CH NVR
- Purpose
  - Guide on how to attach heat sink while replacing NVR mainboard for repair
- NVR mainboard + Heat sink attachment guide



[ Location of heat sink ]



[ Without heat sink ]



- Role of heat sink
  - . Effectively distributes heat inside the device to reduce the temperature of the system
  - . Composed of thermal conductors and thermal conducting sheet, internal cooling improves system stability and performance
  - ※ Heat sink is assembled together at manufacturing stage, but not provided on the mainboard when purchased as repair material
- Heat sink material information
  - . Refer to service manual for heat sink of each model
  - . Eg. : XRN-6410B2 (EP07-001610A SINK,HEAT 28\*28\*9)
  - . Eg. : PRN-3210B2 (EP07-001610A SINK,HEAT 28\*28\*9 / EP07-001529A SINK,HEAT 25\*25\*20)
- Notice
  - . When replacing mainboard, remove and re-attach the existing heat sink or order a new heat sink for use
  - . Adhesive tape is applied to the new heat sink, but if the existing heat sink is re-used, the adhesion may be weakened, thus the use of heat sink adhesive is recommended(Heatsink plater)





## Instructions for Sleeve Fan Replacement

Info. Type

☐ Quality

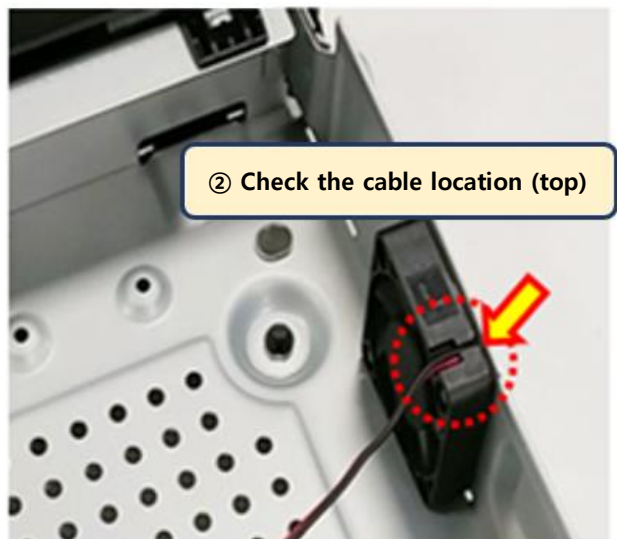
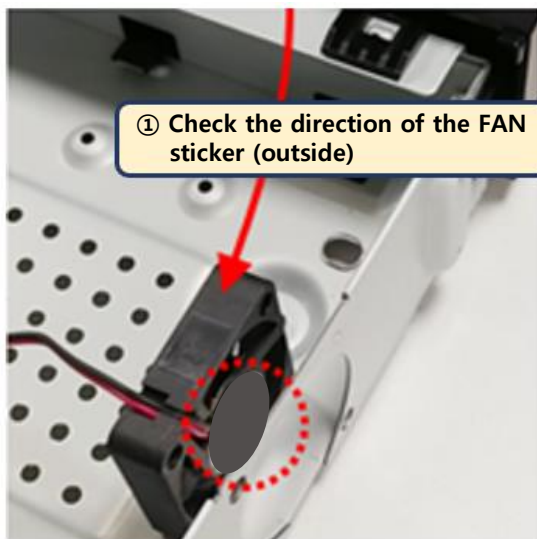
☐ Settings

☒ Repair

☐ S/W

☐ Etc

- **Target model** : HRX-1635/435, QRN-1630S/830S XRN-820S/815S, SPE-1630, ARD-1610, WRN-2010S/2110B1/2110SB1
- **Purpose** - Instructions for sleeve fan replacement
  - . To disseminate precautions against cases of fan component deformation and noise generation due to use of non-standard screws and excessive tightening of screws.
- Instructions for fan replacement



④ Fasten the screws in two diagonal locations

### ✓ Check points

Using screws of different specifications and excessive screw tightening can cause deformation and noise in the fan.

- Use genuine parts (Screws, Fan)
- Do not excessively tighten the screws for fixing the fan.

# How to replace the mainboard/SSD in NVR when reusing HDD

Info. Type

☐Quality ☐Settings ☒Repair ☐S/W ☐Etc

- **Target Models** : XRN-6410DB4, XRN-3210B2 , XRN-1620S , XRN-820S (x86 NVR model )

- **Purpose**

- To guide you on how to preserve recorded video without loss so that duplicate data is not created when reusing the existing HDD after replacing the motherboard/SSD.

- How to restore DB when replacing the mainboard and SSD in X86 NVR

1) How to replace the motherboard

- ① Unmount HDD → ② Replace Motherboard → ③ Enter information (S/N, MAC address, UID) with CS-tool → ④ Install HDD → ⑤ **Automatically Restore settings saved on HDD** → ⑥ Inject the device certificate(HDD connection required)

2) How to replace SSD Memory ( Firmware storage )

- ① Unmount HDD → ② Replace SSD Memory → ③ Set default model with HIT USB (B2, B4) → ④ Enter information (S/N, MAC address, UID) with CS-tool → ⑤ Mount HDD → ⑥ **Automatically Restore settings saved on HDD** → Inject the device certificate(HDD connection required)

✓ Check points

- **A factory reset is performed after entering information (S/N, Mac address, UID) with CS-tool and clicking [Apply] button.**
- **An Automatical Restore is performed if mounting the existing HDD after completing the motherboard/SSD settings**
- **The device certificate requires that the PC be connected to an external network with the HDD connected.**

※ Q&A ( Common questions asked by customers)

1) Q : What if duplicate tables are created during recording and playback ?

- A: 1. If the MAC address changes, the device is recognized as a different one and a duplicate table is created.
2. If the GMT time has changed ( if the time goes back to the past during recording )
3. If distributed storage is set

2) Q: How can I restore the existing settings without its backup file after replacing the motherboard?

- A : With CS-TOOL, you must first perform a factory reset of the motherboard to be replaced.
- To import the configuration file from HDD, there should be no configuration file on the motherboard.

3) Q: Is it possible to also back up distributed storage settings when backing up NVR settings?

- A : The distributed settings can also be saved and backed up ( same as general recording ) 25

## Precautions for upgrading clustered SSM servers

Info. Type

☐Quality ☐Settings ☐Repair ☒S/W ☐Etc

### ● Model name

- SSM appliance product line (XRP Series, PRP Series), SSM SW

### ● Purpose

- To share precautions for upgrading a clustered SSM server.

### ● Precautions for upgrading the servers

#### 1. Backing up settings in case of problems

- Path : Configuration Manager → System → Maintenance → Domain tab → Configuration backup
- It is possible to receive all clustered server settings at once

#### 2. Pausing the Failover feature

- Path : Configuration Manager → System → Maintenance → Domain tab → Failover → Check 'Pause'.
- To prevent unnecessary failover operations due to incorrect recognition that the server is down during the upgrade.

※ Not applicable if you are not using the failover feature.

#### 3. Standard server upgrade sequence

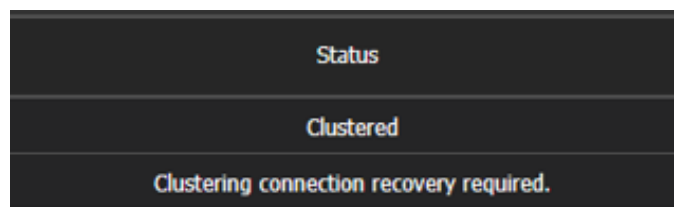
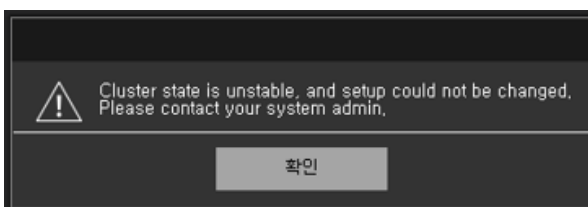
- If you do not want to change the reference server (master server), upgrade the server marked with ★ among the domains first.

Server list	
Add server to domain	Server name
<input checked="" type="checkbox"/>	SSM Server
<input checked="" type="checkbox"/>	★ SSM Server

#### Reference Server?

- The server with the oldest connection to the network
- A server used as a reference for changing the time of cluster servers

#### 4. Warning messages that may appear during upgrade



- A warning is issued when there is a software version mismatch among clustered servers during upgrade.
- Automatic recovery will be supported once all servers have been upgraded and the software versions match. Thus, no special action is required.

## Guide for IP speaker contact signal interlocking method(1/2)

Info. Type

☐Quality☒Settings☐Repair☐S/W☐Etc

- Configuration condition

- When using a single IP speaker(1 unit) alone (Model: All IP speaker models)

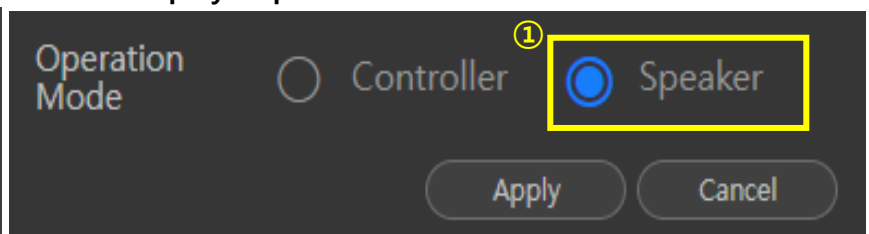
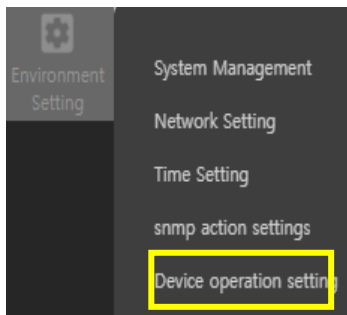
- Working scenario

- When a contact signal (infrared sensor, contact button, emergency bell, etc.) is delivered into the IP speaker, the pre-set sound is broadcasted

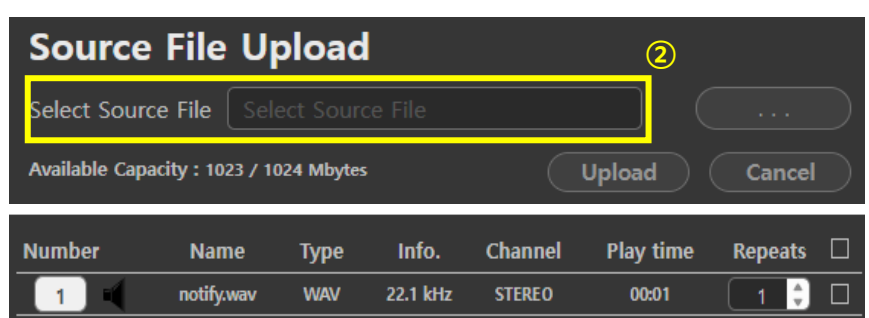
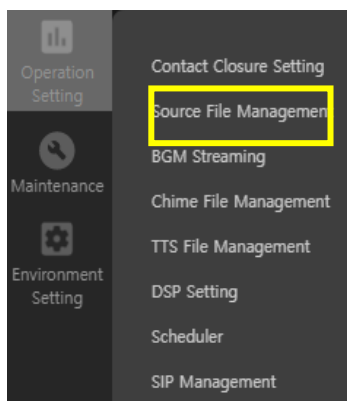
- Step by step how to

- ① Set as 'Speaker mode'(default) → ② Upload audio source file → ③ Set as 'controller mode'
- ④ Device registration(Speaker's IP) → ⑤ Zone registration(Speaker's IP) →
- ⑥ Set event & preset→ ⑦ Set play

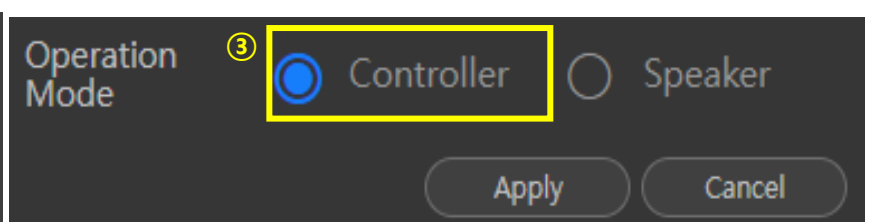
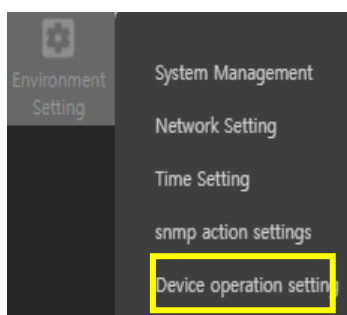
### <Step by step how to>



① How to set 'Speaker mode' : Environment setting→ Device operation setting→ Select 'Speaker' in Operation mode → Apply



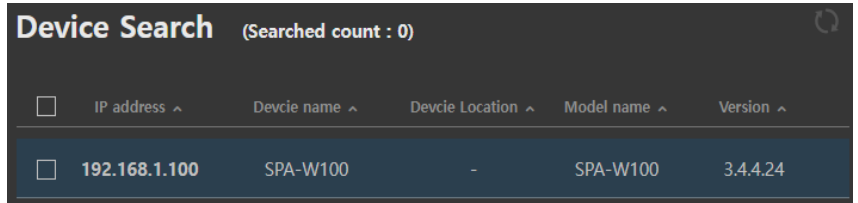
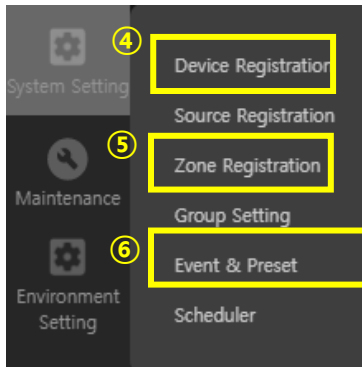
② Source file upload : Operation setting→ Source file management → select and upload a audio source→ Check the audio file list



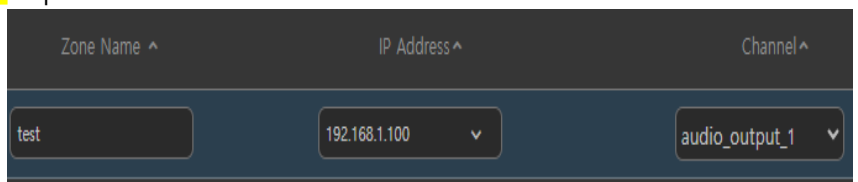
③ How to set 'Controller mode' : Environment setting→ Device operation setting→ Select 'Controller' in operation mode→ Apply

## Guide for IP speaker contact signal interlocking method(2/2)

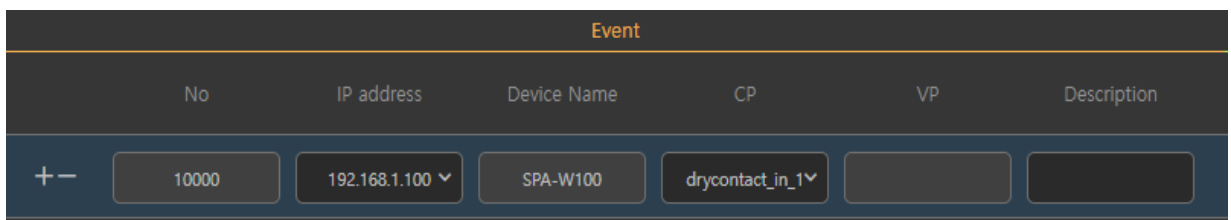
Info. Type

☐Quality☒Settings☐Repair☐S/W☐Etc

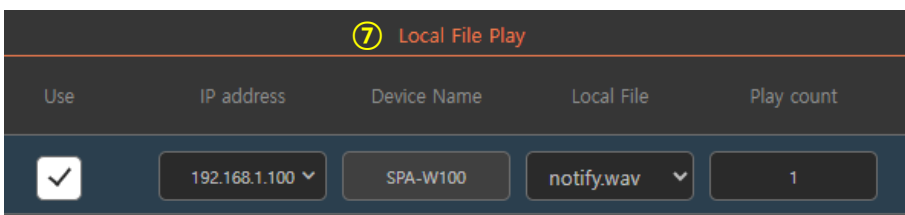
④ Device registration → Device search → Register IP address of speaker



⑤ Zone registration → Insert Zone name → Register IP address of speaker → Register channel(Output channel of speaker)



⑥ Event & Preset → Register IP address of speaker → Select CP(Contact point) of the speaker



⑦ Set local file play → Register IP address of speaker → Select audio source file → Set play count



1. When using a single IP speaker(1unit) alone, it could have a limited use of some features as the scenario is a minimal interworking configuration
2. For TTS input languages, each region may have different supported languages

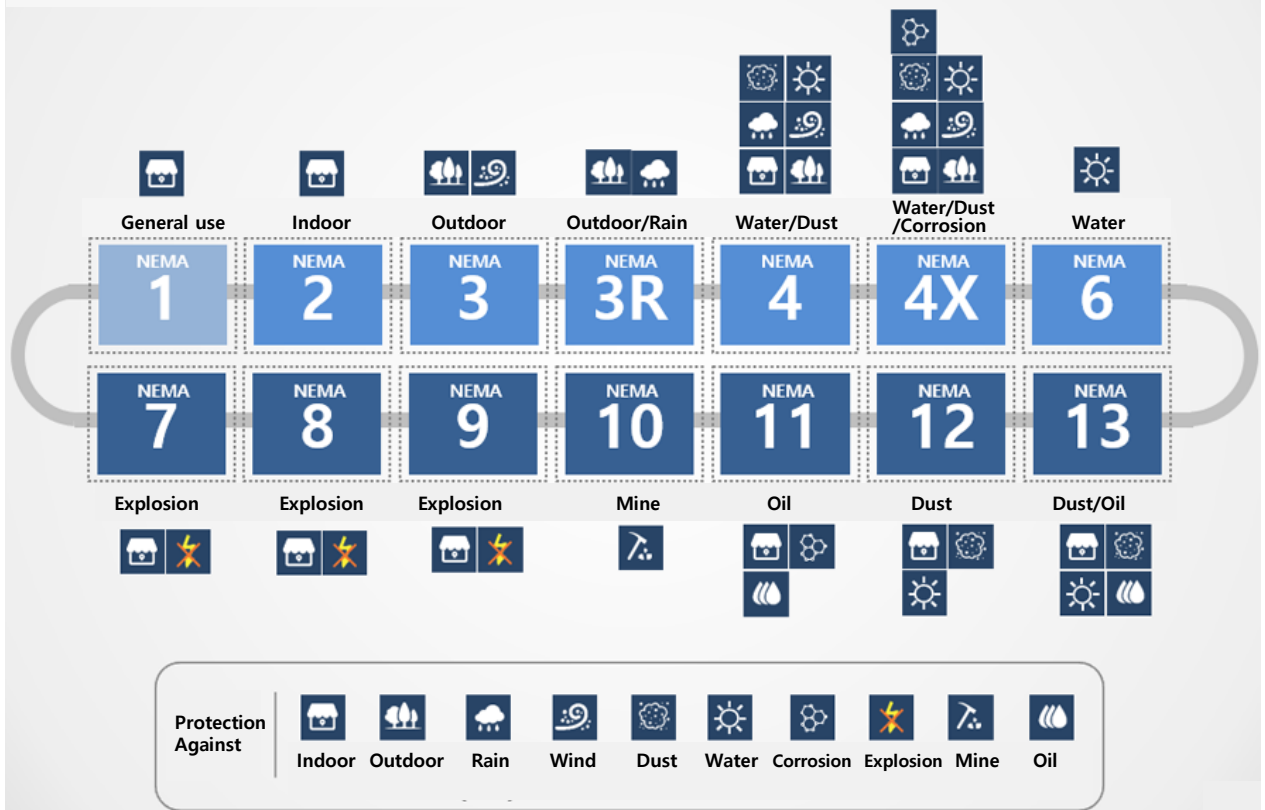
## NEMA/IP enclosure ratings overview and comparison(1/2)

Info. Type

☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

- NEMA/IP ratings are standards for protecting equipment from water, dust, chemicals, etc.
  - NEMA rating is not a global standards yet commonly used in North America region
  - IP rating is more likely used as an international standard

### Key feature of NEMA protection rating



- **Both are protection ratings, but the measurements are different**
  - Since NEMA considers a wide range of environmental conditions, such as oil and ice, it is particularly suitable if an enclosure is required to describe various conditions including humidity and mechanical damage
  - The NEMA rating also measures corrosion or exposure to chemicals (Advantage of NEMA rating)
  - The IP rating mainly measures the degree of inflow of particles (such as dust) and liquids, thus it only needs to meet the appropriate protection regulations
- **Unlike IP rating, the higher NEMA rating does not necessarily mean more advanced device**
  - Because there are specific requirements for each rating, it is most important to meet the specific requirements



## NEMA/IP enclosure ratings overview and comparison(2/2)

Info. Type

☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

### ● NEMA enclosure rating

NEMA Rating	IP Equivalent	NEMA Definition
1	IP10	Enclosures constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree of protection against falling dirt.
2	IP11	Enclosures constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment, to provide a degree of protection against falling dirt, and to provide a degree of protection against dripping and light splashing of liquids
3	IP54	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, and windblown dust; and that will be undamaged by external formation of ice on the enclosure
3R	IP54	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, and snow; and that will be undamaged by external formation of ice on the enclosure
3S	IP54	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, and windblown dust; and in which the external mechanism(s) remain operable when ice laden.
4	IP66	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, and hose-directed water, and corrosion; and that will be undamaged by the external formation of ice on the enclosure
4X	IP66	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, hose-directed water, and corrosion; and that will be undamaged by the external formation of ice on the enclosure
5	IP52	Enclosures constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against settling airborne dust, lint, fibers, and flyings; and to provide a degree of protection against dripping and light splashing of liquids.
6	IP67	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against hose-directed water and the entry of water during occasional temporary submersion at a limited depth; and that will be undamaged by the external formation of ice on the enclosure.
6P	IP67	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to the personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against hose-directed water and the entry of water during prolonged submersion at a limited depth; and that will be undamaged by the external formation of ice on the enclosure
12 and 12K	IP52	Enclosures constructed (without knockouts) for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against circulating dust, lint, fibers, and flying; and against dripping and light splashing of liquids
13	IP65	Enclosures constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against circulating dust, lint, fibers, and flyings; and against the spraying, splashing, and seepage of water, oil, and non corrosive coolants.



NEMA1~6, 11~13 are used for general safety area(non-explosionproof)  
NEMA7~10 are use for hazardous area(explosionproof)

# Introducing the new IoT communication protocol MQTT

Info. Type

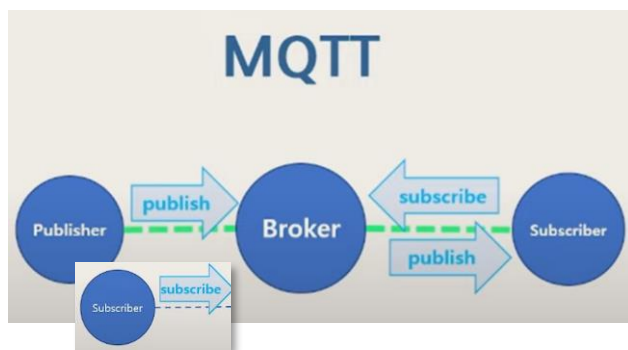
☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

- Model : Basic feature for newly released models, expending from P AI, X to Q series
- Purpose
  - Introducing the new IoT communication protocol MQTT so that users can optimize and configure the desired system
- What is MQTT?

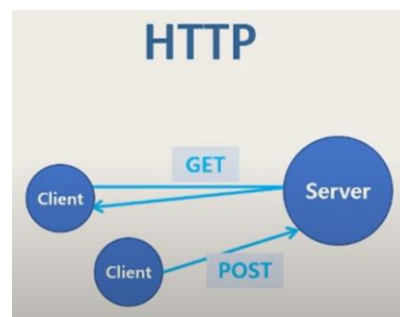
## - Definition of MQTT?

MQTT is a Message Queuing Telemetry Transport which is a message protocol that can publishes and subscribes based on TCP/IP

## - Structure and terms



VS



- . MQTT client establishes a connection with the MQTT broker.
- . Once connected, the client can either publish messages, subscribe to specific messages, or do both.
- . When the MQTT broker receives a message, it forwards it to subscribers who are interested for specific 'topic'
- . MQTT provides **continuous, stateful session**, and it is bi-directional that the clients can both publish and subscribe

- . Clients request for data, and server responds to the clients
- . Authorized clients can request to post data on server
- . The direction of data communication is clearly set (request-send), and clients takes lead for a data exchange

## - Advantages

### 1) Super lightweight

The smallest MQTT control message is 2 bytes, which is optimized for IoT by communicating with minimal use of packet and power within limited resource

### 2) Expandability

Because it is light and simple protocols that requires minimal source of code and power, it can expand its connectivity with many devices as long as the device has internet connection

### 3) Reliability

It reduces time for reconnection between IoT device and cloud, and provides three type of Quality of Service (QoS) agreement in order secure reliability

## ● How to setup

- For MQTT Client and publish/subscribe setting, refer to Online help for each model

# Network Cable Types and User Guide

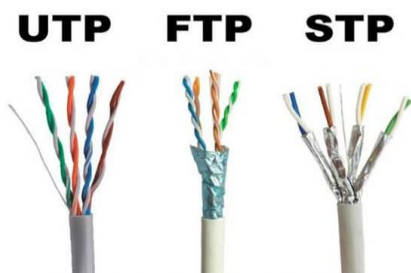
Info. Type ☐Quality ☐Settings ☐Repair ☐S/W ☒Etc

- Purpose
  - To provide information on the types of network cables to help you choose the right cable for your product.

Types	Form	Transmission Rate	Bandwidth
Cat.5	A cable in which insulated copper wires are twisted together.	100Mbps	100Mhz
Cat.5e		1Gbps	100MHz
Cat.6	A cable that has a built-in cross-plastic shield between the twisted copper wires to prevent interference.	1Gbps	250Mhz

● Difference between UTP and FTP

	Unshielded Twist Pair (UTP)	Foiled Twisted Pair (FTP)	Shielded Twist Pair (STP)
Features	A cable with twisted wires without shielding	A cable with twisted 4-pair wires shielded with aluminum	A cable with twisted 4-pair wires, each wrapped with an aluminum shield
Advantages	Low price	More resistant to noise than UTP	Excellent in noise prevention because it is double or triple shielded
Use	Home, office	Wiring in environments with high interference, factories, etc.	Outdoors or special environments where high current flows.
Grounding	Impossible	Possible	Possible



- Recommended Specifications
  - Cable length: 100m or shorter
  - Cable specification: **Cat5e or higher**
  - Cable resistance:  $\leq 0.125 \Omega/\text{m}$

- ⚠ Problems caused by using non-recommended cables
  - N/W connection may be frequently disconnected.
  - PoE power supply may not work.
  - Normally it works, but when the power load increases, the connection may be disconnected.

# NTP server synchronization specification

Info. Type   ☐Quality   ☐Settings   ☐Repair   ☐S/W   ☒Etc

● **Target Models**

- All our NVR & N/W Camera products currently running

● **Purpose**

- To Describes the NTP server synchronization specification

● **Information about the NTP server**

- Default NTP Server IP : time.bora.net (203.248.240.140)  
※ The IP address(203.248.240.140) indicates a universal NTP server for Linux & Windows operating systems.

● **Sync Period**

- NTP synchronization is performed every hour after setting
- If the NTP server does not respond: Reconnection will be attempted to synchronize with the NTP server every hour.

● **When there is a time difference between the NVR and the NTP server**

Time Difference	Sync	Remarks
0-1 second	No Syncing	NTP synchronization does not work.
1-5 seconds	Syncing	The RTC and system time are changed to the NTP server time.
5 seconds to 60 minutes		After a system pause occurs, the RTC and system time are changed to the NTP server time (overlapping intervals occur)
60 minutes or more	No Syncing	NTP synchronization does not work. ※ F/W version v2.46 and later (XRN-410S/810S/1610S, PRN-4011)