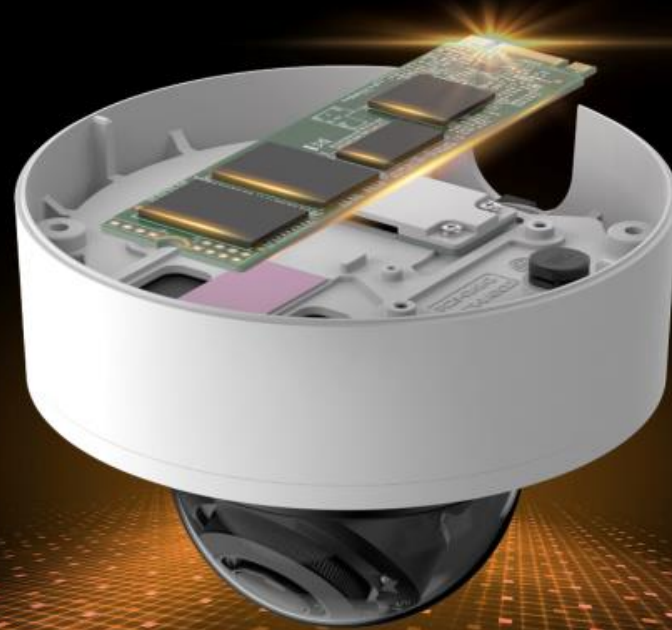
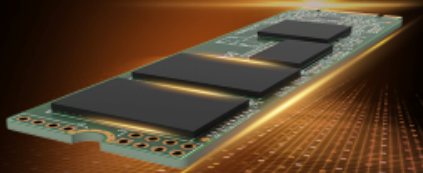


# SolidEDGE

PNV-A6081R-E1T / PNV-A6081R-E2T





# 1

## Why SolidEDGE?

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- 1-1. First real SSD based camera
- 1-2. New era of cloud managed solution
- 1-3. System components & architecture

# 2

## Key Features

---

- 2-1. Sever-less solution
- 2-2. Flexible system structure
- 2-3. Cloud video management with WAVE sync
- 2-4. SSD status management
- 2-5. Next level cybersecurity
- 2-6. Reinforced durability

# 3

## Specification and Installation

---

- 3-1. Specification
- 3-2. Model description
- 3-3. Model naming rule of SolidEDGE
- 3-4. At a glance and components
- 3-5. Installation solution guide of SolidEDGE

## Appendix

- 1) WAVE Client Desktop application download
- 2) Installation of the WAVE application from the Web Server
- 3) Updating the WAVE server from the Client
- 4) Activation of additional WAVE licenses
- 5) Safe SSD drive replacement

# 1

## Why SolidEDGE?

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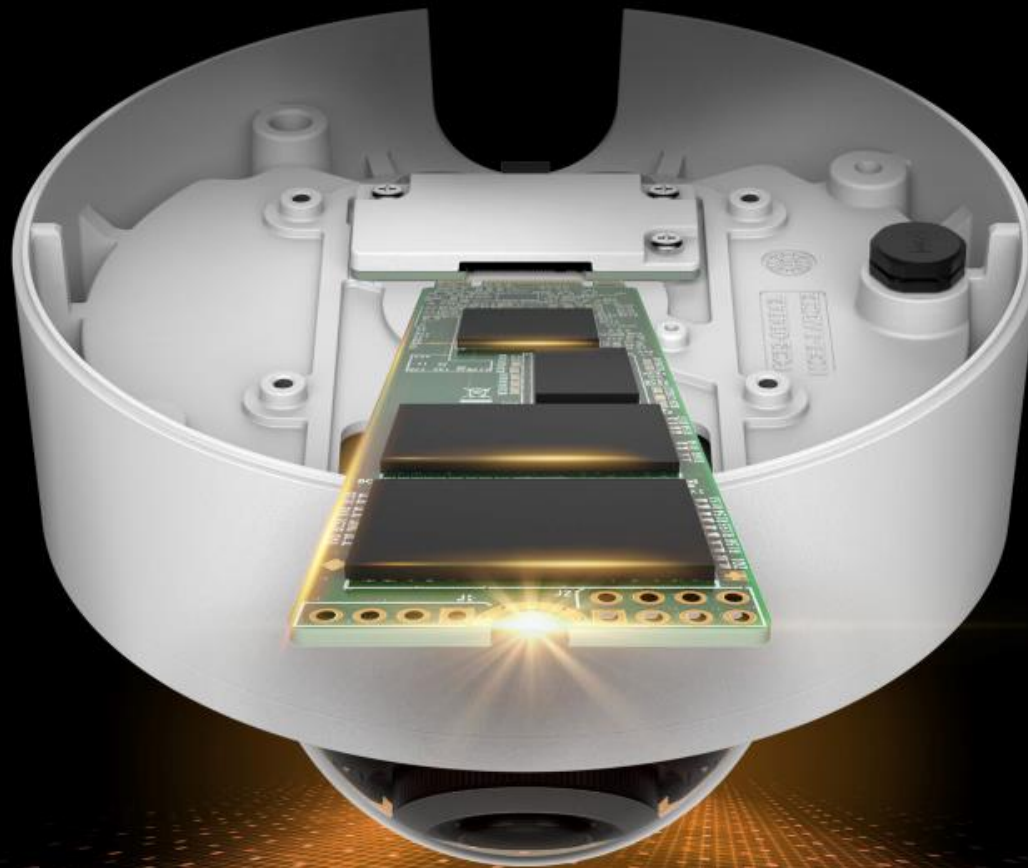
- 1-1. New era of cloud managed solution
- 1-2. First real SSD drive based camera
- 1-3. System components & architecture

# 1-1. First real SSD(Solid-State Drive) based camera

The SolidEDGE will eliminate the server without heavily relaying on the cloud?

## Hosting the recording video on the EDGE

The SolidEDGE has a built-in Rugged SSD that in the camera that it can host the WAVE recording server files as well as the video recording.




## Hosting the WAVE recording server on the EDGE

The SolidEDGE System has a powerful hardware on the edge (Quad core CPU, 4GB of RAM dedicated Encoder,...) as well as an embedded Linux operating system.




## 1-2. New era of cloud managed solution


Cloud solutions revealed the need for low maintenance security solution and the SolidEDGE delivers!



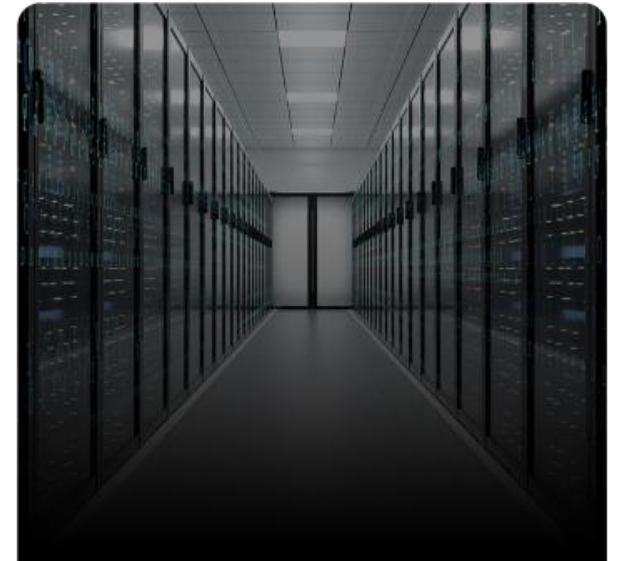
Very easy to get it up and running in a short period of time



No need for a complicated setup



No need to maintain anti-virus, anti-malware, and other application updates



No need for IT rack space, MDF/IDF, ventilation, etc.

# 1-3. System components & Architecture



## SolidEDGE

- With embedded WAVE VMS server
- Can record up to 5 additional cameras
- Can be merged with other servers(TBD)



## WAVE Desktop & Mobile

- Can monitor the video
- Can configure the system
- Can used to monitor the video from a smartphone/tablet



## WAVE Sync

- Cloud service to enable easy remote access

# 2

## Key features

---

- 2-1. Sever-less solution
- 2-2. Flexible system structure
- 2-3. Cloud video management with WAVE sync
- 2-4. SSD status management
- 2-5. Next level cybersecurity
- 2-6. Reinforced durability

# 2-1. Server-less solution

A SolidEDGE system is composed of one or more SolidEDGE, each with an embedded WAVE VMS server.

※ 1TB or 2TB of SSD storage options for each SolidEDGE.





## 2-2. Flexible system structure

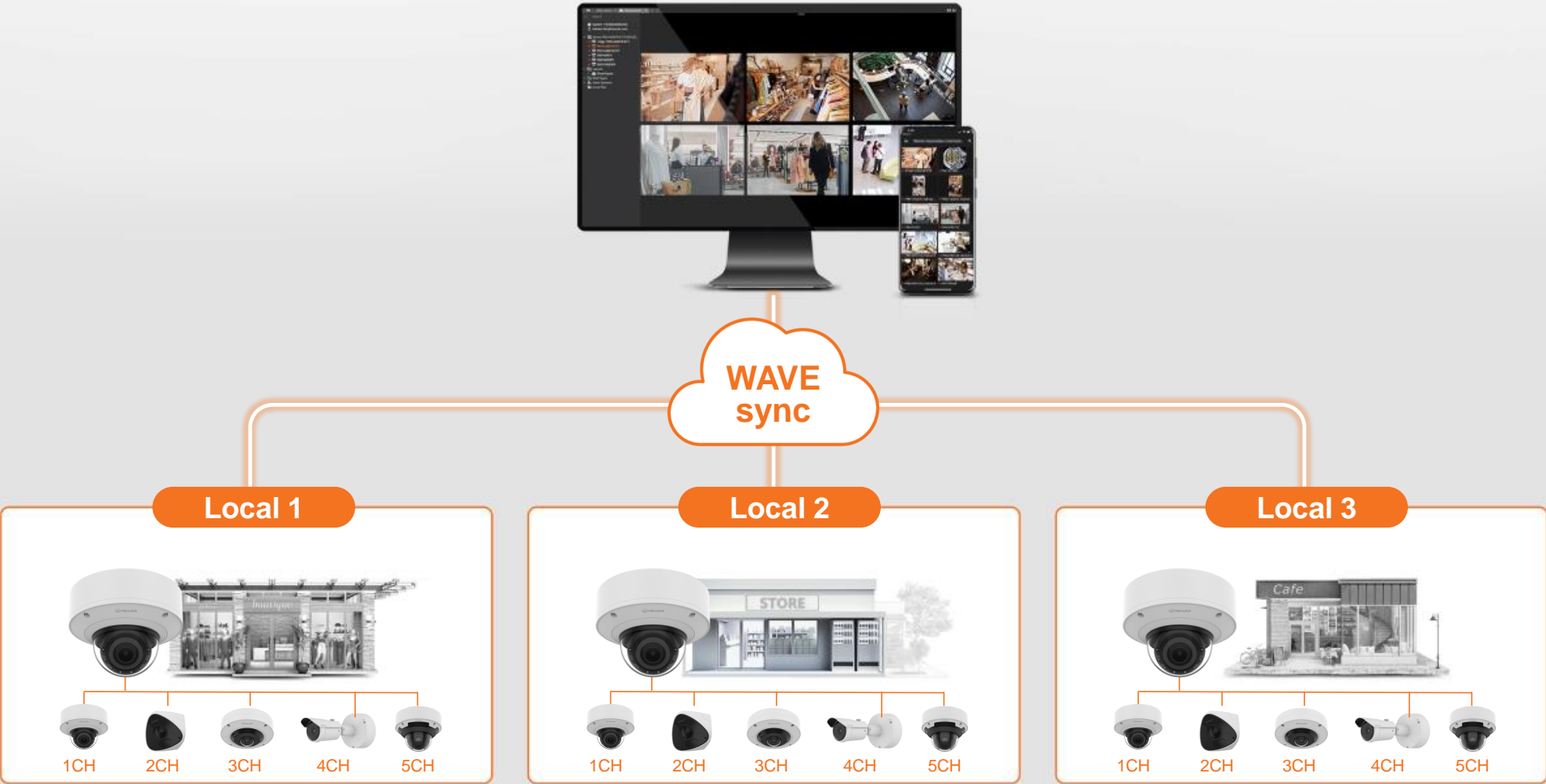
Each SolidEDGE can record up to 5 additional cameras to the system, which bring total number of camera per EDGE system to 6 cameras including the SolidEDGE.

※ 1CH License is included and user can add up to 5 additional WAVE Pro licenses.



# 2-3. Cloud video management with WAVE sync

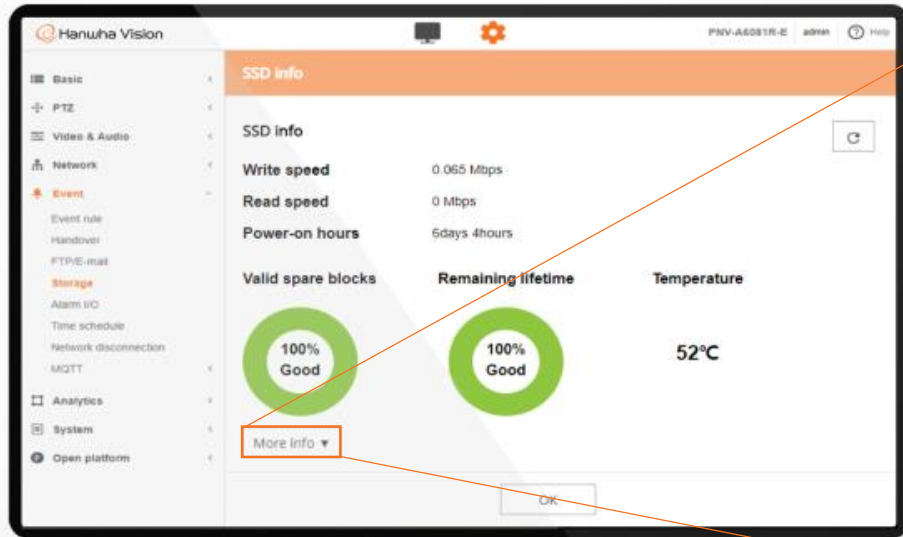
Each SolidEDGE system can be merged with other servers for a system size of TBD servers. (TBD)



# 2-4. SSD status management

User can check the status of SSD drive on the camera web page.

※ Setup - Event - Storage - Info



Status info

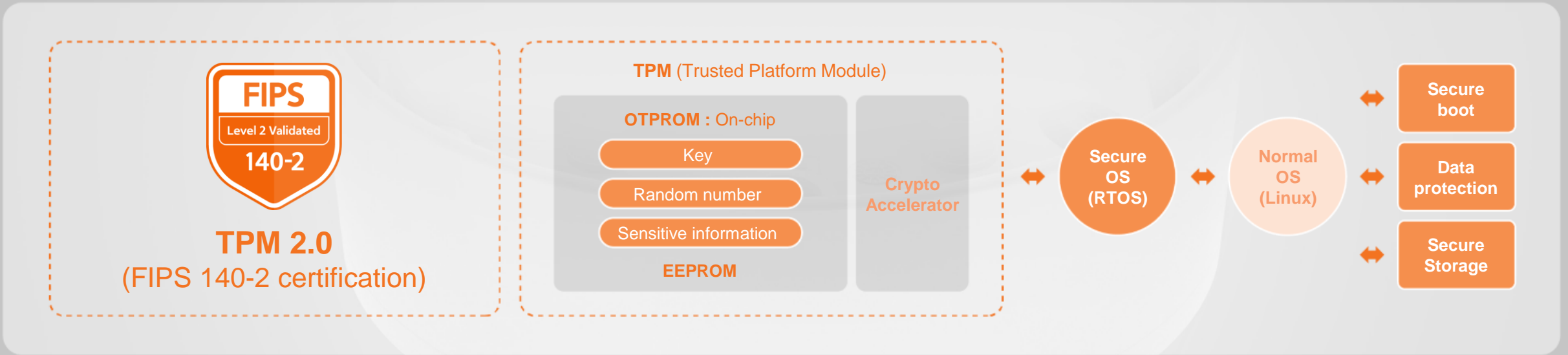
**More info ▲** **Detail SSD info for analyze**

Model : TS1TMTS952T2  
FW Version : 02J0T4GB  
Serial No : H478730250

ID	Attribute name	Value
01	Read Error Rate	0
05	Reallocated Sectors Count	0
09	Power-On Hours	148
0C	Power Cycle Count	11
94	SLC Total Erase Count	162

# 2-5. Next level cybersecurity

The cybersecurity of the new SolidEDGE validates the boot process, securely stores key information, and preempts hacking risk with unauthorized access blocking. Our cameras also have been certified Secure by default certification and including device certificate Root CA. As a result, we can provide industry-leading end-to-end cybersecurity to the customer.



✓ Data Protection

- Secure storage/OS

✓ Improved security

- TPM 2.0(FIPS 140-2 level2), Secure by default certified
- Device certificate(Hanwha private Root CA)

✓ Integrity

- Secure boot
- Secure Open platform App
- Signed firmware

✓ Secured Hardware

- Secure JTAG

## 2-6. Reinforced durability



### Metal shielded RJ-45

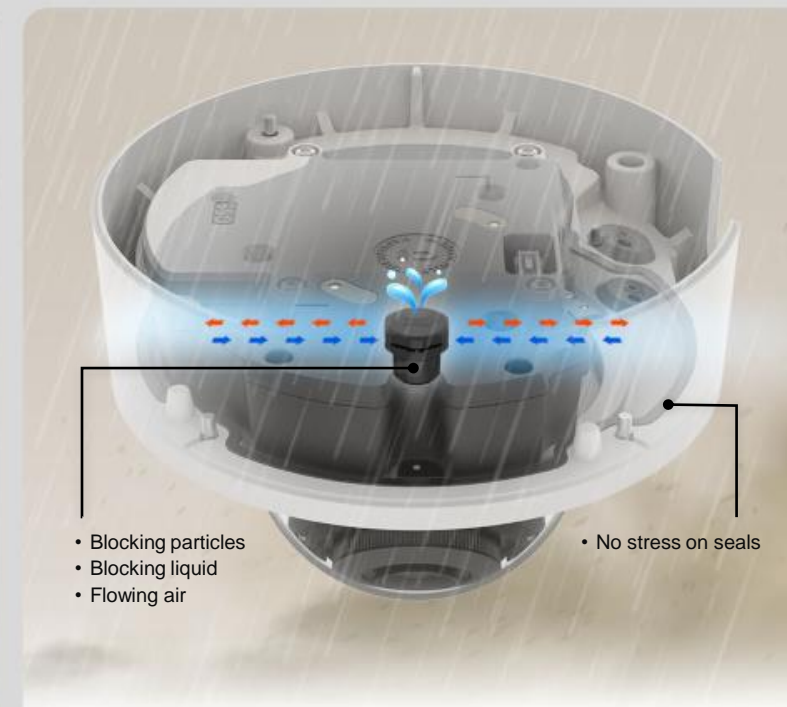
Metal-shielded RJ-45 terminal and enhanced grounding frame structures can protect the camera from transient voltage (lightning, static electricity).

※ Using STP (shielded twisted pair) cabling is recommended.



### Hard-coated dome bubble

Hard-coated dome bubble provides better resistance to scratches from external stimuli (sand, worker's hand, etc.). Also, the degradation of resolution due to scratches is minimized.



### Humidity control with AIR vent

The built-in air vent prevents condensation and maintains performance of long-term use and storage through water vapor control. Also, it can prevent damage and stress on the seals and internal components through pressure equilibrium in the product.



# 3

## Specification and Installation

---

3-1. Specification

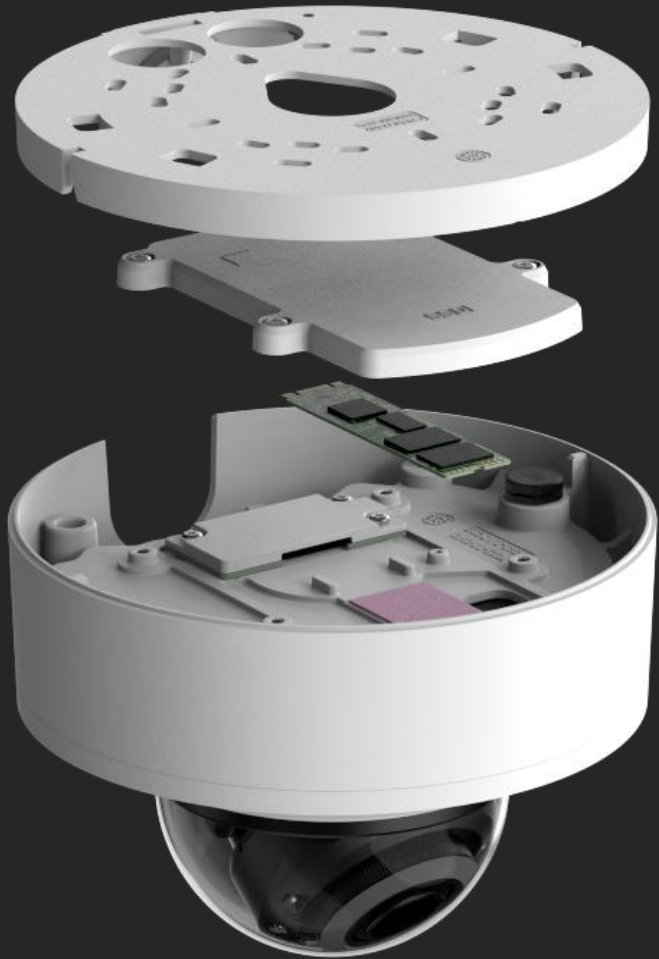
3-2. Model description

3-3. Model naming rule of SolidEDGE

3-4. At a glance and components

3-5. Installation solution of SolidEDGE

## 3-1. Specification



### SolidEDGE

#### PNV-A6081R-E1T, PNV-A6081R-E2T

- 1TB / 2TB SSD storage options available
- 1x Professional WAVE license pre-loaded
- Encrypted software updates are provided to the camera to ensure best cyber security
- 2MP, 4.4~9.3mm motorized V/F lens
- Support H.265/H.264/MJPEG
- WiselR 40m
- Next level cybersecurity
  - ✓ Device certificate(Hanwha private Root CA)
  - ✓ TPM 2.0(FIPS 140-2 level2 certified), Secure OS/boot/storage, Signed firmware
- Support PoE+/12VDC
- Hard-coated dome bubble
- IP66/IP67/IP6K9K, NEMA 4X, IK10

## 3-2. Model description

SolidEDGE		
Type	Model name	Description
Camera	<b>PNV-A6081R-E1T</b>	2MP, Max 120fps, 4.4~9.3mm, WDR(120dB), Wise IR 40m, TPM 2.0(FIPS 140-2 level 2 certified), Modular design, IP66/IP67, IP6K9K, NEMA4X, IK10, PoE+, NDAA compliant, Included 1TB SSD, Installed WAVE Pro with 1CH license
	<b>PNV-A6081R-E2T</b>	2MP, Max 120fps, 4.4~9.3mm, WDR(120dB), Wise IR 40m, TPM 2.0(FIPS 140-2 level 2 certified), Modular design, IP66/IP67, IP6K9K, NEMA4X, IK10, PoE+, NDAA compliant, Included 2TB SSD, Installed WAVE Pro with 1CH license
SSD	<b>1TB/2TB</b>	M.2 2280 SSD, SATA3
License	<b>WAVE-PRO-01</b>	Activated WAVE professional license, Enable 1 x IP stream recording, includes life-time SW upgrade, No annual & maintenance cost required ※ Every SolidEDGE includes 1 license and users can add up to 5 additional licenses

## 2-4. System scalability

H.265 on the primary stream and H.264 on the secondary stream is recommended.  
 In this case, you can record the video almost 5 days.(Based 2TB model).

**Max. number of camera = 6**  
 5 additional cameras per SolidEDGE

**Max. number of SolidEDGE**  
 TBD additional camera per system(TBD)

**Max. bandwidth per SolidEDGE**  
 Up to 33Mbps per sever, No AI mode only

### Maximum performance guide

Camera	AI	Stream	Resolution	Codec	Max. Bitrate	Frame rate
Camera 1 (SolidEDGE)	Off	Primary : Live/Recording	2MP	H.265	5Mbps	Max. 30fps
		Secondary : MD	640x360	H.264	512kbps	Max. 3fps
Camera 2	Off	Primary : Live/Recording	4K	H.265	5Mbps	Max. 30fps
		Secondary : MD	640x480/640x360	H.264	512kbps	Max. 3fps
Camera 3	Off	Primary : Live/Recording	4K	H.265	5Mbps	Max. 30fps
		Secondary : MD	640x480/640x360	H.264	512kbps	Max. 3fps
Camera 4	Off	Primary : Live/Recording	4K	H.265	5Mbps	Max. 30fps
		Secondary : MD	640x480/640x360	H.264	512kbps	Max. 3fps
Camera 5	Off	Primary : Live/Recording	4K	H.265	5Mbps	Max. 30fps
		Secondary : MD	640x480/640x360	H.264	512kbps	Max. 3fps
Camera 6	Off	Primary : Live/Recording	4K	H.265	5Mbps	Max. 30fps
		Secondary : MD	640x480/640x360	H.264	512kbps	Max. 3fps

# 3-3. Model naming rule of SolidEDGE



**Series Name**

- P** Premium
- X** Versatile
- Q** Quality
- H** HD+
- L** Entry
- T** Vertical(Special)
- A** Alpha
- E** China only
- K** VPM
- Z** India only
- O** Ossa
- J** JDM
- S** Legacy

**Customized Product**

- SK** SKO, SKD...
- CJ** CJO, CJD...
- VS** VSO

**Product Type**

- P** Network cam
- N** Analog cam
- C** UTP Camera
- U**

**Shape**

- B** Box
- D** Dome
- F** Fisheye
- M** Multi-Sensor
- O** Bullet
- P** PTZ
- U** Positioning
- V** Vandal
- Z** Zoom box
- E** Flateye
- C** Chass Bundle

**Grade**

- Null** Basic
- A** AI
- E** Entry
- L** Lite
- K** Korea Online
- V** Value
- I** India
- C** Core AI

**Total Resolution**

- 1** Small sensor
  - 2** QQVGA
  - 3** QVGA
  - 4** VGA
  - 5** 1M
  - 6** 2M
  - 7** 3 ~ 4M
  - 8** 5 ~ 7M
  - 9** 8M↑
  - 12** 12MP
  - 15** 15MP
  - 24** 24MP
  - 32** 32MP
  - 34** 34MP
  - 36** 36MP
  - 40** 40MP
- (example)  
 6MP x 2CH = 12MP  
 8MP x 4CH + 2MP PTZ = 34MP

**Lens**

- 00** No Lens
- 01** 3mm ↓ fixed
- 02** 3.1 ~ 4mm fixed
- 03** 4.1 ~ 6mm fixed
- 04** 6.1 ~ 9.9mm fixed
- 05** 10mm↑ fixed
- 06** 2X V/F
- 07** 2X ~ 9X V/F
- 08** 2X ~ 9X M-V/F
- 09** 10X↑ V/F
- XX** Zoom (PTZ, Zoom)

**Version**

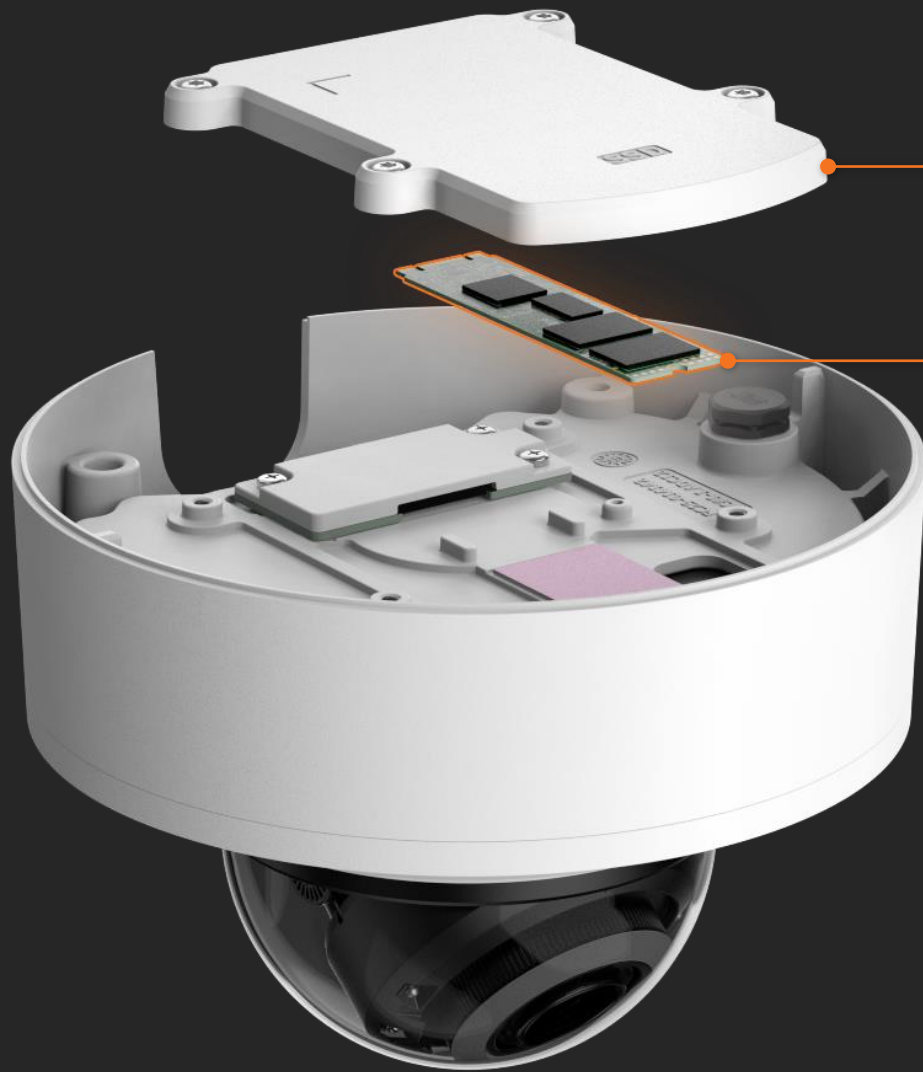
0 ~ 9

**Features**

- A** Revision
- B** Black Color
- C** Counting or Corner
- D** Dual eye
- E** Explosion Proof or PoE extender
- F** Flush or SFP LC (Fiber Channel)
- G** Government/TTA
- H** Housing
- I** White LED
- L** BLE
- M** Mobile
- NB** No Battery
- OP** Open platform
- I** Option change
- P** PTZ (for multi)
- Q** Quad eye
- R** IR or Radiometric
- S** Stainless Steel
- T** Thermal or Triple eye
- U** Dummy
- V** Vandal
- W** Wiper, White Color
- X** Modular design
- Y** Body Temp
- Z** PTRZ
- LP** License plate
- FR** Face recognition
- RU** Dummy with IR
- R1** Legacy code
- R2** Legacy BOM mode
- RV** IR + vandal
- SSD** Built-in SSD
- E** EDGE(SSD)
- 1T** Capacity of SSD
- 2T** Capacity of SSD

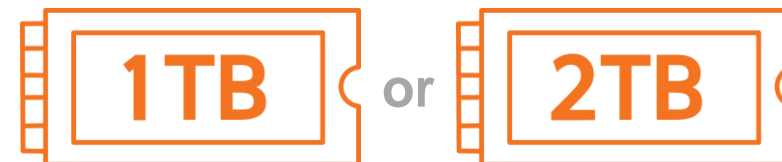


## 3-4. At a glance and components



SSD cover

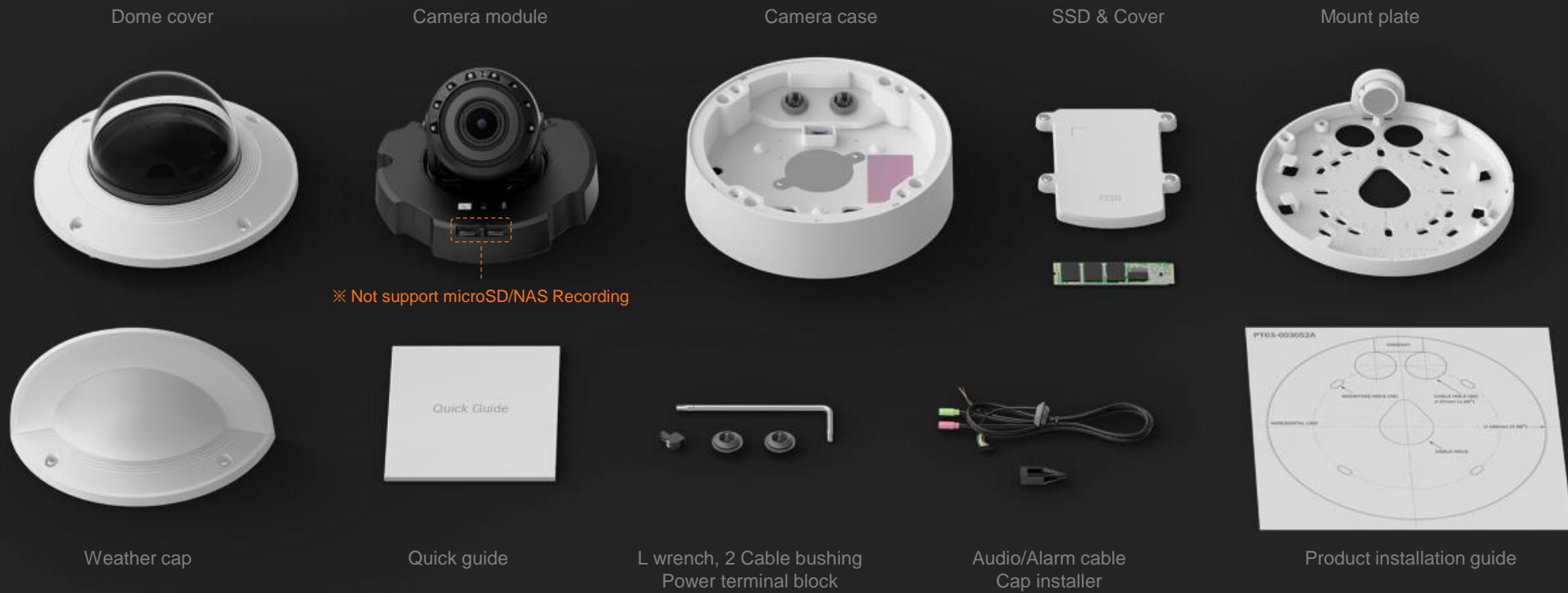
Solid-State Drive



\* Choose models with 1TB or 2TB of SSD storage options for each SolidEDGE camera.

# 3-4. At a glance and components

The installer-friendly packaging allows for easy camera pre-configuring before shipping it to the installation site.



# 3-5. Installation solution of SolidEDGE

<b>Hanging Adaptor</b> SBP-180HMW1	<b>Ceiling Mount Base</b> SBP-140CMB	<b>Ceiling Mount Base</b> SBP-180CMB	<b>Ceiling Mount Pipe</b> SBP-150CMP/300CMP/900CMP	<b>Ceiling Mount Coupler</b> SBP-C15P	<b>Ceiling Mount (Assembly)</b> SBP-150CMI	<b>Ceiling Mount (Assembly)</b> SBP-300CMI	<b>Ceiling Mount (Assembly)</b> SBP-300CMW1
<b>Ceiling Mount (Assembly)</b> SBP-900CMW	<b>Ceiling Mount</b> SBP-156CMW	<b>Wall Mount</b> SBP-300WMW	<b>Wall Mount</b> SBP-300WMW1	<b>Wall Mount Base</b> SBP-300BW	<b>Pole Mount</b> SBP-300PMW1	<b>Pole Mount</b> SBD-180PMW	<b>Corner Mount</b> SBP-300KMW1
<b>Parapet Mount</b> SBP-300LMW	<b>Parapet Mount</b> SBP-156LMW	<b>Cabinet</b> SBP-300NBW	<b>Back Box</b> SBV-180BW	<b>Back Box (Waterproof)</b> SBV-180WW	<b>Weather Cap</b> SBV-181WCW		

# Ceiling

(PNV-A6081R-E1T/E2T)



Back Box



SBV-180WW



Back Box



SBV-180BW



Ceiling Mount



SBP-156CMW

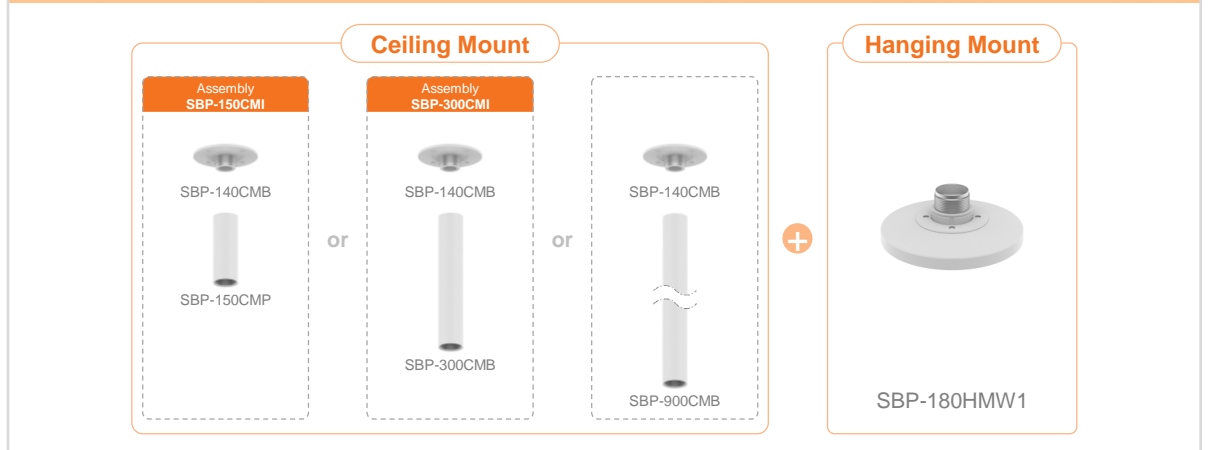
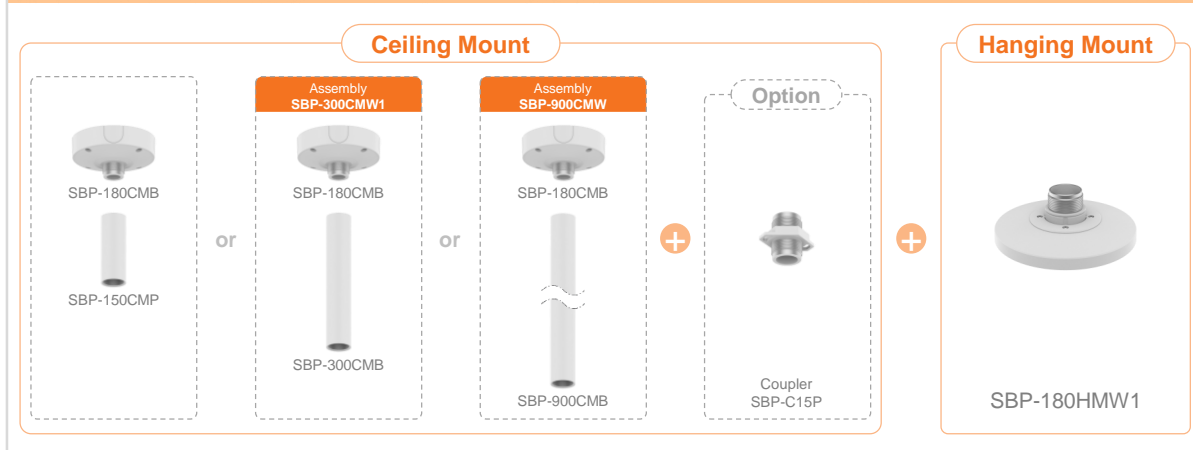
Hanging Mount



SBP-180HMW1

# Ceiling

(PNV-A6081R-E1T/E2T)





# Wall

(PNV-A6081R-E1T/E2T)



Back Box



SBV-180WW



Back Box



SBV-180BW



Weather Cap



SBV-181WCW

# Wall

(PNV-A6081R-E1T/E2T)



Wall Mount

Option



Installation Box  
SBP-300NBW

or



Wall Mount Base  
SBP-300BW



SBP-300WMW1

or



SBP-300WMW



SBP-180HMW1

Hanging Mount

# Pole

(PNV-A6081R-E1T/E2T)



Wall Mount



SBD-180PMW

Pole Mount



SBP-300PMW1

Option



Installation Box  
SBP-300NBW

Wall Mount



SBP-300WMW1

or



SBP-300WMW

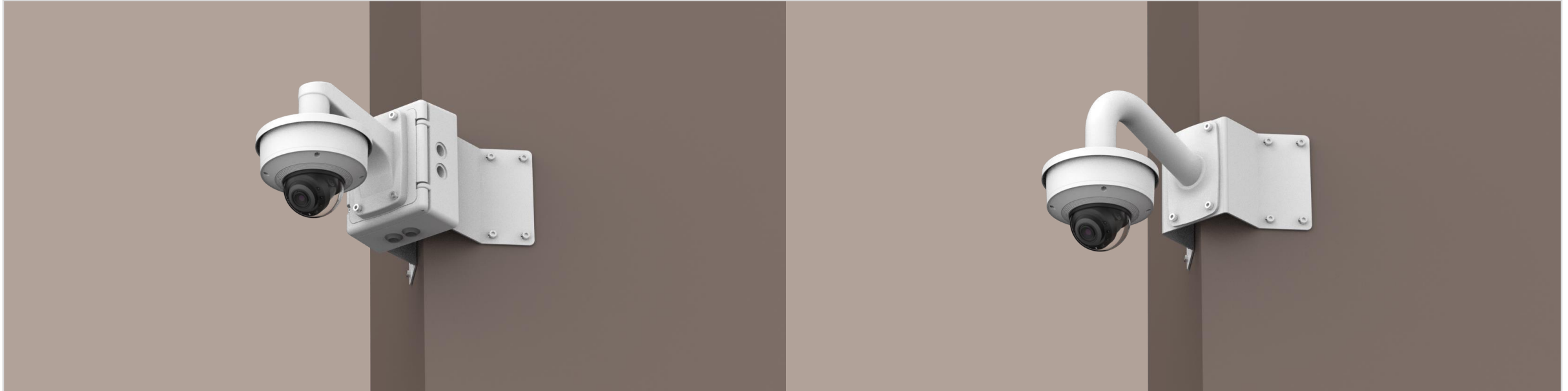
Hanging Mount



SBP-180HMW1

# Corner

(PNV-A6081R-E1T/E2T)



**Corner Mount**



SBP-300KMW1

**Wall Mount**

Option



Installation Box  
SBP-300NBW

+



SBP-300MMW1

or



SBP-300MMW

**Hanging Mount**



SBP-180HMW1

# Parapet (PNV-A6081R-E1T/E2T)



Parapet Mount



SBP-300LMW



Hanging Mount



SBP-180HMW1



Parapet Mount



SBP-156LMW



Hanging Mount



SBP-180HMW1

# Appendix

---

- 1) WAVE Client Desktop application download
- 2) Installation of the WAVE application from the Web Server
- 3) Updating the WAVE server from the Client
- 4) Activation of additional WAVE licenses
- 5) Safe SSD drive replacement



# 1) WAVE Client Desktop application download

Download the app

The SolidEDGE has WAVE server pre-loaded. If the WAVE server needed to be re-installed, The ARM WAVE version can be download from the webpage [www.wavevms.com/download/](http://www.wavevms.com/download/). The WAVE server can be re-installed from the camera webpage

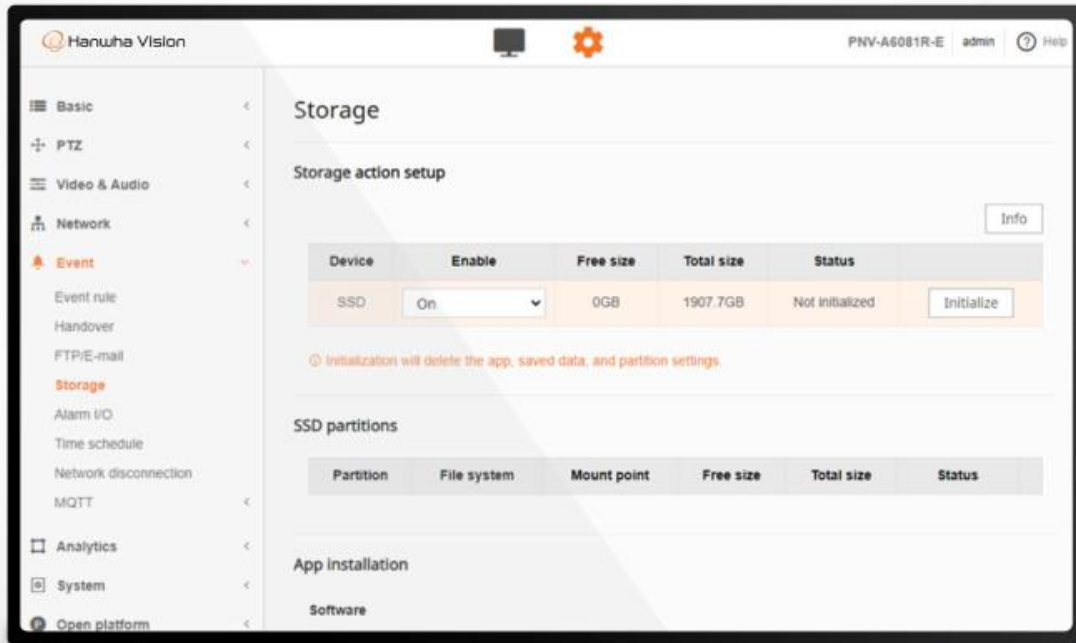


Download client software or server software for re-installation

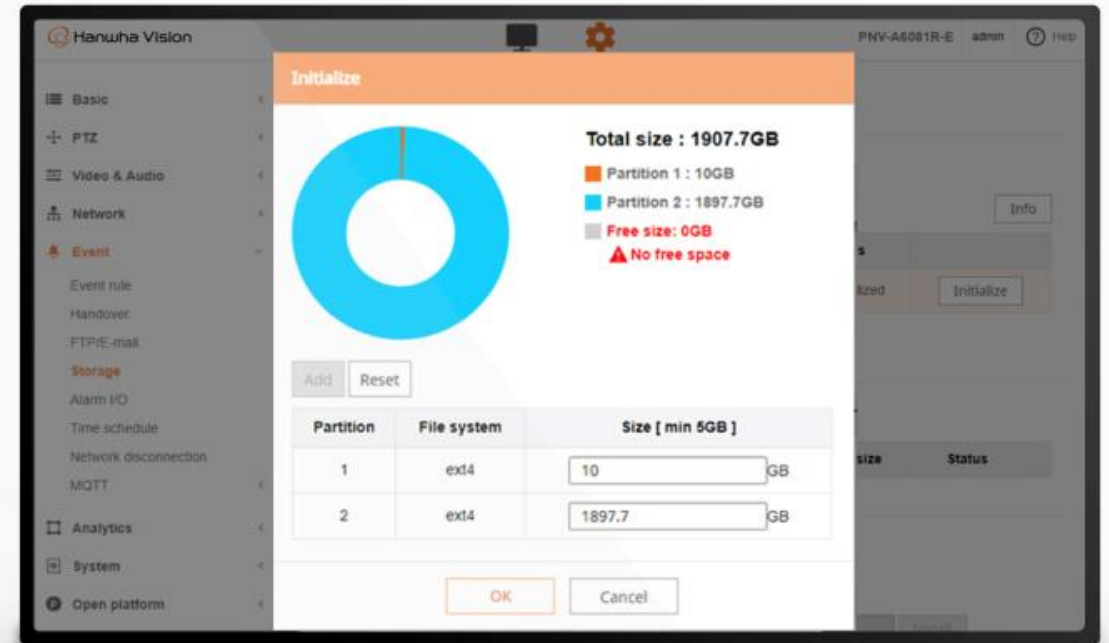
X64 - SERVER ONLY

X64 - CLIENT ONLY

## 2) Installation of the WAVE application from the Web Server



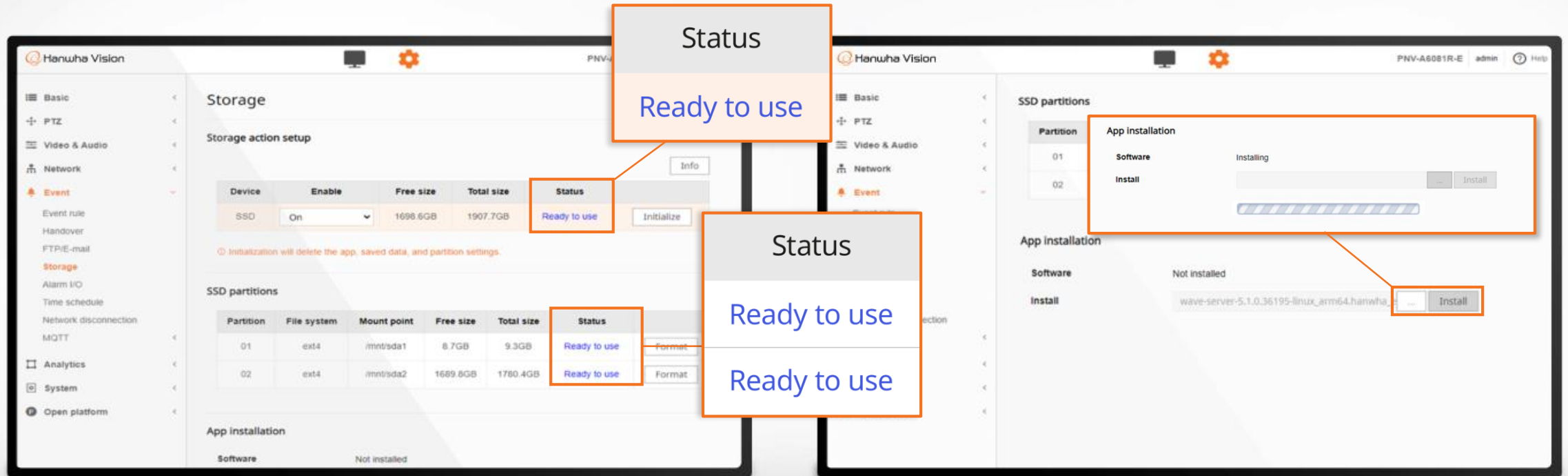
1. Status check and click the Initialize button



2. Add the partition to the SSD

Partition 1: 10GB recommended / Partition 2: Size except for

## 2) Installation of the WAVE application from the Web Server



The image displays two screenshots of the Hanwha Vision web interface, illustrating the installation process. The left screenshot shows the 'Storage' configuration page, and the right screenshot shows the 'App installation' page.

**3. Status that completed the initialize**

**4. Select the file and install the WAVE app**

**Status**  
Ready to use

**Status**  
Ready to use

**Status**  
Ready to use

**Status**  
Ready to use

**App installation**  
Installing

**App installation**  
Not installed

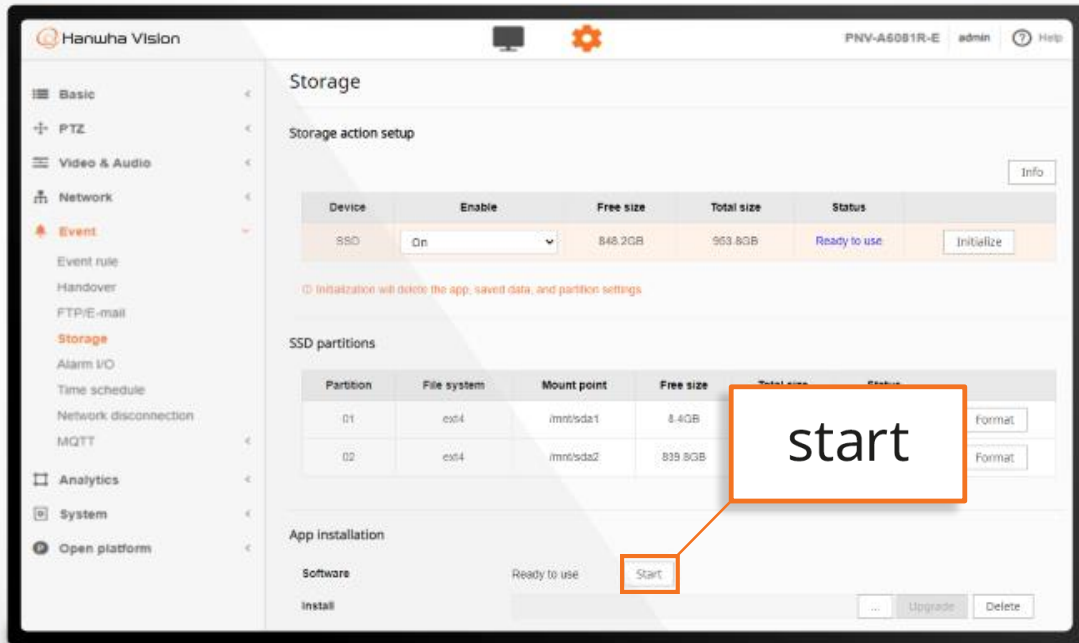
Device	Enable	Free size	Total size	Status
SSD	On	1696.6GB	1907.7GB	Ready to use

Partition	File system	Mount point	Free size	Total size	Status
01	ext4	/mnt/sda1	6.7GB	9.3GB	Ready to use
02	ext4	/mnt/sda2	1689.6GB	1780.4GB	Ready to use

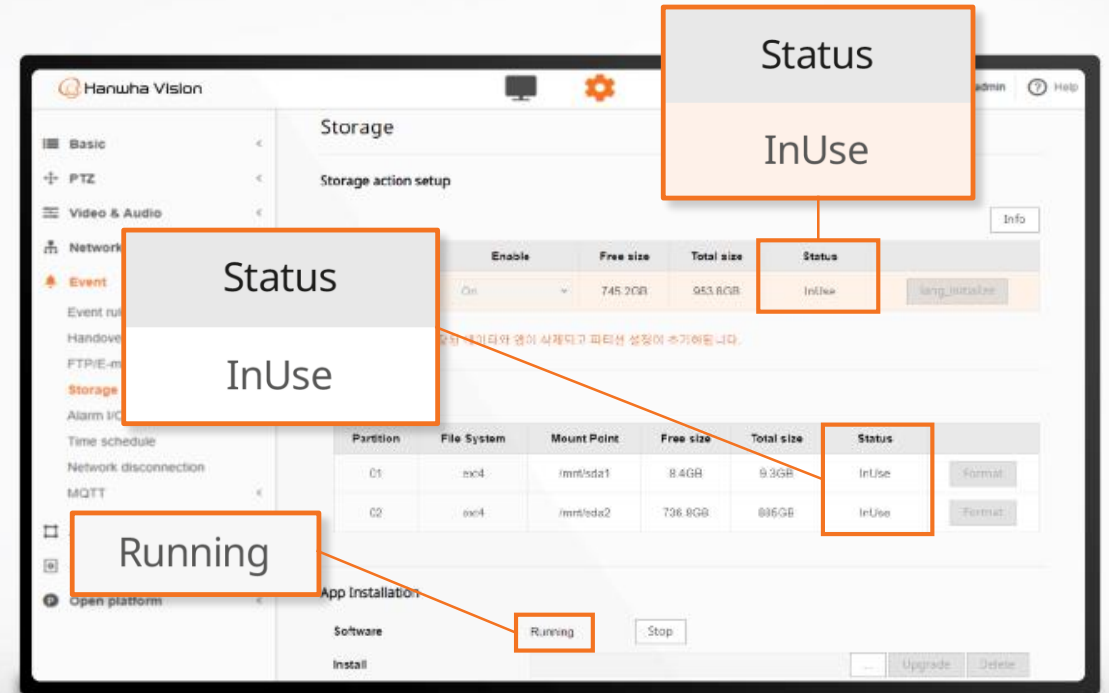
Partition	Software	Status
01		Installing
02		Installing

Software	Status
wave-server-5.1.0.36195-linux_arm64.hanwha	Not installed

## 2) Installation of the WAVE application from the Web Server

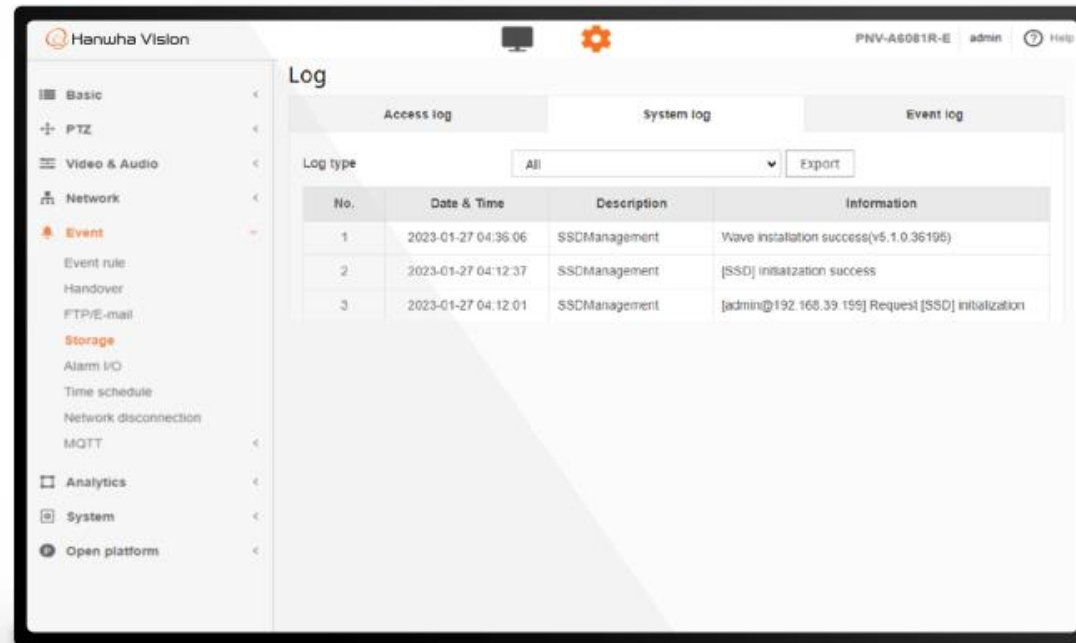


5. Click the start button when status changed to "Ready to use"



6. Final status "In-use", "Running"

## 2) Installation of the WAVE application from the Web Server



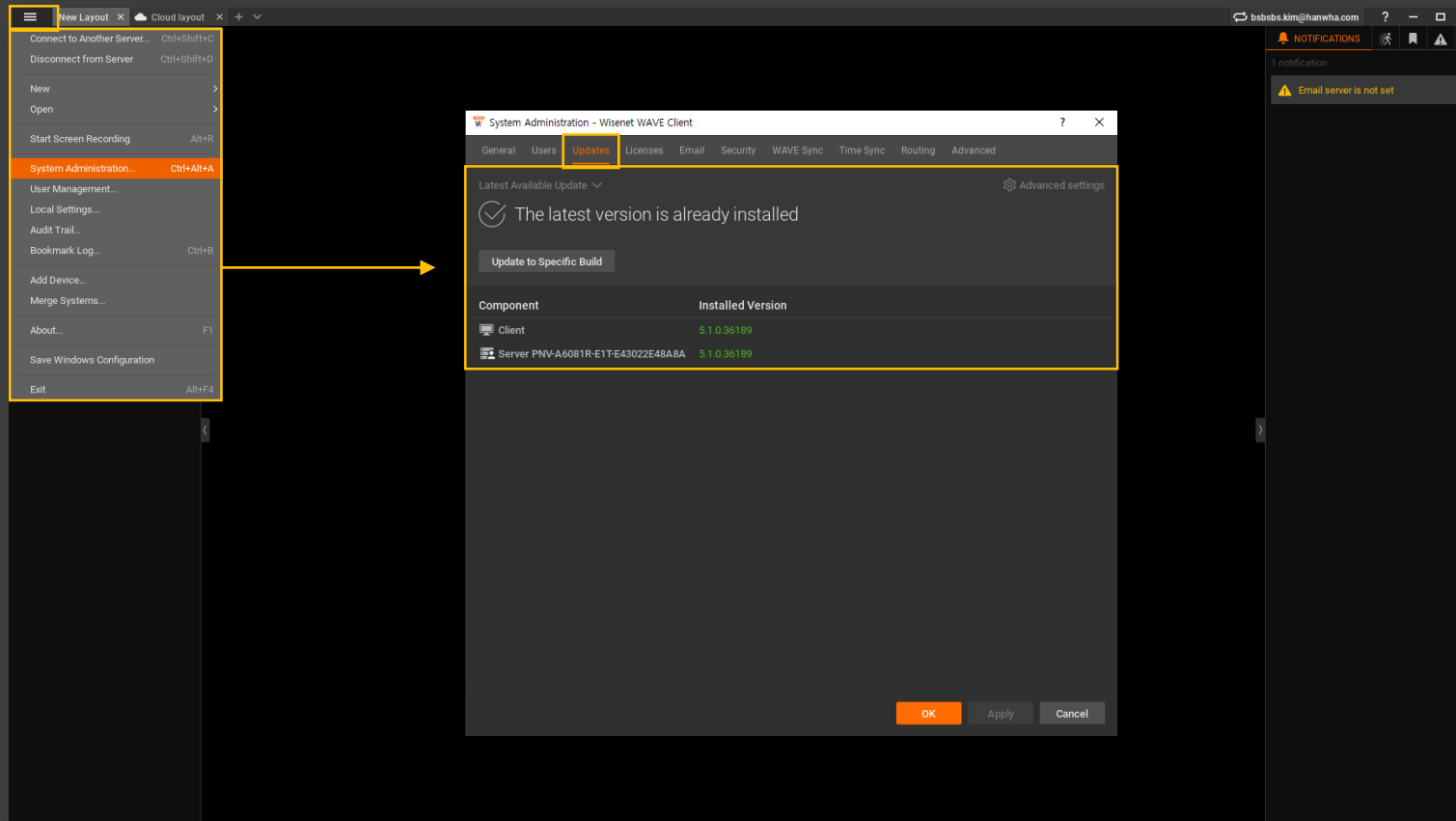
7. User can check the information on the system log

### 3) Updating the WAVE server from the Client

Update the server

The user can also upgrade the WAVE server software version using the WAVE client.  
WAVE can check the latest version of application.

✂ System administration - Updates

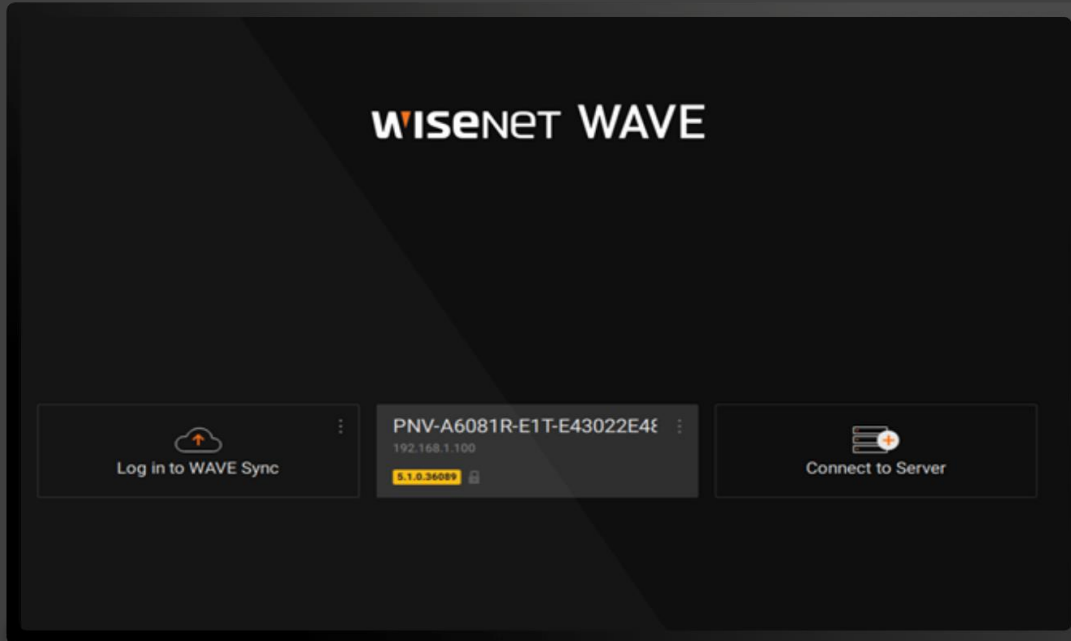


The screenshot shows the 'System Administration - Wisenet WAVE Client' interface. The 'Updates' tab is active, displaying a message: 'The latest version is already installed'. Below this message is a table showing the installed versions for the Client and Server components.

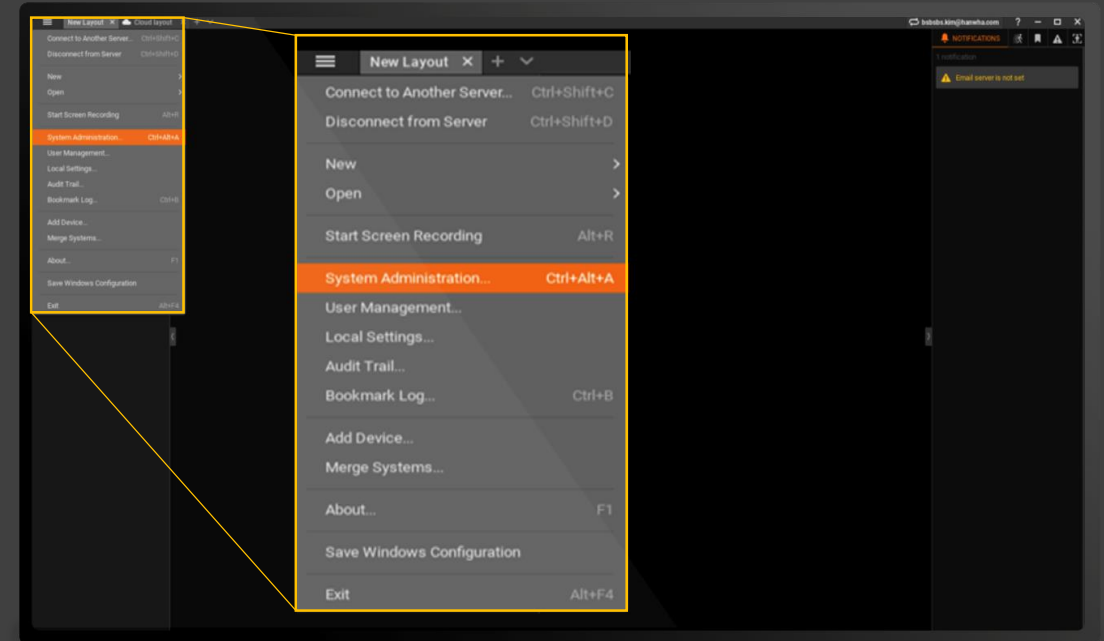
Component	Installed Version
Client	5.1.0.36189
Server PNV-A6081R-E1T-E43022E48A8A	5.1.0.36189



## 4) Activation of additional WAVE licenses

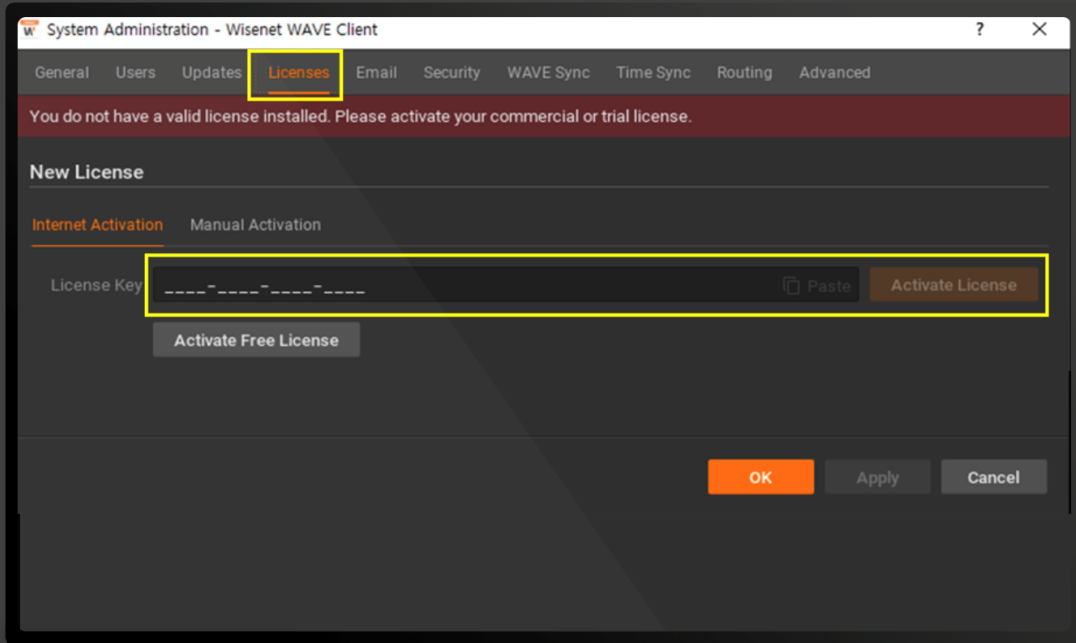


1. Log-in to the server

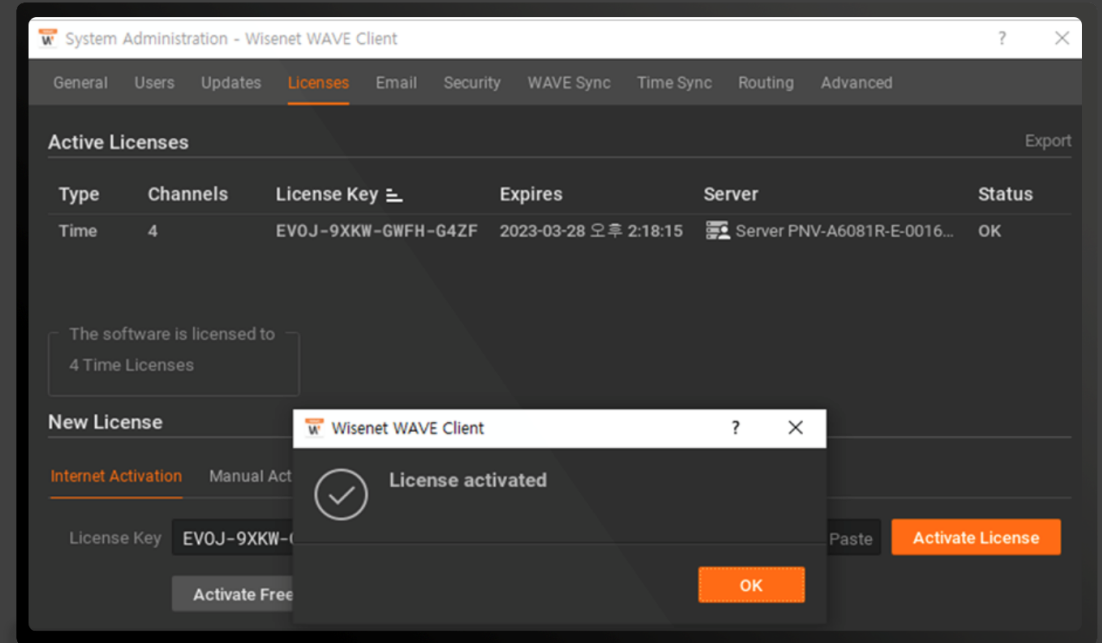


2. Select the "System administration" menu

## 4) Activation of additional WAVE licenses



3. Enter the license tab, input the key



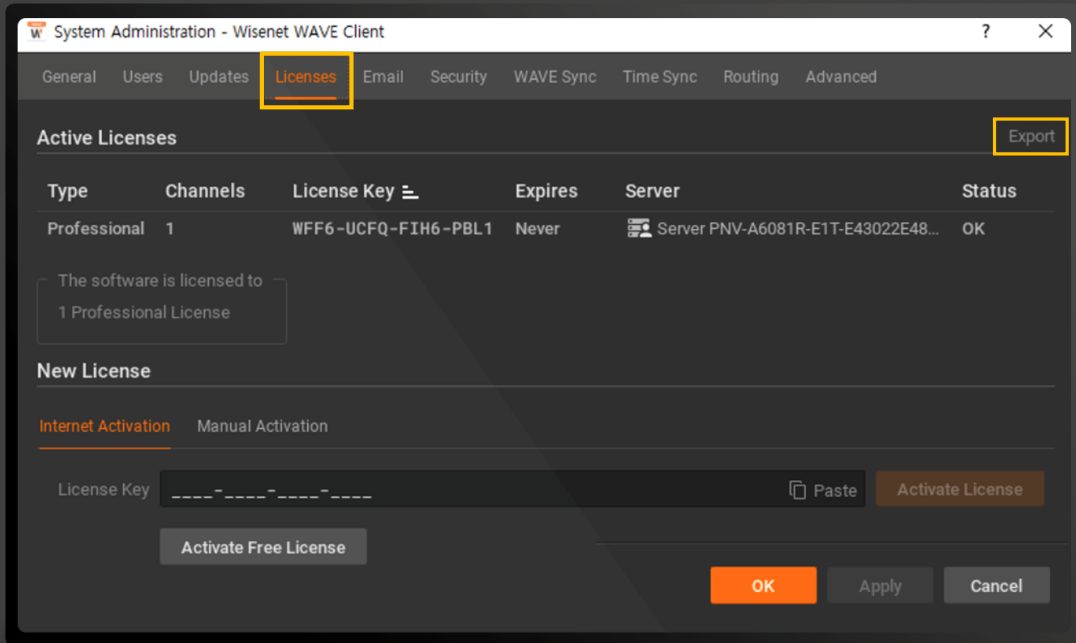
4. Click the activate the license button

## 4) Activation of additional WAVE licenses Export the license key

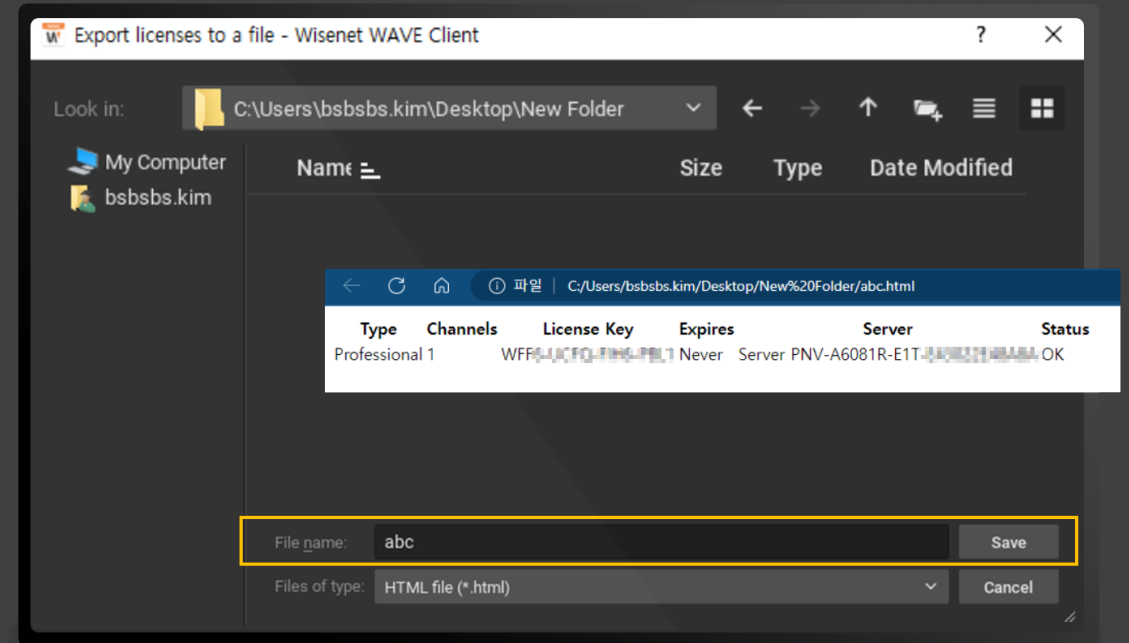
We recommend that you save the license key in safe place.

The WAVE application won't work if the SSD is changed or the WAVE server software is reinstalled.

※ System administration - Licenses - Export



1. Click the Export button



2. Save the license key as a file

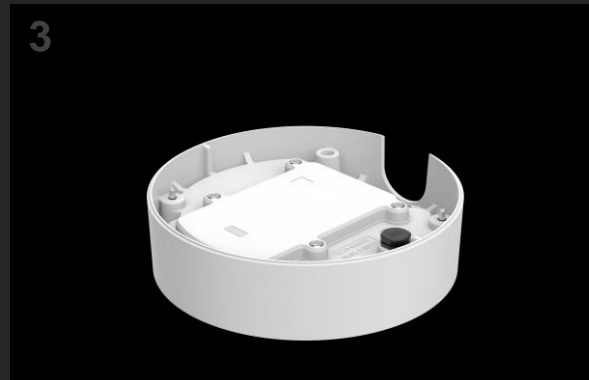
# 5) Safe SSD drive replacement



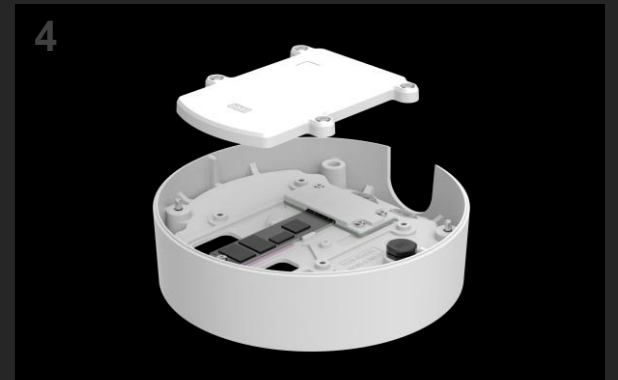
1  
Power off the camera  
(Pull out the PoE cable)



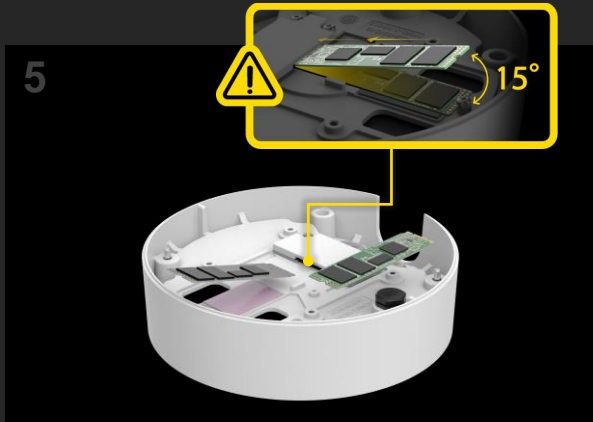
2  
Remove the camera module



3  
Remove and flip the bottom case



4  
Take off the SSD cover



5  
Change SSD drive and cover the cover



6  
Put the camera module into the bottom case first



7  
Connect module and case bottom  
※ Caution. Don't put the power in first before combine the module and bottom case. Camera cannot recognize the SSD or SSD can be broken.



8  
Power on  
(Connect the PoE cable)

# 5) Safe SSD drive replacement

1. Power off the camera  
(Pull out the PoE cable)
2. Remove the camera  
module
3. Remove and flip the  
bottom case
4. Take off the SSD cover
5. Change SSD drive and  
cover the cover
6. Put the camera  
module into the bottom  
case first
7. Connect module and  
case bottom
8. Power on  
(Connect the PoE cable)



