

# INSTRUCTION MANUAL

## 4 Megapixel Box Camera

Before installing and using the camera, please read this instructions thoroughly and keep for reference.

# INFORMATION FOR USER



CAUTION : TO REDUCE THE RISK OF ELECTRIC SHOCK,  
DO NOT REMOVE COVER (OR BACK).  
NO USER SERVICEABLE PARTS INSIDE.  
REFER SERVICING TO QUALIFIED  
SERVICE PERSONNEL.



The lightning flash with arrowhead symbol, within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

## Regulatory Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions :

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to correct the interference at his own expense.

**WARNING** - Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

**CAUTION** : To prevent electric shock and risk of fire hazards:

- ◆ Do NOT use other than specified power source.
- ◆ Do NOT expose this appliance to rain or moisture.

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# PRECAUTIONS

- **Do not install the camera in extreme temperature conditions**  
Do use the camera under conditions where temperatures are within  $-10^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ . Especially be careful for ventilation under high temperatures.
- **Do not install or use the camera in an environment where the humidity is high**  
It can cause the image quality to be poor.
- **Do not install the camera under unstable lighting conditions**  
Severe lighting change or flicker can cause the camera to work improperly.
- **Never use the camera close to a gas or oil leak**  
It can cause malfunctions to occur.
- **Do not disassemble the camera**  
There are no user-serviceable parts inside it.
- **Do not drop the camera or subject them to physical shock.**  
It can cause malfunctions to occur.
- **Never keep the camera directly face to strong light.**  
It can damage Image sensor
- **Do not expose the camera to rain or spill beverage on it.**  
If it gets wet, wipe it dry immediately. Liquids can contain minerals that corrode the electronic components.

## Note

If the camera is exposed to spotlight or object reflecting the strong light then smear or blooming may occur.

Please check the power whether it satisfies the recommended specification before connecting the camera.

# FEATURES

## BOX CAMERA

This color video camera is designed to use for video monitoring systems

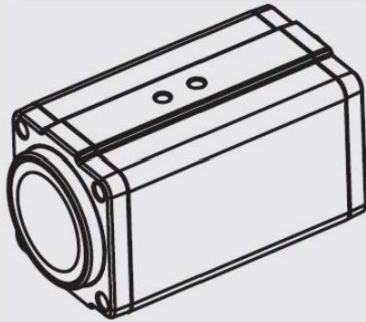
**BMH-S29Q : DC12V model**

- 1/2" Sony Starvis CMOS sensor
- Built-in 3.6~10mm Motorized Zoom Lens
- QHD Resolution support
- Day & Night (ICR)
- Wide Dynamic Range
- Digital Noise Reduction (2D+3D)
- Privacy mask Function
- On Screen Display
- Intelligent motion detection
- Protocol
- EX-SDI : long range transmission up to 250m~500m (depends on cable quality)

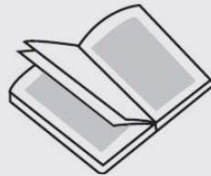
Video transmission, power supply to a camera and serial communication can be performed through a Coaxial cable.

# ACCESSORIES

## ACCESSORIES



CAMERA



MANUAL



DC 12V CABLE



SERVICE VIDEO OUT  
BNC CABLE

## OPTIONAL REMOTE CONTROLLER



Not used

Tele/ Up

Far / Right

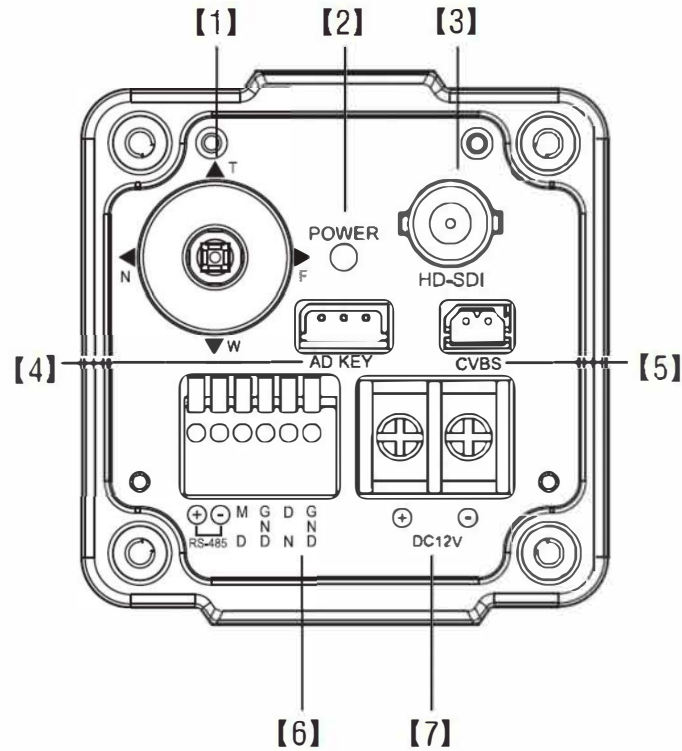
Menu/ Set

Wide / Down

Near / Left

# REAR PANEL INTERFACES

## NAME OF EACH PARTS

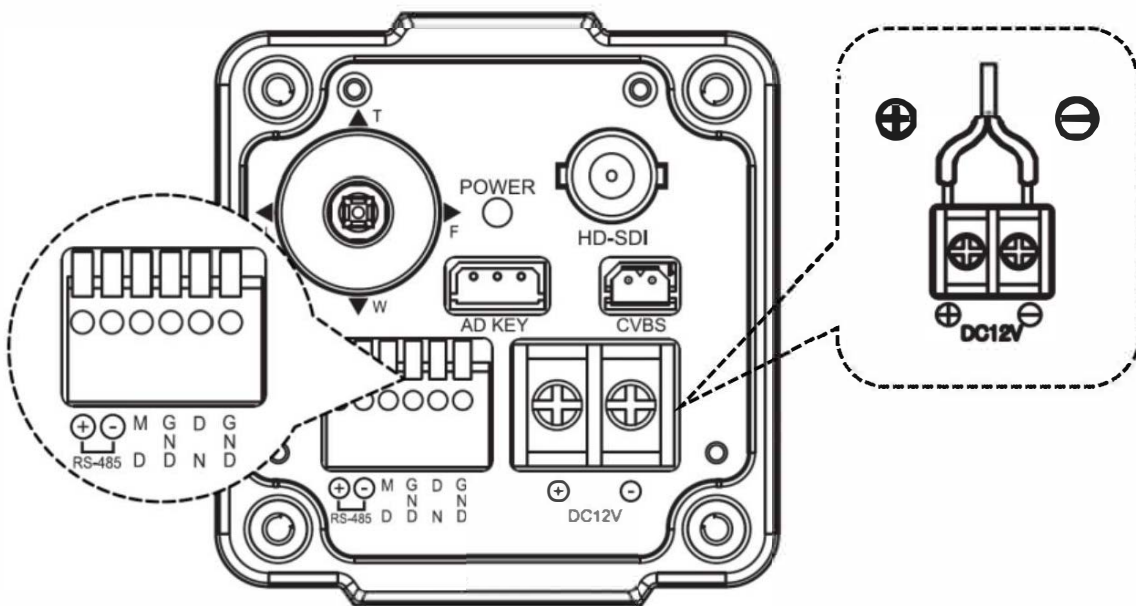


- [1]** OSD / Zoom / Focus control
- [2]** Power LED
- [3]** HD-SDI Out
- [4]** AD Key
  - 1 : GND
  - 2 : AD-key
  - 3 : GND
- [5]** CVBS Out
- [6]** Control Terminal
  - 1 : RS-485 (+)
  - 2 : RS-485 (-)
  - 3 : Motion Detection Out
  - 4 : Ground
  - 5 : Day&Night Input (Low→Night, High→Day)
  - 6 : Ground
- [7]** Power : DC12V

# REAR PANEL INTERFACES

## CONNECTIONS

1. Coaxial cable connecting (HD-SDI / EX-SDI)
  - Coaxial cable should be properly connected to a monitor, DVR. or one cable receiver unit
  - Please use a coaxial cable and BNC connector which have 75Ω impedance
2. Power supply to the camera (DC12V)
  - Connect a DC 12V power source to the camera careful with polarity.
3. RS-485 line connection (RS485)
  - Connect to an external controller careful with polarity referring to below picture
4. Motion Detection Out (MD)
  - When motion detected, camera outputs DC3.3V through this port.
5. Day & Night input (D&N)
  - Day/Night mode can be switched by a signal from an external device.
  - To use this function, <DAY&NIGHT> setting should be set to <EXT>.

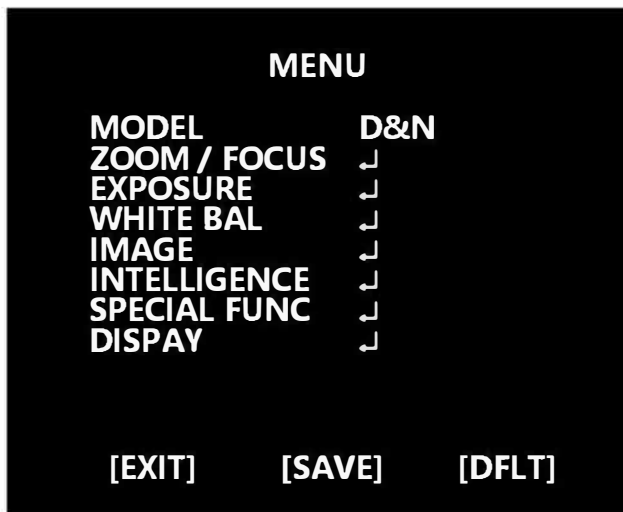




# MAIN MENU

Camera menu is subject to change without prior notice for the functional upgrade or quality improvement. Also, we may use slip sheet for the change. Please check the camera version and the slip sheet if the camera menu and this manual's menu is not matched.

## MAIN MENU



The menu consists of the “Main Menu” and “Sub Menu”.

Except MODEL, the rest main menus have associated sub menu. So, if you select each main menu, associated sub menu is displayed.

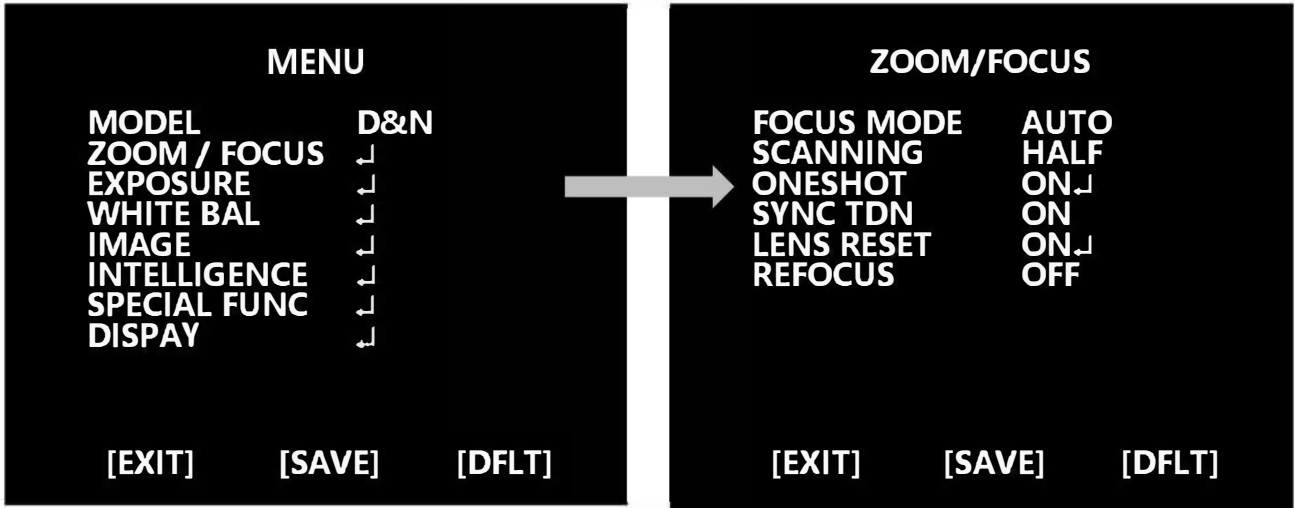
If you want save the current settings, select [SAVE]

If you do not want save the current settings, select [EXIT]  
But, before power off → on, camera will keep the changed current settings.

If you want to restore the default settings, select [DFLT]

- ◆ MODEL : Please keep “D&N” setting without change
  - ▶ D&N, IR-CDS, COLOR
    - ▷ D&N : Apply to non-IR model only
    - ▷ IR-CDS : Apply to IR model
    - ▷ COLOR : Apply to non TDN model

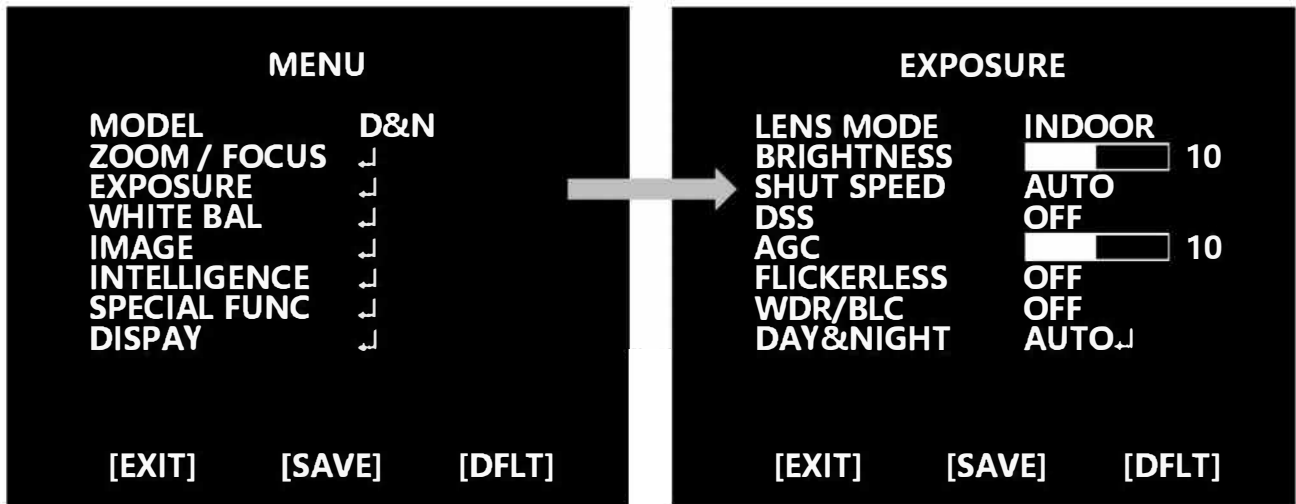
## FOCUS



- ◆ FOCUS MODE : Set auto focus mode ► AUTO, MANUAL
- ◆ SCANNING : Set focus scan range ► HALF, FULL
- ◆ ONESHOT : Set readjust focus
  - ON : Pressing the [SET] button more than 3 seconds activates the One-push Auto Focus.
- ◆ SYNC TDN : Performs the One-shot AF when the TDN switched.
- ◆ LENS RESET : Performs the lens initialization.
  - ON : Pressing the [SET] button more than 3 seconds activates the Lens initialization.
- ◆ REFOCUS : Set refocusing time interval. ► OFF, ON↓
  - ▷ INTERVAL TIME : 1day ~ 10days

# EXPOSURE

## EXPOSURE



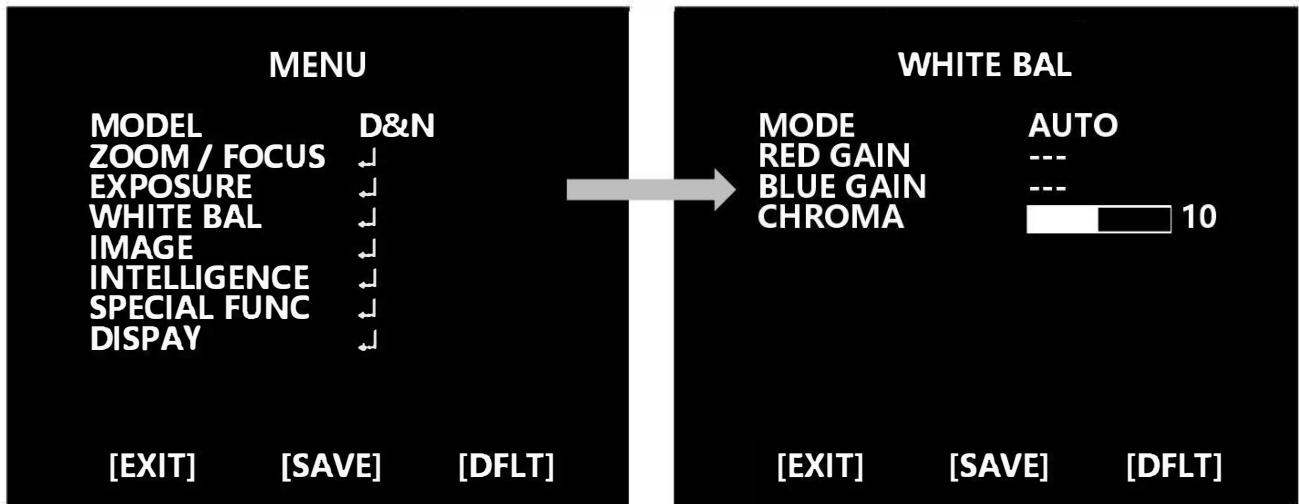
- ◆ LENS MODE : Select LENS mode↵
  - ▷ INDOOR / OUTDOOR / DEBLUR
  
- ◆ BRIGHTNESS : Set brightness level ▶ 0(dark) ~ 20(bright) steps
  
- ◆ SHUT SPEED : Set the shutter operation mode ▶ AUTO / MANUAL↵
  - ▷ Manual Shutter Speed
    - \* 60/50 fps mode :  
1/60(50), 1/100, 1/120, 1/250, 1/500, 1/700, 1/1000, 1/2000, 1/3000,  
1/6000, 1/10000, 1/20000, 1/30000, 1/60000 sec
    - \* 30/25 fps mode :  
1/30(25), 1/60(50), 1/100, 1/120, 1/250, 1/500, 1/700, 1/1000, 1/2000,  
1/3000, 1/6000, 1/10000, 1/20000, 1/30000, 1/60000 sec
  
- ◆ DSS : Set maximum DSS (Digital Slow Shutter) operating range.
  - \* 60/50 fps mode ▶ OFF / x2, x4, x8, x16, x32, x64
  - \* 30/25 fps mode ▶ OFF / x2, x4, x8, x16, x32
  
- ◆ AGC : Set Auto Gain Control ▶ 0 ~ 10 steps
  
- ◆ FLICKERLESS : Set Flickerless mode ▶ OFF / ON

# EXPOSURE

- ◆ WDR/BLC : Set WDR(Wide Dynamic Range) or BLC(Backlight compensation)
  - ▶ WDR↵
    - ▷ MODE : Select WDR mode.
      - ▶ LINE, FRAME
    - ▷ LEVEL : Set WDR level.
      - ▶ LOW, MID-LOW, MIDDLE, MID-HIGH, HIGH
      - ※ WDR does not work at Manual Shutter Mode.
  - ▶ BLC↵
    - ▷ POSITION : Adjust the position of BLC target window
    - ▷ SIZE : Adjust the BLC target window size
    - ※ Can not use WDR and BLC at the same time.  
(If WDR On, BLC will be Off. Also if BLC On, WDR will be Off)
  
- ◆ DAY&NIGHT : Select how to judge Day & Night condition.
  - ▶ MODE : Please Keep MODEL as "D&N" without change
    - ▷ AUTO
      - ※ Day&Night condition is decided by internal processing.
      - ▶ DELAY : 0 ~ 255 sec
      - ▶ THRS : 0 ~ 28
      - Day↔Night switching level in Auto Mode.  
The lower number, Day & Night changes at lower illumination.
      - ▶ GAP : LOW, MID-LOW, MIDDLE, MID-HIGH, HIGH
      - Illumination gap between Day→Night and Night→Day switching level.
      - ▶ IR DETECTION : Set IR-Detection mode. (ON/OFF)
      - ▶ IR DET LEVEL : Set IR-Detection level.
      - ▶ ANTI-SAT : Improves LED saturation. (0~20)
      - ▶ BURST : OFF/ON
    - ▷ EXT-IN
      - ※ Day&Night condition is decided by external signal.
      - ▶ DELAY : 0 ~ 255 sec
      - ▶ ANTI-SAT : Improves light saturation by LED (0~20)
      - ▶ BURST : OFF/ON
      - ▶ POLARITY : Set external Input polarity (ACTIVE LOW / ACTIVE HIGH)
    - ▷ DAY
      - ※ Regardless of the ambient illumination, camera keeps Day mode.
    - ▷ NIGHT
      - ※ Regardless of the ambient illumination, camera keeps Night mode.
      - ▶ ANTI-SAT : Improves light saturation by LED (0~20)
      - ▶ BURST : OFF/ON

# WHITE BALANCE

## WHITE BALANCE



◆ AWB : Set WHITE BALANCE mode

▶ AUTO / ONE PUSH<sup>Ⓛ</sup> / MANUAL / INDOOR / OUTDOOR

- ▷ AUTO : Automatically adjusts color according to the lighting condition.
- ▷ ONE PUSH : While ONE PUSH pressed, camera runs the white balance working. if ONE PUSH released, camera stops white balance working.
- ▷ MANUAL<sup>Ⓛ</sup> : Camera does not perform white balance working. User can increase or decrease "RED GAIN" or "BLUE GAIN" manually.
- ▷ INDOOR : Set color temperature to Indoor light (3700°K)
- ▷ OUTDOOR : Set color temperature to Outdoor light (5100°K)

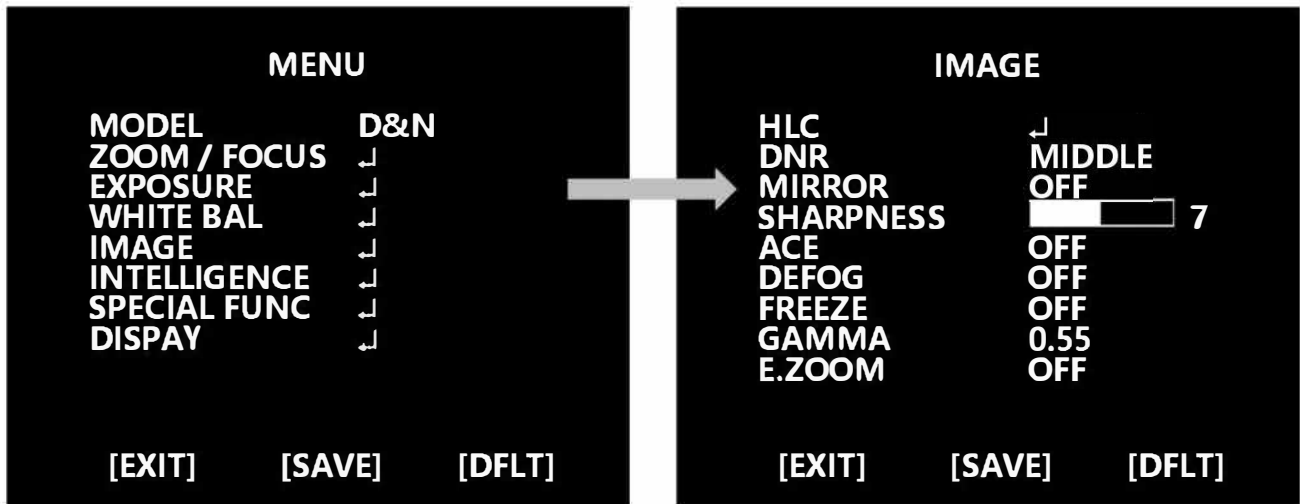
◆ RED GAIN : Adjust R gain value ▶ 0 ~ 20 steps

◆ BLUE GAIN : Adjust B gain value ▶ 0 ~ 20 steps

◆ CHROMA : Adjust CHROMA gain value ▶ 0 ~ 20 steps

# IMAGE

## IMAGE



- ◆ HLC : Set High Light Compensation.  
When camera is shooting extremely bright light source, camera masks the area to prevent saturation on the monitor.
  - ▷ MODE : OFF / ON / NIGHT
  - ▷ LEVEL : 0 ~ 20 steps
  - ▷ COLOR : 0 ~ 13 steps
- ◆ DNR : Set the use of Digital Noise Reduction
  - ▶ OFF / LOW / MIDDLE / HIGH / AUTO
- ◆ MIRROR : Set mirror or flip image mode
  - ▶ OFF / H / V / H&V
    - ▷ H : You can mirror the picture horizontally on the monitor
    - ▷ V : You can flip the picture vertically on the monitor
    - ▷ H&V : You can execute mirror and flip at the same time.
- ◆ SHARPNESS : Adjust sharpness level
  - ▶ 0 ~ 10 steps

# IMAGE

◆ ACE : Set Adaptive Contrast Enhancement function  
▶ OFF / LOW / MIDDLE / HIGH

◆ DEFOG : Set Defog function  
▶ OFF / ON↵  
▷ MODE : AUTO / MANUAL  
▷ LEVEL : LOW / MIDDLE / HIGH

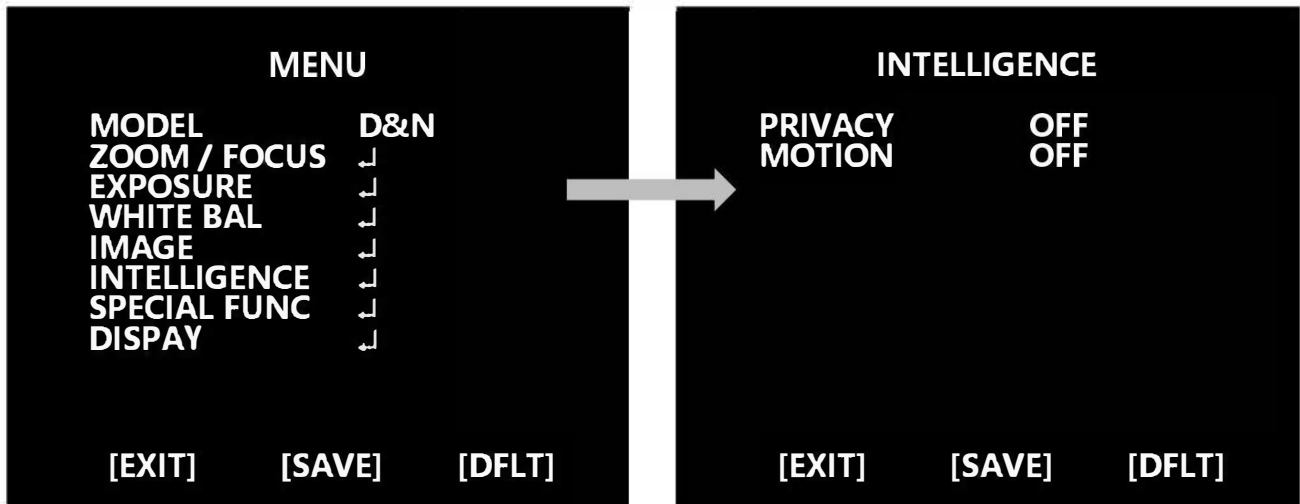
※ You can not use DEFOG and ACE at the same time  
(When ACE On, DEFOG will be Off. Also when DEFOG is On, ACE will be Off)

◆ Freeze : This function stops video  
▶ OFF / ON

◆ GAMMA : Select Gamma  
▶ 0.45 / 0.55 / 0.65 / 0.75

◆ E.ZOOM  
▶ OFF / ON↵  
▷ LIMIT : Max x2 ~ x19, x21, x23, x25, x28, x32  
▷ POSITION : Select maximum digital zoom magnification.

## INTELLIGENCE



◆ PRIVACY : You can hide some areas on the screen

▶ OFF / ON↵

- ▷ MASK# : Select a number of mask area (1 ~ 24)
- ▷ MODE : Enable or disable mask (OFF / ON)
- ▷ POSITION : Adjust the position of the mask
- ▷ SIZE : Adjust the size of the mask
- ▷ COLOR : Select mask color (0 ~ 13)
- ▷ TRANS : Select mask transparency level (0 ~ 3)

◆ MOTION : When there is movement on the screen, camera detects the motion.

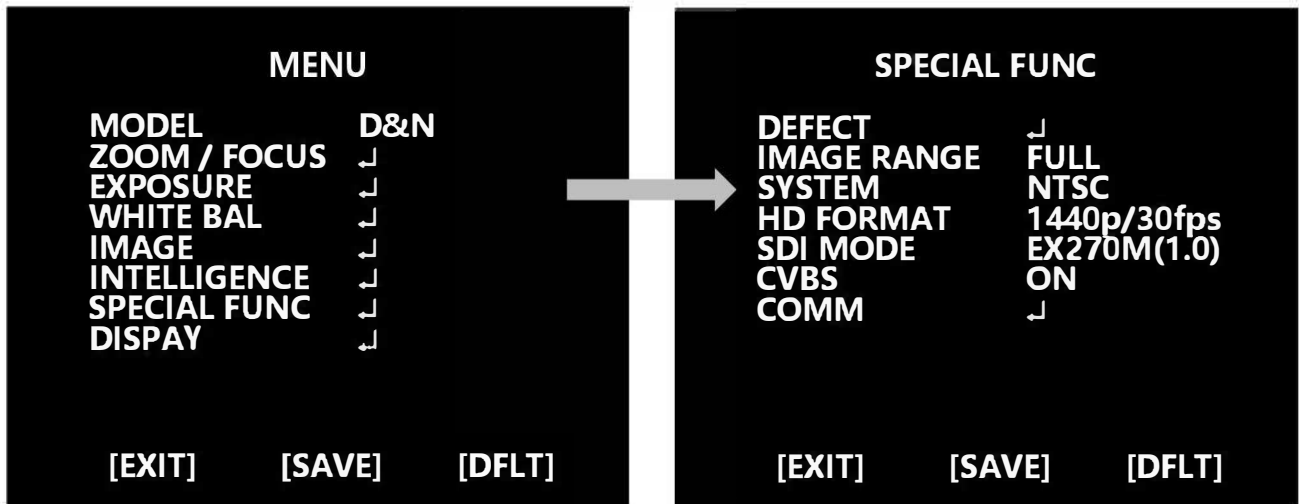
▶ OFF / ON↵

- ▷ AREA# : You can configure up to 3 areas(1~3) of motion detection
- ▷ MODE : OFF / ON (Enable or disable motion detection)
- ▷ SENSITIVITY : Set the sensitivity of motion detection (0 ~ 20 steps)  
The lower number, the higher sensitivity.
- ▷ POSITION : Adjust the position of motion detection area
- ▷ SIZE : Adjust the size of motion detection area
- ▷ INTERVAL TIME : Set the detection time interval (0 ~ 255sec)
- ▷ DWELL TIME : Set the motion alarm duration time (0 ~ 255sec)



# SPECIAL FUNCTION

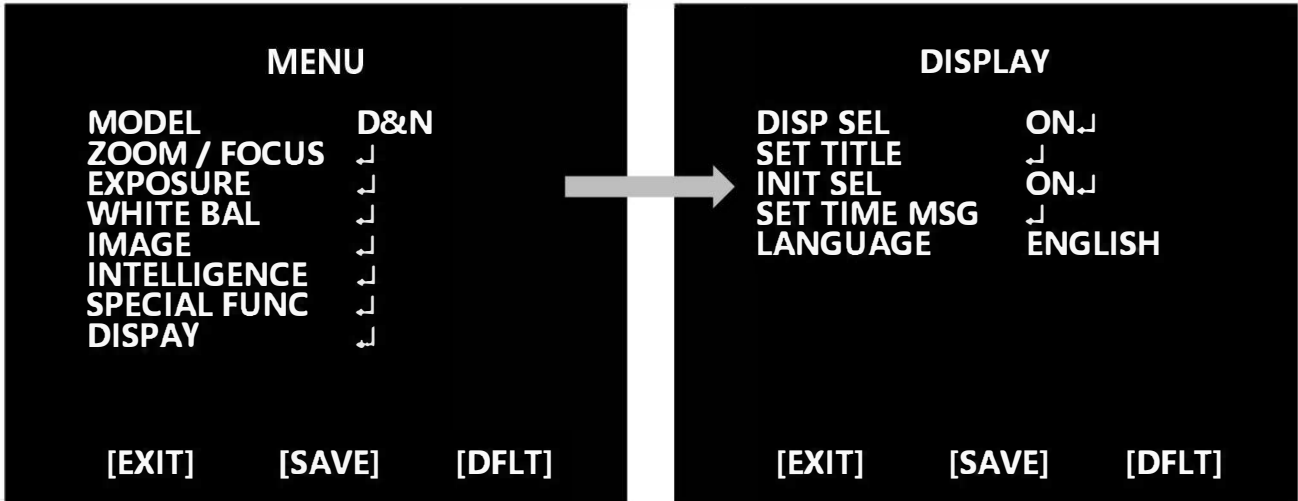
## SPECIAL FUNC



- ◆ DEFECT : Compensates bad pixels on image sensor
- ◆ IMAGE RANGE : Set the bit range of video image  
(Full : 100%, Compressed : 75%)
  - ▶ FULL, COMP, USER↵
  - ▷ LEVEL : Set the level of user mode (0 ~ 32)
- ◆ SYSTEM : Select NTSC(30/60fps) or PAL(25/50fps).
- ◆ HD FORMAT : Set digital video output mode  
(1440p/30/25fps, 1080p/30(25)fps, 720p/30(25)fps)
- ◆ SDI MODE : Select SDI output mode
  - ▶ OFF / HD-SDI / EX-SDI 135M(v2.0) / EX-SDI 135M+(v2.1) / EX-SDI 270M(v1.0)
- ◆ CVBS : Select analog output mode
  - ▶ OFF / ON
- ◆ COMM : Set camera ID, baud rate and protocol
  - ▷ ID : Set camera ID
    - ▶ 1 ~ 255
  - ▷ BAUD RATE : Set the speed of serial communication
    - ▶ 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200bps
  - ▷ PROTOCOL : Select a protocol
    - ▶ VISCA / PELCO-D / PELCO-P / UPDATE

# DISPLAY

## DISPLAY



- ◆ DISP SEL : Select items to display on the screen
  - ▶ OFF / ON↵
    - ▷ ID : OFF / ON ▷ TITLE : OFF / ON
    - ▷ ZOOM RATIO : OFF / ON
    - ▷ SYSTEM MSG : OFF / ON  
(MD Alarm and Wait message)
- ◆ SET TITLE : Configure camera title  
(Text edit - max 40 characters are allowed)
- ◆ INIT SEL : Select messages to display on the initial screen page
  - ▶ OFF / ON↵
    - ▷ ID : OFF / ON ▷ BAUDRATE : OFF / ON
    - ▷ PROTOCOL : OFF / ON ▷ VERSION : OFF / ON
    - ▷ INIT MSG : OFF / ON
- ◆ SET INIT MSG : modify initial message.  
(Text edit - max 40 characters are allowed)
- ◆ LANGUAGE : Select a language to display
  - ▶ English / Simplified Chinese / Traditional Chinese / Japanese
  - ※ Character Table of Text edit Mode

```
A B C D E F G H I J K L M N O P Q R S T
U V W X Y Z a b c d e f g h i j k l m n
o p q r s t u v w x y z , . ( ) { } [ ]
0 1 2 3 4 5 6 7 8 9 * + - / = ~ ! ? " ' "
```

# SPECIFICATIONS

Image Sensor	1/2" Sony Starvis CMOS Sensor
Total Pixels	3,096(H) x 2,094(V) = 6.48M pixels
Active pixels	3,089(H) x 1,744(V) = 5.39M pixels
Lens	Optical 3x, Digital 32x Zoom f = 3.6mm ~ 10mm, F1.5 (wide) ~ F2.8 (tele)
FOV	Horizontal : 86°~37°, Vertical : 47°~22°
Digital Zoom	2x ~ 32x
Resolution	Digital : 1440p30(25), 1080p/30(25)fps, 720p/30(25)fps Analog : 700TVL
Min. illumination	Color(1/30s) : 0.2 lux , BW(1/30s) : 0.05lux Color DSS(1/1s) : 0.02 lux , BW DSS(1/1s) : 0.005 lux
Video Output	HD : HD-SDI <sup>Note1</sup> , EX-SDI Analog SD : VBS (※Test purpose only)
S/N Ratio	more than 50dB (AGC off)
Comm. Baudrate	2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200
Focusing Mode	Auto / Manual
Shutter Speed	1/30(25) ~ 1/60,000 sec
WDR/BLC	OFF / WDR / BLC
White Balance	AUTO / One Push / Manual / Indoor / Outdoor
Power Source	DC12V±10%
Power Consumption	DC 12V : 360mA
Storage Temperature	-20°C ~ +60°C (Humidity : 0%RH ~ 90%RH)
Operating Temperature	-10°C ~ +50°C (Humidity : 0%RH ~ 90%RH)
Weight	480g

\* Note 1 : HD-SDI signals may not exactly match the standard.

\* Note 2 : Design and specifications are subject to change without notice.

P/N :  
PRINTED IN KOREA

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