



# BOSCH

## INSTALLATION INSTRUCTIONS

### EX27/EX27N/EX27D

All-Weather Cameras



MAN-27/27N/27D-01

## **IMPORTANT SAFETY INSTRUCTIONS**

1. Read these instructions.
2. Keep this instruction.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with manufacturer instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the power where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in a way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.



## IMPORTANT

For best results, please read this Instruction Booklet prior to installing the **EX27** camera.

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EU Directives covered by this declaration:

72/9/EC Low Voltage Directives

89/336/EEC Electromagnetic Compatibility Directive

This installation should be made by a qualified service person and conform to all local codes.

**Bosch Security Systems** will not be responsible for injuries or damages resulting from the improper installation or use of any camera sold by **Bosch Security Systems**, their agents, distributors or dealers.

*NOTE: This equipment has been tested and found to comply with the limits for 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. As part of its' normal operation this device can generate radio frequency energy and if not installed and used in accordance with the installation manual may cause interference to radio communications. However, there is no guarantee that interference will not occur on a particular installation. If the device does cause interference to radio or television reception the user is encouraged to try to correct the interference by one or more of the following measures:*

- 1) Fit Ferrite beads on all cable to and from the power supply box, within the box walls.*
  
- 2) Route the composite cable between the camera and the power supply in steel conduit piping over the entire run of the cable up to and including connection to a deep conduit base fitted under the camera and a conduit fitting adaptor in the wall of the PSU box.*
  
- 3) Contact a Bosch Service Center for further advice.*

# INDEX – EX27/27N/EX27D

1.	DESCRIPTION.....	7
2.	UNPACKING.....	8
3.	EX27/EX27N MECHANICAL SPECIFICATIONS... ..	9
4.	EX27D MECHANICAL SPECIFICATIONS.....	10
5.	INITIAL PREPARATIONS.....	11
6.	GUIDELINES.....	12
7.	VOLTAGE INPUT.....	13
8.	CAMERA AND LENS ACCESS.....	14
9.	PHOTOCELL ADJUSTMENTS.....	17
10.	LENS ADJUSTMENTS.....	19
11.	OSD MENU SYSTEM.....	21
12.	TROUBLESHOOTING GUIDE.....	40
13.	GENERAL SPECIFICATIONS.....	43

# 1. DESCRIPTION

The **EX27** camera is an all-weather system that includes all of the best features of a “plug and play” camera without compromise to CCD optics and lens quality.

Full size vari-focal auto-iris lenses are integrated as standard equipment for simplified installations. High resolution extended day/night CCDs ensure that a picture is received under extreme outdoor lighting conditions.

The **EX27** is rugged, compact, power protected, weather sealed, easily installed and designed for use in industrial applications.

A voltage regulator circuit automatically allows for *12VDC* or *24VAC* operation without any wiring changes. Its wider voltage range also provides protection from voltage surge, transient spikes, and reverse voltage.

The **EX27** is available in several models to meet individual requirements or specific needs.

## 2. UNPACKING

Care should be taken when unpacking. Check the parts list and confirm all items have been located. Inspect the equipment thoroughly to ensure nothing was damaged in transit.

Contact a Bosch Service Center if a problem is noted, see the rear page of this booklet for contact numbers.

### **PARTS LIST** (items supplied with unit)

- *EX27/EX27N/EX27D* camera assembly
- Installation Instructions
- Universal type pan/tilt mounting bracket with  
1/4 - 20 captive nut
- 3mm Allen key

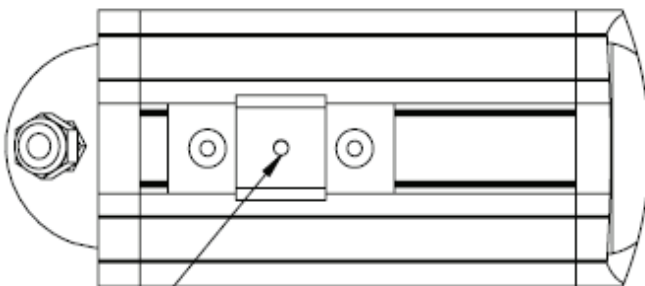
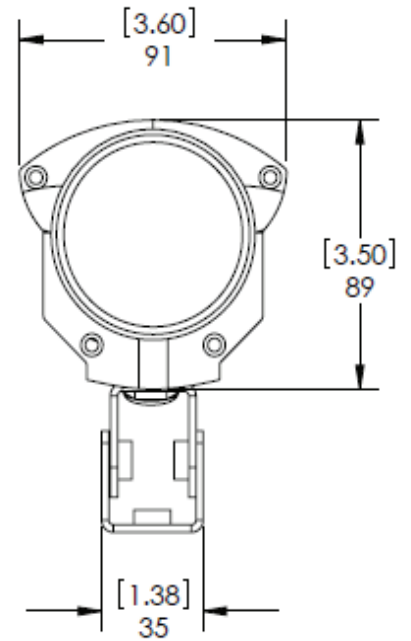
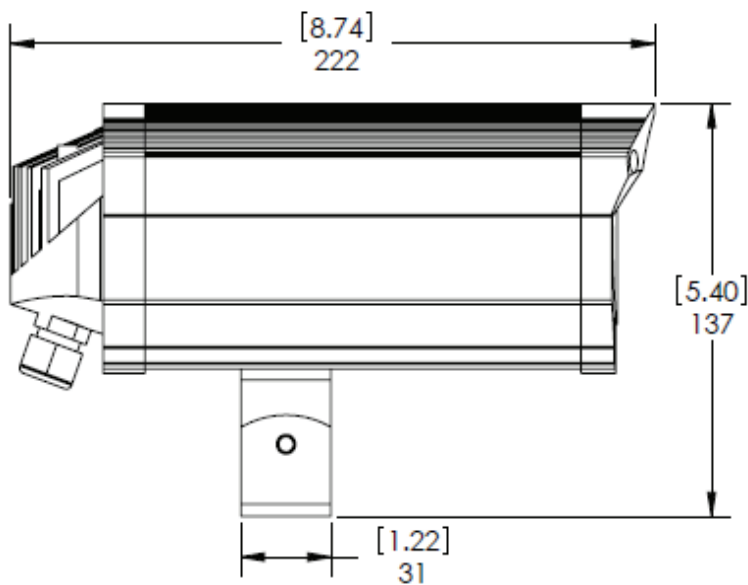
### **ITEMS REQUIRED FOR INSTALLATION**

(not supplied with unit)

- Hardware for camera mounting (bolts, etc.)
- Mounting tools and wrenches
- Optional mounting brackets (contact Bosch for details and prices)

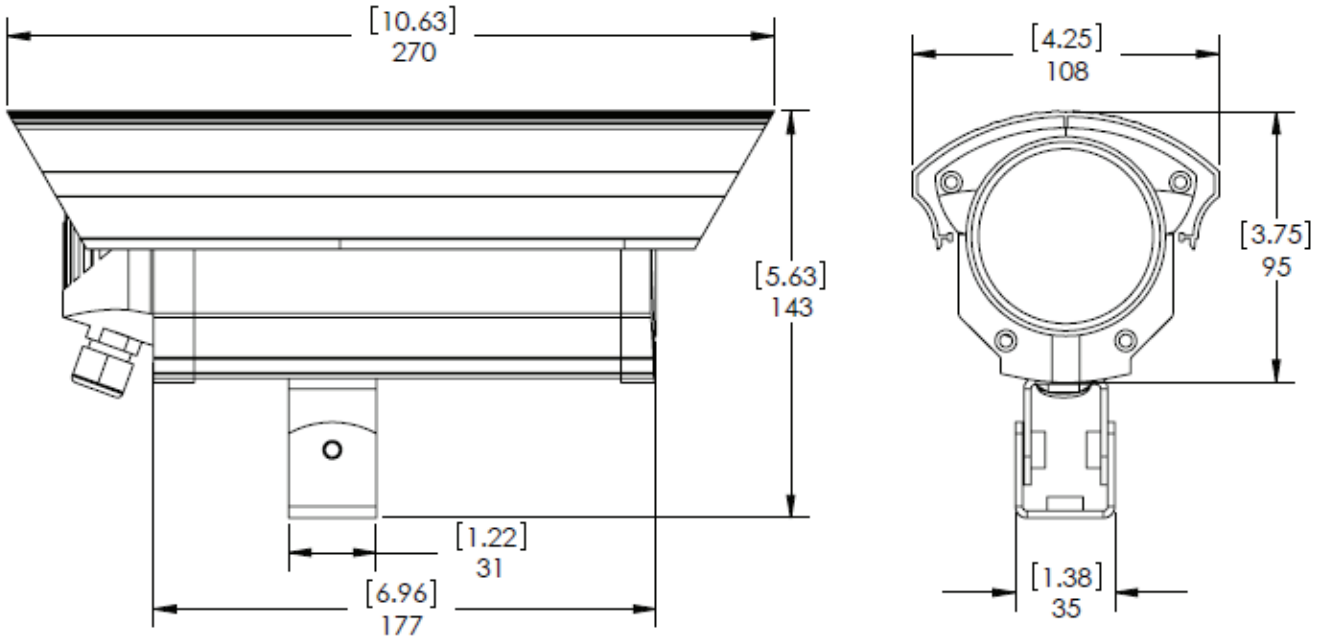


### 3. EX27/EX27N MECHANICAL SPECIFICATIONS



1/4-20 UNC  
Tapped Hole

# 4. EX27D MECHANICAL SPECIFICATIONS



1/4-20 UNC  
Tapped Hole

## 5. INITIAL PREPARATIONS

- Determine the operating voltage at the installation site.
- All cameras have been tested prior to shipment.

Select a suitable location that is protected from accidental damage, tampering, and environmental conditions exceeding the camera's specifications.

*Caution: The selected mounting location should not place the camera in a situation where its environmental specifications could be exceeded.*

*Ensure the selected location is protected from falling objects, accidental contact with moving objects, and unintentional interference from personnel. Follow all applicable building codes.*

## 6. GUIDELINES

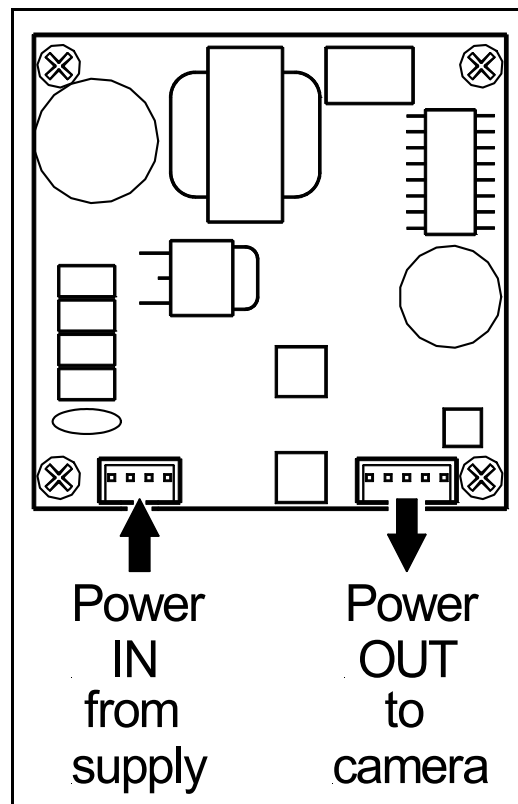
**The following installation guidelines must be followed:**

- Locate the camera such that it cannot be easily interfered with, either intentionally or accidentally.
- Select a mounting surface capable of supporting the combined weight of the camera and mounting hardware under all expected conditions of vibration and temperature.
- Secure all cabling.
- Installations on drywall must use a 1/4" bolt and drywall butterfly type anchor or superior connection.

## 7. VOLTAGE INPUT

The camera unit is pre-connected with an electrically isolated power board for 24VAC or 12VDC operation with no wiring change or wiring polarity. See figure 7-1 for wiring details.

Note: Input voltage is 10.5VDC to 40VDC for DC input. The AC input range is 12VAC to 28VAC.

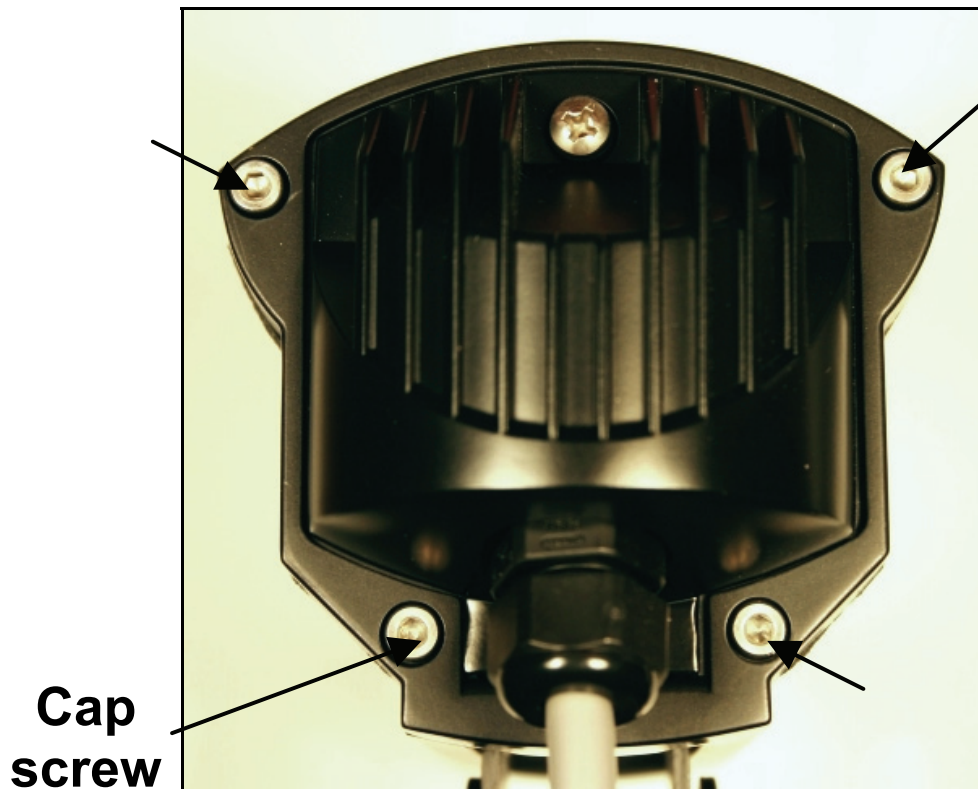


**FIGURE 7 – 1**  
**12VDC or 24VAC**  
**Electrically Isolated Board**

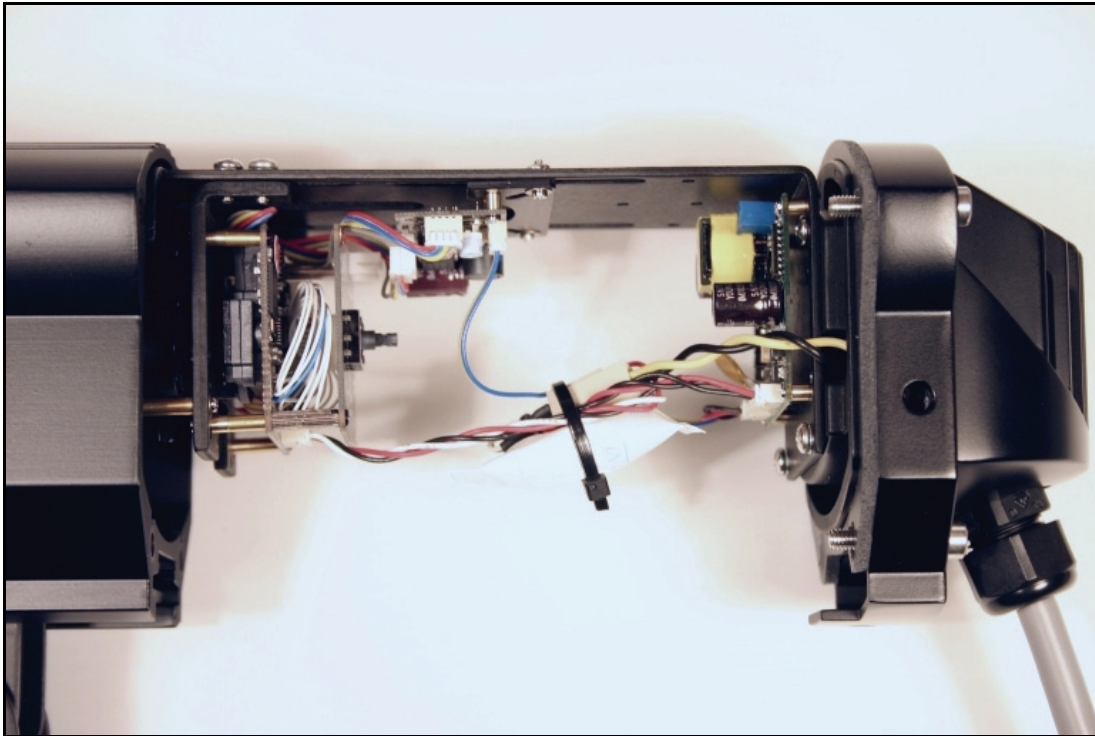
## 8. CAMERA AND LENS ACCESS

The following steps show the installer how to access the camera board and the camera lens.

- Step 2.1 - Remove the four cap screws with a 3mm Allen key. See **Figure 8-1** on page 15.
- Step 2.2 - Carefully slide out the rear housing from the main enclosure. Make sure the gasket remains with the rear section. See **Figure 8-2** on page 16.
- Step 2.3 - Make any necessary camera or lens adjustments as described in **Section 9, 10 or 11**.
- Step 2.4 - Carefully slide the rear section into the main enclosure and tighten the cap screws.



***FIGURE 8 – 1***  
***Rear Housing Removal***

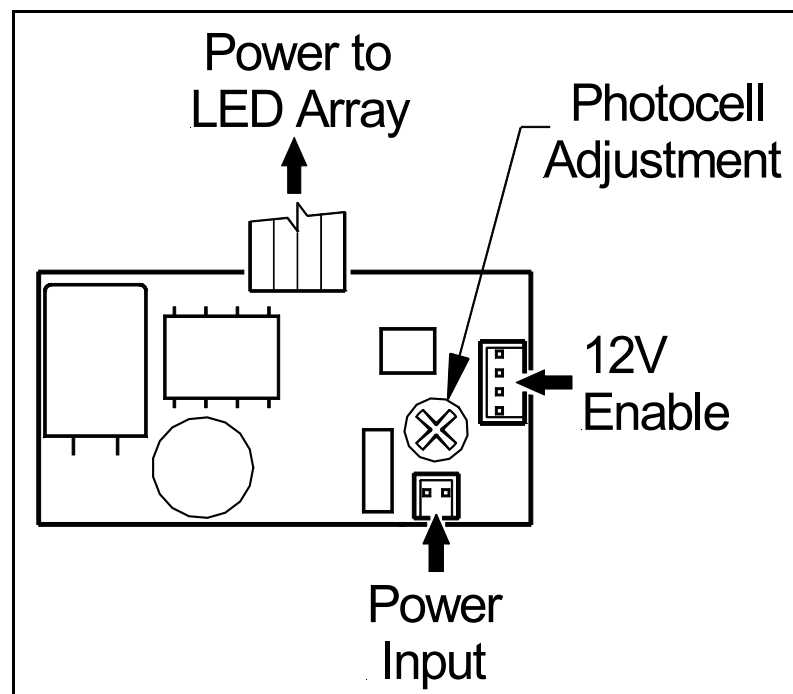


***FIGURE 8 – 2***  
***Camera and Lens Access***

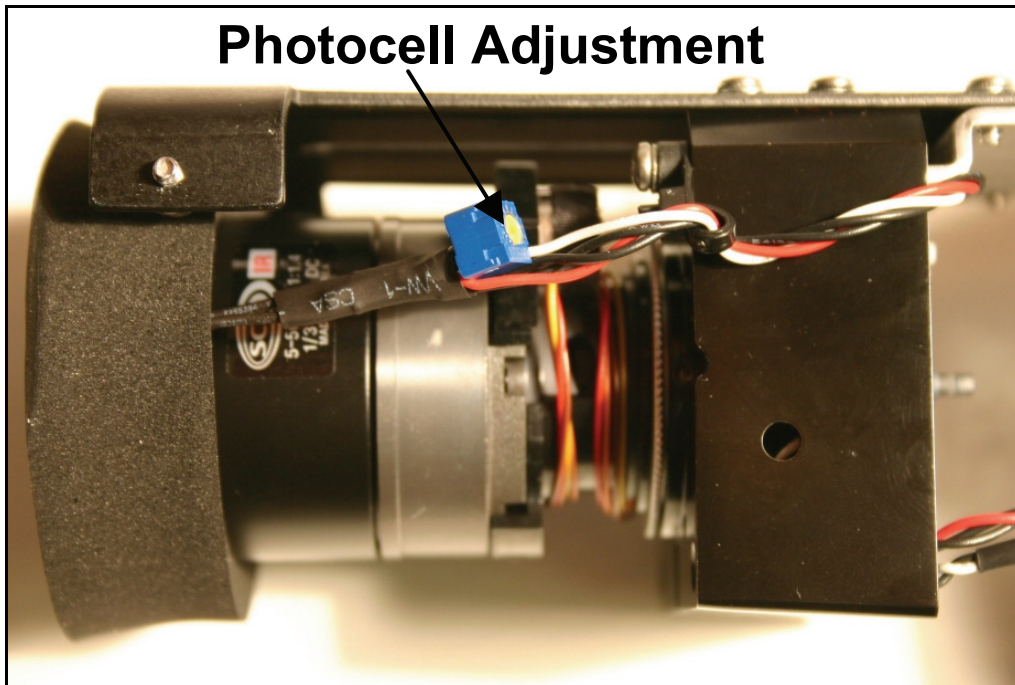


## 9. PHOTOCCELL ADJUSTMENTS

The photocell settings are optimally set from the factory; **only** adjust these settings if experiencing undesired day/night switching operation. To increase the night switching sensitivity turn the dial clockwise, to increase the day switching sensitivity turn the dial counter-clockwise. For EX27N versions refer to figure 9-1. For EX27 and EX27D refer to figure 9-2.



**FIGURE 9 – 1**  
**EX27N LED Array Power Board**

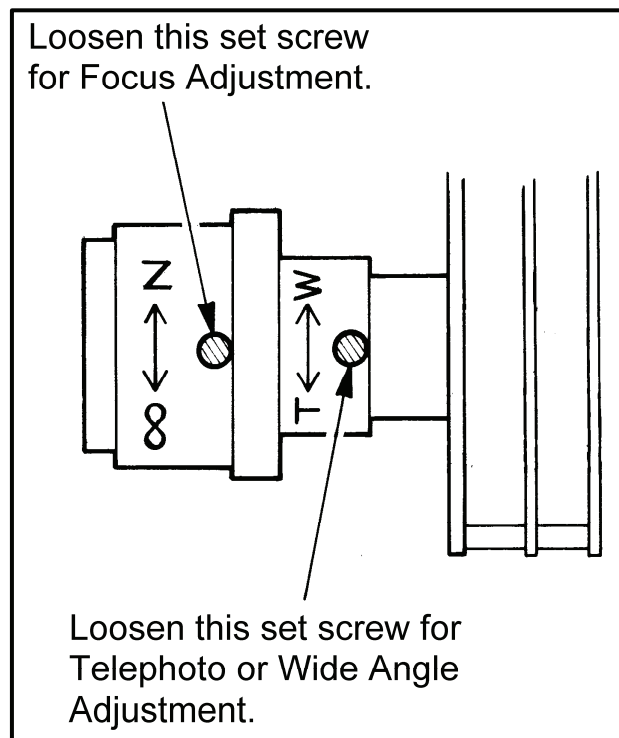


***FIGURE 9 – 2  
EX27/EX27D Day/Night Switch  
Adjustment***

## 10. LENS ADJUSTMENTS

Refer to figure 10-1 and follow the directions below:

- Loosen the lens set screws for focus/zoom adjustments.
- The adjustment marked T  $\longleftrightarrow$  W is for image zoom.
- The adjustment marked N  $\longleftrightarrow$   $\infty$  is for image focus.
- Re-tighten the setscrews after focus adjustments have been completed.



**FIGURE 10 – 1**  
**EX27 Vari-focal Lens Focus Adjustment**



## IMPORTANT

Use a Neutral Density filter or an Infra-Red Pass filter to cover the lens during focusing to simulate low light conditions on scene for correct 24-hour focusing. For vari-focal lenses, the camera should be focused with the lens iris fully opened to simulate the worst possible depth of field. Using a Neutral Density filter or Infra-Red Pass filter will ensure the iris is fully open for correct setup and adjustment.


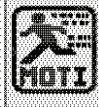
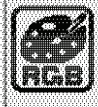





Note that statement above is applicable only for Day/Night or IR version cameras.

# 11. OSD MENU SYSTEM

1. Follow the instructions in **Section 8** to access the OSD controls.
2. Enter the OSD menu by pressing the joystick button; to navigate through the menu use up, down, left and right.
3. Follow the instructions below to make camera adjustments.

## ■ CAMERA OPERATION

### MENU

<b>1. EXPOSURE</b>		<b>5. MOTION</b>	
	LENS		ALARM
	MANUAL/DC		
	E. SHUTTER		
	AUTO-1/100000		
	BLC		
	AGC		
	OFF~36dB		
<b>2. COLOR</b>		<b>6. PRIVACY</b>	
	WB MODE		MASK 1
	AWC		MASK 2
	ATW		MASK 3
	MANUAL		MASK 4
	PUSH LOCK		COLOR SET
<b>3. DAY&amp;NIGHT</b>		<b>7. SETUP</b>	
	D&N MODE		CAMERA ID
	AUTO		TITLE EDIT
	COLOR		TITLE RESET
	BW		TITLE POSITION
	EX-CONT		DPC SET
			LANGUAGE
			PC CONT.
<b>4. FUNCTION</b>		<b>8. EXIT</b>	
	MIRROR		EXIT
	SHARPNESS		SAVE & EXIT
	GAMMA		FACTORY SET
	SLC		
	HME		
	DRC		

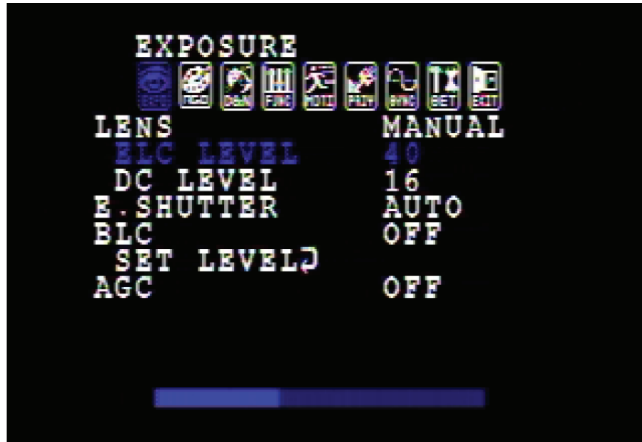
## ■ CAMERA OPERATION



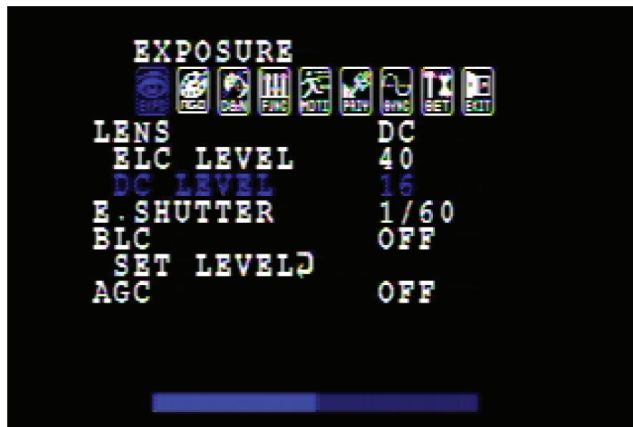
### EXPOSURE - LENS

Select the type of lens ( MANUAL / DC)

**MANUAL** : Select for manual iris control. The brightness of the screen is adjustable by ELC level.



**DC** : Select for automatic iris control. The offset brightness of the screen is adjustable by DC level.



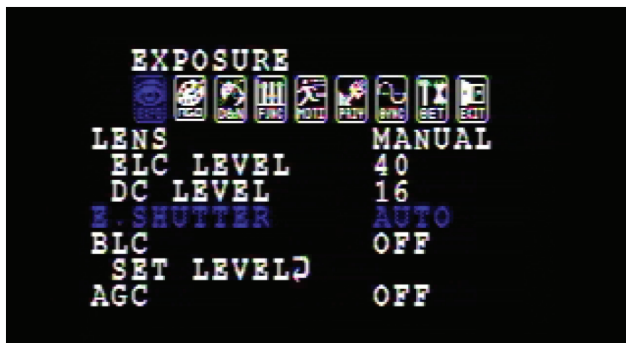
## ■ CAMERA OPERATION



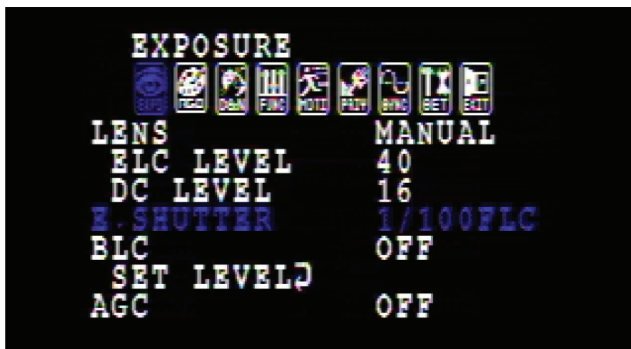
### EXPOSURE - E.SHUTTER

This mode is selectable to either Auto or Fixed control for the electronic shutter.

AUTO : Set for complete automatic operation of the electronic shutter  
(Unavailable when Lens iris control is set to DC)



FIXED : Set to desired minimum shutter speed, 10 levels available.  
1/50s(PAL), 1/60s(NTSC), 1/100s, 1/250s, 1/500s, 1/1000s,  
1/2000s, 1/4000s, 1/10000s, 1/100000s)



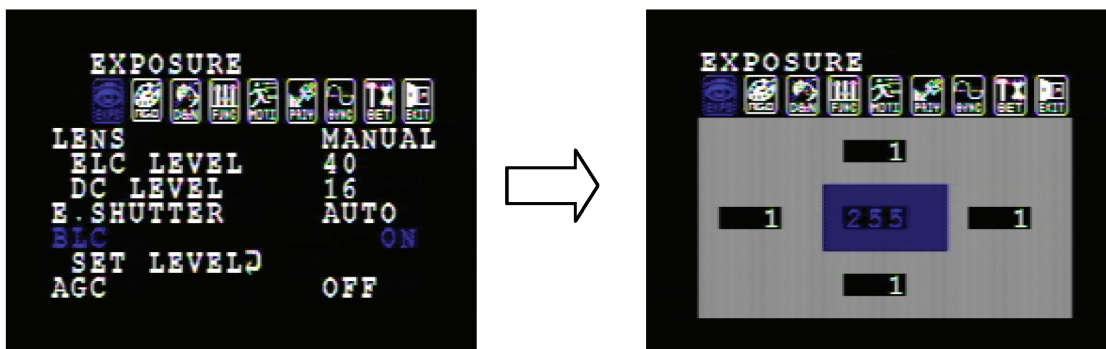
## ■ CAMERA OPERATION



### EXPOSURE - BLC (Back Light Compensation)

When there is a strong backlight in the scene, change BLC in order to get a uniform image.

By selecting "BLC ON", BLC activity area and level are adjustable in 5 sections (TOP / DOWN / CENTER / RIGHT / LEFT). Increase the level in areas desired to become brighter for compensation.



## ■ CAMERA OPERATION



### EXPOSURE - AGC (Auto Gain Control)

This function is designed to automatically adjust video gain to enhance the picture in darker scenes. AGC is adjustable within OFF - 36dB.





## ■ CAMERA OPERATION



### COLOR - WHITE BALANCE CONTROL

Screen color is adjustable in accordance with the type of ambient light on scene.

AWC : Use this for color temperatures below 2500°C and over 9500°C (indoors)

ATW : Use this for color temperatures between 2500°C and 9500 °C (outdoors)

Manual : The white balance is manually controlled.

PUSH LOCK : If PUSH LOCK is selected, the white balance adjusts automatically for the current light on scene.



## ■ CAMERA OPERATION

Manual : Adjust RED or BLUE in accordance with the type of ambient light on scene.



## ■ CAMERA OPERATION



### COLOR - GAIN CONTROL

Select the desired gain value. The higher the gain level, the more the scene displays that color.

R-Y GAIN : Adjustment of RED color

B-Y GAIN : Adjustment of Blue color



## ■ CAMERA OPERATION



### DAY & NIGHT (AUTO / COLOR / B/W)

This function determines how day and night modes are handled.

AUTO : The camera automatically switches between day and night mode depending on the light level.

COLOR : The camera stays in day mode.

B/W : The camera stays in night mode.



BURST SIGNAL : If ON, the screen shows a color burst while switching to day mode from night mode.

SET LEVEL : Not adjustable.

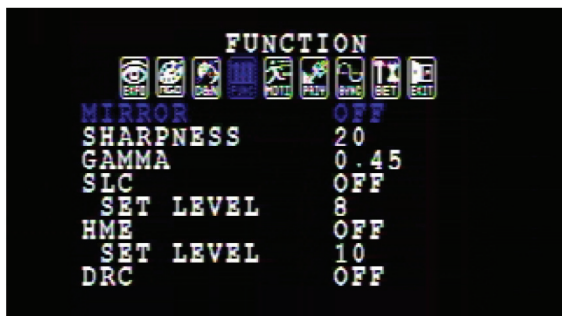
READ TIME : The switching time delay in AUTO mode for when the scene suddenly gets darker or brighter, adjustable from 3 secs to 12 secs.

## ■ CAMERA OPERATION



### FUNCTION - MIRROR

If ON is selected, the horizontal image on the screen is reversed.



### FUNCTION - SHARPNESS

The image sharpness is adjustable.



## ■ CAMERA OPERATION



### FUNCTION - GAMMA

GAMMA LEVEL is selectable in 3 levels. 0.45, 0.6, 1.0.



### FUNCTION - SLC (SIDE LIGHT COMPENSATION)

Select this mode when the corner of the screen is darker than the center.

As the level increases, the image becomes brighter.



## ■ CAMERA OPERATION



FUNCTION - HME (High Light Masking Exposure)  
This function masks the bright areas on the screen.

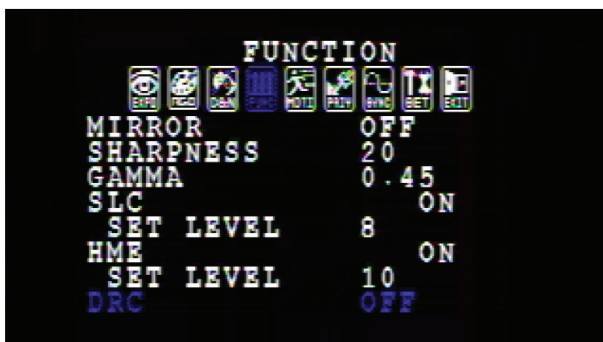
The brightness of HME is adjustable.

As the level of HME is increased, the masking area increases.



FUNCTION - DRC (Dynamic Range Compensation)

This function is to compensate darker images when different exposures are in one scene.

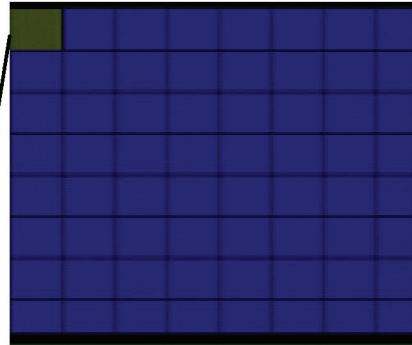
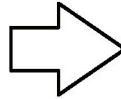


## ■ CAMERA OPERATION



### MOTION DETECTION

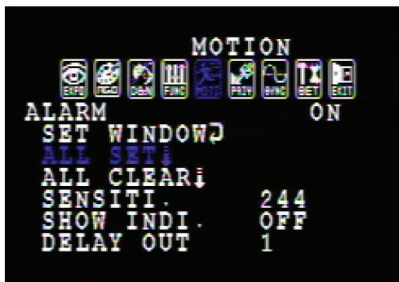
This camera feature allows you to detect the movement of an object in 64 different areas of the screen, and display an alarm on the screen.



Select or deselect blue areas with the joystick, only the blue areas are monitored for movement.

ALL SET : Set entire screen for movement detection.

ALL CLEAR : Clear entire screen for movement detection.



**ALL SET**



**ALL CLEAR**

## ■ CAMERA OPERATION

Sensitivity level : As the sensitivity level increases, smaller movements are detected.



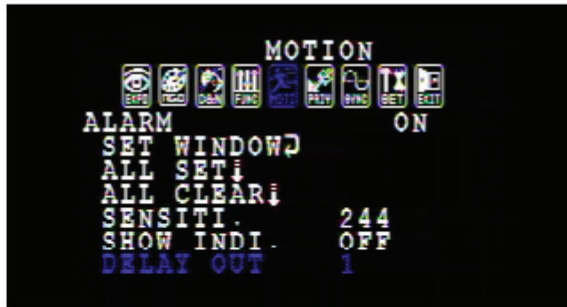
SHOW INDI : The motion detected indicator can be selected as icon, trace or off.





## ■ CAMERA OPERATION

DELAY OUT : The alarm signal display on the screen is delayed from 1sec to 15 sec.



## ■ CAMERA OPERATION



### PRIVACY (PRIVACY MASKING ZONE)

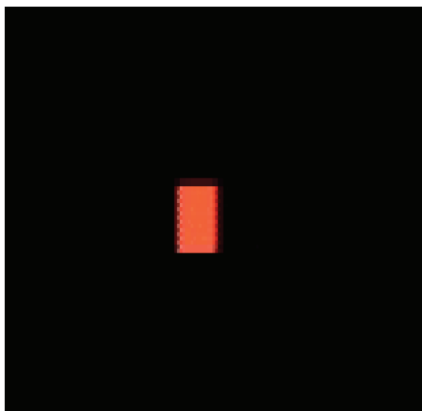
This function sets certain areas of the screen to be hidden. 4 masking zones are available.

MASK 1 : Adjust the masking area by using the joystick.

MASK 2 : Adjust the masking area by using the joystick.

MASK 3 : Adjust the masking area by using the joystick.

MASK 4 : Adjust the masking area by using the joystick.



If "set window" is selected, the cell is displayed on the screen and then adjusted by moving the joystick UP / DOWN / RIGHT / LEFT. Once desired area is covered press the joystick in until mask area is black then move the joystick any direction to return to the previous screen.

## ■ CAMERA OPERATION



### PRIVACY - COLOR SET

This function is to select the color of the masking cells.



## ■ CAMERA OPERATION



### SET UP - CAMERA ID

Enter a camera ID as a unique identifier.



## ■ CAMERA OPERATION



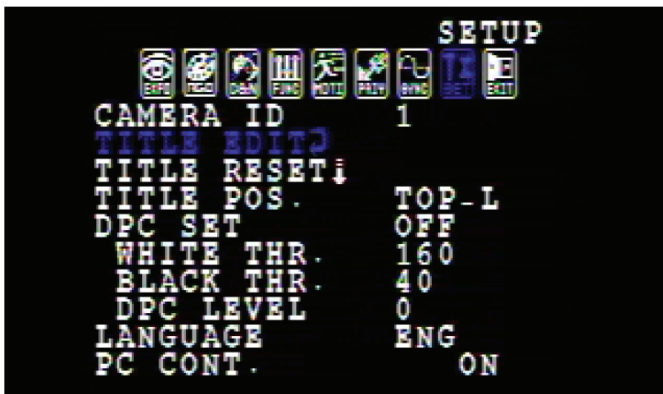
### SET UP - TITLE DISPLAY

Camera title is displayed on the screen when a value is entered.

TITLE EDIT : Select the value

TITLE RESET : Clears the title.

TITLE POSITION SELECTION : Set area to display title.



If editing the title, this image is displayed, select desired characters by using the joystick.

## ■ CAMERA OPERATION

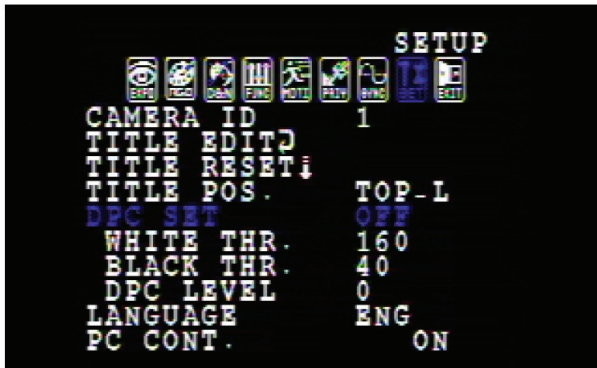


### SET UP - DPC SET (Defect Pixel Cancellation)

This function automatically removes dead pixels in real time.

WHITE THR. : For cancelling the white defective pixels.

BLACK THR. : For cancelling the black defective pixels.



The cancellation sensitivity of defective pixels is adjustable.

For adjusting defective white pixel sensitivity, set WHITE THR. and DPC LEVEL at the same time.

For adjusting defective black pixel sensitivity, set BLACK THR and DPC LEVEL at the same time.

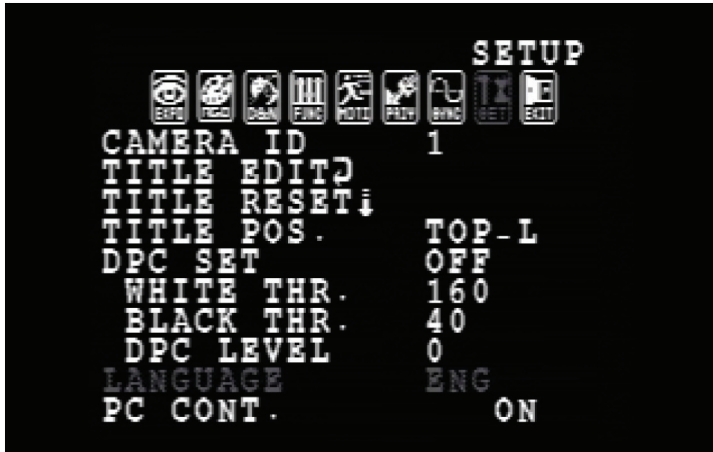


## ■ CAMERA OPERATION



### SET UP - LANGUAGE

The language of the OSD menu is selectable to either English or Chinese.



## ■ CAMERA OPERATION



### SET UP - PC CONT.

PC communication is available by setting PC CONT. "ON" (not supported)



## ■ CAMERA OPERATION



EXIT

EXIT : Exit the OSD menu.

SAVE & EXIT : Exit the OSD menu after saving the current setting.

FACTORY SET : Change setting to the factory default. (make sure to SAVE & EXIT after)



NOTE : Lens, Day & Night and ID/Title settings stay the same even after a FACTORY SET.

## 12. TROUBLESHOOTING GUIDE

<i>PROBLEM</i>	<i>POSSIBLE CAUSE</i>	<i>LIKELY SOLUTION</i>
<b>No Video</b>	<p>1. <u>Power Supply:</u> -Connections....</p> <p>-Voltage Range...</p>	<p>Check input power connections at the cable leads. Check for loose wires.</p> <p>If connected to DC, check voltage input range of 10.5 - 40 V.</p> <p>If connected to AC, check input voltage range of 12 – 28 V.</p> <p>Measure the voltage at the Input terminal block.</p>



**No Video**  
(cont'd.)

---

**Poor Picture Quality**

Snowy Image

2. Video Connections

---

Poor Video Signal

41

Determine if wiring polarity at “Video Connector” terminal block is correct. Check BNC connector.

If still no video, connect the camera directly to the monitor. Check the video signal. If okay, the problem is with the interconnections. If still no video, contact a Bosch Service Center. See rear page of this manual for contact information.

---

Ensure video cable is correctly matched and terminated with 75 ohms at each end. Make sure video cables are similar types.

<b>Poor Picture Quality</b>		
Snowy Image (cont'd.)	Noisy Power Supply	Check connections. Relocate or replace power supply.
Horizontal Scan Lines, Rolling Up or Down	Ground Looping on video cable	Check the coax cable shield is not touching ground, e.g. at couplings. An electrically isolated circuit board or isolation transformer may be required.
	24V ac operation	Line Lock adjustment required.
Negative, scrambled, or faded image	Low voltage	Check voltage at input power cable. Must be >10.5V dc or >12V ac.

## 13. GENERAL SPECIFICATIONS

Input Voltage:	10.5-40 VDC 12-28 VAC (50/60Hz), 4.5W
Enclosure (housing):	Aluminum casting and extrusion (sealed to IP66 / NEMA4)
Viewing Window:	Polycarbonate
Weight:	1.4kg ( 3.1lbs. )

*Subject to Change Without Notice.*

**Notes:**

**Notes:**

**Notes:**

**Notes:**

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