



FULL HD Color Camera CSDW2M60CM28 SPECIFICATIONS

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TOSHIBA TELI CORPORATION

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RESTRICTION FOR USE

● Should the equipment be used in the following conditions or environments, give consideration to safety measures and inform us of such usage:

1. : Use of the equipment in the conditions or environment contrary to those specified, or use outdoors.
2. : Use of the equipment in applications expected to cause potential hazard to people or property, which require special safety measures to be adopted.

● This product can be used under diverse operating conditions. Determination of applicability of equipment or devices concerned shall be determined after analysis or testing as necessary by the designer of such equipment or devices, or personnel related to the specifications. Such designer or personnel shall assure the performance and safety of the equipment or devices.

● This product is not designed or manufactured to be used for control of equipment directly concerned with human life (*1) or equipment relating to maintenance of public services/functions involving factors of safety (*2). Therefore, the product shall not be used for such applications.

(*1): Equipment directly concerned with human life refers to:

- Medical equipment such as life-support systems, equipment for operating theaters.
- Exhaust control equipment for exhaust gases such as toxic fumes or smoke.
- Equipment mandatory to be installed by various laws and regulations such as the Fire Act or Building Standard Law.
- Equipment related to the above

(*2): Equipment relating to maintenance of public services/functions involving factors of safety refers to:

- Traffic control systems for air transportation, railways, roads, or marine transportation.
- Equipment for nuclear power generation.
- Equipment related to the above.

CASES FOR INDEMNITY

- In the case damage or losses are caused by fire, earthquake, or other acts of God, acts by a third party, deliberate or accidental misuse by the user, or use under extreme operating conditions.
- In the case of indirect, additional, consequential damages (loss of business interests, suspension of business activities) are incurred as result of malfunction or non-function of the equipment, we shall be exempted from responsibility for such damages.
- In the case damage or losses are caused by failure to observe the information contained in the instructions in this instruction manual and specifications.
- In the case damage or losses are caused by use contrary to the instructions in this instruction manual and specifications.
- In the case damage or losses are caused by malfunction or other problems resulting from use of equipment or software that is not specified.
- In the case damage or losses are caused by repair or modification conducted by the customer or any unauthorized third party (such as an unauthorized service representative).
- Expenses we bear on this product shall be limited to the individual price of the product.
- The item that is not described in specifications of this product is off the subject of the guarantee.

USAGE PRECAUTIONS

● Handle carefully

Do not drop the equipment or allow it to be subject to strong impact or vibration, as such action may cause malfunctions. Further, do not damage connected cables, since this may cause wire breakage.

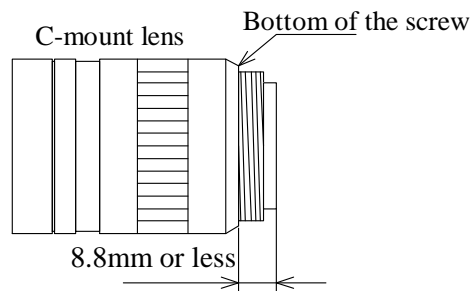
● Environmental operating conditions

Do not use the product in locations where the ambient temperature or humidity exceeds the specifications.

Otherwise, image quality may be degraded or internal components may be adversely affected. In particular, do not use the product in areas exposed to direct sunlight. Moreover, during shooting under high temperatures, vertical stripes or white spots (noise) may be produced, depending on the subject or camera conditions (such as increased gain). However, such phenomena are not malfunctions.

● About lens mount

As for the C-mount lens used combining this camera, the projection distance from bottom of the screw should use 8.8 mm or less.



● Combination check with the lens

This camera might from a ghost to image area depending on the combination of a lens and an illumination with this camera. But this is not a failure of this camera. Therefore, Please check the combination of the lens and the illumination with this camera when you use.

● Combination check with the monitor

Depending on a used monitor and the combination of the DVI-D cable, there is the case that is not displayed normally by a monitor. Please confirm the combination of a monitor and DVI-D cable and this camera beforehand.

● Do not apply image pickup surface to the direct sun or intense light

The color filter of the sensor fades when I guess strong light right for a long time.

● Occurrence of moiré

If you shoot thin stripe patterns, moiré patterns (interference fringes) may appear. This is not a malfunction.

● Occurrence of noise on the screen

If an intense magnetic or electromagnetic field is generated near the camera or connected cables, noise may be generated on the screen. If this occurs, move the camera or the cable.

● If the equipment is not to be used for a long duration

Turn off power to the camera for safety and attach the lens cap to the camera to protect the image pickup surface.

● Maintenance

Turn off power to the equipment and wipe it with a dry cloth.

If it becomes severely contaminated, gently wipe the affected areas with a soft cloth dampened with diluted neutral detergent. Never use alcohol, benzene, thinner, or other chemicals because such chemicals may damage or discolor the paint and indications.

If the image pickup surface becomes dusty, contaminated, or, scratched, consult your sales representative.

● Precaution in the power supply from camera control connector

There is the case that noise appears depending on a PC. Then please use the DC12V supply from a power supply connector.

There is a possibility that the camera malfunction according to falling supply voltage depending on a Mini-USB cable for camera control to use.

In that case, please use the DC12V supply from a power supply connector.

When you use Auto Iris control, please use the power supply from the AC adapter.

● Disposal

When disposing of the camera, it may be necessary to disassemble it into separate parts, in accordance with the laws and regulations of your country and/or municipality concerning environmental contamination.



“This symbol is applicable for EU member states only”

1. INTRODUCTION

This HD color camera is a unit type medical camera utilized 1/2.8 inch sensor.

A picture output is DVI-D, so that you can get high-speed and high-resolution picture.

Because this camera can connect a monitor directly, it is suitable for use of observation.

2. FEATURES

(1) High-frame rate

This camera output a picture size of the FULL HD with 1920×1080/60p or 1920×1080/60i.

(2) Color reproduction characteristics

This camera is superior in color reproduction characteristics because the sensor is adopted a primary color mosaic filter.

(3) DVI-D

The picture output is possible just to be connected to the monitor directly because the picture output is DVI-D.

(4) Small and light

This camera is small and light.

(5) Camera control

It is possible to control this camera from camera control connector.

(6) Electronic lines

It is possible to show a monitor screen electronic lines by two vertical and horizontal.

(7) Grid

It is possible to show a monitor screen grid lines.

(8) Auto Iris control

It is possible to control the auto Iris lens through the EIAJ RC-5204 connector.

(9) RoHS compliant

3. COMPONENT

(1) Camera body × 1

(2) Accessories

▪ Intentional Manual(Japanese) × 1

▪ Intentional Manual(English) × 1

※No application software attached to this camera.

※No DVI-D cable, Mini-USB cable for camera control and Lens attached to this camera.

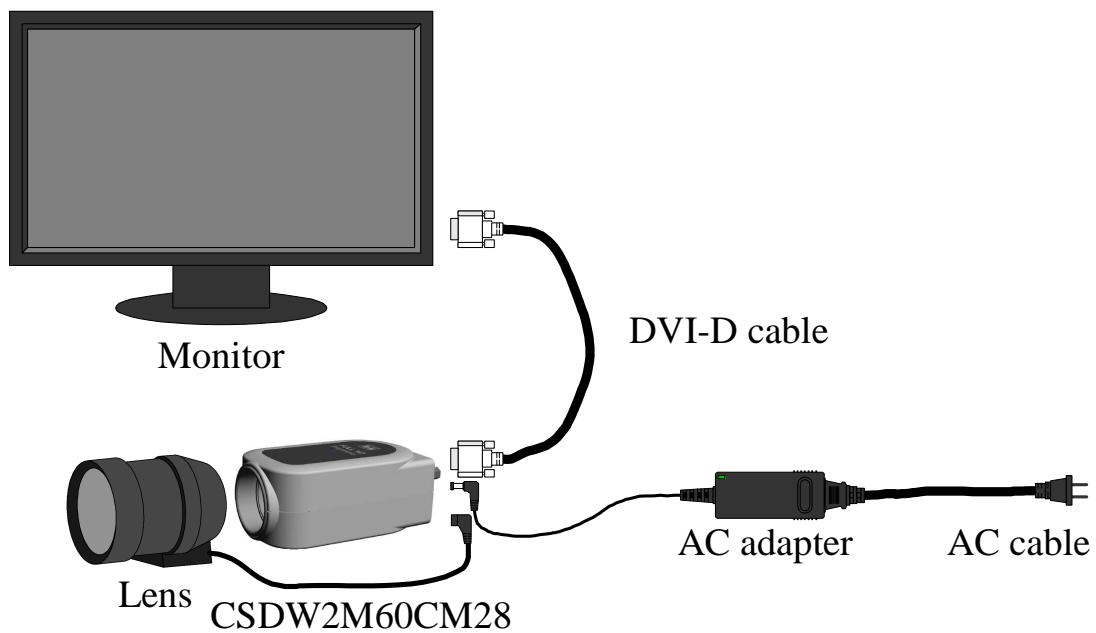
4. OPTIONAL PARTS

▪ AC Adapter SPU16A-105-ASN

▪ AC Cable APC1025-01P (Only in Japan)

※Please contact our business charge for detail of option unit.

<Connection example>



5. FUNCTION

(1) Setup-level setting

It is possible to set the setup-level. A setting range is -16LSB ~ +16LSB. (Factory setting : 8LSB)

(2) Gain setting

There are 2 modes of MANU(manual) mode and AUTO mode. (Factory setting : AUTO)

A setting range is -6dB ~ +12dB.

AUTO mode always regulates gain depending on the brightness of an object.

It is possible to setting max gain of this time.

(3) Electronic shutter

There are 2 modes of MANU(manual) and AUTO. (Factory setting : AUTO)

- MANU mode

It is possible to select the shutter speed with 9 phases.

- AUTO mode

AUTO mode always regulates shutter speed to the brightness of the subject.

It is possible to setting max gain of this time.

※It is possible to change detect ratio (Peak : Average) in AUTO mode.

(4) White balance

There are 4 kinds of modes of MWB(Manual White Balance), OPWB(One Push White Balance), AWB(Auto White Balance) and .PresetWB(Preset White Balance).

It is possible to choose it to a subject, a use. (Factory setting : OPWB)

- MWB(Manual White Balance)

R-gain and B-gain can be set independently.

Setting range : 0dB ~ 12dB

- OPWB(One Push White Balance)

It is regulated by one push so that RGB of the center of image area become equal.

- AWB(Auto White Balance)

It is always reproduced kept images of the balance and pursuit the change of the source of light automatically.

- PresetWB(Preset White Balance)

It is possible to select the white balance value which the color temperature of the source of light.

(5) Aperture

It is possible to set aperture correction revision of the output picture.

A setting range is 8 phases (0~7) each High frequency and Low frequency. (Factory setting : 3)

- Phase up : Picture's edge is emphasized.

(6) Gamma correction

It is possible to set gamma correction of the output picture with 17 phases(0~16). (Factory setting : 5)

- Phase up : The shading of the shade become clear.

(7) Auto Iris control

Regulate Lens Iris automatically to the brightness of the subject reasonable photography.

※When you use Auto Iris control, please use the power supply from the AC adapter.

※It is possible to work with DC control lens only (Recommendation lens : DV10×8SA-SAIL FUJIFILM)

(8) Mirror mode

It is possible to turn over the output picture.

It is possible to change ON/OFF each Horizontal and Vertical.

(9) Electronic line

Because it is possible to show a monitor screen electronic lines by two vertical and horizontal, it is convenience to align and measure the images.

You can move the line by one pixel of unit and set the following items.

- Line type

Fill / Translucent

- Line width

1 pixel / 2 pixels

- Line color

changeable

- Setting range

Vertical : 0~1919

Horizontal : 0~1079

(10) Grid

It is possible to show a monitor screen grid lines.

You can regulate the grid interval by one pixel of unit and set the following items.

- Grid type
 Translucent
- Grid interval
 Vertical : 4~1920
 Horizontal : 4~1080
- Grid Width
 1 pixel
- Grid color
 Changeable

(11) Color matrix

It is possible to adjust the color masking manually. The adjustment method is changing possibility in RGB and YUV. (Factory setting : RGB)

- RGB
 The variable parameter is R-G, R-B, G-B, G-R, B-R and B-G.
- YUV
 The variable parameter is hue, and saturation(u / v).

6. SPECIFICATION

[Electronic Specification]

(1) Image sensor	1/2.8 type CMOS sensor
▪ Total pixels	2144(H)×1588(V)
▪ Valid pixels	2096(H)×1561(V)
▪ Valid number of output pixels	1920(H)×1080(V)
▪ Pixel size	2.5μm(H)×2.5μm(V)
▪ Scanning area	1/2.8 type
(2) Scanning system	Progressive
(3) Synchronization system	Internal synchronization
(4) Aspect ratio	16 : 9
(5) Video output	Color 8 bit each RGB (Fatory setting : 1920×1080/60p)
▪ 1920×1080/60p	
Output clock rate	148.352 MHz
Horizontal	67.43 kHz
Vertical	59.94 Hz
▪ 1920×1080/60i	
Output clock rate	74.176MHz
Horizontal	33.72 kHz
Vertical	29.97 Hz
(6) Standard sensitivity	2000lx, F4, 5000K
(7) Minimum sensitivity	24 lx (F1.4, gain : +12dB, gamma : 16, video level : 50%)
(8) Gain	MANU / AUTO change (Fatory setting : AUTO)
▪ MANU(Manual gain control)	
Corrective range	-6dB~+12dB(Fatory setting : 0dB)
▪ AUTO(Auto gain control)	
Detection area	Full screen
Corrective range	-6dB~+12dB
	(It is possible to setting max gain. (Factly setting : 12dB))
Detection ratio (Peak : Average)	100:0, 75:25, 50:50, 25:75, 0:100 (Factly setting : 100:0)
(9) Set up	-16LSB~+16LSB (Fatory setting : 8LSB)

- (10) White balance MWB / OPWB / AWB / PresetWB change (Fatory setting : OPWB)
- MWB (Manual white balance)
 - Corrective range 3000K ~ 6500K
 - Setting method R-gain and B-gain can be set independently. (0 ~ +12dB each R and B)
 - OPWB (One push white balance)
 - Corrective range 3000K ~ 6500K
 - Detection area Center of the screen
 - AWB (Auto whit balance)
 - Corrective range 3000K ~ 6500K
 - Detection area Full screen
 - PresetWB (Preset White Balance)
 - Color temperature 3000K / 3700K / 4000K / 4500K / 5500K / 6500K
- (11) Gamma 17 step Change (Fatory setting : 5)
- 0 Correction OFF ($\gamma=1$)
 - 1 ~ 16 Correction ON
- (12) Aperture 8 Step change each High frequency and Low frequency.
(Fatory setting : 3)
- 0 Correction OFF
 - 1 ~ 7 Correction ON
- (13) Mirror mode
- Horizontal turn ON / OFF change (Fatory setting : OFF)
 - Vertical turn ON / OFF change (Fatory setting : OFF)
- (14) Electronic line ON / OFF change (Fatory setting : OFF)
- Number Vertical, Horizontal each 2 lines
 - Type Fill / Translucent change
 - Width 1 pixel / 2 pixels change
 - Color Changeable
 - Setting range Vertical : 0 ~ 1919
Horizontal : 0 ~ 1079
- (15) Grid ON / OFF change (Fatory setting : OFF)
- Type Translucent
 - Interval Vertical : 4 ~ 1920
Horizontal : 4 ~ 1080
 - Width 1 pixel
 - Color Changeable

(16) Power source

• Dc connector supply DC $12V \pm 10\%$ (Ripple voltage $50mV_{p-p}$)

• Camera control connector supply DC $5V \pm 5\%$ (Ripple voltage $50mV_{p-p}$)

※When both DC cable and Mini-USB cable for camera control were connected, +12V from DC cable is given priority.

※A note

There is a possibility that the camera malfunction according to falling supply voltage depending on a Mini-USB cable for camera control to use.

In that case, please use the DC12V supply from a power supply connector.

(17) Power consumption Approx. 2.5W

[Internal sync specification]

(1) Pixel clock rate	148.500/1.001MHz±100ppm
(2) Scanning rate	
Horizontal	67.433kHz
Vertical	59.94Hz

[Electronic shutter specification]

(1) Shutter system	Rolling shutter
(2) Shutter speed	MANU / AUTO change (Factory setting : AUTO)
▪ MANU(9 phase)	
PRESET setting	1/60s , 1/100s , 1/120s , 1/250s , 1/500s , 1/1000s , 1/2000s , 1/4000s , 1/10,000s (Factory setting : 1/60s)
▪ AUTO	
Corrective range	1/60s~1/10,000s (It is possible to setting max gain. (Factory setting : 1/10,000s))
Detection area	Full screen
Detection ratio(Peak : Average)	100:0, 75:25, 50:50, 25:75, 0:100 (Factory setting : 100:0)

[Camera control]

Please confirm communication specifications about a control method and the communication specifications.

[Machine externals specification]

- | | |
|--|--|
| (1) Dimensions | 44mm(W) × 34mm(H) × 77mm(D)
(Protruding portions such as screws and connectors are not included.) |
| (2) Weight | Approx. 100g |
| (3) lens mount | C-mount |
| (4) Camera body grounding
/ Insulation status | Conductive between circuit GND and camera body |

[Ambient condition]

- | | |
|---------------------------|-------------------------------|
| (1) Performance assurance | |
| Temperature | 0°C ~ 40°C |
| Humidity | 10% ~ 90% (no condensation) |
| (2) Operation assurance | |
| Temperature | 0°C ~ 40°C |
| Humidity | 90% or less (no condensation) |
| (3) Storage assurance | |
| Temperature | -20°C ~ 60°C |
| Humidity | 90% or less (no condensation) |

[Safety standards]

EMC standard (Electro-Magnetic Compatibility)

- EMI (Electro-Magnetic Interference)
EN61000-6-3
FCC Part 15 Subpart B class A
- EMS (Electro-Magnetic Susceptibility)
EN61000-6-2

A request about adaptability of EMC standard

The adaptability of the safety standard of this camera is assured in the condition of combination with the Optional parts.

Please confirm the EMC adaptability when it combines with parts other than them.

[Connector Description]

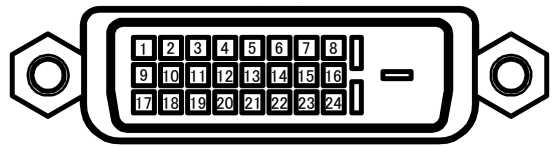
(1) DVI-D connector

Picture output connector

• Connector model (Camera side) XM4M-2432-1312 (OMRON)

• Pin assignment

Pin No.	I/O	Function
1	O	TX2-
2	O	TX2+
3	-	TX2/4 Shield
4	-	TX4-(N.C.)
5	-	TX4+(N.C.)
6	O	DDC Clock
7	O	DDC Data
8	-	N.C.
9	O	TX1-
10	O	TX1+
11	-	TX1/3 Shield
12	-	TX3-(N.C.)
13	-	TX3+(N.C.)
14	-	+5V
15	-	GND
16	I	Hot Plug Detect
17	O	TX0-
18	O	TX0+
19	-	TX0/5 Shield
20	-	TX5-(N.C.)
21	-	TX5+(N.C.)
22	O	TX Clock Shield
23	O	TX Clock+
24	O	TX Clock-



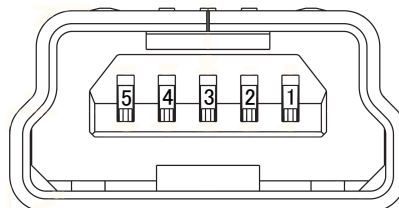
(2) Camera control connector

• Connector model (Camera side)

UX60SC-MB-5ST(80) (HIROSE ELECTRIC)

• Pin assignment

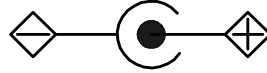
Pin No.	I/O	Function
1	-	POWER
2	I/O	USB D-
3	I/O	USB D+
4	-	N.C.
5	-	USB_GND



(3) Power supply connector

This is a connector for +12V power supply.

- Connector model (Camera side) LGP3831-0200F (SMK)
- Conformity plug standard EIAJ RC-5320A voltage category 4



(4) Lens control Connector

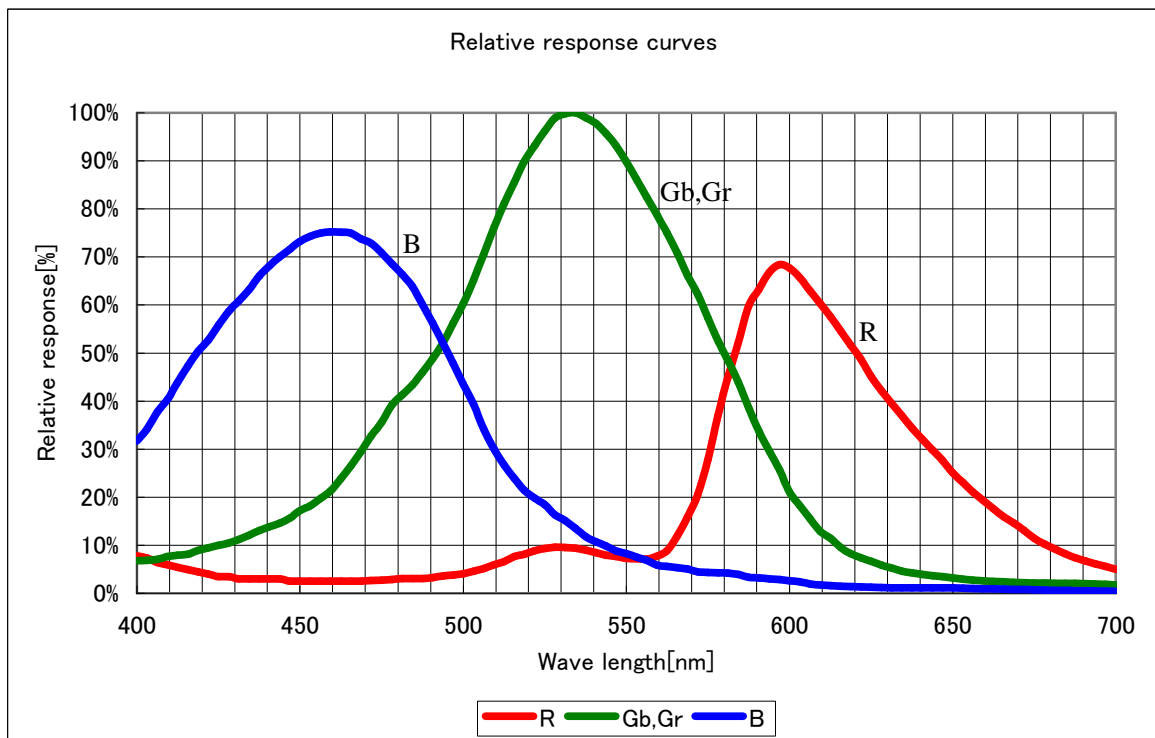
This is a connector for control auto Iris lens.

- Control system DC control
- Connector model (Camera side) D4-157J-250 (TECHNICAL ELECTRON)
- Conformity plug standard EIAJ RC-5204

[Spectral Sensitivity Characteristic]

※The lens characteristics and light source characteristics is not reflected in table.

※It includes an IR cut filter characteristic.



7. GUARANTEE

The period of guarantee is 12 months after the product delivery.

If any trouble because of responsibility of our company occurred during the period, we repair it free of charge according to [SERVICE].

But in the case of following, guarantee becomes inapplicable.

- The trouble because of an error in use and unfair repair and remodeling.
- The trouble because of a fall after the purchase and transportation.
- The trouble because of fire, natural calamity(earthquake, storm and flood damage, thunderbolt), damage from salty breeze, gas harm and abnormal voltage.

8. SERVICE

(1) Condition for repair

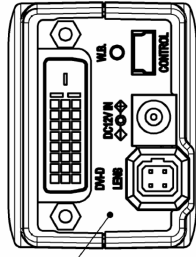
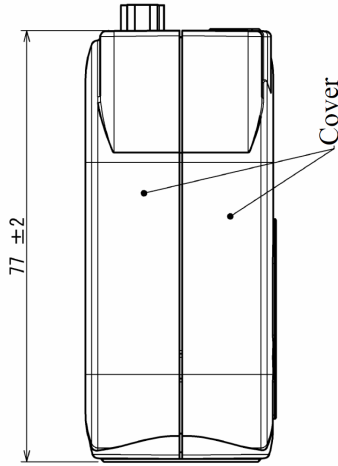
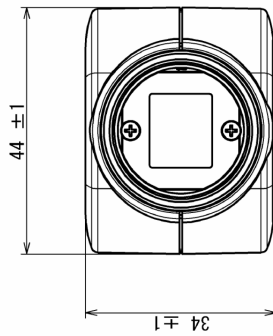
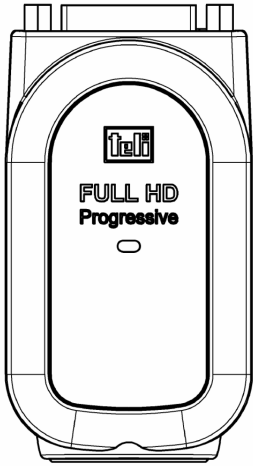
When the user requests us to repair product, please return it our factory and we repair it.

But user bear overheads(travel expenses, a cost of camera disassembly charge) and return cost.

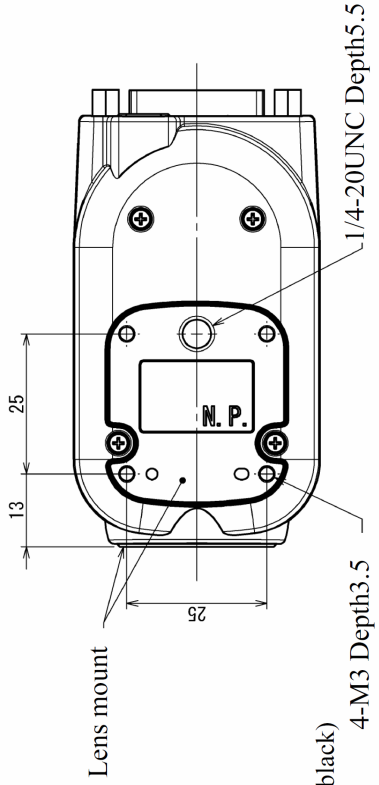
(2) A period to accept repair

- ① Repair for free Refer to [GUARANTEE].
- ② Charged repair 7 years after the production end.

9. APPEARANCE



Rear panel



Specification

- Material : Aluminum die cast
- Lens mount : ABS
- Cover : Aluminum alloy sheet
- Treatment : Painting(pearl white)
- Cover : Cation electro-painting(black)
- Rear panel : 1/4-20UNC Depth5.5
- Rear panel : 4-M3 Depth3.5

unit : mm



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Distributor

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 - Information contained in this document is subject to change without prior notice.
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