



Ultra-High-Resolution CMOS Color Camera CSX12M25CMP19 PRODUCT SPECIFICATION

CONTENTS

Restriction For Use.....	1
Exemption Clauses	2
Notes on using this product	3
CAUTIONS ON USE	5
1. Overview.....	6
2. Features.....	6
3. Configuration	7
4. Option	7
5. Specification.....	8
6. Function.....	15
7. Appended figure	19
8. Warranty	21
9. Repair	21

TOSHIBA TELI CORPORATION

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 personal related to the specifications. Such designer or personal 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 refer 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 service/functions involving factors of safety refer to:

Traffic control systems for air transportation, railways, roads, or marine transportation.

Equipment for nuclear power generation.

Equipment related to the above.

Although sufficient check is performed about translation of these specifications, we will apply a Japanese sentence, if a doubt should occur.

Exemption Clauses

- TELI assumes no responsibility or liability for damage arising from fire, earthquake, an act by a third party or other accidents, or intentional or careless error or misuse by the user, or use under abnormal conditions.
- TELI assumes no responsibility or liability for incidental damages (e.g., loss of business profits or interruption of business) arising from use of or inability to use the camera equipment.
- TELI assumes no responsibility or liability in the case damages or losses are caused by failure to observe the information contained in the operation manual and specifications and interface specifications.
- TELI assumes no responsibility or liability in the case damages or losses are caused by use contrary to the instructions in this operation manual and specifications and interface specifications.
- TELI assumes no responsibility or liability in the case damages or losses are caused by malfunction or other problems resulting from use of equipment or software that is not specified.
- TELI assumes no responsibility or liability in the case damages 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.
- TELI does NOT guarantee the items that are not described in the specification.

Notes on using this product

- 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 the connection cable, since this may cause wire breakage.

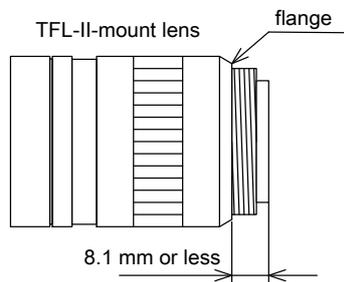
- Environmental operating conditions

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.

- Regarding a lens mount

Install a next lens; Dimension of protrusion from flange is equal to or less than 8.1 mm. If a lens does not stand to this condition, it might not be installed to this camera.



- Check a combination with the lens

Depending on the lens and lighting you use, an image is reflected as a ghost in the imaging area. However, this is not because of a fault of the camera.

In addition, depending on the lens you use, the performance of the camera may not be brought out fully due to deterioration in resolution and brightness in the peripheral area, aberration and others.

Be sure to check a combination with the camera by using the lens and lightning you actually use.

When installing a lens in the camera, make sure carefully that it is not tilted.

In addition, use a mounting screw free from defects and dirt. Otherwise, the camera may be unable to be removed.

Notes on using this product

- **Avoid intensive light**

Do NOT expose the camera's image-pickup-plane to sunlight or other intense light directly. If the part of CMOS sensor is exposed to spot-intensive light, you might get a picture problem like blooming and/or smear. Under the comparison at the same video output level, the shorter the exposure time setting, the more smear is generated.
- **Do not expose the camera's image-pickup-plane to sunlight or other intense light directly.**

Its inner CMOS sensor might be damaged. Moreover the burn-in and the fades of the color filter of sensor might occur when exposed to strong light for a long time.
- **Occurrence of moire**

If you shoot thin stripe patterns, moire 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 connection cable, noise may be generated on the screen. If this occurs, move the camera or the cable.
- **Handling of the protective cap**

If the camera is not in use, attach the lens cap to the camera to protect the image pickup surface.
- **If the equipment is not to be used for a long duration**

Turn off power to the camera for safety.
- **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.

CAUTIONS ON USE

- When disposing of the camera

Wastes of this product should be separated and discarded in compliance with the various national and local ordinances.

This camera is showing the following symbol to body due to EU environmental regulation (Waste Electrical and Electronic Equipment (WEEE)). However this symbol is applied to only an EU member state.



Phenomena specific to CMOS sensor

- Defective pixels

A CMOS image sensor is composed of photo sensor pixels in a square grid array. Due to the characteristics of CMOS image sensors, over- or under-driving of the pixels results in temporary white or black areas (as if these are noises) appearing on the screen. This phenomenon, which is not a defect is exacerbated under higher temperatures and long exposure times.

- Image shading

The brightness of the upper part of the screen may be different from that of the lower part. Note that this is a characteristic of a CMOS image sensor and is not a fault.

This phenomenon is generated when the shutter speed is fast.

We recommend that the shutter speed of the camera should be slower than 1/100s to reduce the effect by this phenomenon

- Burn-in phenomenon

When it keeps entering light into the camera, the afterimage might be generated. Note that this is a characteristic of a CMOS image sensor and is not a fault.

This phenomenon comes to be generated easily when light enters for the reading period of the image. When the random trigger shutter mode is used, the phenomenon is not generated easily by entering the single-shot light matched to the camera exposure timing with the flash and the LED lighting, etc. If the phenomenon is caused, the phenomenon can be decreased by putting time for a while without entering light.

1. Overview

This CMOS camera is an Ultra-High-resolution color camera employing a 12,580 thousand pixel readout system CMOS sensor.

2. Features

(1) High speed output at Ultra-High-resolution pixel.

The TOSHIBA TELI's proprietary 1.9 type 12,580 thousand pixel Ultra-High-resolution CMOS sensor outputs the entire 12,580 thousand pixels in a speed as high as 25fps.

(2) Scalable mode

Scalable of a partial readout function optimum to diversifying high-speed image processing is available.

It supports a variable frame rate to increase the frame rate by reading an arbitrary area by specifying an address in horizontal and vertical directions.

(3) Global shutter

As it employs a global electronic shutter similar to a CCD image sensor, clear images of even fast-moving object are obtainable with less blur.

(4) Random trigger shutter

Photo images can be imported in any timing by inputting external trigger signals.

(5) CoaXPress interface

The interface of an image output and camera control has adopted the CoaXPress standard.

CoaXPress can transmit a picture, communication, control, and a power supply with one common coaxial cable at high speed, and it outputs a 12,580 thousand pixel all pixel at the high speed of about 25 fps in this camera.

By using the coaxial cable excellent in long cable length and pliability, it can respond to various pieces of image-processing equipment broadly.

(6) GenIcam

Since it is based on GenICam (Generic Interface for Cameras) which is an international industrial use camera standard, camera control can be performed easily.

(7) New lens mount TFL-II

TOSHIBA TELI's unique TFL-II mount to take advantage of the resolution of a large high-precision sensor is employed for the lens mount. The TFL-II mount is large and has a flange back as short as 17.5mm to support high performance lenses. The lens attaching part is a M48 screw mount with ϕ 50mm positioning engaging mechanism to support high precision. An F mount lens can also be used via an optional FTAR-2 mount conversion adaptor.

3. Configuration

- (1) Camera body x 1
- (2) Accessory
 - Operation Manual (Japanese) x 1
 - Operation Manual (English) x 1

*Application software is not attached to this camera.

4. Option

- (1) CoaXPress cable D4.5HDC01E-SB (Manufactured by CANARE)
 (Recommended cable length: 60m or less)
- (2) Camera mounting kit CPTC12M (Manufactured by TOSHIBA TELI)
- (3) F mount lens adapter FTAR-2 (Manufactured by TOSHIBA TELI)

*NOTE: Contact your dealer / distributor for details of option units.

***Conformity of optional peripherals and EMC regulations**

The adaptability of the safety standard of this camera is guaranteed in the condition of combination with the above-mentioned option parts. The customer must execute the confirmation of a final safety conformance with the machine and the entire device when it combines with parts other than our specification and it is used.

5. Specification

[Electrical specification]

- (1) Imager CMOS image sensor
 - Number of active pixels 4096 (H) × 3072 (V)
 - pixel size 6 μm (H) × 6 μm (V) (Square-grid array)
 - Scanning area 24.576 mm(H) x 18.432 mm(V)
 - Optical size Equivalent to 1.9 type
 - Color filter RGB primary color mosaic-on-tip color filter
- (2) Scanning system Progressive
- (3) Aspect ratio 4:3
- (4) Synchronization method Internal synchronization
- (5) Sensitivity 3000 lx, F4, 5000 K
- (6) Minimum object illuminance 125 lx
(F2.8, GAIN: MAX, reading all pixels, image level: 50%,
Shutter speed: 16msec)
- (7) Image output Compliant with CoaXPress standard
 - Data RAW 8 bit
The order of outputting RAW data (When read all pixels).

		Column				
		1	2	3	4	5
Line	1	R	G	R	G	...
	2	G	B	G	B	...
	3	⋮				

- Readout mode (Medium configuration, Shutter OFF)
 - All pixel readout Approx. 25 fps / 4096(H) × 3072(V)
 - Scalable Depends on the window setting.
- (8) Gain
 - Digital gain 0 to +18 dB [180step, 1step= Approx. 0.1dB] (Factory default : 0 dB)
- (9) Set-up level 0 to Approx.+25% [528step]
(Factory default : Approx.+6.25%...132)
- (10) Gamma 1.0 (standard)

- | | |
|---|--|
| (11) White balance | Manual (with OPWB function)
Corrective Range : 3000K to 6500K
Setting Method : Independent R/B Gain* Setting
*Digital Gain |
| <ul style="list-style-type: none"> • OPWB
(One Push White Balance) | Corrective Range : 3000K to 6500K
Detect Area : Full Screen
Detect Method : Average |
| (12) Power supply voltage | DC24 V \pm 10 % (ripple 50 mV(p-p) or less)
The power supply standing up must increase up to the stipulated voltage monotonously. |
| (13) Power consumption | Approx. 6.5 W |

[Electrical shutter specification]

- | | |
|--|--|
| (1) Shutter Speed | Shutter OFF or 1/20,000 to 2 sec
The exposure time at shutter OFF is different depending on the reading mode. (Factory default : Shutter OFF) |
| (2) Random Trigger Shutter | ON / OFF switching (Factory default : OFF) |
| <ul style="list-style-type: none"> • Fixed mode • Pulse width mode | The exposure time depends on the shutter speed setting
The exposure time depends on the pulse width.
Minimum pulse width : 50 μ sec
(Minimum exposure time: 50 μ sec) |

Note: The brightness of the upper part of the screen may be different from that of the lower part. Note that this is a characteristic of a CMOS image sensor and is not a fault. This phenomenon is generated when the shutter speed is fast. We recommend that the shutter speed of the camera should be slower than 1/100s to reduce the effect by this phenomenon.

[Internal sync signal specification]

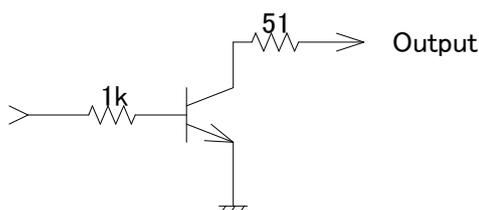
- | | |
|---|---|
| (1) Driving frequency | |
| <ul style="list-style-type: none"> • Output mode | *Medium configuration, Shutter OFF |
| <ul style="list-style-type: none"> All pixel readout | Horizontal : Approx.75 kHz
Vertical : Approx.25 Hz |
| <ul style="list-style-type: none"> Scalable | By window setting |

[Input signal specification]

- (1) TRIG CoaXPress I/F and DC IN connector input
- Signal level (DC IN connector) TTL level
 - Polarity Positive/Negative switching (Factory default: Negative)
 - Pulse width 50 μ sec or more

[Output signal specification]

- (1) Output circuit Open collector



- (2) Specification

- (2-1) Exposure out The period is exposure time.
The polarity is negative.

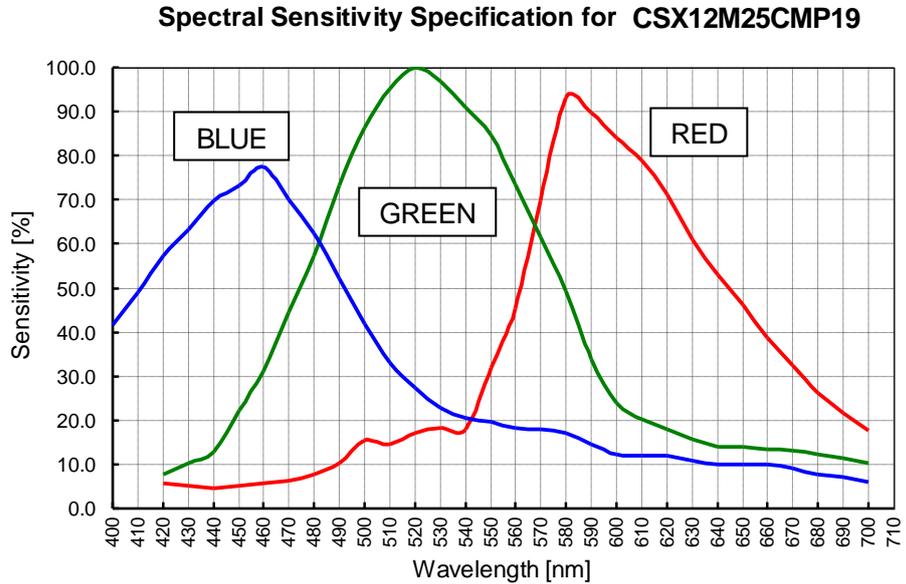
[Mechanical spec]

- (1) Lens mount TOSHIBA TELI's unique TFL-II mount
- Mount screw M48mm P=0.75
 - Positioning engagement part Φ 50mm H7
 - Flange back 17.5 mm
- (2) Dimensions 75 mm (W) \times 75 mm (H) \times 69.5 mm (D)
(Not including protrusion)
- (3) Weight Approx.430 g
- (4) Camera body grounding: insulation status
Conductive between circuit GND and camera body

[Operating ambient conditions]

- (1) Performance assurance Temperature : 0 to +40 degrees C
Humidity : 10% to 90% (No dew formation)
- (2) Operation guaranteed Temperature : -5 to +45 degrees C
Humidity : 10% to 90% (No dew formation)
- (3) Storage Temperature : -20 to +60 degrees C
Humidity : 90% or less (No dew formation)

[Typical ambient conditions]



(*The lens characteristics and light source characteristics are not reflected in table.)

[Various safety standards]

(1) Electro-Magnetic Compatibility

EMI(Electro-Magnetic Interference) EN61000-6-4

EMS(Electro-Magnetic Susceptibility) EN61000-6-2

(2) FCC

FCC Part 15 Subpart B class A

**THIS DEVICE HAS 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 UNDESIRE OPERATION.**

[Environmental Correspondence]

It complies with the following instruction.

- (1) RoHS conformity
- (2) Administrative Measure on the Control of Pollution Caused by Electronic Information Products (Popular name : China RoHS)
 - a) Environmental usage period refer to 7.2
 - b) Poisonous substance content table refer to 7.2
 - c) Toxic substance content table refer to 7.2

[Interface Specification]

- (1) Interface CoaXPress standard
- (2) Transfer rate CXP-5
- (3) Indicator lamp states

State	Indication
No power	Off
System booting	Solid orange
Link detection in progress, PoCXP active	Fast flash green
Device / Host incompatible, PoCXP active	Slow flash alternate red / green
Device / Host connected, but no data being transferred	Slow pulse green
Device / Host connected, waiting for event (e.g. trigger, exposure pulse)	Slow pulse orange
Device / Host connected, data being transferred	Solid green whenever data transferred (i.e. blink synchronously with data)
System error (e.g. internal error)	Fast flash red

[Connector pin assignment]

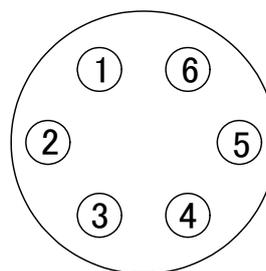
(1) Video output/controlling (CoaXPress) CXP-5

- Connector type: BNC(75)J-H.FLJ-BPA(40) (Manufactured by HIROSE ELECTRIC)

(2) Power supply connector DC IN

- Connector (camera side) : HR10A-7R-6PB(73) (Manufactured by HIROSE ELECTRIC)
- Compatible plug (cable side): Equivalent to HR10A-7P-6S(73) (Manufactured by HIROSE ELECTRIC) or equivalent

Pin No.	I/O	Signal name
1	O	Exposure out
2	-	GND
3	-	GND
4	I	TRIG
5	-	GND
6	-	DC+24V(option) *1



Rear View

*1 : Since DC+24V input of 6pin is not used by usual, please set it to OPEN.

[Dip switch setting]

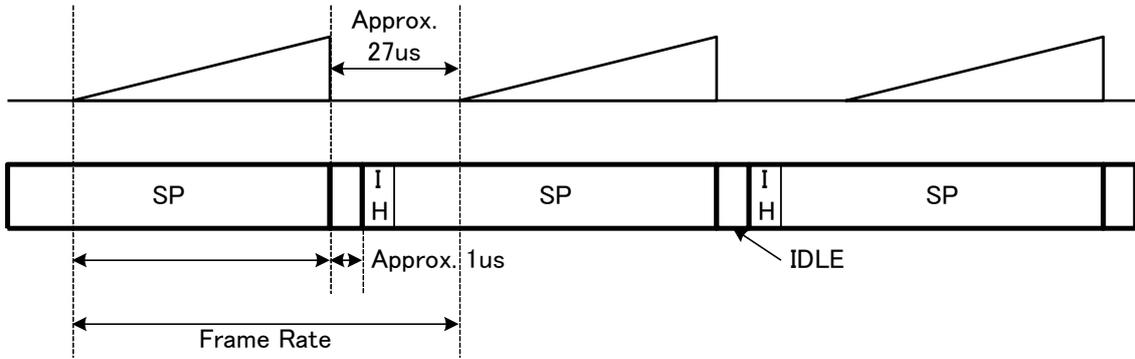
It is not used in this camera.

Please set all OFF.

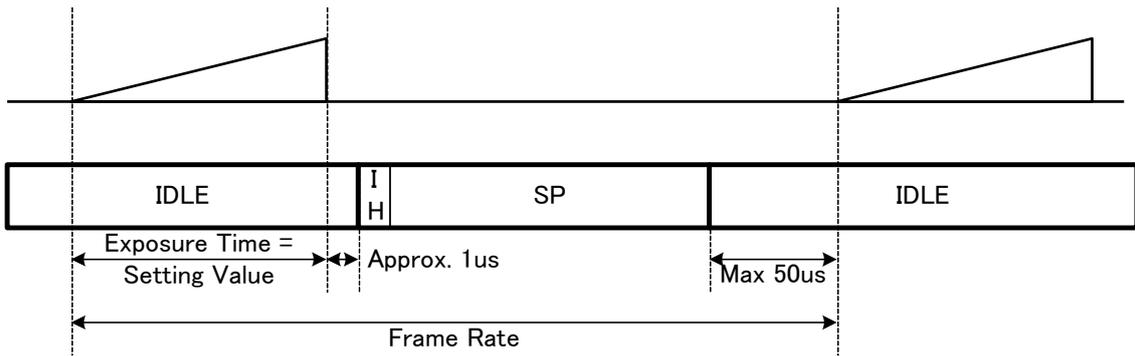
[Timing Chart]

(1) Shutter OFF mode

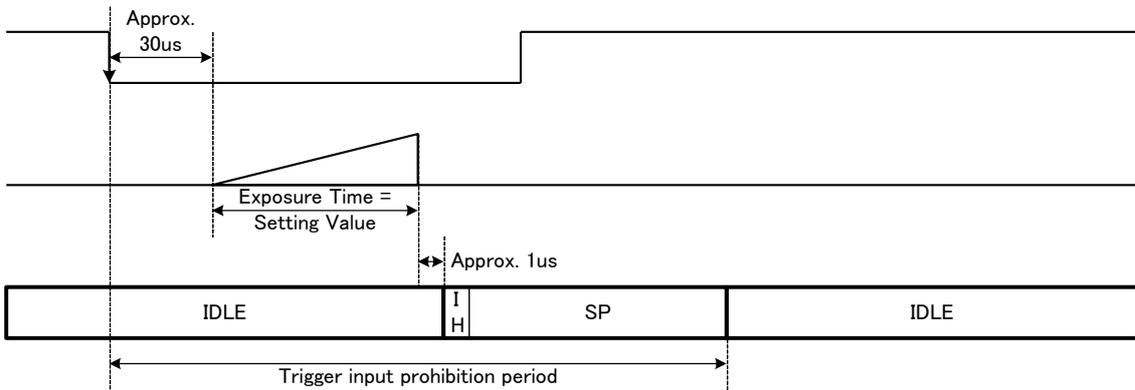
SP : Stream Packet
IH : Image Header



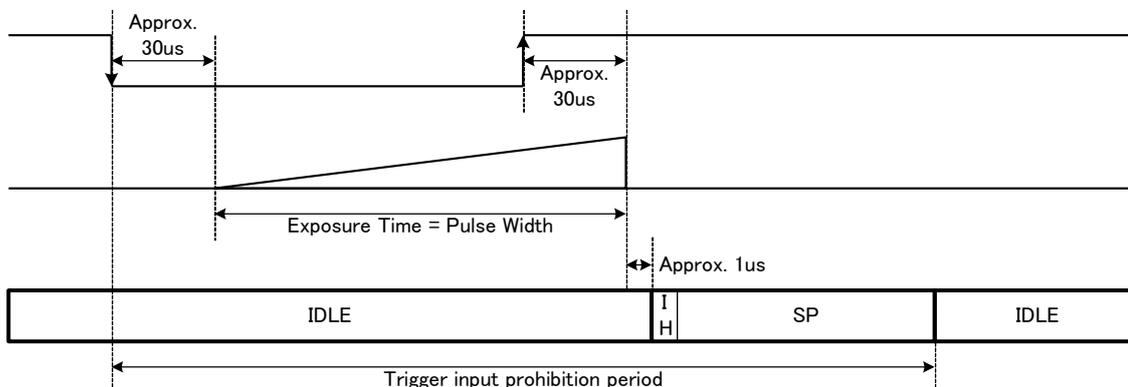
(2) Shutter ON mode



(3) Random Trigger Shutter FIX mode



(4) Random Trigger Shutter Pulse width mode



6. Function

6.1. Scan mode

The image output is output from the CoaXPress connector, and can take the output image by Frame grabber board. The frame rate and the resolution of the output image that this camera corresponds are as follows. (At shutter OFF.)

Output mode	Setting	Frame rate	Output size
All pixel readout	/	Approx.25 fps	4096 (H) × 3072 (V)
Scalable	/	Depends on the window setting	

*As for the frame that switched the mode when continuously operating, the image of the brightness not intended might be output.

6.1.1. All pixel readout

The camera reads all pixels (4096(H) × 3072(V) pixels) in about 25 fps.

6.1.2. Scalable

Only arbitrary area can be read. Areas can be read in high speed by skipping unwanted areas.

6.2. Shutter mode

6.2.1 Shutter OFF

The shutter speed changes in this mode pending on the frame rate.

Shutter speed is defined by the following calculation. (Reference value)

$$\text{Shutter speed} = \text{Frame rate (msec)} - 27(\mu \text{ sec})$$

*The lower limit of the shutter speed at the time of the shutter OFF mode is set to 59.6µsec.

(3)Memory

Scalable setting can be saved in memory banks 1- 8.

6.4. White balance

This camera has the function of MWB (Manual White Balance). The white balance can be adjusted by using OPWB (One Push White Balance) function besides the manual operation according to object and the usage.

The step omission increases when the gain improves because it uses a digital gain.

- MWB (Manual White Balance)

The gain of R/B can be set respectively independently.

Setting range : 1 to 3.99 times

- OPWB (One Push White Balance) function

This function is adjusted that RGB of the entire image area (the entire output window when Scalable is used) becomes equal. However, the white balance might not be correctly adjusted according to subject and the source of light of which it takes picture.

6.5. FPN correction

FPN(Fixed Pattern Noise) is corrected by taking the black image, and doing the subtraction processing in the camera.

FPN data corresponds to a normal shutter and the random trigger shutter and the data is preserved in "Memory 0" before shipment. Please call and load data in each shutter mode.

The preserved data becomes two patterns though the correction data can be acquired in any camera settings. Because FPN is changed by the setting and the environment of the camera, the re-acquisition of the correction data might become necessary by the state of the camera at that time. It is not possible to write it in "Memory 0".

Area All pixels

Number of saving data 2 ("Memory 1, 2")

*Please shut out the light and maintain it in the state that the image is regularly output.

*It is not possible to correct the sensitivity varies of pixels.

*It takes about a few minutes to acquire and to preserve the correction data. Meanwhile, please do not turn off the power supply of the camera.

6.6. Defect pixels correction

This is the correction functionality that can average the next both right and left same color pixels.

Therefore the effectiveness of this collection would get weak in case that the defective pixels are located at the both edge of the window or that the defective pixels lie in a line.

The user can select any pixels.

Please correct the correction data according to the output mode.

The maximum pixel that can be set 2048 pix

6.7. Output of test pattern

Some test patterns can be output by cutting the output of the sensor.

It is output by the frame rate matched to each shutter mode and the scanning mode.

However, the test pattern cannot be output in the Scalable mode.

It is output for the random trigger shutter by the external trigger signal input.

The shutter speed, the setup, and the gain become invalid.

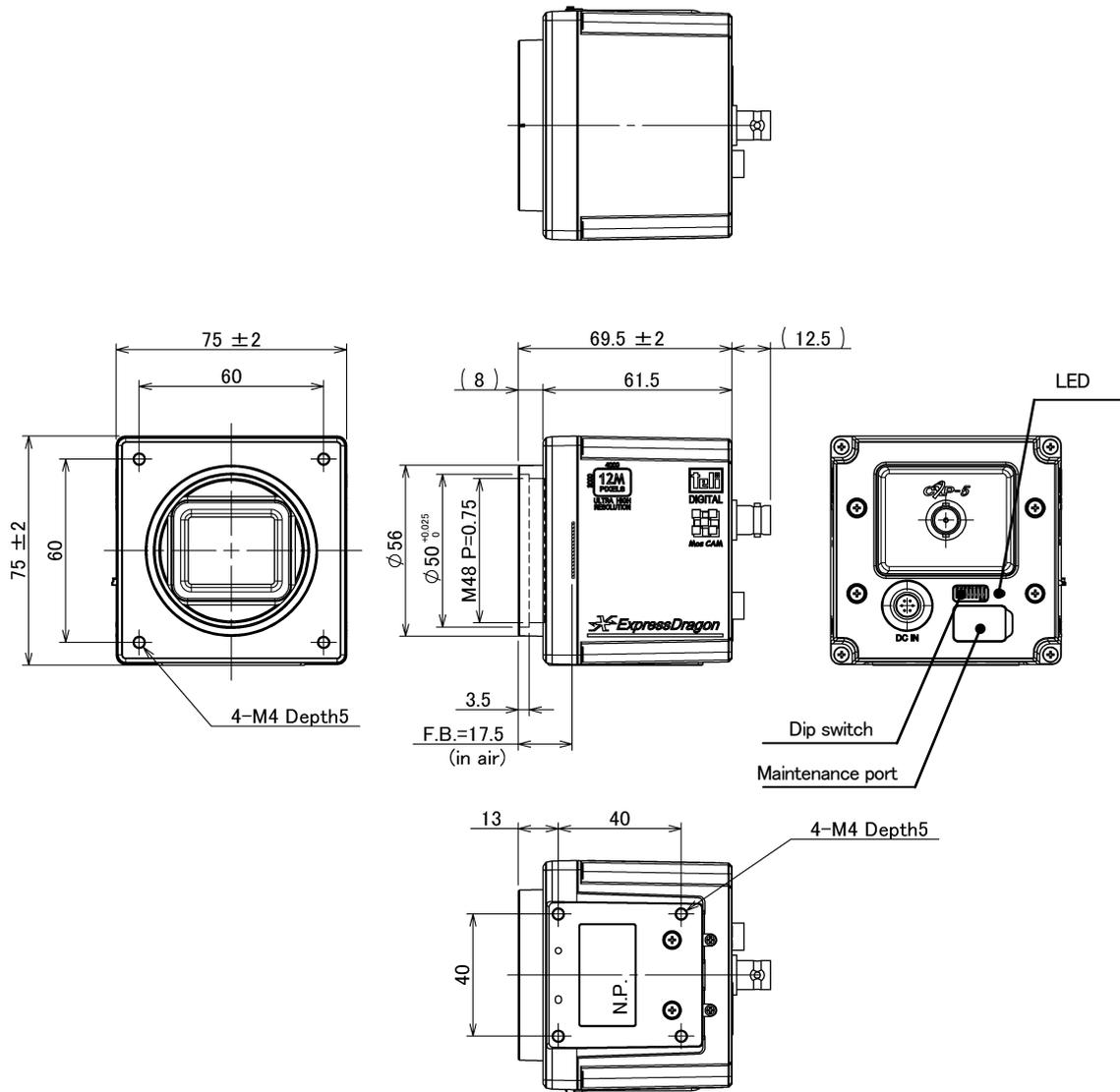
The FPN correction, pixel defect correction, and the step correction function, etc. become invalid.

The kind of the test pattern that can be output is as follows.

- (1) Black
- (2) White
- (3) Gray1(170/256)
- (4) Gray2(85/256)
- (5) Stripe
- (6) Ramp
- (7) Gray scale

7. Appended figure

7.1. External-view Drawing



Design specification
 Principal material : Aluminum die cast
 Processing : Cation electro-painting(black)

7.2. Administrative Measure on the Control of Pollution Caused by Electronic Information Products
(Popular name : China RoHS) Related information

 <p>中华人民共和国 环保使用期限</p>	<p>环保使用期限标识，是根据电子信息产品污染控制管理办法以及，电子信息产品污染控制标识要求(SJ/T11364-2014)、电子信息产品环保使用期限通则，制定的适用于中国境内销售的电子信息产品的标识。</p> <p>电子信息产品只要按照安全及使用说明内容，正常使用情况下，从生产月期算起，在此期限内，产品中含有的有毒有害物质不致发生外泄或突变，不致对环境造成严重污染或对其人身、财产造成严重损害。</p> <p>产品正常使用后，要废弃在环保使用年限内或者刚到年限的产品时，请根据国家标准采取适当的方法进行处置。</p> <p>另外，此期限不同于质量/功能的保证期限。</p> <p>The Mark and Information are applicable for People's Republic of China only.</p>
---	--

<产品中有毒有害物质或元素的名称及含量>

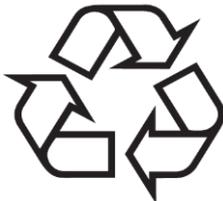
部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
相机本体	×	○	○	○	○	○

「本表格依据SJ/T 11364的规定编制」
 ○：表示该有毒有害物质在该部件所有均质材料中的含量均在电子信息产品中有毒有害物质的限量要求标准规定的限量要求(GB/T26572)以下
 ×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出电子信息产品中有毒有害物质的限量要求标准规定的限量要求(GB/T26572)
 This information is applicable for People's Republic of China only.

リサイクルに関する情報(包装物)

有关再利用的信息(包装物)

Information on recycling of wrapping composition

<p>箱／箱子／Box</p>  <p>段ボール 瓦楞纸板 Corrugated cardboard</p>	<p>内部緩衝材料・袋 内部缓冲材料・袋 Internal buffer materials・Bag</p>  <p>PE-LD</p>
---	--

D4205488B

8. Warranty

The term of a warranty is one year after the product delivery.

If by any chance trouble by responsibility of our company occurs before an above period, TELI repairs it free of charge.

- During terms of a guarantee, when the trouble cause is the case of below, TELI charges the repair costs.

- (1) Troubles and the damages that causes by misuse, unsuitable repair or remodeling.
- (2) Distribution hazards like drops and vibrations after purchase. Troubles and damages by transportation.
- (3) Troubles and damages by fire, natural calamity (earthquake, storm and flood damage, thunderbolt), damages from salty breeze, gas harm, abnormal voltage.
- (4) Deterioration in image quality because of the fading and the burn-in of color filter of CMOS sensor.

9. Repair

Condition for repair

Basically, has to return it to our company when the user requests us to repair product.

Beside that, customer should pay these expenses (travel expenses, camera disassembly technology costs) of both customer and end user. Also customer should pay in themselves costs for return camera to us.

The period of repairing product

- (1) Repair free of charge ... Refer to Clause 8.
- (2) Charged repair Basically, repair period is 7 years after the last production end of products.



TOSHIBA TELI CORPORATION

Head Office : 7-1, 4 chome, Asahigaoka, Hino-shi, Tokyo, 191-0065, Japan
(International Business Department)

Phone : +81-42-589-8771

Fax : +81-42-589-8774

URL : <http://www.toshiba-teli.co.jp/en/>

Distributor

- This product must be classified for disposal according to the laws of each country and municipal laws.
 - Information contained in this document is subject to change without prior notice.
-