



CCD Monochrome Video Camera Specifications

MODEL

CS8620i (EIA)	CS8620Ci (CCIR)
CS8630i (EIA)	CS8630Ci (CCIR)
CS8620Hi(EIA)	CS8620HCi (CCIR)
CS8630H (EIA)	CS8630HC (CCIR)

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WARNINGS & CAUTIONS

[Definition of markings]





The meaning of each mark used in this instruction manual is given below.

 DANGER	This mark warns the user that improper use, indicated with this mark, may cause death or severe personal injuries against the user or people around him/her.
 CAUTION	This mark warns the user that improper use, indicated with this mark, may cause personal injuries (*1) or material damages (*2) against the user or people around him/her.










Notes

*1 : Personal injuries mean wounds, burns, electric shocks, and others for which the person injured need not to be hospitalized nor to be cared for the long term.








*2 : Material damages mean any direct or consequential damages related to property or material loss.

	This mark indicates what the user SHOULD NOT DO . The details of things which the user should not do are described next to this mark.
	This mark indicates what the user MUST DO . The details of things which the user must do are described next to this mark.
	This mark indicates that the user must be alert against a possible DANGER . The details of the danger which the user must be aware of are described next to this mark.
	This mark indicates that the user are given a CAUTION against possible hazards. The details of the caution which the user must be aware of are described next to this mark.

● Handling Precautions

 <u>DANGER</u>	
 MUST	<p><u>If any overheating sign is observed, discontinue use immediately.</u></p> <p>In the event that smoke, smell, or any other overheating sign is observed, turn its power switch OFF immediately, and remove its camera cable from camera connector. Do NOT try to continue to use your camera. To do so in spite of a clear sign of a malfunction invites a fire, an electric shock hazard, or any other serious damage. In such case, after confirming that there is no risk of a fire accident, contact us or our dealer/distributor through which you purchased this device for repair service. To avoid hazard, do NEVER attempt to repair it yourself.</p>
 MUST	<p><u>If any malfunctioning sign is observed, discontinue use immediately.</u></p> <p>Do NOT try to use this device when it is obviously malfunctioning. (Example: No images on the monitor) In the event of a malfunction, turn its power switch OFF immediately, and remove its camera cable from camera connector. In such case, contact us or our dealer/distributor through which you purchased this device for repair service.</p>
 MUST	<p><u>If any liquid gets into the device, discontinue use immediately.</u></p> <p>In the event that water, or any other type of liquid gets into the body, do NOT try to continue to use the device. To do so invites a fire or an electric shock hazard. In such case, turn its power switch OFF immediately, and then remove its camera cable from camera connector. After that, contact us or our dealer/distributor through which you purchased this device for repair service/technical advice.</p>
 MUST	<p><u>Connection/Disconnection only AFTER power OFF.</u></p> <p>When you connect/disconnect camera connector, make sure to turn power SW OFF first. This camera is not designed for “hot-plugging”. Do NEVER make connection/disconnection while power ON. Doing so might cause a breakdown.</p>
 MUST	<p><u>Use manufacturer-recommended peripheral devices (option units) only.</u></p> <p>Make sure to use option units specified in this operation manual only. When connected with any other non-guaranteed peripheral devices, your camera might fail to perform its full capacity. In the worst case, it might cause a fire or breakdown.</p>
 NEVER pull apart	<p><u>Do NOT disassemble this device.</u></p> <p>Do NOT attempt to pull apart, repair, or modify your camera yourself. To do so might lead to a fire or an electric shock accident. Contact us or the dealer/distributor from which you purchased the device for repair/modification.</p>
 DON'T	<p><u>Do NOT supply any power other than specified.</u></p> <p>This device is designed to work only under specified voltage. Do NOT attempt to supply the device with power other than specified. Supplying the device with any unspecified power invites a fire or an electric shock hazard. (CS8600 series --- DC+12V)</p>
 DON'T	<p><u>Do NOT use the camera in a high-humidity environment.</u></p> <p>Do NOT place your camera near a humidifier, or in other high-humidity environment. To do so might cause a fire or an electric shock accident.</p>

● Handling Precautions

 CAUTION	
 CAUTION	If the camera is operated in the electromagnetic field, there may be cases where beat noises (vertical, horizontal, or oblique stripes) appear in the video output. In that case, take preventive measures on the electromagnetic-wave generating source so that your camera do not receive the interference by the electromagnetic-wave. Take extra precautions against electromagnetic-wave-interference if your camera is used with a servomotor, inverter, or other electromagnetic-wave-generating equipment.
 CAUTION	Avoid giving a strong shock against the camera body. It might cause a breakdown or damage. If your camera is used in a system where its camera head is subjected to strong repetitive shocks, its camera head is possible to break down. If you intend to use your camera in such a situation, make sure to use an optional camera-connector-fixing-hardware to connect the connector-plug to the camera body.
 CAUTION	When the camera is not in use, put a lens or a lens-cap onto the camera head so that the image pickup plane of CCD is protected from dust, foreign object, or any other flaw-causing object. If the glass plane (image pickup plane) gets dirty, clean it with a cotton swab. When it needs to be cleaned with a cleaner, be sure NOT to use any organic solvent other than ethyl alcohol. As a countermeasure against condensation, when the camera is moved from a warm condition/environment to a cold one, take appropriate precautions to prevent condensation from forming on the camera.
 CAUTION	Do not pull strongly the camera cable/camera-head nor swing it. The stress from pulling or swinging may cause damage in the coating of the cable, or breaks in the inside wires.
 CAUTION	Avoid short-circuiting signal output. Otherwise, it may cause a malfunction.
 CAUTION	Do NEVER expose its camera head to any intensive light (such as direct sunlight). Otherwise, its inner image pickup device might get damaged.

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 when the equipment is operated in a commercial environment. This equipment generates, uses, can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be require to correct the interference at his own expense.

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 accept any interference received, including interference that may cause undesired operation.

RESTRICTION FOR USE

In the case where a malfunction of this camera (e.g. video output cut-off) can be expected to lead to a significant accident, avoid using this device for such system build-in use.

DISCLAIMER (LIMITED WARRANTY)

We assume no responsibility and shall be held harmless for damage or loss incurred by the user in the following cases.

1. In the case where damage or loss is caused by fire, earthquake, or other acts of Gods, acts by a third party, misuse by the user deliberately or erroneously, or use under extreme operating conditions.
2. In the case where any indirect, additional, consequential damages (e.g. loss of expected interest, suspension of business activities) are incurred as results of a malfunction or non-functioning of this device, we shall be exempted from assuming responsibility for such damages.
3. In the case where damage or loss is caused by incorrect use which is not in line with the instructions given in this operation manual.
4. In the case where damage or loss is caused by a malfunction resulting from bad connection with other equipment.
5. In the case where damage or loss is caused by repair or modification done by the user.

1. PRODUCT DESCRIPTION

Model CS86xxi is a miniature camera series featuring its ultra-small light-weight body. The CS86xxi camera series is designed mainly for factory automation, machine vision, and image measurement application.

2 FEATURES

(1) High resolution

The 380,000 pixel CCD realizes the horizontal resolution of 570TV lines.

High-density images with minimum moire-fringes & beatings are obtained. (CCIR: 440,000 pixels, 560TV lines)

(2) Ultra-compact & light-weight body

The camera features its ultra-small light-weight body. Its super-small body will free you from much of your space restriction problem. The camera is driven by DC12V.

(3) Electronic shutter

The built-in electronic shutter allows this camera to capture a fast-moving object clearly and sharply.

(4) AGC (Automatic Gain Control)

This series is equipped with AGC function. With the AGC, the camera obtains optimal images constantly even when the amount of incoming light fluctuates.

(5) Restart/Reset

When the restart/reset function set ON, the camera captures images at any timing given by R.R. pulse input (VD input).

Remark : CS8620Hi, CS8620HCi are possible for a restart/reset operation only at the field integration mode.

(6) SS (Special shutter) & RTS (Random trigger shutter)

This camera is fitted with special shutter and random trigger shutter function, which allows the camera to capture images cued by external trigger input.

(7) Near-infrared region sensitivity (Model ----H type only)

The CCD integrated in the model CS8620Hi, CS8620HCi, CS8630H, and CS8630HC has a near-infrared-region sensitivity. These models capture clear images even under near-IR shooting condition.

CS8600i Series Spec Lookup Table

Model name	Image size	TV format	Near IR	SS / RTS	R.R.
CS8620i	1/2 type	EIA	×	○	○
CS8620Hi	1/2 type	EIA	○	○	○
CS8630i	1/3 type	EIA	×	○	○
CS8630H	1/3 type	EIA	○	○	○
CS8620Ci	1/2 type	CCIR	×	○	○
CS8620HCi	1/2 type	CCIR	○	○	○
CS8630Ci	1/3 type	CCIR	×	○	○
CS8630HC	1/3 type	CCIR	○	○	○

3. CONFIGURATION

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

4. SPECIFICATION

(1) TV system	(EIA)	Based on EIA standard
	(CCIR)	Based on CCIR standard
(2) Image sensor		Interline CCD
• Total pixel counts		
	(EIA)	811(H)×508(V)
	(CCIR)	795(H)×596(V)
• Active pixel counts		
	(EIA)	768(H)×494(V)
	(CCIR)	752(H)×582(V)
• Video output pixel counts		
	(EIA)	756(H)×485(V)
	(CCIR)	742(H)×575(V)
• Cell size		
	(CS8620i,CS8620Hi)	8.4×9.8 μm
	(CS8620Ci,CS8620HCi)	8.6×8.3 μm
	(CS8630i,CS8630H)	6.35×7.4 μm
	(CS8630Ci,CS8630HC)	6.5×6.25 μm
• Scanning area		
	(CS8620i,CS8620Ci, CS8620Hi,CS8620HCi)	6.5×4.85mm (type-1/2)
	(CS8630i,CS8630Ci, CS8630H,CS8630HC)	4.8×3.6mm (type-1/3)
• H drive frequency (Internal sync)		
	(EIA)	14.31818MHz ±100ppm
	(CCIR)	14.18750MHz ±100ppm
(3) Scanning lines		
	(EIA)	525 lines
	(CCIR)	625 lines
(4) Scanning format		2 : 1 interlace
(5) Sync System		Internal/External (automatic change over)

(6) Scanning frequencies (internal synchronization mode)

Horizontal drive (H)

(EIA) 15.734kHz \pm 100ppm

(CCIR) 15.625kHz \pm 100ppm

Vertical drive (V)

(EIA) 59.94Hz \pm 100ppm

(CCIR) 50.0Hz \pm 100ppm

(7) Aspect ratio

4:3

(8) Sensitivity

•Standard (GAIN:MGC, γ =1.0)

(CS8620i,CS8620Ci) 200 lx ,F5.6 (3100K)

CS8630i,CS8630Ci)

(CS8620Hi,CS8620HCi) 400 lx ,F11 (3100K)

(CS8630H,CS8630HC) 400 lx ,F8 (3100K)

•Minimum (GAIN:MAX, γ =0.45)

(CS8620i,CS8620Ci) 0.2 lx ,F1.4

(CS8630i,CS8630Ci) 0.2 lx ,F1.4

(CS8620Hi,CS8620HCi) 0.1 lx ,F1.4

(CS8630H,CS8630HC) 0.2 lx ,F1.4

(9) Video output

VS:1.0V(p-p) /75 Ω

VS (Video + SYNC)

(10) Resolution

Horizontal

(EIA) 570 TV lines

(CCIR) 560 TV lines

Vertical

(EIA) 485 lines (350 TV lines)

(CCIR) 575 lines (410 TV lines)

(11) S/N

60dB(p-p)/rms (typical)

(GAIN:MGC, γ =1.0)

(12) Input signal

①External sync pulses

HD•VD/SYNC/VS

•Pulse level

HD、VD、SYNC:2~6V(p-p)

VS:1.0(SYNC0.3)V(p-p)

•Input impedance

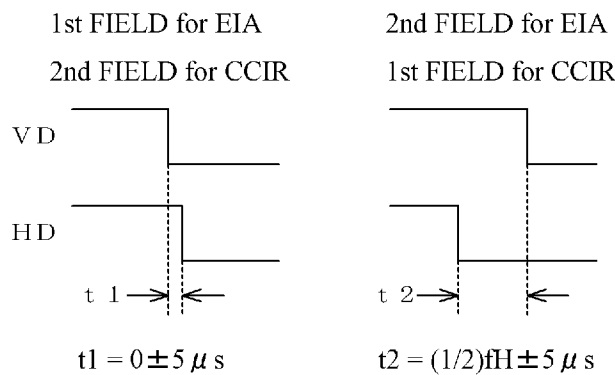
75 Ω / High Switch-able by the panel SW

(Initial factory setting: High)

•Scanning system

2 : 1 interlace

- Polarity Negative
- Pulse width HD: $6.4 \pm 3 \mu s$
VD: $150 \sim 800 \mu s$
- Frequency
- Horizontal (fH)
 - (EIA) $fH = 15.734 \text{kHz} \pm 2\%$
 - (CCIR) $fH = 15.625 \text{kHz} \pm 2\%$
- Vertical (fV)
 - (EIA) $fV = 2fH/525$
 - (CCIR) $fV = 2fH/625$
- Scanning lines
 - (EIA) 525 lines
 - (CCIR) 625 lines
- Phase different The difference in phase between the falling edge of VD and that of HD is shown in the figure below.



② Shutter trigger (TRG)

- Pulse level VL=0~0.5V VH=2~5V
- Input impedance High impedance
- Polarity Positive
- Pulse width $2 \mu s \sim 1/4s$

(13) Output signal

① HD/VD pulses

Under internal sync operation, output available by the panel SW selection (Initial factory setting: IN)

- Output level (high impedance) HD: $4.5 \pm 0.5V(p-p)$
VD: $5.0 \pm 0.5V(p-p)$
- Scanning system 2 : 1 interlace
- Polarity Negative
- Pulse width
 - (EIA) HD: $6.36 \pm 1 \mu s$, VD: $572 \pm 10 \mu s$
 - (CCIR) HD: $6.41 \pm 1 \mu s$, VD: $480 \pm 10 \mu s$

- Frequency
- Horizontal (fH)
 - (EIA) $fH=15.734\text{kHz} \pm 100\text{ppm}$
 - (CCIR) $fH=15.625\text{kHz} \pm 100\text{ppm}$
- Vertical (fV)
 - (EIA) $fV=2fH/525$
 - (CCIR) $fV=2fH/625$
- Scanning lines
 - (EIA) 525 lines
 - (CCIR) 625 lines

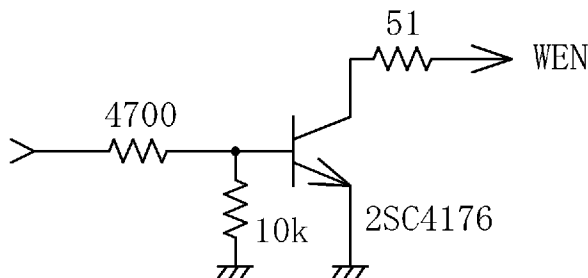
② Clock pulse

- Output level $2.0 \pm 0.3\text{V(p-p)}$ (high impedance)
- Frequency (Under internal synchronization)
 - (EIA) $14.31818\text{MHz} \pm 100\text{ppm}$
 - (CCIR) $14.18750\text{MHz} \pm 100\text{ppm}$

③ WEN

Under random trigger shutter operation, WEN is output during the period starting from the VIDEO OUT START VD falling edge through the VIDEO OUT END VD falling edge.

- Polarity Positive
- Diagram The circuit is shown in the figure below.



- (14) Sensitivity setting Mode selection via panel SW (Initial factory setting: MGC)
AGC(Automatic Gain Control)
MGC (Manual Gain Control)
- (15) MGC Manual sensitivity adjustment available
- (16) Gamma 1.0 / 0.45 selectable via rear panel DIP switch
(Initial factory setting: 1.0)
- (17) White clip Clip-level: $820 \pm 40\text{mV(p-p)}$ (Excluding SYNC)
- (18) Electronic shutter Normal shutter
The following shutter speed setup is possible by rear panel DIP switch selection.
Normal, 1/125, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000s, and Flicker-less (Initial Factory setting: Normal)

Slow-speed shutter

1FLD,2FLD, 4FLD, 6FLD,8FLD, and 10FLD

(19) Random trigger shutter

RTS Mode selection available

1	Shutter-speed Switch Setting	Internal sync	SYNC Non-reset
2	Shutter-speed TRIG Pulse-width Setting	Internal sync	SYNC Non-reset
3	Shutter-speed Switch Setting	Internal sync	SYNC Reset
4	Shutter-speed TRIG Pulse-width Setting	Internal sync	SYNC Reset
5	Shutter-speed Switch Setting	HD / VD IN (*1)	SYNC Non-reset
6	Shutter-speed TRIG Pulse-width Setting	HD / VD IN (*1)	SYNC Non-reset
7	Shutter-speed Switch Setting	HD / VD IN (*2)	SYNC Non-reset
8	Shutter-speed TRIG Pulse-width Setting	HD / VD IN (*2)	SYNC Non-reset

*1: Consecutive HD / Consecutive VD IN

*2: Consecutive HD / Single VD IN

(20) Special shutter

User-defined shutter-timing and shutter-speed cued and timed by shutter trigger and restart / reset pulse input ON / OFF selectable via rear panel DIP SW (Initial factory setting: OFF)

(21) CCD integration mode

Field / Frame storage(integration)

Switch-able by rear panel DIP Switch Selection (Initial factory setting : frame integration)

(22) Restart/Reset

Restart / Reset function available via rear panel DIP-SW selection (Initial factory setting: OFF)

Remark : CS8620Hi, CS8620HCi are possible for a restart/reset operation only at the field integration mode.

(23) Power source

DC12V±10%[Ripple level : Less than 10mV(p-p)]

(24) Power consumption

approx. 1.3W

(25) Ambient condition

·Performance assurance

Temperature 0°C~40°C

Humidity 20~80% (No condensing)

·Operation assurance

Temperature -10°C~50°C

Humidity 20~80% (No condensing)

·Storage

Temperature -20°C~60°C

Humidity 20~95% (No condensing)

(26) Lens mount

C-mount

(27) Flange back

17.526mm

(28) Dimensions

29(W)×29(H)×31(D)mm (Excluding protruding part)

(29) Mass

Approx. 50g

(30) Option unit

·Power adapter

CA130C (AC100V)

- Power / Video connector (Maker : Hirose denki)
HR10A-10P-12S
- Camera cable
CPRC3700 (2m,3m, 5m, 10m)
- Tripod adapter
- IR cut filter

*** Conformity of EMC conditions**

About the conformity of the EMC standard of this machine, it has guaranteed in the conditions combined with the recommended parts.

When used combining parts other than specification of our company, I ask you to have final EMC conformity checked of a visitor with a machine and the whole equipment.

(31) Connector Pin Assignment

Compatible plug: HR10A-10P-12S (Manufactured by HIROSE ELEC.)

Pin No.	External sync.			Internal sync.
	HD VD	VS/SYNC	R.R.	
1	GND	GND	GND	GND
2	+12V	+12V	+12V	+12V
3	GND	GND	GND	GND
4	VIDEO OUT	VIDEO OUT	VIDEO OUT	VIDEO OUT
5	GND	GND	GND	GND
6	HD IN	----	HD IN	HD OUT*
7	VD IN	VS/SYNC IN	R.R. IN	VD OUT*
8	GND	GND	GND	GND
9	CLOCK OUT	CLOCK OUT	CLOCK OUT	CLOCK OUT
10	WEN OUT	WEN OUT	----	WEN OUT
11	TRIG IN	TRIG IN	TRIG IN	TRIG IN
12	GND	GND	GND	GND

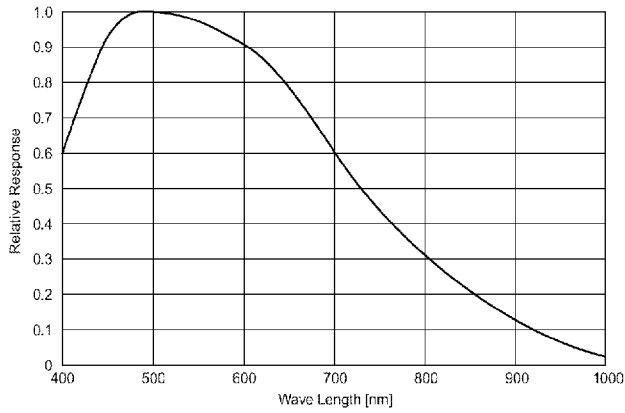
* HD VD output is available via inner SW selection under internal sync operation.

5. Appearance

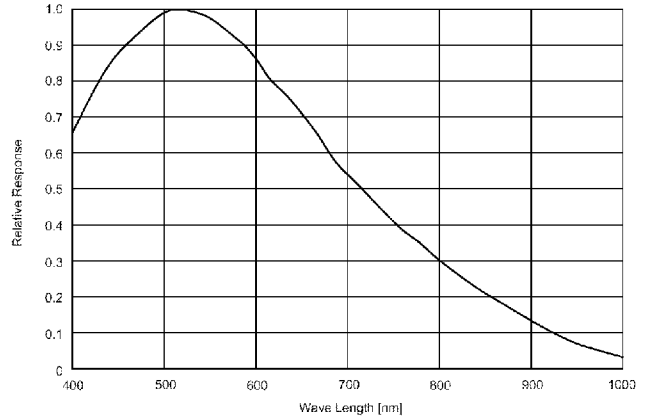
Typical spectral response

[The lens characteristics and light source characteristics is not reflected in the table.]

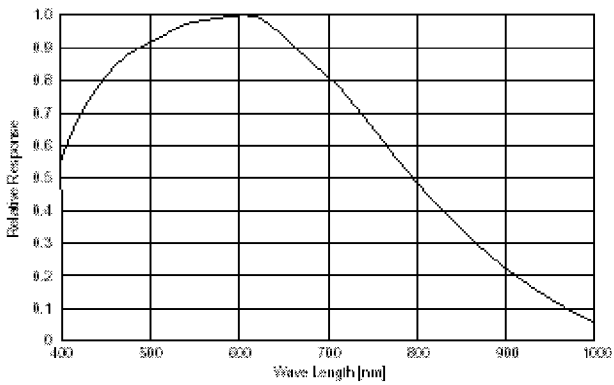
CS8620i, CS8620Ci



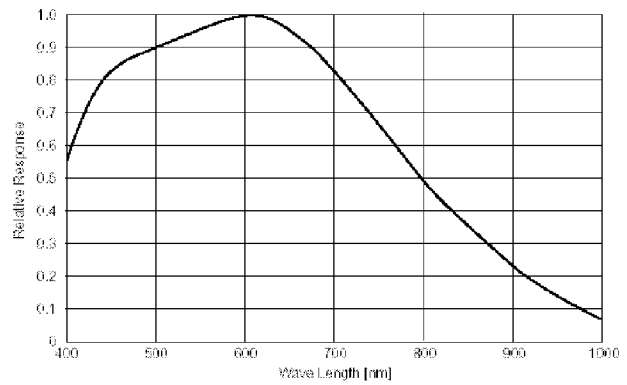
CS8630i, CS8630Ci



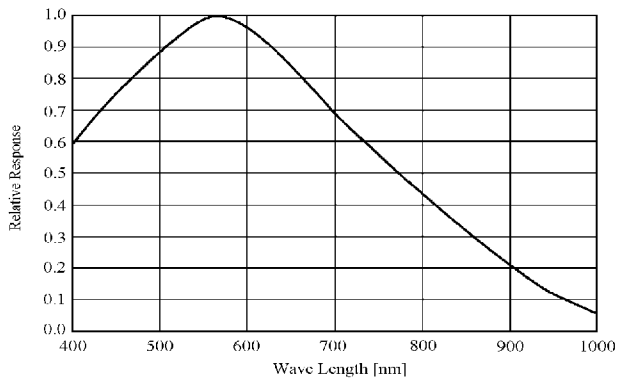
CS8620Hi



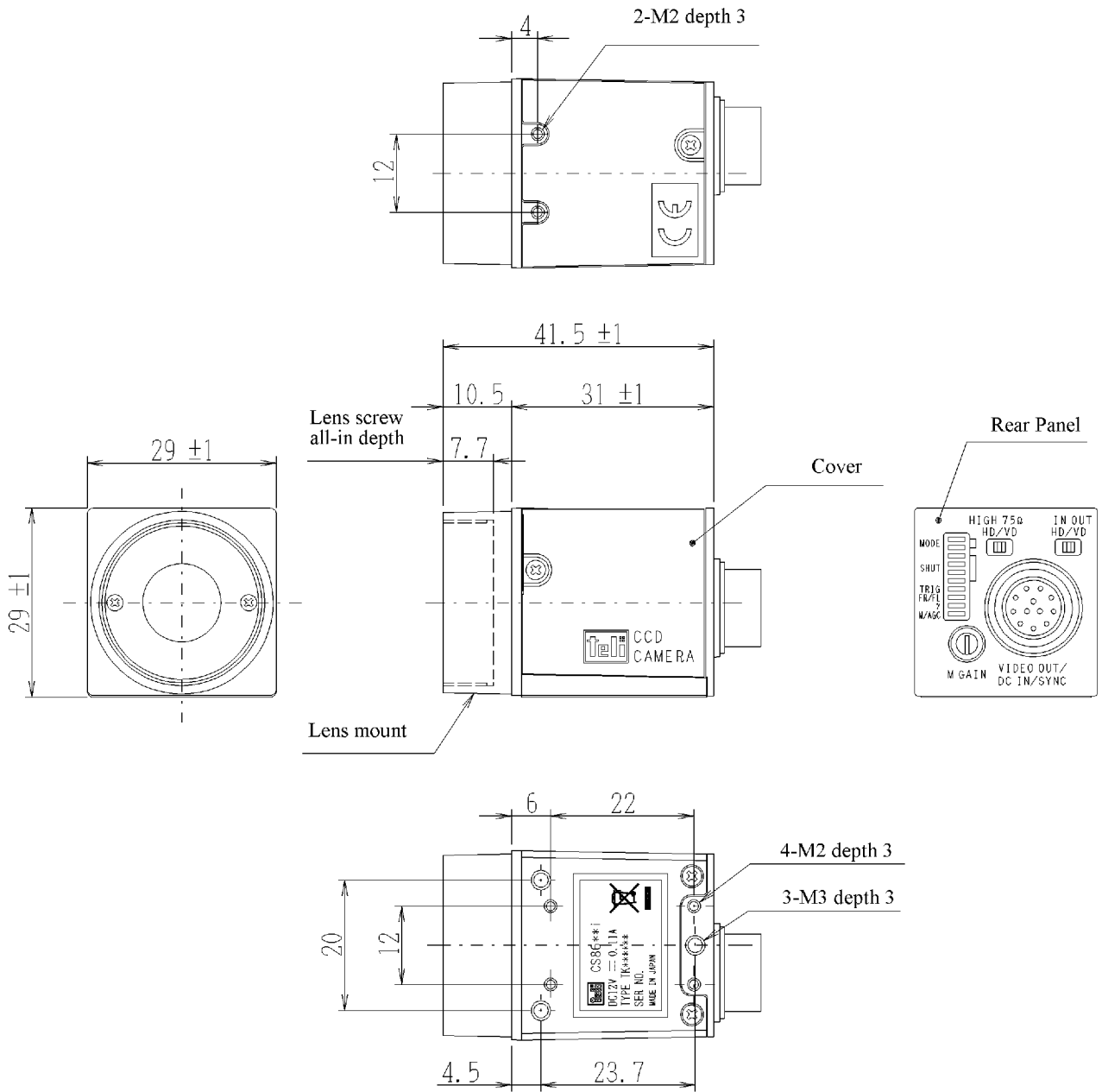
CS8620HCi



CS8630H, CS8630HCi



DRAWINGS



Specification

Material

Lens-mount, Rear panel : Aluminum die-cast

Cover

: Anticorrosion aluminum alloy

Processing

Lens-mount, Rear panel : Cation coating

Cover

: Leather satin coating



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