3CCD color camera

HV-F203GV

Operation Manual

(Tentative Version)

Thank you for purchase this fine Hitachi Kokusai Electric CCD camera.
Before using the camera, please read this operation manual carefully.
There is a possibility that the revised edition is exhibited on web.
Please confirm by web shown in an Installation Guide.

Hitachi Kokusai Electric Inc.

RoHS Compliant
These products comply with the requirement of the RoHS (Restriction of the use of Certain Hazardous Substances in Electrical and electronic Equipment) Directive 2002/95/EC.

Version in Sep, 2017

IMPORTANT SAFETY INSTRUCTIONS

1. Read Instructions
All the safety and operating instructions should be read before the product is operated.

2. Retain Instructions
The safety and operating instructions should be retained for future reference.

3. Heed Warnings
All warnings on the product and the operating instructions should be adhered to.

4. Follow Instructions
All operating and use instructions should be followed.

5. Cleaning
Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

6. Attachments
Do not use attachments not recommended by the product manufacturer as they may cause hazards.

7. Water and Moisture
Do not use this product near water - for example, near a bath tub, wash bowl, kitchen sink, or laundry tub; in a wet basement; or near a swimming pool; and the like.

8. Accessories
Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

9. Moving
A product and cart combination should be moved with care.
Quick stops, excessive force, and uneven surfaces may cause the product and cart combination to overturn.

10. Ventilation
Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered.
The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

11. Power Sources
This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your product dealer or local power company. For products intended to operate from battery power, or other sources, refer to the operating instructions.

12. Grounding or Polarization
This product is equipped with a three-wire grounding-type plug a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.

13. Power-Cord Protection
Power-supply cords should be routed to that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plug, convenience receptacles, and the point where they exit from the product.

14. Lightning
For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the product due to lightning and power-line surges.

15. Overloading
Do not overload wall outlets, extension cords or integral convenience receptacles as this can result in a risk of fire or electric shock.

16. Object and Liquid Entry

Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

17. Inflammable and Explosive Substance

Avoid using this product where there are gases, and also where there are inflammable and explosive substances in the immediate vicinity.

18. Heavy Shock or Vibration

When carrying this product around, do not subject the product to heavy shock or vibration.

19. Servicing

Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

20. Damage Requiring Service

Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

a. When the power-supply cord or plug is damaged.

b. If liquid has been spilled, or objects have fallen into the product.

c. If the product has been exposed to rain or water.

d. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.

e. If the product has been dropped or damaged in any way.

f. When the product exhibits a distinct change in performance-this indicates a need for service.

21. Replacement Parts

When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part.

Unauthorized substitutions may result in fire, electric shock, or other hazards.

22. Safety Check

Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

23. Wall or Ceiling Mounting

The product should be mounted to a wall or ceiling only as recommended by the manufacturer.

24. Heat

The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

25. Hot attention

Camera the power is turned on, the surface temperature will be more than 50℃(122°F).

If you touch the camera, please turn off the power.

WICHTIGE SICHERHEITS ANWEISUNGEN

1. Alle Anweisungen lesen
Vor Betrieb des Erzeugnisses sollten alle Sicherheits-und Bedienungsanleitungen gelesen werden.

2. Die Anweisungen aufbewahren
Die Sicherheits-und Bedienungsanleitungen sollten fünftigen Bezug aufbewahrt werden.

3. Warnungen beachten
Die Warnungen auf dem Erzeugnis und in den Bedienungsanleitungen solten beachtet werden.

4. Anweisungen befolgen
Alle Bedienungsanleitung-und
Verwendungsanweisungen sollten befolgt werden.

5. Reinigung
Den Stecker des Geräts vor Reinigung aus der Steckdose ziehen. Keine flüssigen Reinigungsmittel oder Aerosolreiniger verwenden. Zum Reinigen einen feuchten Lappen verwenden.

6. Zubehör
Nur vom-Hersteller des Erzeugnisses empfohlenes Zubehör verwenden, da es sonst zu Störungen kommen kann.

7. Wasser und Feuchtigkeit
Dieses Erzeugnis nicht in der Nähe von Wasser verwenden - z.B, in der Nähe einer Badewanne, eines Waschbeckens, einer Küchenspüle, eines Waschzubers, in einem nassen Keller, in der Nähe eines Schwimmbeckens usw.

8. Aufstellung
Das Erzeugnis nicht auf einen unstabilen Wagen, Stand, Dreifuß, Träger oder Tisch stellen.
Das Erzeugnis kann sonst herunterfallen und ein kind oder einen Erwachsenen schwer verietzen.
Außerdem kann das Gerät schwer beschädigt werden. Nur mit einem Wagen, Stand, Dreifuß, Träger oder Tisch verwenden, der vom Hersteller empfohlen oder mit dem Erzeugnis verkauft worden ist. Für jegliche Anbringung sollten die Anweisungen des Herstellers befolgt werden, und das vom Hersteller empfohlene Anbringungszubehör sollte verwendet werden.

9. Eine Kombination von Erzeugnis und Wagen sollte vorsichtig bewegt werden
Schneller Halt, übermäßige Krafteinwirkung und unebene Oberflächen können Umkippen der kombination von Erzeugnis und Wagen verursachen.

10. Ventilation
Schlitze und Öffnungen im Gehäuse dienen der Ventilation. Sie sind für zuverlässigen Betrieb des Gerätes und Schutz vor Überhitzung erforderlich und dürfen nicht blockiert oder abgedeckt werden. Die Öffnungen sollten niemals dadurch blockiert werden, daß, das Gerät auf ein Bett, ein Sofa, einen Teppich oder eine ähnliche Oberfläche gestellt wird.
Das Gerät sollte nur dann in Einbauinstallierung wie in einem Bücherschrank oder einem Gestell verwendet werden, wenn angemessene Ventilation vorgesehen ist bzw. Die Anweisungen des Herstellers befolgt worden sind.

11. Stromversorgung
Dieses Erzeugnis sollte nur an der auf dem Typenschild angegebenen Stromversorgungsart betrieben werden. Wenn Sie nicht sicher sind, was für eine Stromversorgung Sie haben, so wenden Sie sich bitte an Ihren Erzeugnishändler oder an das lokale Elektrizitätswerk. Beziehen Sie sich für Batteriebetrieb oder andere Stromquellen vorgesehene Erzeugnisse bitte auf die Bedienungsanleitungen.

12. Erdung oder Polarisierung
Dieses Erzeugnis ist mit einem Schutzkontaktstecker mit drei Leitern ausgerüstet, mit einem Erdungskontakt. Dieser Stecker paßt nur in ein schuko-Steckdose. Dies ist eine Sicherheitsmaßnahme. Wenn Sie den Stecker nicht in die Steckdose stecken können, so wenden Sie sich bitte an ihren Elektriker, damit er die veraltete Schuts des Schutzkontaktsteckers unwirksam.

13. Netzkabelschutz
Netzkabel sollten so verlegt werden, deß möglichst nicht darauf getreten wird und daß sie nicht eingeklemmt werden, mit besonderer Beachtung der kabel an Stackern, Verlängerungskabeln und dem Austritt des Kabels aus dem Erzeugnis.

14. Blitzschlag
Für zusätzlichen Schutz des Erzeugnisses während eines Gewitters oder bei Nichtverwendung für lange Zeit den Stecker aus der Steckdose ziehen. Dies verhütet Beschädigung durch Blitzschlag und Netzspannungsstöße.

15. Überlastung
Wandsteckdosen, Verlängerungskabel und eingebaute Bequemlickkeitssteckdosen nicht überlasten, da dies Feuer oder elektrischen Schlag verursachen kann.

16. Eindringen von Fremdkörpern und Flüssigkeit

Niemals Objekte irgendwelcher Art durch die Öffnungen in das Gerät schieben, da diese unter hoher Spannung stehende Teile berühren oder kurzschließen können, wodurch es zu Feuer oder elektrischem Schlag kommen kann. Niemals Flüssigkeiten irgendwelcher Art auf das Erzeugnis verschütten.

17. Entflammbare und explosive Substanzen

Vermeiden Sie Verwendung dieses Erzeugnisses an Orten mit Gasen bzw. entflammbaren oder explosiven Substanzen in der direkten Umgebung.

18. Starke stöße oder Vibrationen

Setzen Sie das Erzeugnis beim Transport nicht starken Stößen oder Vibrationen aus.

19. Wartung

Versuchen Sie nicht, dieses Erzeugnis Selbst zu warten, da Sie sich durch Öffnen bzw. Entfernen von Abdeckungen hohen Spannungen und sonstigen Gefährdungen ausserzen können.

Beziehen Sie sich für jegliche Wartung auf qualifiziertes Wartungspersonal.

20. Beschädigung, die Wartung erfordert

Ziehen Sie den Stecker dieses Erzeugnisses aus der Steckdose und wenden Sie sich an qualifiziertes Wartungspersonal, wenn eine der folgenden Bedingungen vorliegt:

a. Wenn das Netzkabel oder der Stecker beschädigt ist.
b. Bei Eindringen von Flüssigkeit oder Fremdkörpern in das Gerät.
c. Wenn das Erzeugnis Regen oder Wasser ausgesetzt worden ist.
d. Wenn das Erzeugnis bei Befolgen der Bedienungsanleitungen nicht normal funktioniert.
   Nur die Regelelemente verstellen, die in den Bedienungsanleitungen behandelt werden, da unangemessene Einstellung anderer Regelelemente Beschädigung verursachen kann und oft beträchtliche Arbeit durch einen qualifizierten Techniker erfordert, um das Erzeugnis wieder, zu normalem Betrieb zurückzubringen.
e. Wenn das Erzeugnis fallen gelassen oder beschädigt worden ist.
f. Wenn das Erzeugnis eine klare Änderung in der Leistung zeigt-dies weist darauf hin, daß Wartung erforderlich ist.

21. Ersatzteile

Wenn Ersatzteile erforderlich sind, darauf achten, daß der Wartungstechniker nur die vom Hersteller festgelegten Ersatzteile oder Teile mit den gleichen Charakteristiken wie die ursprünglichen Teile verwendet. Unautorisierte Ersatzteile können Feuer, elektrischen Schlag oder sonstige Gefährdungen verursachen.

22. Sicherheitsprüfung

Bitten Sie den Wartungstechniker nach der Vollendung von Wartung oder Reparaturarbeiten an diesem Erzeugnis um die Durchführung von Sicherheitsprüfungen, um zu bestimmen, daß das Erzeugnis im angemissenen Betriebszustand ist.

23. Anbringung an der Wand oder an der Decke

Das Erzeugnis sollte nur entsprechend den Empfehlungen des Herstellers an einer Wand oder an der Decke angebracht werden.

24. Wärme

Das Erzeugnis sollte fern von Wärmequellen wie Radiatoren, Heizwiderständen, Öfen und anderen Wärme erzeugenden Erzeugnissen (einschließlich Verstärkern) aufgestellt werden.

25. Hot Aufmerksamkeit

Kamera das Gerät eingeschaltet ist, wird die Oberflächentemperatur mehr als 50 ℃ (122 ° F).
Wenn Sie die Kamera berühren, bitte das Gerät ausschalten.

MISES EN GARDE IMPORTANTES

1. Lire les instructions

Lire toutes les instructions de sécurité et de fonctionnement avant de faire fonctionner l'appareil.

2. Conserver ces instructions

Conserver les instructions de sécurité et de fonctionnement á des fins de référence ultérieure.

3. Tenir compte des avertissements

Tous les avertissements qui figurent sur l'appareil et dans le mode d'emploi devront être respectés.

4. Observer les instructions

Observer toutes les instructions de fonctionnement et d'utilisation.

5. Nettoyage

Avant de procéder au nettoyage, débrancher l'appareil de la prise secteur. Ne pas utiliser de produits de nettoyage liquides ou en aérosol.

Nettoyer l'appareil avec un chiffon humide.

6. Fixations

Ne pas utiliser de fixations non recommandées par le fabricant de l'appareil car elles pourraient être source de danger.

7. Eau et humidité

Ne pas utiliser l'appareil á proximité d'eau-ar exemple prés d'une baignoire, d'un lavabo, d'un évier ou d'un bac á lessive, dans un sous-sol humide, ou prés d'une piscine, etc.

8. Accessoires

Ne pas placer l'appareil sur un chariot, un socle, un pied, un support ou one table instables L'appareil pourrait tomber, blessant griévement des enfants ou des adultes, et étant sérieusement endommagé.

Utiliser exclusivement le chariot, le socle, le pied, le support ou la table recommandés par le fabricant, ou vendus avec l'appareil. Pour tout montage de l'appareil, respecter les instructions du fabricant, et utiliser á cette fin l'accessoire de montage recommandé par le fabricant.

9. L'appareil monté sur son chariot devra être déplacé avec précaution

Des arrêts brusques, une force excessive et des surfaces irréguliéres pourraient provoquer le renversement de l'ensemble appareil-chariot.

10. Ventilation

Les fentes et les ouvertures du coffret sont prévues pour la ventilation ainsi que pour garantir un fonctionnement en toute sécurité de l'appareil et le protéger de toute surchauffe, et ces ouvertures ne devront donc être ni obstruées ni recouvertes. Ne jamais obstruer les ouvertures en placant l'appareil sur un lit, un sofa, un tapis ou toute surface similaire. Ne jamais placer l'appareil dans un support confiné, par exemple une bibliothéque ou une é tagé re, sans ventilation suffisante ou sans repecter les instructions du fabricant.

11. Sources d'allmentation

L'appareil devra être alimenté exclusivement sur le type d'alimentation indiqué sur l'étiquette signalétique. Sil'on n'est pas sûr du type d'alimentatio du local, consulter le revendeur de l'appareil ou la compagnie d'électricité locale. Pour les appareils qui fonctionnent sur batterie ou sur d'autres sources, voir le mode d'emploi.

12. Mise á la terre ou polarisation

L'appareil est doté d'une fiche trifilaire avec mise á la terre, dont la troisiéme broche assure la mise á la terre. Cette fiche ne rentrera que dans les prises trifilaires de mise á la terre. Ceci est une mesure de sécurité. Si la fiche ne rentre pas dans la prise, faire remplacer la prise désuéte par un électricien.

Ne pas rendre vaine la measure de sécurité assurée par cette prise avec mise á la terre.

13. Protection du cordon d'alimentation

Acheminer les cordons d'alimentation de facon qu'on ne risque pas de marcher dessus ou de les coincer sous un objet placé dessus ou contre eux.

Faire particuliérement attention aux fiches des cordons, á la proximité des prises, et á l'endroit oú ils ressortent de l'appareil.

14. Foudre

Pour renforcer la protection de l'appareil pendant un orage, ou si l'on s'en éloigne ou qu'on reste longtemps sans l'utiliser, le débrancher de la source d'alimentation. Ceci permettra d'éviter tout dommage de l'appareil dú á la foudre et aux surtensions de ligne.

15. Surcharge

Ne pas surcharger les prises, rallonges et prises multiples car cela pourrait entraîner un risque de feu ou de choc électrique.

16. Pénétration d'objets et de liquides

Ne jamais enfoncer d'objets d'aucune sorte dans les ouvertures de l'appareil car ils pourraient toucher des points de tension dangereuse ou court-circuiter des piéces, ce qui pourrait provoquer un feu ou un choc électrique. Ne jamais renverser de liquide d'aucune sorte sur l'appareil.

17. Substances inflammabes et explosives

Eviter d'utiliser l'appareil en présence de gaz, ainsi qu'á proximité immédiate de substances inflammables et explosives.

18. Chocs ou vibrations violents

Lorsqu'on transporte l'appareil, ne pas le soumettre á des chocs ou des vibrations violents.

19. Réparations

Ne pas tenter de réparer l'aapareil soi-même car le fait d'ouvrir ou de retirer les caches risque d'exposer l'utilisateur á des tensions dangereuses notamment. Confier toute réparation á un personnel qualifié.

20. Dommages nécessitant réparations

Débrancher l'appareil de la source d'alimentation et confier les réparations á un personnel qualifié dans les cas suivants:

a. Lorsque le cordon d'alimentation ou sa fiche sont endommagés
b. Si du liquide s'est renversé sur l'appareil ou que des objets sont tombés dedans
c. Si l'appareil a été exposé á la pluie ou á l'eau.
d. Si l'appareil ne fonctionne pas normalement lorsqu'on observe les instructions d'utilisation.
   Ne régler que les commandes couvertes par le mode d'emploi ; en effet, un réglage incorrect des autres commandes pourrait entrainer des dommages et nécessiteront souvent des travaux de réparation coûteux par un technicien qualifié pour remettre l'appareil en état de marche.
e. Si l'appareil est tombé ou qu'il a été endommagé.
f. Si l'appareil affiche une nette modification de ses performances, cela signifie qu'il a besoin d'être réparé.

21. Piéces de rechange

Si l'on a besoin de piéces de rechange, veiller á ce que le technicien de réparation utilise exclusivement les piéces de rechange spécifiées par le fabricant ou des piéces ayant les mêmes caractéristiques que les piéces d'origine. Les piéces de rechange non autorisées risquent de provoquer un feu, un choc électrique et autres dangers.

22. Vérificaton de sécurité

Aprés tout travail d'entretien ou de réparation de l'appareil, demander au technicien de réparation d'effectuer les vérifications de sécurité pour s'assurer que l'appareil est en bon état de marche.

23.Montage au mur ou au plafond

L'appareil ne pourra être monté au mur ou au plafond que de la maniére recommandée par le fabricant.

24. Chaleur

Eloigner l'appareil des sources de chaleur, telles que radiateurs, appareils de chauffage, cuisiniéres, et de tour produit engendrant de la chaleur (y compris les amplificateurs).

25. Une attention chaude

Caméra de la mise sous tension, la température de surface sera plus de 50 ℃ (122 ° F).

Si vous touchez l'appareil photo, s'il vous plaît éteindre l'appareil.

IMPORTANT NOTICE

USA

These products have 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, and 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 product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

Changes or modifications not expressly approved by Hitachi Kokusai Electric Ltd. responsible for compliance could void the user's authority to operate the equipment.

For Canada

This product does not exceed the class A/class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations.

Le présent appareil n'émet pas de bruits radioélectriques dépassant les limités applicable aux appareils numériques de classe A prescrites dans le rVglement sur le brouillage radioélectrique édicter par le ministére des communications du canada.

China RoHS

The following statement is related to the regulation on " Measures for the Administration of the control of Pollution by Electronic Information Products " , known as " China RoHS ".
The table shows contained Hazardous Substances in this camera.

说明书（环境方面：补充资料）

对象产品：彩色摄像机

1．电子产品污染控制标志

此标志是根据 2006 年 2 月 28 日公布的《电子信息产品污染控制管理办法》以及 SJ/T11364-2006《电子信息产品污染控制标识要求》而制定的，是用来表示适用于在中华人民共和国流通的电子信息产品的环保使用期限。

只要遵守此类产品的安全事项以及使用上应注意的问题，从制造日起到此年限内，不会发生产品中的有害物质外泄、突变等，不会对环境、人体以及财产产生严重影响。同时，此年限是除去必须定期交换的保守部品的，是其他产品的环保使用期限。

产品在正常情况下使用完毕要废弃时，请遵守各地区对电子信息产品的回收・再利用的相关各项法律、法规。

另外，从第三者处转买的情况下即使在本期限内也视为失去效力。

2．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)	水银 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
1	主机	×	○	×	○	○	○

○：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 SJ/T11363-2006 标准规定的限量要求以下。

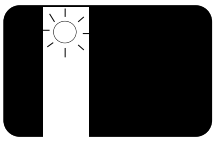
×：表示该有毒有害物质至少在该部件的某一均材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。

Phenomena inherent to CCD imaging device

The following phenomena are inherent to a charge coupled device imaging element and do not indicate malfunction.

1) Smear and blooming

Vertical bands are visible when a strong light enters the scene. Adjust the camera aiming direction carefully to avoid strong direct or reflected light.



2) Fixed pattern noise

High ambient temperature can cause fixed pattern noise to appear throughout the scene.

3) Moire

Interaction between patterns can produce an additional "phantom" pattern to appear. The CCD picture elements (pixels) are arranged in a pattern, which can interact with a pattern in the scene (e.g., a performer wearing a finely striped necktie) to result in a Moire pattern. The effect should be considered when selecting costumes, props and other scene elements.

4) Ghosting

Strong direct or reflected light near an object of interest can cause ghosting of the object to appear in the picture. The effect is more obtrusive with certain iris settings and lens types. Select the scene layout and camera pointing direction carefully in order to avoid this effect.

5）White spot

Imperceptible white spots may rarely come up on the screen due to cosmic rays and so on. It becomes easy to appear when the sensitivity of the camera is raised in the operation at the high temperature.

Combination with a microscope

The following phenomena occur by combining a camera and optical apparatus and do not indicate malfunction.

1) Vignetting

Depending on a microscope, light may enter into a camera at an angle larger than a lens for large view reservation, and the portion which becomes dark at the screen upper and lower ends may occur. This phenomenon can be reduced by the shading compensation function of a camera. However, this phenomenon cannot be rectified completely. When accessories, such as a relay lens, are prepared for the microscope, vignetting may improve optically.

Operating considerations Notes to users

1. Important safety notes

- Please supply the direct current 12V of the camera input power supply within the range of 11 to 13V
- Time will be needed for about four seconds by the time the camera works normally after turning on the power supply.
- Observe that flammable objects, water or metal do not enter the camera interior. These may lead to failure or accident.
- Do not modify the camera or use the camera with external covers removed. These may cause failure, void any warranties and pose a safety hazard.
- Sop using the camera at the approach of electrical storm (thunder audible). Protect the camera from rain if using it outdoors.
- In event the camera shows any abnormality, switch off the camera and disconnect the power cord. Contract a Hitachi Denshi service representative.

2. Handling

- Do not attempt to remove cover.
- When installing or removing a lens, be sure to use care that water or dust dose not enter the inside of the camera.

3. Installing and storage

Avoid installing or storing the camera in the following environments.

- Environments exposed to direct sunlight, rain or snow.
- Environments where combustible or corrosive gas exists.
- Excessively warm or cold environment (Operating ambient temperature: -10 to 50℃).
- Humid or dusty environment.
- Place subjected to excessive vibration or shock.
- Environment exposed to strong electric or magnetic field.
- Do not aim the camera lens at the sun.
- Do not shoot strong light.

When such a scene is shot, vertical trailing will appear. However, this is not due to failure. In case strong light enters camera through the lens, partial deterioration in picture quality will result.

4. To obtain stable performance for long time

When the camera is used continuously for long time under high ambient temperature, the inside electrical parts become deteriorated, resulting in shortening its life. To use the camera continuously for long time, the highest temperature must be below 40℃.

5. Connectors

Confirm the power is off before connecting or disconnecting a signal cable. Grasp connectors by the body, not the attached wires.

6. Cleaning

- Use a blower or a lens brush to remove dusts on the lens or the optical filter.
- Wipe dirts on the case off with dry soft cloth. If dirks are hardened, wipe them off with cloth moistened with neutral detergent liquid; wipe the cover with dry cloth.
- Do not use benzene, thinner, alcohol, liquid cleaner or spray-type cleaner.
- In event dust or other debris is lodged between the CCD and optical filter, consult dealer for cleaning by an optical technician.

Table of Contents

1. Overview

HV-F203GV is high precision 3CCD progressive scan color camera, which has a C mount prism, 1/1.8 inch 2M pixels square CCD and Gigabit Ethernet interface. The camera can be powered from the LAN cable by PoE (Power over Ethernet)

2. Standard composition

Check when unpacking

Camera 1
Installation guide 1
Plug for DC IN/SYNC connector (HR10A-10P-12S) 1

Optional accessories

(1) 12 pin plug HR10A-10P-12S(01)
(2) Junction box JU-F30
(3) LAN cable (CAT5E or CAT6)
In the CE Marking region, use a high flexibility shielded cable (recommended C5E(S-HFR)(K)-HSL-1: Oki). Refer to page 8.

(4) Camera cable

	Molded type	Shield type
2m	C-201KSM	C-201KSS
5m	C-501KSM	C-501KSS
10m	C-102KSM	C-102KSS

In the CE Marking region, use the shield type and attach clamp filter (ZCAT 2035-0930A: TDK) at both ends (camera and video processor ends). Refer to page 8

Note : When not using the specified junction box, LAN cable, camera cable and clamp filter, malfunctions may be caused.

3. Features

・High resolution and color fidelity

The 1/1.8-inch 2.0 million pixels square lattices progressive scan CCD and dichroic prism for RGB color achieves a high resolution picture and good color reproduction.

・Small and lightweight

Although it is 3CCD Camera, it is compact and lightweight. (55(W) x 55(H) x 89(D) mm / approx. 370g.)

・Gigabit Ethernet

By adoption of Gigabit Ethernet interface, high-speed connection of maximum of 1 Gbps can be possible. Moreover, by using hub or switcher, construction of multiple camera system can be easily performed. It is also possible to 100m.

・GigE Vision™ correspondence

Based on Industrial camera interface standard GigE Vision, a maximum of 1Gbps high speed data transmit is available and suitable for image processing.

・GenICam™ correspondence

Development of camera control system is easy because industrial camera control API "GenICam" lead EMVA (European Machine Vision Association).

・Various picture quality enhancement

Independent size color masking is the Hitachi innovation for optimizing color balance. Saturation and hue of 6 colors (Red, Green, Blue, Cyan, Magenta and Yellow) can be adjusted independently to deliver the best color in image capture, microscope and other applications.

In-out gradation control can be arbitrarily adjusted by using LUT.

・Auto shading correction

Color shading due to aberration of the lens is automatically compensated or reduced.

・Versatile CCD drive functions

Video frame capture on demand using external trigger signal

Long integration mode (max. 10 seconds)

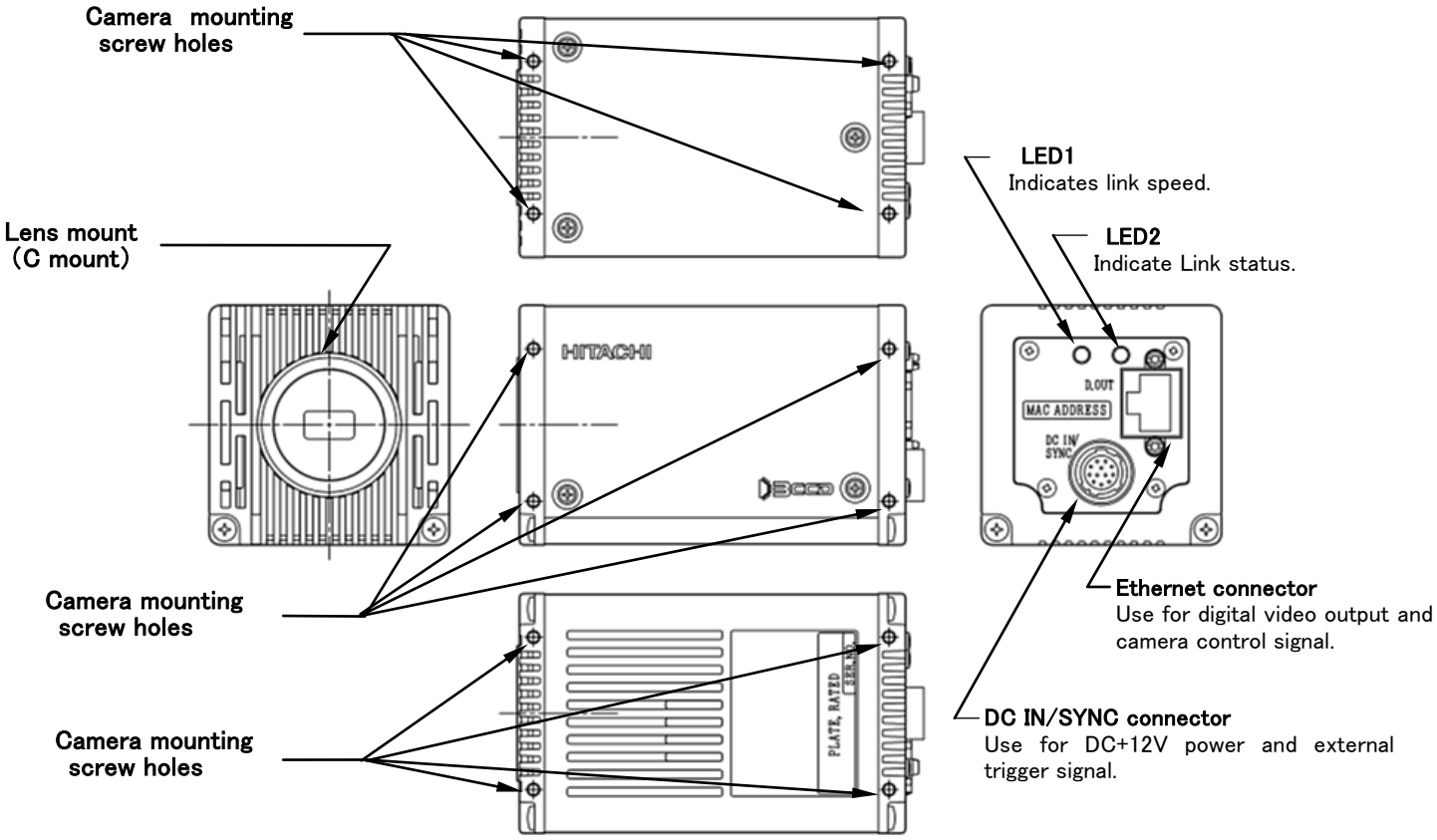
Variable shutter mode (min. 1/100,000 second)

Auto electronic shutter mode

・Power over type Ethernet

Power supply can be input via Ethernet cable.

4. Section name and functions



5. Camera mounting (Attention :Hot!)

The camera chassis will become a very high temperature by high data rate. Please be careful about handling so that you don't get burned.

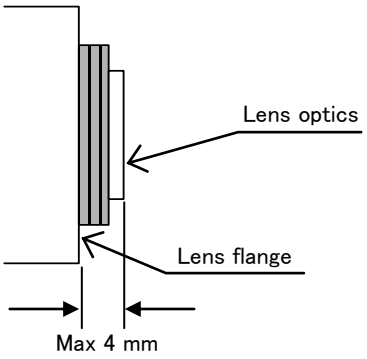
Please don't touch the camera a power supply is supplied with. Please wait a moment until a camera gets cold after stopping supply of a power supply.

When doing the handling which touches a camera, a heat sink is needed.

The heat sink size : Like a size of t10mm x 135mm x 135mm by aluminum plate.

6. Lens

CAUTION
Observe the dimensions of the lens mounting selection as illustrated at the right.
If the dimensions are not observed, do not use such a lens, because the lens and the camera will be damaged.



Selecting a lens

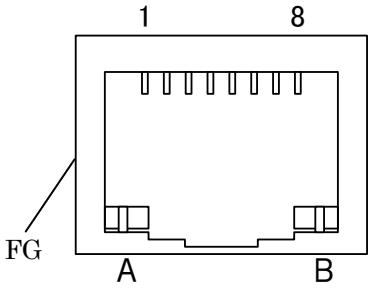
The proper lens is important for obtaining adequate performance from the camera. Especially in the case of a three elements CCD system C mount camera, the lens incidence and exit distances are important. If separation is too short, color irregularity Is apt to occur at the top and bottom of the image.

Conversely if too long, where the lens iris is a nearly fully open, resolution is impaired, while shading and flare can seriously detract from image quality. When using 3 CCD color system camera, it is also recommended to use a lens designed for this purpose.

7. Connector & LED

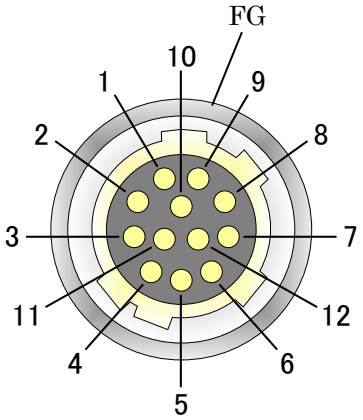
(1) Ethernet connector

PIN NO.	Signal
1	TRP1+
2	TRP1−
3	TRP2+
4	TRP3+
5	TRP3−
6	TRP2−
7	TRP4+
8	TRP4−
A	N.C.
B	N.C.
FG	GND



(2) DCIN/SYNC connector

PIN NO.	Signal	PIN NO.	Signal
1	GND (+12V)	7	TRIG(H) IN
2	+12V	8	N.C.
3	GND	9	N.C.
4	N.C.	10	FLASH /VD OUT
5	GND	11	N.C.
6	N.C.	12	TRIG(C) IN
		FG	GND



Connector (matching camera: SNH−10−12(RPCB) SANWOO or equivalent
Plug (matching cable plug : HR10A−10P−12S(01) HIROSE　or equivalent

Please connect the FG/1and 3/5 pin to the ground because camera may break down.
Please connect the ground to the ground terminal of the power supply, personal computer, etc.
Please do not power 2pin and PoE at the same time.

TRIG are input using digital isolation, and FLASH/VD OUT is output by digital Isolation,
therefore 12 pin are isolate from FG/1/3/5 pin.
When the system requirement should be connect to GND and that doesn't need isolation,
please connect 12pin to FG/1/3/5 pin.

(Note) Please do not unplug and insert cable (digital out cable) with a power supplied to a camera.
Install clamp filter (ZCAT2035−0930A: TDK) at both ends (camera and video processor ends) in the CE marking region.
Please do not input any signal to N.U. pin because machine may break down.

(3) LED1,2

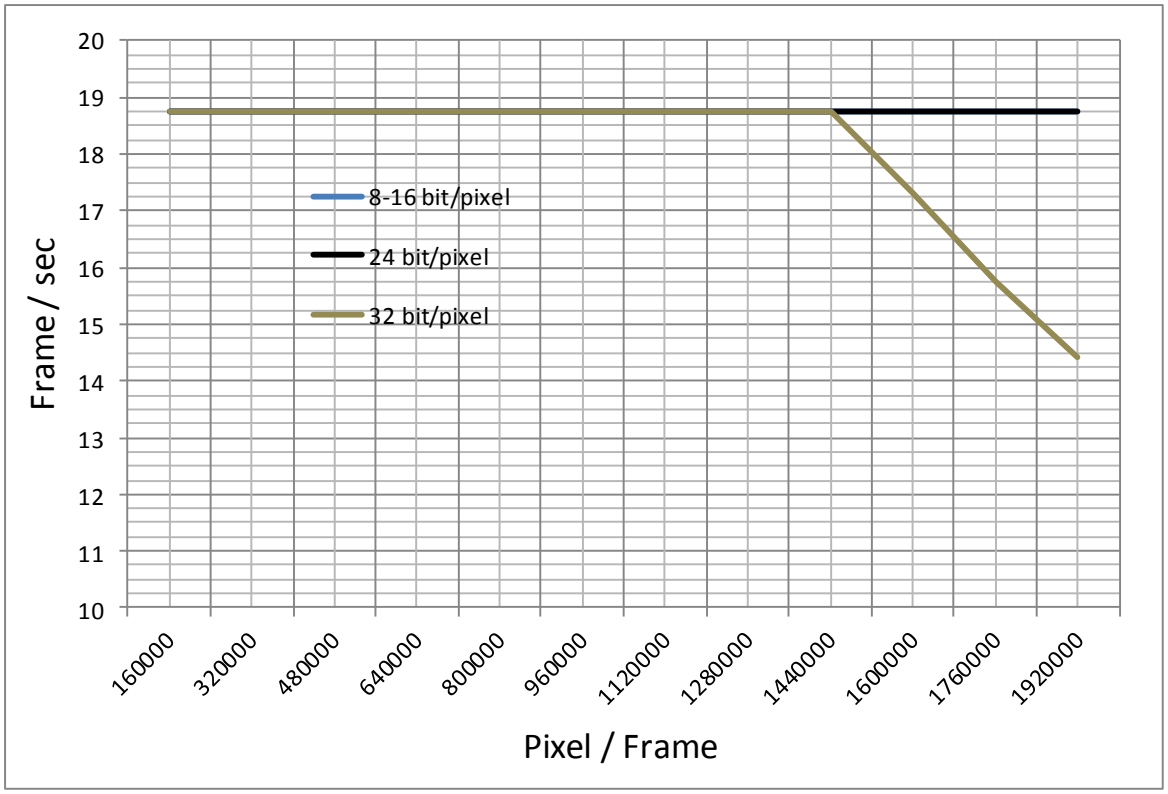
Status	LED1	LED2
Unlinked	Off lit.	Off lit.
1Gb Linked	Green lit.	Green lit or blinking green.
100Mb Linked	Red lit.	Green lit or blinking green.
The Camera IP address was determined It is maintained until the first detection command from the pc viewer is received	Orange lit.	Green lit.

8. Representative example of video output scheme

Word length of data	Horizontal resolution	Vertical resolution	Frame rate	Approved standards
24bit(R:8bit, G:8bit, B:8bit)	1600 (R,G,B)	1200 (R,G,B)	Approx 18.75FPS	GVSP_PIX_RGB8_PACKED, GVSP_PIX_BGR8_PACKED
32bit(R:10bit, G:10bit, B:10bit)	1600 (R,G,B)	1200 (R,G,B)	Approx 14FPS	GVSP_PIX_BGR10V1_PACKED
16bit(Y:8bit, U:8bit, V:8bit)	1600 (Y)	1200 (Y)	Approx. 18.75FPS	GVSP_PIX_YUV422_PACKED

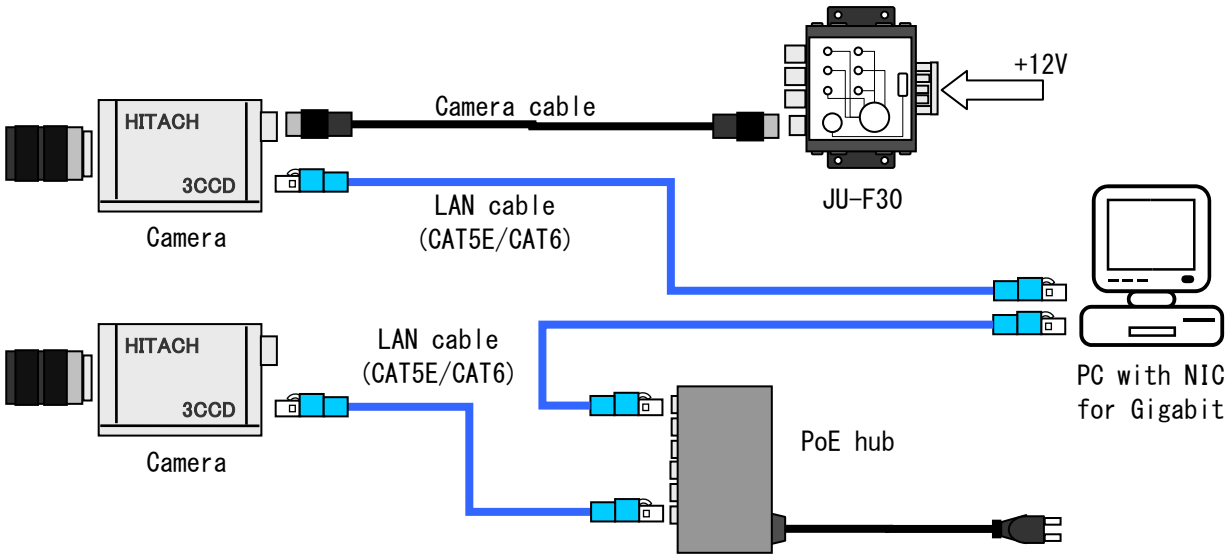
Frame rate is limited less than 1 GByte (Depends on the usage of band width of Giga Ether Net) by data amount acquired by multiplying of word length of data, horizontal resolution vertical resolution and frame rate.

The number of pixel per 1 frame is multiplied value of width and height. The frame rate is represented by following figure.
Frame rate of 8–16 bit/pixel overlaps the frame rate of 24 bit/pixel.



9. System example

HV-F203GV connect to PC sing LAN cable.



(*) Note that following point when connecting the camera

(1) Please connect the camera to device for Gigabit Ethernet IEEE802.3ab(1000BASE-T)

(2) Please use LAN cable of CAT5E or more (recommendation: CAT6 straight cable).

(3) To the NIC for Jumbo frame is recommended to be used
Recommended NIC: Intel Pro1000 PT Desktop

(4) When the camera is connected to Laptop PC, please use the one whose built-in LAN is Gigabit Ethernet IEEE802.3ab(1000BASE-T) correspondence.
The external LAN card (CardBus32 or USB2.0) may not display the cameras ability because of the bus limitation.

(5) Please connect the camera and PC by 1 to 1 as much as possible
Please use the device corresponded to Jumbo frame when using the switching hub etc.

(6) Please confirm if the camera and the connected LAN port have same subnet.
Example-1: Same subnet --> Controllable

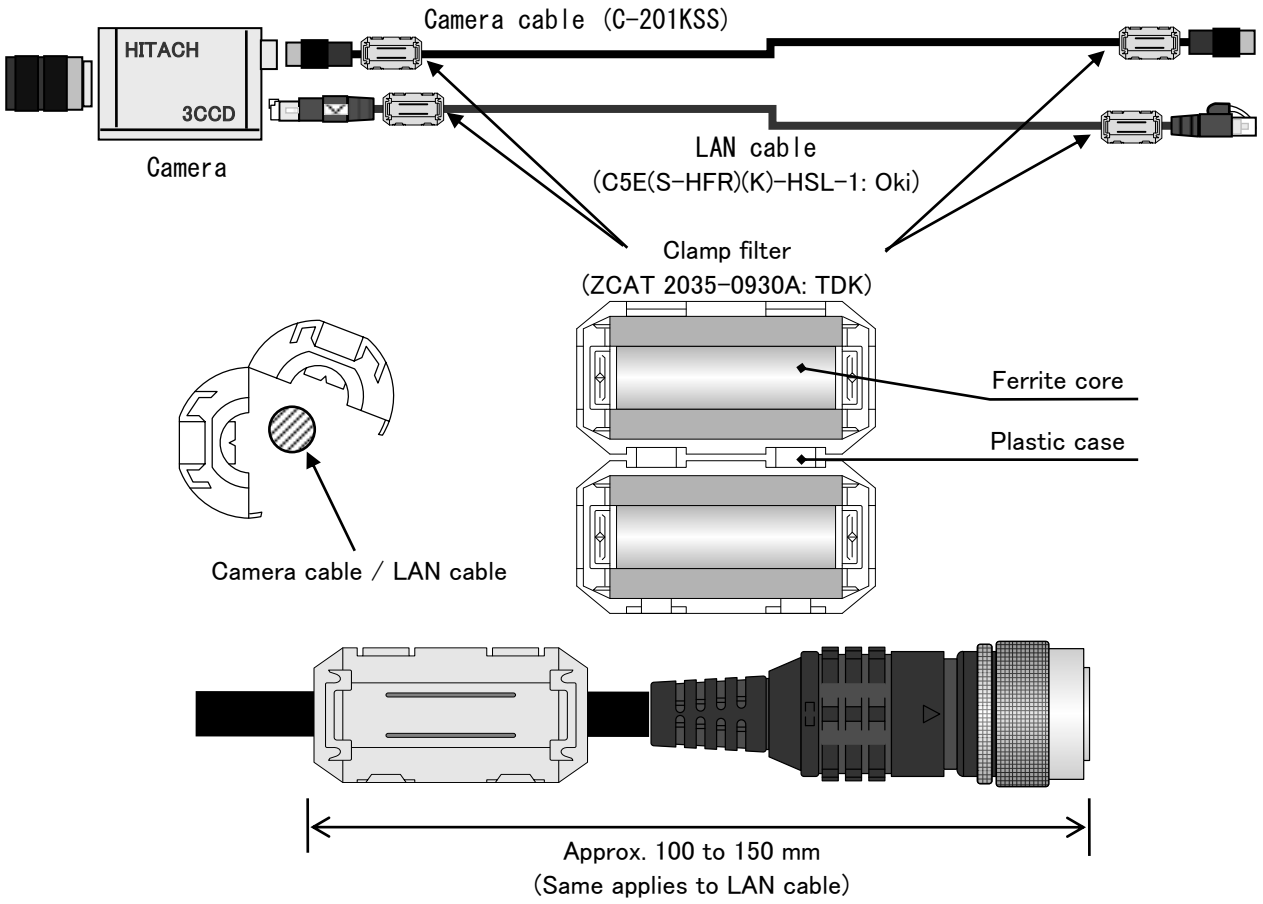
	IP address	Subnet mask	**Subnet**
Camera	192.168.1.100	255.255.255.0	**192.168.1.0/24**
LAN port	192.168.1.1	255.255.255.0	**192.168.1.0/24**

Example-2: Different subnet --> Uncontrollable

	IP address	Subnet mask	**Subnet**
Camera	192.168.1.100	255.255.255.0	**192.168.1.0/24**
LAN port	192.168.2.1	255.255.255.0	**192.168.2.0/24**

(7) A striped noise might be caused according to the equipment (hub etc.) connected with the camera.
In that case, please try the following:
-Connect the cable to another port of the equipment again.
-Adjust the packet delay value of the camera. (Packet delay Feature Name "GevSCPD")
(e.g. 0 -> 2500.)

(8) In the CE Marking region, use following specified cables and clamp filters.



10. Functions and operations

Various mode setup and adjustment of HV-F203GV are performed by the remote control via Gigabit Ethernet. Operation and adjustment way of function utilized are described below.

"Standard" means the function based on GenICam™ Standard Feature Naming Convention (SFNC) and "Custom" means the original function. The software for GenICam™ can operate by using command name. Moreover, it can also be operated by reading /writing the value to address directly.

Each function and operation belongs to one of the following 5 kinds of data type.

Enumeration	: Enumerated type
Integer	: Integer type
Float	: Floating point type
Boolean	: Logical data type
Command	: Execute type
String	: Character string type

10.1. DeviceControl Category

・ Device Vendor Name ： Vendor name of camera

Feature name : DeviceVendorName (String /Standard)
Address : 00000048 h
Values (Read only) : "Hitachi Kokusai Electric Inc."

・ Device Model Name ： Model of camera

Feature name : DeviceModelName (String / Standard)
Address : 00000068 h
Values (Read only) : "HV-F203GV"

・ Device Manufacturer Info ： Vender information

Feature name : DeviceManufacturerInfo (String / Standard)
Address : 000000A8 h
Values (Read only) : "www.hitachi-kokusai.co.jp"

・ Device Version ： Version information of camera

Feature name : DeviceVersion (String / Standard)
Address : 00000088 h
Values (Read only) : "1.0.0.0 (F:0.1.0.0)"

＊ different according to camera version

・Device Firmware Version： Version information of firmware

Feature name : DeviceFirmwareVersion (String / Standard)
Address : A00100A0 h
Values (Read only) : "1.0.0.0"

＊ different according to camera version

・Device Serial Number： Serial number

Feature name : DeviceSerialNumber (String / Standard)
Address : 000000D8 h
Values (Read only) : "12345678"

＊ different according to the camera

・Device User ID ： User programmable ID

Feature name : DeviceUserID (String / Standard)
Address : 000000E8 h
Values(Factory setting Blank): Any null-terminated string (16 Byte)

・Device Family Name ： Family name of camera

Feature name : DeviceFamilyName (String / Standard)
Address : A0010080 h
Values (Read only) : "GigEV CAMERA"

・Device Type: Type of camera

Feature name : DeviceType (Enumeration / Standard)
Address : A00100C0 h
Values (Read only) : 0 "Transmitter"

・Device Scan Type ： Scan type of image sensor

Feature name : DeviceScanType (Enumeration / Standard)
Address : A00100D0 h
Values (Read only) : 0 "Areascan"

・ Device Clock Selector :Types of clocks to be reffered by DeviceClockFrequency

Feature name : DeviceClockSelector (Enumeration / Standard)
Address : A00100E4 h
Values : 0 "Sensor"

・ Device Clock Frequency ： Clock frequency specified by DeviceClockSelector

Feature name : DeviceClockFrequency (Float/ Standard)
Address : A00100E8 h
Values (Read only) : 45000000 [Hz]

・ Device Reset ： Camera reset

Feature name : DeviceReset (Command / Standard)
Address : A00100B0 h
Values (Write only) : 1 Camera is restarted by command "1"

・Device TL Version Major ： The version information of GigEVision Transport Layer

Feature name : DeviceTLVersionMajor (Integer/ Standard)
Address : 0-15 bit of 00000000 h
Values (Read only) : 1

・Device TL Version Minor ： The version information of GigEVision Transport Layer

Feature name : DeviceTLVersionMinor (Integer / Standard)
Address : 16-31bit of 00000000 h
Values (Read only) : 2

・Device Registers Endianness ： The endianness information of device resister

Feature name : DeviceRegistersEndianness (Enumeration / Standard)
Address : 0-bit of 00000004 h
Values (Read only) : 1 "Big" Big Endian

・ Device Character Set ： The information of character code of this device

Feature name : DeviceCharacterSet (Enumeration / Standard)
Address : 24-31bit of 00000004 h
Values (Read only) : 1 "UTF-8"

・Device Link Selector ： Select the Device Link Channel

Feature name : DeviceLinkSelector (Integer / Standard)
Address : 00000600 h
Values (Read only) : 1

・Device Link Speed ： Link speed for data communication

Feature name : DeviceLinkSpeed (Integer / Standard)
Address : 00000670 h
Values (Read only) : 100 "100 Mbps"
1000 "1 Gbps"

・Device Event Channel Count ： The supported number of events channel

Feature name : DeviceEventChannelCount (Integer / Standard)
Address : 00000900 h
Values (Read only) : 1

・Device Stream Channel Count ： The supported number of streaming channel

Feature name : DeviceStreamChannelCount (Integer / Standard)
Address : 00000904 h
Values (Read only) : 1

・Device Link Heartbeat Timeout ： The time setting of heart beat time

Feature name : DeviceLinkHeartbeatTimeout (Float / Standard)
Address : A009001C h
Values (Factory setting 3000000) : 500000 to 100000000 [us]

・Timestamp Latch ： Latch of timestamp

Feature name : TimestampLatch (Command / Standard)
Address : 00000944 h
Values (Write only) : 2 Timestamp count is latched to Timestamp Latch Value when 2 is written.

・Timestamp Reset ： Reset of timestamp

Feature name : TimestampReset (Command / Standard)
Address : 00000944 h
Values (Write only) : 1 Current timestamp count is reset when 1 is written.

・Timestamp Latch Reset ： Time stamp counter reset after timestamp counter latched

Feature name : TimestampLatchReset (Command / Custom)
Address : 00000944 h
Values (Write only) : 3 Timestamp count is latched to Timestamp Latch Value and current timestamp count is reset when 3 is written.

・Timestamp Latch Value ： Counter value of 64bit latched by TimestampLatch

Feature name : TimestampLatchValue (Integer[64bit] / Standard)
Address : A0090014 h/ A0090018 h
Values (Read only) : 0 to 2^64 Latched timestamp count by Timestamp Latch is entered.

・Device Link Heartbeat Mode ： Heartbeattime mode enable/disable

Feature name : DeviceLinkHeartbeatMode (Enumeration / Standard)
Address : 00000954 h
Values (Factory setting 0) : 0 "ON" Enable Heartbeattimeout.
1 "OFF" Disable Heartbeattimeout.

・Device Stream Channel Endianness ： Endianness of stream channel

Feature name : DeviceStreamChannelEndianness （Enumeration / Standard）
Address : 2-bit of 00000D04 h
Values (Read only) : 0 ″Little″ Little Endian

10.2. ImageFormatControl Category

・Sensor Width ： Valid horizontal pixel number of image sensor

Feature name : SensorWidth (Integer / Standard)
Address : A002F000 h
Values (Read only) : 1600

・Sensor Height ： Valid vertical pixel number of image sensor

Feature name : SensorHeight (Integer / Standard)
Address : A002F004 h
Values (Read only) : 1200

・ Width Max ： Maximum width of the image

Feature name : WidthMax (Integer / Standard)
Address : A002F008 h
Values (Read only) : 1600

・Height Max ： Maximum height of the image

Feature name : HeightMax (Integer / Standard)
Address : A002F00C h
Values (Read only) : 2 to 1200

***This value depends on the value of BinningVertical and PartialScanHeight.**

・Width ： Set the actual image width

Feature name : Width (Integer / Standard)
Address : A0020000 h
Values (Factory setting 1600)
: 2 to Width Max − Offset X

***The width is set in increments of 2 pixels**

・Height ： Set the actual image height

Feature name : Height (Integer / Standard)
Address : A0020004 h
Values (Factory setting 1200)
: 2 to Heght Max − Offset Y

***The height is set in increments of 2 pixels**

・Offset X ： Set the horizontal offset

Feature name : OffsetX (Integer / Standard)
Address : A0020008 h
Values (Factory setting 0) : 0 to Width Max − Width

***The horizontal offset is set in increments of 2 pixels**

・Offset Y ： Set the vertical offset

Feature name : OffsetY (Integer / Standard)
Address : A002000C h
Values (Factory setting 0) : 0 to Height Max − Heght

***The vertical offset is set in increments of 2 pixels**

・Binning Selector ： Selection of binning process

Feature name : BinningSelector (Enumeration / Standard)
Address : A002003C h

Values : 0 "Sensor"

・Binning Vertical : Vertical binning setting

Feature name : BinningVertical (Enumeration / Standard)
Address : A0020010 h
Values (Factory setting 1) : 1 "OFF" Disable Binning.
: 2 "ON" Enable Binning.

・Test Pattern : display test pattern

Feature name : TestPattern (Enumeration / Standard)
Address : A0020020 h
Values (Factory setting 0) : 0 "OFF "
: 1 "Horizontal Ramp"
: 4 "Color bar"

・Center Set X : Auto adjustment of Offset X to get horizontal center of image

Feature name : CenterSetX (Command / Custom)
Address : A002F010 h
Values (Write only) : 1 CenterSetX is executed when 1 is written.

・Center Set Y : Auto adjustment of Offset Y to get vertical center of image

Feature name : CenterSetY (Command / Custom)
Address : A002F014 h
Values (Write only) : 1 CenterSetY is executed when 1 is written.

・Max Size Set : Offest X and Offset Y are set to zero, and Width and Height are set to Max value respectively

Feature name : MaxSizeSet (Command/ Custom)
Address : A002F018 h
Values (Write only) : 1 MaxSizeSet is executed when 1 is written.

・Pixel Format : Set the pixel format

Feature name : PixelFormat (Enumeration / Standard)
Address : A0020014 h
Values (Factory setting 02180014 h)
: 01080001 h "Mono 8"
: 01100003 h "Mono 10 "
: 01100005 h "Mono 12"
: 0210001F h "YUV422_8 UYVY"
: 02180014 h "RGB8"
: 02180015 h "BGR8"
: 0220001C h "RGB10 V1Packed"

Pixel alignments of each Pixel format are following.

・Mono 8

0 ⋯ 7
Byte 0

・Mono 10

0 ⋯ 7	8 9XXXXXX
Byte 0	Byte 1

・Mono 12

0 ⋯ 7	8⋯11XXXX
Byte 0	Byte 1

・RGB8

Red	Green	Blue
0 ⋯ 7	0 ⋯ 7	0 ⋯ 7
Byte 0	Byte 1	Byte 2

・BGR8

Blue	Green	Red
0 ⋯ 7	0 ⋯ 7	0 ⋯ 7
Byte 0	Byte 1	Byte 2

・RGB10 V1Packed

B G R	Blue	Green	Red
010101XX	2 ⋯ 9	2 ⋯ 9	2 ⋯ 9
Byte 0	Byte 1	Byte 2	Byte 3

・YUV422_8 UYVY Y: Luminance
U: Color difference B-Y
V: Color difference R-Y

U0	Y0	V0	Y1
0 ⋯ 7	0 ⋯ 7	0 ⋯ 7	0 ⋯ 7
Byte 0	Byte 1	Byte 2	Byte 3

・Partial Scan Mode ： Partial scan mode enable/disable

Feature name	: PartialScanMode (Boolean / Custom)	
Address	: A0FF0100 h	
Values (Factory setting 0)	: 0 FALSE	Disable Partial Scan.
	: 1 TRUE	Enable Partial Scan.

・Partial Scan Offset Y ： Offset of valid area of partial scan

Feature name	: PartialScanOffsetY (Integer / Custom)
Address	: A0FF0104 h
Values (Factory setting 0)	: 0 to Sensor Height − Partial Scan Height

・Partial Scan Height ： Width of valid area of partial scan

Feature name	: PartialScanHeight (Integer / Custom)
Address	: A0FF0108 h
Values (Factory setting 1200)	: 100 to Sensor Height − Partial Scan Offset Y

10.3. AcquisitionControl Category

・Acquisition Mode ： AcquisitionMode setting

Feature name : AcquisitionMode (Enumeration / Standard)
Address : A0030000 h
Values (Factory setting 1) : 1 "Continuous" Continuous image capture mode
2 "Multi Frame" Specified number of image capture mode
3 "Single Frame" Single frame capture mode

・Acquisition Start ： Start capture

Feature name : AcquisitionStart (Command / Standard)
Address : A0030004 h
Values (write only) : 1 Image capture processing is started when 1 is written.

・Acquisition Stop ： Stop capture

Feature name : AcquisitionStop (Command / Standard)
Address : A0030008 h
Values (write only) : 0 Image capture processing is stoped when 0 is written.

・Acquisition Frame Count ： Setting of the number of captured frame

＊This fuction is enabled when Acquisition Mode is Multi Frame.

Feature name : AcquisitionFrameCount (Integer / Standard)
Address : A003000C h
Values (Factory setting 1) : 1 to 255

・Acquisition Frame Rate ： Setting of framerate

Feature name : AcquisitionFrameRate (Float / Standard)
Address : A0030010 h
Values (Factory setting 142) : 1 to 142 [Hz(fps)]
Maximum frame rate is changeable by 1 fps
An actual frame rate is decided by size of the picture.

・Acquisition Frame Rate Enable ： Set the frame rate

Feature name : AcquisitionFrameRateEnable (Boolean / Standard)
Address : A0030014 h
Values (Factory setting 0) : 0 FALSE Not perform the frame rate functions.
1 TRUE Perform frame rate functions.

・Current Frame Rate ： Current actually frame rate

Feature name : CurrentFrameRate (Float / Custom)
Address : A0F30100 h
Values (read only) : 1.0 to 142.045 [Hz] It is frame rate that camera actually drives.

・Trigger Selector ： Select the trigger action

Feature name : TriggerSelector (Enumeration / Standard)
Address : A0030020 h
Values : 1 "Frame Start" Select this when using normal trigger mode.

・Trigger Mode (related to Trigger Selector) ： Select the mode selected at Trigger Selector

Feature name : TriggerMode (Enumeration / Standard)
Address : A0030024 h
Values (Factory setting 0) : 0 "OFF" Set trigger mode selected at Trigger Selector to OFF.
1 "ON" Set trigger mode selected at Trigger Selector to ON.

・Trigger Software (related to Trigger Selector) ： Generate the software trigger selected at Trigger Selector
***using when Trigger Source is Software**

Feature name : TriggerSoftware (Command / Standard)
Address : A0030028 h
Values (write only) : 1 Whenever 1 is written, the software trigger is generated.

・Trigger Source (related to Trigger Selector) ： Select the trigger source selected at Trigger Selector

Feature name : TriggerSource (Enumeration / Standard)
Address : A003002C h
Values (Factory setting 0) : 0 "Line 1" Input trigger signal from 7 pin of DCIN/SYNC connector (TRIG).
7 "Software" Use software trigger.

・Trigger Activation (related to Trigger Selector) ： Select polarity of trigger signal selected at Trigger Selector

Feature name : TriggerActivation (Enumeration / Standard)
Address : A0030030 h
Values (Factory setting 1) : 0 "Falling Edge" Falling of input signal is made into trigger signal.
1 "Rising Edge" Rising of input signal is made into trigger signal.

・Trigger Delay (related to Trigger Selector) ： Set the duration of trigger delay selected at Trigger Selector

Feature name : TriggerDelay (Float / Standard)
Address : A0030034 h
Values (Factory setting 0) : 0 to 2,000,000 [Hz] A range and a step of trigger delay time was 0 to 2,000,000 us.

・Exposure Mode ： Setting of electric shutter

Feature name : ExposureMode (Enumeration / Standard)
Address : A0030040 h
Values (Factory setting 0) : 0 "OFF" Shutter Off (exposure 1/30second)
1 "Timed" Shutter speed according to setting of ExposureTime.
2 "Trigger Width" It become ONE trigger mode. ***Refer to page 33 "Trigger mode"**
8 "Preset Timed" Shutter speed according to setting of ExposureTimePreset.

・Exposure Time Preset ： Setting of the Preset shutter

Feature name : ExposureTimePreset (Enumeration / Custom)
Address : A0F30040 h
Values (Factory setting 1) : 1 "1/30s (33,333us)" Set the shutter speed to 1/30 second..
2 "1/60s (16,667us)" Set the shutter speed to 1/60 second..
3 "1/100s (10,000us)" Set the shutter speed to 1/100 second..
4 "1/250s (4,000us)" Set the shutter speed to 1/250 second..
5 "1/1,000s (1000us)" Set the shutter speed to 1/1,000 second..
6 "1/2,000s (500us)" Set the shutter speed to 1/2,000 second..
7 "1/10,000s (100us)" Set the shutter speed to 1/10,000 second..
8 "1/50,000s (20us)" Set the shutter speed to 1/50,000 second..

・Exposure Time ： Setting of the Variable shutter

Feature name : ExposureTime (Float / Standard)
Address : A0030044 h
Values (Factory setting 53333.3)
: 10 to 10,000,000 [us] Set the shutter speed in the range from 1/100,000 to 10 second in us.

・Exposure Auto ： Setting of Auto Electric Shutter (AES)

Feature name : ExposureAuto (Enumeration / Standard)
Address : A003004C h
Values (Factory setting 0) : 0 "OFF" AES is not performed and **Exposure Time (Preset)** is validated.
2 "Continuous" Shutter speed is automatically adjusted in the range from normal shutter to 1/100,000 second according to light source brightness
Adjustment range can be changeable by setting of Exposure Auto Lower Limit
/Exposure Auto Upper Limit.

***This command priority to Exposure Time (Preset) command**

・Exposure Auto Lower Limit ： Lower limit of automatic adjustment range

Feature name : ExposureAutoLowerLimit (Float / Custom)
Address : A0F30020 h
Values (Factory setting 10) : 10 to 53333.3 [us] Set limit value in the range from 1/100,000 second to normal shutter in us.

・Exposure Auto Upper Limit ： Upper limit of automatic adjustment range

Feature name : ExposureAutoUpperLimit (Float / Custom)
Address : A0F30024 h
Values (Factory setting 53333.3)
: 10 to 53333.3 [us] Set limit value in the range from 1/100,000 second to normal shutter in us.

10.4. DigitalIOControl Category

・Line Selector ： Select the line

Feature name	: LineSelector (Enumeration / Standard)	
Address	: A0040000 h	
Values	: 0 "Line1 (7pin)"	Setting of 7 pin of DCIN/SYNC connector.
	1 "Line2 (10pin)"	Setting of 10 pin of DCIN/SYNC connector.

・Line Inverter (related to Line Selector) ： Invert the output signal selected at Line Selector

Feature name	: LineInverter (Boolean / Standard)	
Address	: A0040004 h	
Values (Factory setting 0)	: 0 FALSE	output signal is not inverted.
	1 TRUE	output signal is inverted.

・Line Mode (related to Line Selector) ： Input/output of the line selected at Line Selector

Feature name	: LineMode (Enumeration / Standard)	
Address	: A0040008 h	
Values (Read only)	: 0 "Input"	It means selected line is using for input (when Line Selector is Line1).
	1 "Output"	It means selected line is using for output (when Line Selector is Line2).

・Line Source ： Selection of the signal outputs from a 10 pin. *using when Line Mode is Output

Feature name	: LineSource (Enumeration / Standard)	
Address	: A0040010 h	
Values (Factory setting 0)	: 0 "OFF"	Nothing is output.
	1 "Exposure Active"	Flash pulse (strobe) is output.
	2 "Timer1 Active"	Adjusted flash pulse is output.
	3 "Camera VD"	VD signal is output.

・Line Format (related to Line Selector) ： Invert the input/output signal

Feature name	: LineFormat (Enumeration / Standard)	
Address	: A0040014 h	
Values (read only)	: 2 "TTL"	It means selected line is TTL level signal (when Line Selector is Line2).
	5 "Opto Coupled"	It means selected line is Opto-Coupled (when Line Selector is Line1).

10.5. CounterAndTimerControl Category

・Timer Selector ： Select the timer to adjust strobe

Feature name : TimerSelector (Enumeration / Standard)
Address : A0050000 h
Values : 0 ″Timer 1″

・Timer Duration (related to Timer Selector) ： Set the duration of timer

Feature name : TimerDuration (Float / Standard)
Address : A0050004 h
Values (Factory setting 0) : 0 ″OFF″ TimerDuration is disable
1 to 2,000,000 [us] Set the range from 0 μsec to 2,000,000 us.

***When Value is 0 ″Off″, this width equals the width of exposure time. Otherwise the width is set by this value**

・Timer Delay (related to Timer Selector)： Set the delay of timer

Feature name : TimerDelay (Float / Standard)
Address : A005000C h
Values (Factory setting 0) : 0 to 2,000,000 [us] Set the range from 0 us to 2,000,000 us.

・Timer Trigger Source (related to Timer Selector) ： Select timer trigger source

Feature name : TimerTriggerSource (Enumeration / Standard)
Address : A0050020 h
Values : 1 ″Exposure Start″ Timer starts at the same time as the start of exposure.

・Timer Trigger Activation (related to Timer Selector) ： Select polarity of trigger signal selected at Timer Selector

Feature name : TimerTriggerActivation (Enumeration / Standard)
Address : A0050024 h
Values : 1 ″Rising Edge″ Rising of input signal is made into trigger signal.

10.6. AnalogControl Category

・Gain Selector ： Specify the signal used for gain adjustment

Feature name : GainSelector (Enumeration / Standard)
Address : A0070000 h
Values : 0 "All"

・Gain ： Setting of master gain

Feature name : Gain (Float/ Standard)
Address : A0070008 h
Values (Factory setting 0) : 0.0 to 12.0 [dB]
＊The value is changeable by 0.1 dB between the range 0.0 to 12.0 dB

・Gain Auto ： Adjust electrical sensitivity automatically (AGC)

Feature name : GainAuto (Enumeration / Standard)
Address : A007000C h
Values (Factory setting 0) : 0 "OFF" Automatic gain control is not performed and **Gain** is validated.
2 "Continuous" The video level is automatically adjusted in the range of 0 to 12.0dB. Adjustment range can be changeable by setting of Gain Auto Lower Limit /Gain Auto Upper Limit.
＊This command is given to priority more than Gain.

・Gain Auto Lower Limit ： Lower limit of automatic adjustment range

Feature name : GainAutoLowerLimit (Float / CustomStandard)
Address : A0F70028 h
Values (Factory setting 0) : 0.0 to 12.0 [dB] Adjust the gain level 0 to 12.0dB at intervals of 0.1dB.

・Gain Auto Upper Limit ： Upper limit of automatic adjustment range

Feature name : GainAutoUpperLimit (Float / CustomStandard)
Address : A0F7002C h
Values (Factory setting 12): 0.0 to 12.0 [dB] Adjust the gain level 0 to 12.0dB at intervals of 0.1dB.

・Black Level Selector ： Channnel selection to adjust black level

Feature name : BlackLevelSelector (Enumeration / Standard)
Address : A0070010 h
Values : 0 "ALL"

・Black Level ： Level adjust for master black

Feature name : BlackLevel (Float / Standard)
Address : A0070018 h
Values (Factory setting 0) : −64.0 to 63.0 Adjust the gain level −64.0 to 63.0 at intervals of 1.0.

・Paint Black Mode ： Setting of paint black (color level of Red, Green and Blue can be separately varied)

Feature name : PaintBlackMode (Enumeration / Custom)
Address : A0FF002C h
Values (Factory setting 0) : 0 "OFF" Not perform the paint black functions.
1 "ON" Perform paint black functions.

・Paint Black Selector ： Switch the color doing Paint black

Feature name : PaintBlackSelector (Enumeration / Custom)
Address : A0FF0030 h
Values : 1 "Red" Perform the paint black function about Red.
2 "Green" Perform the paint black function about Green.
3 "Blue" Perform the paint black function about Blue.

・Paint Black (related to Paint Black Selector) : Adjust level of color selected at Paint Black Selector

Feature name : PaintBlack (Integer / Custom)
Address : A0FF0034 h
Values (Factory setting 0) : 0 to 127 Adjust the color level of the color selected at Paint Black Selector in 128 steps.

・Balance White Auto : Setting of auto white balance

Feature name : BalanceWhiteAuto (Enumeration / Standard)
Address : A0070020 h
Values (Factory setting 0) : 0 "OFF" Automatic white adjustment is not performed and can adjust **Balance Ratio**
1 "Once" Automatic white adjustment is performed that affects features on the **Balance Ratio** And after adjustment this feature automatically will turn to **"Off"**.
2 "Continuous" White balance is adjusted in real time (automatic tracking).

***This command is given to priority more than Balance Ratio**

・Balance Ratio Selector : Switch the adjustment color (RED / BLUE)

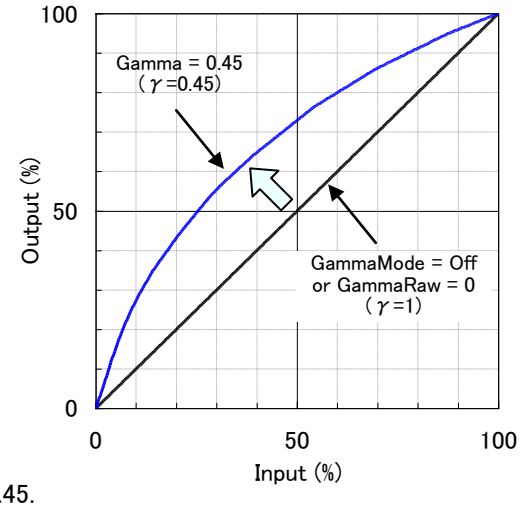
Feature name : BalanceRatioSelector (Enumeration / Standard)
Address : A0070024 h
Values : 0 "Red" Switch the color adjusted at Balance Ratio Red.
2 "Blue" Switch the color adjusted at Balance Ratio Blue.

・Balance Ratio (related to Balance Ratio Selector) : Adjust the RED / BLUE gain

Feature name : BalanceRatio (Float / Standard)
Address : A0070028 h
Values (Factory setting 1.0): 0.5 to 2.0 Adjust the RED / BLUE gain range from x0.5 to x2.0 .

・Gamma Mode : Gamma mode enable/disable

Feature name : GammaMode (Enumeration / Custom)
Address : A0F70010 h
Values (Factory setting 0) : 0 "OFF" γ=1.0
1 "ON" γ=0.45
2 "ON (Special)" S-shaped gamma curve



・Gamma : Adjust gamma correction level

Feature name : Gamma (Float / Standard)
Address : A0070030 h
Values (Factory setting 1.0) : 1.0 to 0.45
Gamma correction coefficient is set up in 1.0 to 0.45.

・Knee Mode : Setting of knee

Feature name : KneeMode (Enumeration / Custom)
Address : A0F70040 h
Values (Factory setting 0) : 0 "OFF" Not perform knee.
1 "ON" Knee function provides natural graduation in bright portions.

・Knee Point ： Adjust knee point

Feature name : KneePoint (Float / Custom)
Address : A0F70044 h
Values (Factory setting 75): 75 to 100 [%] Setting value toward 100% side increase start level of knee and 75% side decrease start level of knee.

・Knee Slope ： Adjust knee slope

Feature name : KneeSlope (Float / Custom)
Address : A0F70048 h
Values (Factory setting 0.375): 0.375 to 1 Setting value toward 0.375 side intensify effective of knee and 1 side weaken effective of knee.

・Sharpness ： Adjust sharpness level

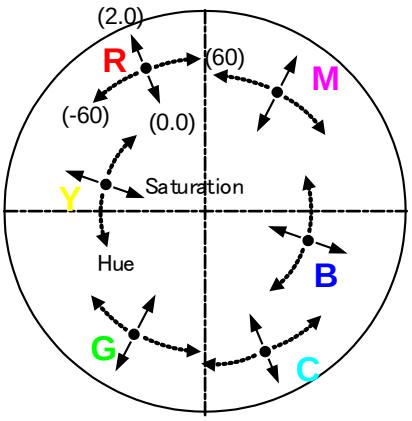
Feature name : Sharpness (Integer / Custom)
Address : A0F70050 h
Values (Factory setting 0) : 0.0 to 8.0 Setting value toward 0.0 side reduces correction for soft contour and 8.0 side

increase correction for sharper contours.

・Masking Mode ： Setting of 6 vector independent masking (primary color R G B and complementary color Ye Cy Mg saturation and hue can be separately varied).

Feature name : MaskingMode (Enumeration /Custom)
Address : A0FF001C h
Values (Factory setting 0) : 0 "OFF" Not perform masking functions.
1 "ON" Perform masking functions.

Adjust directivity on the hue circle by feature.



・Masking Selector ： Select the color done masking

Feature name : MaskingSelector (Enumeration / Custom)
Address : A0F70070 h
Values : 0 "Red" Perform masking function about Red.
1 "Yellow" Perform masking function about Yellow.
2 "Green" Perform masking function about Green.
3 "Cyan" Perform masking function about Cyan.
4 "Blue" Perform masking function about Blue.
5 "Magenta" Perform masking function about Magenta.

・Masking Saturation (related to Masking Selector) ： Adjust saturation of the color selected at Masking Selector

Feature name : MaskingSaturation (Float / Custom)
Address : A0F70074 h
Values (Factory setting 1.0) : 0.0 to 2.0 Adjust the saturation of the color selected at Masking Selector

・Masking Hue (related to Masking Selector) ： Adjust hue of the color selected at Masking Selector

Feature name : MaskingHue (Float / Custom)
Address : A0F70078 h
Values (Factory setting 0.0) : −60.0 to 60.0 Adjust the hue of the color selected at Masking Selector.

Masking Selector	Toward −60 side …	Toward 60 side …
Red	Come near to Yellow	Come near to Magenta
Yellow	Come near to Green	Come near to Red
Green	Come near to Cyan	Come near to Yellow
Cyan	Come near to Blue	Come near to Green
Blue	Come near to Magenta	Come near to Cyan
Magenta	Come near to Red	Come near to Blue

・Shading Correction : Correct unevenness on the surface chromatically and luminously.

Feature name	: ShadingCorrection (Boolean / Custom)	
Address	: A0F700A0 h	
Values (Factory setting 0)	: 0 FALSE	Disable correction of shading.
	1 TRUE	Enable correction of shading

・Shading Detect : Detect unevenness on the surface

Feature name	: ShadingDetect (Command / Custom)	
Address	: A0F700A4 h	
Values (write only)	: 1	When 1 is written, start shading detection.
		The camera takes an object of gray flat screen
		that detect unevenness on the surface chromatically and luminously.

10.7. LUTControl Category

・LUT Enable ： Setting of look up table

Feature name	: LUTEnable (Boolean / Standard(*))	
Address	: A0080004 h	
Values (Factory setting 0)	: 0 FALSE	Disable look-up-table feature.
	1 TRUE	Enable look-up-table feature.

(*) With this camera, a setup of TRUE/FALSE is applied to a total color regardless of the state of LUT Selector.

・LUT Selector ： Switch the color (All/Red/Green/Blue) doing adjustment.

Feature name	: LUTSelector (Enumeration / Standard)	
Address	: A0080000 h	
Values	: 0 “All”	The LUTValue affects adjustment on all color of RGB.
	: 1 “Red”	The LUTValue affects adjustment on the color of Red.
	: 2 “Green”	The LUTValue affects adjustment on the color of Green.
	: 3 “Blue”	The LUTValue affects adjustment on the color of Blue.

・LUT Index (related to LUT Selector) ： Video level before look-up-table.

Feature name	: LUTIndex (Integer / Standard)	
Address	: A0080008 h	
Values	: 0 to 255	Setting original input video level 0 to 100% by 256 steps

・LUT Value (related to LUT Selector and LUT Index) ： Video level after look-up-table.

Feature name	: LUTValue (Integer / Standard)	
Address	: A008000C h	
Values	: 0 to 255	Setting conversion output video level by 256 steps for the INDEX value.

Note : When LUT Selector sets ″All″, data-write affects all colors on RGB,
and read data is LUT Value of Red.

10.8. AutoLevelControl Category

・ALC Adjust ： Setting value of video level when AGC or AES is ON

Feature name : ALCAdjust (Float / Custom)
Address : A0070080 h
Values (Factory setting 1) : 0 to 4 Setting value toward 0 side decrease convergence level and 4 side increase convergence level.

・ALC Gate Width ： Setting the width of optical measurement area for AES and AGC

Feature name : ALCGateWidth (Float / Custom)
Address : A0070084 h
Values (Factory setting 100) : 5 ～ 100 − ALC Gate Offset X [%]

・ALC Gate Height ： Setting the Heght of optical measurement area for AES and AGC

Feature name : ALCGateHeight (Float / Custom)
Address : A0070088 h
Values (Factory setting 100) : 5 ～ 100 − ALC Gate Offset Y [%]

・ALC Gate Offset X ： Setting the horizontal offset of optical measurement area for AES and AGC

Feature name : ALCGateOffsetX (Float / Custom)
Address : A007008C h
Values (Factory setting 0) : 0 ～ 100 − ALC Gate Width [%]

・ALC Gate Offset Y ： Setting the vertical offset of optical measurement area for AES and AGC

Feature name : ALCGateOffsetY (Float / Custom)
Address : A0070090 h
Values (Factory setting 0) : 0 ～ 100 − ALC Gate Heght [%]

・ALC GATE DISP ： ALC gate displayed/hidden

Feature name : ALCGateDisp (Enumeration / Custom)
Address : A0070094 h
Values (Factory setting 0) : 0 ″OFF″ ALC Gate is hidden.
1 ″ON″ ALC Gate is displayed.

10.9. PixelCorrection Category

・White Spot Correction Mode ： White spot correct mode enable/disable

Feature name	: WhiteSpotCorrectMode (Enumeration / Custom)	
Address	: A0FF00A0 h	
Values	: 0 "OFF"	Disable correction of white spot noise.
	1 "ON"	Enable correction for stored white spots.

・White Spot Correction Selector ： Color setting of threshold of white spot correct mode

Feature name	: WhiteSpotCorrectSelector (Enumeration / Custom)
Address	: A0FF00B0 h
Values	: 0 "Red"
	: 1 "Green"
	: 2 "Blue"

・White Spot Correction Level ： Threshold of white spot detection

Feature name	: WhiteSpotCorrectLevel (Integer /Custom)	
Address	: A0FF00A4 h	
Values	: 1 to 99 [%]	Set the white spot detection threshold between 1% and 99% of the video level.

・White Spot Correct Detect ： Detect the white spot

Feature name	: WhiteSpotCorrectDetect (Command / Custom)	
Address	: A0FF00A8 h	
Values (write only)	: 1	When 1 is written, start white spot detection The pixel having video level that exceeds White Spot Correction Level is judged as white spot.

・White Spots Correct Count ： The number of white spot detection

Feature name	: WhiteSpotCorrectCount (Integer/ Custom)
Address	: A0FF00B4 h
Values (Read only)	: 0 ～ 4095

10.10. DigitalNoiseReduction Category

・Digital Noise Reduction Mode ： Noise reduction mode enable/disable

Feature name : DigitalNoiseReductionMode (Enumeration / Custom)
Address : A0FF0180 h
Values (Factory setting 0) : 0 "OFF" Disable digital noise reduction.
1 "ON" Enable digital noise reduction.

10.11. AutoSetupStatus Category

・Auto Setup Type ： This feature shows the type of autosetup which performed recently.

Feature name : AutoSetupType (Enumeration / Custom)
Address : A0FF0200 h
Values(read only) : 0 "Idle" Not perform auto setup function.
: 1 "White Balance" The function that operated recently is BalanceWhiteAuto .
: 4 "Auto Shading" The function that operated recently is ShadingDetect.
: 6 "Pixel Correction" The function that operated recently is WhiteSpotCorrectDetect.

・Auto Setup Result ： Results of auto adjustment

Feature name : AutoSetupResult (Enumeration / Custom)
Address : A0FF0208 h
Values(read only) : 0 "OK"
1 "Error"
19 "Error Low Light"
20 "Error High Light"
255 "Busy"

Refer to following table for meaning of each value.

Error code	Countermeasure
0	Normally finished (Also in not performing, it becomes this value.)
1	Retry the function.
19	Increase the intensity of illumination, turn lens iris to ward open direction, or increase the gain to provide a proper video level.
20	Decrease the intensity of illumination, turn lens iris toward closed direction, or decrease the gain to provide a proper video level.
255	Under automatic adjustment.

Description : This feature shows the executing result of the auto setup function.

10.12. TransportLayerControl Category

Payload Size ：

Feature name : PayloadSize (Integer / Standard)
Address : A0090010 h
Values (Read only) : Data size for 1 frame of the picture at Byte.

10.13. GigEVision Category

・Gev MAC Address : MAC address of camera

Feature name	: GevMACAddress (Integer[64bit] / Standard)	
Address	: 00000008 h /0000000C h	
Values (Read only)	: XXXXXXXXXXXX h	* different according to the camera

・Gev Supported Option Selector : Information to check whether this camera supports the specified option

Feature name	: GevSupportedOptionSelector (Enumeration / Standard)
Address	: A009F008 h
Values	: 0 to 36

・Gev Supported Option : Used to reference and specify the existence of various option of GV

Feature name	: GevSupportedOption (Boolean / Standard)	
Address	: A009F00C h	
Values (Read only)	: 0 FLASE	Unsupported Option
	1 TRUE	Supported Option

・Gev Current IP Configuration LLA : <bit:29> of LLA(AUTO IP) enable/disable

Feature name	: GevCurrentIPConfigurationLLA (Boolean / Standard)	
Address	: 29-bit of 00000014 h	
Values	: 1 TRUE	OS assigns IP arress by LLA
		* Unable to disable this value

・Gev Current IP Configuration DHCP : DHCP enable/disable

Feature name	: GevCurrentIPConfigurationDHCP (Boolean / Standard)	
Address	: 30-bit of 00000014 h	
Values (Factory setting 1)	: 0 FALSE	Disable assigning IP address by DHCP
	1 TRUE	Enable assigning IP address by DHCP

・Gev Current IP Configuration Persistent IP : Enable or disable Persistent IP

Feature name	: GevCurrentIPConfigurationPersistentIP (Boolean / Standard)	
Address	: 31-bit of 00000014 h	
Values (Factory setting 0)	: 0 FALSE	Disable persistent IP address of the camera.
	1 TRUE	Enable persistent IP address of the camera.

・Gev Current IP Address : Current IP address

Feature name	: GevCurrentIPAddress (Integer / Standard)
Address	: 00000024 h
Values (Read only)	: IP address assigned to the camera

・Gev Current Subnet Mask : Current subnet mask

Feature name	: GevCurrentSubnetMask (Integer / Standard)
Address	: 00000034 h
Values (Read only)	: Subnet mask assigned to the camera

・Gev Current Default Gateway : Current default gateway

Feature name	: GevCurrentDefaultGateway (Integer / Standard)
Address	: 00000044 h
Values (Read only)	: Default gateway assigned to the camera

・Gev First URL ：

Feature name : GevFirstURL (String / Standard)
Address : 00000200 h
Values (Read only) : Specify the first URL

・Gev Second URL ：

Feature name : GevSecondURL (String / Standard)
Address : 00000400 h
Values (Read only) : Specify the second URL. (This camera has no value. (NULL))

・Gev Persistent IP Address： Setting of fixed IP adress

Feature name : GevPersistentIPAddress (Integer / Standard)
Address : 0000064C h
Values (Factory setting 192.168.10.10 (C0A80A0A h))

・Gev Persistent Subnet Mask ： Setting of sub net mask of fixed IP adress

Feature name : GevPersistentSubnetMask (Integer / Standard)
Address : 0000065C h
Values (Factory setting 255.255.0.0 (FFFF0000 h))

・Gev Persistent Default Gateway ：Setting of default gateway of fixed adress

Feature name : GevPersistentDefaultGateway (Integer / Standard)
Address : 0000066C h
Values (Factory setting 0.0.0.0 (00000000 h))

・Gev CCP ： Acsess permission of application

Feature name : GevCCP (Enumeration / Standard)
Address : 00000A00 h
Values (Read only) : 0 "Open"
: 1 "Exclusive"
: 2 "Control"

・Gev SCDA ： Destination IP address of stream channnel

Feature name : GevSCDA (Integer / Standard)
Address : 00000D18 h
Values : Destination IP address of stream channnel

・Gev SCP Host Port ： Port of GVSP

Feature name : GevSCPHostPort (Integer / Standard)
Address : 16-31bit of 00000D00 h
Values : 0000 h ～ FFFF h

・Gev SCPS Fire Test Packet ： Transmission of test packet

Feature name : GevSCPSFireTestPacket (Boolean / Standard)
Address : 0-bit of 00000D04 h
Values : 0 FALSE
1 TRUE This camera sends a test packet, and this value is set to 0.

・Gev SCPS Do Not Fragment ： Setting "do not fragment" bit of stream packet IP header

Feature name : GevSCPSDoNotFragment (Boolean / Standard)
Address : 1-bit of 00000D04 h
Values (Factory setting 1) : 0 FALSE This camera sets 0 to "do not fragment" bit of stream paket IP header .
1 TRUE This camera sets 1 to "do not fragment" bit of stream paket IP header.

・Gev SCPS Packet Size ：

Feature name : GevSCPSPacketSize (Integer / Standard)
Address : 16-31bit of 00000D04 h
Values (Factory setting 576) : 576 ～ 8192 Setting of data amount (BYTE) of 1 packet for transmission of image data

・Gev SCPD ： Packet delay

Feature name : GevSCPD (Integer / Standard)
Address : 00000D08 h
Values (Factory setting 0) : 0 ～ 2,000,000 [10nsec/step] Delay time between packet transmission is changeable by 10ns

・Gev Interface Selector ： Selection of link of physical layer

Feature name : GevInterfaceSelector (Integer / Standard)
Address : A0090004 h
Values : 0

・Gev Stream Channel Selector ： Selection of stream channel

Feature name : GevStreamChannelSelector (Integer / Standard)
Address : A0090008 h
Values : 0

・Gev SCP Interface Index： Current selected link of physical layer

Feature name : GevSCPInterfaceIndex (Integer / Standard)
Address : A009000C h
Values (Read only) : 0

10.14. UserSetControl Category

・User Set Selector ： Selection of saved or loaded channel

Feature name	: UserSetSelector (Enumeration / Standard)	
Address	: A00A0000 h	
Values	: 0 "Default"	Factory setting
	1 "User Set 1"	Channel 1
	2 "User Set 2"	Channel 2
	3 "User Set 3"	Channel 3
	4 "User Set 4"	Channel 4

・User Set Load (related to User Set Selector of USER SETS) ： Load execution

Feature name	: UserSetLoad (Command / Standard)	
Address	: A00A0004 h	
Values (Write only)	: 1	When 1 is written, load the memory channel selected at User Set Selector.

・User Set Save (related to User Set Selector of USER SETS) ： Save execution

Feature name	: UserSetSave (Command / Standard)	
Address	: A00A0008 h	
Values (write only)	: 1	When 1 is written, save to the memory channel selected at User Set Selector.
		＊"Default" cannot be saved

・User Set Default ： Selection of loaded channel when camera reset or start

Feature name	: UserSetDefault (Enumeration / Standard)	
Address	: A00A000C h	
Values (Factory setting 0)	: 0 "Default"	Loading factory setting
	1 "User Set 1"	Loading the setting of Channel 1
	2 "User Set 2"	Loading the setting of Channel 2
	3 "User Set 3"	Loading the setting of Channel 3
	4 "User Set 4"	Loading the setting of Channel 4

11. Trigger mode

Trigger mode settings of HV-F203GV are following procedure.

1. Fixed shutter mode

When external trigger signal is POSITIVE (TriggerActivation: "RisingEdge"), after the trigger signal rise, exposure is start
The exposure time is set by the camera electronic shutter speed.

(A) Hardware Trigger

(1) TriggerMode → "Off"
(2) TriggerSelector → "FrameStart"
(3) TriggerMode → "On"
(4) TriggerSource → "Line1" / "Software"
(5) TriggerActivation → "RisingEdge" / "FallingEdge"
(6) ExposureMode → "Off" / "Timed" / "PresetTimed" : When Off, exposure = 1/18.75 second. When Timed, using value of ExposureTime. When PresetTimed, using value of ExposureTimePreset.

(B) Software trigger

(1) TriggerMode → "Off"
(2) TriggerSelector → "FameStart"
(3) TriggerMode → "On"
(4) TriggerSource → "Software"
(5) ExposureMode → "Off" / "Timed" / "PresetTimed" : When Off, exposure = 1/18.75 second. When Timed, using value of ExposureTime. When PresetTimed, using value of ExposureTimePreset.

When actually operating, repeat (a) and (b) alternately.
TriggerSoftware → write "1"

Timing by the software-trigger.
Exposure by the value of ExposureTime.

2. ONE Trigger mode

When external trigger signal is POSITIVE (TriggerPolarity: "RisingEdge"), after the trigger signal rise, exposure is start.
The trigger signal width equals the exposure time.

Hardware trigger

(1) TriggerMode → "Off"
(2) TriggerSelector → "FrameStart"
(3) TriggerMode → "On"
(4) TriggerSource → "Line1" (Software is disable)
(5) TriggerActivation → "RisingEdge" / "FallingEdge"
(6) ExposureMode → "TriggerWidth"

4. Others

Operation of the camera by the combination of each setting value is shown a table below.

OPERATION \ SETTING		Exposure Mode	Exposure Time	Exposure Auto	TriggerMode [TriggerSelector]	TriggerSource [TriggerSelector]
Normal mode	SHUTTER:OFF	Off	Don't Care	Off	Off	Don't Care
	MANUAL SHUTTER	Timed	10 us to 10 s	Off	Off	Don't Care
	AUTO SHUTTER	Off or Timed	Don't Care	Continuous	Off	Don't Care
Trigger mode	SHUTTER:OFF	Off	Don't Care	Off	On	Line1(#7) or Software
	MANUAL SHUTTER	Timed	10 us to 10 s	Off	On	Line1(#7) or Software
	AUTO SHUTTER	Off or Timed	Don't Care	Continuous	On	Line1(#7) or Software
	PULSE WIDTH	TriggerWidth	Don't Care	Don't Care	On	Line1(#7)

12. UsetSetSave and data save timing

Each parameter of the camera is stored in UserSet 1 to 4 or common area.
Parameters saved in UserSet 1 to 4 are saved in UserSet 1 to 4 Selected by "UserSetSelector" by executing "UsetSetSave".
Common parameters are saved when value is changed or saved when "UsetSetSave" is executed.

Note. Please do not turn off the power until 5 seconds after UsetSetSave is executed.

Table A . Features saved in UserSetx

No	Category	Feature name	SAVE TIMING:
1-1	ImageFormatControl	Width	*A
1-2	ImageFormatControl	Height	*A
1-3	ImageFormatControl	OffsetX	*A
1-4	ImageFormatControl	OffsetY	*A
1-5	ImageFormatControl	BinningVertical	*A
1-6	ImageFormatControl	TestPattern	*A
1-7	ImageFormatControl	PixelFormat	*A
1-8	ImageFormatControl	PartialScanMode	*A
1-9	ImageFormatControl	PartialScanOffsetY	*A
1-10	ImageFormatControl	PartialScanHeight	*A
1-11	AcquisitionControl	AcquisitionMode	*A
1-12	AcquisitionControl	AcquisitionFrameCount	*A
1-13	AcquisitionControl	AcquisitionFrameRate	*A
1-14	AcquisitionControl	AcquisitionFrameRateEnable	*A
1-15	AcquisitionControl	TriggerMode	*A
1-16	AcquisitionControl	TriggerSource	*A
1-17	AcquisitionControl	TriggerActivation	*A
1-18	AcquisitionControl	TriggerDelay	*A
1-19	AcquisitionControl	ExposureMode	*A
1-20	AcquisitionControl	ExposureTimePreset	*A
1-21	AcquisitionControl	ExposureTime	*A
1-22	AcquisitionControl	ExposureAuto	*A
1-23	AcquisitionControl	ExposureAutoLowerLimit	*A
1-24	AcquisitionControl	ExposureAutoUpperLimit	*A
1-25	DigitalIOControl	LineInverter	*A
1-26	DigitalIOControl	LineSource	*A
1-27	CounterAndTimerControl	TimerDuration	*A
1-28	CounterAndTimerControl	TimerDelay	*A
1-29	AnalogControl	Gain	*A
1-30	AnalogControl	GainAuto	*A
1-31	AnalogControl	GainAutoLowerLimit	*A
1-32	AnalogControl	GainAutoUpperLimit	*A
1-33	AnalogControl	BlackLevel	*A
1-34	AnalogControl	PaintBlackMode	*A
1-35	AnalogControl	PaintBlack	*A
1-36	AnalogControl	BalanceWhiteAuto	*A
1-37	AnalogControl	BalanceRatio	*A
1-38	AnalogControl	GammaMode	*A
1-39	AnalogControl	Gamma	*A
1-40	AnalogControl	KneeMode	*A
1-41	AnalogControl	KneePoint	*A

1-42	AnalogControl	KneeSlope	*A
1-43	AnalogControl	Sharpness	*A
1-44	AnalogControl	MaskingMode	*A
1-45	AnalogControl	MaskingSaturation	*A
1-46	AnalogControl	MaskingHue	*A
1-47	AnalogControl	ShadingCorrection	*A
1-48	LUTControl	LUTEnable	*A
1-49	LUTControl	LUTValue	*A
1-50	AutoLevelControl	ALCAdjust	*A
1-51	AutoLevelControl	AlcGateWidth	*A
1-52	AutoLevelControl	AlcGateHeight	*A
1-53	AutoLevelControl	AlcGateOffsetX	*A
1-54	AutoLevelControl	AlcGateOffsetY	*A
1-55	DigitalNoiseReduction	DigitalNoiseReductionMode	*A

Table B . Features saved in Common area

No	Category	Feature name	SAVE TIMING:
2-1	DeviceControl	DeviceUserID	*B
2-2	GigEVision	GevCurrentIPConfigurationDHCP	*B
2-3	GigEVision	GevCurrentIPConfigurationPersistentIP	*B
2-4	GigEVision	GevPersistentIPAddress	*B
2-5	GigEVision	GevPersistentSubnetMask	*B
2-6	GigEVision	GevPersistentDefaultGateway	*B
2-7	UserSetControl	UserSetDefault	*B
2-8	DeviceControl	DeviceLinkHeartbeatTimeout	*A or *B
2-9	DeviceControl	DeviceLinkHeartbeatMode	*A or *B
2-10	GigEVision	GevSCPSDoNotFragment	*A or *B
2-11	GigEVision	GevSCPSPacketSize	*A or *B
2-12	GigEVision	GevSCPD	*A or *B
2-13	PixelCorrection	WhiteSpotCorrectCount	*A

SAVE TIMING

*A: It is saved when "UserSetSave" is executed.

*B: It is saved when the value is changed. (Immediate save)

13. Digital output

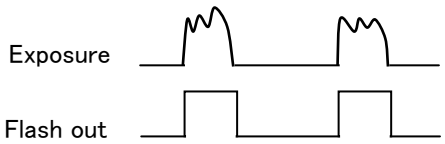
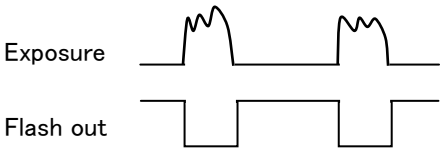
The method of setting of digital output is explained.

1. Flash out (strobe pulse)

This camera can output flash pulse when trigger mode or electric shutter mode,
(A) When output flash pulse at the same time as exposure time and without delay.
(1) LineSelector → "Line2"
(2) LineSource → "ExposureAcitve" ・・・ (*1)
(3) LineInverter → False / True ・・・ (*1)

(B) When adjust delay or duration of flash pulse
(1) LineSelector → "Line2"
(2) LineSource → "Timer1Active" ・・・ (*1)
(3) LineInverter → False / True ・・・ (*1)
(4) TimerSelector → "Timer1"
(5) TimerDuration → 0 to 2,000,000 ・・・ (*2)
(6) TimerDelay → 0 to 2,000,000
(7) TimerTriggerSource → "ExposureStart"

(*1) Following table shows polarity of flash out signal

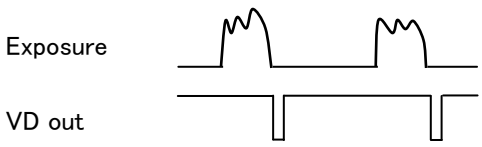
LineInverter	Output flash signal
False	
True	

(*2) When set to 0 → duration of flash pulse is equal to actual exposure time

2. VD out

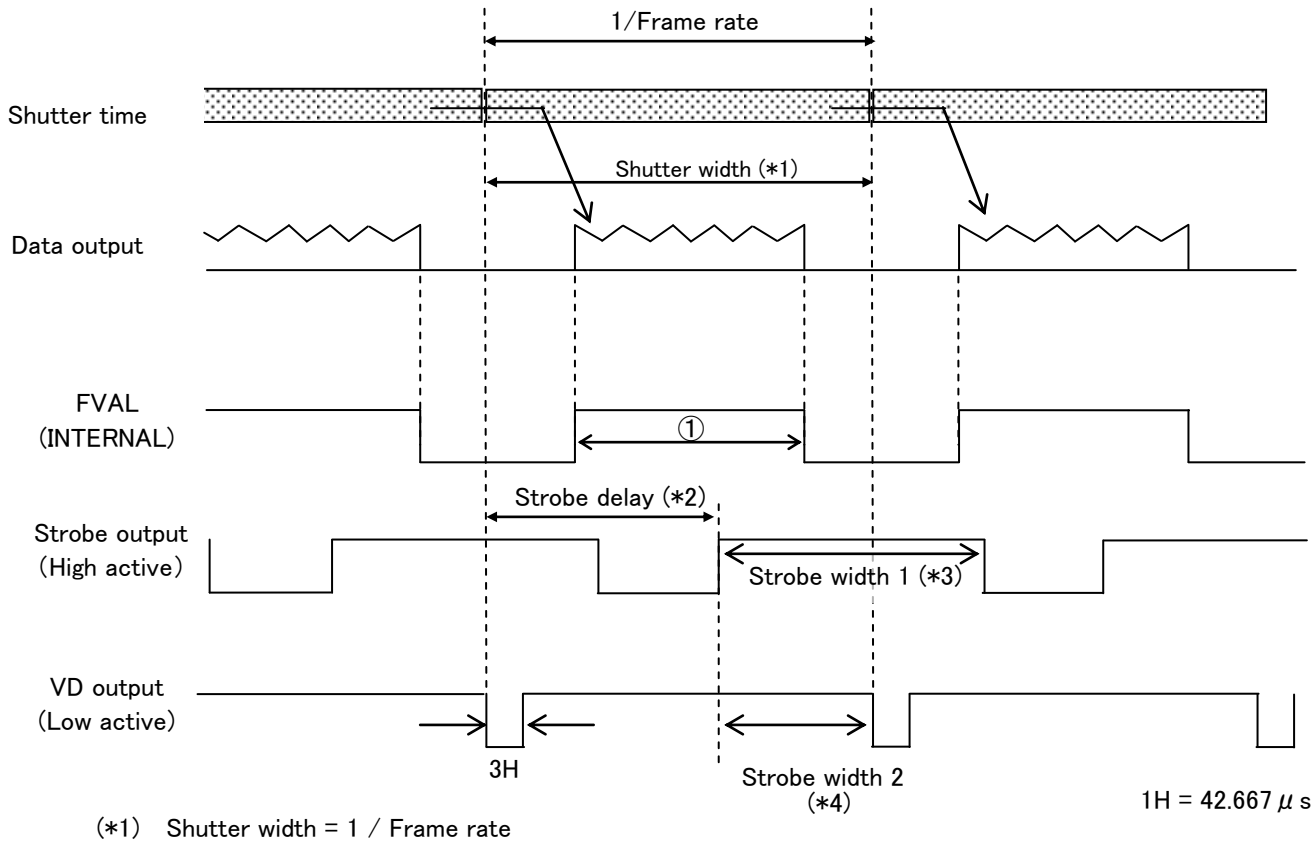
This camera can output camera VD. It is used when synchronizing other camera.
(1) LineSelector → "Line2"
(2) LineSource → "VD"

Following table shows polarity of VD signal

VD signal


14. Trigger operation and timing chart

14.1. TriggerMode and ExposureMode are set to OFF



(*1) Shutter width = 1 / Frame rate

(*2) When DigitalIOControl.LineSource is set to "ExposureActive", Strobe delay is set to 0.0 μs.
When DigitalIOControl.LineSource is set to "Timer1Active", Strobe delay is represented by following equation.
Strobe delay = CounterAndTimeControl.TimerDelay * 1.0 μs (Note 14.1.1) (Note 14.1.3)

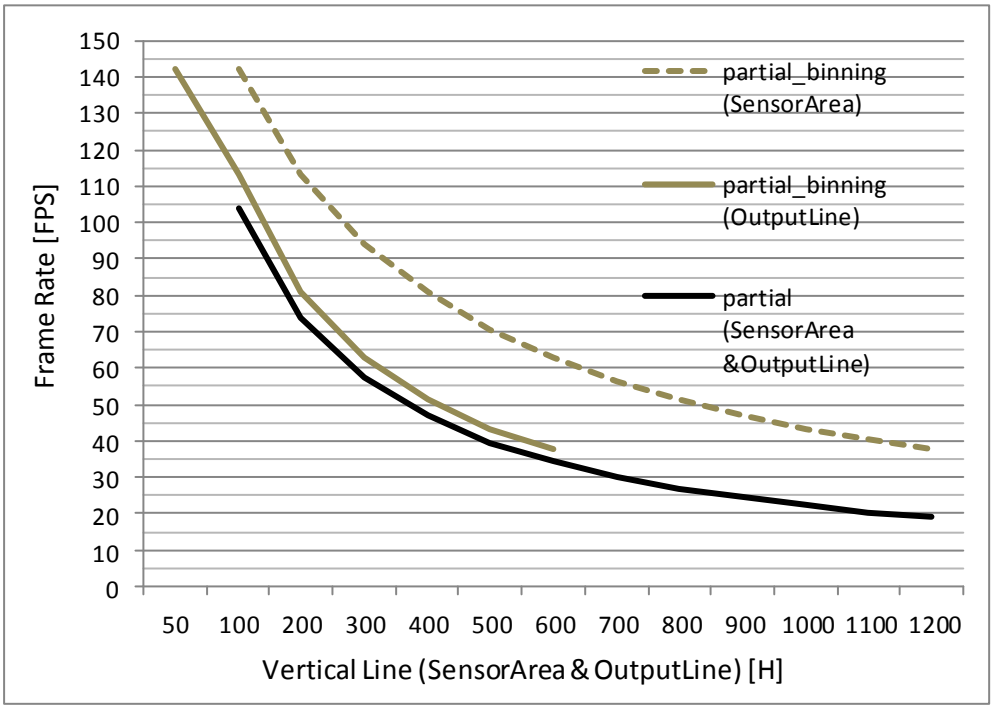
(*3) When DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimeControl.TimerDuration is set to non-zero, Strobe width 1 is represented by following formula.
Strobe width 1 = CounterAndTimeControl.TimerDuration * 1.0 μs (Note 14.1.2) (Note 14.1.3)
When DigitalIOControl.LineSource is set to "ExposureActive" or
DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimerControl.TimerDuration is set to 0, Strobe width 1 is represented by following formula.
Strobe width 1 = Shutter width (*1)

(*4) Strobe width 2 = Shutter width − Strobe delay = (*1) − (*2)

(Note 14.1.1) Set the strobe delay in the range from 0.0 to 2.0 seconds in us.
(Note 14.1.2) Set the strobe width in the range from 1.0u to 2.0 seconds in us.
(Note 14.1.3) The setting value must be smaller than Frame rate. Otherwise, pulse signal could not be outputted.
(Note 14.1.4) [x] is Ceiling function.

	PartialScanMode OFF		PartialScanMode ON (Note 14.1.4)	
	BinningVertical OFF	BinningVertical ON	BinningVertical OFF	BinningVertical ON
①	1200H	600H	(HEIGHT) H	[HEIGHT/2] H
1/Frame rate	1250H	625H	(2+[(12+OFFSET)/12] +29+HEIGHT +[(1207−HEIGHT −OFFSET)/12]+1) H	(2+[(8+OFFSET)/12] +[(38+HEIGHT/2] +[(1202−HEIGHT −OFFSET)/12]+1) H

The relationship between maximum frame rate and vertical lines for partial scan mode and partial scan and binning mode are shown in following graph.



Equation below is the formula for the "total number of lines by capture width (the decimal point is truncated)" and the "frame rate".

(1) Equation of total number of line for partial scan mode

The total number of line = 33+⌊OFFSET/12⌋+ HEIGHT+⌊(1207−HEIGHT−OFFSET)/12⌋ (Note 14.1.4)

(2) Equation of total number of line for partial scan and binning mode

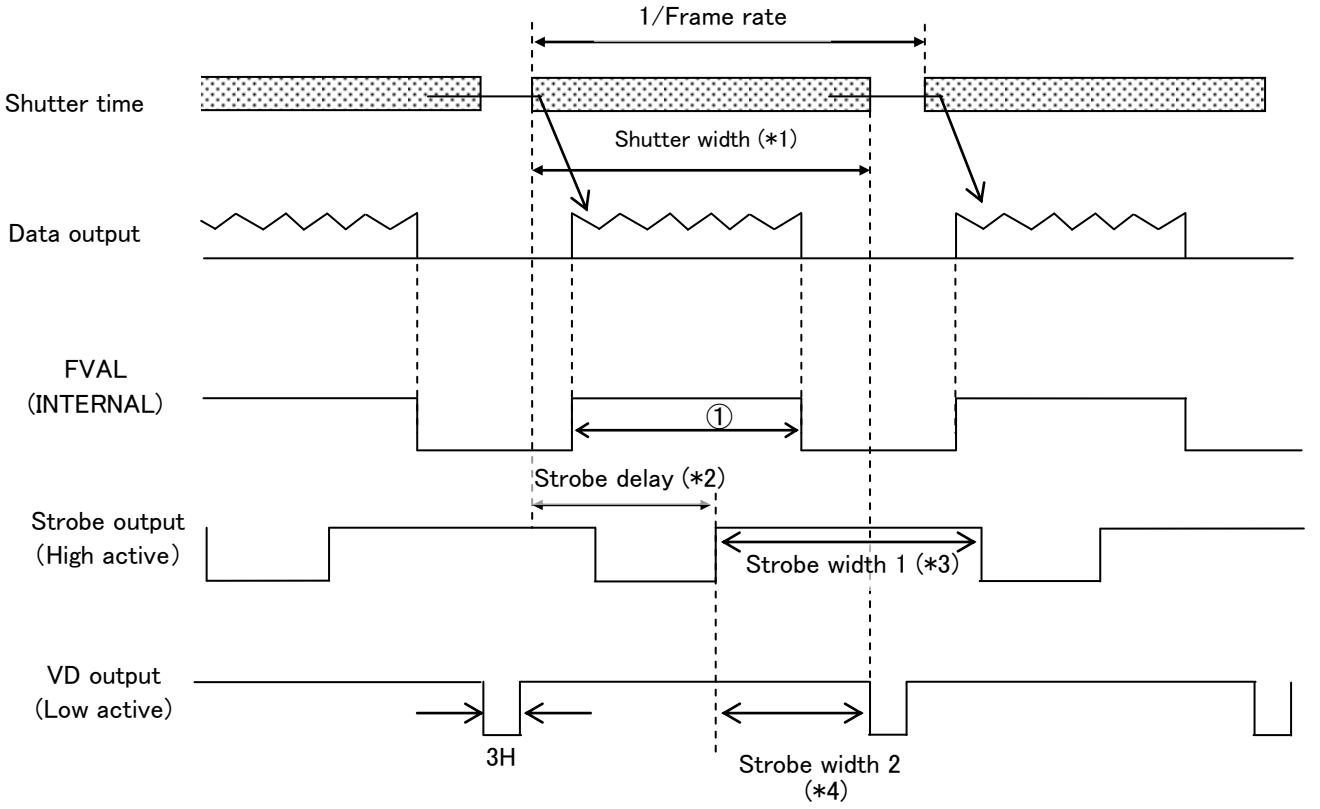
The total number of line = 22+⌊(8+OFFSET)/12⌋+⌊HEIGHT/2⌋+⌊(1202− HEIGHT− OFFSET)/12⌋ (Note 14.1.4)

Frame rate = (45000000 / 1920) / The total number of line

*Notes on partial scan use

(Note 14.1.5) The capture start position + capture width, please use 1200 H or less.

14.2. TriggerMode is set to OFF and ExposureMode is set to Timed or PresetTimed mode



1H = 42.667 μ s

(*1) When AcquisitionControl.ExposureMode is set to "Timed", Shutter width is represented by following equation.
Shutter width = AcquisitionControl.ExposureTime * 1.0 μs (Note 14.2.1) (Note 14.2.2)
When AcquisitionControl.ExposureMode is set to "PresetTimed", Shutter width is represented by following equation.
Shutter width = AcquisitionControl.ExposureTimePreset
Values: Preset1 "1/30sec", Preset2 "1/60sec", Preset3 "1/100sec", Preset4 "1/250sec",
Preset5 "1/1000sec", Preset6 "1/2000sec", Preset6 "1/10000sec", Preset8 "1/50000sec"

(*2) When DigitalIOControl.LineSource is set to "ExposureActive", Strobe delay is set to 0.0 μs.
When DigitalIOControl.LineSource is set to "Timer1Active", Strobe delay is represented by following equation.
Strobe delay = CounterAndTimeControl.TimerDelay * 1.0 μs (Note 14.2.3) (Note 14.2.4)

(*3) When DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimeControl.TimerDuration is larger than 1, Strobe width 1 is represented by following equation. (Note 14.2.3) (Note 14.2.5)
Strobe width 1 = CounterAndTimeControl.TimerDuration * 1.0 μs
When DigitalIOControl.LineSource is set to "ExposureActive" or
DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimerControl.TimerDuration is set to 0,
Strobe width 1 is represented by following equation.
Strobe width 1 = Shutter width = (*1)

(*4) Strobe width 2 = Shutter width − Strobe delay = (*1) − (*2)

(Note 14.2.1)

(a) When AcquisitionControl.AcquisitionFrameRate is smaller than 1/Shutter width and AcquisitionControl.AcquisitionFrameRate is smaller than the frame rate of partial scan, Frame rate is represented by following equation.
Frame rate = AcquisitionControl.AcquisitionFrameRate

(b) AcquisitionControl.AcquisitionFrameRate is smaller than 1/Shutter width and AcquisitionControl.AcquisitionFrameRate is larger than the frame rate of partial scan, Frame rate is represented by following equation.
Frame rate = Frame rate of partial scan

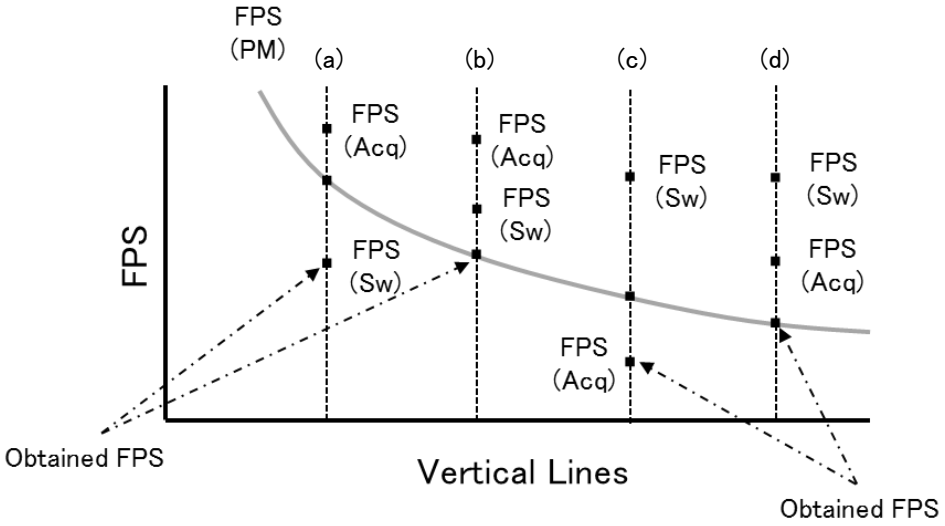
(c) Shutter width is larger than 1/AcquisitionControl.AcquisitionFrameRate and 1/Shutter width is smaller than the frame rate of partial scan, Frame rate is represented by following equation.
Frame rate = 1/Shutter width

(d) Shutter width is larger than 1/AcquisitionControl.AcquisitionFrameRate and 1/Shutter width is larger than the frame rate of partial scan, Frame rate is represented by following equation.
Frame rate = Frame rate of partial scan

These relationships are shown in following table and graph.

	(a)	(b)
Condition 1	AcquisitionControl.AcquisitionFrameRate ＞ 1/Shutter width	
Condition 2	1/Shutter width ＜ Partial Max Frame rate	1/Shutter width ≧ Partial Max Frame rate
Obtained FPS	1/Shutter width	Partial Max Frame rate

	(c)	(d)
Condition 1	AcquisitionControl.AcquisitionFrameRate ＜ 1/Shutter width	
Condition 2	AcquisitionControl.AcquisitionFrameRate ≦ Partial Max Frame rate	AcquisitionControl.AcquisitionFrameRate ＞ Partial Max Frame rate
Obtained FPS	AcquisitionControl.AcquisitionFrameRate	Partial Max Frame rate



(PM) Maximum frame rate of partial scan mode : Partial Max Frame rate

(Sw) Maximum frame rate required for exposure : 1/Shutter width

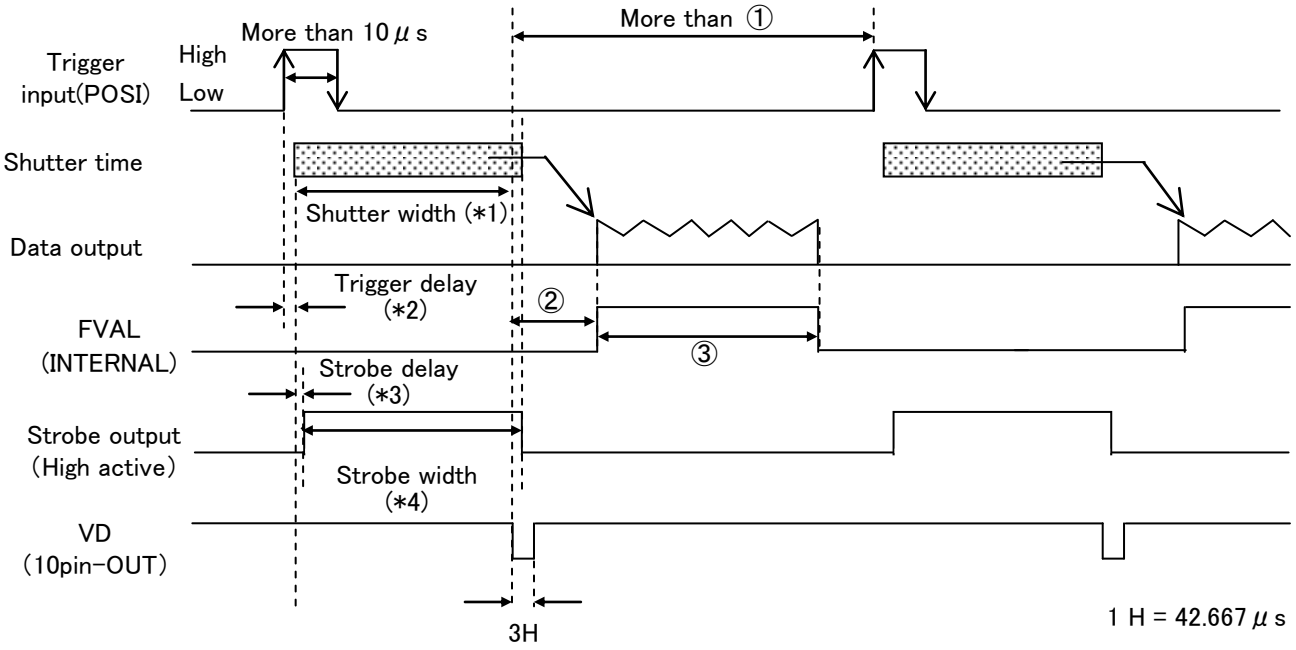
(Acq) Frame rate set by AcquisitionControl.AcquisitionFrameRate by User : AcquisitionControl.AcquisitionFrameRate

(Note 14.2.2) Set the Strobe delay in the range from 10.0u to 2.0 seconds in us.
(Note 14.2.3) The setting value must be smaller than Frame rate. Otherwise, pulse signal could not be outputted.
(Note 14.2.4) Set the Strobe delay in the range from 0.0 to 2.0 seconds in us.
(Note 14.2.5) Set the Strobe delay in the range from 1.0us to 2.0 seconds in us.
(Note 14.2.6) [x] is Ceiling function.

	PartialScanMode OFF		PartialScanMode ON (Note 14.2.6)	
	BinningVertical OFF	BinningVertical ON	BinningVertical OFF	BinningVertical ON
①	1200H	600H	(HEIGHT) H	[HEIGHT/2] H
1/Frame rate	1250H	625H	(2+⌈(12+OFFSET)/12⌉ +29+ HEIGHT +⌈(1207−HEIGHT −OFFSET)/12⌉+1) H	(2+⌈(8+OFFSET)/12⌉ +⌈(38+HEIGHT/2⌉ +⌈(1202−HEIGHT −OFFSET)/12⌉+1) H

14.3. TriggerMode is set to ON and ExposureMode is set to Timed or PresetTimed

When external trigger signal is POSITIVE (high active), after the trigger signal rise, exposure is start.
The exposure time is set by the camera electronic shutter speed. The video output is obtained immediately after the end of fixed exposure.



(Note 14.3.1)

(*1) When AcquisitionControl.ExposureMode is set to "Timed", Shutter width is represented by following function. (Note 14.3.2)
Shutter width = AcquisitionControl.ExposureTime * 1.0 μs
When AcquisitionControl.ExposureMode is set to "PresetTimed"
Shutter width = AcquisitionControl.ExposureTimePreset
Values: Preset1 "1/30sec", Preset2 "1/60sec", Preset3 "1/100sec", Preset4 "1/250sec", Preset5 "1/1000sec", Preset6 "1/2000sec", Preset6 "1/10000sec", Preset8 "1/50000sec"

(*2) Trigger delay = Rise time of photocoupler + 0.33 μs + AcquisitionControl.TriggerDelay * 1.0 μs. (Note 14.3.3)

(*3) When DigitalIOControl.LineSource is set to "Timer1Active", Strobe delay is represented by following equation. (Note 14.3.3)
Strobe delay = CounterAndTimeControl.TimerDelay * 1.0 μs
When DigitalIOControl.LineSource is set to "ExposureActive", Strobe delay become 0.0 μs

(*4) When DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimeControl.TimerDuration is set to non-zero, Strobe width is represented by following equation. (Note 14.3.4)
Strobe width = CounterAndTimeControl.TimerDuration * 1.0 μs
When DigitalIOControl.LineSource is set to "ExposureActive" or DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimerControl.TimerDuration is set to zero, Strobe delay equal Shutter width like following equation.
Strobe width = Shutter width = (*1)

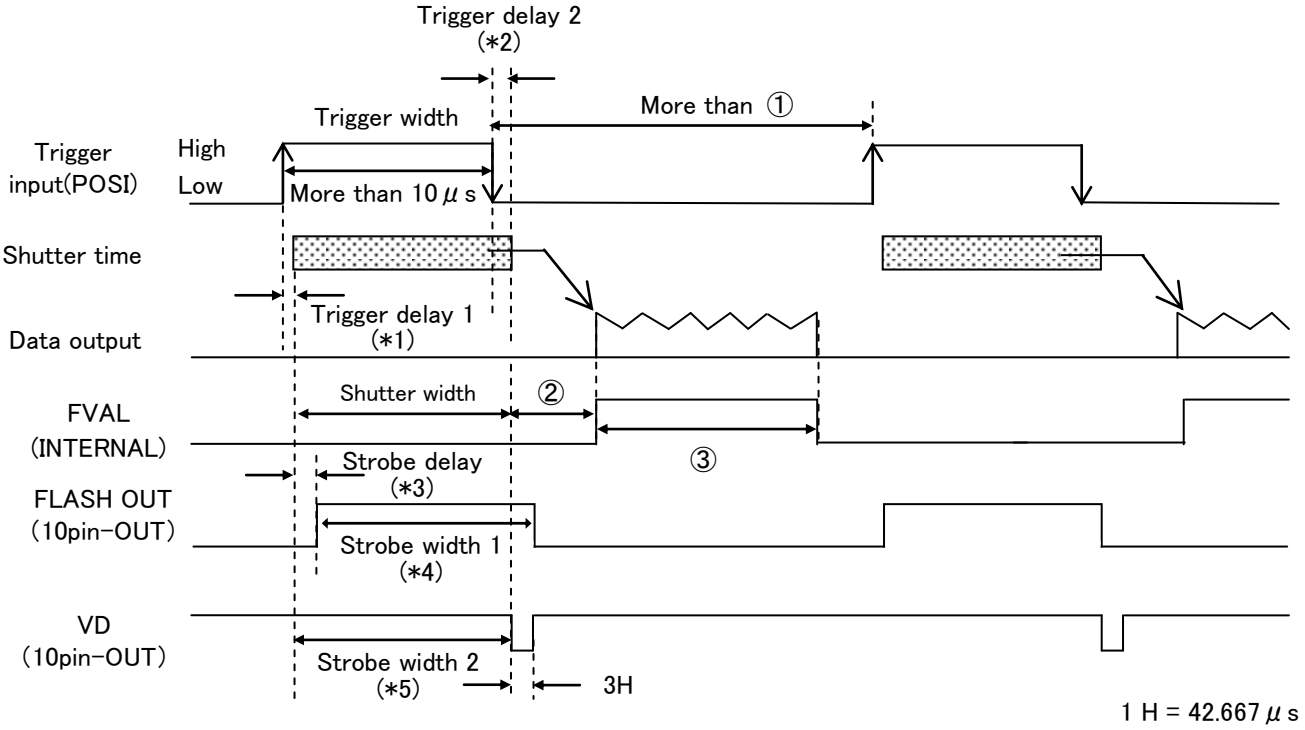
(Note 14.3.1) The setting value must be smaller than Frame rate. Otherwise, pulse signal could not be outputted.
(Note 14.3.2) Set the Shutter width in the range from 10.0u to 10.0 seconds in us.
(Note 14.3.3) Set the Strobe delay in the range from 0.0 to 2.0 seconds in us.
(Note 14.3.4) Set the Strobe width in the range from 1.0 to 2.0 seconds in us.

(Note 14.3.5) [x] is Ceiling function

	PartialScanMode OFF		PartialScanMode ON (Note 3.3.5)	
	BinningVertical OFF	BinningVertical ON	BinningVertical OFF	BinningVertical ON
①	1250H	625H	(2+⌈(12+OFFSET)/12⌉ +29+HEIGHT +⌈(1207−HEIGHT − OFFSET)/12⌉+1) H	(2+⌈(8+OFFSET)/12⌉ +⌈(38+HEIGHT/2⌉ +⌈(1202−HEIGHT −OFFSET)/12⌉+1) H
②	50H	25H	(2+⌈(12+OFFSET)/12⌉) H	(2+⌈(8+OFFSET)/12⌉) H
③	1200H	600H	(29+HEIGHT) H	(19+⌈(HEIGHT/2)⌉) H

14.4. TriggerMode is set to ON and ExposureMode is set to TriggerWidth

When external trigger signal is POSITIVE (high active), after the trigger signal rise, exposure is start. At the trigger signal falling edge, the internal VD signal is reset and the video data are transmitted. The trigger signal width equals the exposure time.



(Note 14.4.1)

(*1) Trigger delay 1 = Rise time of photocoupler ＋ 0.26 μs + AcquisitionControl.TriggerDelay * 1.0 μs (Note 14.4.2)

(*2) Trigger delay 2 = Fall time of photocoupler ＋ 4.38 μs + AcquisitionControl.TriggerDelay * 1.0 μs (Note 14.4.2)

(*3) When DigitalIOControl.LineSource is set to "Timer1Active", Strobe delay is represented by following equation.
Strobe delay = CounterAndTimerControl.TimerDelay * 1.0 μs (Note 14.4.2)
When DigitalIOControl.LineSource is set to "ExposureActive", Strobe delay is set to zero.

(*4) When DigitalIOControl.LineSource is set to "Timer1Active", CounterAndTimeControl.TimerDuration is set to non-zero, Strobe width 1 is represented by following equation. (Note 14.4.3)
Strobe width 1 = CounterAndTimeControl.TimerDuration * 1.0 μs
When DigitalIOControl.LineSource is set to "ExposureActive" or DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimerControl.TimerDuration is set to zero, Strobe width equals Trigger width.
Strobe width 1 = Trigger width

(*5) Strobe width 2 = Shutter width − Strobe delay (*3) = Trigger width ― (*1) + (*2) ― (*3)

(Note 14.4.1) The setting value must be smaller than Frame rate. Otherwise, pulse signal could not be outputted.
(Note 14.4.2) Set the trigger and timer delays in the range from 0.0 to 2.0 seconds in us.
(Note 14.4.3) Set the Strobe width in the range from 0.0 to 2.0 seconds in us.

(Note 14.4.4) [x] is Ceiling function

	PartialScanMode OFF		PartialScanMode ON (Note 14.4.4)	
	BinningVertical OFF	BinningVertical ON	BinningVertical OFF	BinningVertical ON
①	1250H	625H	(2+[(12+OFFSET)/12] +29+HEIGHT +[(1207−HEIGHT −OFFSET)/12]+1) H	(2+[(8+OFFSET)/12] +[(38+HEIGHT/2] +[(1202−HEIGHT −OFFSET)/12]+1) H
②	50H	25H	(2+[(12+OFFSET)/12]) H	(2+[(8+OFFSET)/12]) H
③	1200H	600H	(29+HEIGHT) H	(19+[(HEIGHT/2)]) H

15. Input / Output signal

1. Input signal

The level of the trigger signal input to HV-F203GV is as follows.

5Vp-p ± 0.5V

2. Output signal

The level of VD/Flash pulse signal output from HV-F203GV is as follows.

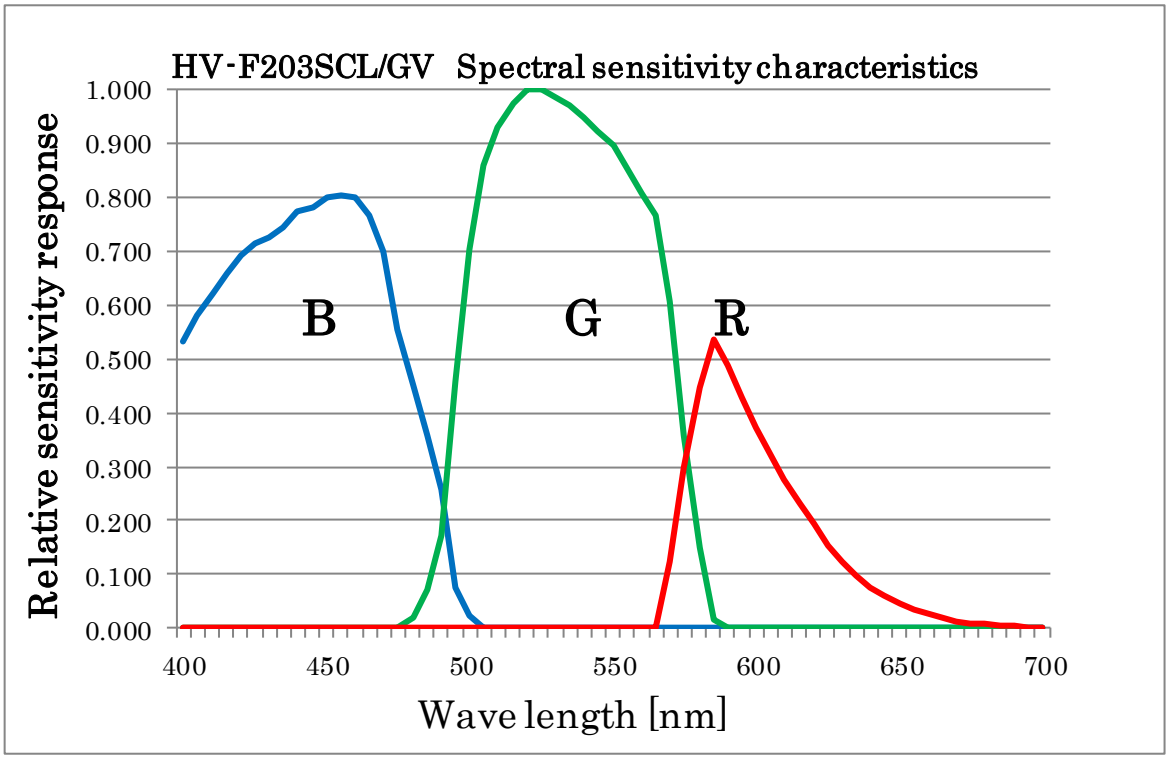
5Vp-p

16. Delay of photocoupler

The difference of the delay time for trigger signal of photocoupler implemented in HV-F203GV depends on input voltage as shown following table.

Voltage of input signal	The case of rising edge	The case of falling edge
5V	7.3～8.8 μs	22.4～23.6 μs
6V	5.3～5.6 μs	31.4～34.5 μs
7V	4.6～4.8 μs	38.2～39.4 μs
8V	3.8～4.1 μs	41.3～41.4 μs
9V	2.7～3.6 μs	42.2～43.0 μs
10V	2.5～2.8 μs	44.3～44.6 μs
11V	2.3～2.6 μs	45.2～45.7 μs
12V	2.2～2.5 μs	45.8～46.6 μs
13V	2.3～2.6 μs	46.6～47.5 μs
14V	2.2～2.5 μs	47.1～48.2 μs
15V	2.1～2.4 μs	47.8～48.3 μs
16V	2.1～2.3 μs	48.3～48.7 μs
17V	2.0～2.2 μs	48.8～49.3 μs
18V	2.0～2.2 μs	48.9～49.3 μs
19V	1.9～2.1 μs	49.3～50.2 μs
20V	1.9～1.9 μs	49.8～50.5 μs
21V	1.9～1.9 μs	50.3～50.9 μs
22V	1.8～1.9 μs	50.7～51.2 μs
23V	1.8～1.8 μs	51.1～51.6 μs
24V	1.8～1.8 μs	51.8～52.1 μs

17. Spectral response

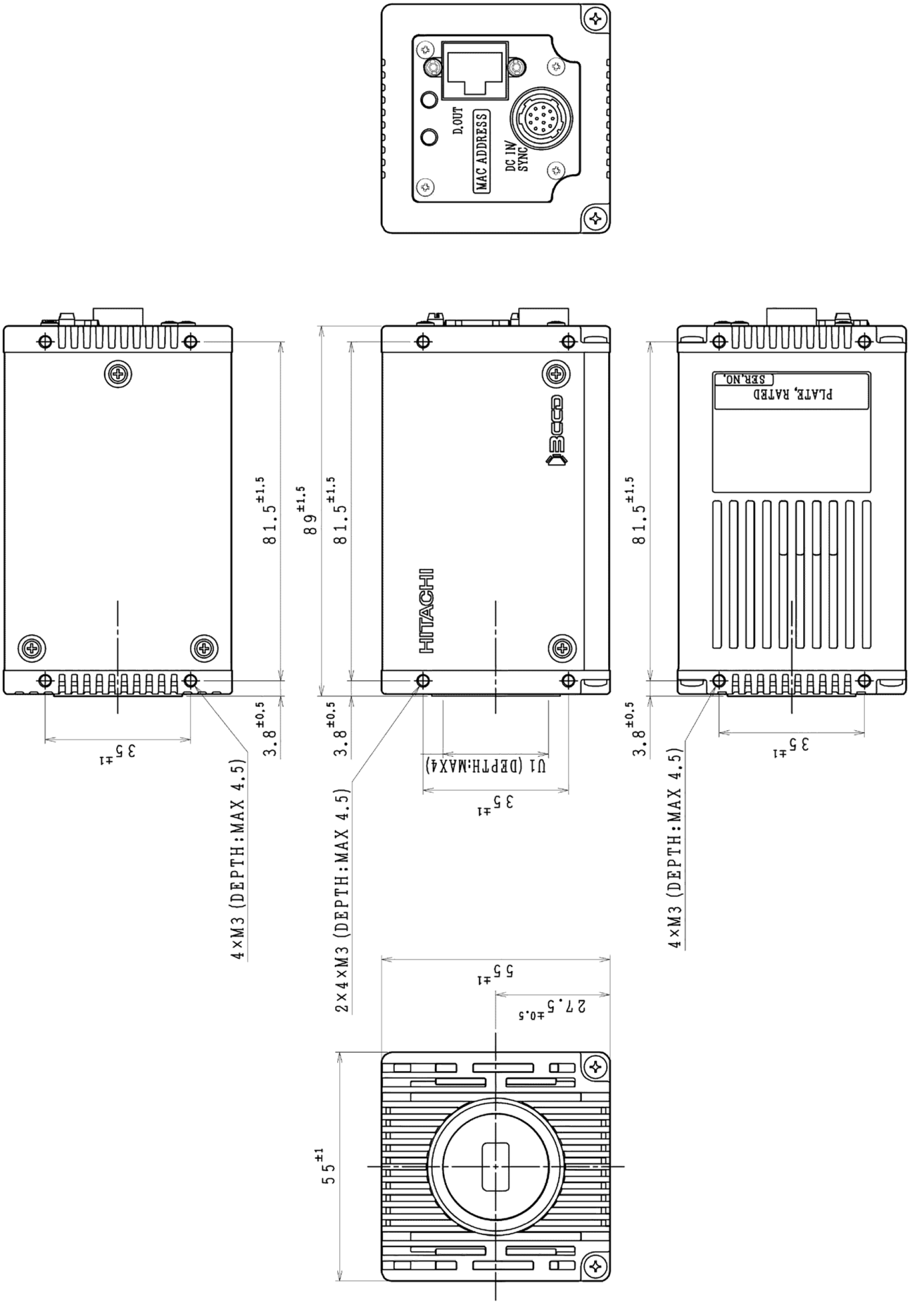


18. Specifications

Specifications of HV-F203GV are showing.

1)	Optical system	1/1.8-inch F1.9 prism with IR cut filter
2)	Imaging device	1/1,8-inch interline CCD
	Total pixels	1688 (H) x 1248 (V)
	Effective pixels	1636 (H) x 1220 (V)
	Active pixels	1600 (H) x 1200 (V)
	Pixel pitch	4.4 μ m (H) x 4.4 μ m (V)
3)	Sensing area	7.040mm (H) x 5.280mm (V)
4)	Scanning system	Progressive scan
5)	Vertical scanning frequency	18.75 Hz
6)	Synchronization	Internal / VD external
7)	Lens mount	C mount (Mount surface projection less than 4.0mm)
8)	Frange back	17.526mm (air conversion)
9)	Video output	
	Interface	Gigabit Ethernet IEEE802.3ab (1000BASE-T)
	Protocol	GigE Vision Version1.2 compliant
	Transmission speed	1Gbps
	Output data format	RGB 8/10bit BGR 8bit YUV422 8bit Mono 8/10/12 bit
	Max output image size	1600 (H) x 1200 (V)
	Max frame rate	18.75 frames per second (RGB 8bit)
10)	Sensitivity	2000lx, F8, 3200K
11)	Electronic shutter	
	Preset	1/30, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second
	Variable	10 to 1/100000 second
12)	External trigger function	
	Mode	OFF, Fixed shutter mode, ONE trigger mode
	Trigger input	From DCIN/SYNC 12pin connector
	Input level	5Vp-p ± 0.5V
13)	Output signal	Strobe / VD : 5Vp-p
14)	Gamma	0.45 / 1.0 / LUT
15)	Gain	Manual / AGC : 0 to +12dB
16)	White balance	Manual / Once Auto / Continuous Auto
17)	Registration	Full screen 0.05% (not including lens response)
18)	Vertical contour correction	2H
19)	region of interest (ROI)	Selectable start position and width of picture grabbing in 2 pixels and 2 lines step
20)	Remote control	
	Control system	GigE Vision Version1.2, GenICam SFNC Version 2.3 compliant
	Control items	TRIGGER, OUTPUT SIGNAL, SHUTTER SPEED, GAIN LEVEL, GAMMA, SHARPNESS, BLACKLEVEL, KNEE, ALC, WHITE BALANCE, MASKING, PAINT BLACK
21)	Power supply	DC12V±1V / 48V (PoE: IEEE802.3af compliant)
22)	Power consumption	Approx.750mA(Approx.9.0W)
23)	Ambient temperature	
	Operating	0 to 40℃ less than 90% RH (without dew condensation)
	Storage	-20 to 60℃ less than 70% RH (without dew condensation)
24)	Vibration endurance	10 to 100Hz (24.5 m/s^2), sweep: 10 minutes, XYZ, 30minutes
25)	Shock endurance	392 m/s^2 (vertical, horizontal, once each faze)
26)	Dimensions	55(W) x 55(H) x 89(D) mm (not including mount protrusions)
27)	Mass	Approx. 370g (not including the lens)
28)	Standard compositions	Camera, Installation guide, Plug for power supply

19. Dimensions



Hitachi Kokusai Electric Inc.

32, Miyuki-cho, Kodaira-shi, Tokyo 187-8511, Japan
Phone: +81-50-3383-3432, Fax: +81-42-322-3270
URL: http://www.hitachi-kokusai.co.jp/global/en/index.html

Hitachi Kokusai Electric Asia (Singapore) Pte. Ltd.

Office : 7 Tampines Grande, #02-04 Hitachi Square, Singapore 528736
Phone: +65-6212-1945, Fax: +65-6231-2429
URL: http://www.hitachi-kokusai.com.sg/

Hitachi Kokusai Electric America, Ltd.

Headquarters : 150 Crossways Park Drive, Woodbury, NY 11797, U.S.A.
Phone: +1(516)921-7200, Fax: +1(516)496-3718
West Office : 11258 Monarch Street, Unit H, Garden Grove, CA 92841, U.S.A.
Phone: +1(714)895-6116, Fax: +1(714)895-6252
Northeast Sales : Phone: +1(860)757-3892
Midwest Sales : Phone: +1(330)334-4115
South Sales : Phone: +1(850)934-1234
Latin/Canada Sales : Phone: +1(516)682-4408
URL: http://www.hitachikokusai.us/

Hitachi Kokusai Electric Europe GmbH

Frankfurt Head Office : SiemensStraße 9, D-63263 Neu-Isenburg, Germany
Phone: +49(0)6102-8332-0, Fax: +49(0)6102-202616
London Office : Windsor House, Queensgate, Britannia Road, Waltham Cross,
Hertfordshire, EN8 7NX, United Kingdom
Phone: +44(0)845-1212177, Fax: +44(0)845-1212180
URL: http://www.hitachi-keu.com/

Hitachi Kokusai Linear Equipamentos Eletrônicos S/A

Head Office : Rodovia BR 459, No121–A, Km 121 - Bairro Corrego Raso,
Santa Rita do Sapucai, 37540-000, MG –Brazil
Phone: +55(35)3473-3473, Fax: +55(35)3473-3474
Sales Office : Alameda Santos, 745 -9 Andar- Conj. 91B, Cerqueira Cesar,
São Paulo, 01419-001, SP –Brazil
Phone: +55(11)3541-3244, Fax: +55(11)3541-2425
URL: http://www.hitachi-linear.com.br/

Hitachi Kokusai Electric Turkey Elektronik Ürünleri Sanayi ve Ticaret A.Ş.
Hitachi Kokusai Electric Turkey Yayıncılık Sistemleri A.Ş.

Office : Istanbul Endustri ve Ticaret Serbest Bolgesi Akif Kopuz Cad. No.3,
34957 Tuzla Istanbul, Turkey
Phone : +90-216-394-8484 Fax : +90-216-394-8482
URL: http://www.hitachi-kokusai.com.tr/