

CCD camera

KP-FD500GV/F500GV

KP-FD202GV/F202GV

KP-FD145GV/F145GV

KP-FD140GV/F140GV

KP-FD83GV/F83GV

KP-FD33GV/F33GV



Operation Manual

Thank you for purchase this fine Hitachi Kokusai Electric CCD camera.

Before using the camera, please read this operation manual carefully and keep this manual on file for ready reference in the future.

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.

Hitachi Kokusai Electric Inc.

Note: The model and serial numbers of your CAMERA are important for you to keep for your convenience and protection. These numbers appear on the nameplate located on the bottom of the products. Please record these numbers in the spaces provided below, and retain this manual for future reference.

Model No. _____ **Serial No.** _____

Declaration of Conformity

Manufacturer's Name: Hitachi Kokusai Electric, Inc.
Manufacturer's Address: 4-14-1 Sotokanda, Chiyoda-ku,
Tokyo 101-8980, Japan

Representative(s) Address in the EU: Hitachi Kokusai Electric Europe GmbH
Siemens Strasse 9, D-63263 Neu-Isenburg,
Germany

Hitachi Kokusai Electric U.K. Ltd.
Windsor House, Britannia Road,
Waltham Cross, Hertfordshire,
EN8 7NX, United Kingdom

declares, that the product:

Product Name: CCD Camera
Model Number(s): KP-FD500GV, KP-F500GV

conforms to the following Standards:

EMC: EN 61000-6-4/2007
EN 61000-6-2/2005

Supplementary Information:

"The product complies with the requirements of the Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC."

Signature:



Y. Yamada
Senior Manager
Quality Assurance Department II
Hitachi Kokusai Electric Inc.



M. Katou
Managing Director
Hitachi Kokusai Electric Europe GmbH
Hitachi Kokusai Electric U.K. Ltd.

Date: December 8, 2008

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Waltham Cross, Hertfordshire,
EN8 7NX, United Kingdom

declares, that the product:

Product Name: CCD Camera
Model Number(s): KP-FD202GV, KP-F202GV

conforms to the following Standards:

EMC: EN 61000-6-4/2007
EN 61000-6-2/2005


Supplementary Information:

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declares, that the product:

Product Name: CCD Camera
Model Number(s): KP-FD145GV, KP-F145GV

conforms to the following Standards:

EMC: EN 61000-6-4/2007
EN 61000-6-2/2005

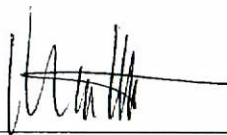
Supplementary Information:

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declares, that the product:

Product Name: CCD Camera
Model Number(s): KP-F140GV KP-FD140GV

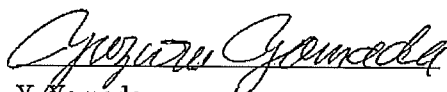
conforms to the following Standards:

EMC: EN61000-6-4:2007
EN61000-6-2:2007

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Date: 18 Sep, 2009

Declaration of Conformity

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EN8 7NX United Kingdom

declares, that the product:

Product Name: CCD Camera
Model Number(s): KP-F83GV KP-FD83GV

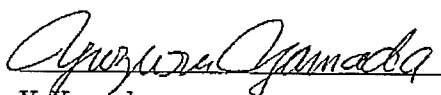
conforms to the following Standards:

EMC: EN61000-6-4:2007
EN61000-6-2:2007

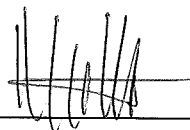
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EN8 7NX United Kingdom

declares, that the product:

Product Name: CCD Camera
Model Number(s): KP-F33GV KP-FD33GV

conforms to the following Standards:

EMC: EN61000-6-4:2007
EN61000-6-2:2007

Supplementary Information:

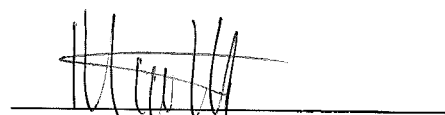
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IMPORTANT SAFETY INSTRUCTIONS

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 so 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.

WICHTIGE SICHERHEITSANWEISUNGEN

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 sollten 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 instabilen Wagen, Stand, Dreifuß, Träger oder Tisch stellen.

Das Erzeugnis kann sonst herunterfallen und ein Kind oder einen Erwachsenen schwer verletzen.

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 Einbauinstallation 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 eine 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 Schutz des Schutzkontaktsteckers unwirksam.

13. Netzkabelschutz

Netzkabel sollten so verlegt werden, daß 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 verhindert Beschädigung durch Blitzschlag und Netzspannungsschöße.

15. Überlastung

Wandsteckdosen, Verlängerungskabel und eingebaute Bequemlichkeitssteckdosen 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 aussetzen 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 Vervollendung von Wartung oder Reparaturarbeiten an diesem Erzeugnis um die Durchführung von Sicherheitsprüfungen, um zu bestimmen, daß das Erzeugnis im angemessenen 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.

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 à 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 à proximité d'eau - par exemple près d'une baignoire, d'un lavabo, d'un évier ou d'un bac à lessive, dans un sous-sol humide, ou près d'une piscine, etc.

8. Accessoires

Ne pas placer l'appareil sur un chariot, un socle, un pied, un support ou une table instables. L'appareil pourrait tomber, blessant grièvement 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 à 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 irrégulières 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 plaçant 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 bibliothèque ou une étagère, sans ventilation suffisante ou sans respecter les instructions du fabricant.

11. Sources d'alimentation

L'appareil devra être alimenté exclusivement sur le type d'alimentation indiqué sur l'étiquette signalétique. Si l'on n'est pas sûr du type d'alimentation 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 à la terre ou polarisation

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

Ne pas rendre vaine la mesure de sécurité assurée par cette prise avec mise à la terre.

13. Protection du cordon d'alimentation

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

Faire particulièrement attention aux fiches des cordons, à la proximité des prises, et à l'endroit où 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 dû à 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 pièces, ce qui pourrait provoquer un feu ou un choc électrique. Ne jamais renverser de liquide d'aucune sorte sur l'appareil.

17. Substances inflammables et explosives

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

18. Chocs ou vibrations violents

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

19. Réparations

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

20. Dommages nécessitant réparations

Débrancher l'appareil de la source d'alimentation et confier les réparations à 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 à la pluie ou à 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 entraîner 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. Pièces de rechange

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

22. Vérification de sécurité

Après 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 manière recommandée par le fabricant.

24. Chaleur

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

IMPORTANT NOTICE

For 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 responsible for compliance could void the user's authority to operate the equipment.

For Canada

These products do not exceed the class A/class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations.

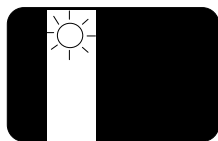
Le présent appareil n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le ministère des communications du Canada.

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) 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.

4) 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.

5) 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.

Operating considerations Notes to users

1. Important safety notes

- Use this camera with a 12VDC 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.
- Stop 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 does 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°C).
- 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°C.

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 dirt on the case off with dry soft cloth. If dirt is hardened, wipe it 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.

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Overview

KP-FD500GV/FD202GV/F145GV/FD140GV/FD83GV/FD33GV are Gigabit Ethernet output type color camera which utilized the progressive scan CCD image sensor with square pixel which adopted the RGB primary color mosaic filter. KP-F500GV/F202GV/F145GV/F140GV/F83GV/F33GV are black and white type. KP-FD145GV and KP-F145GV have sensitivity in the near-infrared region.

Since these cameras are Power over Ethernet (PoE) type, power supply is input via LAN cable.

Standard composition

Check when unpacking

Camera (with IR cut filter / Dummy glass)	1
CD ROM (Documents, Driver and SDK)	1
Composition table	1

Optional accessories

(1) 12 pin plug	HR10A-10P-12S(01)
(2) Junction box	JU-F30/JC-100
(3) Dummy glass (AR coated)	ARC1214
(4) IR cut filter	IRC650
(5) Tripod adaptor	TA-M1
(6) LAN cable (CAT5E or CAT6)	

(7) 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 install clamp filter (ZCAT 2035-0930A: TDK) at both ends (camera and video processor ends).

Features

•High resolution

The 2/3-inch 5.00 million pixels (KP-FD500GV/F500GV), the 1/1.8-inch 2.02 million pixels (KP-FD202GV/F202GV), the 2/3-inch 1.45 million pixels (KP-FD145GV/F145GV), the 1/2-inch 1.45 million pixels (KP-FD140GV/F140GV), the 1/3-inch 0.8 million pixels (KP-FD83GV/F83GV) and the 1/3-inch 0.33 million pixels (KP-FD33GV/F33GV) square lattices CCD achieve a high resolution.

•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™ (V1.00) 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™ (V1.00) correspondence

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

•High color fidelity

RGB primary color mosaic filter and 6 color independent achieve a high resolution and high color fidelity.

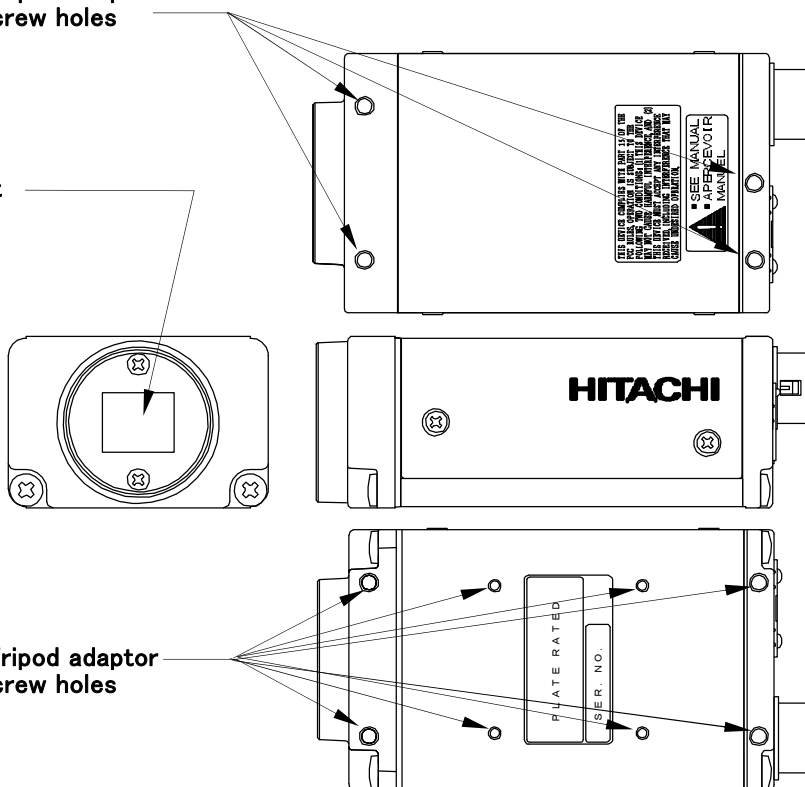
•Power over type Ethernet

Power supply can be input via Ethernet cable.

Section name and functions

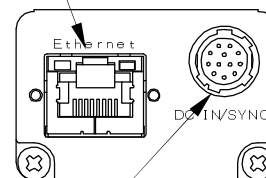
Camera / Tripod adaptor
mounting screw holes

Lens mount
(C mount)



Ethernet connector

Use for digital video output and camera control signal input/output signal.

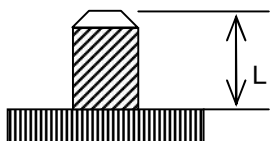


DC IN/SYNC connector

Use for DC+12V power or external trigger /VD signal input.

Camera mounting

Attached optional accessory the tripod adaptor "TA-M1", mount the camera to a tripod or mounting bracket.



Screw type: U1/4-20

Length L = 4 to 5.5mm

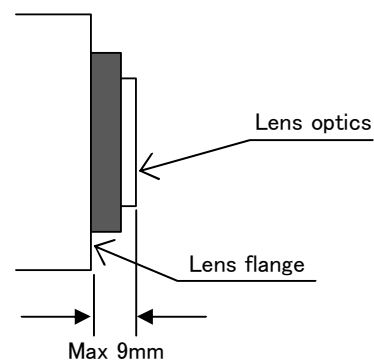
Screws longer than 5.5 mm can cause internal damage, while less than 4 mm prevents secure fastening and risks dropping to cause damage and injury.

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.



Optical filter

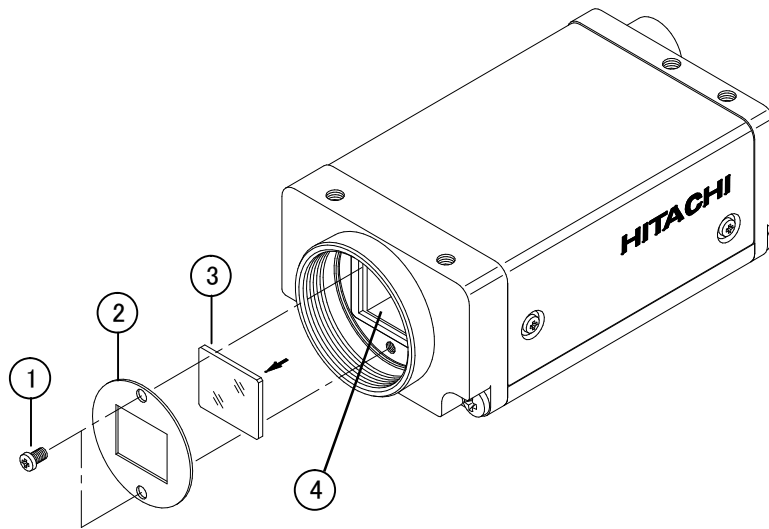
How to remove the IR cut filter / Dummy glass (*).

- (1) Remove two screws ① and filter holder ② will come off.
- (2) Remove the IR cut filter / Dummy glass ③ from filter frame ④.
- (3) Then, reinstall and secure filter holder ② with two screws ①.

Note: Prior to removing the optical filter, be sure to turn off the power. Since garbage etc. invades into image reception surface camera, please work under the clean air, such as a CLEAN ROOM.

* IR cut filter is equipped in the KP-FD500GV/FD202GV/FD145GV/FD140GV/FD83GV/FD33GV.

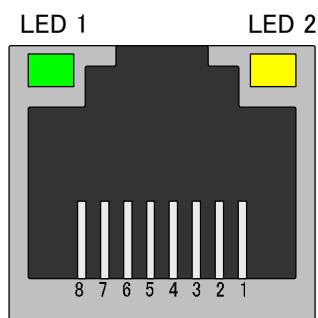
Dummy glass is equipped in the KP-F500GV/F202GV/F145GV/F140GV/F83GV/F33GV.



Connector

1. Ethernet connector

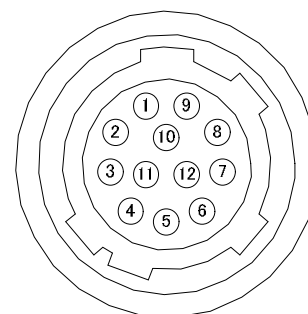
PIN NO.	Signal
1	TRP1+
2	TRP1-
3	TRP2+
4	TRP3+
5	TRP3-
6	TRP2-
7	TRP4+
8	TRP4-



Status	LED 1	LED 2
Immediately after Power ON	Green Light On	Yellow Light On
1Gb Transmission	Green Light On	Yellow Blink On
100Mb Transmission	Red Light On	Yellow Blink On

2. DCIN/SYNC connector

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



Connector (matching camera: SNH-10-12(RPCB) SANWOO or equivalent

Plug (matching cable plug: HR10A-10P-12S(01) HIROSE or equivalent

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

Please do not connect 1 pin and 3/5 pin when using PoE. When connecting it, PoE may stop the power supply.

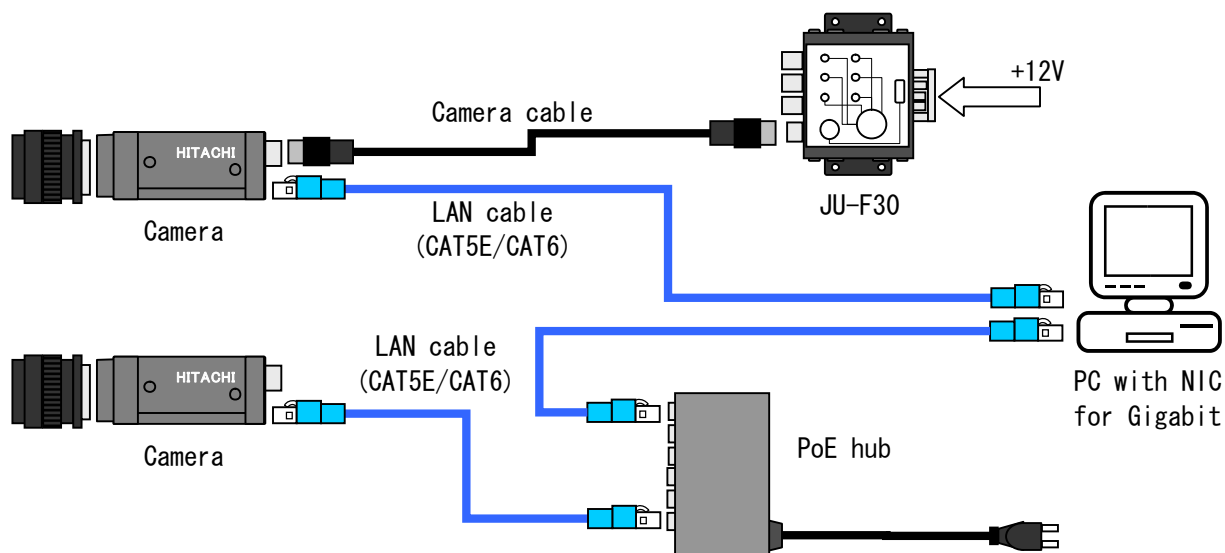
Because TRIG-A/VD and TRIG-B are photo coupler input, 8/12 pin is isolated with 1/3/5 pin. When 8/12 pin is connected to GND, please connect to 3 pin or 5 pin.

(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 legion.

System example

KP-FD500GV/F500GV/FD202GV/F202GV/FD145GV/F145GV/FD140GV/F140GV/FD83GV/F83GV/FD33GV/F33GV connect to PC sing LAN cable.



(*) Note that following point when connecting the camera

- Please connect the camera to device for Gigabit Ethernet (1000BASE-T).
Please set the imaging size according to following formula when the camera is connected to 100BASE network.

$$(\text{Image Width}) \times (\text{Image Height}) \times (\text{Data bit}) \leq 20000000 \quad \dots \text{KP-FD500GV}$$

$$\leq 18750000 \quad \dots \text{KP-F500GV}$$

$$\leq 16000000 \quad \dots \text{KP-FD202GV/F202GV}$$

Any Image size is OK ... Models except the above
- Please use LAN cable of CAT5E or more (recommendation: CAT6 straight cable).
- To the NIC for Jumbo frame is recommended to be used
Recommended NIC: Intel Pro1000 PT Desktop
- When the camera is connected to Laptop PC, please use the one whose built-in LAN is Gigabit Ethernet (1000BASE-T) correspondence.
The external LAN card (CardBus32 or USB2.0) may not display the cameras ability because of the bus limitation.
ExpressCard is corresponded on the standard but useable product is unconfirmed (.as of April, 2008).
- This product prepares the high-performance driver (TurboLinx) and the filter driver (BroadLinx). Please use the driver according to the usage referring to following specifications.

	High-performance driver	Filter driver
Corresponded NIC	Intel Pro1000series	Gigabit Ethernet NIC
Other network (In-house LAN, internet etc.)	Unusable *1	Usable
CPU load	Small	Large

*1: When using high-performance driver, please configure the NIC setting before installation the driver.
- 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.
- A striped noise might be caused according to the equipment (hub etc.) connected with the camera.
In that case, please connect the cable to another port of the equipment again.
- Please disable UAC (User Account Control) when using WindowsVista.

Functions and operations

Various mode setup and adjustment of

KP-FD500GV/F500GV/FD202GV/F202GV/FD145GV/F145GV/FD140GV/F140GV/FD83GV/F83GV/FD33GV/F33GV 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.

1. Commands for acquisition

(1) ACQUITION : Setting for image acquisition method

•MODE : Select of mode

Command name : AcquisitionMode (Standard)

Address : A0030000 h

Values (Factory setting 1) : 1 "Continuous" Frames are captured continuously until stopped with the STOP command.
2 "MultiFrame" The number of frames specified by FRAME COUNT is captured.
3 "SingleFrame" One frame is captured.

•START : Acquisition start

Command name : AcquisitionStart (Standard)

Address : A0030004 h

Values (write only) : 1 Start the acquisition of the camera image.

•STOP : Acquisition stop

Command name : AcquisitionStop (Standard)

Address : A0030008 h

Values (write only) : 0 Stop the acquisition of the camera image.

•FRAME COUNT : Set the number of capture *using when MODE is MultiFrame

Command name : AcquisitionFrameCount (Standard)

Address : A003000C h

Values (Factory setting 1) : 1 to 255 Set the number of frames to be acquired in MultiFrame mode.

•FRAMERATE RAW : Acquisition frame rate

Command name : AcquisitionFrameRateRaw (Standard)

Address : A0030014 h

Values (Factory setting 9: KP-FD500GV

16: KP-F500GV

30: KP-FD202GV/F202GV/FD145GV/F145GV/FD140GV/F140GV

36: KP-FD83GV/F83GV

90: KP-FD33GV/F33GV)

: 5 to 9 : KP-FD500GV

7 to 16: KP-F500GV

7 to 30: KP-FD202GV/F202GV/FD145GV/F145GV/FD140GV/F140GV

7 to 36: KP-FD83GV/F83GV

7 to 90: KP-FD33GV/F33GV

Control the Frame rate in 1 fps step.

* Refer to page 20 "Frame rate"

2. Commands for acquisition image

(1) WIDTH MAX : Maximum width of the image

Command name : WidthMax (Standard)
Address : A002F008 h
Values (read only) : 2448: KP-FD500GV/F500GV
1620: KP-FD202GV/F202GV
1360: KP-FD145GV/F145GV/FD140GV/F140GV
1024: KP-FD83GV/F83GV
656: KP-FD33GV/F33GV

(2) HEIGHT MAX : Maximum height of the image

Command name : HeightMax (Standard)
Address : A002F00C h
Values (read only) : 2050: KP-FD500GV/F500GV
1220: KP-FD202GV/F202GV
1024: KP-FD145GV/F145GV/FD140GV/F140GV
768: KP-FD83GV/F83GV
492: KP-FD33GV/F33GV

(3) WIDTH : Set the actual image width

Command name : Width (Standard)
Address : A0020000 h
Values (Factory setting 2448: KP-FD500GV/F500GV
1620: KP-FD202GV/F202GV
1280: KP-FD145GV/FD140GV
1360: KP-F145GV/F140GV
1024: KP-FD83GV/F83GV
652: KP-FD33GV/F33GV)
: 2 to WIDTH MAX

Set the actual image width at intervals of 2 pixels.

(4) HEIGHT : Set the actual image height

Command name : Height (Standard)
Address : A0020004 h
Values (Factory setting 2050: KP-FD500GV/F500GV
1220: KP-FD202V/F202GV
960: KP-FD145GV/FD140GV
1024: KP-F145GV/F140GV
768: KP-FD83GV/F83GV
490: KP-FD33GV/F33GV)
: 2 to HEIGHT MAX

Set the actual image height at intervals of 2 pixels.

(5) OFFSET : Setting of start position of the actual image

• OFFSET X : Set the horizontal offset

Command name : OffsetX (Standard)
Address : A0020008 h
Values (Factory setting 0) : 0 to (WIDTH MAX - WIDTH - 2)

Set the horizontal start position of the actual image at intervals of 2 pixels.

• OFFSET Y : Set the vertical offset

Command name : OffsetY (Standard)
Address : A002000C h
Values (Factory setting 0) : 0 to (HEIGHT MAX - HEIGHT - 2)

Set the vertical start position of the actual image at intervals of

2 pixels.

(6) BINNING : Setting of the binning mode * for only KP-F500GV/F202GV/F145GVF140GV/F83GV/F33GV

•VERTICAL : Set the number of vertical photo-sensitive cell

Command name : BinningVertical (Standard)

Address : A0020010 h

Values (Factory setting 1) : 1 to 2

When set to 1, not perform the binning mode.

When set to 2, the vertical image size is half and frame rate is increased about 2 times.

(7) PIXEL FORMAT : Setting of the pixel format

•PIXEL FORMAT : Set the pixel format

Command name : PixelFormat (Standard)

Address : A0020014 h

Values : *Refer the following table

Following format is available

Format	Values	Available for
Mono8	01080001 ₁₆	All models
Mono10	01100003 ₁₆	All models
Mono12	01100005 ₁₆	All models
BayerRG8	01080009 ₁₆	only Color camera
BayerRG10	0110000D ₁₆	only Color camera
BayerRG12	01100011 ₁₆	only Color camera
RGB8Packed	02180014 ₁₆	only Color camera
BGR8Packed	02180015 ₁₆	only Color camera
RGB10V1Packed	0220001C ₁₆	only Color camera
RGB12Packed	02180018 ₁₆	only Color camera
YUV422Packed	0210001F ₁₆	only Color camera
YUV422_10Packed	80180001 ₁₆	only Color camera
YUV422_12Packed	80180002 ₁₆	only Color camera

(8) PIXEL COLOR FILTE : Kind of color filter equipped the camera

•MODE : Select the mode

Command name : PixelColorFilter (Standard)

Address : A0020018 h

Values (read only) : 0 "BayerRG" When PixelFormat is BayerRG8/10/12 (only KP-FDXXGV)
4 "None" Others

(9) PARTIAL SCAN : Setting of the partial scan

•MODE : Select the mode

Command name : PartialScanMode (Custom)

Address : A0FF0100 h

Values (Factory setting 0) : 0 "Off" Not perform the partial scan.

1 "On" Perform the partial scan and frame rate is increased. *Refer to page 22

*Note: when WIDTH or HEIGHT is set to 16 or less, AGC and AES may not operate.

3. Commands of the image adjustment

(1) BLACKLEVEL : Setting of master black level

•MODE : Select the mode

Command name : BlackLevelMode (Custom)

Address : A0F70000 h

Values (Factory setting 1) : 0 "Off" Not perform the master black adjustment.
1 "On" Perform the master black adjustment according to a set value.

•LEVEL : Adjustment of master black level

Command name : BlackLevelRaw (Standard)

Address : A0070014 h

Values (Factory setting 128): 0 to 255 Black level is reduced at 0 side and raised at 255 side.

(2) SHRAPNESS : Setting of object contour correction

•MODE : Select the mode

Command name : SharpnessMode (Custom)

Address : A0FF0000 h

Values (Factory setting 0) : 0 "Off" Not perform the contour correction.
1 "On" Perform the contour correction according to a set value.

•LEVEL : Adjust sharpness level

Command name : SharpnessRaw (Custom)

Address : A0FF0004 h

Values (Factory setting 0) : 0 to 255 Setting value toward 0 side reduces correction for soft contour and 255 side increase correction for sharper contours.

(3) MANUAL GAIN : Setting of electrical sensitivity

•MODE : Select the mode

Command name : GainMode (Custom)

Address : A0F70004 h

Values (Factory setting 1) : 0 "Off" Not perform the gain adjustment.
1 "On" Perform the gain adjustment according to a set value.

•LEVEL1 : Adjust electrical sensitivity 1

Command name : GainRaw (Standard)

Address : A0070004 h

Values (Factory setting 0) : 0 to 336 : KP-FD500GV/F500G
Adjust the gain level 0 to 12dB in 337 steps at intervals of 0.0358dB.
0 to 503 : Models except the above
Adjust the gain level 0 to 18dB in 504 steps at intervals of 0.0358dB.

•LEVEL2 : Adjust electrical sensitivity 2

Command name : GainAbs (Standard)

Address : A0070008 h

Values (Factory setting 0) : 0.0 to 12.0 : KP-FD500GV/F500GV
Adjust the gain level 0 to 12dB in 121 steps at intervals of about 0.1dB.
0.0 to 18.0 : Models except the above
Adjust the gain level 0 to 18dB in 181 steps at intervals of about 0.1dB.

(4) AUTO GAIN CONTROL : Adjust electrical sensitivity automatically (AGC)

•MODE : Select the mode

Command name : GainAuto (Standard)

Address : A007000C h

Values (Factory setting 0) : 0 "Off" Not perform the auto gain control.
2 "Continuous" The video level is automatically adjusted in the range of 0 to 18dB.
*This command is given to priority more than MANUAL GAIN.

(5) MANUAL WHITE BALANCE : Setting of manual white balance

***for only KP-FD500GV/FD202GV/FD145GV/FD140GV/FD83GV/FD33GV**

•MODE : Select the mode

Command name : BalanceRatioMode (Custom)
Address : A0F70008 h
Values (Factory setting 0) : 0 "Off" Not perform the white balance adjustment.
1 "On" Adjust Red/Blue gain level according to a set value.

•SELECTOR : Switch the adjustment color (RED / BLUE)

Command name : BalanceRatioSelector (Standard)
Address : A0070024 h
Values (Factory setting 1) : 1 "Red" Switch the color adjusted at MODE/LEVEL Red.
3 "Blue" Switch the color adjusted at MODE/LEVEL Blue.

•LEVEL (related to SELECTOR) : Adjust the RED / BLUE gain

Command name : BalanceRatioAbs (Standard)
Address : A0070024 h
Values (Factory setting 128): 0 to 255 Adjust the RED / BLUE gain in 256 steps.

(6) AUTO WHITE BALANCE : Setting of auto white balance

***for only KP-FD500GV/FD202GV/FD145GV/FD140GV/FD83GV/FD33GV**

•MODE : Select the mode

Command name : BalanceWhiteAuto (Standard)
Address : A0070020 h
Values (Factory setting 0) : 0 "Off" Not perform the auto white balance.
1 "Once" Adjust white balance automatically and change the value of BalanceRatioRaw.
2 "Continuous" White balance is adjusted in real time (automatic tracking).

***unusable when RAW data output mode**

***This command is given to priority more than MANUAL WHITE BALANCE.**

(7) ELECTRIC SHUTTER : Setting of electric shutter

•MODE : Select the mode

Command name : ExposureMode (Standard)
Address : A0030040 h
Values (Factory setting 0) : 0 "Off" The normal shutter (frame rate)
1 "Timed" Shutter speed according to setting.
2 "TriggerWidth" It become ONE trigger mode. ***Refer to page 24 "Trigger mode"**

(8) SHUTTER SPEED : Setting of the shutter speed

•MODE : Select the mode

Command name : PresetShutter (Custom)
Address : A0F30010 h
Values (Factory setting 255): 0 "Off" The normal shutter
1 "Preset1"
:
8 "Preset8"

Select the shutter speed from following 8 step presets.

	KP-FD500GV	KP-F500GV	KP-FD202GV KP-F202GV KP-FD145GV KP-F145GV KP-FD140GV KP-F140GV	KP-FD83GV KP-F83GV	KP-FD33GV KP-F33GV
Preset1	1/9s	1/16s	1/30s	1/36s	1/90s
Preset2	1/60s	1/60s	1/60s	1/60s	1/250s
Preset3	1/100s	1/100s	1/100s	1/125s	1/500s
Preset4	1/250s	1/250s	1/250s	1/250s	1/1000s
Preset5	1/1000s	1/1000s	1/1000s	1/1000s	1/2000s

Preset6	1/2000s	1/2000s	1/2000s	1/2000s	1/4000s
Preset7	1/10000s	1/10000s	1/10000s	1/10000s	1/10000s
Preset8	1/50000s	1/50000s	1/50000s	1/50000s	1/50000s

255 "Variable" Set the shutter speed in the range from 1/10000 to 10 second.

• **VARIABLE1 : Setting of the Variable shutter 1**

Command name : ExposureTimeAbs (Standard)

Address : A0030044 h

Values (Factory setting 111111: KP-FD500GV

62500: KP-F500GV

33333: KP-FD202GV/F202GV/FD145GV/F145GV/FD140GV/F140GV

27777: KP-FD83GV/F83GV

11111: KP-FD33GV/F33GV)

: 10 to 1000000 Set the shutter speed in the range from 1/100000 to 10 second in us.

• **VARIABLE2 : Setting of the Variable shutter 2**

Command name : ExposureTimeRaw (Standard)

Address : A0030048 h

Values (Factory setting 1027 = 403₁₆: KP-FD500GV

917 = 395₁₆: KP-F500GV

834 = 342₁₆: KP-FD202GV/F202GV/FD145GV/F145GV/140GV/F140GV

818 = 332₁₆: KP-FD83GV/F83GV

771 = 303₁₆: KP-FD33GV/F33GV)

: 0 to 1536 Set the shutter speed in the range from 10 to 1/100000 second in 1536

steps.

Setting value can be derived as follows. (*ShutterSpeed*: usec)

a) Setting value YYY_{16} obtained from exposure time.

$$X = \text{int}(\log(\text{ShutterSpeed})) - 1$$

$$YY = \text{int}\left(\left(\frac{\text{ShutterSpeed}}{10^{X+1}} - 1\right) \times \frac{100_{16}}{9}\right)$$

b) Exposure time obtained from setting value YYY_{16} .

$$\text{ShutterSpeed} = 10^{X+1} \times \left(1 + \frac{YY_{16}}{100_{16}} \times 9\right) [\mu\text{sec}]$$

Ex. 1 Exposure time = setting value YYY to obtain 1/125sec (= 8000usec)

$$X = \text{int}(\log(8000)) - 1$$

$$= 2$$

$$YY = \text{int}\left(\left(\frac{8000}{10^{2+1}} - 1\right) \times \frac{100_{16}}{9}\right)$$

$$= \text{int}\left(7 \times \frac{100_{16}}{9}\right)$$

$$= C7_{16}$$

$$\therefore YYY = 2C7_{16}$$

Ex. 2 Setting value 25D₁₆ that produces 1/234.22 second exposure time.

$$\text{ShutterSpeed} = 10^{2+1} \times \left(1 + \frac{5D_{16}}{100_{16}} \times 9\right)$$

$$= 4269.53 [\mu\text{sec}]$$

$$= \frac{1}{234.22} [\text{sec}]$$

(9) **AUTO ELECTRIC SHUTTER : Setting of Auto Electric Shutter (AES)**

• **MODE : Select the mode**

Command name : ExposureAuto (Standard)

Address : A003004C h

Values (Factory setting 0) : 0 "Off" AES is set to OFF.

2 "Continuous" Shutter speed is automatically adjusted in the range from normal shutter to

1/100000 second according to light source brightness

***This command is given to priority more than SHUTTER SPEED.**

(10) GAMMA : Setting of gamma correction

•MODE : Select the mode

Command name : GammaMode (Custom)

Address : A0F70010 h

Values (Factory setting 1) : 0 "Off" Not perform the gamma correction ($\gamma=1$).
1 "On" Adjust the detail gamma according to setting value.

•LEVEL : Adjust gamma correction level

Command name : GammaRaw (Custom)

Address : A0F70014 h

Values (Factory setting 0) : 0 to 255 Set gamma curve in 256 steps.

(11) ALC ADJUST : Setting of Auto Level Control of image level (ALC)

•MODE : Select the mode

Command name : ALCAdjustMode (Custom)

Address : A0FF0008 h

Values (Factory setting 0) : 0 "Off" Convergence level when using AES or AGC is default.
1 "On" Convergence level is setting value set at VIDEO LEVEL.

•VIDEO LEVEL : Setting value of video level when AGC or AES is ON

Command name : ALCAdjustRaw (Custom)

Address : A0FF000C h

Values (Factory setting 128) : 0 to 255 Setting value toward 0 side decrease convergence level and 255 side increase convergence level.

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

***for only KP-FD500GV/FD202GV/FD145GV/FD140GV/FD83GV/FD33GV**
***unusable when RAW data output mode**

•MODE : Select the mode

Command name : MaskingMode (Custom)

Address : A0FF001C h

Values (Factory setting 0) : 0 "Off" Not perform masking functions.
1 "On" Perform masking functions.

•SELECTOR : Select the color done masking

Command name : MaskingSelector (Custom)

Address : A0FF0020 h

Values (Factory setting 1) : 1 "Red" Perform masking function about Red.
2 "Green" Perform masking function about Green.
3 "Blue" Perform masking function about Blue.
4 "Cyan" Perform masking function about Cyan.
5 "Magenta" Perform masking function about Magenta.
6 "Yellow" Perform masking function about Yellow.

•SATURATION (related to SELECTOR) : Adjust saturation of the color selected at SELECTOR

Command name : SaturationRaw (Custom)

Address : A0FF0024 h

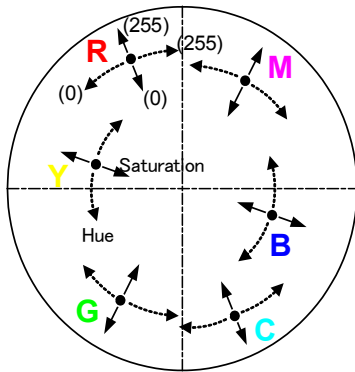
Values (Factory setting 128) : 0 to 255 Adjust the saturation of the color selected at SELECTOR in 256 steps.

• **HUE (related to SELECTOR) : Adjust hue of the color selected at SELECTOR**

Command name : HueRaw (Custom)

Address : A0FF0028 h

Values (Factory setting 128) : 0 to 255



Adjust the hue of the color selected at SELECTOR in 256 steps.

SELECTOR	Toward 0 side ...	Toward 255 side ...
Red	Come near to Yellow	Come near to Magenta
Green	Come near to Cyan	Come near to Yellow
Blue	Come near to Magenta	Come near to Cyan
Cyan	Come near to Blue	Come near to Green
Magenta	Come near to Red	Come near to Blue
Yellow	Come near to Green	Come near to Red

(13) **PAINT BLACK : Setting of paint black (color level of Red, Green and Blue can be separately varied)**

***for only KP-FD500GV/FD202GV/FD145GV/FD140GV/FD83GV/FD33GV**

• **MODE : Select the mode**

Command name : PaintBlackMode (Custom)

Address : A0FF002C h

Values (Factory setting 0) : 0 "Off" Not perform the paint black functions.
1 "On" Perform paint black functions.

• **SELECTOR : Switch the color doing Paint black**

Command name : PaintBlackSelector (Custom)

Address : A0FF0030 h

Values (Factory setting 1) : 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.

• **LEVEL (related to SELECTOR) : Adjust level of color selected at SELECTOR**

Command name : PaintBlackRaw (Custom)

Address : A0FF0034 h

Values (Factory setting 0) : 0 to 255 Adjust the color level of the color selected at SELECTOR in 256 steps.

(14) **KNEE : Setting of knee**

• **MODE : Select the mode**

Command name : KneeMode (Custom)

Address : A0FF0010 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**

Command name : KneePointRaw (Custom)

Address : A0FF0014 h

Values (Factory setting 0) : 0 to 32 Setting value toward 0 side increase start level of knee and 32 side decrease start level of knee.

• **KNEE SLOPE : Adjust knee slope**

Command name : KneeSlopeRaw (Custom)

Address : A0FF0018 h

Values (Factory setting 0) : 0 to 159 Setting value toward 0 side intensify effective of knee and 159 side weaken effective of knee.

4. Commands of Input / Output signal

(1) TRIGGER : Setting of the external trigger *Refer to page 24 "Trigger mode" about details of trigger mode

•SELECTOR : Select the trigger action

Command name : TriggerSelector (Standard)

Address : A0030020 h

Values (Factory setting 1) : 1 "FrameStart" Select this when using normal trigger mode.
 2 "ExposureStart" Select this when using ONE trigger mode and trigger source is software.
 3 "ExposureEnd" Select this when using ONE trigger mode and trigger source is software.
 4 "FrameTransferStart" Select this when using reset control mode.
 5 "VDReset" Select this when using VD reset mode.

•MODE (related to SELECTOR) : Select the mode selected at SELECTOR

Command name : TriggerMode (Standard)

Address : A0030024 h

Values (Factory setting 0) : 0 "Off" Set trigger mode selected at SELECTOR to OFF.
 1 "On" Set trigger mode selected at SELECTOR to ON.

•SOURCE (related to SELECTOR) : Select the trigger source selected at SELECTOR

Command name : TriggerSource (Standard)

Address : A003002C h

Values (Factory setting 0) : 0 "Line1" Input trigger signal from 7 pin of DCIN/SYNC connector (TRIG A).
 2 "Line3" Input trigger signal from 9 pin of DCIN/SYNC connector (TRIG B).
 7 "Software" Use software trigger.

•POLARITY (related to SELECTOR) : Select polarity of trigger signal selected at SELECTOR

Command name : TriggerActivation (Standard)

Address : A0030030 h

Values (Factory setting 1) : 0 "FallingEdge" Falling of input signal is made into trigger signal.
 1 "RisingEdge" Rising of input signal is made into trigger signal.

•SOFTWARE (related to SELECTOR) : Generate the software trigger selected at SELECTOR

*using when SOURCE is Software

Command name : TriggerSoftware (Standard)

Address : A0030028 h

Values (write only) : 1 Whenever 1 is written, the software trigger is generated.

(2) TRIGGER DELAY: Setting of trigger delay

•MODE : Select the mode

Command name : TriggerDelayMode (Custom)

Address : A0F30004 h

Values (Factory setting 0) : 0 "Off" Not perform trigger delay.
 1 "On" Trigger delay is generated for the period set at DELAY TIME.

•DELAY TIME (related to SELECTOR of TRIGGER) : Set the duration of trigger delay selected at SELECTOR

Command name : TriggerDelayRaw (Standard)

Address : A0030038 h

Values (Factory setting 0) : 0 to 4096

Set the following range at intervals.

Camera	Selector of Trigger	Setting range	Intervals
KP-FD500GV	FrameStart	3.73 us to 19.57 ms	Approx. 4.78 us
	FrameTransferStart	108.7 us to 19.68 ms	
KP-F500GV	FrameStart	4.42 us to 11.2 ms	Approx. 2.7 us
	FrameTransferStart	65.2 us to 11.26 ms	
KP-FD202GV /F202GV	FrameStart	4.19 to 6.55 ms	Approx. 1.6 us
	FrameTransferStart	56.36 us to 6.61 ms	
KP-FD145GV /F145GV	FrameStart	3.6 us to 8.35 ms	Approx. 2.04 us
	FrameTransferStart	61.15 us to 8.41 ms	
KP-FD140GV /F140GV	FrameStart	3.5 us to 8.35 ms	Approx. 2.04 us
	FrameTransferStart	61.15 us to 8.41 ms	

KP-FD83GV /F83GV	FrameStart	3.67 us to 13.1 ms	Approx. 3.2 us
	FrameTransferStart	70.2 us to 13.17 ms	
KP-FD33GV /F33GV	FrameStart	3.62 us to 13.1 ms	Approx. 3.2 us
	FrameTransferStart	43.9 us to 13.14 ms	

(3) DIGITAL I/O : Setting of input / output line

•SELECTOR : Select the line

Command name : LineSelector (Standard)

Address : A0040000 h

Values (Factory setting 1) : 0 "Line1" Setting of 7 pin of DCIN/SYNC connector.
1 "Line2" Setting of 10 pin of DCIN/SYNC connector.
2 "Line3" Setting of 9 pin of DCIN/SYNC connector.

•MODE (related to SELECTOR) : Input/output of the line selected at SELECTOR

Command name : LineMode (Standard)

Address : A0040008 h

Values (Read only) : 0 "Input" It means selected line is using for input (when MODE is Line1/Line3).
1 "Output" It means selected line is using for output (when MODE is Line2).

•SOURCE (related to SELECTOR) : Select output signal selected at SELECTOR *using when MODE is Output

Command name : LineSource (Standard)

Address : A0040010 h

Values (Factory setting 1) : 0 "Off" Nothing is output.
1 "ExposureActive" Flash pulse (strobe) is output.
2 "Timer1Active" Adjusted flash pulse is output.
3 "CameraVD" Camera VD signal is output.

•INVERTER (related to SELECTOR) : Invert the input/output signal selected at SELECTOR

Command name : LineInverter (Standard)

Address : A0040004 h

Values (Factory setting 0) : FALSE (0) Input/output signal is not inverted.
TRUE (1) Input/output signal is inverted.

•INVERTER : Invert the input/output signal

Command name : LineInverter (Standard)

Address : A0040014 h

Values (read only) : 2 "TTL" It means selected line is TTL level signal (when MODE is Line2).
5 "OptoCoupled" It means selected line is Opto-Coupled (when MODE is Line1/Line3).

(4) TIMER CONTROL : Control of timer to adjust flash pulse

* Refer to page 34 "Digital output" about details of flash pulse adjustment

•SELECTOR : Select timer

Command name : TimerSelector (Standard)

Address : A0050000 h

Values (Factory setting 1) : 0 "Timer1" Setting of timer 1.

•WIDTH (related to SELECTOR) : Set the duration of timer

Command name : TimerDurationRaw (Standard)

Address : A0050008 h

Values (Factory setting 0) : 0 Timer is stopped at the same time as the end of exposure.
1 to 4096 Set the following range and intervals.

Camera	Setting range	Intervals
KP-FD500GV	from 4.78 us to 19.57 ms	Approx. 4.78 us
KP-F500GV	from 2.7 us to 11.2 ms	Approx. 2.7 us
KP-FD202GV/F202GV	from 1.6 us to 6.55 ms	Approx. 1.6 us
KP-FD145GV/F145GV	from 2.04 us to 8.35 ms	Approx. 2.04 us
KP-FD140GV/F140GV	from 2.04 us to 8.35 ms	Approx. 2.04 us
KP-FD83GV/F83GV	from 3.2 us to 13.1 ms	Approx. 3.2 us
KP-FD33GV/F33GV	from 3.2 us to 13.1 ms	Approx. 3.2 us

• **DELAY TIME (related to SELECTOR): Set the delay of timer**

Command name : TimerDelayRaw (Standard)

Address : A0F40004 h

Values (Factory setting 0) : 0 to 4096

Set the following range and intervals.

Camera	Setting range	Intervals
KP-FD500GV	from 0.32 us to 19.57 ms	Approx. 4.78 us
KP-F500GV	from 0.19 us to 11.2 ms	Approx. 2.7 us
KP-FD202GV/F202GV	from 0.08 us to 6.55 ms	Approx. 1.6 us
KP-FD145GV/F145GV	from 0.14 us to 8.35 ms	Approx. 2.04 us
KP-FD140GV/F140GV	from 0.14 us to 8.35 ms	Approx. 2.04 us
KP-FD83GV/F83GV	from 0.22 us to 13.1 ms	Approx. 3.2 us
KP-FD33GV/F33GV	from 0.22 us to 13.1 ms	Approx. 3.2 us

• **TRIGGER SOURCE (related to SELECTOR) : Select timer trigger source**

Command name : TimerTriggerSource (Standard)

Address : A0050020 h

Values (Factory setting 0) : 0 "Off" Timer does not start

1 "ExposureStart" Timer starts at the same time as the start of exposure.

• **TRIGGER ACTIVATION (related to SELECTOR) : Polarity of timer trigger**

Command name : TimerTriggerActivation (Standard)

Address : A0050024 h

Values (Factory setting 0) : 0 "FallingEdge" Timer starts counting on the falling edge of the selected trigger signal.

1 "RisingEdge" Timer starts counting on the Rising edge of the selected trigger signal.

5. Commands about SAVE/LOAD

This product can save settings of 1. 2. 3. 4. to four memories.

(1) USER SETS : Setting of SAVE/LOAD

•SELECTOR : Select the SAVE/LOAD channel

Command name : UserSetSelector (Standard)
Address : A00A0000 h
Values (Factory setting 0) : 0 "Default" Factory setting
1 "UserSet1" Channel 1
2 "UserSet2" Channel 2
3 "UserSet3" Channel 3
4 "UserSet4" Channel 4

•LOAD (related to SELECTOR of USER SETS) : Load execution

Command name : UserSetLoad (Standard)
Address : A00A0004 h
Values (write only) : 1 When 1 is written, load the memory channel selected at SELECTOR

•SAVE (related to SELECTOR of USER SETS) : Save execution

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

(2) DEFAULT USER SETS : Select the channel to load and make active when the camera is reset

Command name : UserSetSelector (Standard)
Address : A00A000C h
Values (Factory setting 0) : 0 "Default" Factory setting is loaded when camera is reset.
1 "UserSet1" Channel 1 is loaded when the camera is reset.
2 "UserSet2" Channel 2 is loaded when the camera is reset.
3 "UserSet3" Channel 3 is loaded when the camera is reset.
4 "UserSet4" Channel 4 is loaded when the camera is reset.

6. Commands about information of the camera

(1) VENDOR NAME : Vendor name

Command name : DeviceVendorName (Standard)
Address : 00000048 h
Values (read only) : "Hitachi_Kokusai_Electric_Inc"

(2) MODEL NAME : Camera name

Command name : DeviceModelName (Standard)
Address : 00000068 h
Values (read only) : "KP-FD500GV": KP-FD500GV
"KP-F500GV": KP-F500GV
"KP-FD202GV": KP-FD202GV
"KP-F202GV": KP-F202GV
"KP-FD145GV": KP-FD145GV
"KP-F145GV": KP-F145GV
"KP-FD140GV": KP-FD140GV
"KP-F140GV": KP-F140GV
"KP-FD83GV": KP-FD83GV
"KP-F83GV": KP-F83GV
"KP-FD33GV": KP-FD33GV
"KP-F33GV": KP-F33GV

(3) MANUFACTURE INFO : Vendor information

Command name : DeviceManufactureInfo (Standard)
Address : 000000A8 h
Values (read only) : "HitachiKokusaiElectric"

(4) VERSION : Camera version

Command name : DeviceVersion (Standard)
Address : 00000088 h
Values (read only) : "FPGA:vXX.YY Firmware:vXX.YY.ZZ" XX: Major version YY: Minor version ZZ: Sub-minor version
* different according to camera version

(5) FIRMWARE VERSION : Firmware version of the camera

Command name : DeviceFirmwareVersion (Standard)
Address : A0010090 h
Values (read only) : "XXYYZZ" XX: Major version YY: Minor version ZZ: Sub-minor version
* different according to camera version

(6) DEVICE ID : Unique ID of the camera (Serial Number)

Command name : DeviceID (Standard)
Address : 000000D8 h
Values (read only) : "XYYZZZ" X: Shipment year YY: Shipment month ZZZZ: Number
* different according to the camera

(7) USER ID : User programmable ID

Command name : DeviceUserID (Standard)
Address : A00100D0 h
Values : Any null-terminated string (16 Byte)

(8) MONO OR COLOR : Whether the camera is B/W camera or Color camera

Command name : IsMonoCamera_IncFao (Custom)
Address : A0FFFF00 h

Values (read only)

: 1: KP-F500GV/F202GV/F140GV/F140GV/F83GV/F33GV

It means black and white camera

2: KP-FD500GV/FD202GV/FD145GV/FD140GV/FD83GV/FD33GV

It means color camera

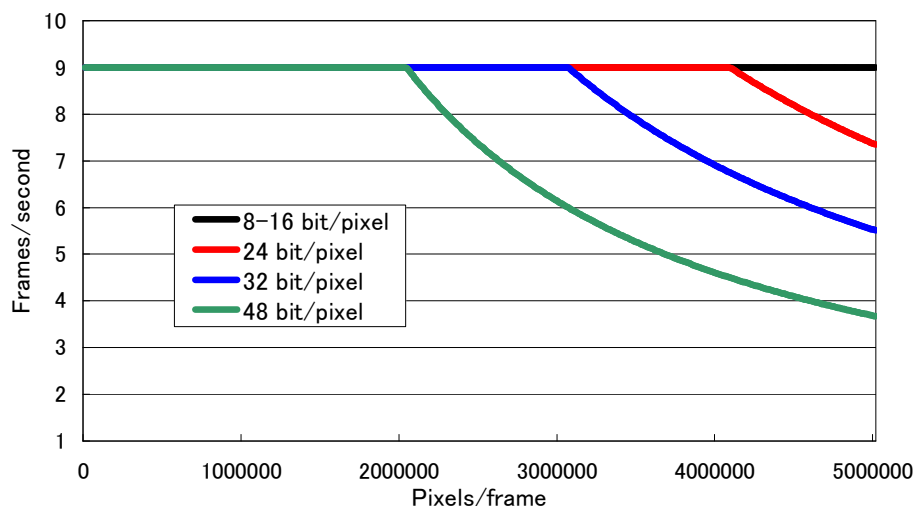
Frame rate

Maximum frame rate of KP-FD500GV/FD202GV/FD140GV/FD83GV/FD33GV/F33GV are decided by data volume per pixel and number of pixel per frame. Data volume per pixel is as follows by set pixel format.

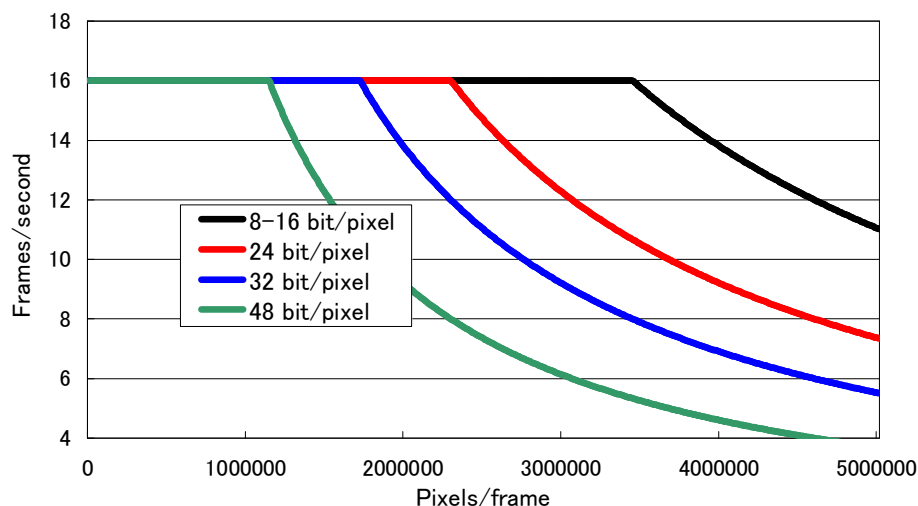
Data / pixel	Pixel format
8bit	RAW 8bit / MONO 8bit
16bit	YUV 8bit / RAW 10bit / RAW 12bit / MONO 10bit / MONO 12bit
24bit	RGB 8bit / YUV 10bit / YUV 12bit
32bit	RGB 10bit
48bit	RGB 12bit

Number of pixel is per frame is obtained by set image width and set image height. Frame rate of each model are as follows.

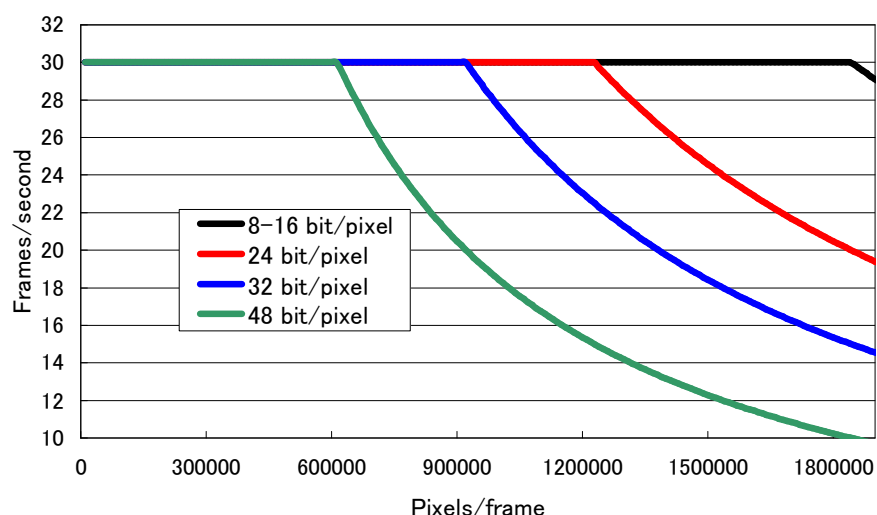
(1) KP-FD500GV



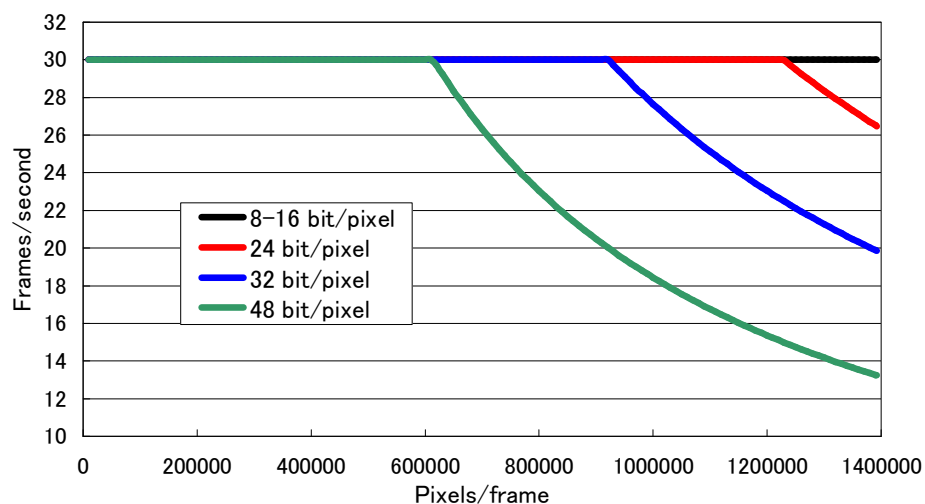
(2) KP-F500GV



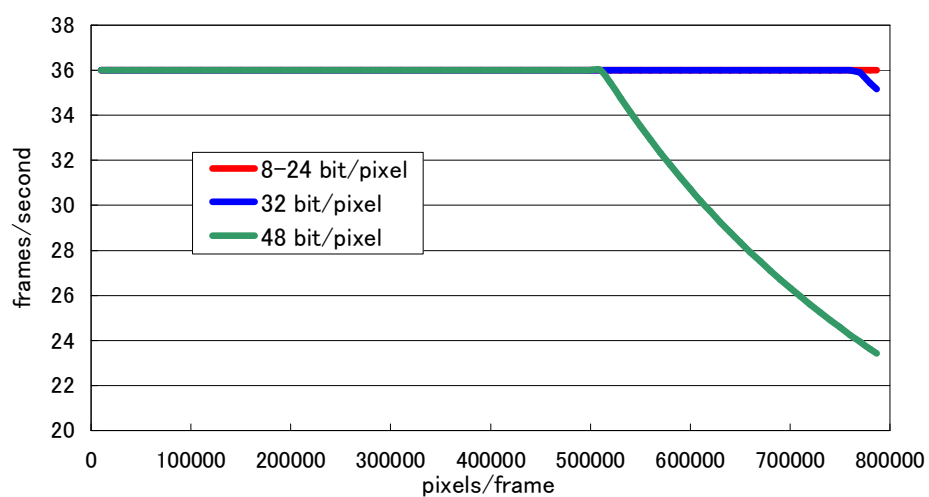
(3) KP-FD202GV/F202GV



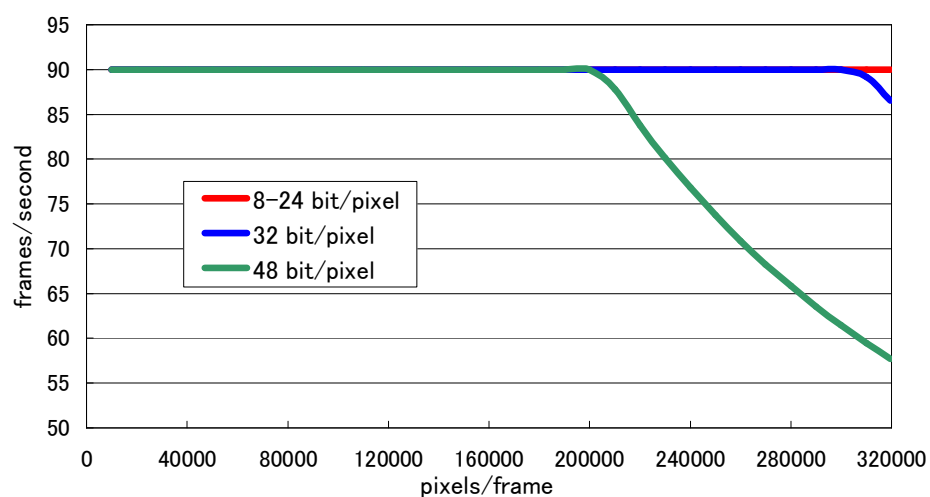
(4) KP-FD145GV/F145GV/FD140GV/F140GV



(5) KP-FD83GV/F83GV



(6) KP-FD33GV/F33GV

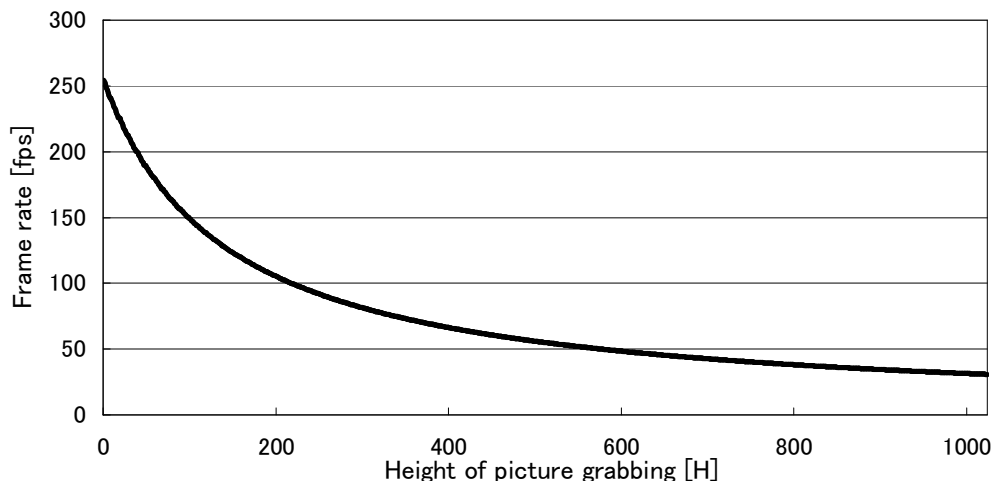


When "PartialScanMode" is "On", number of total line and frame rate can be calculated from following equation using height of grabbing picture.

(1) KP-FD500GV

Total line = $22 + \text{Width} + (1048 - \text{Width}) / 10$... omit the figures after the decimal fractions

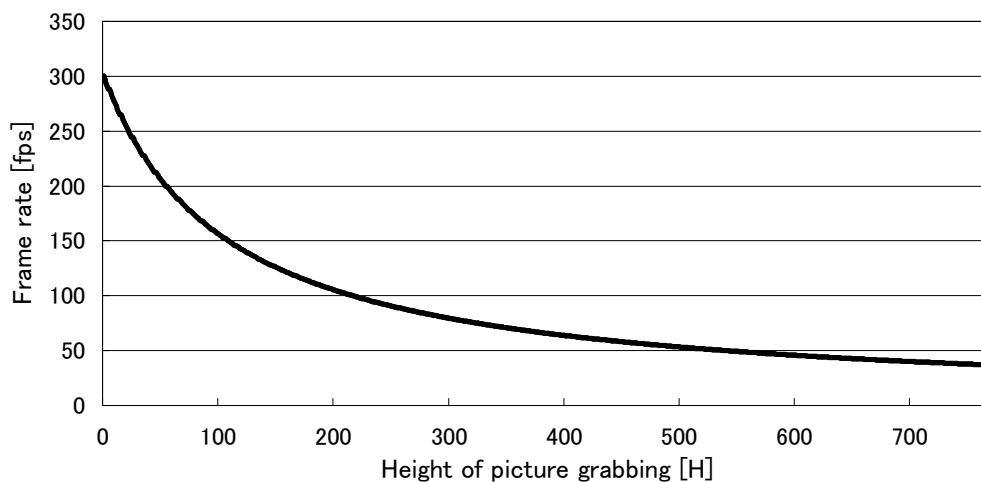
Frame rate = $(57769000 / 1790) / \text{Total line}$



(2) KP-F500GV

Total line = $19 + \text{Width} + (775 - \text{Width}) / 10$... omit the figures after the decimal fractions

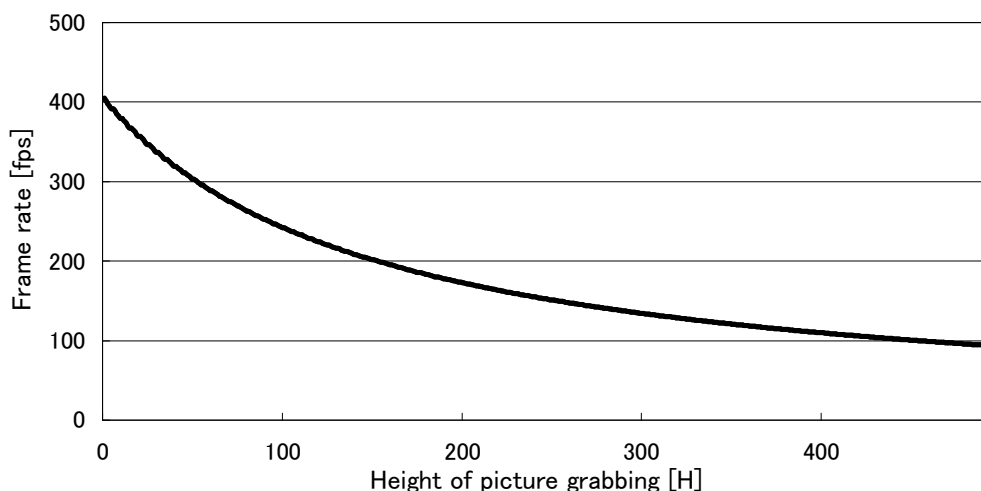
Frame rate = $(37000000 / 1270) / \text{Total line2}$



(3) KP-FD202GV/F202GV

Total line = $17 + \text{Width} + (510 - \text{Width}) / 5$... omit the figures after the decimal fractions

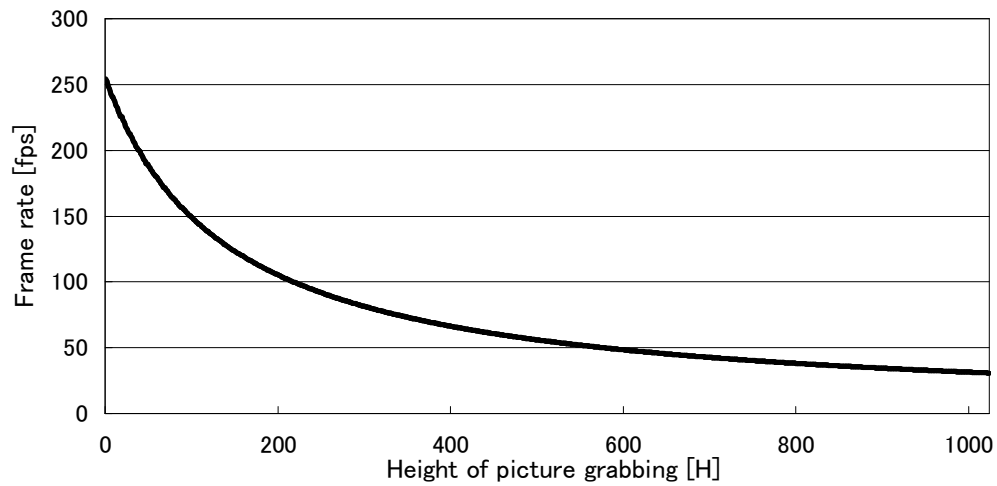
Frame rate = $(37000000 / 768) / \text{Total line}$



(4) KP-FD140GV/F140GV

Total line = 22 + Width + (1048 - Width) / 10 ... omit the figures after the decimal fractions

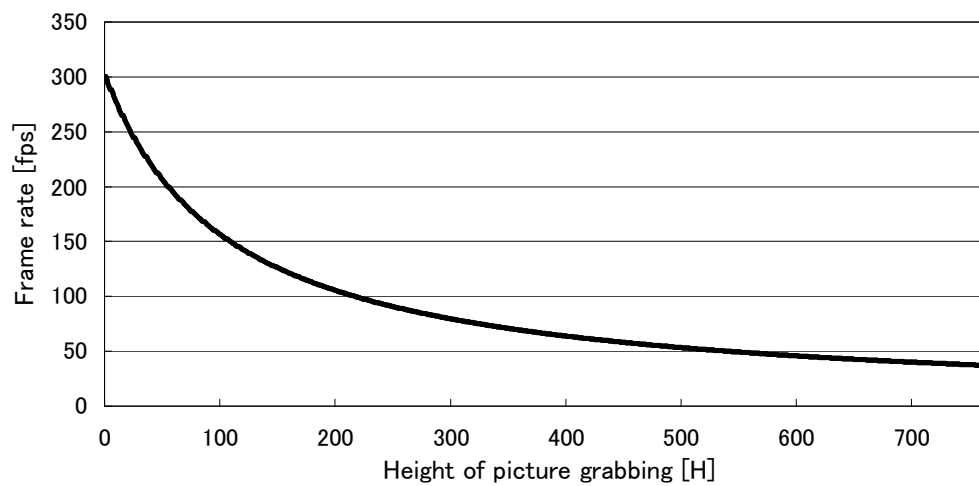
Frame rate = (57769000 / 1790) / Total line



(5) KP-FD83GV/F83GV

Total line = 19 + Width + (775 - Width) / 10 ... omit the figures after the decimal fractions

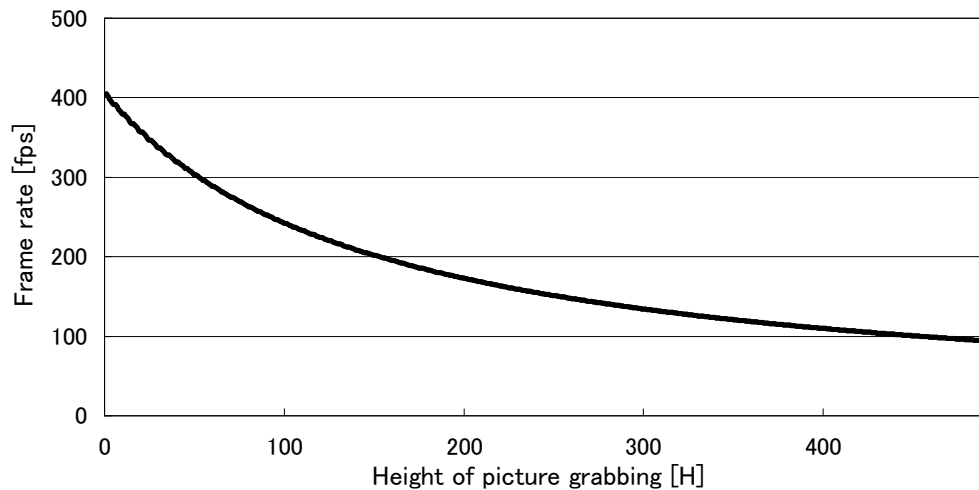
Frame rate = (37000000 / 1270) / Total line



(6) KP-FD33GV/F33GV

Total line = 17 + Width + (510 - Width) / 5 ... omit the figures after the decimal fractions

Frame rate = (37000000 / 768) / Total line



Trigger mode

Trigger mode setting of KP-FD500GV/F500GV/FD202GV/F202GV/FD145GV/F145GV/FD140GV/F140GV/FD83GV/F83GV/FD33GV/F33GV 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.

- (1) TriggerSelector → "VDReset"
- (2) TriggerMode → "Off"
- (3) TriggerSelector → "FrameStart"
- (4) TriggerMode → "On"
- (5) TriggerSource → "Line1" / "Line3" / "Software"
- (6) TriggerActivation → "RisingEdge" / "FallingEdge"
- (7) ExposureMode → "Off" / "Timed"

2. ONE Trigger

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

(A) Hardware trigger

- (1) TriggerSelector → "VDreset"
- (2) TriggerMode → "Off"
- (3) TriggerSelector → "FrameStart"
- (4) TriggerMode → "On"
- (5) TriggerSource → "Line1" / "Line3"
- (6) ExposureMode → "TriggerWidth"

(B) Software trigger

- (1) TriggerSelector → "VDreset"
- (2) TriggerMode → "Off"
- (3) TriggerSelector → "FameStart"
- (4) TriggerMode → "On"
- (5) TriggerSelector → "ExposureStart"
- (6) TriggerMode → "On"
- (7) TriggerSource → "Software"
- (8) TriggerSelector → "ExposureEnd"
- (9) TriggerMode → "On"
- (10) TriggerSource → "Software"
- (11) ExposureMode → "TriggerWidth"

When actually operating, repeat (a) and (b) alternately.

(a) Exposure start

TriggerSelector → "ExposureStart"

TriggerSoftware → write "1"

(b) Exposure end

TriggerSelector → "ExposureEnd"

TriggerSoftware → write "1"

3. Reset control

The readout timing can be set arbitrary set by input the trigger signal (readout pulse) different from the exposure beginning when Fixed shutter mode or ONE trigger mode. Execute following procedure in addition Fixed shutter/ONE trigger settings.

- (1) TriggerSelector → "FrameTransferStart"
- (2) TriggerMode → "On"
- (3) TriggerSource → "Line1" / "Line3" / "Software" ... (*1)
- (4) TriggerActivation → "RisingEdge" / "FallingEdge"

(*1) Please note the value of TriggerSource when using reset control function

Available combination of TriggerSource

		TriggerSource (TriggerSelector: FrameTransferStrat)		
		Line1	Line3	Software
TriggerSource (TriggerSelector: FrameStart)	Line1	×	○	○
	Line3	○	×	○
	Software	○	○	×

4. VD sync mode

Internal VD is reset when input external VD signal falls and the camera synchronizes to external VD.

Exposure time is setting shutter speed.

- (1) TriggerSelector → "VDReset"
- (2) TriggerMode → "On"
- (3) TriggerSource → "Line1" / "Line3"
- (4) TriggerActivation → "FallinEdge" / "RisingEdge"

4. Others

Following table describe camera behavior according to combination of value of ExposureMode and TriggerMode.

Command						Actual behavior
ExposureMode	TriggerMode					
	FrameStart	FrameTransferStart	ExposureStart	ExposureEnd	VDReset	
Off	Off	Off	Off	Off	Off	Normal mode (Normal shutter)
	On	Off	Off	Off	Off	Fixed shutter mode
	Off	On	Off	Off	Off	Normal mode (Normal shutter)
	On	On	Off	Off	Off	Fixed shutter mode & Reset control
	Off	Off	On	Off	Off	Normal mode (Normal shutter)
	On	Off	On	Off	Off	Fixed shutter mode
	Off	On	On	Off	Off	Normal mode (Normal shutter)
	On	On	On	Off	Off	Fixed shutter mode & Reset control
	Off	Off	Off	On	Off	Normal mode (Normal shutter)
	On	Off	Off	On	Off	Fixed shutter mode
	Off	On	Off	On	Off	Normal mode (Normal shutter)
	On	On	Off	On	Off	Fixed shutter mode & Reset control
	Off	Off	On	On	Off	Normal mode (Normal shutter)
	On	Off	On	On	Off	Fixed shutter mode
	Off	On	On	On	Off	Normal mode (Normal shutter)
	On	On	On	On	Off	Fixed shutter mode & Reset control
	Any					On
Timed	Off	Off	Off	Off	Off	Normal mode (Electric shutter)
	On	Off	Off	Off	Off	Fixed shutter mode
	Off	On	Off	Off	Off	Normal mode (Electric shutter)
	On	On	Off	Off	Off	Fixed shutter mode & Reset control
	Off	Off	On	Off	Off	Normal mode (Electric shutter)
	On	Off	On	Off	Off	Fixed shutter mode
	Off	On	On	Off	Off	Normal mode (Electric shutter)
	On	On	On	Off	Off	Fixed shutter mode & Reset control
	Off	Off	Off	On	Off	Normal mode (Electric shutter)
	On	Off	Off	On	Off	Fixed shutter mode
	Off	On	Off	On	Off	Normal mode (Electric shutter)
	On	On	Off	On	Off	Fixed shutter mode & Reset control
	Off	Off	On	On	Off	Normal mode (Electric shutter)
	On	Off	On	On	Off	Fixed shutter mode
	Off	On	On	On	Off	Normal mode (Electric shutter)
	On	On	On	On	Off	Fixed shutter mode & Reset control
	Any					On
TriggerWidth	Off	Off	Off	Off	Off	Normal mode (Normal shutter)
	On	Off	Off	Off	Off	ONE trigger mode (hardware trigger)
	Off	On	Off	Off	Off	Normal mode (Normal shutter)
	On	On	Off	Off	Off	ONE trigger mode (hardware trigger) & Reset control
	Off	Off	On	Off	Off	Normal mode (Normal shutter)
	On	Off	On	Off	Off	ONE trigger mode (hardware trigger)
	Off	On	On	Off	Off	Normal mode (Normal shutter)
	On	On	On	Off	Off	ONE trigger mode (hardware trigger) & Reset control
	Off	Off	Off	On	Off	Normal mode (Normal shutter)
	On	Off	Off	On	Off	ONE trigger mode (hardware trigger)
	Off	On	Off	On	Off	Normal mode (Normal shutter)
	On	On	Off	On	Off	ONE trigger mode (hardware trigger) & Reset control
	Off	Off	On	On	Off	ONE trigger mode (software trigger)
	On	Off	On	On	Off	ONE trigger mode (hardware trigger)
	Off	On	On	On	Off	ONE trigger mode (software trigger) & Reset control
	On	On	On	On	Off	ONE trigger mode (hardware trigger) & Reset control
	Any					On

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,

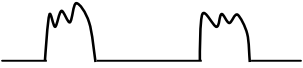
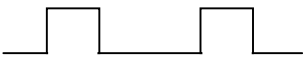
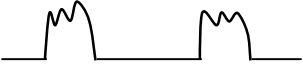
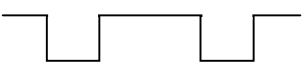
(A) When output flash pulse at the same time as exposure time and without delay.

- (1) LineSelector → "Line2"
- (2) LineSource → "ExposureActive" ... (*1)
- (3) LineInverter → False / True ... (*1)

(B) When adjust delay or duration of flash pulse

- (1) LineSelector → "Line2"
- (2) LineSource → "Timer1Active" ... (*1)
- (3) TimerSelector → "Timer1"
- (4) TimerDurationRaw → 1 to 8190 ... (*2)
- (5) TimerDelayRaw → 0 to 8190
- (6) TimerTriggerSource → "ExposureStart"
- (7) TimerTriggerActivation → "RisingEdge" / "FallingEdge" ... (*1)

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

LineSource	TimerTriggerActivation	LineInverter	Output flash signal
ExposureActive	–	False	Exposure 
Timer1Active	RisingEdge		Flash out 
	FallingEdge	True	
ExposureActive	–	True	Exposure 
Timer1Active	RisingEdge		Flash out 
	FallingEdge	False	



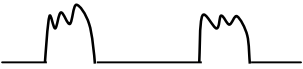
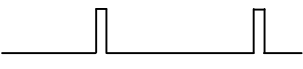
(*2) When set to 0 → duration of flash pulse is equal to actual exposure time

2. VD out

This camera can output camera VD. It is used when synchronizing other camera.

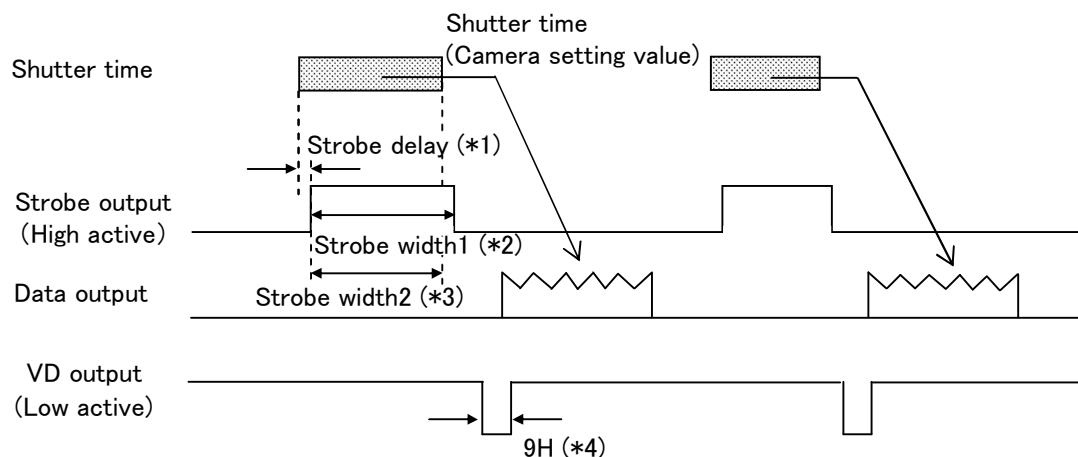
- (1) LineSelector → "Line2"
- (2) LineSource → "VD"
- (3) LineInverter → False / True ... (*1)

(*1) Following table shows polarity of VD signal

LineInverter	VD signal
False	Exposure 
	VD out 
True	Exposure 
	VD out 

Trigger operation and timing chart

1. Normal mode



(*1)

KP-FD500GV	0.32us to 19.57ms	Approx. 4.78us/step
KP-F500GV	0.19us to 11.20ms	Approx. 2.7us/step
KP-FD202GV/F202GV	0.08us to 6.55ms	Approx. 1.6us/step
KP-FD145GV/F145GV	0.14us to 8.35ms	Approx. 2.04us/step
KP-FD140GV/F140GV	0.14us to 8.35ms	Approx. 2.04us/step
KP-FD83GV/F83GV	0.22us to 13.1ms	Approx. 3.2us/step
KP-FD33GV/F33GV	0.22us to 13.1ms	Approx. 3.2us/step

(*2)

KP-FD500GV	4.78us to 19.57ms	Approx. 4.78us/step
KP-F500GV	2.7us to 11.20ms	Approx. 2.7us/step
KP-FD202GV/F202GV	1.6us to 6.55ms	Approx. 1.6us/step
KP-FD145GV/F145GV	2.04us to 8.35ms	Approx. 2.04us/step
KP-FD140GV/F140GV	2.04us to 8.35ms	Approx. 2.04us/step
KP-FD83GV/F83GV	3.2us to 13.1ms	Approx. 3.2us/step
KP-FD33GV/F33GV	3.2us to 13.1ms	Approx. 3.2us/step

(*3)

All model Shutter Time – Strobe delay (when duration time is set to 0)

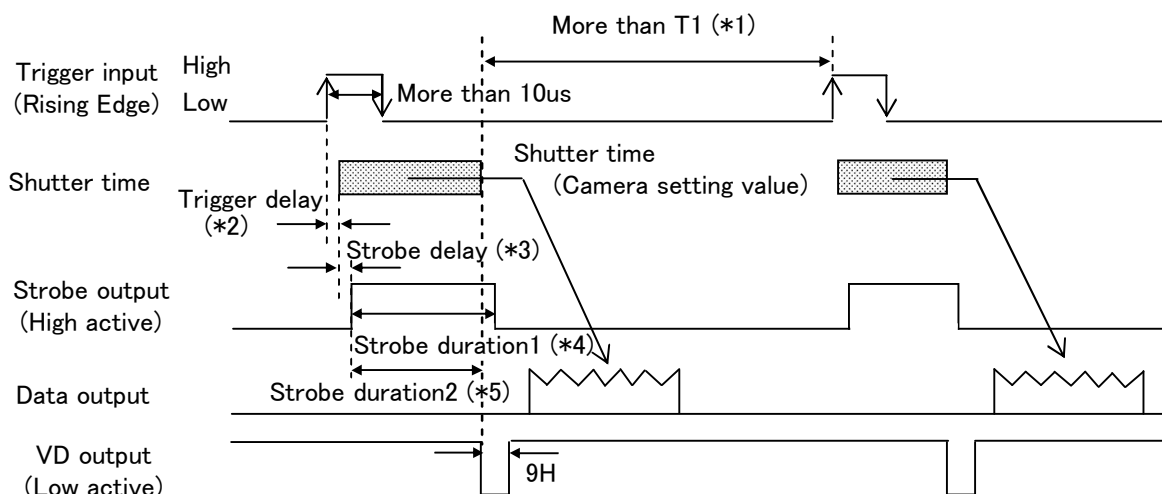
(*4)

KP-FD500GV	1H = Approx. 52.89us
KP-F500GV	1H = Approx. 30.46us
KP-FD202GV/F202GV	1H = Approx. 26.71us
KP-FD145GV/F145GV	1H = Approx. 31.17us
KP-FD140GV/F140GV	1H = Approx. 31.17us
KP-FD83GV	1H = Approx. 34.61us
KP-F83GV	1H = Approx. 34.56us
KP-FD33GV/F33GV	1H = Approx. 21.06us

2. Fixed shutter mode

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. The strobe signal start/end can be set to shutter time. Trigger signal input during exposure is disabled.

Even if the cycle of the input trigger signal is shorter than frame rate, frame rate does not increase. Input trigger signal is not effective from exposure start to data output.



(*1)

All model

$$T1 = 1 / \text{Self frame rate [second]}$$

(*2)

KP-FD500GV

3.73us to 19.57ms Approx. 4.78us/step

KP-F500GV

4.42us to 11.20ms Approx. 2.7us/step

KP-FD202GV/F202GV

4.19us to 65.52ms Approx. 1.6us/step

KP-FD145GV/F145GV

3.6us to 8.35ms Approx. 2.04us/step

KP-FD140GV/F140GV

3.5us to 8.35ms Approx. 2.04us/step

KP-FD83GV/F83GV

3.67us to 13.1ms Approx. 3.2us/step

KP-FD33GV/F33GV

3.62us to 13.1ms Approx. 3.2us/step

(*3)

KP-FD500GV

0.24us to 19.57ms Approx. 4.78us/step

KP-F500GV

0.14us to 11.20ms Approx. 2.7us/step

KP-FD202GV/F202GV

0.06us to 65.52ms Approx. 1.6us/step

KP-FD145GV/F145GV

0.1us to 8.35ms Approx. 2.04us/step

KP-FD140GV/F140GV

0.1us to 8.35ms Approx. 2.04us/step

KP-FD83GV/F83GV

0.16us to 13.1ms Approx. 3.2us/step

KP-FD33GV/F33GV

0.16us to 13.1ms Approx. 3.2us/step

(*4)

KP-FD500GV

4.78us to 19.57ms Approx. 4.78us/step

KP-F500GV

2.7us to 11.20ms Approx. 2.7us/step

KP-FD202GV/F202GV

1.6us to 65.52ms Approx. 1.6us/step

KP-FD145GV/F145GV

2.04us to 8.35ms Approx. 2.04us/step

KP-FD140GV/F140GV

2.04us to 8.35ms Approx. 2.04us/step

KP-FD83GV/F83GV

3.2us to 13.1ms Approx. 3.2us/step

KP-FD33GV/F33GV

3.2us to 13.1ms Approx. 3.2us/step

(*5)

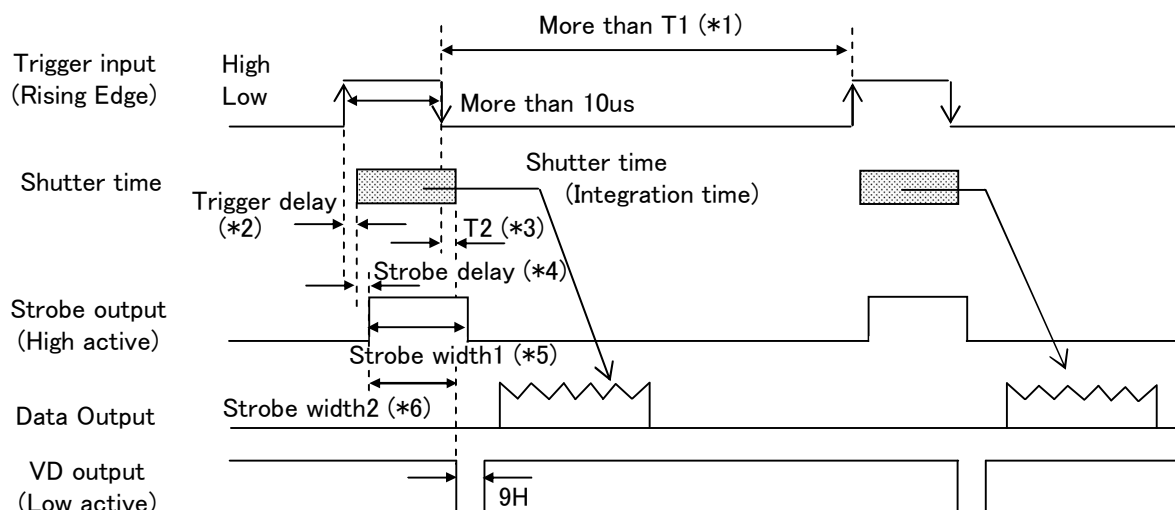
All model

Shutter Time - Strobe delay (when duration time is set to 0)

3. ONE trigger mode

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.

Even if the cycle of the input trigger signal is shorter than frame rate, frame rate does not increase. Input trigger signal is not effective from exposure start to data output.



(*1)

All model 1 / Self frame rate [second]

(*2)

KP-FD500GV	3.97us to 19.57ms	Approx. 4.78us/step
KP-F500GV	4.23us to 11.20ms	Approx. 2.7us/step
KP-FD202GV/F202GV	3.89us to 65.52ms	Approx. 1.6us/step
KP-FD145GV/F145GV	3.99us to 8.35ms	Approx. 2.04us/step
KP-FD140GV/F140GV	3.74us to 8.35ms	Approx. 2.04us/step
KP-FD83GV/F83GV	3.78us to 13.1ms	Approx. 3.2us/step
KP-FD33GV/F33GV	3.67us to 13.1ms	Approx. 3.2us/step

(*3)

KP-FD500GV	56.0us + Trigger delay
KP-F500GV	30.6us + Trigger delay
KP-FD202GV/F202GV	27.4us + Trigger delay
KP-FD145GV/F145GV	29.3us + Trigger delay
KP-FD140GV/F140GV	29.8us + Trigger delay
KP-FD83GV/F83GV	38.4us + Trigger delay
KP-FD33GV/F33GV	30.13us + Trigger delay

(*4)

KP-FD500GV	0.24us to 19.57ms	Approx. 4.78us/step
KP-F500GV	0.14us to 11.20ms	Approx. 2.7us/step
KP-FD202GV/F202GV	0.06us to 65.52ms	Approx. 1.6us/step
KP-FD145GV/F145GV	0.1us to 8.35ms	Approx. 2.04us/step
KP-FD140GV/F140GV	0.1us to 8.35ms	Approx. 2.04us/step
KP-FD83GV/F83GV	0.16us to 13.1ms	Approx. 3.2us/step
KP-FD33GV/F33GV	0.16us to 13.1ms	Approx. 3.2us/step

(*5)

KP-FD500GV	4.78us to 19.57ms	Approx. 4.78us/step
KP-F500GV	2.7us to 11.20ms	Approx. 2.7us/step
KP-FD202GV/F202GV	1.6us to 65.52ms	Approx. 1.6us/step
KP-FD145GV/F145GV	2.04us to 8.35ms	Approx. 2.04us/step
KP-FD140GV/F140GV	2.04us to 8.35ms	Approx. 2.04us/step
KP-FD83GV/F83GV	3.2us to 13.1ms	Approx. 3.2us/step
KP-FD33GV/F33GV	3.2us to 13.1ms	Approx. 3.2us/step

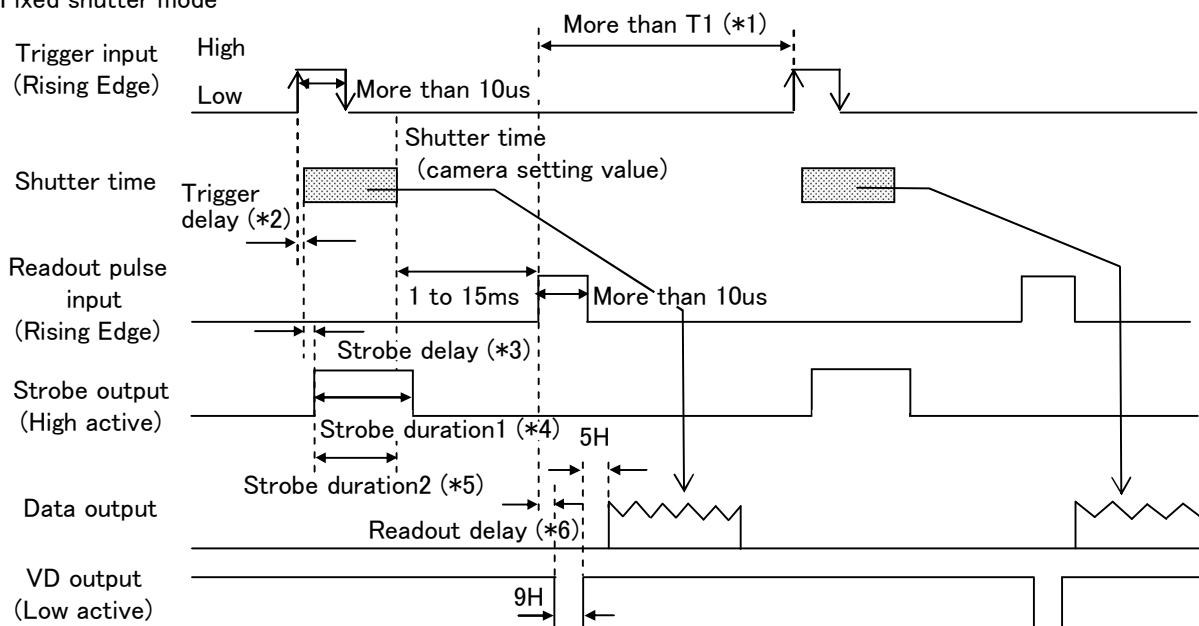
(*6)

All model Shutter Time – Strobe delay (when duration time is set to 0)

4. Reset control mode

When the external trigger signal is HIGH ACTIVE, exposure begins at the rising edge of the trigger signal and ends at the falling edge. At the Readout pulse falling edge, the internal VD signal is reset and the video data are transmitted.

(1) When Fixed shutter mode



(*1)

All model 1 / Self frame rate [second]

(*2)

KP-FD500GV	3.73us to 19.57ms	Approx. 4.78us/step
KP-F500GV	4.42us to 11.20ms	Approx. 2.7us/step
KP-FD202GV/F202GV	4.19us to 6.55ms	Approx. 1.6us/step
KP-FD145GV/F145GV	3.6us to 8.35ms	Approx. 2.04us/step
KP-FD140GV/F140GV	3.5us to 8.35ms	Approx. 2.04us/step
KP-FD83GV/F83GV	3.67us to 13.1ms	Approx. 3.2us/step
KP-FD33GV/F33GV	3.62us to 13.1ms	Approx. 3.2us/step

(*3)

KP-FD500GV	0.24us to 19.57ms	Approx. 4.78us/step
KP-F500GV	0.14us to 11.20ms	Approx. 2.7us/step
KP-FD202GV/F202GV	0.06us to 6.55ms	Approx. 1.6us/step
KP-FD145GV/F145GV	0.1us to 8.35ms	Approx. 2.04us/step
KP-FD140GV/F140GV	0.1us to 8.35ms	Approx. 2.04us/step
KP-FD83GV/F83GV	0.16us to 13.1ms	Approx. 3.2us/step
KP-FD33GV/F33GV	0.16us to 13.1ms	Approx. 3.2us/step

(*4)

KP-FD500GV	4.78us to 19.57ms	Approx. 4.78us/step
KP-F500GV	2.7us to 11.20ms	Approx. 2.7us/step
KP-FD202GV/F202GV	1.6us to 6.55ms	Approx. 1.6us/step
KP-FD145GV/F145GV	2.04us to 8.35ms	Approx. 2.04us/step
KP-FD140GV/F140GV	2.04us to 8.35ms	Approx. 2.04us/step
KP-FD83GV/F83GV	3.2us to 13.1ms	Approx. 3.2us/step
KP-FD33GV/F33GV	3.2us to 13.1ms	Approx. 3.2us/step

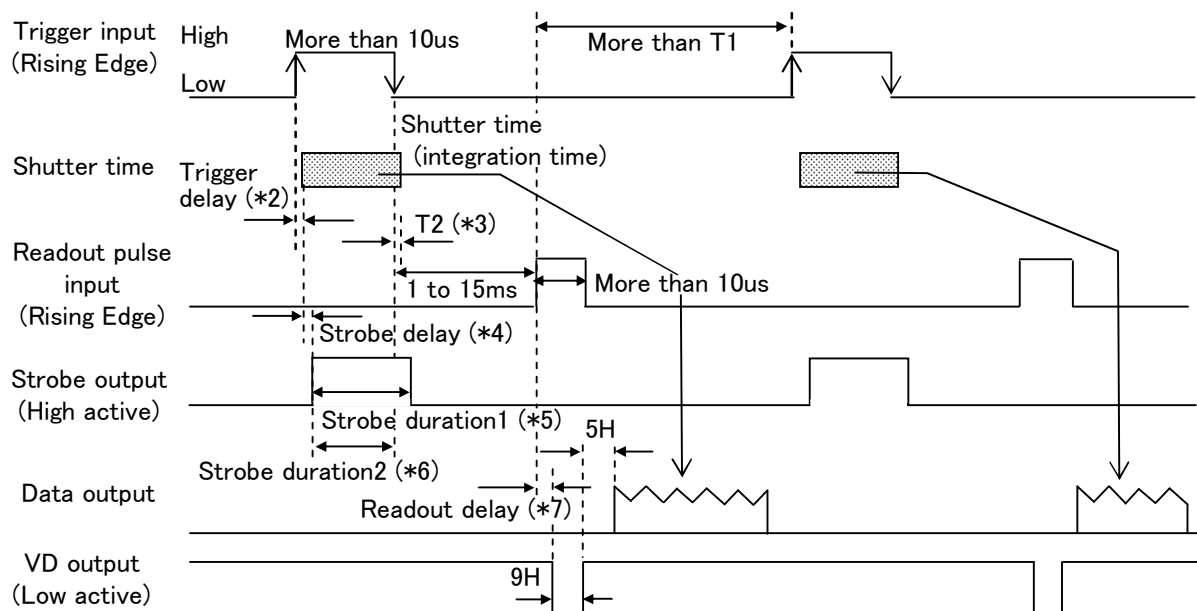
(*5)

KP-FD500GV	108.7us to 19.68ms	Approx. 4.78us/step
KP-F500GV	65.2us to 11.26ms	Approx. 2.7us/step
KP-FD202GV/F202GV	56.36us to 6.61ms	Approx. 1.6us/step
KP-FD145GV/F145GV	61.15us to 8.41ms	Approx. 2.04us/step
KP-FD140GV/F140GV	61.15us to 8.41ms	Approx. 2.04us/step
KP-FD83GV/F83GV	70.2us to 13.17ms	Approx. 3.2us/step
KP-FD33GV/F33GV	43.9us to 13.14ms	Approx. 3.2us/step

(*6)

All model Shutter Time - Strobe delay (when duration time is set to 0)

(2) When ONE trigger mode



(*1)

All model $T1 = 1 / \text{Self frame rate [second]}$

(*2)

KP-FD500GV	4.78us to 19.57ms	Approx. 4.78us/step
KP-F500GV	2.7us to 11.20ms	Approx. 2.7us/step
KP-FD202GV/F202GV	1.6us to 6.55ms	Approx. 1.6us/step
KP-FD145GV/F145GV	2.04us to 8.35ms	Approx. 2.04us/step
KP-FD140GV/F140GV	2.04us to 8.35ms	Approx. 2.04us/step
KP-FD83GV/F83GV	3.2us to 13.1ms	Approx. 3.2us/step
KP-FD33GV/F33GV	3.2us to 13.1ms	Approx. 3.2us/step

(*3)

KP-FD500GV	56.0us + Trigger delay
KP-F500GV	30.6us + Trigger delay
KP-FD202GV/F202GV	27.4us + Trigger delay
KP-FD145GV/F145GV	29.3us + Trigger delay
KP-FD140GV/F140GV	29.8us + Trigger delay
KP-FD83GV/F83GV	38.4us + Trigger delay
KP-FD33GV/F33GV	30.13us + Trigger delay

(*4)

KP-FD500GV	0.24us to 19.57ms	Approx. 4.78us/step
KP-F500GV	0.14us to 11.20ms	Approx. 2.7us/step
KP-FD202GV/F202GV	0.06us to 6.55ms	Approx. 1.6us/step
KP-FD145GV/F145GV	0.1us to 8.35ms	Approx. 2.04us/step
KP-FD140GV/F140GV	0.1us to 8.35ms	Approx. 2.04us/step
KP-FD83GV/F83GV	0.16us to 13.1ms	Approx. 3.2us/step
KP-FD33GV/F33GV	0.16us to 13.1ms	Approx. 3.2us/step

(*5)

KP-FD500GV	4.78us to 19.57ms	Approx. 4.78us/step
KP-F500GV	2.7us to 11.20ms	Approx. 2.7us/step
KP-FD202GV/F202GV	1.6us to 6.55ms	Approx. 1.6us/step
KP-FD145GV/F145GV	2.04us to 8.35ms	Approx. 2.04us/step
KP-FD140GV/F140GV	2.04us to 8.35ms	Approx. 2.04us/step
KP-FD83GV/F83GV	3.2us to 13.1ms	Approx. 3.2us/step
KP-FD33GV/F33GV	3.2us to 13.1ms	Approx. 3.2us/step

(*6)

All model Shutter Time – Strobe delay (when duration time is set to 0)

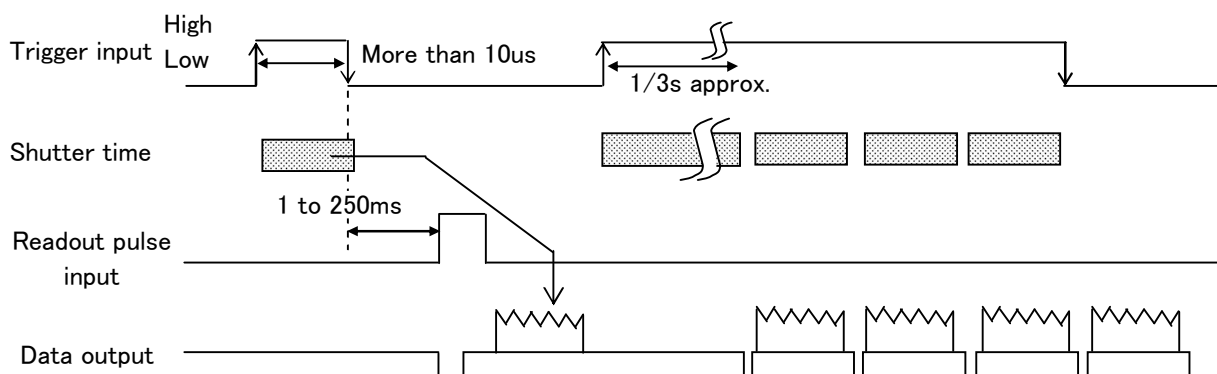
(*7)

KP-FD500GV	109.2us to 19.68ms	Approx. 4.78us/step
KP-F500GV	65.6us to 11.26ms	Approx. 2.7us/step
KP-FD202GV/F202GV	57.72us to 6.61ms	Approx. 1.6us/step
KP-FD145GV/F145GV	66.39us to 8.41ms	Approx. 2.04us/step
KP-FD140GV/F140GV	66.14us to 8.41ms	Approx. 2.04us/step
KP-FD83GV/F83GV	73.06us to 13.17ms	Approx. 3.2us/step
KP-FD33GV/F33GV	45.8us to 13.14ms	Approx. 3.2us/step

Note: Special function of reset control trigger

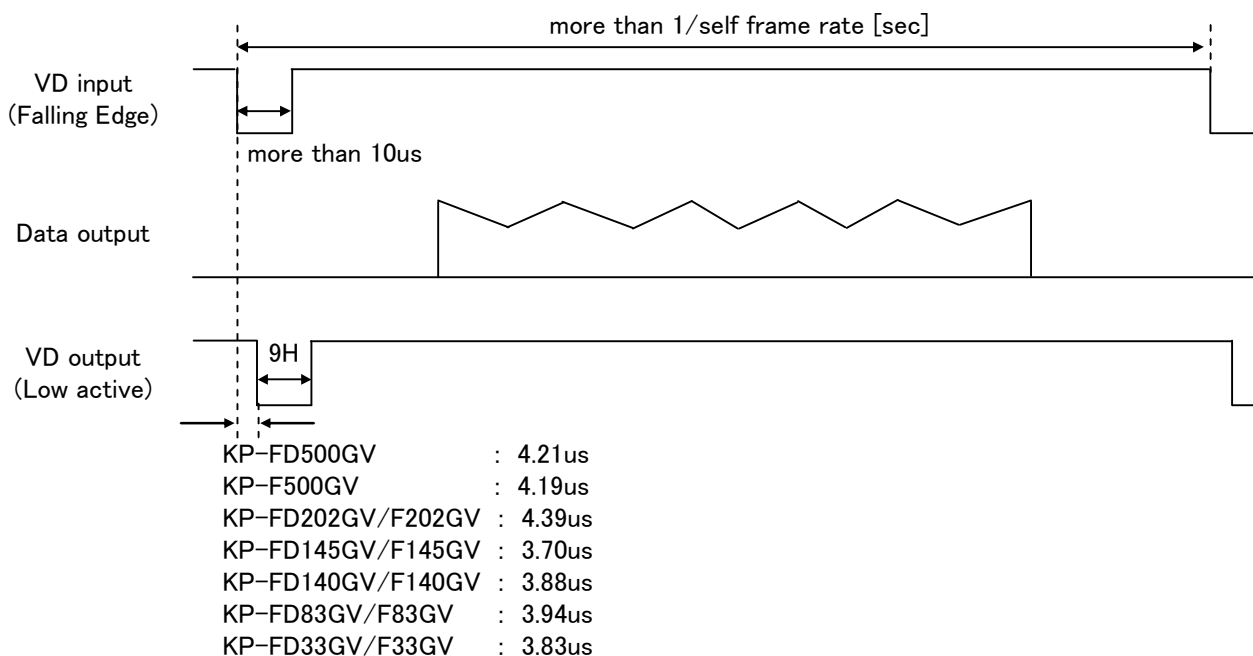
The camera shifts to the output of a normal mode (continuous output) when Trigger input signal passes about 1/3 seconds in the state of High. (The image is output by inputting the Trigger at the VD cycle for this period.)

It returns to the Reset control mode if Trigger input signal becomes Low. However, after becoming Low Trigger input signal, the period of 50 ms becomes a Readout pulse signal input prohibition period.



4. VD reset

When external VD pulse is inputted, internal VD is reset. Exposure time is established shutter speed.



NOTE: If the external VD of cycle which does not match the camera operation mode is input, shutter time has an error.

Input / Output signal

1. Input signal

The level of the trigger signal input to KP-FD500GV/F500GV/FD202GV/F202GV/FD145GV/F145GV/FD140GV/F140GV/FD83GV/F83GV/FD33GV/F33GV is as follows.

High level	: +5.0 to +24V
Low level	: 0 to +0.3V
Threshold (Low → High)	: 3.7V +/- 0.5V
Threshold (High → Low)	: 3.3V +/- 0.5V

2. Output signal

The level of VD/Flash pulse signal output from KP-FD500GV/F500GV/FD202GV/F202GV/FD145GV/F145GV/FD140GV/F140GV/FD83GV/F83GV/FD33GV/F33GV is as follows.

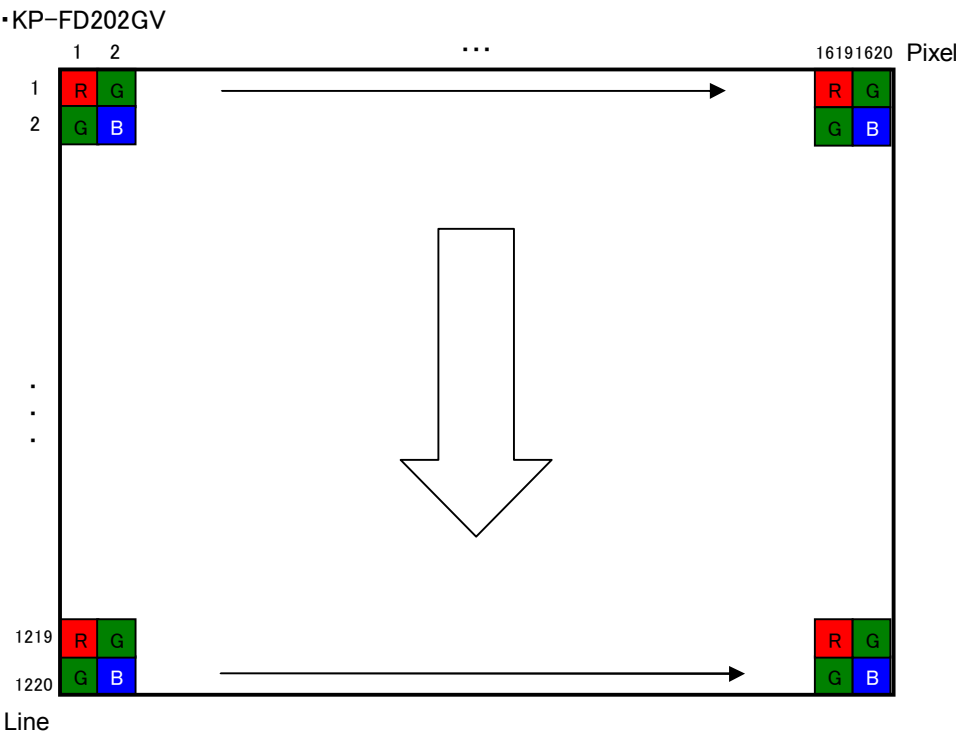
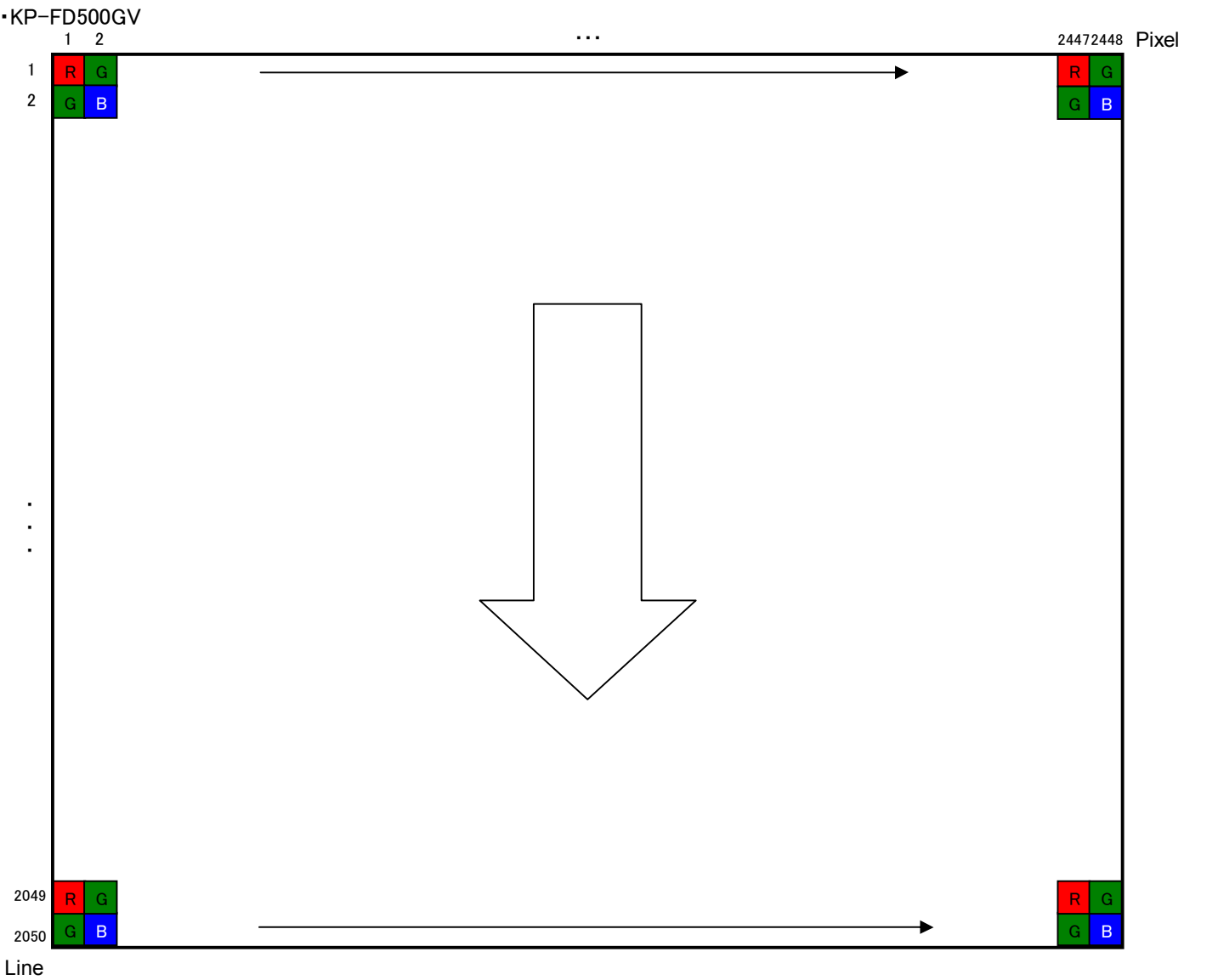
High level	: +5V
Low level	: 0V

Photo coupler delay

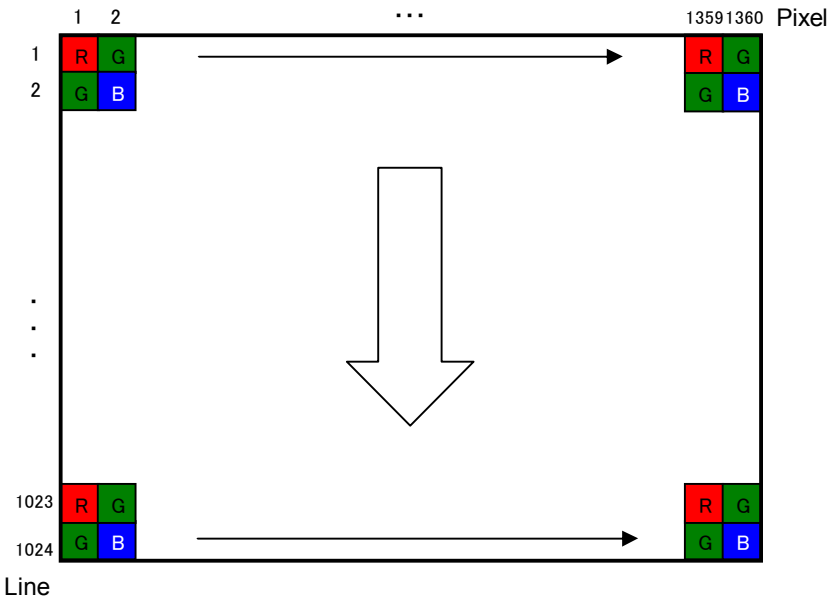
Photo coupler delay period of KP-FD500GV/F500GV/FD202GV/F202GV/FD145GV/F145GV/FD140GV/F140GV/FD83GV/F83GV/FD33GV/F33GV is different depending on the input voltage.

Input voltage	When rising	When falling
5V	6.36 us	16.10 us
6V	4.58 us	16.32 us
7V	3.68 us	18.72 us
8V	2.97 us	20.16 us
9V	2.67 us	21.56 us
10V	2.29 us	21.92 us
11V	2.00 us	22.16 us
12V	1.78 us	22.50 us
13V	1.63 us	22.51 us
14V	1.47 us	23.14 us
15V	1.14 us	23.24 us
16V	1.03 us	23.40 us
17V	0.92 us	22.90 us
18V	1.09 us	22.73 us
19V	1.02 us	23.27 us
20V	0.94 us	23.23 us
21V	0.74 us	23.27 us
22V	0.90 us	23.21 us
23V	0.85 us	23.18 us
24V	0.75 us	23.65 us

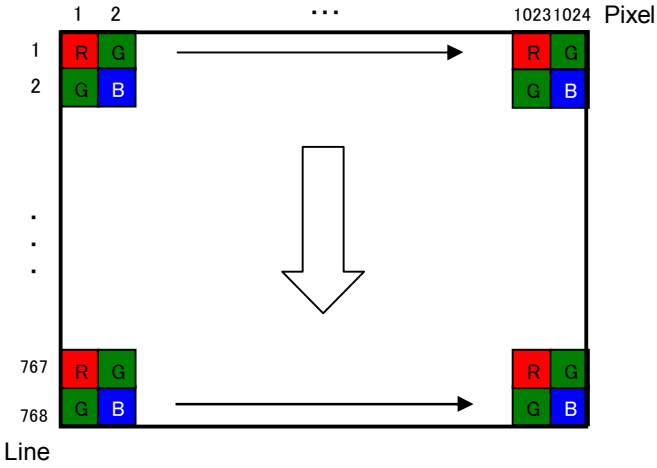
Output sequence of RAW data



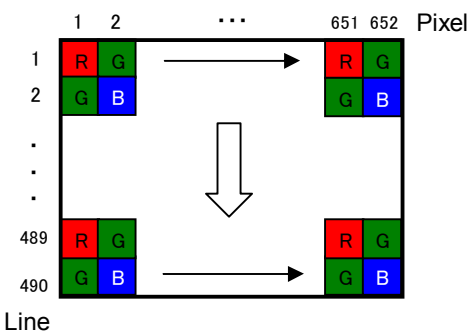
•KP-FD145GV/140GV



•KP-FD83GV

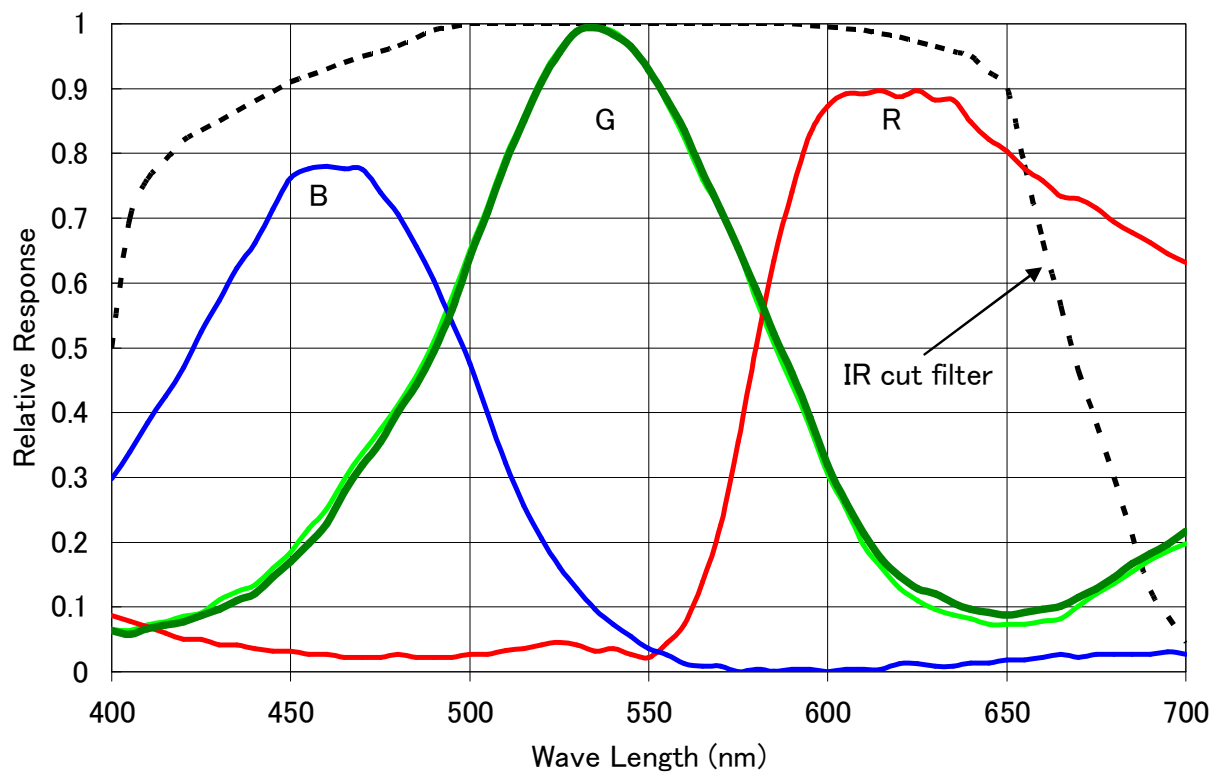


•KP-FD33GV

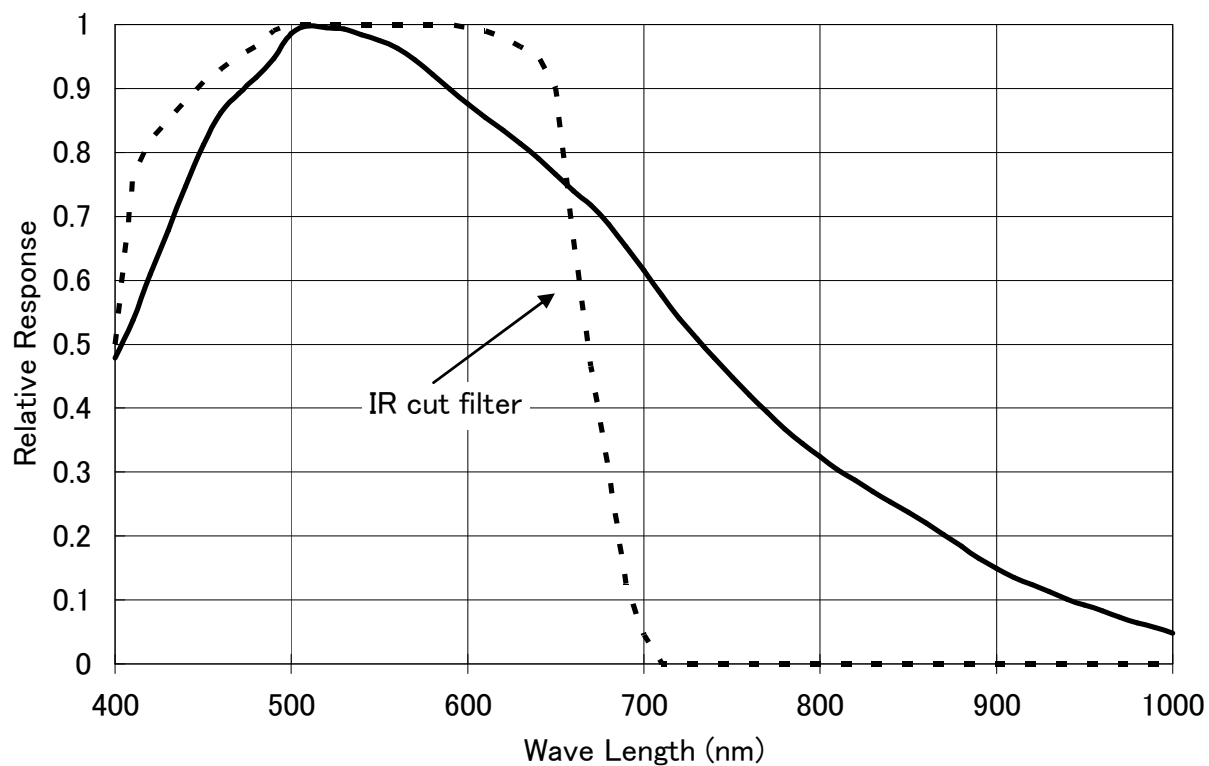


Spectral response

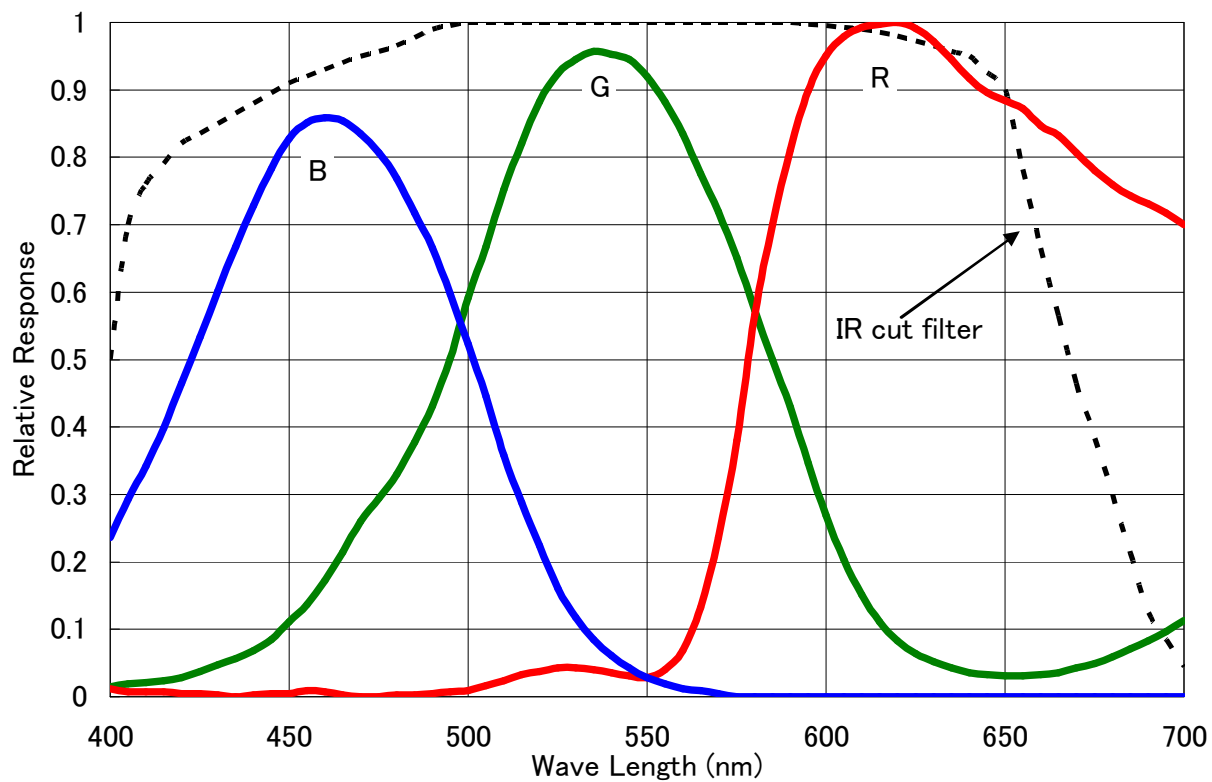
•KP-FD500GV



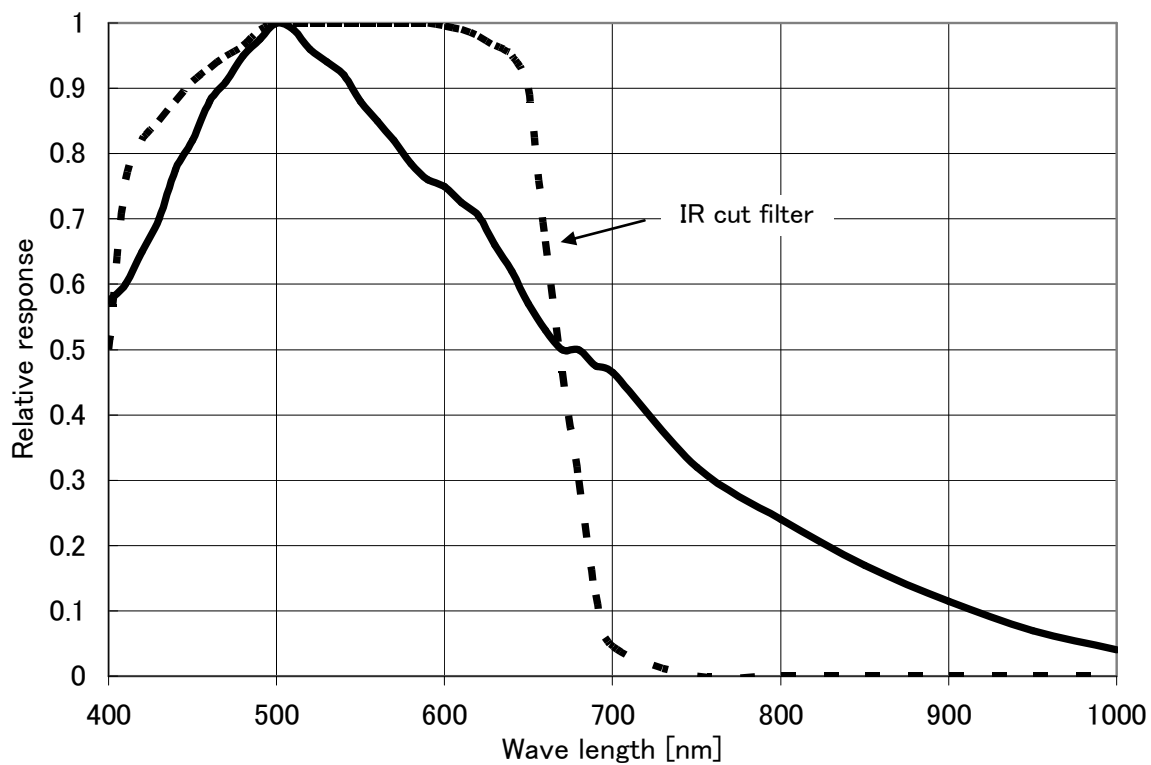
•KP-F500GV



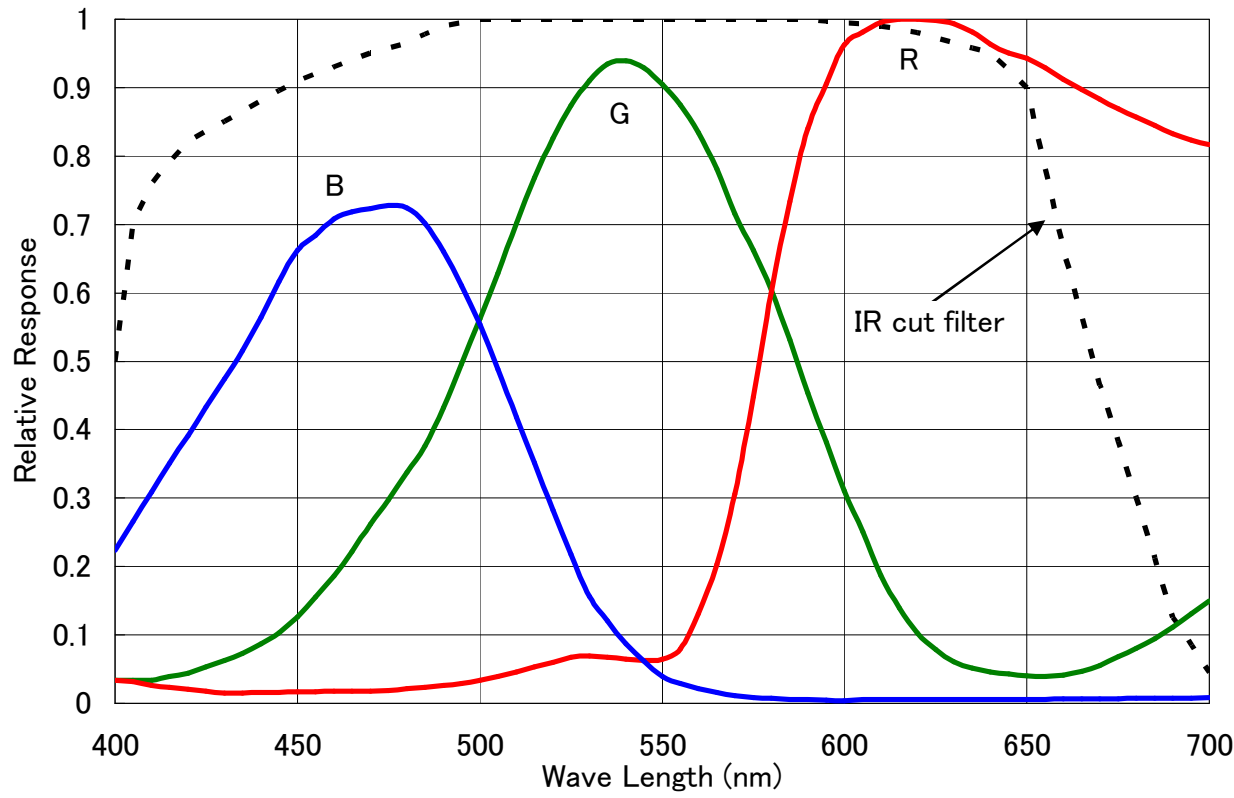
•KP-FD202GV



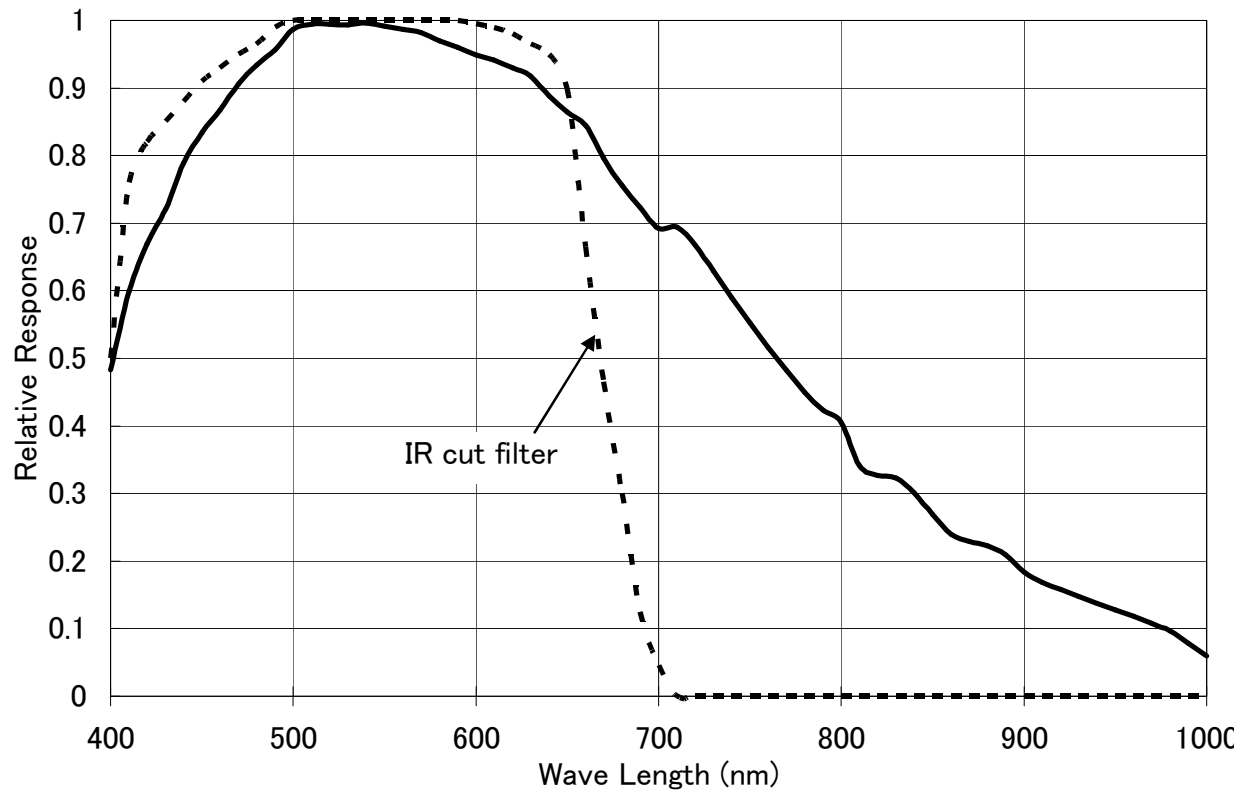
•KP-F202GV



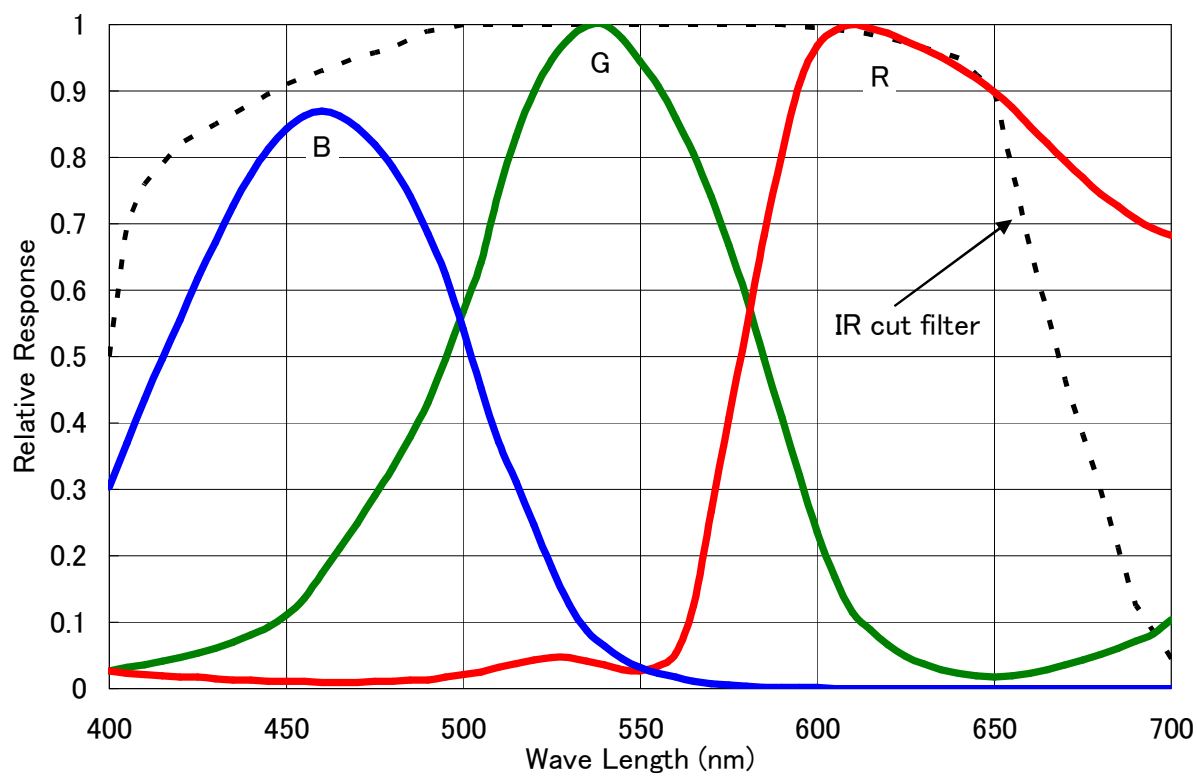
•KP-FD145GV



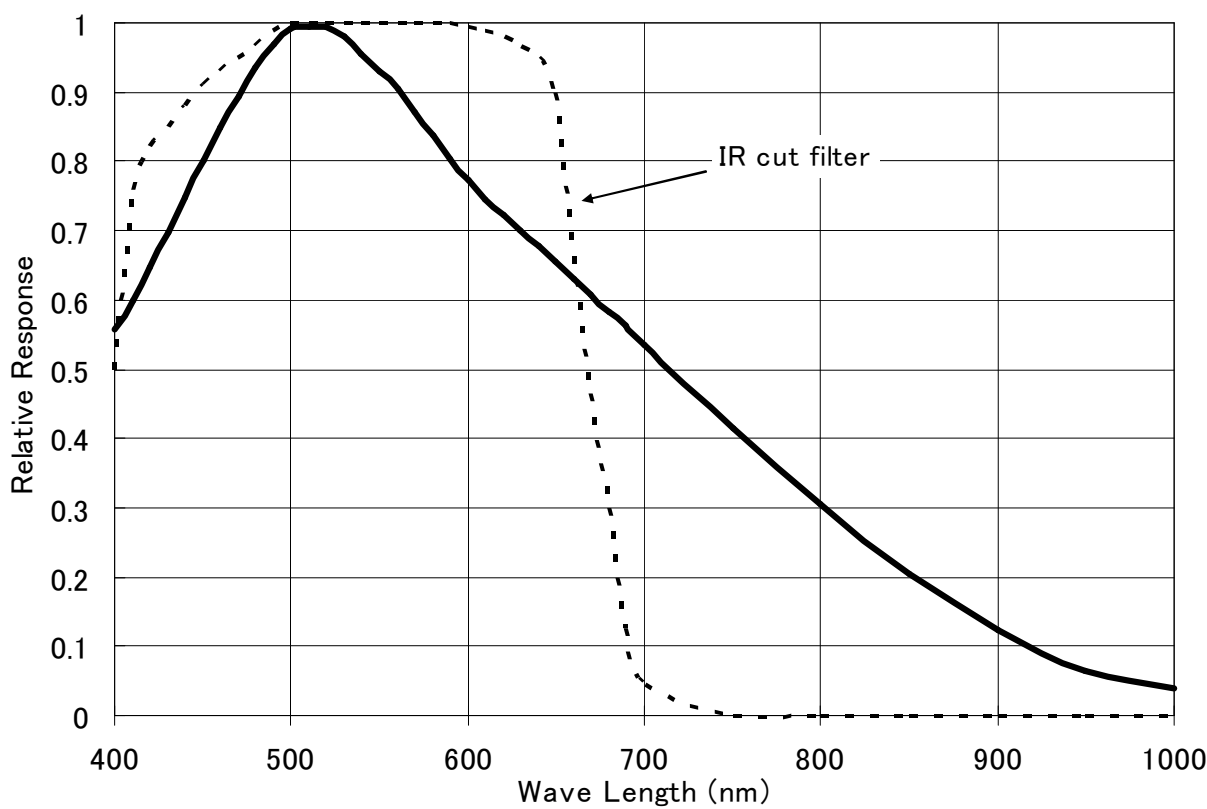
•KP-F145GV



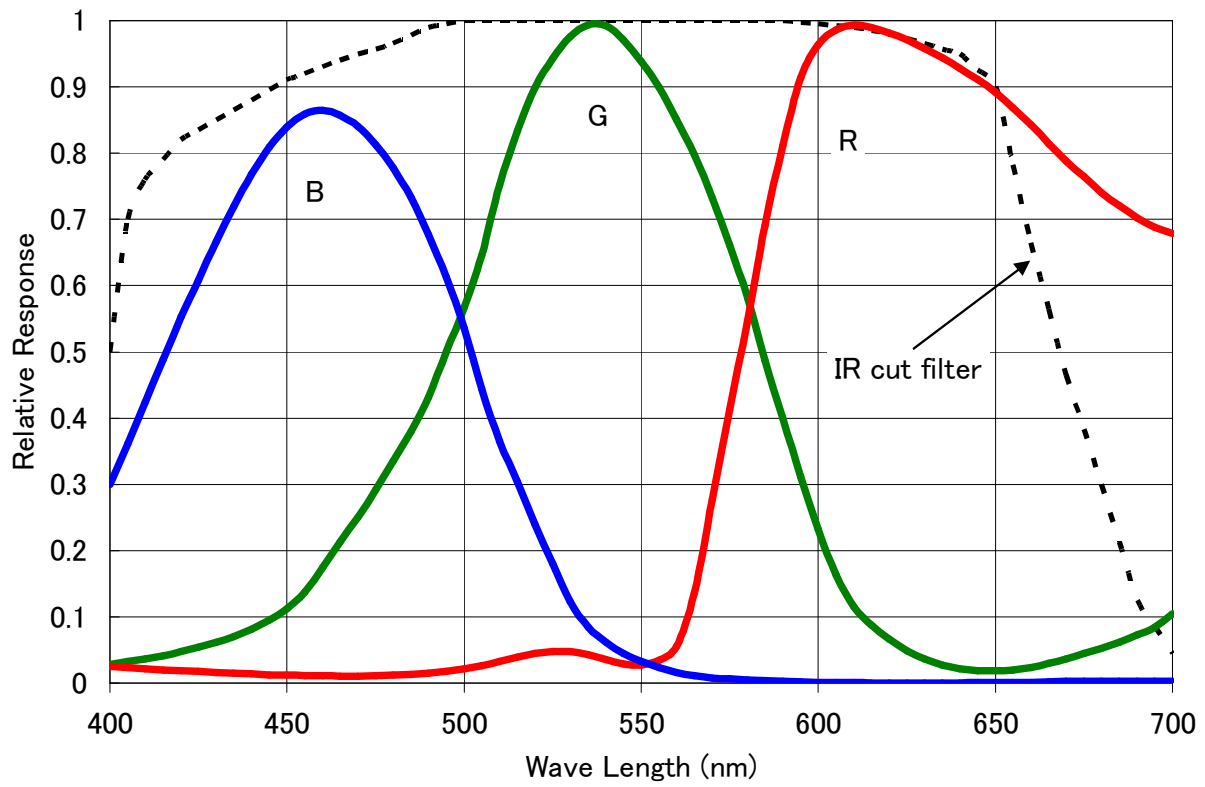
•KP-FD140GV



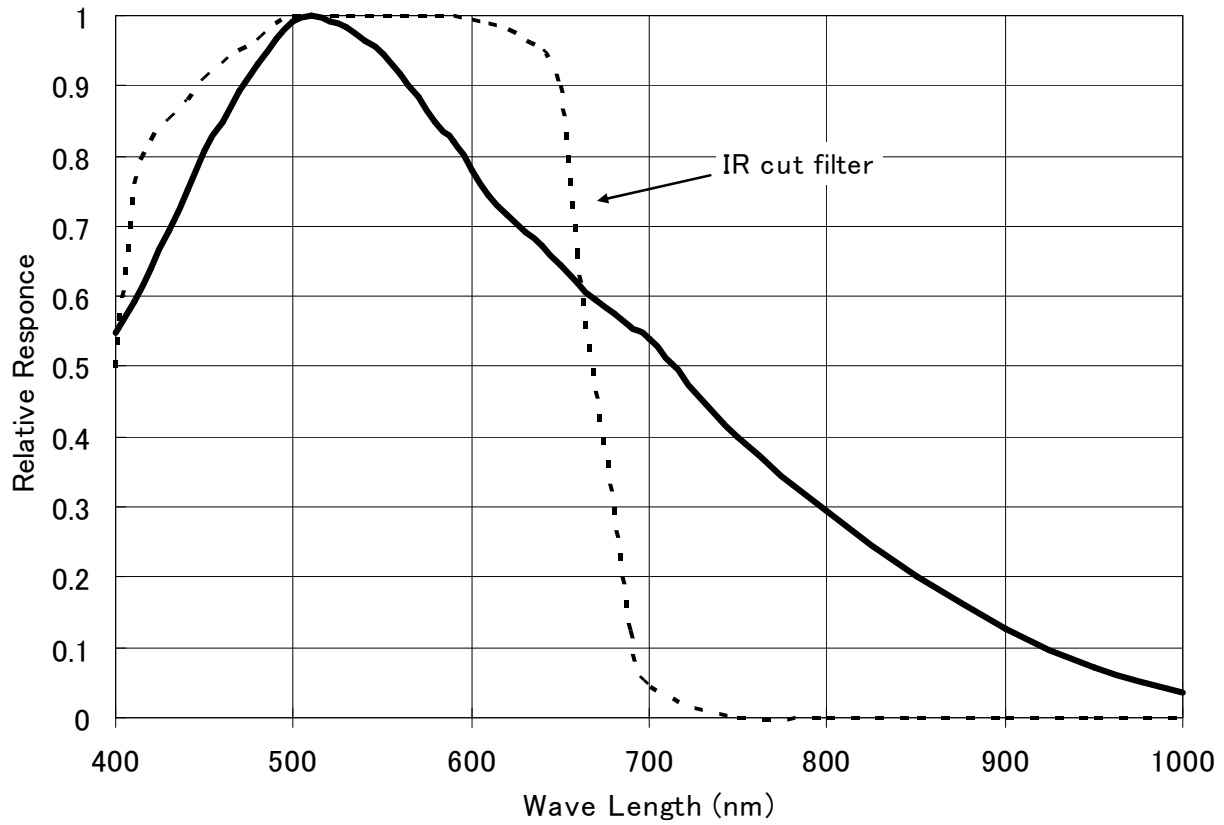
•KP-F140GV



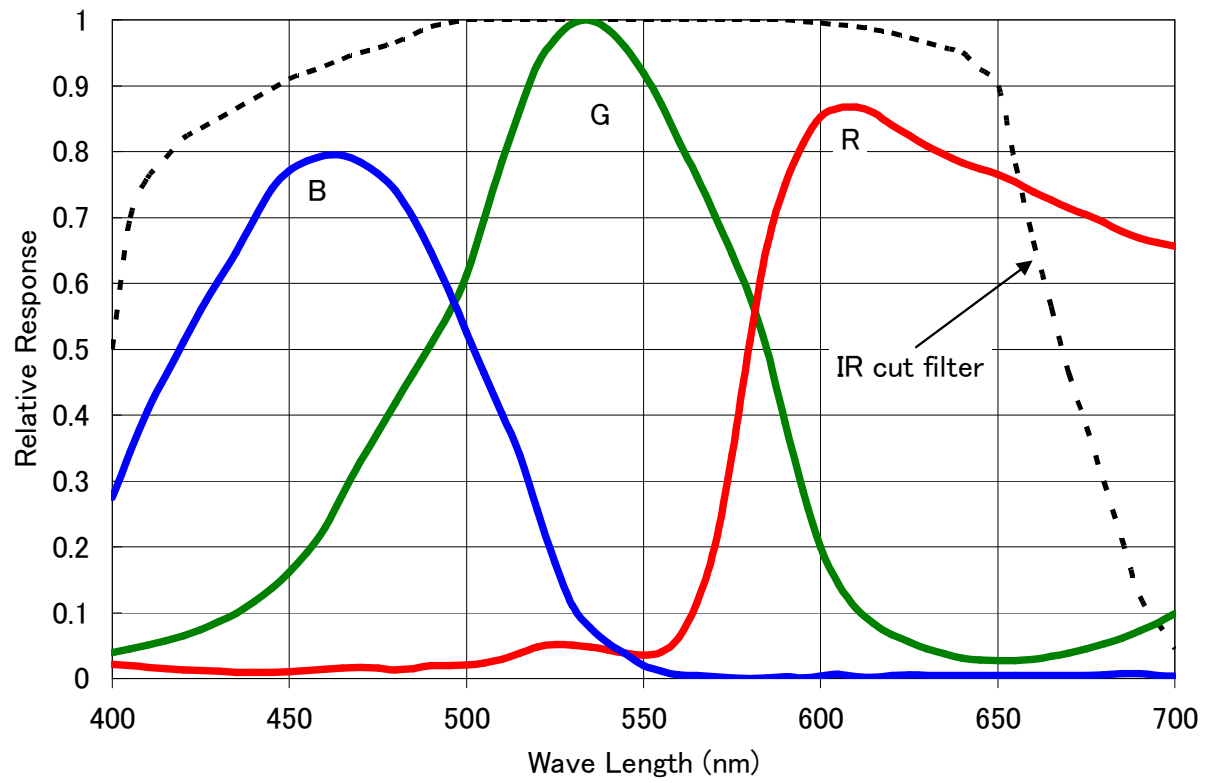
•KP-FD83GV



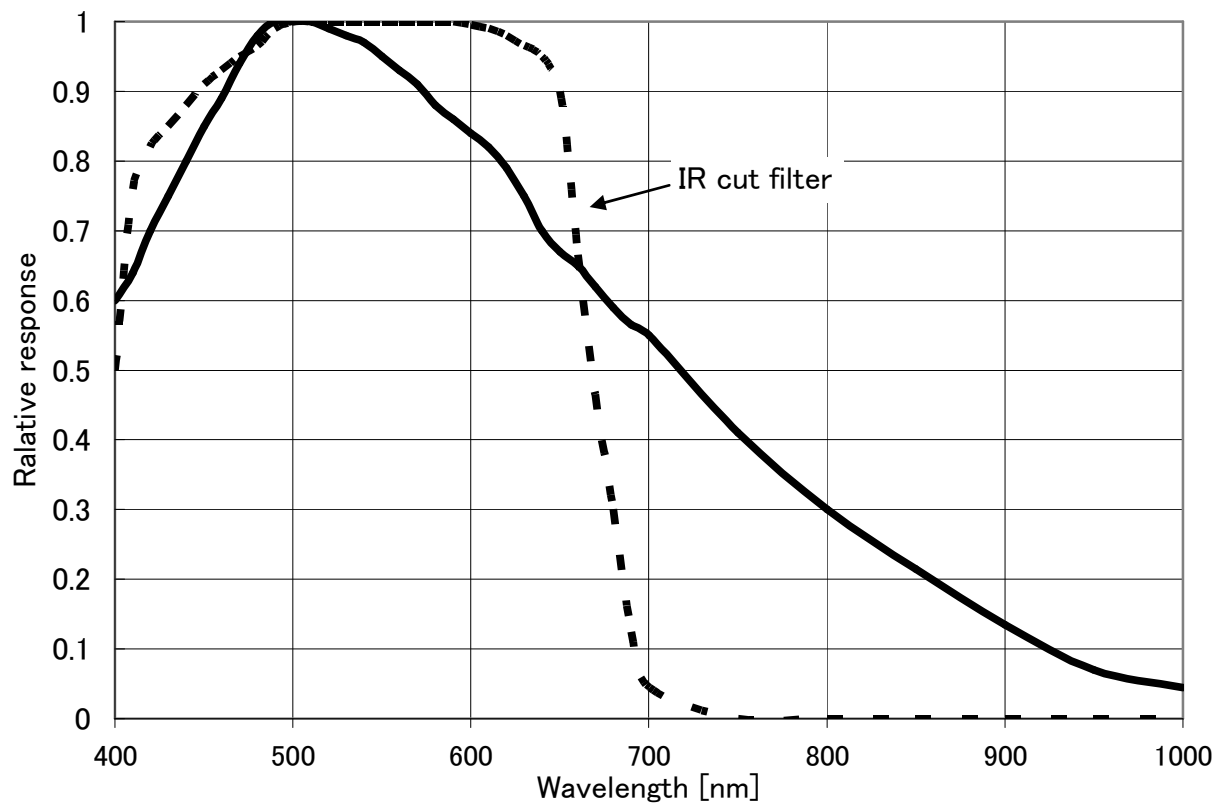
•KP-F83GV



•KP-FD33GV



•KP-F33GV



Specifications

Specifications of KP-FD500GV/FD202GV are showing.

		KP-FD500GV	KP-FD202V	KP-FD145GV
1)	Imaging device	2/3-inch interline CCD	1/1.8-inch interline CCD	2/3-inch interline CCD
	Total pixels	2536 (H) x 02068 (V)	1688 (H) x 1248 (V)	1432 (H) x 1050 (V)
	Effective pixels	2456 (H) x20580 (V)	1628 (H) x 1236 (V)	1392 (H) x 1040 (V)
	Pixel pitch	3.45um (H) x 3.45um (V)	4.4um (H) x 4.4um (V)	6.45um (H) x 6.45um (V)
	Color filter	RGB primary color mosaic filter		
2)	Sensing area	8.47mm (H) x 7.10mm (V)	7.16mm (H) x 5.44mm (V)	8.98mm (H) x 6.71mm(V)
3)	Scanning system	Progressive scan		
4)	Vertical scanning frequency	9 Hz	30 Hz	
5)	Synchronization	Internal / External		
6)	Lens mount	C mount		
7)	Frang back	17.526mm (no adjustment)		
8)	Video output			
	Interface	Gigabit Ethernet		
	Protocol	GigE Vision Version1.00 compliant		
	Transmission speed	1Gbps		
	Output data format	RGB 8/10/12 bit YUV422 8/10/12 bit Mono 8/10/12 bit RAW 8/10/12 bit		
	Max output image size	2448 (H) x 2050 (V)	1620 (H) x 1220 (V)	1392 (H) x 1024 (V)
	Max frame rate	9 frames per second RGB8bit: 7 fps RGB10bit: 5 fps RGB12bit: 3 fps YUV10/12bit: 7fps	30 frames per second RGB8bit: 18 fps RGB10bit: 12 fps RGB12bit: 9 fps YUV8bit: 28fps YUV10/12bit: 18fps RAW10/12bit: 28fps	30 frames per second RGB8bit: 26 fps RGB10bit: 18 fps RGB12bit: 13 fps YUV10/12bit: 26fps
9)	Sensitivity	2000lx, F11, 3200K	2000lx, F5.6, 3200K	400lx, F4, 3200K
10)	Minimum illumination	5lx (F1.4, Gain MAX)	10lx (F1.4, Gain MAX)	5lx (F1.4, Gain MAX)
11)	Electronic shutter			
	Preset	1/9, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second	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, Reset Control mode, VD reset mode		
	Trigger input	From DCIN/SYNC 12pin connector		
13)	Partial scan	Selectable start position and width of picture grabbing in 2 pixels step		
14)	Remote control			
	Control system	GigE Vision Version1.00, GENiCAM Version1.00 compliant		
	Control items	TRIGGER, OUTPUT SIGNAL, SHUTTER SPEED, PARTIAL SCAN, GAIN LEVEL, GAMMA, SHARPNESS, BLACKLEVEL, KNEE, ALC, WHITE BALANCE, MASKING, PAINT BLACK		
15)	Power supply	DC12V±1V / 48V (PoE: IEEE802.3af compliant)		
16)	Power consumption			
	Normal mode	Approx.625mA(Approx.7.4W)	Approx.650mA(Approx.7.8W)	Approx.500mA(Approx.6.0W)
	Partial scan	MAX Approx. 650mA (Approx. 7.8W)	MAX Approx. 710mA (Approx. 8.5W)	MAX Approx. 600mA (Approx. 7.2W)
		when height of actual image size is 2		
17)	Ambient temperature			
	Performance	0 to 40°C less than 90% RH		
	Operating	-10 to 50°C less than 90% RH		
	Storage	-20 to 60°C less than 70% RH (without dew condensation)		
18)	Vibration endurance	15 to 200 to 15Hz (98.6 m/s ²), sweep: 1 minutes, XYZ, 30minutes		
19)	Shock endurance	490.3m/ s ² (vertical, horizontal, once each faze)		
20)	Dimensions	44(W) x 29(H) x 72(D) mm (not including mount protrusions)		
21)	Mass	Approx. 140g		
22)	Standard compositions	Camera (IR-cut filter)		Camera (Dummy glass)
		CD-ROM (Operation manual, driver, SDK), Composition table		

Specifications of KP-FD140GV/FD83GV/FD33GV are showing.

	KP-FD140GV	KP-FD83GV	KP-FD33GV
1) Imaging device	1/2-inch interline CCD	1/3-inch interline CCD	1/3-inch interline CCD
Total pixels	1434 (H) x 1050 (V)	1077 (H) x 788 (V)	692 (H) x 504 (V)
Effective pixels	1392 (H) x 1040 (V)	1034 (H) x 779 (V)	656 (H) x 494 (V)
Pixel pitch	4.65um (H) x 4.65um (V)	4.65um (H) x 4.65um (V)	7.4um (H) x 7.4um (V)
Color filter	RGB primary color mosaic filter		
2) Sensing area	6.32mm (H) x 4.76mm (V)	4.76mm (H) x 3.57mm (V)	4.88mm (H) x 3.66mm (V)
3) Scanning system	Progressive scan		
4) Vertical drive frequency	30 Hz	36 Hz	90 Hz
5) Synchronization	Internal / External		
6) Lens mount	C mount		
7) Frange back	17.526mm (no adjustment)		
8) Video output			
Interface	Gigabit Ethernet		
Protocol	GigE Vision Version1.00 compliant		
Transmission speed	1Gbps		
Output data format	RGB 8/10/12 bit YUV422 8/10/12 bit Mono 8/10/12 bit RAW 8/10/12 bit		
Max output image size	1360 (H) x 1024 (V)	1024 (H) x 768 (V)	652 (H) x 490 (V)
Max frame rate	30 frames per second RGB8bit: 26 fps RGB10bit: 18 fps RGB12bit: 13 fps YUV10/12bit: 26fps	36 frames per second RGB10bit: 35 fps RGB12bit: 23 fps	90 frames per second RGB10bit: 85 fps RGB12bit: 55 fps
9) Sensitivity	2000lx, F5.6, 3200K	2000lx, F5.6, 3200K	2000lx, F5.6, 3200K
10) Minimum illumination	10lx (F1.4, Gain MAX)	10lx (F1.4, Gain MAX)	10lx (F1.4, Gain MAX)
11) Electronic shutter			
Preset	1/30, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second	1/36, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second	1/90, 1/250, 1/500, 1/1000, 1/2000, 1/10000, 1/10000, 1/50000 second
Variable	10 to 1/100000 second		
12) External trigger function			
Mode	OFF, Fixed shutter mode, ONE trigger mode, Reset Control mode, VD reset mode		
Trigger input	From DCIN/SYNC 12pin connector		
13) Partial scan	Selectable start position and width of picture grabbing in 2 pixels step		
14) Remote control			
Control system	GigE Vision Version1.00, GENiCAM Version1.00 compliant		
Control items	TRIGGER, OUTPUT SIGNAL, SHUTTER SPEED, PARTIAL SCAN, GAIN LEVEL, GAMMA, SHARPNESS, BLACKLEVEL, KNEE, ALC, WHITE BALANCE, MASKING, PAINT BLACK		
15) Power supply	DC12V±1V / 48V (PoE: IEEE802.3af compliant)		
16) Power consumption			
Normal mode	Approx.500mA(Approx.6.0W)	Approx.360mA(Approx.4.3W)	Approx.390mA(Approx.4.7W)
Partial scan	MAX Approx. 580mA (Approx. 7.0W)	MAX Approx. 390mA (Approx. 4.7W)	MAX Approx. 430mA (Approx. 5.2W)
	when height of actual image size is 2		
17) Ambient temperature			
Performance	0 to 40°C less than 90% RH		
Operating	-10 to 50°C less than 90% RH		
Storage	-20 to 60°C less than 70% RH (without dew condensation)		
18) Vibration endurance	15 to 200 to 15Hz (98.6 m/s ²), sweep: 1 minutes, XYZ, 30minutes		
19) Shock endurance	490.3m/ s ² (vertical, horizontal, once each faze)		
20) Dimensions	44(W) x 29(H) x 72(D) mm (not including mount protrusions)		
21) Mass	Approx. 140g		
22) Standard compositions	Camera (IR-cut filter), CD-ROM (Operation manual, driver, SDK), Composition table		

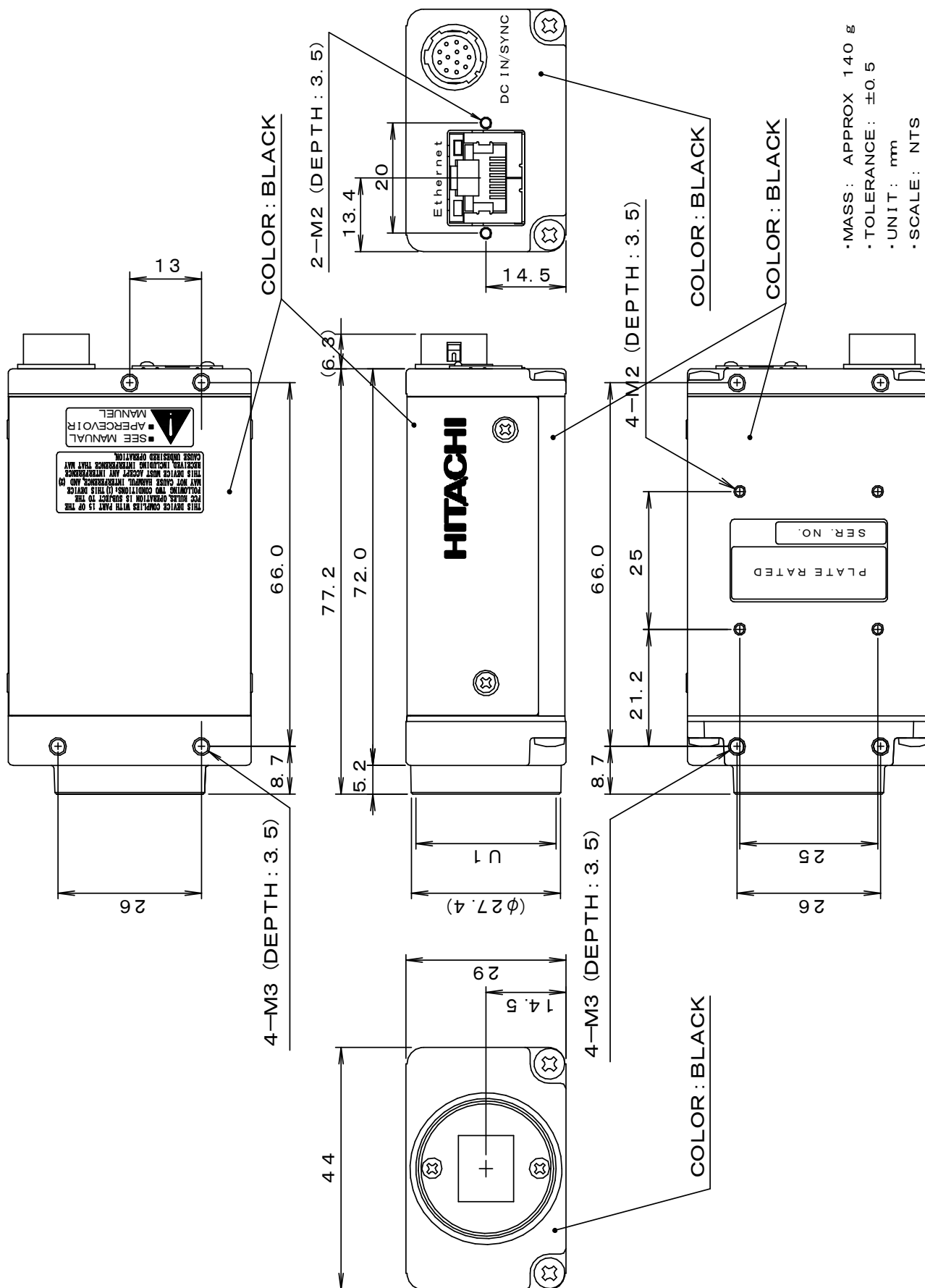
Specifications of KP-F500GV/F202GV/F145GV are showing.

	KP-F500GV	KP-F202GV	KP-F145GV
1) Imaging device	2/3-inch interline CCD	1/1.8-inch interline CCD	2/3-inch interline CCD
Total pixels	2536 (H) x 2068 (V)	1688 (H) x 1248 (V)	1434 (H) x 1050 (V)
Effective pixels	2456 (H) x 2058 (V)	1628 (H) x 1236 (V)	1392 (H) x 1040 (V)
Pixel pitch	3.45um (H) x 3.45um (V)	4.4um (H) x 4.4um (V)	6.45um (H) x 6.45um (V)
2) Sensing area	8.47mm (H) x 7.10mm (V)	7.16mm (H) x 5.44mm (V)	8.98mm (H) x 6.71mm (V)
3) Scanning system	Progressive scan		
4) Frame rate	16 frames per second	30 frames per second	30 frames per second
5) Synchronization	Internal / External		
6) Lens mount	C mount		
7) Frange back	17.526mm (no adjustment)		
8) Video output			
Interface	Gigabit Ethernet		
Protocol	GigE Vision Version1.00 compliant		
Transmission speed	1Gbps		
Output data format	Mono 8/10/12 bit		
Max output image size	2448 (H) x 2050 (V)	1620 (H) x 1220 (V)	1360 (H) x 1024 (V)
Frame rate	16 frames per second	30 frames per second	30 frames per second
9) Sensitivity	400lx, F8, 3200K	2000lx, F11, 3200K	400lx, F5.6, 3200K
10) Minimum illumination	1lx (F1.4, Gain MAX)	5lx (F1.4, Gain MAX)	2.5lx (F1.4, Gain MAX)
11) Electronic shutter			
Preset	1/16, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second	1/30, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second	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, Reset Control mode, VD reset mode		
Trigger input	DCIN/SYNC 12pin connector		
13) Partial scan	Selectable start position and width of picture grabbing in 2 pixels step		
14) Remote control			
Control system	GigE Vision Version1.00, GENiCAM Version1.00 compliant		
Control items	TRIGGER, OUTPUT SIGNAL, SHUTTER SPEED, PARTIAL SCAN, BINNING, GAIN LEVEL, GAMMA, SHARPNESS, BLACKLEVEL, KNEE, ALC		
15) Power supply	DC12V±1V / 48V (PoE: IEEE802.3af compliant)		
16) Power consumption			
Normal mode	Approx.650mA(Approx.7.8W)	Approx.625mA(Approx.7.5W)	Approx.450mA(Approx.5.4W)
Partial scan	MAX Approx. 700mA (Approx. 8.4W)	MAX Approx. 700mA (Approx. 8.4W)	MAX Approx. 550mA (Approx. 6.6W)
	when height of actual image size is 2		
17) Ambient temperature			
Performance	0 to 40°C less than 90% RH		
Operating	-10 to 50°C less than 90% RH		
Storage	-20 to 60°C less than 70% RH (without dew condensation)		
18) Vibration endurance	15 to 200 to 15Hz (98.6 m/s ²), sweep: 1 minutes, XYZ, 30minutes		
19) Shock endurance	490.3m/ s ² (vertical, horizontal, once each faze)		
20) Dimensions	44(W) x 29(H) x 72(D) mm (not including mount protrusions)		
21) Mass	Approx. 140g		
22) Standard compositions	Camera (dummy glass), CD-ROM (Operation manual, driver, SDK), Composition table		

Specifications of KP-F140GV/F83GV/F33GV are showing.

	KP-F140GV	KP-F83GV	KP-F33GV
1) Imaging device	1/2-inch interline CCD	1/3-inch interline CCD	1/3-inch interline CCD
Total pixels	1434 (H) x 1050 (V)	1077 (H) x 788 (V)	692 (H) x 504 (V)
Effective pixels	1392 (H) x 1040 (V)	1034 (H) x 779 (V)	656 (H) x 494 (V)
Pixel pitch	4.65um (H) x 4.65um (V)	4.65um (H) x 4.65um (V)	7.4um (H) x 7.4um (V)
2) Sensing area	6.32mm (H) x 4.76mm (V)	4.76mm (H) x 3.57mm (V)	4.88mm (H) x 3.66mm (V)
3) Scanning system	Progressive scan		
4) Vertical drive frequency	30 Hz	36 Hz	90 Hz
5) Synchronization	Internal / External		
6) Lens mount	C mount		
7) Frange back	17.526mm (no adjustment)		
8) Video output			
Interface	Gigabit Ethernet		
Protocol	GigE Vision Version1.00 compliant		
Transmission speed	1Gbps		
Output data format	Mono 8/10/12 bit		
Max output image size	1360 (H) x 1024 (V)	1024 (H) x 768 (V)	652 (H) x 490 (V)
Frame rate	30 frames per second	36 frames per second	90 frames per second
9) Sensitivity	2000lx, F11, 3200K	2000lx, F11, 3200K	2000lx, F11, 3200K
10) Minimum illumination	5lx (F1.4, Gain MAX)	5lx (F1.4, Gain MAX)	5lx (F1.4, Gain MAX)
11) Electronic shutter			
Preset	1/30, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second	1/36, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second	1/90, 1/250, 1/500, 1/1000, 1/2000, 1/10000, 1/10000, 1/50000 second
Variable	10 to 1/100000 second		
12) External trigger function			
Mode	OFF, Fixed shutter mode, ONE trigger mode, Reset Control mode, VD reset mode		
Trigger input	DCIN/SYNC 12pin connector		
13) Partial scan	Selectable start position and width of picture grabbing in 2 pixels step		
14) Remote control			
Control system	GigE Vision Version1.00, GENiCAM Version1.00 compliant		
Control items	TRIGGER, OUTPUT SIGNAL, SHUTTER SPEED, PARTIAL SCAN, BINNING, GAIN LEVEL, GAMMA, SHARPNESS, BLACKLEVEL, KNEE, ALC		
15) Power supply	DC12V±1V / 48V (PoE: IEEE802.3af compliant)		
16) Power consumption			
Normal mode	Approx.450mA(Approx.5.5W)	Approx.340mA(Approx.4.1W)	Approx.360mA(Approx.4.3W)
Partial scan	MAX Approx. 540mA (Approx. 6.5W)	MAX Approx. 400mA (Approx. 4.8W)	MAX Approx. 420mA (Approx. 5.0W)
	when height of actual image size is 2		
17) Ambient temperature			
Performance	0 to 40°C less than 90% RH		
Operating	-10 to 50°C less than 90% RH		
Storage	-20 to 60°C less than 70% RH (without dew condensation)		
18) Vibration endurance	15 to 200 to 15Hz (98.6 m/s ²), sweep: 1 minutes, XYZ, 30minutes		
19) Shock endurance	490.3m/ s ² (vertical, horizontal, once each faze)		
20) Dimensions	44(W) x 29(H) x 72(D) mm (not including mount protrusions)		
21) Mass	Approx. 140g		
22) Standard compositions	Camera (dummy glass), CD-ROM (Operation manual, driver, SDK), Composition table		

Dimensions



About CD-ROM

Attached CD-ROM has the following composition.

• KP-F(D)XXGV_OperationManual(E)/(J).pdf	: The operation manual of camera (this file) in English and Japanese.
• InstallManual(E)/(J).pdf	: The install manual in English and Japanese.
• ViewerSoftwareManual(E)/(J).pdf	: The viewer software manual in English and Japanese.
• RegisterMap.pdf	: Register map of the camera.
• HitachiGigECamera.exe	: The Installer of driver, software and SDK.

Note:

- ① The included control software within CD-ROM operate only in WindowsXP SP2/SP3 and Windows Vista (32-bit).
- ② The control software may not operate normal when it is used for the other camera, because software for Hitachi Kokusai Electric Inc's 1CCD GigE Camera.
- ③ Hitachi Kokusai Electric Inc. does not guarantee regarding the faulty, damage of the hardware and also software of the customer by a driver and also viewer software.

Hitachi Kokusai Electric Inc.

UDX Akihabara Bldg. 14-1 Sotokanda 4-choume, Chiyoda-ku, Tokyo 101-8980, Japan

Phone: +81(0) 3-6734-9432, Fax: +81(0) 3-5209-5942

URL: <http://www.hitachi-kokusai.co.jp>

Hitachi Kokusai Electric (Shanghai) Co., Ltd.

Beijing Branch : Room 1413, Beijing Fortune Building, 5 Dong San Huan Bei-Lu,
Chao Yang District, Beijing, 100004 China
Phone: +86(0) 10-6590-8755/8756, Fax: +86(0) 10-6590-8757

Hitachi Kokusai Electric America, Ltd.

Headquarters and : 150 Crossways Park Drive, Woodbury, New York 11797, U.S.A.
Northeast Office Phone: (+1) 516-921-7200, Fax: (+1) 516-496-3718
West Office : 371 Van Ness Way, Suite 120 Torrance, CA, 90501, U.S.A.
Phone: (+1) 310-328-6166, Fax: (+1) 310-328-6252
Midwest Sales : Phone: (+1) 330-334-4115, Fax: (+1) 516-496-3718
Service (+1) 989-345-5379
South Sales : Service (+1) 256-774-3777
Parts Center : phone (+1) 516-682-4435, Fax: (+1) 516-921-0993
Latin Sales : phone (+1) 519-682-4420, Fax: (+1) 516-496-3718
URL: <http://www.hitachikokusai.us>

Hitachi Kokusai Electric Canada, Ltd.

Head Office : 1 Select Avenue Unit#12 Scarborough, Ontario M1V 5J3, Canada
Phone: (+1) 416-299-5900, Fax: (+1) 416-299-0450
Eastern Office : 5795 Chemin St. Francois St. Laurent, Quebec H4S 1B6, Canada
Phone: (+1) 514-332-6687, Fax: (+1) 514-335-1664
URL: <http://www.hitachikokusai.ca>

Hitachi Kokusai Electric Europe GmbH

Sales and Engineering : Siemensstr. 9, D-63263 Neu-Isenburg, Germany
Frankfurt Office Phone: +49(0) 6102-8332-0, Fax: +49(0) 6102-202616
General email address: info@hitachi-ke-eu.com
URL: <http://www.hitachi-keu.com/>

Hitachi Kokusai Electric U.K. Ltd.

Head Office : Windsor House, Britannia Road, Waltham Cross, Hertfordshire EN8 7NX, United Kingdom
Phone: +44(0) 845-121-2177, Fax: +44(0) 845-121-2180
General email address: uksales@hitachi-ke-eu.com
URL: <http://www.hitachi-keu.com/>