Pipe Inspection Camera System

TS3040

Instruction Manual

TOSHIBA TELI CORPORATION

Table of Contents

D4196268B

Introduction

Thank you for purchasing the TS3040 Pipe Inspection Camera System.
This instruction manual describes precautions and other important information for using this product.
Read this manual thoroughly for the correct use of the product.
While the information in this manual has been carefully checked, should you find any typographic error or have any questions on the contents, please contact TOSHIBA TELI.
After reading this manual, keep it readily available for future reference.

Operation and handling

◎ This product is able to be used only for industrial.
  This product has to be operated and handled by operator who has special knowledge.

Export Control

◎ If you wish to export this product, check the Japanese Foreign Exchange and Foreign Trade Law as well as export-related regulations for destinations subject to the U.S. Export Administration Regulations, and take necessary procedures.

Disposal

◎ This product may not be disposable as domestic waste. Dispose of the product according to local regulations. For details, contact the local government.

"This symbol is applicable for EU member states only"

Product Lifetime

◎ Do not use this product within ambient temperature or humidity exceeding the product specifications. Doing so will significantly reduce the product lifetime.

Image Quality

◎ Display unevenness may occur on the screen. This is due to the characteristics of liquid crystal, and is not a failure.
◎ Light vertical stripes may appear on the screen. This is due to the characteristics of liquid crystal, and is not a failure.
◎ When a checkered pattern with one dot spacing is displayed with intermediate colors and intermediate brightness, flickering may occur. This is not a failure.
◎ Some dots may remain red, green, blue, or unlit on the screen. This is not a failure.
◎ When input image signals or synchronizing signals contain noise or fluctuations, they may appear on the screen. This is not a failure.

Burn-In

◎ If the same image is displayed on the screen for a long time, an afterimage may remain on the screen. While this phenomenon will be resolved gradually by displaying various images, avoid displaying the same image for a prolonged duration, as the burn-in (afterimage) may become permanent.

Caution

◎ No part of this manual may be reproduced without prior permission.
◎ The contents of this manual are subject to change without notice.

[Safety Precautions]

This instruction manual contains important information for the safe and correct use of the product and for prevention of personal injuries and property damages.
Before reading this manual, understand the following contents on the marks and symbols, and observe the descriptions.

[Definition of Marks]

⚠ **WARNING** — Indicates that improper use that fails to observe the instruction labeled with this mark may result in death or severe personal injury.

⚠ **CAUTION** — Indicates that improper use that fails to observe the instruction labeled with this mark may result in personal injury or material damage.

*1: Personal injury refers to wounds, burns, electric shocks, and other injuries that do not require hospitalization or long-term treament.
*2: Material damage refers to any direct or consequential damage related to property or material loss.

[Definition of Symbols]
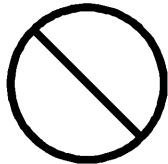
🚫 This mark indicates a PROHIBITED action (what the user must NOT do).
Details are described with text and pictures, either inside or near this mark.
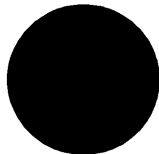
⬤ This mark indicates a REQUIRED action (what the user MUST do).
Details are described with text and pictures, either inside or near this mark.

◇ This mark indicates a DANGER.
Details are described with text and pictures, either inside or near this mark.

△ This mark indicates a CAUTION.
Details are described with text and pictures, either inside or near this mark.

⚠ WARNING

Unplug

Use an input power-supply voltage within the specification range of this product.
Using a power-supply voltage exceeding the specification range may cause fire and failure or affect human bodies.

Avoid

Do not use this product in a hot place (at 40°C or higher) or under direct sunlight.
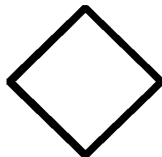Doing so degrades heat dissipation and causes burn damage or fire.

Avoid

Do not use this product under high temperature and humidity, or move the product abruptly from a cold place to a warm place.
Failure may occur due to condensation and cause injuries and accidents.

Avoid

Never use this product in a highly humid place or in a place where condensation occurs easily.
Doing so degrades insulation and causes fire or electric shock.

Do not wet

Do not use this product in the rain or in a place subject to water or liquid splashes.
Do not place any vase, glass, or other containers that contain chemical agents or water, or small metal objects on the equipment.
If liquid or foreign material enters the equipment, a short circuit may occur, resulting in fire or electric shock.
If liquid or foreign material enters the equipment, unplug the power cord from the adapter box of the main unit, and contact your dealer for repair.

Do not wet

This product is not waterproof. Working with wet equipment or hands causes electric shock.
Wipe off water completely before use.
Wear protective equipment such as safety shoes and rubber gloves during use.
If the product is submerged, stop the use immediately and contact your dealer.

Avoid

Do not use this product in a dusty environment.
Doing so degrades insulation and causes fire or electric shock.

Avoid

When it starts thundering, unplug the power cord from the adapter box as soon as possible for safety reasons.
Failure to do so causes electric shock, burn damage, or fire.

Avoid

Do not place any heavy object (5 kg or greater) or apply strong force onto the main unit.
Doing so causes damage or failure of the main unit, fire, or electric shock.

Avoid

Do not use this product in a flammable atmosphere.
Otherwise, explosion or fire may result due to sparks at electric contacts.

Avoid

If this product may topple over or fall and affect persons or the vicinity, take measures to prevent the product from toppling over or falling.

Avoid

⚠ WARNING

Avoid
Do not leave SD/SDHC cards in a place within the reach of small children.
Swallowing the cards by mistake may cause bodily harm.
If a child swallows it accidentally, seek immediate medical attention.

Avoid
Be careful not to drop this product when moving or carrying it.
The product is heavy, and dropping it on one's foot may cause injury.
If you find any damage such as deformation or crack on the product, do not use the product, and contact your dealer.
A sharp edge on the damaged product may cause cuts.

Avoid
Do not drop this product or apply strong impact on it when carrying it.
Otherwise, personal injuries or product failure may result.

Avoid
Avoid poor postures when lifting and moving this product.
Otherwise, you may damage your lower back.

Unplug
If any foreign material enters this product, immediately unplug the power cord from the adapter box and power outlet.
Failure to do so causes fire and electric shock.

Avoid
Keep your face and any fragile item away from the camera head and camera cable.
Otherwise, personal injuries or item damage may occur due to the resilience of the cable.

Avoid
Do not look directly at the illumination of the camera head. Doing so may harm your eyes.

Avoid
Be careful with the rotation of the cable drum during work.
Otherwise, your hands or fingers may be caught, resulting in injuries and accidents.

Avoid
Hold the camera cable firmly when replacing or working with the cable.
Otherwise, the camera cable may jump unexpectedly due to the resilience of the camera cable, resulting in personal injuries or equipment damage.

Avoid
Do not work with improper posture for a long time. Doing so may cause lower back pain.

Do not disassemble
Do not disassemble, repair, or modify this product by yourself.
Doing so impairs the product safety and causes failure, malfunctions, and accidents.

⚠ WARNING

Unplug

If you observe an unusual smell or noise, overheating, or smoke, immediately unplug the power cord from the adapter box and power outlet.
Failure to do so causes fire, electric shock, and failure.
Contact your dealer for repair. Never attempt to repair the equipment by yourself. Doing so is very dangerous.

Instruction

Use a power cord compliant with the requirements and standard of the power supply for each region.

Avoid

Do not use a 3P-2P conversion adapter with the power cord plug.
It will prevent the cord from grounding or connecting to "earth," and cause fire and electric shock.

Avoid

Observe the following to avoid fire and electric shock.
    - Do not bend or twist the power cord by force.
    - Keep the power cord away from heat generating objects such as thermal appliances.
    - Do not place objects on the power cord.
    - When unplugging the plug, hold the plug instead of pulling the cord.
    - Do not touch the plug with wet hands.
    - Do not use the equipment if the plug or power cord is damaged or its inside is exposed.
    - If the connection of the plug to the outlet is loose, or the plug or cord is warm, stop using the equipment.
    - Do not connect multiple plugs to a single outlet.

Unplug

If this product is dropped and the casing is damaged, unplug the power cord from the adapter box and power outlet.
Otherwise, fire or electric shock may result. Immediately stop using the equipment and contact for repair.

Maintenance

Conduct annual maintenance to use the product in a good condition.
If maintenance is not performed, problems and failures may be left undetected, and cause fire, accidents, and injuries.
Be sure to perform an inspection before use.
Also inspect and clean the product after use.

Unplug

When inspecting or cleaning the equipment, make sure to unplug the power cord from the adapter box and power outlet.
Failure to do so causes electric shock and personal injuries.

Avoid

When using this product, be careful not to allow third parties to enter the work environment.
Entry of third parties causes accidents and injuries.

⚠ CAUTION

🚫 **Avoid**

Keep this product and power cord away from thermal appliances.
Otherwise, the cables of this product and the cord may melt, resulting in fire or electric shock.

🚫 **Avoid**

Carefully wipe off dust attached to the metal part of the power cord connector.
Attached dust may cause fire.

🚫 **Avoid**

Do not install the equipment onto an unstable table, an incline, or other unstable places.
Otherwise, the equipment may topple over and cause personal injury.
Be sure to install and secure this product in a stable place.

🚫 **Avoid**

Do not install the equipment in a place subject to oil fumes, steam, or dust.
Otherwise, the internal temperature may increase, resulting in burn damage or fire.

🚫 **Avoid**

Do not install the equipment in a place where cold air blows.
Otherwise, condensation is formed and causes electric leaks and burn damage.

❗ **Instruction**

If this product is used near a device that generates noise, or the power cord of this product is used with the power outlet of such a device, noise or fluctuations may appear on images displayed by this product.
In such a case, keep this product away from the noise-generating device.

❗ **Instruction**

If this product is used near other electronic equipment, this product may not work properly or the electronic equipment may be affected.
In such a case, keep this product away from the electronic equipment.
Also, avoid strong magnetic force and static electricity. Otherwise, a malfunction or failure may result.

❗ **Instruction**

If this product is used near a radio receiving device such as a radio, television, FM tuner, or BS tuner, electromagnetic interference may occur.
In such a case, keep this product away from the device. Also, connect the power plug of this product to a power outlet other than the power outlet of the radio-receiving device.

🚫 **Avoid**

Do not get on this equipment.
Doing so may cause the equipment to move, topple over, or become damaged, and cause personal injuries.

❗ **Instruction**

Be sure to connect the power cord to the adapter box before connecting it to the power outlet.

❗ **Instruction**

Be sure to turn off the power before connecting the equipment.
Failure to do so may cause electric shock.

⚠ CAUTION

Instruction

Pay attention to the cord and cable connected to this product when working.
Stumbling on or being caught by the cord or cable causes injuries and accidents.

Instruction

Before moving the equipment, make sure to unplug the power cord from the adapter box and power outlet, and remove the external connection cables.
If you move the equipment without removing the cord and cables, the cord and cables may become damaged and cause fire or electric shock.

Instruction

When moving or carrying this product, hold the top of the main unit frame, and make sure that:
- No cord or cable is connected to the main unit.
- The hood and image recording unit are stored.
- The cable drum is locked and does not rotate.

Instruction

When loading the equipment onto a vehicle, secure the equipment.
Otherwise, the equipment may be moved abruptly by harsh breaking or sharp cornering, and cause failure, accidents, and personal injuries.

Avoid

Do not put or insert foreign materials (e.g., flammable items, water, and metals) or fingers in the connector of the equipment.
Otherwise, fire, electric shock, or personal injury may result.

Avoid

Do not insert objects other than an SD or SDHC card into the SD card slot.
Otherwise, fire, electric shock, or failure may result.

Avoid

When operating this product, do not use a sharp object to press the buttons (switches).
Otherwise, the sheet of the buttons (switches) may be damaged, resulting in fire or electric shock.

Avoid

Do not drop the equipment from a high position.
The falling object may hit a person, causing a fatal accident.
When working at a high position, take adequate fall-prevention measures.

Avoid

Do not use benzene, alcohol, or paint thinner to clean the equipment.
Otherwise, the coating or display unit may be damaged or altered.

Avoid

Do not use organic solvents or strong detergents to clean the camera head.
Otherwise, the cover at the top of the camera head may be altered, resulting in significant degradation of strength.
Degraded strength will result in cracking of the head and result in loss of waterproof performance.

Avoid

Make sure that bolts on the camera head and skid are tightly secured.
Otherwise, the bolts may come off and the waterproof performance of the camera head may be lost, resulting in failure due to water entry.

⚠ CAUTION

When replacing the camera head, use the tools provided with the product.
Failure to do so may result in your fingers becoming pinched or injured due to the resilience of the spring.

Avoid

When replacing the camera cable and camera head, secure enough work space to keep people away from the site and also pay attention to the surroundings.
The resilience of the camera cable may cause personal injuries or equipment damage.

Avoid

When cleaning the equipment, or if the equipment will not be used for a long time, unplug the power cord from the adapter box and power outlet for safety reasons.

Avoid

This product uses a lithium battery and an LCD panel.
Follow the local regulations when disposing of the product.
Dispose of the product properly to prevent environmental pollution.

Separate disposal

Memo

● **Handle with care**
  - Do not drop the equipment or allow it to be subject to strong impact or vibration. Otherwise, failure may result.
  - Do not damage the connection cable. Otherwise, wire breakage may occur in the cable.
  - If the camera head is stuck in a pipe, do not pull the camera cable by force. Push back the cable slightly, and then pull it while rotating it. Pulling the cable by force may cause failure.

● **Ambient temperature and humidity**
  - Do not use the product in locations where the ambient temperature or humidity exceeds the specifications. Otherwise, image quality may be degraded or internal components may be adversely affected. In particular, do not use the product in areas exposed to direct sunlight.
    When capturing images under high temperatures, vertical stripes or white spots (noise) may be observed depending on the subject or camera conditions. This is not a failure of the equipment.

● **Handling the camera head**
  - Do not direct the lens of the camera head toward sunlight or intense light.
    The entry of direct light may damage the image sensor element and cause failure.
  - The camera head is waterproof against immersion. Do not disassemble, as it may result in loss of waterproof performance.
  - The camera head is not maintenance-free.
    When inserting the camera head into a pipe, be careful not to damage the camera head by hitting it against obstacles. If the camera head becomes scratched or damaged, contact your dealer.
  - The camera head is equipped with an automatic leveling system. Avoid strong impact.
    Otherwise, the automatic leveling system may not work properly.
  - The LED cover is made of resin (polycarbonate).
    Do not use the equipment in an atmosphere (of toluene or thinner) that may affect the resin.

● **Connecting the camera head**
  - Be sure to power off the equipment before connecting the camera head.
  - Attach the camera head firmly. Attaching the camera head improperly may cause water entry into the camera head and camera cable, resulting in failure.

● **Handling the camera cable**
  - Hold the camera cable firmly when working.
    The resilience of the camera cable may cause personal injuries and equipment damage.
  - Apply the drum stopper when not rewinding the camera cable drawn out from the drum.
    Otherwise, the camera cable may be drawn out further due to the resilience of the camera cable, and an unexpected accident may occur.

● **Drawing out the camera cable**
  - When drawing out the camera cable, pay attention to the draw-out speed.
    If the draw-out speed is too fast, the cable drum may rotate faster than the draw-out speed, causing the cable to become loose. This may cause injuries and equipment damage.
  - Draw out the camera cable slowly, making sure that the cable comes out smoothly.

● **Rewinding the camera cable**
  - Rewind the camera cable onto the drum by pushing the cable into the drum.
    Do not rotate the drum by hand to rewind the camera cable. The camera cable may not be able to keep up with the rotation of the drum, causing the rewinding radius to become small and the camera cable to become damaged.

● **Sharply bent camera cable**
  - Bending the camera cable sharply exceeding the minimum bending radius may break the cable.
    If the camera cable is broken, stop working with it immediately.

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Usage Precautions

● Image recording unit
- The LCD monitor on the image recording unit may be dark when used at a low temperature. This is not a failure.
- It will take time to start or stop the image recording unit due to the processing of internal software.
  This is not a failure of the equipment. It will take about 20 seconds to start, and about seven seconds to stop.
  If the main unit is powered off and immediately powered back on, only the main unit is turned on, and the image recording unit will not be powered on. Make sure that the Power LED on the image recording unit turns off before powering on the main unit.
- If an intense magnetic field or radio wave is generated near the equipment, noise may appear on the screen. This is not a failure of the equipment.
- A button cell battery is used for the clock and will need to be replaced once in about five years (at 25°C). If you feel that the battery has weakened, contact our sales staff or your dealer.

● Backing up the recorded data
- Powering off the equipment or performing a different operation during recording, or applying strong impact or static electricity from the outside may cause data to be destroyed. Back up the data recorded on the SD/SDHC cards onto a PC or other media to prevent accidental data loss.
  TOSHIBA TELI will not be liable for any loss or damage to the recorded data.
- If your SD/SDHC card does not have sufficient free space, you may be unable to save the last recording data. If there is insufficient free space, use another SD/SDHC card or move the stored data onto a PC.

● SD/SDHC cards
- Proper operation is not guaranteed if cards other than those recommended are used. Use other cards strictly at your own risk. Also, note that TOSHIBA TELI will not be liable for any loss or damage to the recorded data.
  Recommended SD/SDHC cards:
  Toshiba   SD-C series
  Transcend   TS1GSDC, TS2GSDC, TS4GSDHC6, ..., TS16GSDHC6
- Applying strong impact to the equipment while an SD/SDHC card is inserted may cause the SD/SDHC card to become unrecognized.
  In particular, if a strong impact is applied during recording, the data may not be saved.
  If an SD/SDHC card cannot be recognized, reinsert the SD/SDHC card, and then power off and on the equipment.
- Do not remove the SD/SDHC card while recording or playing back images. Doing so may damage files on the card.
  Remove the SD/SDHC card after stopping the operation.
- When using SD/SDHC cards on a PC or other devices, use a card reader that supports the capacity of the cards. Incompatible card readers may not work properly.
- Some data may be subject to copyright or other rights.
  Exercise due care when reproducing or distributing data. TOSHIBA TELI will not be liable for any troubles pertaining to the illicit handling or printing of the data.

● Connecting the equipment
- Be sure to power off the equipment before connecting any part or device to the equipment.
- Connect the plug firmly. Otherwise, failure may occur.

● Use of the equipment
- Use the equipment only for a single purpose. Do not inspect both water pipes and drain pipes with a single equipment.
  The filth or dirt attached in another use may enter the water pipe.

Usage Precautions

● **Avoid direct sunlight**
  - Do not leave this product under direct sunlight or in a car. Doing so may cause deformation and failure of the equipment.
    When leaving the equipment in a car, cover the equipment with a plastic sheet or cloth to protect it from direct sunlight.

● **When carrying from a cold place to a warm place**
  - Condensation may occur on the equipment surface or the LCD monitor screen.
    In such a case, let the equipment dry for one hour or longer before use.

● **Waterproof performance**
  - The cable drum, image recording unit, and main unit are not waterproof. Be careful not to get them wet. If the equipment gets wet, immediately wipe off the water with a dry cloth.
  - If the equipment gets wet with rain due to sudden change of the weather, immediately cover the equipment with a plastic sheet or the likes.

● **Storing the equipment**
  - Unplug the power cord from the adapter box and power outlet, and store indoors with this product.
    Take care to protect the main unit from direct sunlight and water.
  - Clean the camera head, camera cable, and main unit before storage.

● **In case of a failure**
  - If a failure occurs, unplug the power cord from the adapter box and power outlet, and contact your dealer.
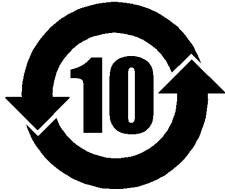
环保使用期限标识，是根据电子信息产品污染控制管理办法以及，电子信息产品污染控制标识要求(SJ/T11364-2006)、电子信息产品环保使用期限通则，制定的适用于中国境内销售的电子信息产品的标识。

电子信息产品只要按照安全及使用说明内容，正常使用情况下，从生产月期算起，在此期限内，产品中含有的有毒有害物质不致发生外泄或突变，不致对环境造成严重污染或对其人身、财产造成严重损害。

产品正常使用后，要废弃在环保使用年限内或者刚到年限的产品时，请根据国家标准采取适当的方法进行处置。

另外，此期限不同于质量/功能的保证期限。

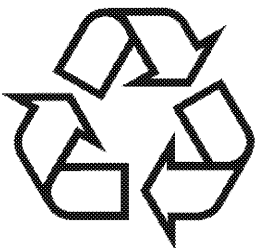The Mark and Information are applicable for People's Republic of China only.

中华人民共和国
环保使用期限

＜产品中有毒有害物质或元素的名称及含量＞

部件名称	有毒有害物质或元素					
	铅（Pb）	汞（Hg）	镉（Cd）	六价铬（Cr(VI)）	多溴联苯（PBB）	多溴二苯醚（PBDE）
产品主机	×	×	×	×	○	○
相机头部	×	○	×	○	○	○
镜头	○	○	○	○	○	○
相机线缆	×	○	×	○	○	○
滑环	×	○	○	○	○	○
操控主板组件	×	○	○	○	○	○
监视器及收纳组件	×	○	×	×	○	○
电源适配器箱及收纳组件	×	○	○	○	○	○

○：表示该有毒有害物质在该部件所有均质材料中的含量均在电子信息产品中有毒有害物质的限量要求标准规定的限量要求(SJ/T11363-2006)以下

×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出电子信息产品中有毒有害物质的限量要求标准规定的限量要求(SJ/T11363-2006)

This information is applicable for People's Republic of China only.

リサイクルに関する情報（包装物）
有关再利用的信息(包装物)
Information on recycling of packaging material

箱 ／ 箱子 ／ Box

内部緩衝材料・袋
内部缓冲材料・袋
Internal buffer materials / Bag

段ボール
瓦楞纸板
Corrugated cardboard

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Disclaimer

TOSHIBA TELI shall be exempt from taking responsibility for damage or losses incurred by the user in the following cases:
- In the case damage or losses are caused by fire, earthquake, or other acts of God, acts by a third party, deliberate or accidental misuse by the user, or use under extreme operating conditions.
- In the case incidental damage (loss of business interests, suspension of business activities, deformation or loss of data) or serious events (accidents involving loss of human life, fire, environmental pollution) are caused by use or non-use of the product.
- In the case problems pertaining to industrial property rights of third parties occur for which the structure and manufacturing process of the product are not direct causes.
- In the case damage or losses are caused by failure to observe the information contained in this instruction manual and specifications.
- In the case damage or losses are caused by use not described in this instruction manual and specifications.
- In the case damage or losses are caused by a malfunction or other problems due to combination with connected devices.
- In the case damage or losses are caused by malfunction or other problems resulting from use of equipment or software that is not specified.
- In the case damage or losses are caused by repair or modification conducted by the customer or an unauthorized third party.

TOSHIBA TELI shall bear no expenses greater than the individual price of the product.
Items that are not explicitly accounted for in the specifications or instruction manual of this product are outside the scope of the warranty.

Restrictions for Use

- If the equipment is to be used in the following conditions or environments, make considerations for safety measures and inform TOSHIBA TELI of such usage:

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

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

- This product is not designed or manufactured to be used for control of equipment directly concerned with human life [*1] or equipment relating to maintenance of public services/functions involving factors of safety [*2]. Do not use the product for such applications.

    (*1): Equipment directly concerned with human life refers to:
        - Exhaust control equipment for exhaust gases such as toxic fumes and smoke.
        - Equipment for which installation is mandated by various laws and regulations such as the Fire Act and Building Standard Law.
        - Equipment related to the above.

    (*2) Equipment relating to maintenance of public services/functions involving factors of safety refers to:
        - Traffic control systems for air transportation, railways, roads, or marine transportation.
        - Equipment for nuclear power generation.
        - Equipment related to the above.

- When using this product in an environment or applications with strong impact or vibration, take preventive measures to avoid failure and extend the product lifetime.

Memo

1. Package Contents

After opening the package of the product, check that the following items are included.
If any item is missing, contact your dealer.

Items already attached to the equipment

    1) Camera head (φ30 mm) ································· 1 piece ☐

    2) Camera cable (40 m) ································· 1 piece ☐

    3) Cable drum and control unit ································· 1 set ☐

    4) Adapter box ································· 1 piece ☐

Accessories

    1) Spare camera cable (40 m) ································· 1 piece ☐

    2) Accessory storage case ································· 1 set ☐

       - Focus adjustment tool ································· 1 piece ☐

       - Spring holding tool ································· 1 piece ☐

       - Camera cap ································· 1 piece ☐

       - Hex wrench (for M2) ································· 1 piece ☐

       - Hex wrench (for M3) ································· 1 piece ☐

       - Hex socket head bolt (M2x4, for attaching the camera head) 6 pieces ☐

       - φ40 mm skid ································· 1 piece ☐

       - Hex socket head bolt (M2x6, for attaching the φ40 mm skid) 8 pieces ☐

       - φ50 mm skid ································· 1 piece ☐

       - Hex socket head bolt (M3x6, for attaching the φ50 mm skid) 8 pieces ☐

       - SD card (2GB, with an SD card case)································· 1 piece ☐

    3) Instruction manual (this document) ································· 1 copy ☐
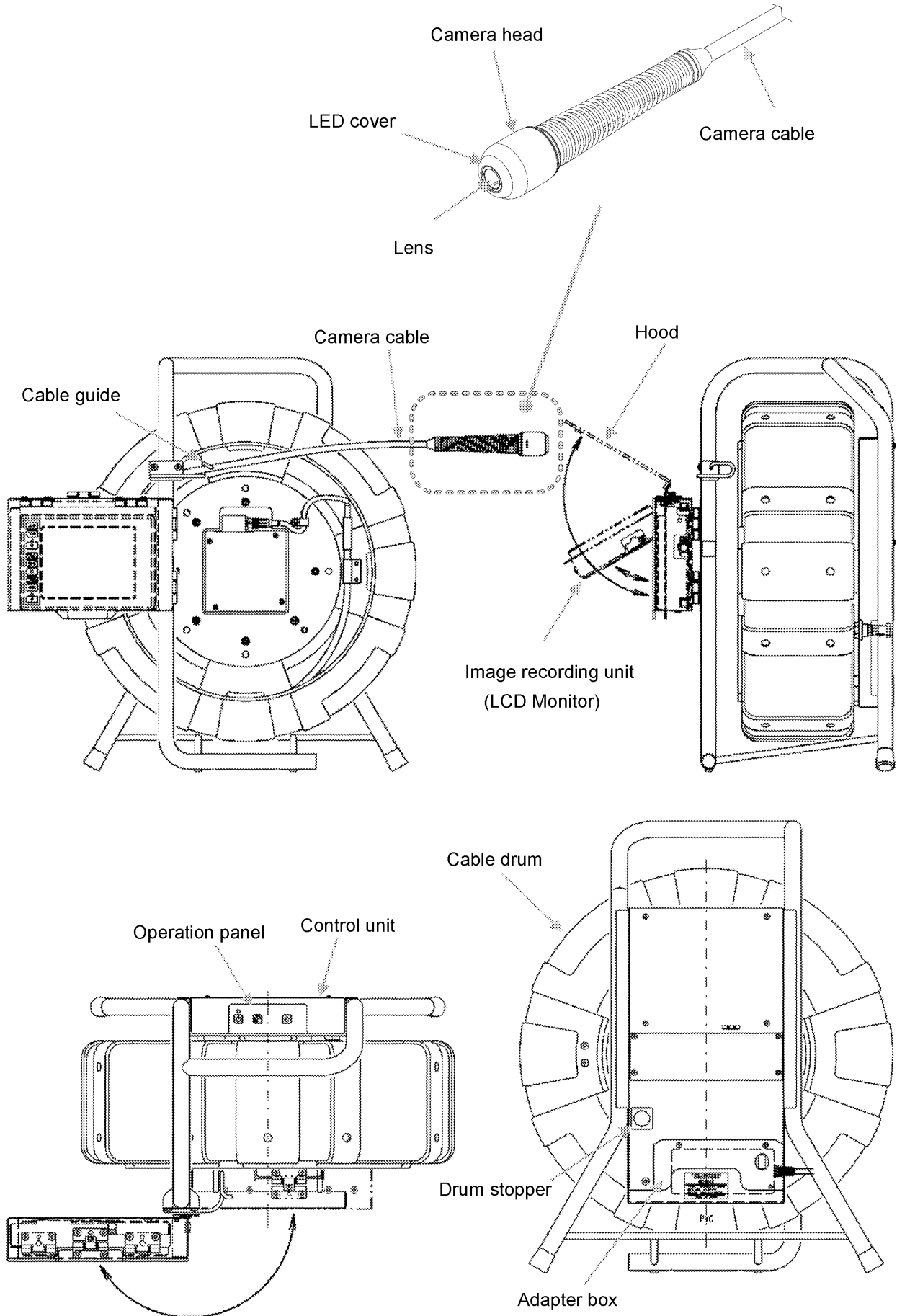
2. Features

This product has the following features.

1. Camera head equipped with an automatic leveling system

2. Camera head connection mechanism with good maintainability

3. Camera head and camera connector with underwater waterproof structures
   (Designed to meet IP68[1] , Only when connected to the camera cable).

4. Super-wide-angle lens
   Angle of view (diagonal): approx. 160 degrees in air, approx. 96 degrees in water

5. Illumination with power-saving, long-lifetime, super-high-intensity white LED

6. 40 m camera cable that can be easily pushed in

7. Light-weight main unit for better portability

8. Function for approximating the draw-out length of the camera cable and displaying the length on the monitor screen

9. Image recording unit for recording images during inspection or measurement

---

1) Environmental rating: IP rating designed to meet the standards of the Ingress Protection (IP) rating IP68 per IEC 60529 (Degrees of Protection provided by enclosures - IP Code). The product design was confirmed to meet the IP rating by means of construction design verification process only.

3. Part Names

Camera head

LED cover

Camera cable

Lens

Camera cable

Hood

Cable guide

Image recording unit
(LCD Monitor)

Cable drum

Operation panel   Control unit

Drum stopper

Adapter box

4. Connecting the Equipment

1. Connecting the Power Cord

    (1) Connect the power cord to the adapter box on the side of this product.

          When doing so, make sure that the power cord is inserted firmly.

AC power supply
AC100-240V
Adapter box

Adapter LED
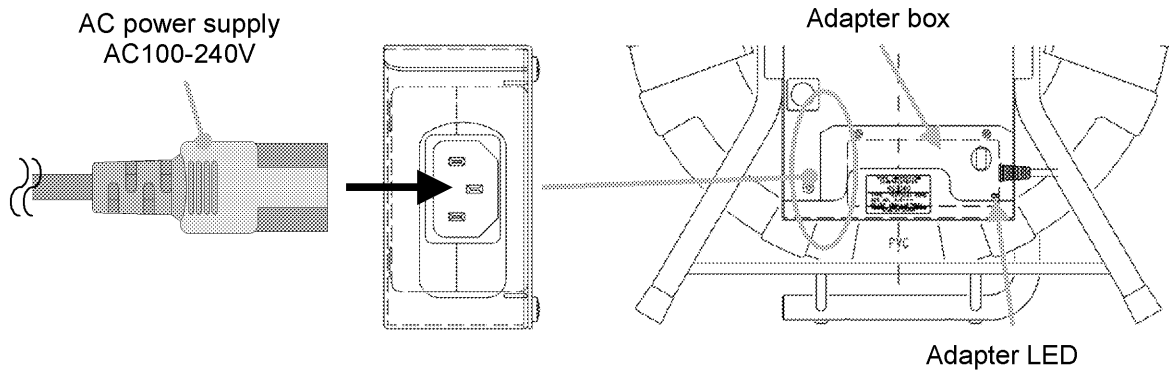
⚠ CAUTION

1. Power cord

A power cord is not provided with the product, and must hence be provided by the user.

Use a power cord that satisfies the following conditions:

(1) Use a power cord compliant with the **requirements and standard of the power supply** for each region.

[Information]	- Japan	Voltage: single-phase 100 V	Frequency: 50/60 Hz
	- U.S.	Voltage: single-phase 120 V	Frequency: 60 Hz
	- Europe	Voltage: single-phase 220 to 240 V	Frequency: 50 Hz

(2) Use a power cord connector plug that can be connected to 3P inlet type socket (compliant with IEC320 C14).

(3) In Japan, use a power cord certified by the <PS>E standard, and connect it to a 100 VAC power supply.

(4) Be sure to ground the power cord.

    Failure to do so may cause electric shock.

2. Connecting the power cord

(1) When connecting the power cord, avoid bending by force or applying excessive force.

    Otherwise, failure such as wire breakage may result.

(2) When connecting the power cord, be careful not to contact your fingers or hands with the adapter box.

    Contact with the metal part of the adapter box may cause injuries.

(3) Be sure to connect the power cord to the adapter box before connecting it to an AC power supply (a power outlet, etc.).

(4) When connecting the power cord, do so at a flat and stable place. Connection work at an unstable place may cause

    failure or injuries.

3. Vicinity of the adapter box

Do not place objects around the adapter box on the side of the product.

Operating the power button of the product does not disconnect the equipment from the power supply. Secure enough

work space so that the power cord can be unplugged from the adapter box immediately in case of a failure or fire.

4. Precautions for using the power cord

(1) Take care to avoid exposing the power cord to rain, snow, or ultraviolet rays. Failure to do so may cause degradation of

    the power cord, resulting in an accident, failure, or injury.

(2) Be sure to inspect the power cord before use and after use. If you find any damage such as scratches or cracks, stop its

    use and replace with a new one.

2. Connecting External Equipment

This product can output video image signals to external equipment.

Monitor attaching frame

Video output terminal

Cover

Screws
(M2x3) x 2
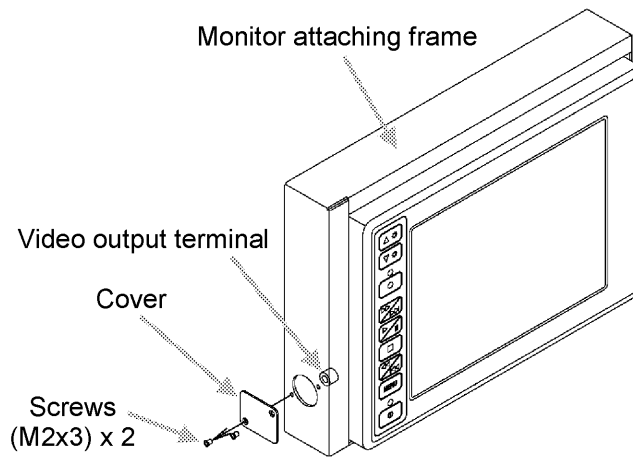
(1) Remove the cover from the side of the monitor attaching frame of the image recording unit.
(2) Connect a video cable to the terminal on the image recording unit.
(3) Connect the other end of the video cable to the input terminal on the external equipment.

⚠ CAUTION

● Keep the removed screws and cover carefully so as not to lose them.

● Make sure that each piece of equipment is powered off before connecting this equipment and external equipment.

● The video output terminal outputs video image signals (compliant with the NTSC standard).
  Use external equipment that can display video images (compliant with the NTSC standard).

5. Operating the Equipment

1. Selecting the Intended Use

This product can be used for either water pipe inspection or drain pipe inspection.

Before using this product for the first time, select "WATER PIPE" or "DRAIN PIPE" with the label attached to the main unit, according to the intended inspection use.

After that, use the equipment only for the inspection use indicated by the selection label on the main unit.

水道管
WATER PIPE

ご使用前に用途を
選択してください。
Please select your
application before use.

排水管
DRAIN PIPE
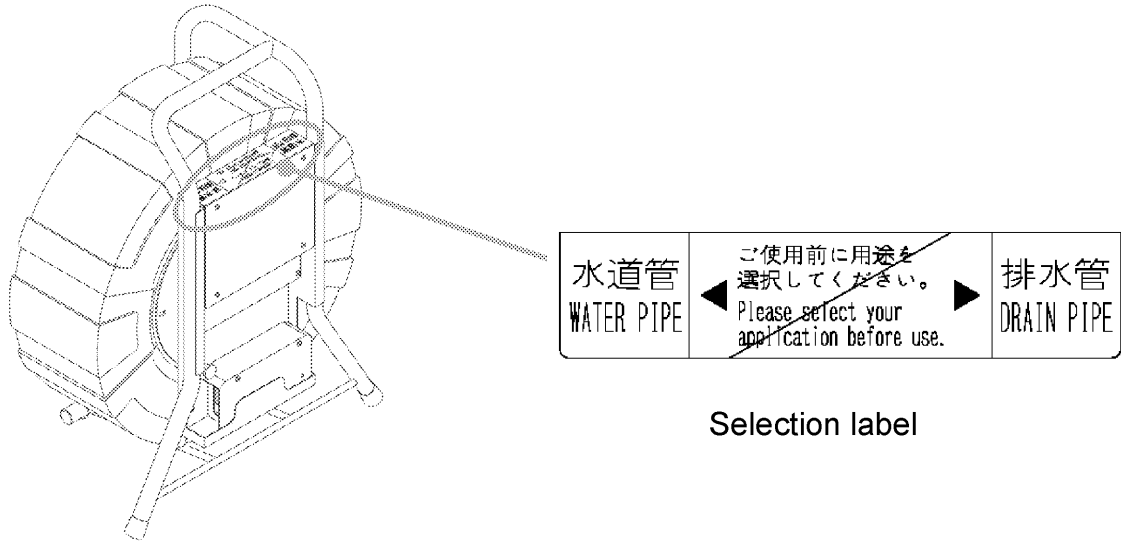
Selection label

(1) Remove the label portion indicating the intended use by peeling from the inside edge of the label. (The selection label is attached to the main unit at both ends of the label.)

(2) Remove the unnecessary label together with the label mat.

(3) Attach the label indicating the intended use back onto the main unit.
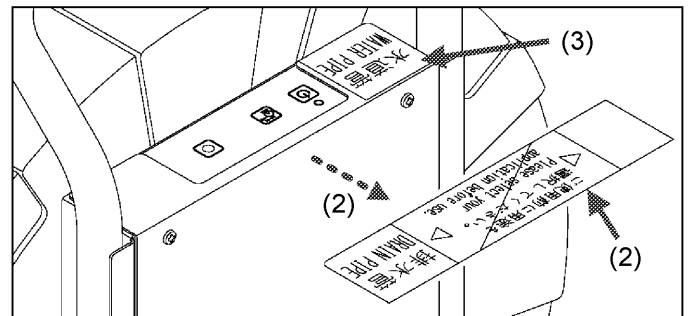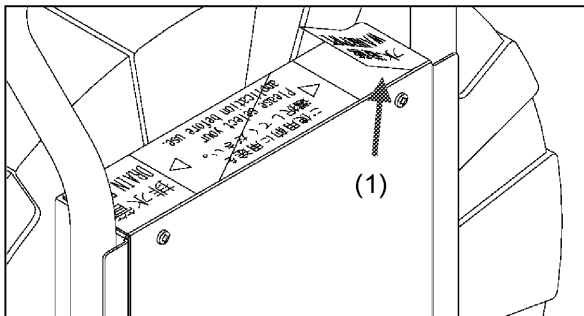
[Example: Selecting water pipe inspection]

⚠ CAUTION

● Do not inspect both water pipes and drain pipes with a single equipment.

Doing so may cause the filth or dirt attached to the equipment during drain pipe inspection to enter a water pipe.

● You may be contacted by TOSHIBA TELI if no label is attached on a product that has been sent in for repair.

2. Main Unit Operation Panel

The following functions can be performed on the main unit:
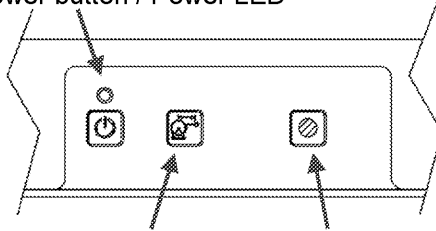
1) Powering on or off the main unit
2) Turning on or off the display of the cable draw-out distance, or resetting the distance
3) Changing the illumination brightness (normal or maximum)

(1) Power button / Power LED

(2) Distance button   (3) Illumination button

Major operations on the main unit		
Power	ON/OFF	⏻
Distance	Display ON/OFF	📷
	Reset	When the distance display is ON 📷 Press and hold
Illumination	Normal / Maximum	🚫 Press and hold

(1) Power button / Power LED

The power is switched between ON and OFF by pressing the Power button.
- Power LED (orange) : Lights up (indicating standby) when the equipment is connected to an AC power supply.
- Power LED (green) : Lights up (indicating active) when the power is on.

(2) Distance button
- Turning on or off the distance display
  Pressing the Distance button turns off the distance display, and pressing the button again displays the distance.
  * When the equipment is powered on, the distance is displayed automatically.
- Resetting the distance display
  Pressing and holding the Distance button for one second or longer while the distance is displayed resets the distance display to "00.0m".
  * When the equipment is powered on, the distance display is reset automatically.

(3) Illumination button
- Pressing and holding the Illumination button for one second or longer switches the brightness of the camera head between normal and maximum.
  * The illumination status is maintained during standby. However, when the AC power supply is turned off, the status returns to "normal".

⚠ CAUTION

● The distance display shows an approximation obtained by counting the number of rotations of the cable drum.
  If the main unit is moved during inspection, the cable drum may rotate and the distance display value may be changed.
  Therefore, do not move the main unit during inspection.
● Before inspection, retract the camera cable completely into the drum, and then power on the equipment.

---

3. Image Recording Unit

This unit displays the images for an ongoing inspection on the LCD screen. The unit can also record (save) the displayed images onto an SD card and later play back the recorded images.
Each function can be set or adjusted on the OSD (On Screen Display) menu screen.

(11) LCD monitor brightness adjustment (Up)

(10) LCD monitor brightness adjustment (Down)

(9) REC LED

(8) Record button

(7) Fast-Forward or Select button

(6) Play/Pause or Select button

(5) Stop or Cancel button

(4) Rewind or Select button

(3) Menu button

(2) Power LED

(1) Power button
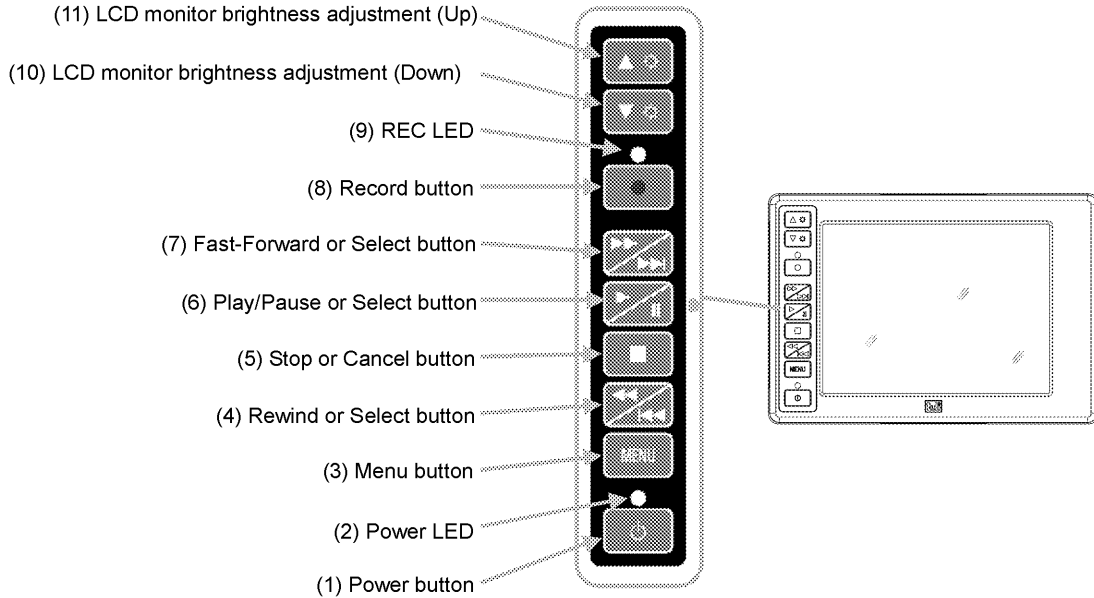
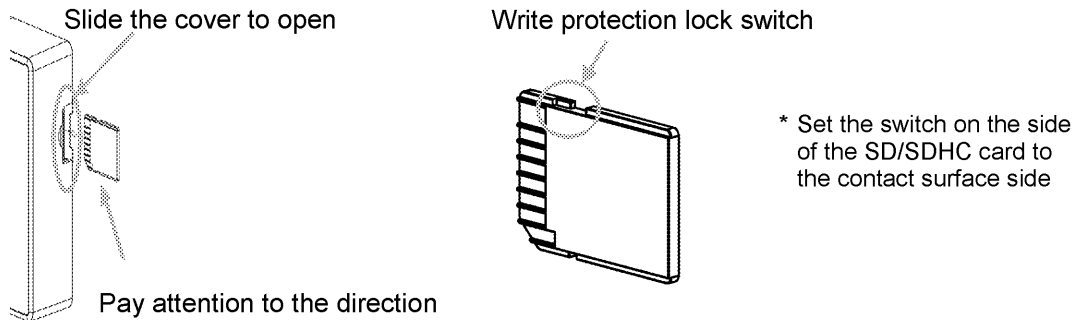|	Name	When the OSD menu is hidden	When the OSD menu is displayed	During playback
(1)	Power button	Turns on or off the power of the image recording unit.		
(2)	Power LED	Lights up in green when the power is on. Flashes in green when the unit is starting or stopping, or when the unit is executing processing.		
(3)	Menu button	Displays the OSD menu.	Hides the OSD menu. Enables operation of special functions.	Disabled
(4)	Rewind or Select button	Disabled	Moves the cursor to the left. Decreases a setting value.	Picture: Displays the previous image. Movie: Selects a reverse playback speed.
(5)	Stop or Cancel button	Disabled (Stops recording if recording.)	Cancels the current operation. Goes back to the previous screen (without saving the current settings).	Stops playback. (Returns to the file list.)
(6)	Play/Pause or Select button	Displays the file list.	Confirms the settings.	Picture: Disabled Movie: Pauses or resumes playback.
(7)	Fast-Forward or Select button	Disabled	Moves the cursor to the right. Increases a setting value.	Picture: Displays the next image. Movie: Selects a playback speed.
(8)	Record button	Starts recording a picture or movie.	Disabled	Picture: Disabled Movie: Records a picture.
(9)	REC LED	Lights up in red when recording.	Disabled	Picture: Disabled Movie: Lights up when recording a picture.
(10)	LCD monitor brightness adjustment (Down)	Decreases the brightness of the LCD monitor.	Moves the cursor down. Moves the cursor to the right when setting the clock.	Decreases the brightness of the LCD monitor.
(11)	LCD monitor brightness adjustment (Up)	Increases the brightness of the LCD monitor.	Moves the cursor up. Moves the cursor to the left when setting the clock.	Increases the brightness of the LCD monitor.

* This table shows the main functions of each button. For details, refer to the description of each item.

1) Inserting or removing an SD/SDHC card

    (1) Slide open the SD card slot cover on the right side of the image recording unit.

    (2) When inserting an SD/SDHC card, face the contact surface of the card to the front (screen) side and slowly push in the card until it clicks.

          When removing the card, push the card slowly until it clicks, and then pull the card out.

    (3) When done, slide and close the SD card slot cover.

Slide the cover to open   Write protection lock switch

* Set the switch on the side of the SD/SDHC card to the contact surface side

Pay attention to the direction

> **⚠ CAUTION**
>
> ● Be careful not to insert an SD or SDHC card in the wrong direction or upside down.
>   Inserting an SD/SDHC card by force may result in failure or damage.
> ● Before recording images onto an SD/SDHC card, be sure to unlock the write protection switch on the card.
>   When the switch on the side of the SD/SDHC card is set to "Lock", it is not possible to write or delete data, or format the card.
> ● If an SD/SDHC card contains important data or data that must be saved, move the data onto another media before using the card to avoid deleting the data by mistake.

2) Turning on or off the power of the image recording unit.

The image recording unit is turned on or off in conjunction with the operation of the Power button on the main unit operation panel.

If the main unit is powered on but the image recording unit is not turned on, or if you want to turn on or off only the image recording unit, perform the following operations.

[Turning the power on]

    Press and hold the Power button of the image recording unit for a while. The unit is turned on and the Power LED flashes in green indicating that the unit is starting up.

    The unit displays color bars while starting up. When the unit has started up normally, the Power LED lights up in green and the unit displays an image.

[Turning the power off]

    When the unit is active, press and hold the Power button for a while. The Power LED flashes in green and the exit process for the image recording unit starts.

    After a short time, the power turns off and the Power LED goes out.

      * During the exit process, an OSD message is displayed on the screen.

> **⚠ CAUTION**
>
> ● When the power of the main unit is off, the image recording unit cannot be turned on.
> ● When the main unit is powered on, it will take a while for an image to be displayed on the image recording unit.
>   This is not a failure of the equipment.
> ● When the main unit is powered off, an OSD message for the exit process is not displayed.

3) Operating the OSD menu screen

Each function of the image recording unit can be set or adjusted on the OSD menu screen.
To display the OSD menu screen, press the Menu button.

Move to the bottom setting item on the next page of the menu screen

Cursor

Page number of the menu screen

Setting items

| △ ✿ | | ▽ ✿ |
Up   Down

Select the item with the Up and Down buttons

Adjustment and selection options

Left   Right

Select option with the Left and Right buttons
* Use the Up and Down buttons for some settings

Move to the top setting item on the next page of the menu screen
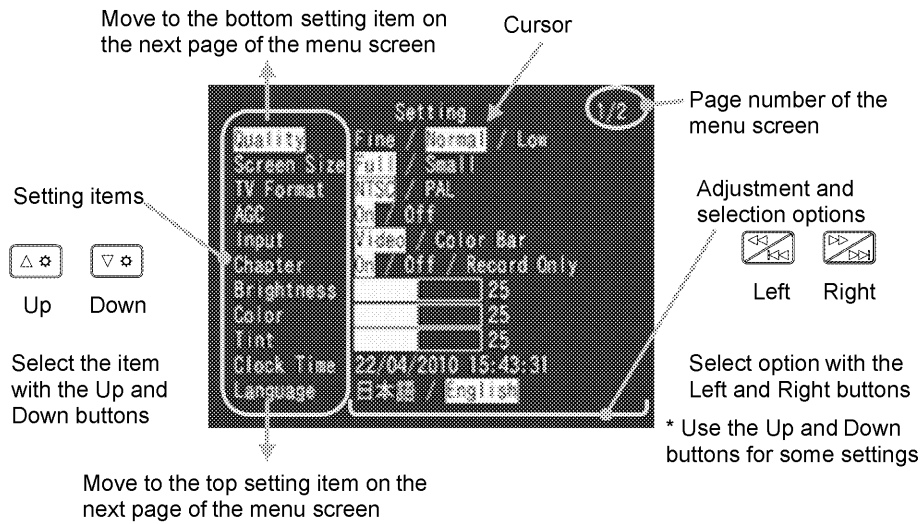
The setting items are displayed on the left side of the screen. On the right of the setting items, the settings and adjustment options for the selected setting item are displayed.
Push the Up and Down buttons to move the cursor to select a setting item, and push the Left and Right buttons to perform setting and adjustment.
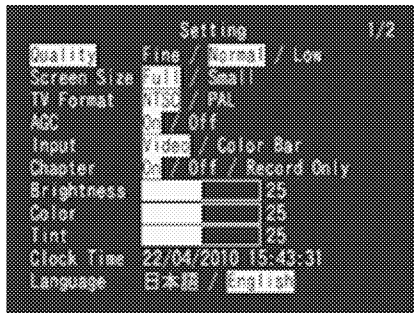
Menu Screen 1
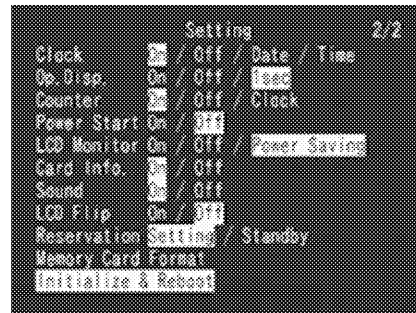
Menu Screen 2

There are two menu screens. To display the other screen, move the cursor past the top or bottom setting item by pressing the Up or Down button.

| MENU | Updates the settings and adjustment contents and then closes the menu.

| □ | Closes the menu without updating the settings and adjustment contents.

After completing the desired settings and adjustments, press the Menu button to hide the OSD menu screen. In the process of hiding the OSD menu, the settings and adjustments are saved onto the internal memory.
When the Stop or Cancel button is pressed, the OSD menu screen is closed without saving or updating the settings and adjustments.

⚠ CAUTION

● When the OSD menu is displayed or when processing the hiding of the menu, do not power off the main unit. Doing so will prevent settings and adjustments from being saved correctly, and a malfunction may occur due to damaged setting values or the settings may be reset to the default values.

● The OSD menu is not closed automatically. Be sure to press the Menu button or Cancel button to close the OSD menu. Operations such as recording cannot be performed while the OSD menu is being displayed.

4) Setting the display language

Display the OSD menu and select the "Display Language" setting item by operating the Up and Down buttons.

Select " 日本語 (Japanese) " or "English" for the display language by operating the Left and Right buttons.

* The factory default setting for the display language is " English ".

5) Setting the clock

Display the OSD menu and select the "Clock" setting item by operating the Up and Down buttons.

Setting item

△ ✿　　▽ ✿

Up　　Down

Select "Clock" with the Up and Down buttons
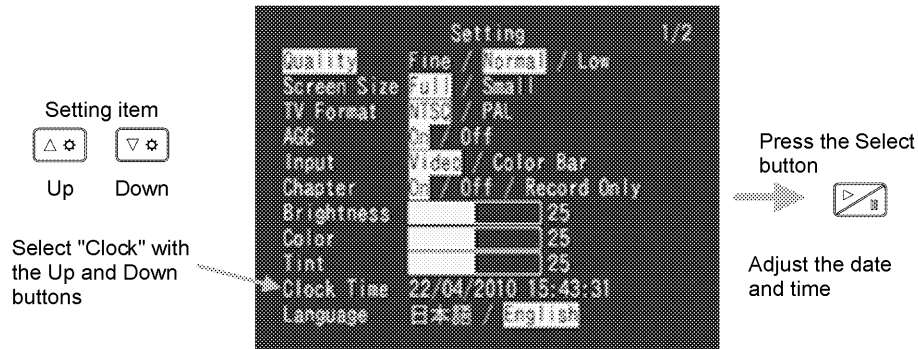
Press the Select button

Adjust the date and time

Move the cursor onto "Clock" and press the Select button. Adjust the date and time.

● Adjusting date and time

You can set the year, month, day, hour (in 24-hour notation), minute, and second.
The cursor is first displayed on "year". The value at the cursor position can be adjusted by pressing the Left and Right buttons.
Move the cursor by pressing the Up and Down buttons.

2012. 03. 13　15: 26: 07　In this state, press the Decision button.

Press

2012. 03. 13　15: 26: 07　The Year can be adjusted. Press the ◁◁ or ▷▷ button to decrease or increase the setting value.

Press

2012. 03. 13　15: 26: 07　The cursor moves to the right, and the Month can be adjusted. Set with the Left and Right buttons in the same manner as for the Year.

Press

2012. 03. 13　15: 26: 07　The cursor moves to the right, and the Day can be adjusted. Set with the Left and Right buttons in the same manner as for the Year.

* Adjust hour, minute, and second in the same manner.

After completing the setting, press the Select button again.
The cursor highlights the entire date and time and the setting is completed.

⚠ CAUTION

● To save the settings, press the Menu button to close the OSD menu.

● Before using the equipment, check the clock and set it as needed. Note that the value of the clock is used for file names.

● When the OSD menu is displayed or when processing the hiding of the menu , do not power off the main unit. Doing so will prevent settings and adjustments from being saved, and a malfunction may occur due to damaged setting values or the settings may be reset to the default values.

6) Recording images

The image recording unit can record both "pictures" and "movies".

When the Record button is pressed once, a "picture" is recorded. When the Record button is pressed and held for a while, a "movie" is recorded.
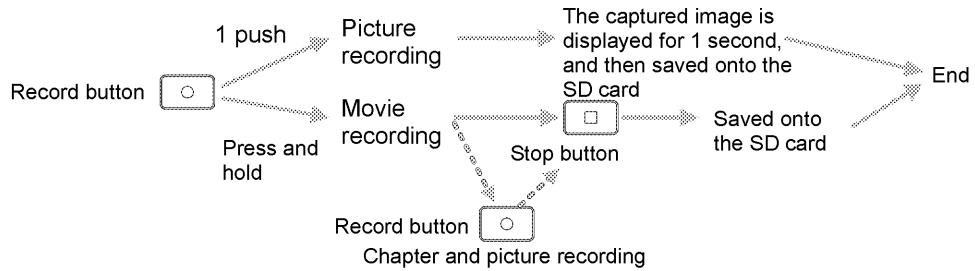
Select the recording method to suit your needs.

The REC LED lights up in red when the unit is recording a picture or movie.

[Detailed setting items]

Picture ·········· Image size

Movie ·········· Image size, quality, chapter setting, timer recording

Movie recording time length (approx., condition: Full size)

Quality	SD Card Capacity		SDHC Card Capacity			
	1 GB	2 GB	4 GB	8 GB	16 GB	32 GB
High	26 min	52 min	1 h 45 min	3 h 32 min	7 h 13 min	14 h 29 min
Normal	44 min	1 h 27 min	2 h 55 min	5 h 54 min	12 h 01 min	24 h 09 min
Low	1 h 28 min	2 h 55 min	5 h 52 min	11 h 48 min	24 h 03 min	48 h 18 min

* The maximum file size is 4 GB and the maximum recording time is 180 minutes for each file.

⚠ CAUTION

● When recording for a long time, the recorded data is automatically saved every three hours or every time the data size reaches 4 GB.

Note that recording is interrupted during the save process, and no image is recorded during that time.

[Recording a picture and chapter when recording a movie]

When the Record button is pressed during movie recording, a picture and chapter are recorded.

Chapters can be used as data for locating a specific scene during playback.

(Available only on the image recording unit)

The recording method for chapters can be selected on the OSD menu screen.

When it is not necessary to use chapters or pictures, change the chapter setting.

* For details, refer to **(6) Chapter** on page 17.

7) File name and destination folder structure

The file name of a recorded picture or movie data is created from date and time of the recording, determined based on the time adjusted with the "Clock" setting item.

File name

YYYYMMDDhhmmss.jpg

Year Month Day Hour Minute Second Extension
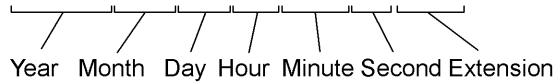
Example: When recorded on March 13, 2012 at 17:52:48
　　　Picture: 20120313175248.jpg
　　　Movie: 20120313175248.mp4 　* Note the difference in the file extension.

Recorded data are stored onto an SD/SDHC card.
The folder structure on the SD/SDHC card is as follows.

Memory Card
NTSC
☆1 movie — Folder for storing movie files Extension : mp4
chapter — Folder for storing chapter files Extension : cha (text file)
☆2 picture — Folder for storing picture files Extension : jpg
cache — Management data folder for displaying thumbnails of movies and pictures
movie
picture — Folder for storing thumbnail images
movie　　: For movies and chapters
picture　: For pictures
Extension　: jpg
PAL movie

The storage destination depends on the TV system.
* The subfolder structure is the same as for NTSC.

The storage destination is changed based on the setting of the "TV System" setting item.
Select "NTSC" for the "TV System" setting item.

When reading or playing back the data on a PC, select the files from the folder indicated by "☆1" or "☆2" in the figure.

⚠ CAUTION

● Do not change the folder structure and folder names on the memory card.
　Otherwise, the thumbnail or chapter function may not work properly, resulting in data damage or a failure.

- 12 -

8) Playing back images

Data stored onto an SD/SDHC card can be played back.
Without performing operations such as recording, press the Play button with the OSD menu hidden.
The "Picture File List" or "Movie File List" is displayed.
* The list last operated will be displayed.

When the OSD menu screen is hidden and when no operation is being performed   Play button

Picture File List

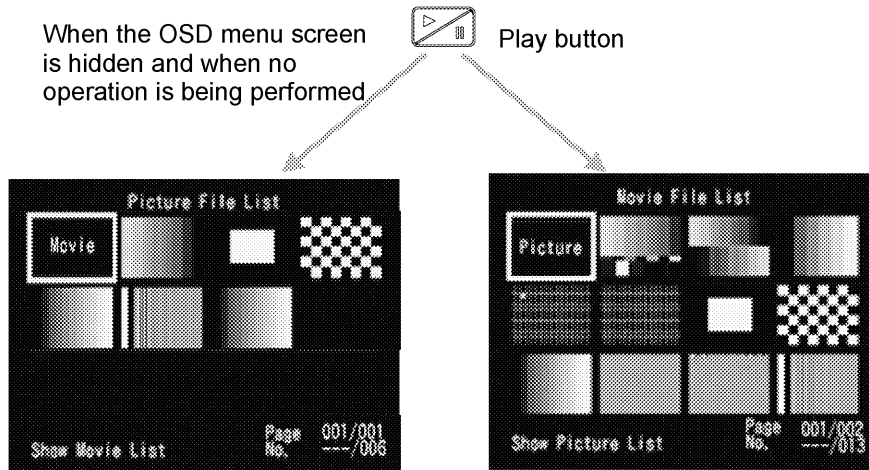Movie

Show Movie List   Page No. 001/001 ----/006

Movie File List

Picture

Show Picture List   Page No. 001/002 ----/013

The file list displays thumbnails for data stored on the SD/SDHC card.
The thumbnails are displayed in descending order of the recorded date and time.
Move the cursor with the Up, Down, Left, and Right buttons to select a file, and press the Play button to confirm.
By moving the cursor to Pictures (or Movies) and pressing the Play button, the file list can be switched between "Movies" and "Pictures".

Cursor movement   Up
Cursor movement Down
Cursor movement Right
Select / Play
Cancel / Back
Cursor movement Left
File deletion (when pressed and held)
Chapter playback (movie)
Power On/Off

Cursor   Page title

Movie File List

Picture

Show Picture List   Page No. 001/002 ----/013

File name display   Thumbnail
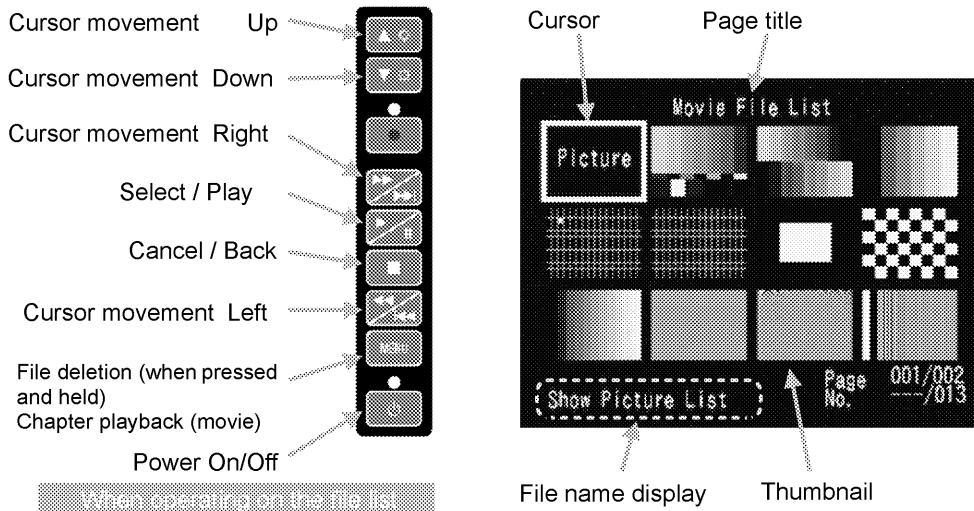
[Playback function]

☆ **Picture**   **1. Continuous playback**

Press the Right (Fast-Forward) button during picture playback to display the next picture.
Press the Left (Rewind) button to display the previous picture.

2. Slideshow playback

Select a picture to play back from the "Picture File List", and then **press and hold** the Play button to start a slideshow playback.

* Press the Cancel (Stop) button to return to the "Picture File List" screen.

☆ **Movie**

1. Recording pictures while playing back a movie (only for normal speed)

Press the Record button during movie playback to capture the image being played back as a picture.

Note that the quality of the picture will not be good if the movie has been recorded in low quality.

* For details, refer to **(1) Quality** on page 16.

2. Changing the movie playback speed

Press the Right (Fast-Forward) button during playback to change the playback speed.

Press the Left (Rewind) button to start reverse playback.

Every time the Right (Fast-Forward) or Left (Rewind) button is pressed, the playback speed is changed.

Reverse playback is performed as frame-by-frame playback.

Right (Fast-Forward) button:
Left (Rewind) button:

Normal ⟶ 4x ⟶ 8x ⟶ 1/4x
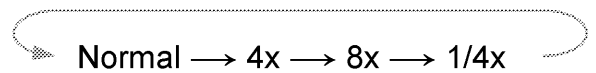
3. Chapter playback

If the chapter function is used during the recording of a data, the "Chapter List" screen can be displayed by selecting a thumbnail from the "Movie File List" and pressing the Menu button.

Operate the cursor in the same way as on the "Movie File List" to select the thumbnail of the file to play back, and press the Play button to confirm.

Pressing the Right (Fast-Forward) button while paused (by pressing the Play button during playback) will resume playback from the next chapter image.

Similarly, pressing the Left (Rewind) button resumes playback from the previous chapter image.
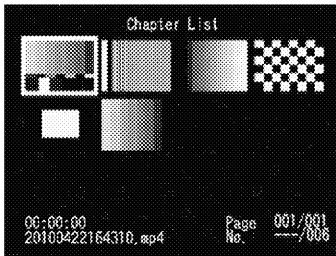
9) Displaying information

By adjusting or setting the setting items from the OSD menu, information can be displayed on the screen.

The following four items can be displayed:
(1) Clock Display
(2) Operation Status
(3) Counter
(4) Card Information

The items that can be displayed vary depending on the operation state.

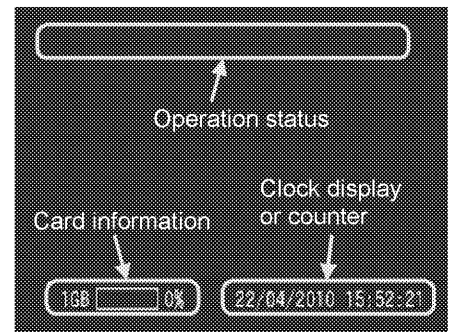|	Normal	During recording		During playback	
		Movie	Picture	Movie	Picture
Clock Display	○	×	×	×	×
Operation Status	×	○	×	○	×
Counter	×	○	×	○	×
Card Information	○	○	×	×	×

○ : Can be displayed when set, × : Cannot be displayed even if set

The four items available for display are set or adjusted from the OSD menu.

(1) Clock Display — The date and/or time can be displayed at the lower right of the screen.
Options : On / Off / Date and Time / Clock
On ⋯⋯ Displays the date and time in the format of Year. Month. Day. Hour : Minute : Second.
Date and Time ⋯⋯ Displays the date and time in the format of Month. Day. Hour : Minute : Second.
Clock ⋯⋯ Displays the time in the format of Hour : Minute : Second.

(2) Operation Status — The current quality, size, TV system, and status (recording or playback) can be displayed at the top of the screen.
Options : On / Off / 1 Sec
On ⋯⋯ Displays quality, size, TV system, and status (recording or playback).
1 Sec ⋯⋯ Displays the same contents as for "On" for one second.

(3) Counter — The elapsed time for movie recording or playback, or the clock for recorded data can be displayed.
Options : On / Off / Clock
On ⋯⋯ Displays the elapsed time (Hour: Minute: Second) for recording or playback in increments of one second.
Clock ⋯⋯ Displays the date and time of recorded data in the format specified by "Clock Display".
* Use this function to see the date and time of the recorded data during playback.
Do not forget to set the "Clock Display" setting.

(4) Card Information — The remaining capacity of the SD/SDHC card can be displayed at the lower left of the screen.
Options : On / Off
When set to "On", the card information will be displayed in red when the used capacity reaches 76%.

- 15 -

10) OSD menu setting items

Each function of the image recording unit can be set or adjusted on the OSD menu screen.
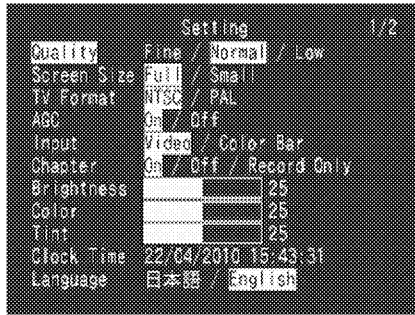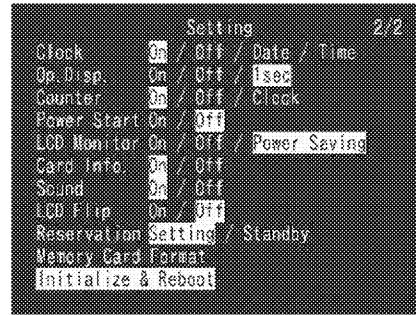
| Menu Screen 1 | Menu Screen 2 |

* For operation details, refer to **3) Operating the OSD menu screen** on page 9.

[OSD menu settings (page 1/2)]

(1) Quality　　Specifies image quality for movie recording.　　　　　[Only for movies]

Options :　High / Normal / Low

High　　········Full: 5.0 Mbps, Small: 1.5 Mbps
Normal　········Full: 3.0 Mbps, Small: 1.0 Mbps
Low　　········Full: 1.5 Mbps, Small: 0.5 Mbps

*　With high quality, movies can be recorded clearly, but the size of each file will be large. Pay attention to the remaining capacity of the SD/SDHC card.

*　With low quality, file sizes will be relatively small, but block noise will occur due to image compression.

*　Perform a trial recording before selecting the quality.

(2) Size　　Specifies the size of images to be recorded.

Options :　Full / Small

Size	Movie		Picture	
	NTSC	PAL	NTSC	PAL
Full	720x480	720x576	640x480	768x576
Small	360x240	360x288	320x240	384x288

*　When "Small" is selected, file sizes will be small, but the displayed images will be coarse as the images will be enlarged for playback.

⚠ **CAUTION**　When the size is switched, color bars may be displayed.
This is not a failure.

(3) TV System　　Specifies the signal system for the input to the image recording unit.

[Do not change]

Options :　NTSC / PAL

⚠ **CAUTION**　**Do not set to PAL.**
TS3040 uses NTSC system signals.

(4) AGC Setting　　　Specifies whether to enable the function for automatically adjusting the level of input image signals.
Options : On / Off
The AGC function automatically adjusts the signal level to within the standard range if the level of an input signal is greater than 120% of the rated level.
When this function is enabled, response to level variation will be slightly slower.
When response is important, select "Off".

(5) Input Mode　　　Specifies whether to display the camera image or color bars.
Options : Image / Color Bars
Select "Image" for conventional use.
Select "Color Bars" to adjust the LCD monitor.

(6) Chapter　　　Specifies the setting of the chapter function for movie recording.
[Only for movies]
Options : On / Off / Chapter Only
On 　　········· Records both chapters and pictures.
Off 　　········· Records only pictures without recording chapters.
Chapter Only 　 Records only chapters without recording pictures.

(7) Brightness　　　Specifies the brightness of the LCD monitor.
　Options : 0~50　　　　　**Standard value: 25**

(8) Saturatiom　　　Specifies the saturation of the LCD monitor.
　Options : 0~50　　　　　**Standard value: 25**

(9) Hue　　　Specifies the hue of the LCD monitor.
　Options : 0~50　　　　　**Standard value: 25**

*　Settings (7) thru (9) (brightness, saturation, and hue) adjust only the display status of the LCD monitor, and do not affect the recorded image (movie or picture) data.

(10)Clock　　　Specifies the date and time on the image recording unit.
For details, refer to **5) Setting the clock** on page 10.

(11)Display Language
Specifies the display language for the OSD.
For details, refer to **4) Setting the display language** on page 10.

[OSD menu settings (page 2/2)]

(1) Clock Display Specifies whether to display the clock on the screen.
For details, refer to **9) Displaying information** on page 15.

(2) Operation Status Specifies whether to display the current quality, size, TV system, and status
(recording or playback) on the screen.
For details, refer to **9) Displaying information** on page 15.

(3) Counter Specifies whether to display the clock during movie recording and playback.
[Only for movies]
For details, refer to **9) Displaying information** on page 15.

(4) Power Interlock Specifies whether to allow the Power button on the main unit to turn on or off the
image recording unit.
Options : On / Off
On ·············· The image recording unit can be turned on or off with the
Power button on the main unit.
Off ·············· The image recording unit can be turned on or off only with
the Power button on the unit itself.
* When the setting is "On", the image recording unit can be turned on or off with
its own Power button.

(5) LCD Monitor Specifies the power-supply setting of the image recording unit.
Options : On / Off / Power Saving
On ·············· Displays images on the LCD monitor when the image
recording unit is active.
Off ·············· Does not display images on the LCD monitor.
[Do not select]
Power Saving ······ The power of the LCD monitor is turned off about 10
minutes after the last button operation (power saving mode).
To return from power saving mode, press any operation button.
* The LCD monitor uses a fluorescent tube.
It will take some time for the brightness to stabilize.

⚠ **CAUTION** **Do not set to Off.**
When set to Off, the LCD monitor on the image recording unit will not
display any image, and there will be no way to cancel the Off mode.
* In such a case, connect an external monitor or reset to default settings.

(6) Card Information Specifies whether to display the remaining capacity of the SD/SDHC card on the
screen.
For details, refer to **9) Displaying information** on page 15.

(7) Sound Effects Specifies whether to enable sound effects during operation.
Options : On / Off

(8) LCD Inversion Specifies whether to rotate the display image of the LCD monitor by 180 degrees.
Options : On / Off

ON
OFF
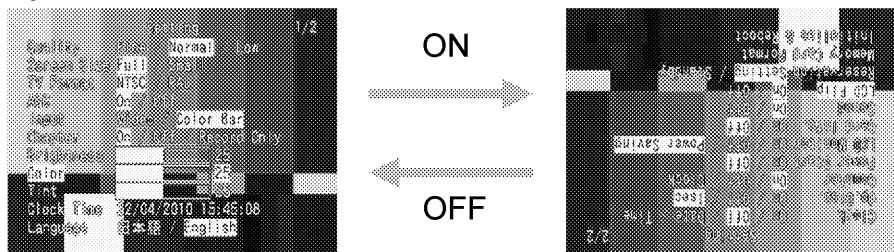
* This function does not invert the cursor motion. Operate carefully when the display image
inverted.

(9) Timer Recording Specifies date and time for automatic recording.   [Only for movies]
Up to eight timer recording items can be set and registered for up to one month in advance.
Options : Registration / Timer Set
Registration ·········· Specifies the date and time for each timer recording item.
Timer Set·············· Activates the specified timer recording.

[Registering timer recording items]
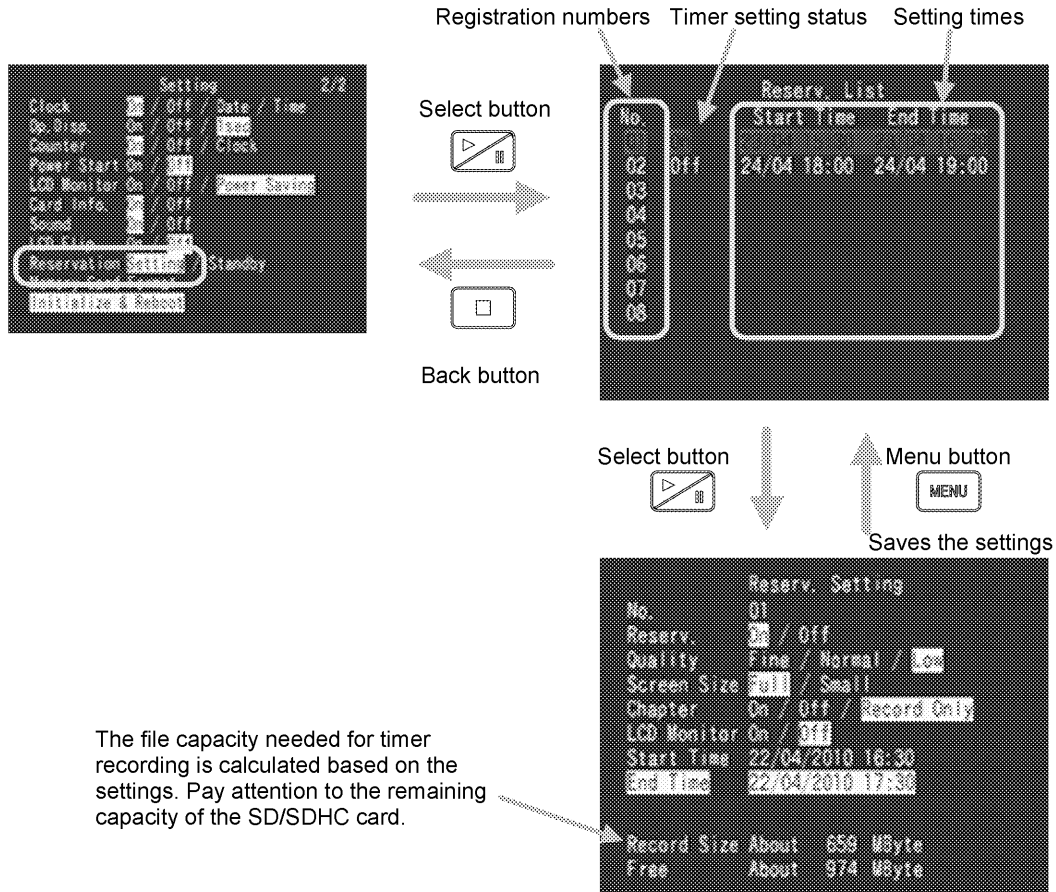Move the cursor to the "Timer Recording" setting item and the "Registration" option, and press the Select (Play) button. The "Timer Recording Item List" is displayed.

Registration numbers Timer setting status Setting times

Select button

Back button

Select button   Menu button

Saves the settings

The file capacity needed for timer recording is calculated based on the settings. Pay attention to the remaining capacity of the SD/SDHC card.

Up to 8 items can be registered in the "Timer Recording Item List".
Select the registration number to set, and press the Select (Play) button.
The "Timer Recording Settings" screen is displayed for configuring detailed settings.
 * The setting items in the "Timer Recording Item List" can be set in the same way as in the OSD menu.
 * During timer recording, a chapter is recorded every 15 minutes.
 * When the Back button is pressed to return from the "Timer Recording Settings" screen to the "Timer Recording Item List", the settings specified in the "Timer Recording Settings" screen are not saved and the previous state is restored.

To enable a timer recording item, set "Timer Setting" to "On" on the "Timer Recording Settings" screen and press the Menu button.
Error checking is performed. If there is no problem with the settings, the "Timer Recording Item List" screen is displayed.
If an error message is displayed, check the settings on the "Timer Recording Settings" screen.

Each enabled timer recording item will be indicated with a red "On" next to its number.

[Enabling timer recording]

Move the cursor to the "Timer Recording" setting item, and then to the "Timer Set" option. Press and hold the Select (Play) button for a while.

Timer recording is performed for the timer recording items that are "On" in the "Timer Recording Item List".

If there is no problem with the settings, timer recording enters a standby state and the timer recording setting is completed.

Complete the Timer Set setting at least 30 seconds prior to the start time of the recording.

* When "LCD Monitor" is set to "On" on the "Timer Recording Settings" screen, the LCD monitor displays an image on the OSD indicating that it is in standby state.
  When "LCD Monitor" is set to "Off" on the "Timer Recording Settings" screen, the LCD monitor is powered off, and no screen is displayed.
* During the standby state of timer recording, the image recording unit cannot be operated.

[Cancelling timer recording]

To cancel the Timer Set setting, press and hold the Power button for a while.

The image recording unit is turned on, the Timer Set setting is cancelled, and the "Timer Recording Item List" screen is displayed.

Select the number for the timer recording item to cancel, open the "Timer Recording Settings" screen, and set "Timer Setting" to "Off" on the screen.

On the "Timer Recording Item List" screen, check that the corresponding timer recording item is set to "Off". If so, the cancellation is successful.

[Stopping timer recording]

To stop a timer recording in process, press and hold the Power button for a while.

The timer recording is terminated and the exit process is executed.

To cancel timer recording during a standby state, press and hold the Stop button for a while.

⚠ **CAUTION**

● When recording for a long time, the recorded data is automatically saved every three hours or every time the data size reaches 4 GB.

Note that recording is interrupted during the save process, and no image is recorded during that time.

● In the following cases, if "Size" is changed due to the timer recording settings, color bars may be displayed during processing.

This is not a failure.

(1) When the Timer Set setting is performed 30 to 100 seconds prior to the recording start time

(2) When timer recording is performed continuously (i.e. there is only a one minute interval between the end time of a recording and the start time of the next)

(3) When the timer recording is cancelled during the standby state of timer recording

● Note that when a timer recording is completed, the image recording unit is turned off.

---

(10)Initialize Memory Card

Initializes (formats) an SD/SDHC card.

Press and hold the Select (Play) button for a while to open a confirmation screen.

Select "Yes", and press and hold the Select (Play) button for a while. The initialization (formatting) of the SD/SDHC card starts.

When "Format complete" is displayed, press the Select (Play) button.

⚠ CAUTION

● During initialization (formatting), do not remove the SD/SDHC card or turn off the power.
  Otherwise, the SD/SDHC card may become damaged.
● Note that performing initialization (formatting) deletes all data on the SD/SDHC card.

(11) Initialize Settings and Restart Initializes the settings of the image recording unit.
Press and hold the Select (Play) button for a while to initialize the settings and restart the image recording unit.
It is recommended that you note down the setting values before initialization.

⚠ CAUTION

Reset setting values after initialization.
The default settings for the image recording unit differ from the factory default settings for this product (TS3040).
For correct use of this product, reset the settings to values for TS3040.

	Default Value	TS3040 Setting Value
Settings 1/2		
Quality	Normal	Normal
Size	Full	Full
TV System	NTSC	NTSC
AGC Setting	オフ（Off）	On
Input Mode	Image	Image
Chapter	On	On
Brightness	25	25
Saturation	25	25
Hue	25	25
Clock	Not reset	Not reset
Display Language	日本語（Japanese）	English
Settings 2/2		
Clock Display	On	On
Operation Status	1 Sec	1 Sec
Counter	On	On
Power Interlock	オフ（Off）	On
LCD Monitor	省電力（Power Saving）	On
Card Information	On	On
Sound Effects	On	On
LCD Inversion	Off	Off
Timer Recording	Setting values are cleared	Setting values are cleared

Be sure to change the four items, " AGC 設定（AGC Setting）", "表示言語（Display Language）", "電源連動（Power Interlock）", and "液晶モニタ（LCD Monitor）", to the setting values for TS3040.

⚠ CAUTION

● If "TV System" is set to "PAL" and "LCD Monitor" is set to "OFF", the OSD menu screen will not be displayed, making operation difficult. Do not set (change) these settings.

11) Others

(1) All reset

In the following cases, it will be difficult to initialize the settings from the OSD menu:
- The display of the OSD menu is corrupt, and the menu cannot be operated normally.
- The LCD monitor does not display.

In these cases, perform the following procedure (all reset) to initialize the settings.

Press the Power button on the image recording unit to turn off its power.

↓

Press and hold the Stop or Cancel button for one second or longer, and while holding the Stop or Cancel button, also press and hold the Power button.
(This will turn on the power of the image recording unit. Keep holding the buttons.)

↓

Color bars are displayed. Release the buttons after one second.

↓

The all reset procedure (for initializing the settings) is complete.

After an all reset, use the OSD menu to change the settings to the TS3040 setting values.
* For details, refer to **(11) Initialize Settings and Restart** on page 21.

(2) Deleting files

On the "Picture File List" or "Movie File List", the file selected with the cursor can be deleted.
Move the cursor to the thumbnail of the file you wish to delete, and then press and hold the Menu button for a while.

"Yes" ·············· Deletes only the selected file.
"Delete all files"······ Deletes all files displayed in the file list.
 * Either all movies or all pictures are deleted (depending on the selected file).

⚠ CAUTION

● While files are being deleted, do not remove the SD/SDHC card or turn off the power.

● Deleted files cannot be restored. Take measures such as backing up important data in advance to avoid data loss.

---

(3) Using the data

Image data recorded with the image recording unit can be played back on a PC.
To use the data on an SD/SDHC card on a PC, prepare a card reader that supports the SD/SDHC card.
Data recorded by the image recording unit are saved in the following formats:

|	
Movie	MP4 format (.mp4)
Picture	JPEG format (.jpg)

Use software suitable for each format.

⚠ CAUTION

● Note that once data is moved or edited, you may no longer be able to play back the data with the image recording unit.

● Some data may be subject to copyright or other rights.

● Exercise due care when reproducing or distributing data. TOSHIBA TELI will not be liable for the handling of illicit data.

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4. Operation Procedures

(1) Move the hood and image recording unit upward, and insert an SD/SDHC card into the right side of the image recording unit.

(2) After inserting the card, adjust the position of the hood and image recording unit for easier viewing.

Hood

SD/SDHC card
(Pay attention to the direction)

Image recording unit
(LCD monitor)
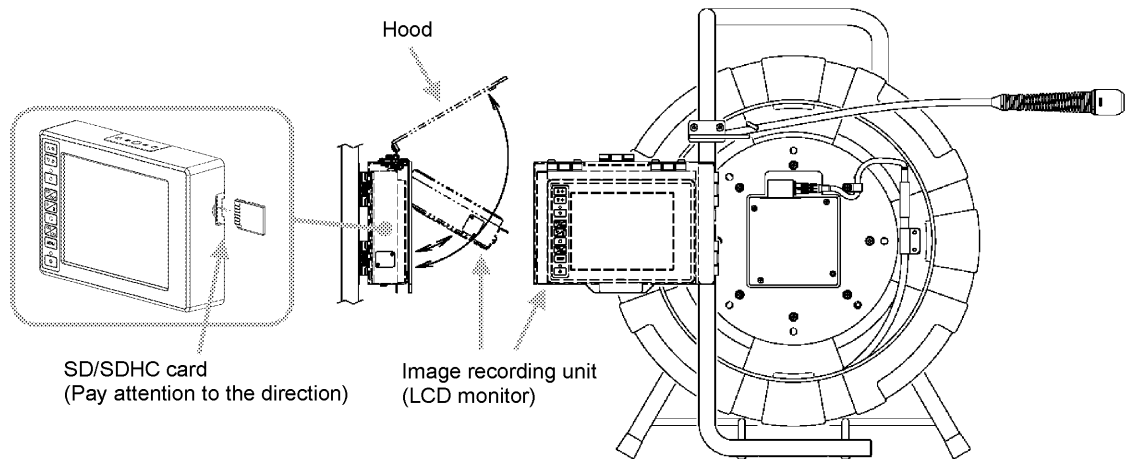
(3) Release the drum stopper.

(4) Hold the camera head and slowly draw out the camera cable. Set the camera cable onto the cable guide.

Drum stopper

Lock

Release

Rotate 90 degrees.

Camera cable

Cable guide
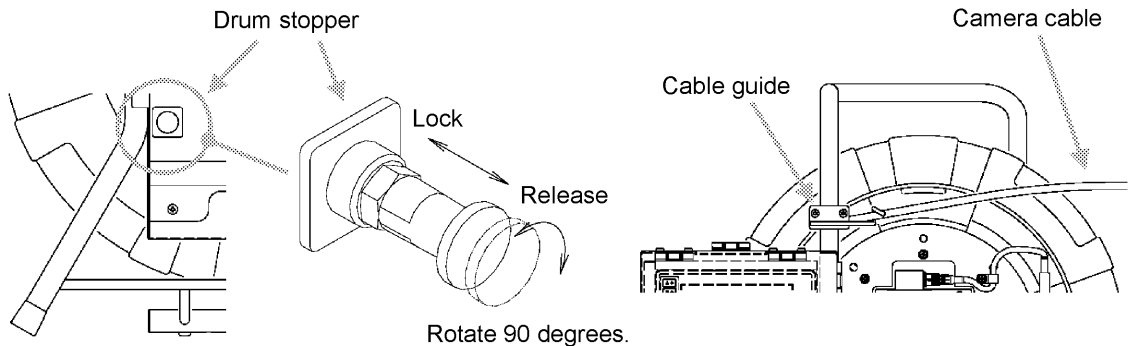
(5) Connect the plug of the power cord to an AC power supply (power outlet).
    * For details, refer to "**1. Connecting the Power Cord**" in **4. Connecting the Equipment**.

(6) Press the Power button on the main unit operation panel, and then insert the camera head into the inlet of the pipe.

(7) Operate the Distance button as needed to reset, display, or not display the distance of the camera cable.

(8) Draw out the camera cable slowly and insert the camera head into the pipe.

(9) Operate the image recording unit as needed to record images.

(10) After completing inspection work, rewind the camera cable slowly into the cable drum, and then store the camera head into the cable drum. When rewinding the camera cable, check the camera cable for any scratches or other flaws.

(11) Press the Power button on the main unit operation panel to turn off the power, and then unplug the power cord from the adapter box and AC power supply (power outlet).
    Shortly after turning off the power for the main unit, the power for the image recording unit (LCD monitor) will also be turned off.

(12) Hold the camera head and remove the camera cable from the cable guide. Store the camera cable into the cable drum.

(13) Restore the drum stopper back to the lock position, and slowly rotate the cable drum to lock it. When the cable drum is locked properly, it will not rotate.

(14) Return the hood and image recording unit back to the original state.

[Moving or carrying the equipment]

Check the following before moving or carrying this product.

(1) The camera cable is stored into the cable drum.
(2) The drum stopper is returned to the lock position, and the cable drum does not rotate.
(3) The hood and image recording unit are returned back to the original state.
(4) The power cord is unplugged from the adapter box and power outlet.
(5) All cables are disconnected from the product.
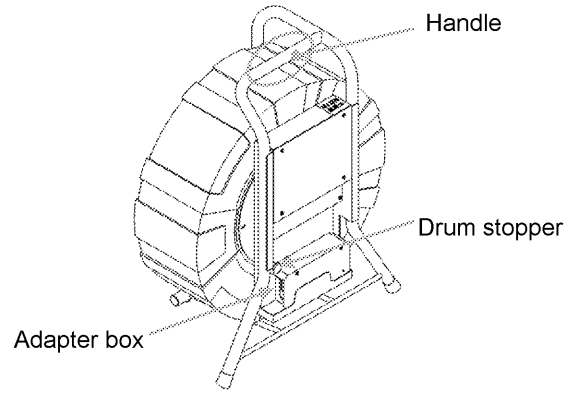
After checking the above, hold the handle on the top of the main unit frame from the operation panel side, and move or carry the equipment, paying attention to surroundings.

Handle
Drum stopper
Adapter box

⚠ CAUTION

● Before using this product, make sure that there are no scratches or cracks on the power cord and camera cable.
● Be sure to use a power cord appropriate for the region where the equipment is used.
● Be sure to use an AC power supply within the specification range of this product.
● Be sure to install this product in a stable place before use.
● Avoid wetting the main unit when using this product.
● The camera head is equipped with an automatic leveling system. Avoid strong impact.
   Otherwise, the automatic leveling system may not work properly.
● If a solvent such as paint thinner contacts the LED cover of the camera head, it will significantly reduce the strength and waterproof performance.
   Immediately wash off any solvent with water.
   If any flaw such as a large scratch is made on the lens surface or camera cable, consult your dealer.
● Do not apply excessive force onto the image recording unit.
● Do not draw out the camera cable without releasing the drum stopper. Otherwise, the camera cable may become damaged.
● When leaving the cable drum unattended, be sure to apply the drum stopper. Otherwise, the camera cable will be drawn out due to the resilience of the camera cable and may cause an unexpected accident.
● Do not apply excessive force onto the drum. Doing so may break the lock of the drum stopper and draw out the camera cable, and cause an unexpected accident.
● When carrying this product, store the camera cable into the drum, apply the lock on the drum stopper, and unplug the power cord from the adapter box and power outlet.
● Do not grip the handle with wet hands. Otherwise, the handle may slip, causing the equipment to be dropped.
● Do not move or carry the equipment in an improper posture.
● When moving or carrying the equipment, be careful not to contact the control unit or other parts with your body. Otherwise, an injury may occur.
● After using this product, store this product indoor along with the power cord.
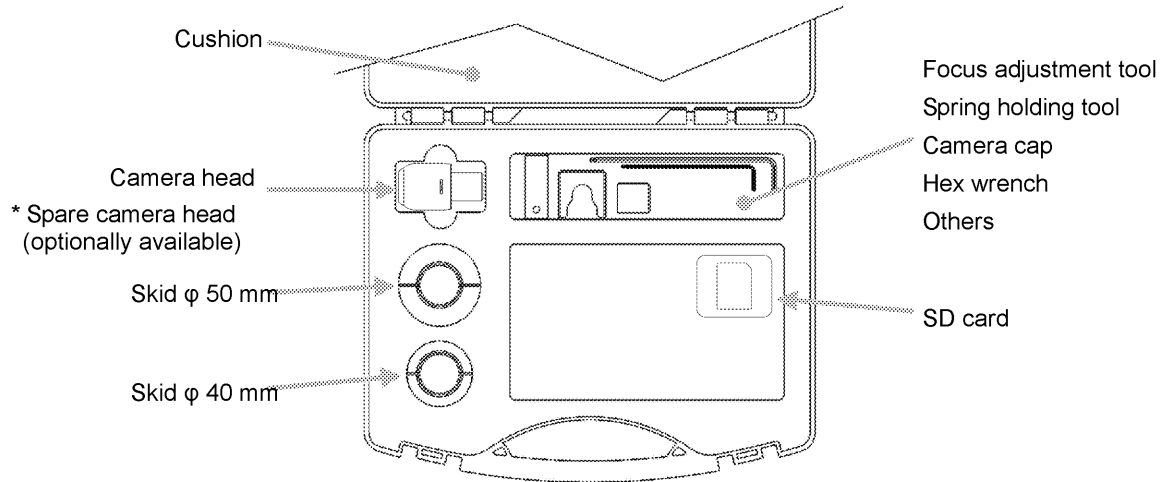
6. Replacing and Adjusting Parts

By using the accessories for this product, you can adjust the focus of the camera head, change the skid, and replace the camera cable.

1. Storing the Accessories

Skids, tools required for replacement, and the SD card for the image recording unit are provided in the accessory storage case.
Keep them stored safely.

* The cushion can be removed to access a storage space for this manual.

Cushion

Camera head
* Spare camera head
(optionally available)

Skid φ 50 mm

Skid φ 40 mm

Focus adjustment tool
Spring holding tool
Camera cap
Hex wrench
Others

SD card

* For details on items stored in the accessory storage case, refer to **1. Package Contents**.

2. Adjusting the Focus

You can adjust the focus of the camera by rotating the lens at the top of the camera head with the focus adjustment tool (provided with the product).
Align the focus adjustment tool with the grooves on the lens and rotate the lens.
While checking the image on the monitor, adjust the lens to obtain the best focus.

Focus adjustment tool
(accessory)

Approaching
direction

Groove (four total)

Receding direction
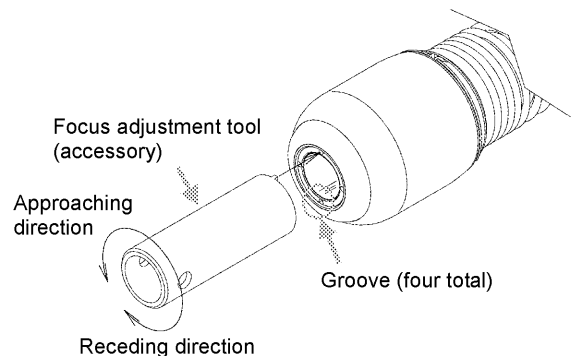
⚠ CAUTION

● Be careful not to scratch the lens while adjusting the focus. A scratch may degrade the image quality.
● When adjusting the focus, do not rotate the lens excessively or forcibly in the clockwise direction (receding direction). Doing so will damage the lens or the focus adjustment tool and cause a failure.
● When adjusting the focus, do not rotate the lens excessively in the counterclockwise direction (approaching direction). Doing so will cause the lens to become detached from the camera head.
Once the lens is detached, dirt or dust may attach to the lens or the waterproofing O-ring, causing the waterproof performance to degrade or dirt to appear on the screen after the lens is reattached to the camera head.

3. Attaching a Skid

Two types of skids, φ 40 mm and φ 50 mm, are provided with this product.
Attach a suitable skid to the camera head based on the operating conditions.

● Attaching the φ 40 mm skid

(1) Position the φ 40 mm skid (provided with the product) around the camera head.
(2) Secure the φ 40 mm skid with four hex socket head bolts (M2x6) using the hex wrench (for M2, provided with the product).
   * The hex socket head bolts are already attached to the skid. Remove them for use in attaching the skid.

Hex socket head bolt
M2x6   x 4
(Accessory)

Skid φ 40mm
(Accessory)
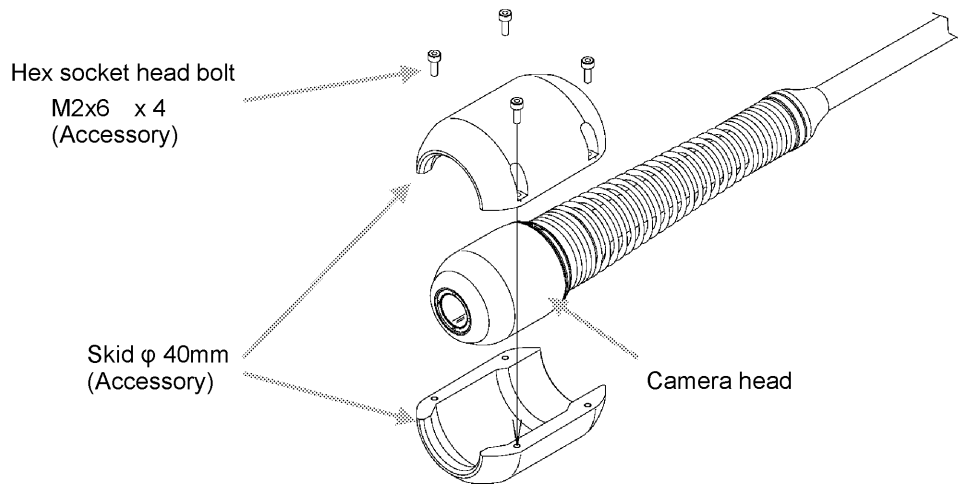
Camera head

● Attaching the φ50 mm skid

(1) Position the φ 50 mm skid (provided with the product) around the camera head.
(2) Secure the φ 50 mm skid with four hex socket head bolts (M3x6) using the hex wrench (for M3, provided with the product).
   * The hex socket head bolts are already attached to the skid. Remove them for use in attaching the skid.

Hex socket head bolt
M3x6   x 4
(Accessory)

Skid φ 50mm
(Accessory)
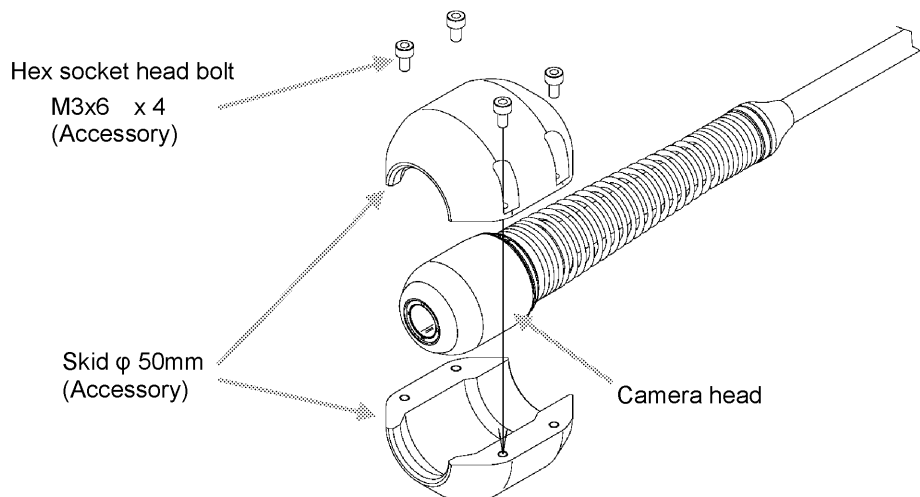
Camera head

⚠ CAUTION
● Pay attention to the combination of the skid and hex socket head screws.
● After using the product, store the skid and hex socket head screws into the accessory storage case to avoid losing them.

4. Replacing the Camera Head

The camera head of this product can be replaced by the user.
When replacing the camera head, separately purchase the HSH030 dedicated camera head and perform the following procedure.
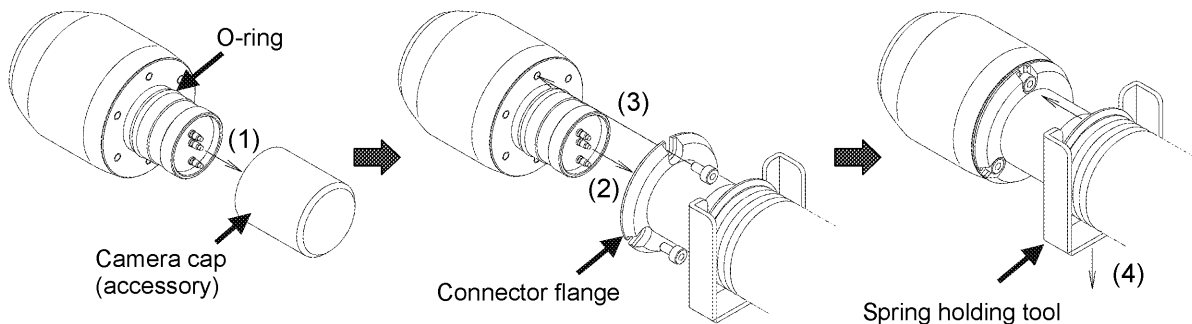
● Removing the camera head

(1) Slide the spring and the ring toward the cable drum, and secure them with the spring holding tool (provided with the product).

(2) Remove the three hex socket head bolts (M2x4) using the hex wrench (for M2, provided with the product).

(3) Remove the camera head from the camera cable.

Ring

Camera head

Slide in this direction   (3)

(1)

Spring

Spring holding tool
(Accessory)

Hex socket head bolt
M2x4 x 3
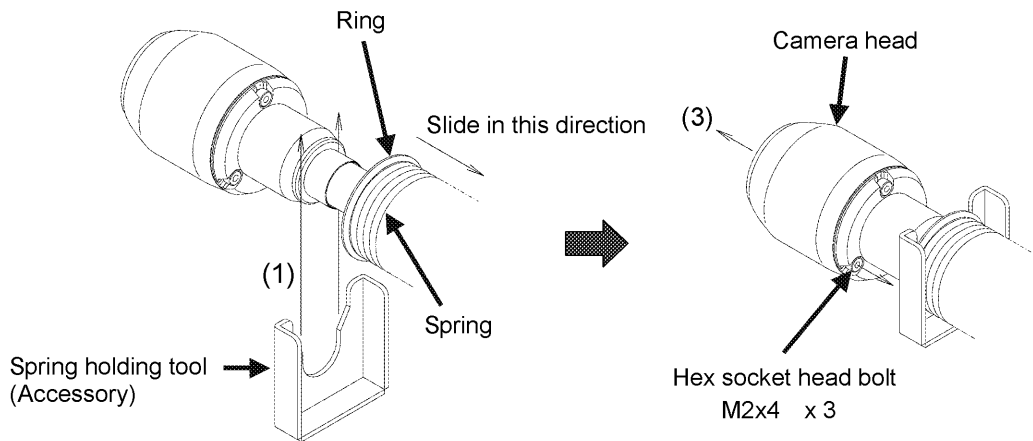
● Attaching the camera head

(1) Remove the camera cap (provided with the camera head) from the camera head.

(2) Insert the camera head into the connector flange.

(3) Attach the three hex socket head bolts (M2x4) using the hex wrench (for M2, provided with the product).
   * Secure the hex socket head bolts firmly.
     If they are not tightened properly, the camera head may become loose and cause the waterproof performance to degrade significantly, causing a failure.

(4) Remove the spring holding tool (provided with the product), and restore the spring and the ring.

O-ring

(3)

(1)

(2)

Camera cap
(accessory)

Connector flange

(4)

Spring holding tool

⚠ CAUTION

● Make sure the power is turned off before replacing the camera head.
  Also, wipe off any water droplet or other foreign materials before starting the work.
● Make sure that there is no dirt or other foreign material attached to the O-ring.
● Before attaching the camera head, make sure that dirt, water droplets, and other foreign materials are not attached to the interior of the connector flange or to the camera head connection part. Failure to do so may cause failure and electric shock.
● Do not damage the O-ring. Otherwise, the waterproof performance will become degraded and may cause a failure.
● Be careful not to pinch your fingers when restoring the spring. Otherwise, an injury may occur.
  When attaching (or removing) the spring holding tool, take measures such as wearing rubber gloves to avoid injuries.

5. Replacing the Lens Unit

The lens unit in the camera head of this product can be replaced by the user.

When replacing the lens unit, separately purchase the lens unit for the HSH030 dedicated camera head and perform the following procedure.

(1) Align the focus adjustment tool with the grooves on the lens and rotate the lens.
(2) Remove the lens from the camera head.
(3) Attach the O-ring to the new lens.
(4) Attach the new lens to the camera head, and adjust the focus.
  * For details on adjusting the focus, refer to "2. Adjusting the Focus" in **6. Replacing and Adjusting Parts**.

Lens unit

Focus adjustment tool (accessory)
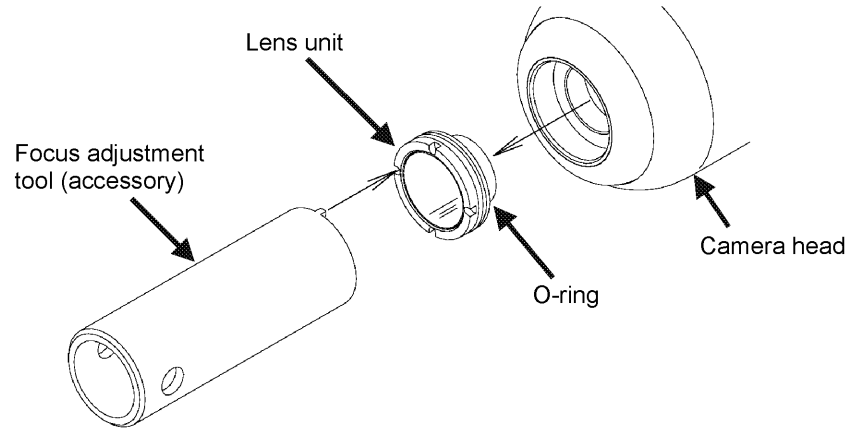
Camera head

O-ring

⚠ CAUTION

- When replacing the lens unit, be careful to prevent dirt, water droplets, and other foreign materials from getting into the camera head.
- Make sure that there is no dirt or other foreign material attached to the O-ring.
- Do not damage the O-ring. Otherwise, the waterproof performance will become degraded and may cause a failure.
- Be careful not to scratch or damage the lens while adjusting the focus.

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6. Replacing the Camera Cable

The camera cable of this product can be replaced by the user.

When replacing the camera head, use the "spare camera cable" provided with the product or purchase the dedicated camera cable HSC040 separately and perform the following procedure.

● Securing work space

Before replacing the camera cable, secure work space to keep people away from the site, as shown in the following figure. Otherwise, the camera cable may jump in an unexpected direction due to the resilience of the camera cable and cause personal injuries or equipment damage.
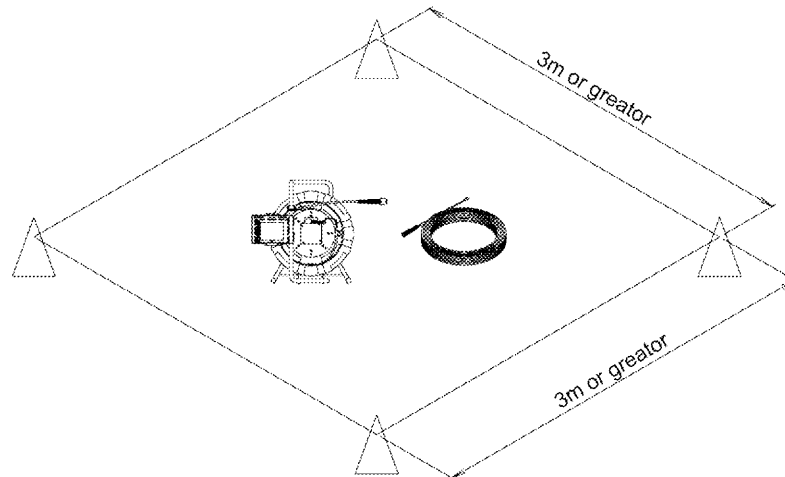
● Replacing the camera cable

(1) Draw out the camera cable wound into the cable drum, leaving about two rotations on the drum.

Do not apply excessive force to the cable.
Wire breakage may occur in the cable.

Cable drum

(3) Connector

(2)

Cable clamp
Screw M4x12 (x1)

Align the cable clip
at this position.

Camera cable

(4)

Screw M4x8 (x2)

Cable clip

* Back side of the cable drum
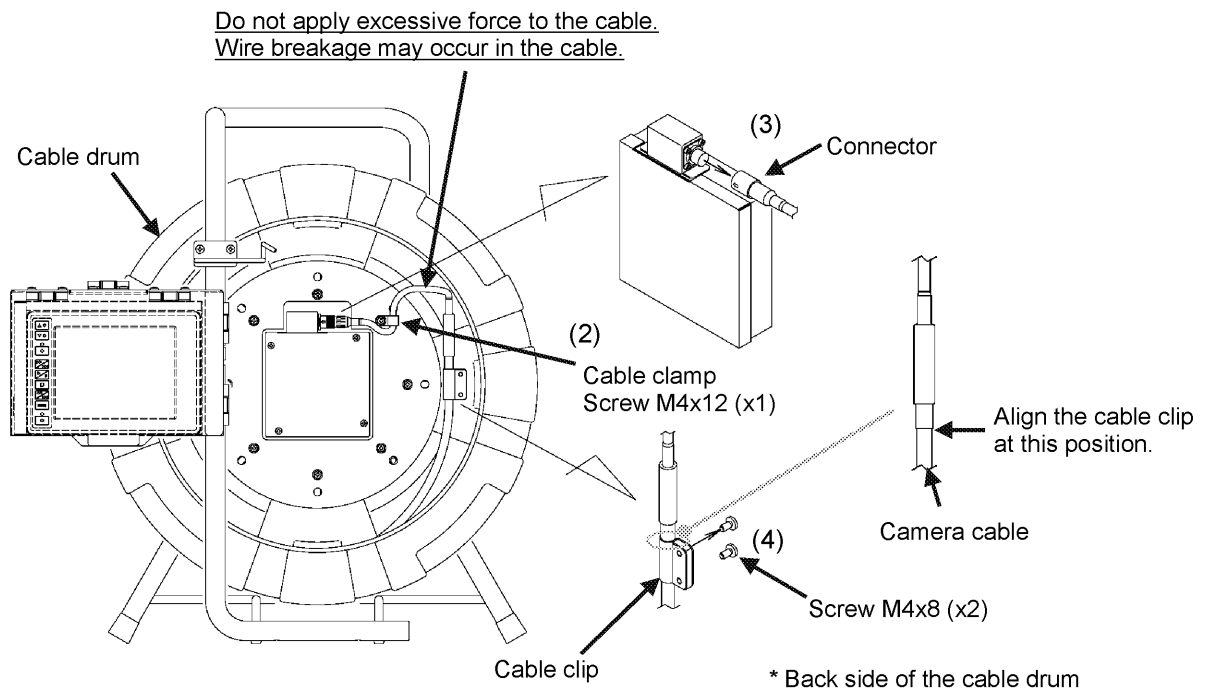
(2) Remove the cable clamp and screws (M4x12).

(3) Remove the connector of the camera cable (by sliding the top of the connector).

(4) Remove two screws (M4x8) and detach the cable clip.

(5) Draw out the remaining camera cable from the cable drum.

* When drawing out the camera cable, hold the camera cable firmly to prevent it from moving unexpectedly.

(6) Release about 2 m of the new camera cable from its connector end.
(7) Draw the camera cable into the cable drum, and secure the camera cable firmly with the cable clip and two screws (M4x8).
    * Pay attention to the attachment position of the cable clip.
(8) Insert the connector firmly.
(9) Secure the camera cable with the cable clamp and screws (M4x12).
(10) Rewind the camera cable into the cable drum.
(11) Replace the camera head.
    * For details on replacing the camera head, refer to "4. Replacing the Camera Head" in **6. Replacing and Adjusting Parts**.
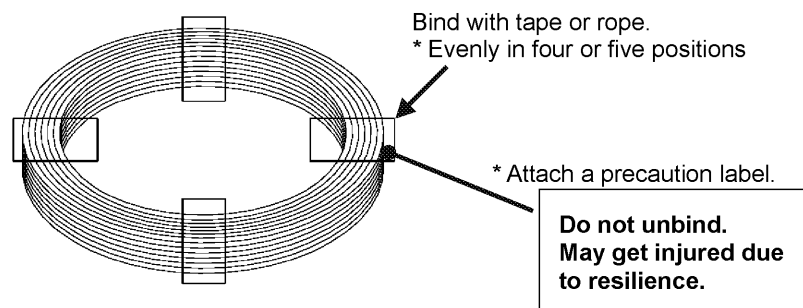

⚠ CAUTION

- Be sure to secure enough work space and pay attention to the surroundings during work.
- Be sure to follow the above procedure when replacing the camera cable.
  Failure to do so may result in excessive force being applied to the camera cable, causing wire breakage or damage to the cable.
- Before replacing the camera cable, unplug the power cord from the adapter box and power outlet, and carefully wipe off any water droplet, dirt, or other foreign materials.
  Hold the camera cable firmly during work. Otherwise, the camera cable may jump unexpectedly due to the resilience of the camera cable, causing personal injuries or equipment damage.
- Do not damage the gasket of the connector. Otherwise, the waterproof performance may degrade and cause a failure.

● Storing the removed camera cable
  Store the removed camera cable as described below.
  When storing the cable, attach a precaution label near the rope or tape binding the wound camera cable, so as to prevent third parties from unbinding the camera cable.

Bind with tape or rope.
* Evenly in four or five positions

* Attach a precaution label.

Do not unbind.
May get injured due
to resilience.

● Discarding the camera cable
  Note that the camera cable is resilient.
  When discarding the camera cable, use a pair of nippers to cut the cable into short pieces with a length of about 1 m each, and dispose of them according to local regulations.

⚠ CAUTION

- The camera cable may jump in an unexpected direction due to the resilience of the camera cable, causing personal injuries or equipment damage.
  Pay attention to the surroundings during work.
- Be careful when cutting the camera cable.

7. Troubleshooting

When using this product, if any of the following phenomena occur, check the following points before requesting repair.
After checking the following points, if the product still does not work normally, contact your dealer.

Problem	Cause	Measures
The power does not turn on.	The power cord is not connected.	Connect the power cord.
	The Power button is not pressed.	Press the Power button to turn on the power.
The LCD monitor displays no image.	The Power button is not pressed.	Press the Power button to turn on the power.
	The camera head is not connected.	Connect the camera head.
	The power of the image recording unit is off.	Turn on the power of the image recording unit.
	The LCD monitor setting of the image recording unit is "Off".	Perform an "all reset" (for initializing all settings) on the image recording unit.
	The LCD monitor setting of the image recording unit is "Power Saving".	Press any operation button on the image recording unit to restore it from the power saving mode.
The LCD monitor displays normally, but goes blank after a short while.	The LCD monitor setting of the image recording unit is "Power Saving".	Press any operation button on the image recording unit. Set the LCD monitor setting to "On".
	Settings for the image recording unit have been initialized.	Set the settings to the TS3040 setting values. (Refer to (11) Initialize Settings and Restart on page 21.)
The LCD monitor does not start.	The power interlock setting of the image recording unit is "Off".	Set the power interlock setting to "On".
	Settings for the image recording unit have been initialized.	Set the settings to the TS3040 setting values. (Refer to (11) Initialize Settings and Restart on page 21.)
The LCD monitor displays a message and cannot be operated.	The TV system setting of the image recording unit is "PAL".	Turn off and on the power of the image recording unit. When the standby screen is displayed following the color bars, immediately press the Menu button to display the menu screen. Then, set the TV system setting to "NTSC".
The menu screen of the image recording unit is not displayed.	The LCD monitor setting of the image recording unit is "Off".	Perform an "all reset" (for initializing all settings) on the image recording unit.
	The TV system setting of the image recording unit is "PAL".	Turn off and on the power of the image recording unit. When the standby screen is displayed following the color bars, immediately press the Menu button to display the menu screen. Then, set the TV system setting to "NTSC".
Images cannot be recorded.	The camera head is not connected.	Connect the camera head.
	An SD/SDHC card is not inserted into the image recording unit.	Insert an SD/SDHC card into the image recording unit.
	The write protection switch on the SD/SDHC card is set to the "Lock" position.	Unlock the write protection switch on the SD/SDHC card.
	The number of stored files has reached 999.	Delete unnecessary files or replace the SD/SDHC card.
	The SD/SDHC card does not have enough remaining capacity.	Delete unnecessary files or replace the SD/SDHC card.

Problem	Causes	Measures
A recorded image cannot be played back.	The file was recorded with equipment other than this product.	Do not play back files recorded with equipment other than this product.
	During recording, strong impact was applied to the main unit.	The image that was being recorded may have not been saved correctly.
	The image has been modified or edited.	Do not play back modified or edited images.
The SD/SDHC card cannot be recognized.	The SD/SDHC card has been formatted with equipment other than this product.	Format the SD/SDHC card with the image recording unit of this product.
The clock on the image recording unit is not correct.	The clock has not been adjusted for a long time.	Adjust the clock. The clock has an error of about ±30 seconds per month (at 25°C)
The image recording unit cannot be operated.	The SD/SDHC card has been removed during recording or playback.	A system error may have occurred. Turn off and on the power of the image recording unit.
The image has too much noise.	The connector is loose.	Connect the connector firmly.
During work, suddenly no image is displayed.	The connector is loose.	Connect the connector firmly.
	Water has entered the camera head.	Replace the camera head. (Refer to 4. Replacing the Camera Head on page 27.)
	Wire breakage has occurred in the camera cable.	Replace the camera cable. (Refer to 6. Replacing the Camera Cable on page 29.)
The illumination does not light up.	The connector is loose.	Connect the connector firmly.
	Water has entered the camera head.	Replace the camera head. (Refer to 4. Replacing the Camera Head on page 27.)
	Wire breakage has occurred in the camera cable.	Replace the camera cable. (Refer to 6. Replacing the Camera Cable on page 29.)
The image is blurred.	The focus is not good.	Adjust the focus.
	The lens glass is not clean.	Wipe off dirt.
	The lens glass is damaged.	Replace the lens unit (refer to page 14).
The cable drum does not rotate.	The drum stopper is locked.	Release the drum stopper.
The cable distance is not displayed.	The distance display is turned off.	Turn on the distance display.

⚠ CAUTION

● This equipment contains precision instruments, and requires specialized skills for its repair.

Never attempt to repair the equipment by yourself. Doing so may not only degrade the performance of the equipment but will also cause accidents and personal injuries.

If any problem occurs on the product, check the above points and contact your dealer.

The camera cable may jump in an unexpected direction due to the resilience of the camera cable, causing personal injuries or equipment damage.

Pay attention to the surroundings during work.

8. Product Specifications

1. Camera Head

- Model name	:	HSH030
- Appropriate pipe diameter	:	φ50 to φ800 mm [1]
- TV system	:	Compliant with the NTSC standard
- Image sensor	:	1/4 inch 300,000 pixels C-MOS sensor
- Scanning method	:	525 lines, 2:1 interlace (RS-170A equivalent)
- Sync. system	:	Internal synchronization
- Scanning frequency	:	Horizontal 15.734 kHz, vertical 59.94 Hz
- Minimum illumination	:	10 lx or less (for AGC MAX, approx. 50% image level)
- Video output	:	VBS 1.0 V (p-p) 75Ω
- Lens	:	F2.8 f = 2 mm
- Angle of view (diagonal)	:	Approx. 96 degrees in water, approx. 160 degrees in air
- S/N ratio	:	40 db or greater (AGC OFF equivalent)
- White balance	:	Auto
- ALC	:	Auto

Gain   0 to +18 dB

Shutter   1/30 sec to 1/15,750 sec

- Illumination	:	Four white LEDs
- Waterproof structure	:	At a water pressure of 1.0 MPa

(**Designed to meet IP68** [2] , Only when connected to the camera cable)

- Explosion-proof structure	:	**This equipment is not explosion-proof.**
- External dimensions	:	Shown in external views
- Main material	:	Stainless steel
- Weight	:	Approx. 90 g

Caution   1) For pipes with a diameter of 300 mm or greater, you must be able to check joint sections with a skid attached to the camera head.

2. Camera Cable

- Model name	:	HSC040
- Outer diameter and length	:	φ8 mm x 40 m
- Number of core wires	:	Three composite cores
- Rod	:	FRP (fiber reinforced plastics)
- Outer sheath	:	ETFE (Blue)
- Bending strength	:	980 MPa or greater (compliant with JISK6911 article 5.17)
- Minimum bending radius	:	R140 mm (at room temperature)
- Waterproof structure	:	At a water pressure of 1.0 MPa

(**Designed to meet IP68** [2] , Only when connected to the camera head)

* The performance is in accordance with the specifications of the camera head.

- Explosion-proof structure	:	**This equipment is not explosion-proof.**
- Weight	:	Approx. 4 kg

2)   Environmental rating: IP rating designed to meet the standards of the Ingress Protection (IP) rating IP68 per IEC 60529 (Degrees of Protection provided by enclosures - IP Code).
The product design was confirmed to meet the IP rating by means of construction design verification process only.

3. Cable Drum and Control Unit

- Wound cable length   :   φ8 mm x 40 m
- Cable distance counter   :   Number of reel rotations detection system
- Cable distance display function
   (1)   Display range   :   -99.9 m to 99.9 m
   (2)   Display position   :   Monitor screen (Possible to set whether or not to display the distance)
- Image recording unit
   (1)   Model name   :   VR570
   (2)   LCD screen size   :   5.6 inch TFT color LCD monitor
   (3)   Display color   :   Full color
   (4)   Viewing angle   :   Top 40 degrees, bottom 20 degrees, left 50 degrees, right 50 degrees (typ.)
   (5)   Number of pixels   :   320 dots (H) x RGB x 234 dots (V)
   (6)   Illumination   :   Internal light (with a CCFL fluorescent tube)
   (7)   Picture   :   Format   JPEG file
               Size   Full 640 x 480   (NTSC)
                          Small 320 x 240   (NTSC)
               File extension   .jpg
   (8)   Movie   :   Format   H.264 High Profile
               Size   Full 720 x 480, 30 fps   (NTSC)
                          Small 360 x 240, 30 fps   (NTSC)
               File extension   .mp4
               Quality   High: 5 Mbps (Full), 1.5 Mbps (Small)
                          Normal: 3 Mbps (Full), 1 Mbps (Small)
                          Low: 1.5 Mbps (Full), 0.5 Mbps (Small)
   (9)   Recording media
      Recording media   :   SD card   1 GB, 2 GB
                    SDHC card   4 GB, 8 GB, 16 GB, 32 GB
      Format type   :   SD card   FAT16
                    SDHC card   FAT32
      Speed class   :   Class 2, Class 4, Class 6
      Recommended SD/SDHC cards
       Toshiba   :   SD-C series
       Transcend   :   TS1GSDC, TS2GSDC, TS4GSDHC6, ..., TS16GSDHC6

Caution   SD/SDHC cards other than those recommended may not work properly.

   (10) Movie recording time length (approx., condition: Full size)

Quality	SD Card Capacity		SDHC Card Capacity			
	1 GB	2 GB	4 GB	8 GB	16 GB	32 GB
High	26 min	52 min	1 h 45 min	3 h 32 min	7 h 13 min	14 h 29 min
Normal	**44 min**	**1 h 27 min**	**2 h 55 min**	**5 h 54 min**	**12 h 01 min**	**24 h 09 min**
Low	1 h 28 min	2 h 55 min	5 h 52 min	11 h 48 min	24 h 03 min	48 h 18 min

Caution   • The maximum file size is 4 GB and the maximum recording time is 180 minutes for each file.
       • The memory capacities were calculated using 1,048,576 bytes as 1 MB.

   (11) Functions   :   a) Picture recording   Pictures can be recorded during recording or playback.
              b) Playback   Normal, 4x, 8x, 1/4x
              c) Reverse playback   Normal, 4x, 8x, 1/4x (frame-by-frame reverse playback)
              d) Counter display   Either playback time or clock display can be selected.
              e) Chapter   Playback can be started from an image recorded for a
                             chapter or be skipped to a chapter.

- Explosion-proof structure	:	**This equipment is not explosion-proof.**
- External dimensions	:	Shown in external views
- Weight	:	Approx. 8 kg (without including the camera head and camera cable)
- Environmental consideration	:	Conforming to RoHS directive

4. Input Power Supply Unit

- Input voltage	:	100 to 240 ACV ± 10%
- Frequency	:	50 / 60 Hz
- Number of phases	:	Single phase
- Consumption current	:	0.4 A (typ.)
- Input connector	:	3P-Inlet (compliant with IEC60320-1 C14)
- Transient over-voltage range	:	Category II

5. Environmental Requirements

1) Operating

- Operating site	:	Indoor and outdoor sites (no water and dust)
- Ambient temperature	:	0 ~ +40 °C
- Ambient humidity	:	10 to 80% (No condensation)
- Ambient pressure	:	70 kPa to 106 kPa
- Altitude	:	2,000 m or less
- Pollution degree	:	2

2) Storage

- Storage temperature	:	-10 ~ +60 °C
- Storage humidity	:	10 to 80 % (No condensation)
- Storage pressure	:	70 kPa to 106 kPa

3) Transportation

- Transportation temperature	:	-10 ~ +60 °C
- Transportation humidity	:	10 to 80 % (No condensation)
- Transportation pressure	:	0 kPa to 106 kPa

6. External Dimensions
- Shown in external views

7. Weight
- Approx. 12 kg   (with the camera head and camera cable connected)
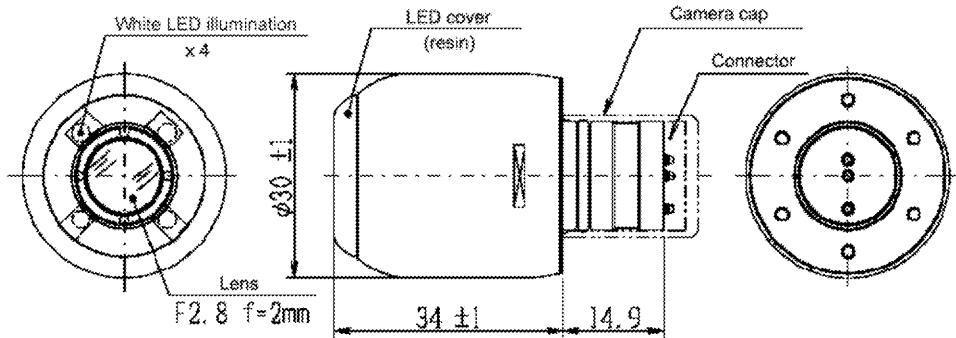
8. Applicable Standards

1) Safety standard (for measuring instruments)	:	IEC61010-1
2) EMC standard	:	IEC61326-1, CISPR11 Class A
3) Ingress protection code	:	IP-21

9. External Views

1) Camera head

Main material   : Stainless steel
Waterproof   : Waterproof structure (Designed to meet IP68[1] , Only when connected to the camera cable)
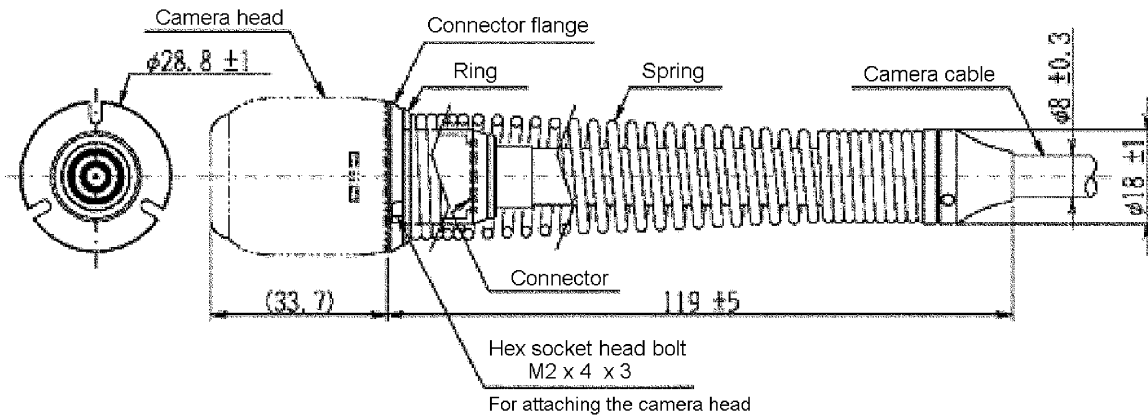

Unit: mm

2) Camera cable connector

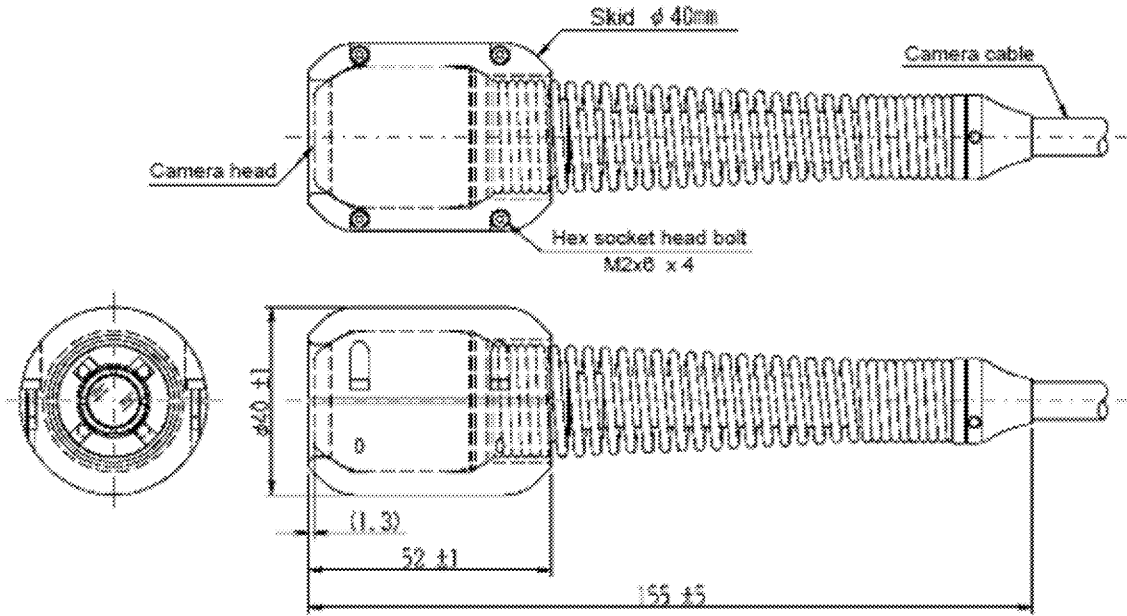Main material   : Stainless steel
Waterproof   : Waterproof structure (Designed to meet IP68[1] , Only when connected to the camera cable)
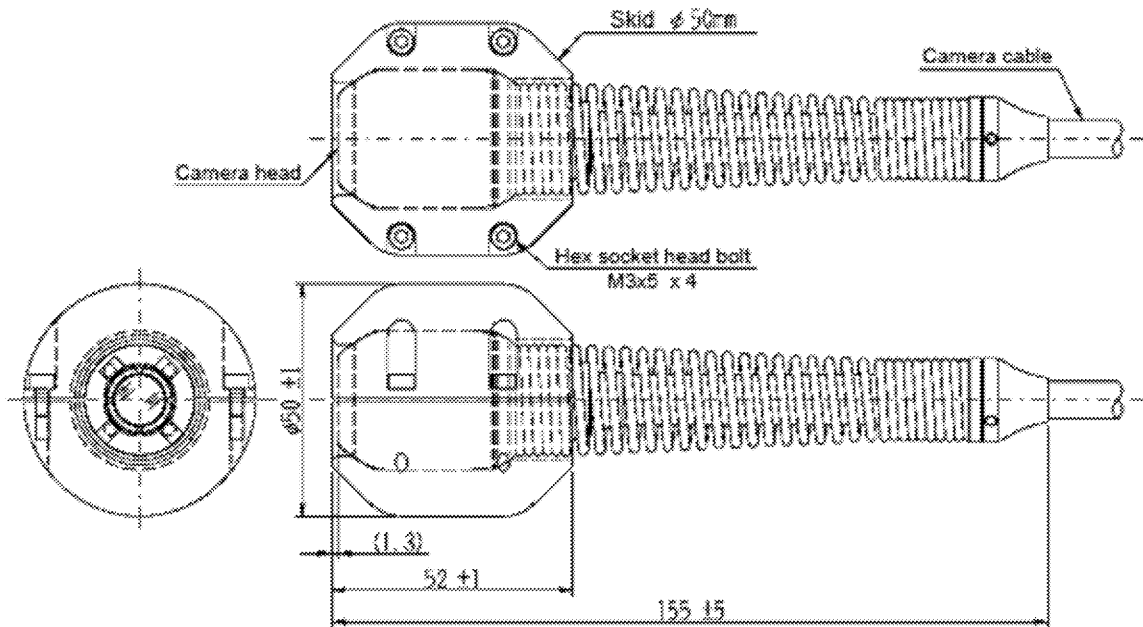

Unit: mm

1) Environmental rating: IP rating designed to meet the standards of the Ingress Protection (IP) rating IP68 per IEC 60529 (Degrees of Protection provided by enclosures - IP Code). The product design was confirmed to meet the IP rating by means of construction design verification process only.

3) φ40 mm skid (accessory), when attached

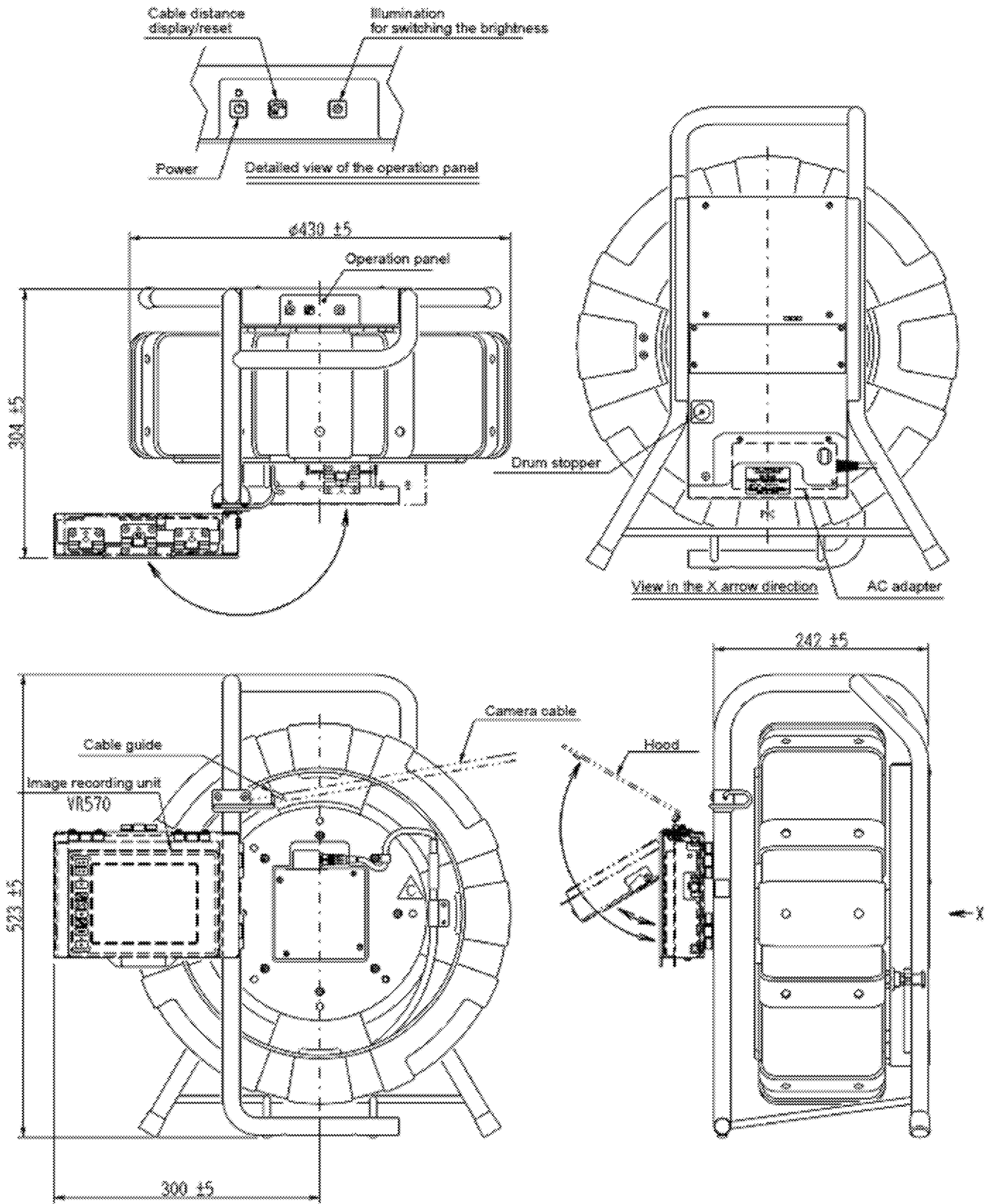

Unit: mm

4) φ50 mm skid (accessory), when attached

Unit: mm

5) Cable drum and control unit

Cable distance
display/reset

Illumination
for switching the brightness

Power

Detailed view of the operation panel

φ430 ±5

Operation panel

304 ±5

Drum stopper

View in the X arrow direction

AC adapter

Cable guide

Camera cable

Image recording unit
VR570

Hood

523 ±5

300 ±5

242 ±5

X

Unit: mm

9. Consumable Parts and Limited-Life Parts

This product uses consumable parts and limited-life parts.
Also, the gasket and adhesive used in the camera head may become degraded due to the operation environment, causing the product quality to lower significantly.
Maintenance should be performed annually to use the product in a good condition.
* For details on regular maintenance, please contact your dealer.

1. Consumable Parts

The following parts are regarded as **consumable parts**, and should be replaced when damaged or degraded.
Using damaged or degraded parts may cause a failure. Replace them as soon as possible.
Be aware that these parts must be repaired or replaced at your cost, even if within the warranty period.

(1) Camera head	Depending on the operating environment and frequency of use, this part will become worn or scratched, and will require early replacement.
(2) Lens	Depending on the operating environment and frequency of use, this part will become worn or scratched, and will require early replacement.
(3) Camera cable	Depending on the operating environment and frequency of use, this part will become worn or scratched, and will require early replacement.
(4) Skid	Contact TOSHIBA TELI when replacement is needed.
(5) Adapter box	Contact TOSHIBA TELI when replacement is needed.

2. Limited-Life Parts

The following parts are regarded as limited-life parts, and may degrade significantly after being used for a certain period of time.
These parts should be replaced when you notice their deterioration.
Contact your dealer for replacement.
Because these parts are internal parts, they must be replaced by a certified staff. Also, be aware that these parts must be replaced at your cost, even if within the warranty period.

Camera head
(1) Slip ring	Approx. five years
(2) Desiccant	Approx. one year

Image recording unit
(3) Button battery (CR2032, for the clock)	Approx. five years (when used at 25°C)
(4) LCD monitor	Approx. 5,000 hours (when used at 25°C)

Cable drum
(5) Encoder	Approx. two years
(6) Slip ring	Approx. five years

● Water vapor will penetrate the camera head through molecular gaps in the gasket, and water droplets will be formed within the camera head.
Maintenance should be performed annually to replace the desiccant for preventing the formation of such water droplets.
● The slip rings used in this product are limited-life parts.
Maintenance should be performed annually to keep the equipment in the best condition.

---

10. Daily Inspection and Cleaning

Before using the equipment, perform the following inspection so that you can use it in a good condition. Also, be sure to clean the equipment after use.

1. Daily Inspection

(1) Camera head
- No crack or scratch on the lens, LED cover, and LED case.
- All four LEDs light up.
- No trace of water entry in the camera head and connector.
- No scratches or dirt on the connector.

(2) Camera cable
- No large scratches or cracks on the sheath.

(3) Movable parts
- No catching or looseness when moved.

(4) Other mechanical parts
- No loose screws.

(5) Images
- No problem with color or contrast. The cable distance is displayed.
- No corruption of image on the screen.

⚠ CAUTION

- Except when inspecting the LEDs and images on the screen, be sure to unplug the power cord from the adapter box and power outlet before inspection.
- When performing daily inspection, be sure to secure enough work space and pay attention to the surroundings during work.
- When inspecting the camera cable, **hold the camera cable firmly** during work.
  The camera cable may jump unexpectedly due to the resilience of the camera cable, causing personal injuries or equipment damage.
- When checking LED lighting, be careful not to look directly at the LEDs.
- If you find any problem during inspection, stop using the product and contact your dealer.

---

2. Cleaning

(1) Camera head and camera cable

During inspection work, water droplets and dirt will attach to the camera head and camera cable. After completing your work, wipe off the water and dirt attached to the camera head and camera cable, and then rewind the clean camera cable into the cable drum.
Also be sure to check the states of the camera head and camera cable when rewinding during work.

(2) Image recording unit (LCD monitor screen)

To keep the display image clear for a long time, clean the LCD screen.
When cleaning, use a soft cloth to wipe off dirt.
Do not wipe off with a rough cloth, as it will scratch the screen and cause unclear images.
For stubborn dirt, wipe only the dirty areas with a soft cloth dampened with neutral detergent diluted with water. Do not use organic solvents such as thinner.
When cleaning, be sure to prevent water droplets and other foreign materials from entering the openings and holes.

(3) Connectors

If there is dirt attached to the connectors, it may decrease the conductivity of the contact parts of the connectors and cause accidents.
If water or dirt is attached to the connectors, immediately wipe it off with a dry cloth.

(4) Other parts

Wipe off water and dirt with a soft cloth. Do not use organic solvents such as thinner.
If dirt is excessive, wipe it off with a soft cloth thoroughly wrung out of neutral detergent diluted with water.

⚠ CAUTION

- Before cleaning the equipment, be sure to unplug the power cord from the adapter box and power outlet.
- When cleaning the equipment, be sure to secure enough work space and pay attention to the surroundings during work.
- When wiping with water, if water droplets enter the equipment or a part, be sure to let it dry for a while in a warm room. Using wet equipment or parts may cause electric shock, accidents, and failure. Pay attention to avoid water entry.
- If a solvent such as thinner or strong detergent contacts the illumination cover of the camera head, it will significantly reduce the strength and waterproof performance.
  Immediately wash off any solvent with water.
- If you find a crack or large scratch on the lens glass, LED cover, or camera cable, stop using the equipment and replace it immediately.
- Do not wet the main unit (cable drum and control unit) directly with water.
  If water droplets are attached to the main unit, immediately wipe off the water droplets with a cloth. Otherwise, the water droplets may enter the equipment and cause a failure.
- When using neutral detergent, dilute with water.

11. Warranty

The warranty period of this product is one year.

- Free-of-charge repair for this product shall be available for one year after delivery.
- Free-of-charge repair for the replaced parts shall be available for six months after repair.
- Repair for this product shall be available at your cost for five years after the end of manufacturing. However, repair for this product shall be no longer available when manufacturing of key parts such as the camera sensor is terminated.
- In principle, failed products must be sent in to a TOSHIBA TELI factory or a partner factory. All removal and installation costs shall not be covered by the warranty.
  Also, shipping cost for the failed products shall be paid by the sender.
- In principle, products to be repaired must be sent in to a TOSHIBA TELI factory or a partner factory. All removal and installation costs shall not be covered by the warranty.
  Also, all overhead costs (such as travel expenses) of the customer and end users as well as the return shipping cost shall be paid by the customer.

Even during the warranty period, a charge will be incurred for repair in the following cases.

- Failure or damage due to maintenance or repair performed by third parties not specified by TOSHIBA TELI.
- Failure or damage caused by dropping the product or during transportation after purchase.
- Failure or damage to the product caused by third-party products not delivered by TOSHIBA TELI.
- Failure or damage due to maintenance or repair performed with non-genuine repair parts.
- Failure or damage caused by failing to observe precautions or instructions in the instruction manual provided with the product.
- Failure or damage caused by ambient conditions beyond the operating conditions including the power supply specification and installation environment described in the instruction manual provided with the product.
- Failure or damage caused by fire, natural disaster (e.g., earthquake, windstorm, flood, lightning strike), salt damage, gas damage, or abnormal voltage.
- Repair or replacement of consumable parts or limited-life parts.

The camera head and camera cable become worn relatively easily, and are hence regarded as consumable parts. Note that their replacement will incur a charge, even if during the warranty period.

⚠ CAUTION

- TOSHIBA TELI is not liable for any loss or damage to the data recorded onto an SD card or other media.
- TOSHIBA TELI will not repair equipment that has been contaminated with toxic or radioactive substances.
- TOSHIBA TELI is not liable for any personal accidents, damage, or failure caused by repair or inspection performed by third parties not specified by TOSHIBA TELI.

For details on repair after the warranty period and the availability period of replacement parts, contact your dealer or a TOSHIBA TELI service staff.
Where possible, products may be repaired, upon your request, and at your cost.
* Before requesting repair, refer to **7. Troubleshooting**.

● <u>Publication</u>   Instruction Manual: **TS3040**   First edition   Created in **Jun 2012**

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● For inquiries or information, contact the sales department at the head office factory or your dealer.