Mold Protector

PLUS‑E

PE-700

Operation Manual

Ver. 0.01

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Ushio Lighting, Inc.

Introduction

Thank you for purchasing Ushio Lighting's Mold Protector PLUS-E PE-700. This manual describes the functions and how to operate it.

Please read this manual before using PE-700, to make optimum use of its functions and features.

⚠ Warning

1. **Do not use this device in a place where there is flammable or explosive gas.**
   It is extremely dangerous, as sparks from the power switch may cause a fire.
2. **Do not use forcibly bend the cable or place heavy things on it.**
   It will damage the cable, and may cause a fire or electric shock.

⚠ Caution

1. **Avoid using the device in a place under direct sunlight, near a heat source, or where it may be vibrated or hit. The ambient temperature should be between 0°C and 45°C, and the relative humidity should be 85% or less where this device is used.**
   *Make sure there is no condensation.
2. **Use the packing material that surrounded the device when it was delivered to transport it somewhere.**
3. **Store it in a dry place, not under direct sunlight.**
4. **Turn off the power in the following cases. It may cause a breakdown or fire if used in an abnormal state.**
   ・ If the device cannot be restored from an abnormal state.
   ・ If a strange smell, smoke or strange sound is coming from the device.
   ・ If foreign matter such as metal pieces or water has gone into the device or in gaps.
5. **Do not take this device apart. It may cause a breakdown or fire.**

Some of the descriptions in this operation manual may be different from the actual device. Please note that the device specification is subject to change without notice. Your understanding is appreciated.
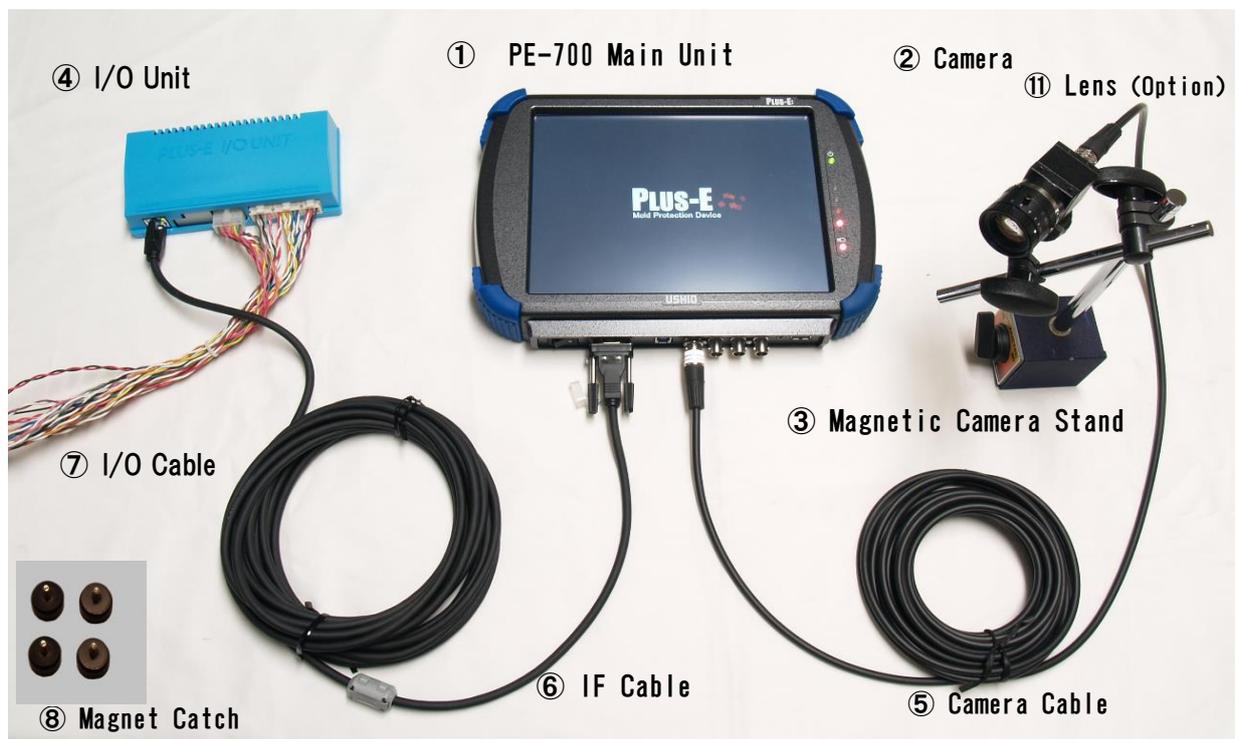
CONTENTS

Chapter 1 Description of Components

1-1　　　Components
1-1-1　Structure of Standard Set Parts

① PE700 Main Unit	1	Main monitoring device
② Camera	1	Standard CMOS camera　(Lens is option)
③ Magnetic camera stand	1	Magnetic camera stand. Camera platform (to fix camera to the stand) is attached
④ I/O unit	1	Unit to link input/output signals between the main unit and the molding machine
⑤ Camera cable	1	BNC cable to connect the main unit to the camera
⑥ IF cable	1	Cable to connect the main unit to the I/O unit
⑦ I/O Cable	4	Cable to connect the I/O unit to the molding machine
⑧ Magnet catch	4	Magnetic screws to fix the main unit on the molding machine.
⑨ Lighting Stand set	1	Magnetic Stand with a lighting set　(Lamp is option)
⑩ Operation pen & cord	1	A touch panel pen. It is accommodated to a hole at the side of the main unit

Standard Parts

1-1-2 Optional Parts (Sold Separately)

⑪ Lens	Lens for CMOS camera
⑫ LED lamp	High Intensity LED lamp to illuminate the monitoring target.
⑬ Infrared (IR) LED lamp	Infrared LED lamp is to irradiate Infrared light to the monitoring target. The camera with IR filter catches the infrared light reflected from the monitoring target. IR light is featured to reduce the influence by ambient light. (To illuminate wider area, Infrared LED floodlight is also available.)
⑭ IR Filter	IR Filter placed on the lens cuts the visible light and enables to monitor the infrared light. It reduces the influence by the ambient light, and increases the recognition to black and grey color.
⑮ Additional camera set	② camera ⑤ camera cable and ⑪ lens are one set. (This set is for monitoring with more than 2 cameras)
⑯ Wide lens	It enables to shoot wider area.
⑰ Zoom lens	It enables to zoom in the imaging area
⑱ USB memory	USB memory is to record the NG image

⑫ LED lamp + Magnetic Stand
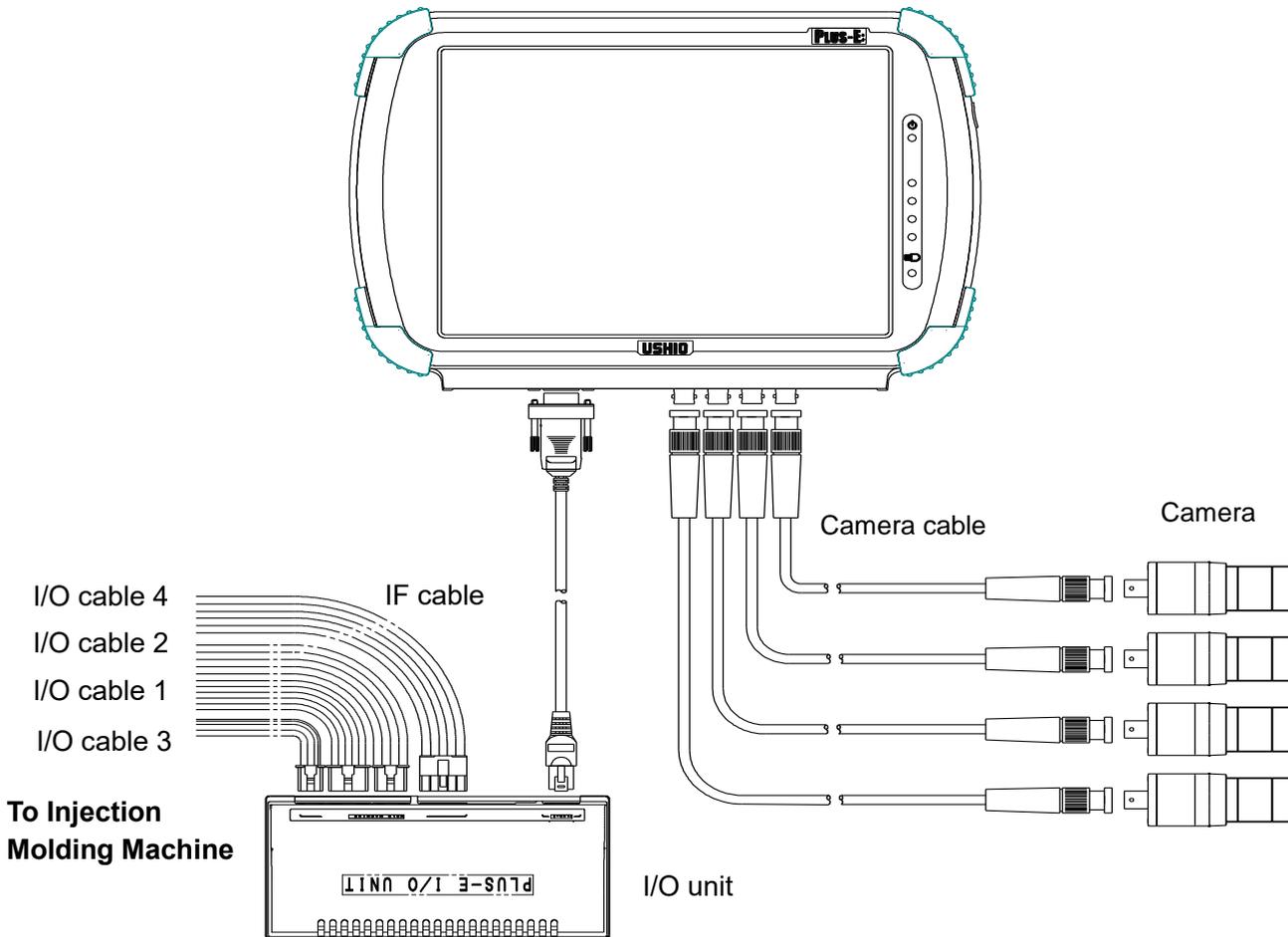(Illuminate with 3000K warm light)

⑬ Infrared LED lamp + Magnetic Stand
(The center of bulb turns on with red color)
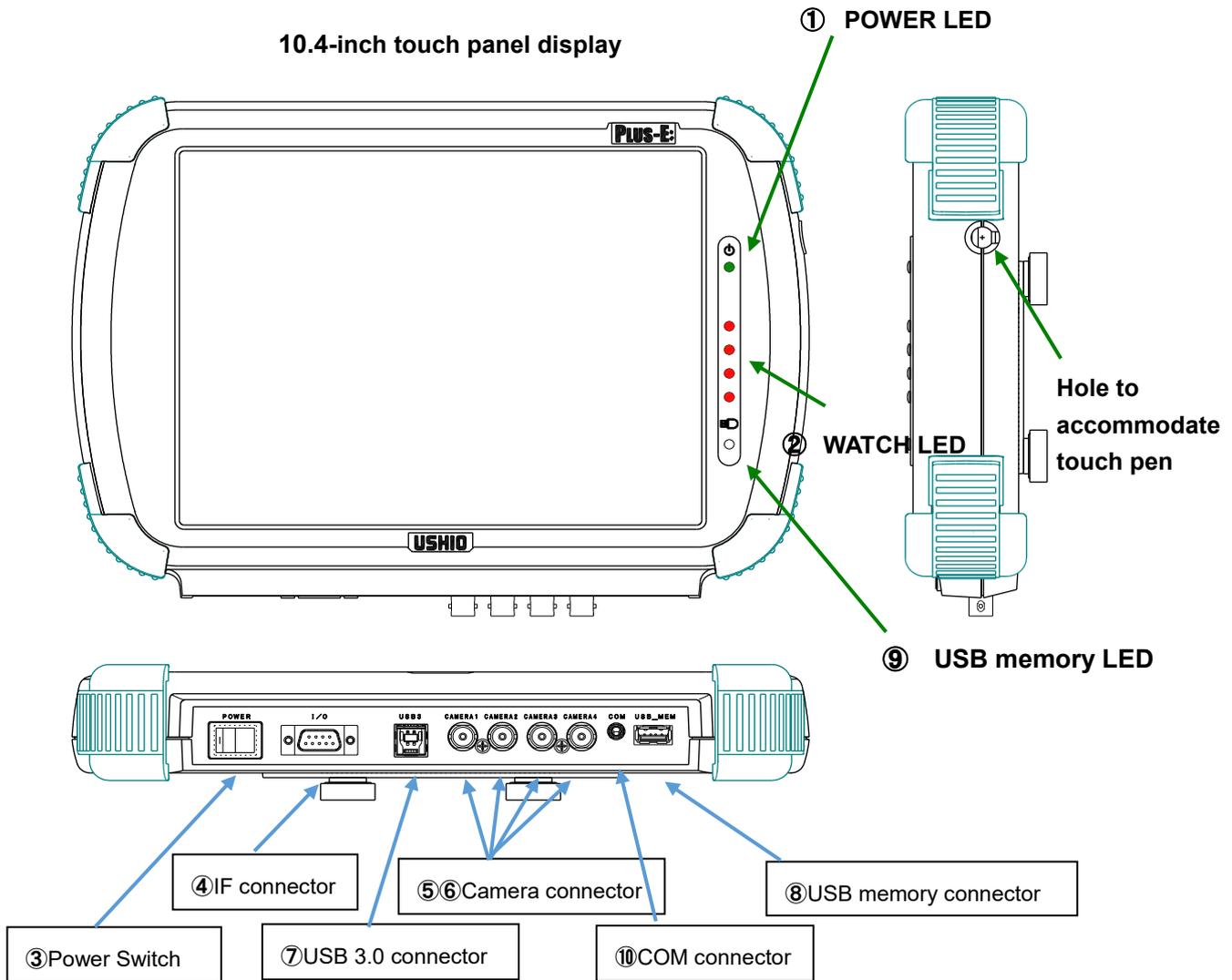
1-2. Connection of I/O Unit and Camera

The procedure to connect the device is shown in the figure below.
(Also see the Parts figure on page 5.)

Camera cable

Camera

I/O cable 4

IF cable

I/O cable 2

I/O cable 1

I/O cable 3

**To Injection
Molding Machine**

PLUS-E I/O UNIT

I/O unit

Note 1.   Four cameras are used in the above figure.

(The 2nd to 4th cameras, lens, magnetic stand and camera cables are option.)

Note 2.   The camera is recognized when power is turned on. Connect the camera cable before

switching the power on.

Note 3.   Connect I/O cables (total of 4) from the I/O unit to each circuit of the molding machine.

Note 4.   Connect the IF cable from the main unit to the I/O unit.

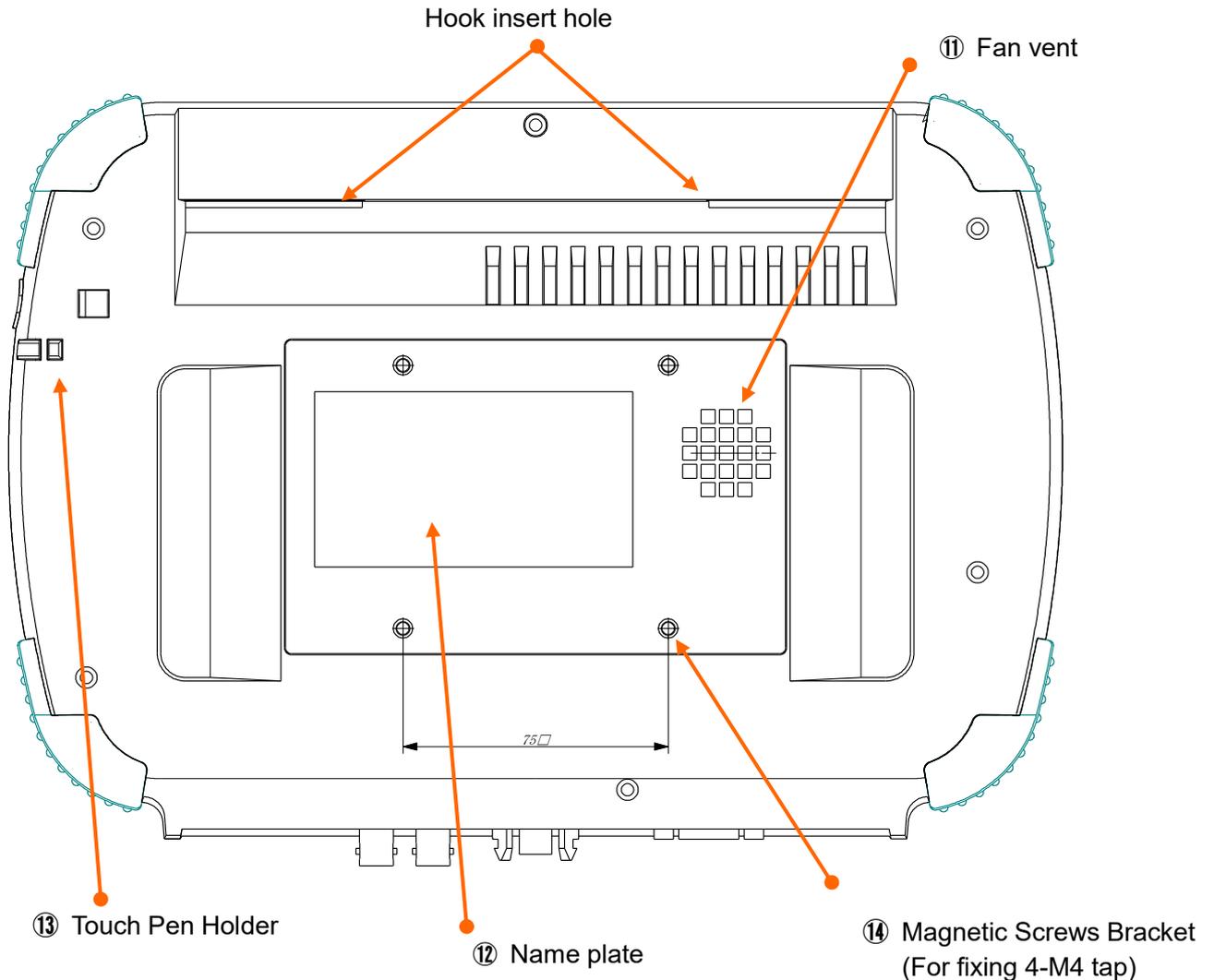Note 5.   Connect the camera cable from the main unit to the camera.

1-3. Structure of Main Unit

PE-700 FRONT

10.4-inch touch panel display

① **POWER LED**

② **WATCH LED**

⑨ **USB memory LED**

Hole to accommodate touch pen

④IF connector

⑤⑥Camera connector

⑧USB memory connector

③Power Switch

⑦USB 3.0 connector

⑩COM connector

POWER LED (green)	: Lights up when the power is on.
WATCH LED (red)	: Lights up while monitoring.
Power Switch	: Press the "●"mark to turn on the power.
IF Connector	: To connect the IF cable. Connect it to the I/O unit.
Camera 1/2 Connector	: To connect the camera cable.
Camera 3/4 Connector	: To connect the camera cable.
USB 3.0 Connector	: To connect USB 3.0 device
USB memory Connector	: Insert USB memory. (Power voltage: 5.0V)
USB memory LED	: Lights up when the USB memory is read or being written.
	Note : Do not pull out the USB memory while the LED light is on.
COM Connector	: It is a connector for testing.

PE-700 Back

Hook insert hole

⑪ Fan vent

⑬ Touch Pen Holder

⑫ Name plate

⑭ Magnetic Screws Bracket
(For fixing 4-M4 tap)

Fan vent   : Vent for heat radiation.
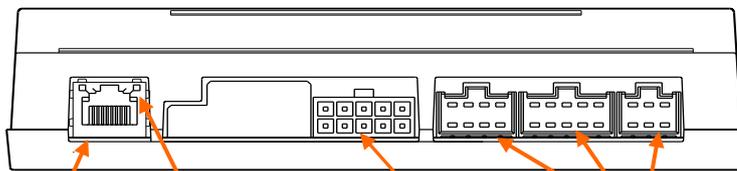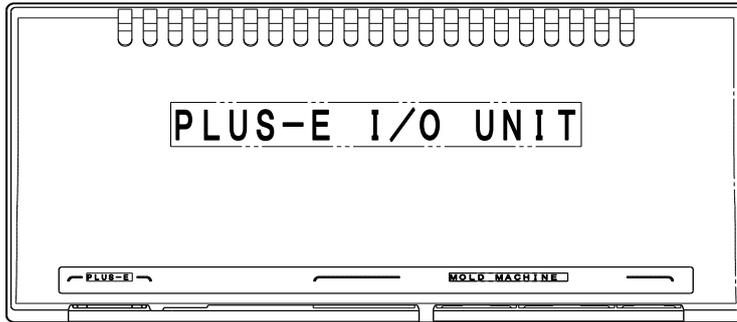**Name plate**   : Serial number is written here.
Touch Pen Holder   : A place to hook a cord for the touch pen.
Magnetic Screws Bracket : Place a magnet screws, a washer and a lubber cover.

1-4. I/O Unit

The specification of I/O unit is same as PE500 and PE600.

② IF Cable Connector　　　　　　　　　　　　　　③ I/O cable connector

① Power LED　　　④ I/O cable connector

POWER LED　　　**:** Lights up when the power is turned on.

IF connector　　　**:** To connect the IF cable from the main unit.

I/O connector　　**:** 6-pin, 8-pin or 10-pin connector to connect to the molding machine
　　　　　　　　　　　with using I/O cables 1, 2 and 3.

I/O connector　　: 10-pin connector. Connect it to the molding machine with using I/O cable 4.

1-5. I/O Cable

There are four I/O cables in total. Connect the connector side to the I/O unit, and the Y terminal side to the internal circuit of the molding machine.

[Input / output signal rating]

Input signal : Non-voltage contact signal. (10KΩ pull-up to +24V power in the receiving circuit.)

Output signal : Semiconductor relay contact output.

※ Contact allowable voltage: ±50V, contact allowable current : ±200mA
(However, ±50V, ±1000mA for Cycle Interlock and Eject Interlock)

I/O Cable Signal Specifications

It is possible to re-combine the connection counterpart with "Input signal connection setup" and "output signal connection setup" for input signals and output signals. However, the following table shows the status of "default" setup (without re-combination).

I/O Cable 1

Pin no.	Core wire identification color	Signal line type	Signal name (Indicates the case without signal re-combination)	Mark tube characters
1	Red	AWG22	OUT1	A1
2	White	twisted pair line	(Cycle interlock output)	A2
3	Yellow	AWG22	OUT3	C1
4	White	twisted pair line	(Eject interlock output)	C2
5	Orange	AWG22	OUT4	D1
6	White	twisted pair line	(Re-eject / Skip output)	D2
7	Green	AWG22	IN1	H1
8	White	twisted pair line	(Mold opening input)	H2
9	Blue	AWG22	IN2	J1
10	White	twisted pair line	(Eject complete signal)	J2

I/O Cable 2

Pin no.	Core wire identification color	Signal line type	Signal name (Indicates the case without signal recombination)	Mark tube characters
1	Brown	AWG22	OUT2	B1
2	White	twisted pair line	(Take-out Robot start output)	B2
3	Black	AWG22	OUT6	F1
4	White	twisted pair line	(Monitoring /Cycle start output)	F2
5	Grey	AWG22	OUT7	G1
6	White	twisted pair line	(Reject defective product)	G2
7	Pink	AWG22	IN3	K1
8	White	twisted pair line	(Input alarm off)	K2

I/O Cable 3

| Pin no.	Core wire identification color	Signal line type	Signal name (Indicates the case without signal recombination)	Mark tube characters
1	Purple	AWG22	OUT5	E1
2	White	twisted pair line	(Output external alarm)	E2
3	Red	AWG22	+24V	24V
4	Black	twisted pair line	GND	GND
5	Black	AWG22	Case earth	EARTH
6			NC (not connected)	

I/O Cable 4

Pin no.	Core wire identification color	Signal line type	Signal name (Custom mode signal CM) (Indicates the case without signal recombination)	Mark tube characters
10	Brown	AWG22	IN4	L1
5	Pink	twisted pair line	(Spare for Input)	L2
9	Red	AWG22	IN5	M1
4	Pink	twisted pair line	(Input 1 for mold switching)	M2
8	Orange	AWG22	IN6	N1
3	Pink	twisted pair line	(Input 2 for mold switching)	N2
7	Yellow	AWG22	IN7	P1
2	Pink	twisted pair line	(Molding machine automatic input)	P2
6	Green	AWG22	IN8	Q1
1	Pink	twisted pair line	(Input error off)	Q2

# Chapter 2 Basic Operation

2-1. Power On and Initial Screen

① When power is turned ON, the Initial Screen (Image 1) is displayed. Select the display language.

② Touch the "USHIO" logo in the center. If it is in manual run mode, the molding machine interlock signal is released, and the main menu (Image 3) is displayed.

(Image 1) Initial Login
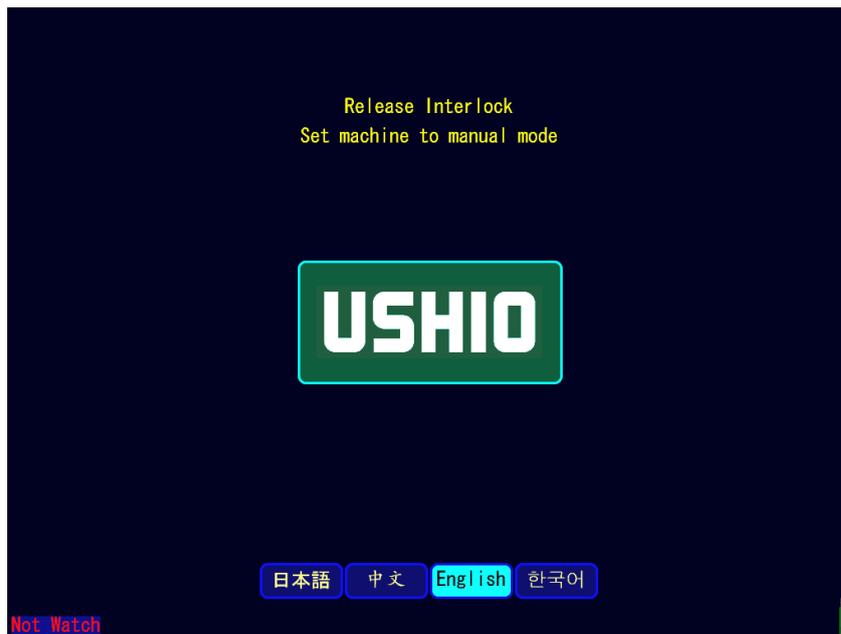
USB memory property

Capacity property

This is displayed only if the USB memory is inserted. The yellow bar shows the used capacity in the USB memory. When the USB memory is being accessed, it is displayed in red.
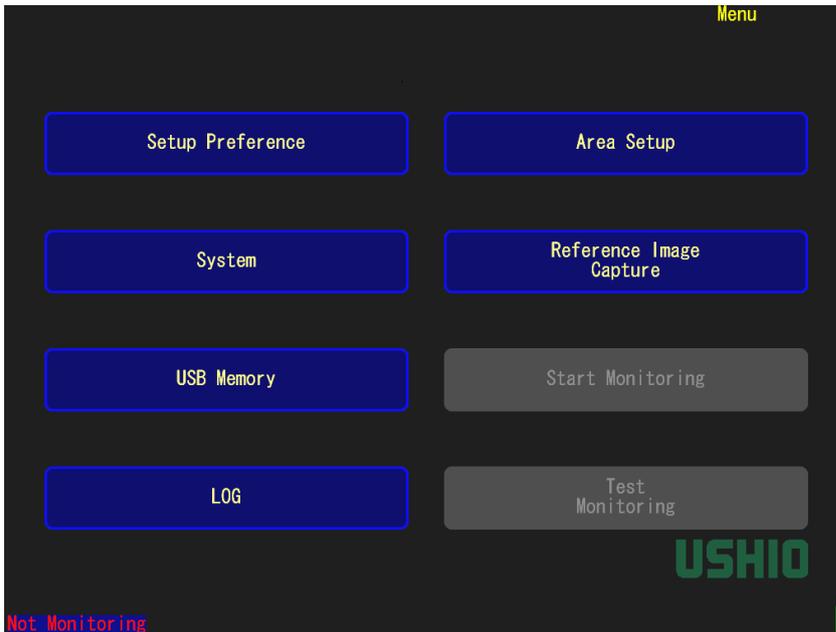
(Image 2) Device Information Display
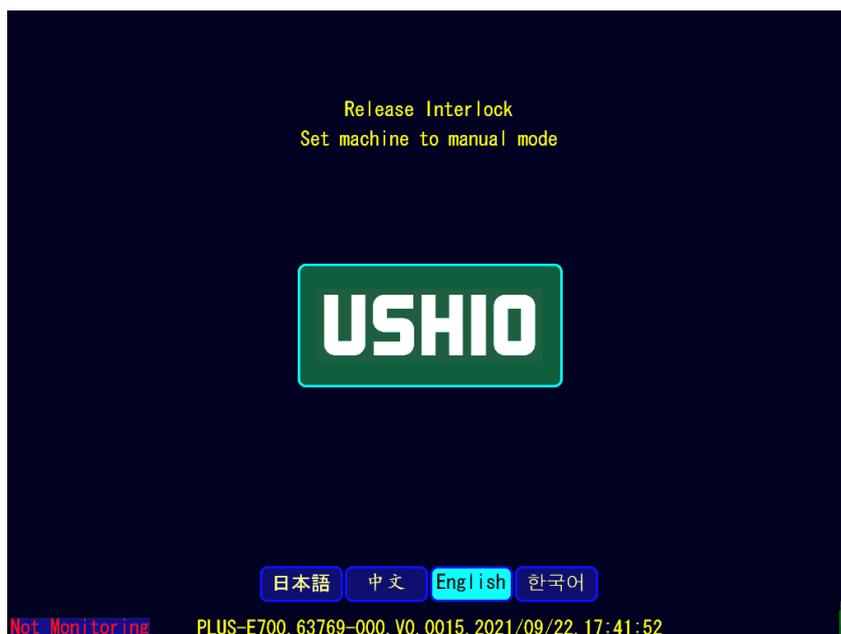
Display of

device serial number,

software version, and clock

When you touch anywhere other than the USHIO logo, this is displayed at the bottom.

2-2. Main Menu
(Image 3)

Main Menu (Image 3)

Setup Preference	**Set the basic settings for monitoring.**
	・Select the Camera No.（Camera **1** , Camera **2** , Camera **3** , Camera **4**）
	・Setup the monitoring method（Inspection 1, Inspection 2）
	・Setup the pre-check, timer, Run (Molding) Machine without monitoring, Reference image capture, Save NG image in USB memory, Save log file
System	**Setup the basic system**
	Setup volumes, display setting, adjustment of mold position / error delete option, password setting, clock, settings for signals
USB Memory	Setup for USB memory when it is inserted.
LOG	Display the log file and write a log file into the USB memory
Area Setup	Setup the monitoring area
Reference Image Capture	Capture the reference image (standard image) for inspection process.
Start Monitoring	Starts monitoring.
Test Monitoring	Starts the monitoring test.

*　　When you select an option on the display, the button changes to light-blue color.

**　　If you touch the button and it is not selected, it means the option is disabled.

***　　When you select the "Menu" button, it goes back to the Main Menu.

2-3. Setup Preference

Select **Setup Preference** in the Main Menu (Image 3).

① Setup the monitoring method of camera 1 & 2.

Monitoring method : setup which camera to use for which inspection.

(Image 4-1) Setup Preference Page 1/3   [Selected buttons are colored in a light-blue]

Inspection 1	Checks the molded products are in the mold before they drop.
Inspection 2	Checks the molded products completely drop off or taken by a take-out robot.
Auto Mark	Only monitoring automatically detected area.
Whole Area	Monitoring the whole area specified by a user.
Camera designation	Setup the monitoring from color, monochrome, or IR (infrared) monitoring for Camera 1 and Camera 2. Displays the camera image as a color image. When you touch the button, the screen is switched to monochrome monitoring. Displays the camera image as a monochrome image. When you touch the button, the screen is switched to IR monitoring. Displays the camera image as an IR monochrome image. When you touch the button, the screen is switched back to color monitoring.

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② Setup the monitoring method of camera 3 & 4.
（Image 4-2） Setup Preference Page 2/3

Inspection 1	Checks the molded products are in the mold before they drop.
Inspection 2	Checks the molded products completely drop off or taken by a take-out robot.
Auto Mark	Only monitoring automatically detected area.
Whole Area	Monitoring the whole area specified by a user.
Camera designation	Setup the monitoring from color, monochrome, or IR (infrared) monitoring for Camera 3 and Camera 4. Displays the camera image as a color image. When you touch the button, the screen is switched to monochrome monitoring. Displays the camera image as a monochrome image. When you touch the button, the screen is switched to IR monitoring. Displays the camera image as an IR monochrome image. When you touch the button, the screen is switched back to color monitoring.

③ Setup the timer 1 and 2, and other setups

（Image 5） Setup Preference Page 3/3   (Image 6) Keypad

<Setup for Timer 1 and 2 >

1. Touch the Timer display part (unit : seconds).
2. Input the time by seconds in the keypad screen (Image 6) and press ENT to confirm.
3. Select whether the monitoring time should be shortened or not, with Wait Time OFF or ON.

    Note 1. **The waiting time becomes effective with Wait Time OFF.**
              During Wait Time On, the monitoring is repeated with no waiting time. When the monitoring judges OK, the monitoring goes to the next process. When it reached to the time set in the timer without acquiring "OK", the monitoring judges NG.

    Note 2. **Timer 1** is the waiting time from mold open complete to inspection image 1 is captured. When the time display button is touched, the keypad is displayed. Input the number for the timer and touch ENT to confirm. You can set any number between 0 to 99.99 seconds by 0.01 seconds.

    Note 3. **Timer 2** is the waiting time from mold open complete or eject complete to the Inspection 2 is captured. Set it up with the same way as the Timer 1.

    Note 4. Wait Time On of **Timer 2** is selectable when "**Eject Complete Signal" setting is set "On" in the System Setting page 3/3.** (Refer to this manual page 20)

(Image 5)　Setup Preference 3/3

Timer 1	Waiting time from mold open complete to inspection image 1 is captured. (Unit : seconds)
Timer 2	Waiting time from mold open complete or eject complete to inspection image 2 is captured.　(Unit : seconds)
Pre-check	**ON** 　　: When NG is detected in the Inspection 2, the monitoring restarts from Inspection 2 and the interlock is released only when OK is shown. **OFF** 　　:　When NG is detected in the Inspection 2 and monitoring is restarted, it skips Inspection 2 and the interlock is released.
Run Machine without monitoring	**Disable:** When the molding machine is in auto-run mode, the interlock is released only during reference image capture and during monitoring. **Enable:** When the molding machine is in auto-run mode, the interlock is released even not during reference image capture or monitoring.
Reference Image Capture	**Auto:** 　　The reference image is automatically captured after mold open complete or eject complete and waiting time. **Manual:** Reference image is captured manually.
Save NG Image	Set whether saving NG images in the USB memory **automatically or manually** when NG is detected. If it is set to "saved manually", touch **"Save NG Image"** when NG is detected. If it is set to "**Auto**" and NG is detected, when the memory is full, the oldest NG image is deleted to save the detected NG image.
Save Log File	Set whether saving the monitoring log automatically or manually when monitoring ends.

Note 1.　When the molding machine is running at other times besides reference image capture and monitoring, "Not Monitoring" blinks in red at the bottom left on the screen.

(Image 7)

Not Monitoring

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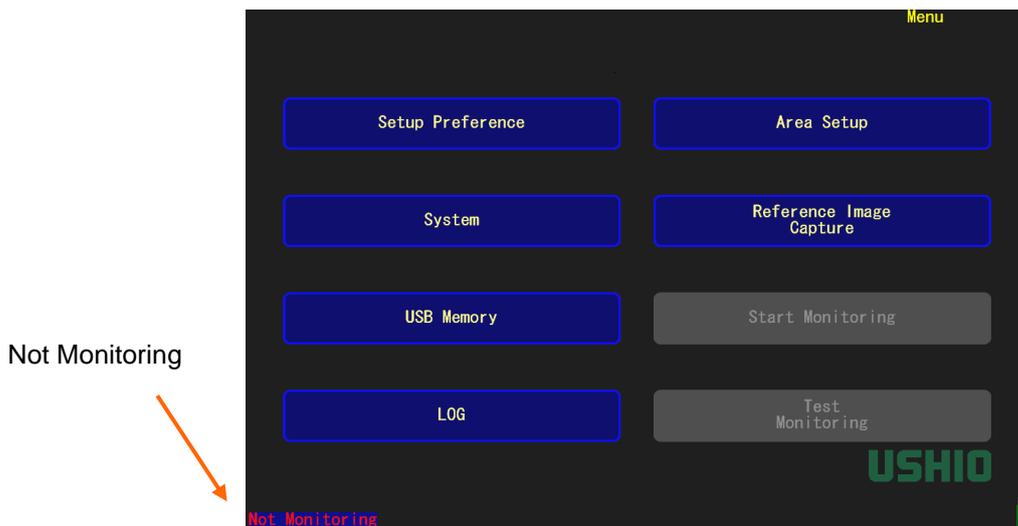
2-4. System Setting
① System Setting Page 1 (1/3)

Touch **System** in the Main Menu (Image 3), and enter to the System Setting (Image 8).

(Image 8)

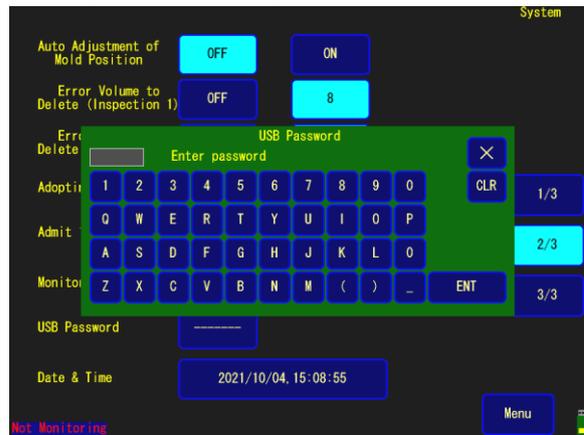| Alarm Volume Key Tone Volume	The keypad is displayed when touching the button. Input the volume, and touch **ENT** to confirm. BS is backspace, CLR is clear. The volume is adjustable 0% to 100%.
Display Brightness	Set the display brightness.
Display off	Set the time to turn off the display when nobody touches the screen. The time is adjustable from 1 minute to 100 minutes.
Calibration	The touch panel is calibrated by selecting **Yes**,
Reset to Factory Default	By selecting **Yes**, all the setting is initialized to factory default.
Language	Select a language: Japanese, Chinese, Korean or English. (Other language support is upon the request)

② **System Setting   Page2   2/3**
（Image 9）

Auto Adjustment of Mold Position	This function automatically corrects the stop position of the mold.
Error Volume to Delete (Inspection 1) Error Volume to Delete (Inspection 2)	Adjusts the fineness / roughness of error detection by deleting NG dot. Tuning is available between 0 and 24. 0 is finer detection, 24 is more rough detection. When it is set to 24, it deletes error dots in approximately 1.09mm x 1.09mm area. (Reduce the error dots) It is disabled when it is set to **OFF or 0**.
Adopting Re-Inspection	When NG is detected at Inspection 1 or 2, **ON**: The re-inspection runs. If the re-inspection results OK, it adopts the result of re-inspection. **OFF**: When NG is detected, the machine stops with NG result.
Admit 1 pixel error	Adjusts the monitoring precision. **ON**: 1 pixel difference is counted as an error. **OFF**: 1 pixel difference is not counted as an error. This function consequently reduces the number of times for the molding machine stops.
Password ・ Monitoring Password	Password means two types of passwords, monitoring password and USB memory password. Set these two passwords when you need. ・Password for protecting the monitoring state. Password must be entered to exit from the monitoring screen. (Image 10)

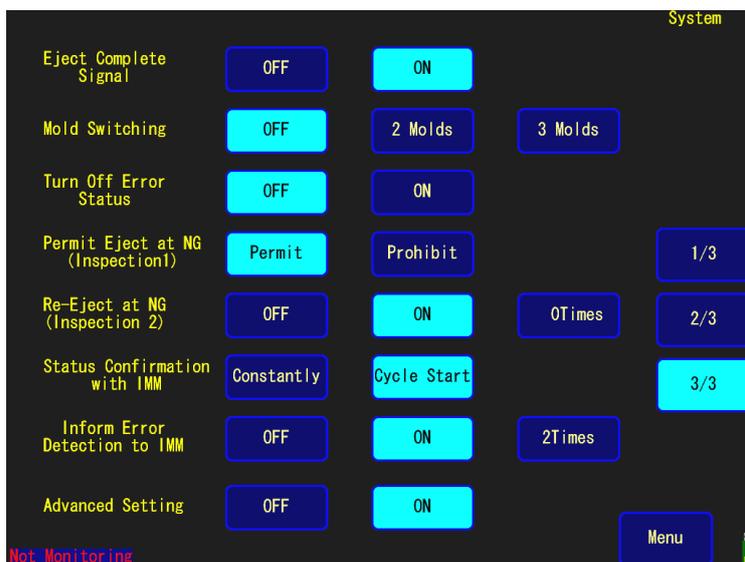| ・ USB Password	・Password to restrict the access to the USB memory. Password must be entered when USB Memory is accessed. (Image 11) ※ By touching the entering box of <u>Monitoring Password</u> or <u>USB Password</u>, the keypad is displayed. Enter the password as you prefer, and touch **ENT** to set.
Date & Time	For correcting the display time & date, touch the time display to display the keypad. After entering the time and date, touch **ENT**. (Image 9 Right)

(Image10) Setting Monitoring Password   (Image 11)　Setting USB Password

③ System Setting Page 3 (3/3)

(Image 12)

Eject Complete Signal (IN2 J)	This setting specifies the signal J is used or not used as Eject Complete signal. **ON** : Eject Complete signal becomes a trigger for Inspection 2 starts. **OFF** : Inspection 2 starts without receiving "Eject Complete Signal", especially when Inspection 2 starts with timer setting.
Mold Switching (IN5 N / IN6 M)	When using 2 or 3 molds in 1 Injection Machine (such as vertical molding machine), PLUS-E memorizes the setting for each mold with the mold switching signal IN5 (M) / IN6 (N) and mold number. (Refer to the table below) **2Molds / 3Molds**: Select 2 or 3 Molds when you use multiple molds. **OFF** : Select OFF when you only use single mold.
Turn Off Error Status (IN8 Q)	When Take-Out Robot receives the signal [OUT7 G] and solves the error by separating the defective products, PLUS-E receives a signal of "error was solved" from the Take-Out Robot and gets reset. **ON** : PLUS-E receives the signal of "error was solved" and get reset. **OFF** : PLUS-E does not need to receive such a signal.
Permit Eject at NG (Inspection 1) (OUT3 C)	Permit or Prohibit the "Eject" when NG is detected at mold open. **Permit** : Eject the molded product when NG is detected at Inspection 1. **Prohibit** : Do Not eject the molded products even NG is detected at Inspection 1, proceed to Inspection 2. This is to stop IMM and let the user to check the NG products every time.
Re-Eject at NG (Inspection 2)	This setting specifies about Re-Eject. **ON** : Enables "Re-Eject" after Inspection 2. Set how many times

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(OUT4 D)	to re-eject (0-100 times)
	OFF : Disables "Re-Eject".
Status Confirmation with IMM (OUT6 F)	This setting is how frequent PLUS-E and the molding machine communicate.
	Cycle Start : Once in a molding process, at cycle starts
	Monitoring On : Always through the molding process
Inform Error Detection to Take-Out Robot (OUT7 G)	When the Inspection 1 detects NG (error), PLUS-E informs that to Take-Out Robot. Take-Out Robot receives this signal and separates the NG products.
	ON : The signal needs to be sent to Take-Out Robot.
	OFF: No need to inform the error to Take-Out Robot.
Advanced Setting	**ON** : Advanced Setting is available (Refer to below)
	OFF : Advanced Setting is disabled.

Mold Switching and Mold Number

No of Mold	Switch 1 IN5 (N)	Switch 2 IN6 (M)	Mold Number
1	－	－	Mold 1
2	0	－	Mold 1
	1	－	Mold 2
3	1	0	Mold 1
	0	1	Mold 2
	0	0	Mold 3

④ **Advanced Setting**

Advanced Setting is set to OFF as Factory Default.

Advanced Setting enables the following settings

   1   Detailed monitoring

   2   Monitoring a different area in Inspection 1 and Inspection 2

   3   Setting the sensitivity of the mold reflection surface

   4   Monitoring the vertical injection machine is available

Advanced Setting ：OFF	Type of Area （2 types）	Monitoring Area：The area to monitor
		Masked Area　：The area not to monitor
	Sharing Area	The area monitored in the Inspection 1 and Inspection 2 is shared.
	Type of Sensitivity (Sensitivity 1, 2）	Sensitivity 1：Monitoring Sensitivity on the Auto-marked area Sensitivity 2：Monitoring Sensitivity on the Non-Auto-marked area
	Sensitivity 3	Unavailable
Advanced Setting ：ON	Type of Area （3 types）	Product Area：Products Area to monitor in details
		Surface Area：Mold Surface Area to widely monitor
		Masked Area：Area not to monitor
	Separated Area	Separate setting is available between Inspection 1 area and Inspection 2 area.
	Type of Sensitivity (Sensitivity 1,2,3）	Sensitivity 1：Monitoring Sensitivity on the Auto-marked area Sensitivity 2：Monitoring Sensitivity on the Non-Auto-marked area OR on the dark spot in the surface area Sensitivity 3：Monitoring Sensitivity on the Non-Auto-marked area OR bright spot in the surface area
	Sensitivity 3	Setting is available in products area and surface area.

【Additional Comments about Advanced Setting】

 ① Advanced Setting： OFF　(Standard Setting is OFF).

   There are two different types of area to setup. Monitoring area and Masked area.

   There are two types of sensitivities, the sensitivity 1 and 2.

   In case of auto-mark monitoring, the sensitivity 1 is applied to the auto-marked area.

   The whole area monitoring covers both the monitoring with sensitivity 1 to the marked spot

   and monitoring with sensitivity 2 to the surrounded area.

② Advanced Setting：ＯＮ

・The area to set is three types. Product area, Surface area, Masked area.
　The sensitivity is also three types. Sensitivity 1, 2, and 3.

・You can set the different areas for Inspection 1 and Inspection 2.

・You need to proceed both settings for Inspection 1 area and Inspection 2 area.
　For a short-cut, use the Copy All function (P28)
　The Sensitivity 2 for darkness and Sensitivity 3 for brightness are applied to the designated
　Surface area.

・The surface area is monitored by a monitoring method that sets the range of the bright and
　dark directions to the reference image, regardless of the designation of partial judgment /
　whole area judgment. In order to prevent a false detection due to light reflection on the metal
　surface, the surface area uses the judgement through the sensitivity 2 for dark spot and the
　sensitivity 3 for bright spot.

・The products area mainly monitors the auto-marked area with the sensitivity 1.

・In addition to the auto-mark monitoring, the whole area monitoring monitors the area
　excluding the marked spot with setting the tolerance sensitivity in both brightness and
　darkness by the sensitivity 2 and 3.

2-5. Area Setup

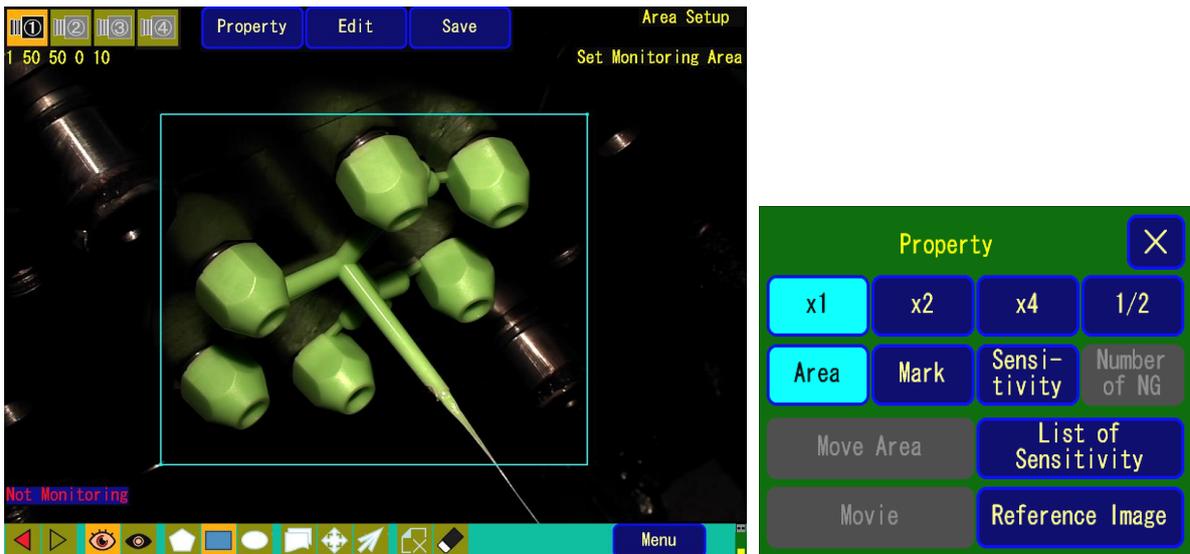2-5-1　Area Setup（Advanced Setting : OFF）

Enter the Area Setup by touching Area Setup in the main menu (Image 3)

Select the monitoring area in the Area Setup. (Image 15)

(1) Area Setup

① Image of Area Setup

(Image 15)

② Terms in the Area Setup (Refer to Image 15 and 16)

Terms		Property of Area Setup and Camera Image
	① Magnification	Magnification of Displaying Camera Image 　　Select from 1x to 4x　（1/2 is available with 2 Cameras）
	② Property	Area　　　：Display the area frame Mark　　　：Display the auto-mark Sensitivity：Sensitivity for touched (specified) area 　　　　　　　Indicates the number of masked area.
	③ List of Sensitivity	Display the list of Sensitivity
	④ Movie	Display the Movie
Edit		Creating an Area・Apply the designated setting
	① New Area	Select Monitoring Area or Masked Area to create new area.
	② Area	Select from Move, Copy, or Delete the area. Setting the sensitivity.
	③ Corner	Select from Add, Move, or Delete the corner.
Menu		Go Back to Main Menu

③ ICONS

Icons	Group	Name of Icon	Meaning of Icon
◁ ▷	REDO-UNDO	Repeat / Cancel	Repeat / Cancel the next or proceeding operation
◉ ●	Area Type	Monitoring Area Masked Area	Designate the type of Area setup. 2 types are available in simple mode.
⬠ ▢ ⬭	Geometry	Polygon Quadrangle Oval	Designate the geometry to create an area from three types: Polygon / Quadrangle / Oval.
▢ ✛ ➤	Edit	Copy / Move Move corner	Designates an operation to the created area
⊠ ◆	Delete	Delete Area / Delete Corner	Delete a designated area (yellow frame) / Delete a designated corner (only from a polygon).

(2) Area Setup Procedure

1) Create Area

Press "**Edit**" button and Select "**Monitoring Area**" for the new area, then close the window by pressing X. Select the **geometry icon** (Polygon, Quadrangle or Oval) at bottom of screen.
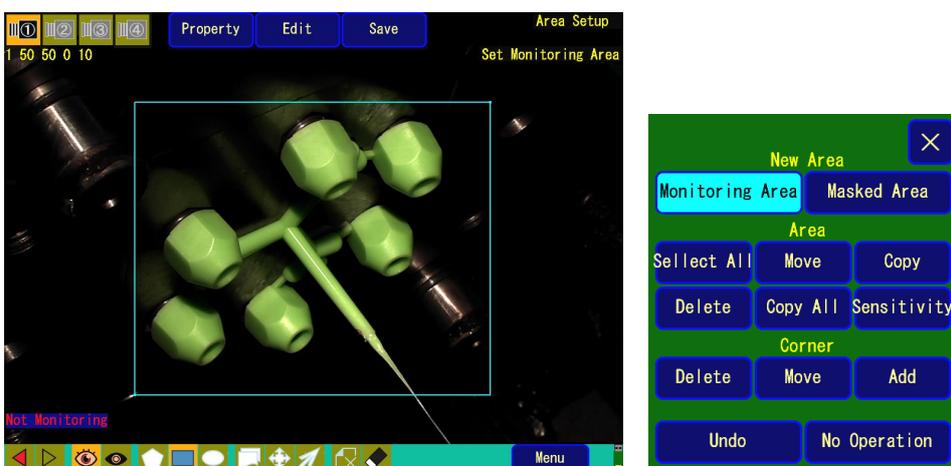
To create a polygon, touch corners one by one and press "**Save**" to confirm.

To create a quadrangle, designate diagonal 2 points.

To create an oval, designate a center of the circle/oval, then Radius 1 and Radius 2 which is perpendicularly intersecting to Radius 1.

You can turn on and off the buttons at screen above by touching the geometry icon.

(Image 16)

Note: In case of a polygon, it is possible to designate a shape with up to 32 corners.

The maximum number of areas to create is 30.

To set a Masked Area, select the "**Masked Area**" button for the New Area.
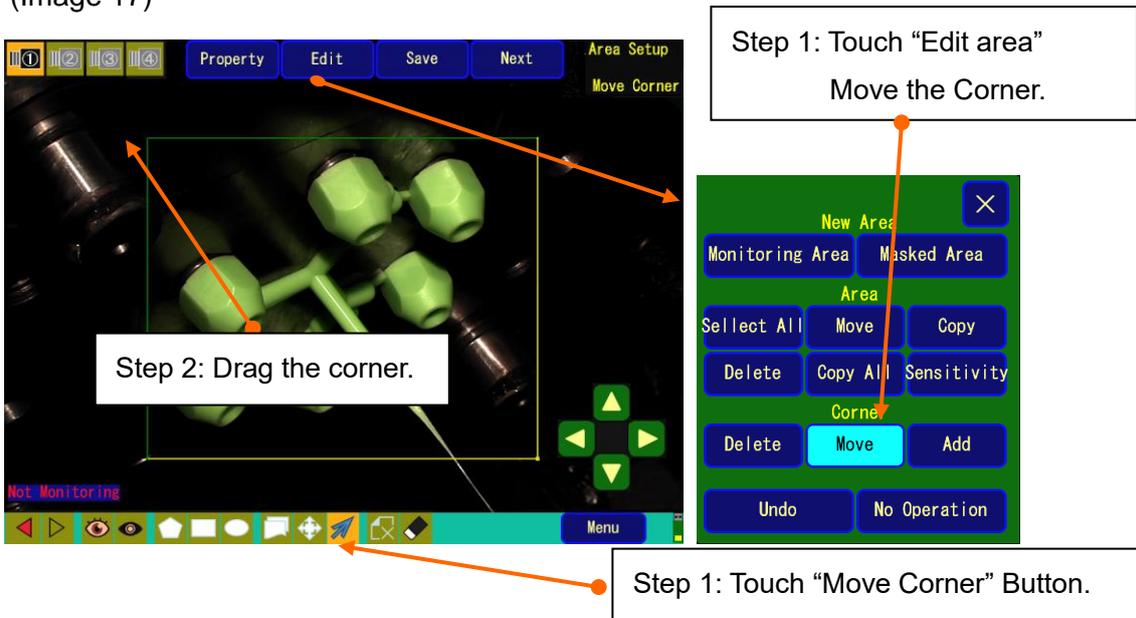
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2) Move, Add or Delete Corners

2)-1. How to Move Corners: 1

To move a corner of the area, press "**Move Corner**" button, drag the corner with pressing it.

You also can open the "Edit" window and select "Move" in the Corner.

Close the window with X. Drag the corner on the screen.

(Image 17)

Step 1: Touch "Edit area"
Move the Corner.

Step 2: Drag the corner.

Step 1: Touch "Move Corner" Button.
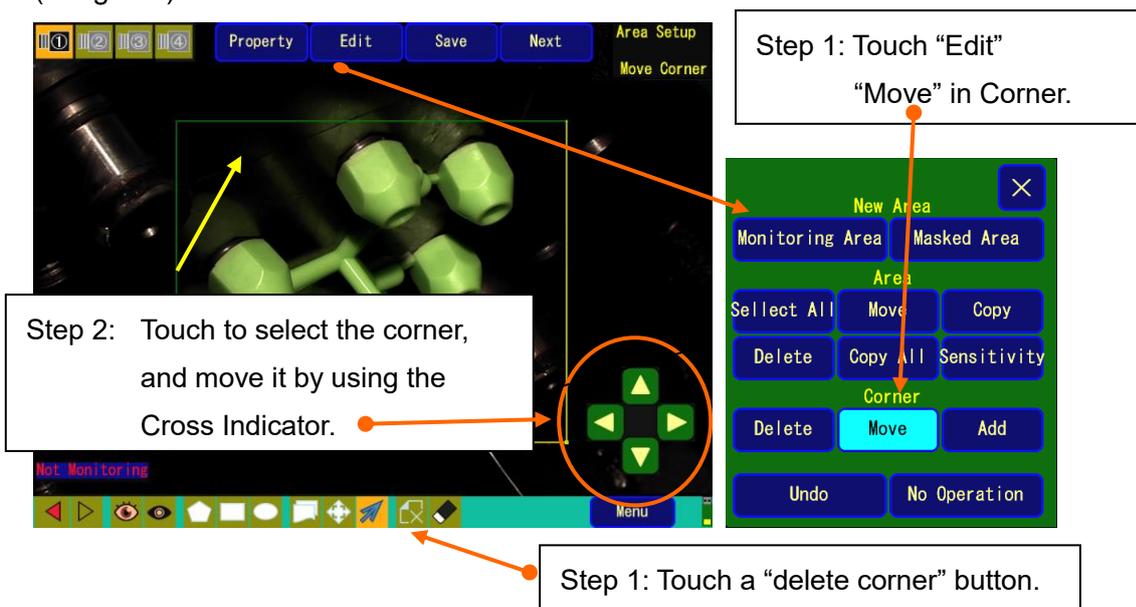
2)-2. How to Move Corners: 2

To perform fine adjustment of moving a corner, select the corner and then use the Cross Indicator to move upper / lower / right / left directions. Moving the cross indicator is available by pressing the center of the cross.

(Image 18)

Step 1: Touch "Edit"
"Move" in Corner.

Step 2:   Touch to select the corner, and move it by using the Cross Indicator.

Step 1: Touch a "delete corner" button.

2)-3. How to add or delete a corner

To add or delete a corner, touch "**Edit**", select "**Add**" or "**Delete**" in Corner,
Touch the corner to delete or touch the screen to add a corner.
It is possible to delete a corner with Corner Delete Icon at the bottom.
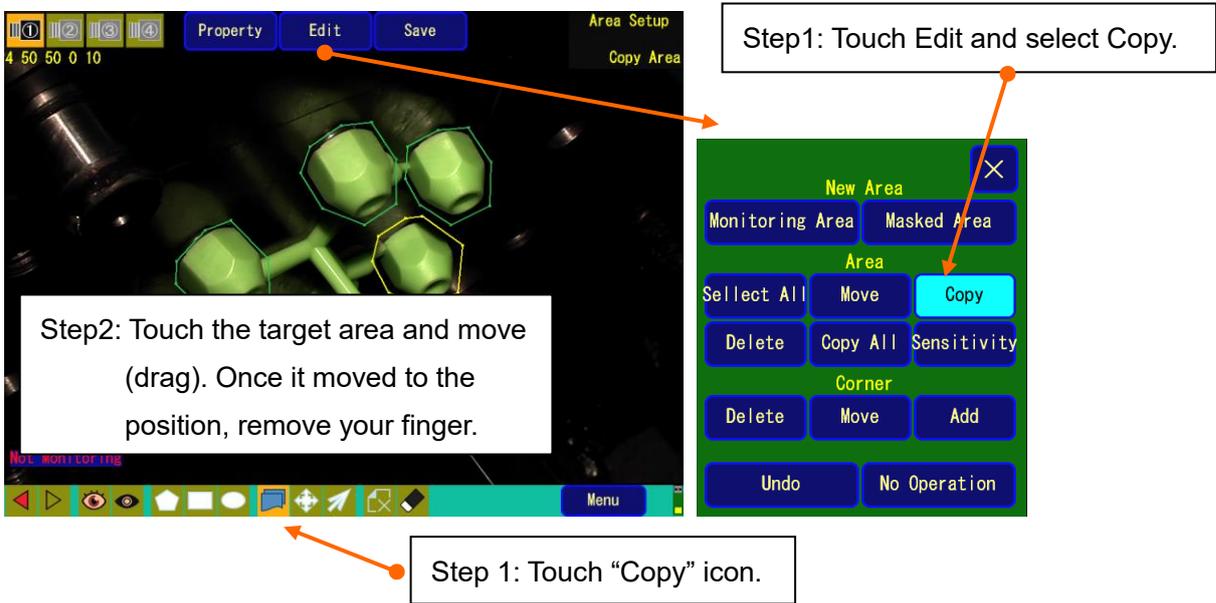

3) Copy or Move Area
3)-1. Copy Area
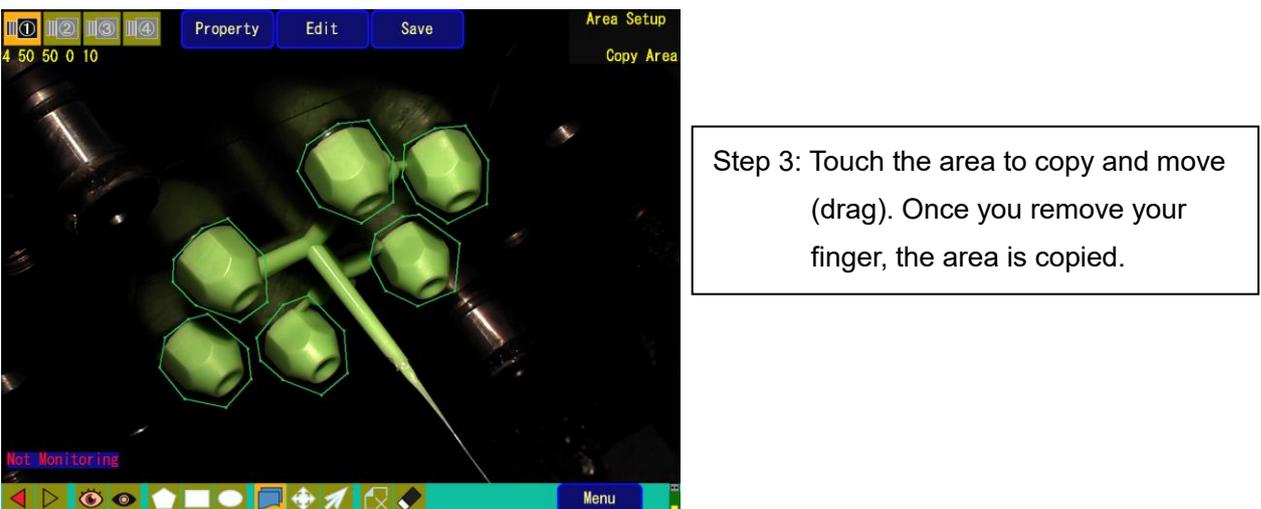Touch the "**Copy Icon**" at the bottom of the screen.
 Touch the line or the corner of existing area and slide it, the copied area is created and follows.
The attribute of the area is also copied at the same time.
You can copy the area by choosing "**Edit**" and select **"Copy"**.
(Image 19)

Step1: Touch Edit and select Copy.

Step2: Touch the target area and move (drag). Once it moved to the position, remove your finger.

Step 1: Touch "Copy" icon.

(Image 20)

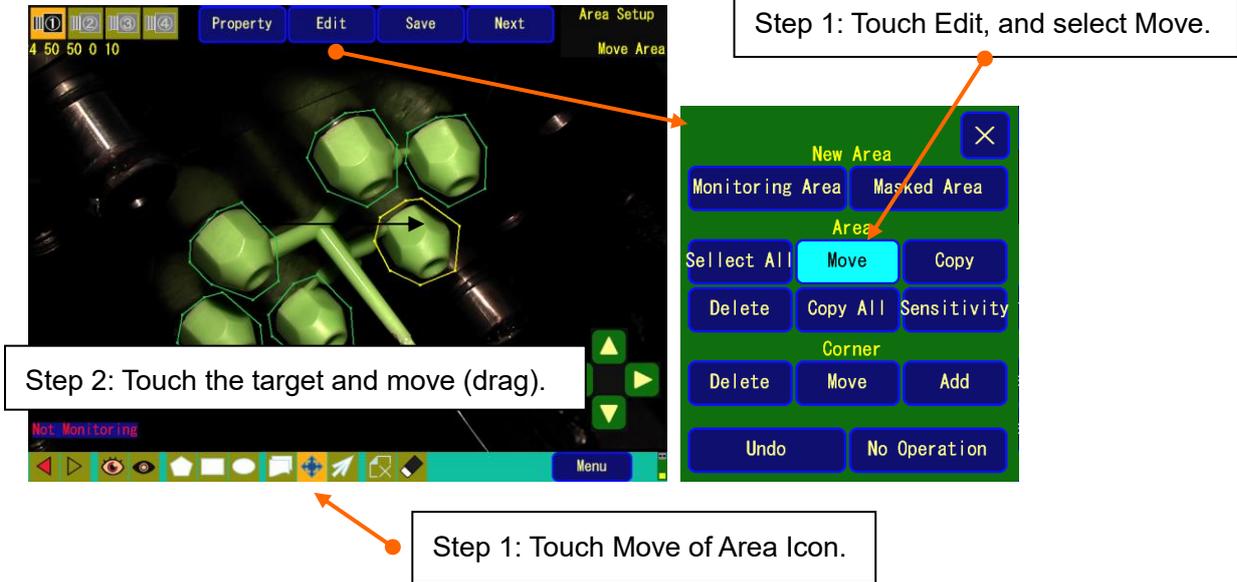Step 3: Touch the area to copy and move (drag). Once you remove your finger, the area is copied.

3)-2. Move Area

Press "**Edit**" and select "**Move**". Then, touch and move the area on the screen.

It is also possible to select "**Move**" by using Move of Area Icon**.**

(Image 21)

Step 1: Touch Edit, and select Move.

Step 2: Touch the target and move (drag).

Step 1: Touch Move of Area Icon.

* Number of areas to create: You can individually create a total of 30 areas
* Switching the area at area setup: Switch the selected area by touching the area

3)-3**. Copy A (Copy All) function when Advanced Setting is On**

(Copy A is limited to only when Advance Setting is ON)

a. Function

Copy the entire area at one time.

・Display with Inspection 1 area ⇔ Display with Inspection 2 area

b. How to operate

For the Inspection 1 area is copied to Inspection 2 area, touch **Edit** and **Copy A** (Image 22), and touch Paste area (Image 23).

(Image 22)

(Image 23)

4) Changing Area Type

When you proceed **Area setup** (Image 3) → **Edit** → **Sensitivity** then touch the target area, a screen for sensitivity appears. (Image 24) The area type is displayed on the top right of the numbers. You can switch the area type (**monitored area**, **masked area**) by touching the button (Image 24)

Area Type

S	Surface Area
P	Product Area
MO	Monitoring Area
MA	Masked Area
R	Reject Area

When Advanced Setting is OFF in system setting

There are two types of area to set. **Monitored area** and **Masked area**.

**Monitored area** is where the auto-marked product area or the whole mold surface area. Monitoring judgment is carried out based on the set values of Sensitivity 1, Sensitivity 2 and number of Masked areas.

Masked area is where NOT to be monitored.

NG is to set the maximum number of error dot to allow. It relates to strictness of error detection. You can set any number between 0 and 999 in this keypad. You can also set the sensitivity with using a slide bar (See 2-8. How to Monitor).

5). Sensitivity List Display

If you select **Area set up** (Image 3) → **Property** → **List of Sensitivity** (Image 25), a sensitivity list appears. It shows a list of Area No., Sensitivity1, Sensitivity 2, Area type (monitored area/masked area), and the number of ALLOWED NG. (Image 26)
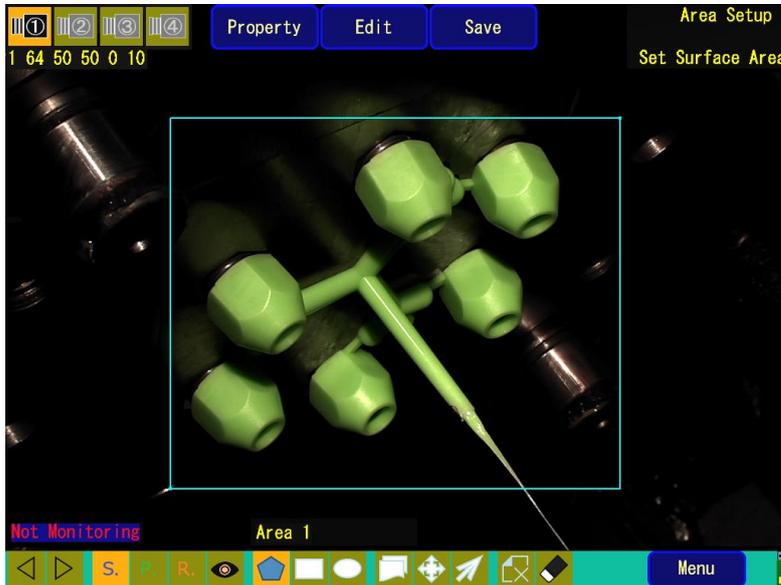
(Image 25)
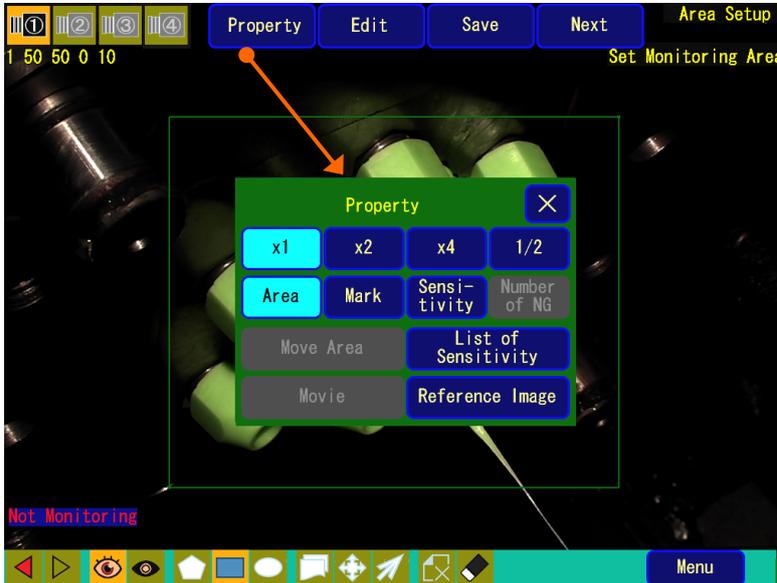
(Image 26) Sensitivity List Display

2-5-2. Area Setup (Advanced Setting: ON)

(1) When Advanced Setting in System Settings is On

⇒See page 23: ④-3. Advance Setting in the System Setting.

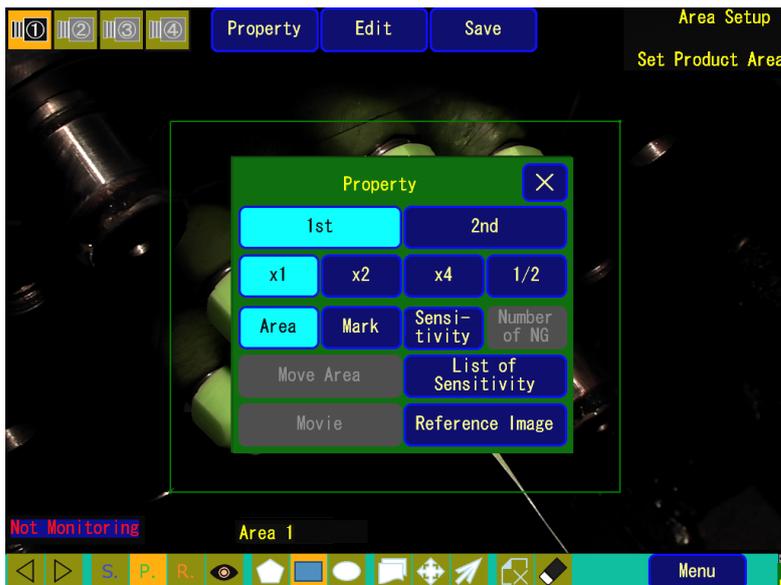(Image 27-1) Area Set Up (when Advanced Setting Is On)

 Icons indicates the area type

S : Surface Area、 **P** : Product Area, **R** : Reject Area, Masked area.

<R: Reject Area> is only enabled while "Turn Off Error Status" in the System Setting Page 3 is <u>ON</u>.

(Image 27-2) shows the property in Area Setup (when Advanced Setting Is On).

2-6. Reference Image Capture

Reference Image Capture is to register the reference image to compare through monitoring.

(1) Reference Image Capture Screen.

Touch **Ref. image capture** in the Main Menu (Image 3), go to <u>Reference Image Capture</u>.
(Image 28). (**Area set up has to be completed before Ref. image capture**.)

It is also possible to enter <u>Reference Image Capture</u> (Image 28) in the Area Setup.

Next Process > Reference Image Capture .

(Image 28) Reference Image Capture

Status of Ref. Image is taken/not taken

Mold **1**   Mold **2**   Mold **3**

□□   □□   □□   ・・Camera 1

□□   □□   □□   ・・Camera **2**

□□   □□   □□   ・・Camera **3**

□□   □□   □□   ・・Camera **4**

Left□ Ref. Image for Inspection 1

Right□ Ref. Image for Inspection 2

□ If it is taken already, ✓ is shown

□ Red Indicates Ref. Image is NOT taken

<Setting Process for Reference Image Capture>

Extract reference color and adjust color sensitivity.	In the Reference image capture, touch the product on the screen to extract a reference color (resin color) and adjust color sensitivity.
Sensitivity	Select **Sensitivity** to go to the sensitivity settings (Image 29A).
Timer	Select **Timer** to go to the wait time setting (Image 30). Adjust Timer 1 and Timer 2.
Start	Start capturing the reference image. The method of reference image capture differs depending on it is set to **manual or auto** in Setup Preference (page 17, Image 5). Refer to the page 33 (4) for Image Capturing.

(Image 28-1) Reference Image Capture Screen

(2)　The extraction of reference color and adjustment of color sensitivity.

Touch ⊞ <Reference Color Extract button> on Image 28-1 to display Image 28-2.

The frame becomes orange to indicate the color extract mode.

⊞ The Reference Color Extract button is displayed to indicate that the Color Extract mode becomes active. Touch the product with this mode to display a ✛ mark on the display.

The sign ✛ indicates it is a spot to extract the reference color. You can drag (move) the ✛ mark on the display. The standard color is displayed in the center of ⊞ Reference Color Extract Icon.

（Image 28-2）

A slide bar to adjust the color sensitivity is at the bottom. The color sensitivity is the sensitivity

to recognize the product color. Adjust the sensitivity from 0% to 100%. A larger value means that Color and Brightness are closer to the Reference Image. 0% means the function of color monitoring is turned off. The area recognized as a product is colored in green. Therefore, it is possible to confirm the product mark by adjusting the color sensitivity
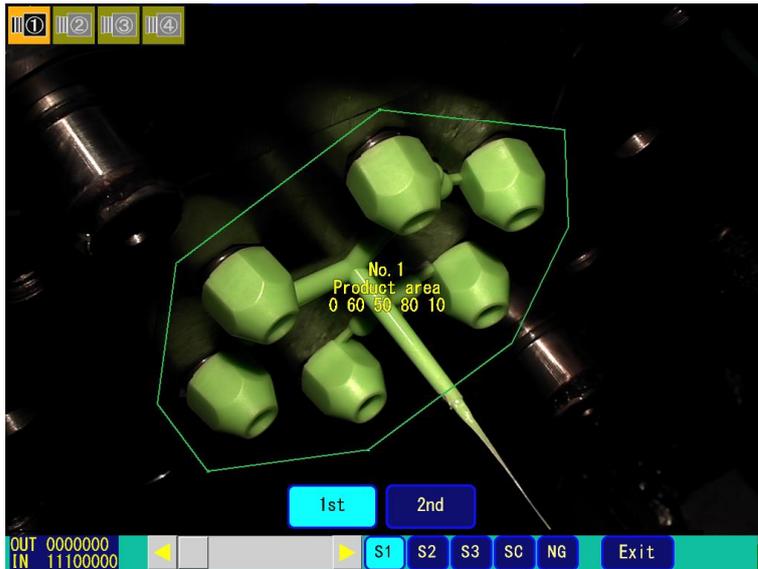（Image 28-3）
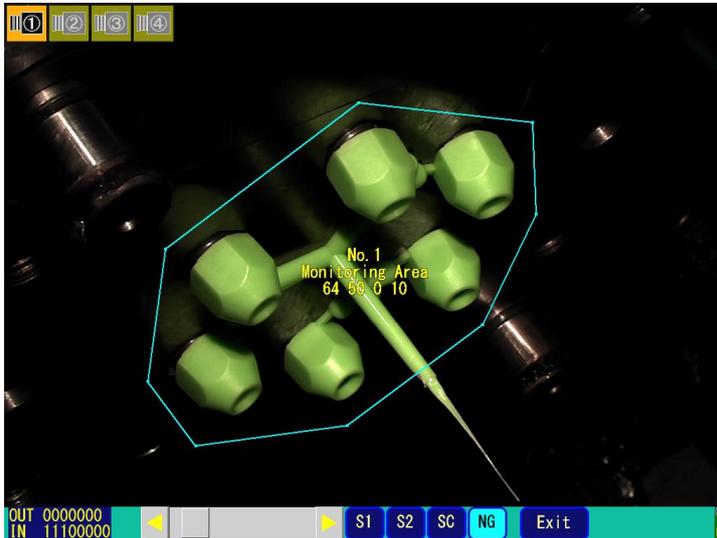
(3) Sensitivity Setting

Move the slide bar to adjust Sensitivity 1 (S1), Sensitivity 2 (S2), Color Sensitivity (SC) and NG (the number of allowed dot for NG) for Inspection 1 and Inspection 2.

Touch the area where you want to change the sensitivity. Touch the slide bar and slide it right to increase, or left to decrease the value. When you touch the bar and slide it, the value increases (decreases) by 10 steps. If you touch the arrows, it increases (decreases) by 1 step.

（Image 29A）　Sensitivity Adjustment Screen (Advanced Setting : OFF)

(Image 29B)　Sensitivity Adjustment Screen (Advanced Setting : ON)

(4) Timer Setting

After touching Timer 1 or Timer 2, use the keypad to enter the waiting time and press ENT to confirm.

(Image 30) Timer Setting

(5) Image capture

① Auto capture

<When Ref. image capture is set to **Auto** in the Setup Preference (page 16, Image 5)>

When you touch **Start** (Image 28), it automatically captures the reference image of Inspection 1 after receiving the mold open signal and wait time is over.

In the following step, after the product is dropped and the wait time is over, the reference image of Inspection 2 is automatically captured.

After capturing ends, the monitored area of the product is auto marked and displayed in pink.
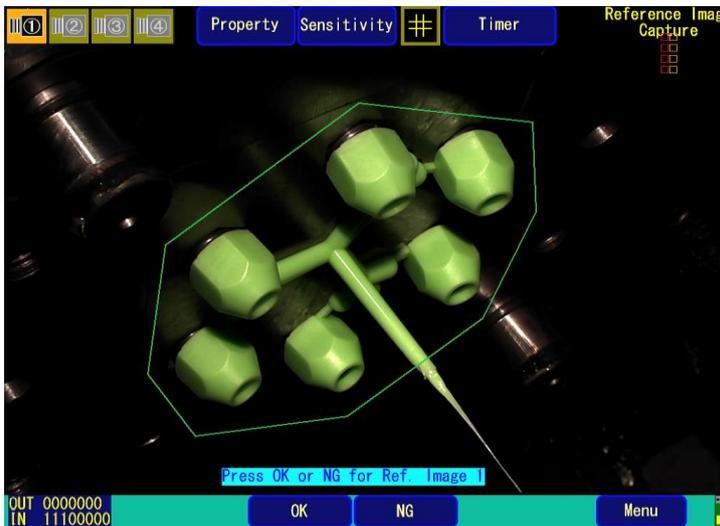
(Image 31)

② Manual capture

[When Ref. image capture is set to **Manual** in Setup Preference (page 16, Image 5)]

a. When you touch **Start** (Image 28), it automatically captures the reference image of Inspection 1 after receiving the mold open signal and the wait time is over, (Image 32).

(Image 32)   Reference Image Capture of Inspection 1

b. If you touch **OK**, then the reference image is captured.

For retrying, touch **NG**. You can re-take (re-capture) the image.

c. In the following step, after the product is dropped and the wait time is over, the reference image of Inspection 2 is automatically captured. (Image 33)

(Image 33)   Reference Image Capture of Inspection 2

d. If you touch **OK**, the reference image is captured.

For retrying, touch **NG**. You can re-take (re-capture) the image.

e. After capturing ends, the monitored area of the product is auto marked and displayed in pink.

(Image 34)
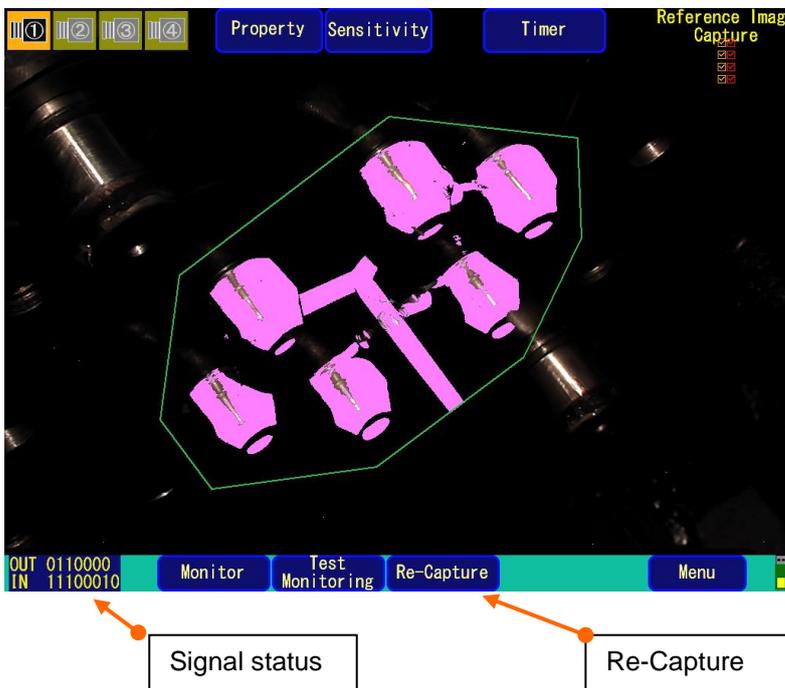
※1

If you use 2 cameras, the reference image is captured by camera 1 and 2 simultaneously.

※2

To re-capture the reference image, select **Re-capture** on the display.

Signal status

Re-Capture

③ Signal Status at bottom left Part of the display

(Signal Status is displayed during reference image capture and monitoring)
The numbers 1 and 0 displayed at bottom left show the signal status.
[Array of numbers from left to right correspond to the signals from top to bottom in the table below.]　　0: BREAK　　　　1: MAKE

OUT	Output signal	1	Cycle Interlock	IN	Input signal	1	Mold opening
		2	Extract Start			2	Eject complete
		3	Eject Interlock			3	Alarm off
		4	Re-eject			4	Spare for Input
		5	Alarm			5	Input mold movement 1
		6	Monitoring / Cycle start			6	Input mold movement 2
		7	Discharge NG product / Eject			7	Automatic Input from machine
						8	Error Removal

By touching the signal status, it displays the signal status property. (Image 34-1)

Signal status property is also displayed on a monitoring screen.

(Image 34-1) Signal Status Properties
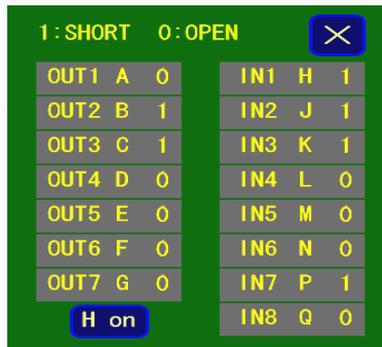
(Image 34-2)

NG Delete Mark（CYAN Color）

Erasing NG Delete Mark

If you delete NG position when NG occurs and re-capture the reference image, ERASE button is added at bottom of the screen.

NG erase mark indicates a masked area, but will be restored as monitored area with erasing.

2-7. How to Test Monitoring

39

Monitoring Test is proceeded by entering **Test** in the Main Menu (Image 3), or proceeding in the Reference Image Capture steps to **Test** (Image 31 or 34), then go to the Test Screen (Image 35). On the Test Screen, it compares the actual image with the reference image stored through reference image capture. You can adjust the sensitivity with checking the NG part (red) and auto-mark (Pink).

When you touch **Sensitivity** button in the Testing screen (Image 35), the slide bar to adjust the sensitivity is displayed. (Image 36A, 36B)

(Image 35) Test Screen

Terms in Test Screen (Image 35)

Property	Switching camera, enlarge display, display / hide area mark and sensitivity.
Sensitivity	Adjust the sensitivity and allowed number of NG with a slide bar for specified areas.
Delete Prev. Errors	Deletes the NG on the display, when "Delete Prev. Errors" is touched. When you exit, the setting goes back to the previous step.
Inspection 1	Select for Inspection 1 testing.
Inspection 2	Select for Inspection 2 testing.
Continuous run	When continuous run is selected, the test continues along the internal timer setting.
Menu	Return to the Main Menu

(Image 36A)   Test with Advance Setting is OFF (Default)

(Image 36B)　Test with Advance Setting is ON
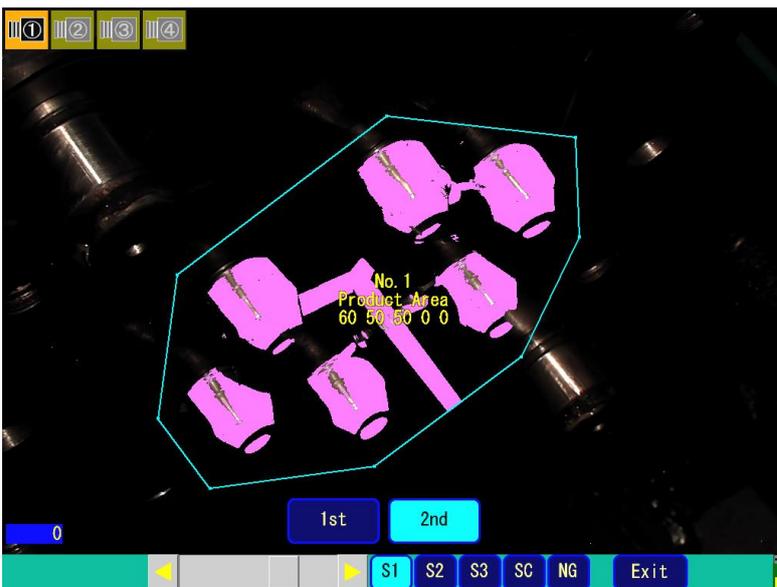
You can adjust Sensitivity 1 (S1), Sensitivity 2 (S2), Sensitivity 3 (S3), Sensitivity for color (SC) and the number of allowed NG for each Inspection 1 and Inspection 2 with the slide bar. Touch the area where you want to change the sensitivity and select a sensitivity button from S1 to NG. Adjust it with the slide bar.

Touch the upper (lower) range, the value will increase (decrease) by 10 steps.

Touch the ▲ (▼) arrow, it will increase (decrease) by 1 step.

2-8. How to Monitor

To go to the monitoring screen, touch **Start Monitoring** on the Main Menu (Image 3), or touch **Monitoring** after reference image capture (Image 31 or 34) (Image 37)

Monitoring is checking if the actual image is same as the reference image.

The timing of the check is often set before and after of the product drops.

These two timings are called Inspection 1 and Inspection 2.

PLUS-E communicates with the injection machine through the mold open signal and eject complete signal while controlling the clamping signal and eject interlock signal.

Be sure to capture the reference image before you start monitoring.

(See 2-7. Reference Image Capture)

(Image37) Monitoring Screen

Terms in Monitoring Screen (Image 37)

Property	Display setting for monitoring, displaying sensitivity list and monitoring information.
Sensitivity	Adjusts the area sensitivity, and set up the number of allowed NG.
Timer	Reset the timer
Monitor	A button to start Monitoring. When NG is detected in the Inspection 1, a button to restart Inspection 2 appears.
Menu	Ends monitoring and Go back to Main Menu.

(1). Property

After touching **Property** on Image 37, touch **Area, Mark, or Sensitivity.** to display the area, auto mark, area number, area type, sensitivity, and number of allowed NG.
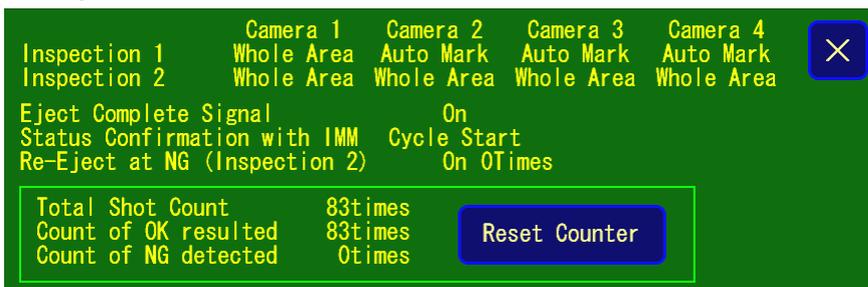(Image 38)
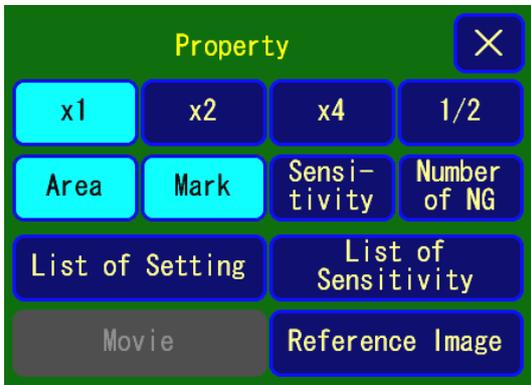
When you touch **Property, then Set list** on Image 37, the settings and total shot count, watch OK count, and watch-NG count currently being counted are displayed (Image 39). Touching **Reset Counter** resets all the counted values.
（Image 39）

(2) Sensitivity Setting

When you touch **Sensitivity** button on Image 37, the slide bar is displayed. (Image 40A, 40B). The slide bar is to adjust Sensitivity 1 (S1), Sensitivity 2 (S2), Sensitivity 3 (S3), and the number of allowed NG for Inspection 1 and Inspection 2 in the range of 0 - 100. Touch the area where you want to change the sensitivity and specify the area. (you can set the maximum of 999)
Touch the slide bar and drag it to increase or decrease the value.
The slide bar adjusts the value by 10 steps. When you touch the ▲ (▼) arrow button, it will adjust the value by 1 step.
The screen will return to the original Monitoring Screen when you touch **Exit.**

(Image 40A)　Monitoring with Advance Setting is OFF (Default)

(Image 40B)　　Monitoring with Advance Setting is ON

(3)　Timer Setting

You can set the Wait time by touching **Timer** on Image 37.
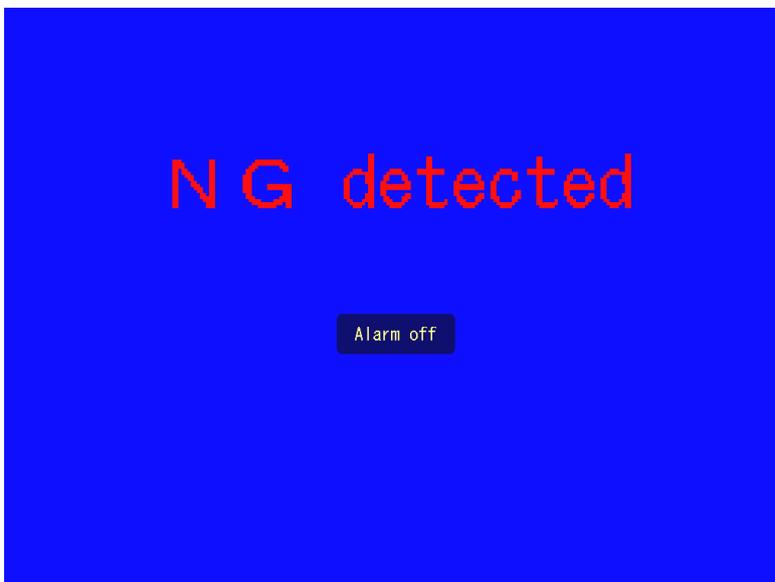
(Image 41)

(4)   Monitoring Operation

(4) -1. Detecting NG in the inspection and Display on the screen

When the monitoring detects NG (error), the buzzer is turned on and "NG detected" is displayed on the screen.

(Image 42)

(4) -2. Turn OFF Alarm when NG is detected

Touch anywhere on the screen to turn off the alarm and exit the "NG detected" screen.

It turns off the buzzer and the NG location starts blinking in red.

If 2 cameras are used for monitoring, it automatically switches to display the image from the camera which detected the NG. (If there are NG on both images from both camera 1 and 2, the display is split in half and show both errors). (Image 43 and 44)

(Image 43) Inspection 1 detects NG

(Image 44) Inspection 2 detects NG

(4)-3. Return to Monitoring

・You can return to monitoring by touching **Monitor** on Image 43 or 44.

・Touch **Mask from inspection** when setting the NG location as a non-monitored.

・When you save the NG image in the USB memory, touch **Save in USB Memory** when the message appears. (You need to set Manual setup for saving NG image in Setup Preference page3/3)

(4)-4. Monitoring Ends

When you end the monitoring, you touch **Menu**, you will be asked "Do you want to exit?"

Select **Yes**.

Note: If a monitoring password is set, enter the password to exit.

(5) Display NG Rate.

When you select NG Rate in the property (Image45), the number of NG and allowed NG will

appear in the area marking while monitoring.

(Image 45)
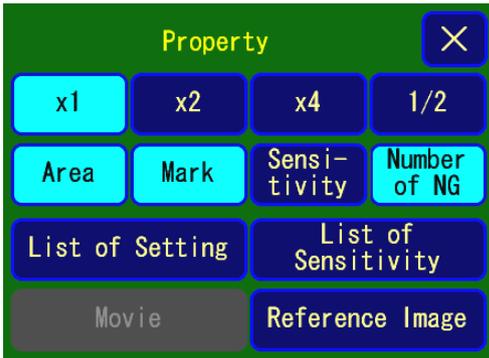
When the number of NG is more than allowed NG, it is colored in red.

When the number of NG is less than allowed NG, it is colored in yellow.

（Image 46）   （Image 47）

(6) Display the Reference Image

In the property (image 48), select Ref. Image button to display the Reference Image and the previous error image. In order to designate the image, specify the camera from 1～4, Inspection 1 or 2, and Mold 1～3. You can display the property from Area Setup, Ref. Image Capture or Test screen.

(Image 48)

Reference Image /
Monitoring Image at NG
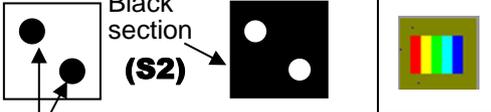
Camera Setting（1～4）

(Image 49)

Exit from the Properties

Select the image

Select a mold

Inspection 1
Inspection 2
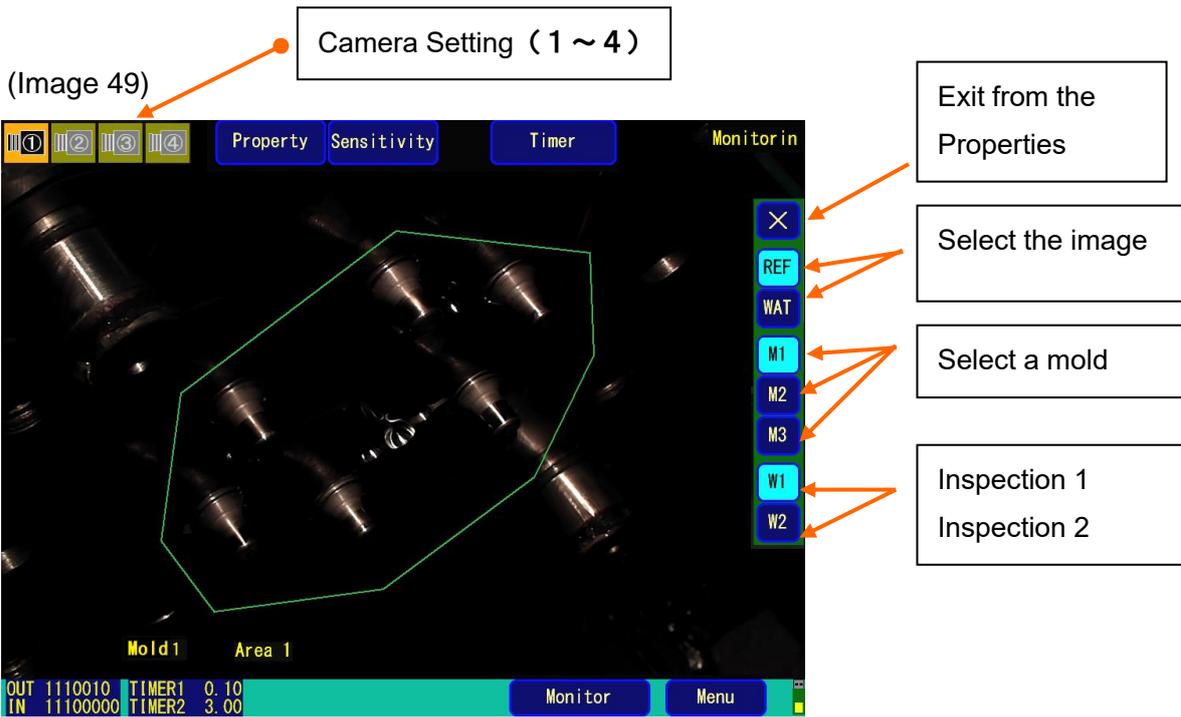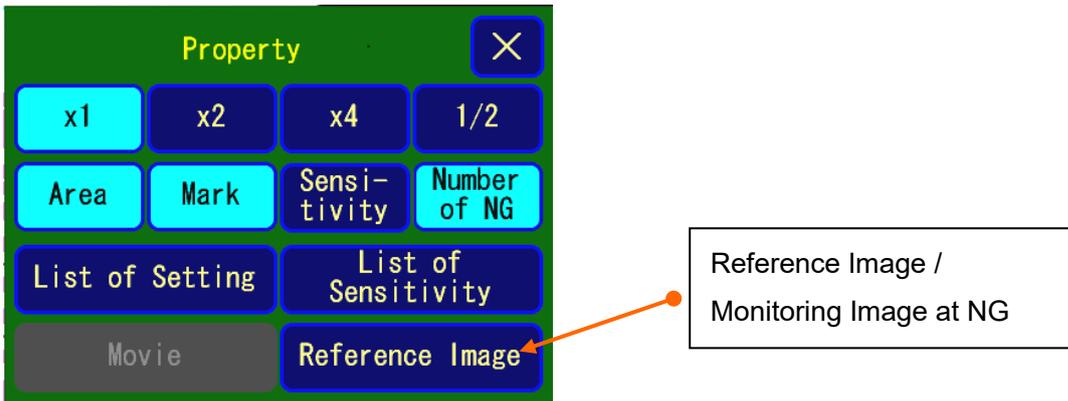
Image 49 shows an example of monitoring screen.

(Monitoring, Mold1, OUT 1110010, IN 1110010, Timer1 0.10 Timer2 3.00)

[Examples of Monitoring Combination: If Advance Setting is OFF]

Below figures are examples of combining more than 2 monitoring of before and after a product is dropped. The black dots represent monitoring locations. (Sensitivity settings for auto-mark areas are monitored with **S1**, and other areas are monitored with **S2**.)

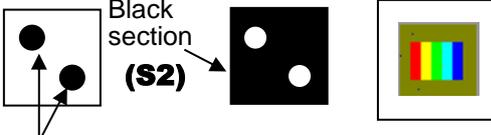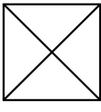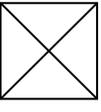| Setup Preferences	Monitoring area before product drop	Monitoring area after product drop
Inspection 1: Auto mark / Inspection 2: Auto mark	(Monitored area) — Color monitoring — Auto-mark Area (S1)	(Monitored area) — Color monitoring — Auto-mark Area (S1)
Inspection 1: Auto mark / Inspection 2: Whole area	(Monitored area) — Color monitoring — Auto-mark Area (S1)	(Monitored area) (Monitored) — Black section (S2) — Color monitoring — Auto-mark Area (S1)
Inspection 1: Whole area / Inspection 2: Whole area	(Monitored area) (Monitored) — Black section (S2) — Color monitoring — Auto-mark Area (S1)	(Monitored area) (Monitored) — Black section (S2) — Color monitoring — Auto-mark Area (S1)
Inspection 1: OFF / Inspection 2: Auto mark	None	(Monitored area) — Color monitoring — Auto-mark Area (S1)
Inspection 1: OFF / Inspection 2: Whole area	None	(Monitored area) (Monitored) — Black section (S2) — Color monitoring — Auto-mark Area (S1)
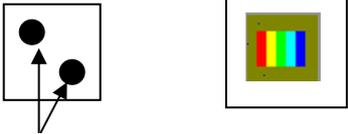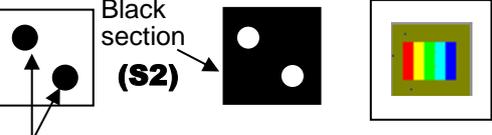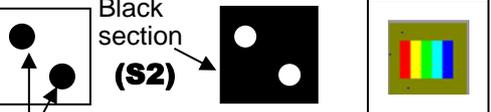
It is also available to set the Inspection 1 ON, and Inspection 2 Off.

You can create a max. 30 areas of Area 1 to Area 30.

In color monitoring, specify the color sensitivity "1 - 100" for the monitoring area and execute monitoring with the appropriate camera for color monitoring. In Inspection 1, the color comparison between the actual product image and the reference image color is conducted. Similarly, in Inspection 2, it monitors the mold surface to check if there is any resin remains.

2-9. How to Use USB Memory

When a USB memory is inserted, go to the USB Memory Screen (Image 55) by selecting <u>USB Memory</u> in the Main Menu (Image 3).

(1) USB memory property

(Image 55) （If BMP and Log files exist）

LOG FILE

BMP FILE

Move folder

▲：Return to root

SET：Return to SET folder

Image Log：Return to folder of the Day.

Bar graph for capacity

Usable Capacity
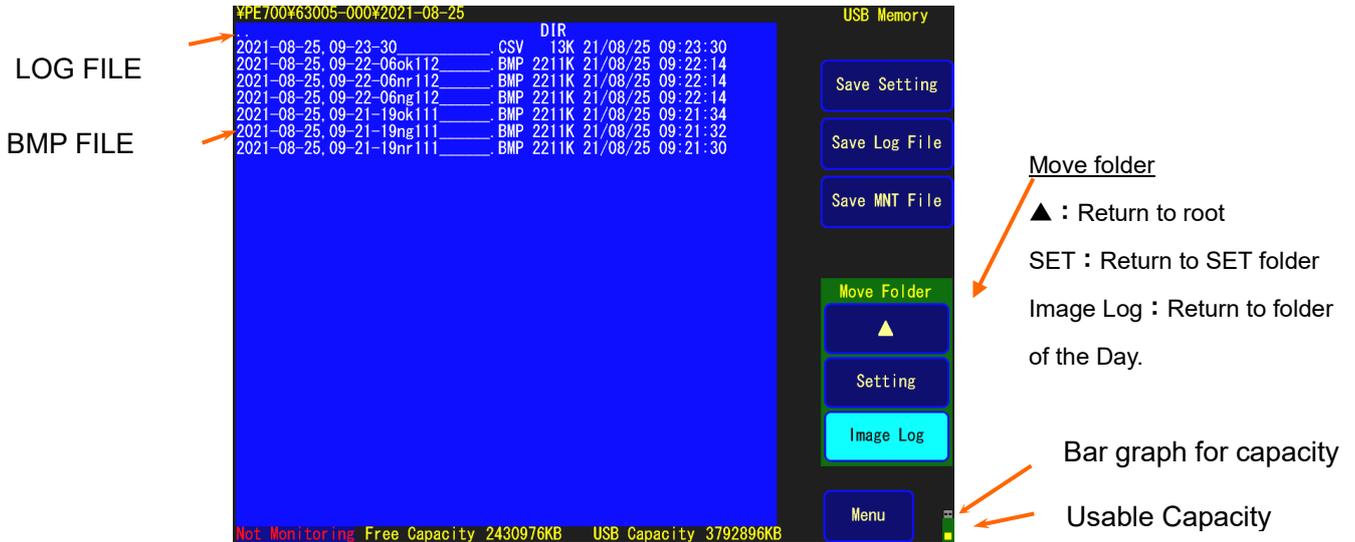
Note: The directory of saved file is /PE700/"8-digit device number". The 8-digit number is automatically set (Example: 63005-000).

The Setting File is saved in the specific sub folder.

(2) Save data in USB memory

If you directly touch **Save settings and Save Log file** on Image 55, <u>**Yes or No**</u> will be displayed (Image 56). Touch <u>**Yes**</u> to save.

(Image 56)

Setting File

File Types and **How to Save** in a USB memory

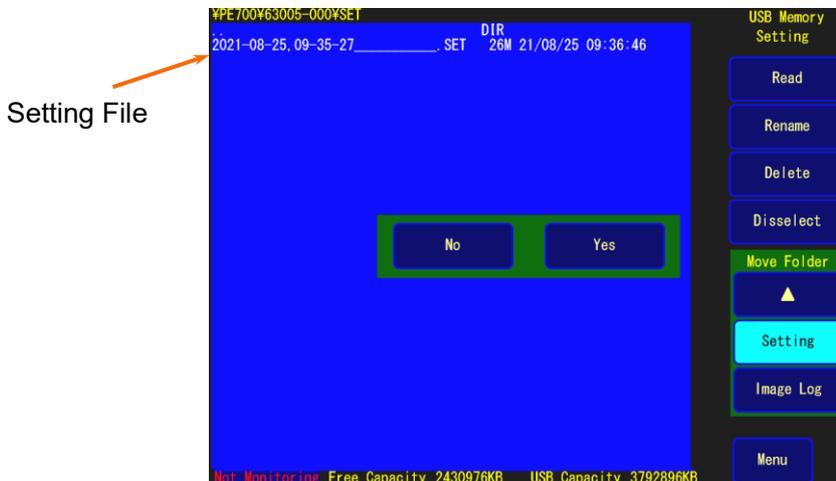| Bar graph	It is displayed when USB memory is inserted. It shows the total capacity and the capacity in use.
USB memory property	While USB memory is being accessed, the red LED turns on. Do not pull out the USB memory while the LED light is on.
Save settings (file)	Saves the settings file in the USB memory.
Settings file	**Setup information file for PLUS-E main unit.** The filename contains the time and date of creation. Its extension is ".SET". (Example: 160625095032_____.SET) The saved settings information includes: settings for Setup Preferences, System Settings (**excluding** monitoring password and USB memory password), monitored area and sensitivity, auto-mark, cancellation mark, and reference image.
Save Log (file)	Saves the log file in the USB memory.
Log file	**File in which the monitoring information of the molding machine is written.** The filename includes date and time of creation. Its extension is ".**CSV**". (Example: 101201095032_____.CSV) When Save Log file is executed on the main menu, monitoring information of that moment is created as a log file, and is saved in the unit. Monitoring information includes: power activation date and time, monitoring count deletion date and time, reference image capture date and time, monitoring start date and time, monitoring end date and time, NG detection date and time, total shot count, monitoring OK / NG count, and NG detection count. The file contains NG images, and is created when an NG is detected.
Save BMP (file)	Saves the BMP file (Maintenance file) in the USB memory.
MNT file	It is a **hidden file** where information such as memory in the device is written each time a file is created. The filename includes the date and time of creation. Its contents are useful for the manufacturer during analysis and problem resolution. Its extension is ".BMP". (Example：06095032_____.BMP)
BMP file	**This is an actual image file when an inspection NG is detected.** Its extension is ".BMP". There are 3 types: actual image with NG (ng), actual image with NG removed (nr), and actual image just before NG (ok). All 3 files are simultaneously created when NG is detected. The filename includes YYMMDD : HHMMSS (Mold No. <marked"1" when not selected>), Camera No.: Depends on type of monitoring.

[Log File Example]

(Device display example)   (Display contents explanation)

POWER ON,2016/06/18,14:06:11	: Power activation date and time
TOTAL WATCH COUNT FROM POWER ON,31	: Total watch count after power-on
WATCH-OK COUNT FROM POWER ON,26	: Watch-Ok count after power-on
WATCH-NG COUNT FROM POWER ON,5	: Watch-NG count after power-on
Log START,2016/06/18,14:06:11	: Log deletion date and time
Log SAVE,2016/06/18,14:39:54	: Log saved date and time
TOTAL WATCH COUNT,31	: Total watch count after deletion
WATCH-OK COUNT,26	: Watch-ok count after deletion
WATCH-NG COUNT,5	: Watch-NG count after deletion
STANDARD IMAGE CAPTURE,2016/06/18,14:36:58	: Reference image capture date and time
WATCH START,2016/06/18,14:37:04	: Watch start date and time
NG,2016/06/18,14:38:02,0,5761,0,2676	: Detection date & time & NG element count
	Camera 1 Inspection 1 NG element count,
	Camera 1 Inspection 2 NG element count,
	Camera 2 Inspection 1 NG element count,
	Camera 2 Inspection 2 NG element count
NG,2016/06/18,14:38:25,5761,0,634,0	
·	Fact. Serial=59869-001
·	
WATCH STOP,2016/06/18,14:39:38	: Monitoring completion date and time

[BMP file example]

When there are 2 molds (optional), the mold number is added before the camera number.

<Device display example>

095032ok112___.BMP
095032nr112___.BMP
095032ng112___.BMP

<Screen display contents >

095032: 09 (hr) 50 (min) 32 (sec),

ok: Image just before NG,   **nr**: Image with NG removed,   **ng**: Image with NG)

1:   Mold No. (Select Mold No. 1 or 2 when there are 2 molds specification.)

1:   Camera 1 (**2**: Camera 2)

2:   Inspection 2 (**1**: Inspection 1)

(3) How to manipulate files in USB memory

① If files are saved in the USB memory, touch the top left on the display (Image 57) in the following order: **<DIR> /→ Open → Yes, <DIR> PE700 → Open →Yes**.

Next, touch in the following order: **<DIR> Device No. → Open → Yes**. The file list will be displayed. (Image 58)

(Image 57) Selection of Saved File 1
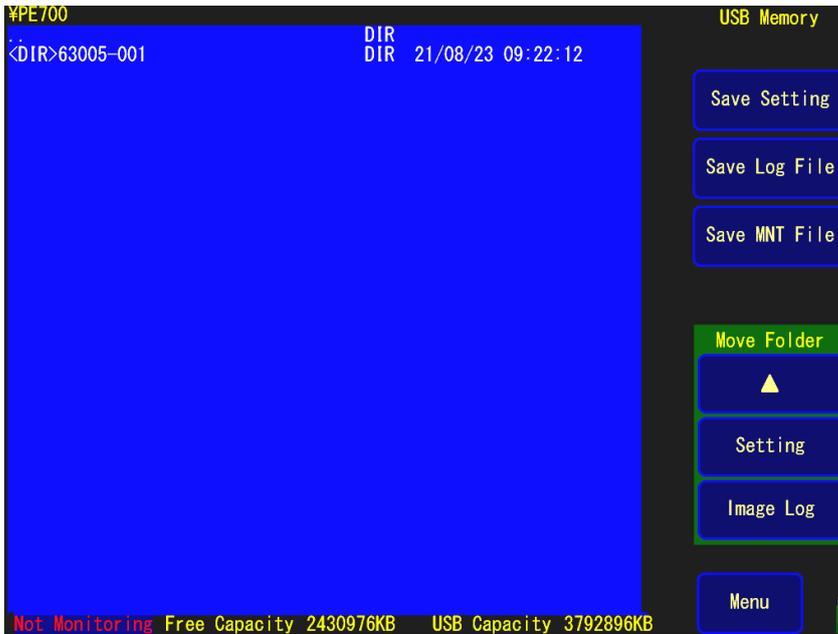
② When you select a file (displayed in red) on the USB memory screen, **Read, Rename and Delete** is displayed.

(Image 58) Selection of Saved File
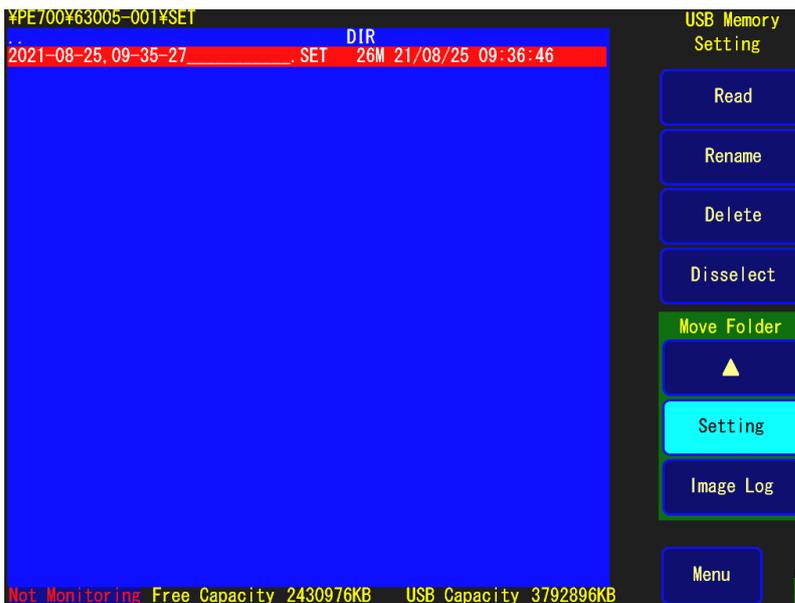
③ Read, rename, or delete a file.

Touch directly on **Read, Rename, or Delete**, and press **Yes**. (Image 59)

(Image 59) Selecting the File Operation

(4) Rename a File

To rename a file, directly touch the filename and press **Yes** (Image 60). A keyboard for renaming the file will be displayed (Image 61). Directly touch the letters to enter a new filename, and press **ENT** to confirm.

(Image 60) Selection of File to Rename   (Image 61) Input the new name of the file
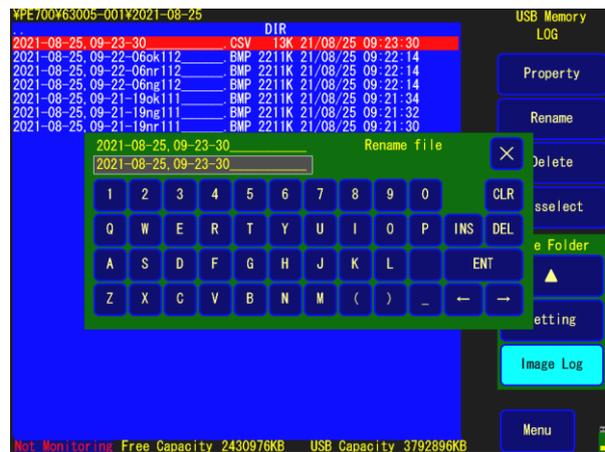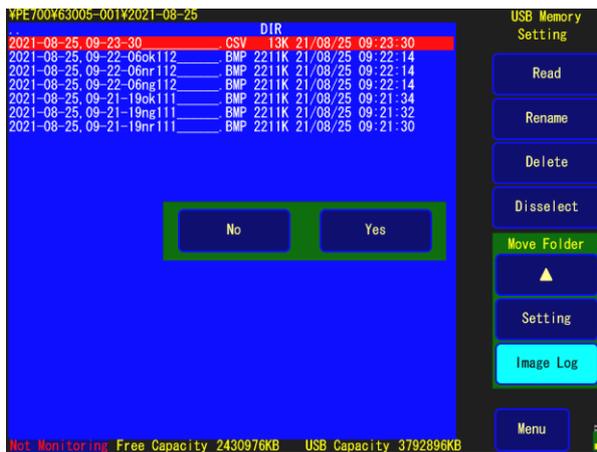
2-10. How to Display the Log

Select **Log** on the Main Menu (Image 3), the **Log Screen** like Image 62 is displayed. The Log data is a device operation record, including NG information saved in the device memory.

(1) How to operate

Delete	Delete the log data.
Save	Save the log data.
Menu	Return to the Main Menu

*When a USB memory is inserted, you can transfer the saved log information to the USB memory.

(Image 62) Log Data Display
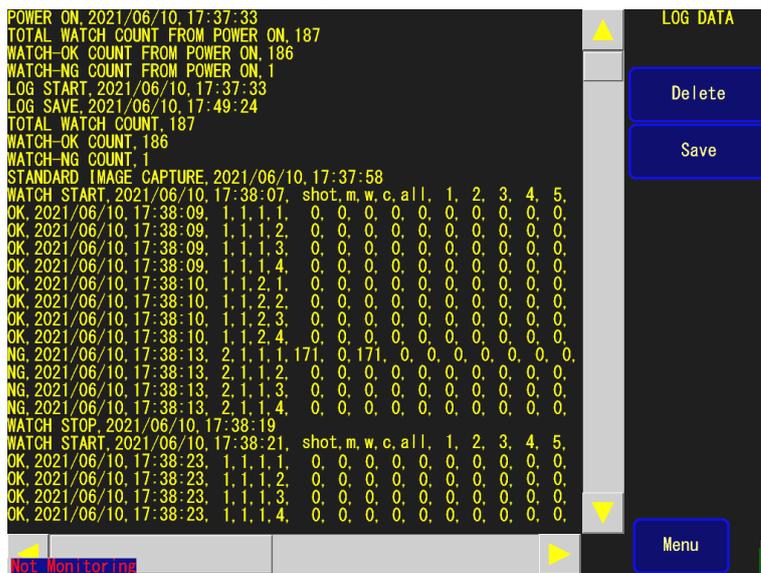
LOG Data Head Information (Explain the Image 62)

LOG DATA	Date	Time
POWER ON	2021/6/10	17:37:33
TOTAL WATCH COUNT FROM POWER ON	187 times	
WATCH-OK COUNT FROM POWER ON	186 times	
WATCH-NG COUNT FROM POWER ON	1 time	
LOG START	2021/6/10	17:37:33
LOG SAVE	2021/6/10	17:49:24
TOTAL WATCH COUNT	187 times	
WATCH-OK COUNT	186 times	
WATCH-NG COUNT	1 time	
STANDARD IMAGE CAPTURE	2021/6/10	17:37:58

Monitoring Information in LOG Data

Monitoring Result	DATE	TIME＋mS		Shot	Mold#	Number of Monitoring	Camera#	Total NG	NG for Areas Area1～Area30				
WATCH START	2021/6/10	17:38:07	ms	shot	m	w	c	all	1	2	3	・・・	30
OK	2021/6/10	17:38:09	384	1	1	1	1	0	0	0	0	・・・	0
OK	2021/6/10	17:38:09	384	1	1	1	2	0	0	0	0	・・・	0
OK	2021/6/10	17:38:09	384	1	1	1	3	0	0	0	0	・・・	0
OK	2021/6/10	17:38:09	384	1	1	1	4	0	0	0	0	・・・	0
OK	2021/6/10	17:38:10	663	1	1	2	1	0	0	0	0	・・・	0
OK	2021/6/10	17:38:10	663	1	1	2	2	0	0	0	0	・・・	0
OK	2021/6/10	17:38:10	663	1	1	2	3	0	0	0	0	・・・	0
OK	2021/6/10	17:38:10	663	1	1	2	4	0	0	0	0	・・・	0
NG	2021/6/10	17:38:13	401	2	1	1	1	171	0	171	0	・・・	0
NG	2021/6/10	17:38:13	401	2	1	1	2	0	0	0	0	・・・	0
NG	2021/6/10	17:38:13	401	2	1	1	3	0	0	0	0	・・・	0
NG	2021/6/10	17:38:13	401	2	1	1	4	0	0	0	0	・・・	0
WATCH STOP	2021/6/10	17:38:19											
WATCH START	2021/6/10	17:38:21	ms	shot	m	w	c	all	1	2	3	・・・	30
OK	2021/6/10	17:38:23	140	1	1	1	1	0	0	0	0	・・・	0
OK	2021/6/10	17:38:23	140	1	1	1	2	0	0	0	0	・・・	0
OK	2021/6/10	17:38:23	140	1	1	1	3	0	0	0	0	・・・	0
OK	2021/6/10	17:38:23	140	1	1	1	4	0	0	0	0	・・・	0

2-11. Camera Connection

When connecting a camera to the main unit of PE700, always connect a camera cable to an SDI connector (BNC) before turning on the power. Because the camera connection is detected when power is turned on, connection or disconnection of camera cable after the power on should be avoided as it can cause a failure.

Once a camera is detected, the power (DC12V) is supplied to each camera.

The next illustration shows the camera's appearance. To prevent a dust, a seal is attached to the OSD connector. Do not remove the seal when the product is even in use.

Camera appearance illustration
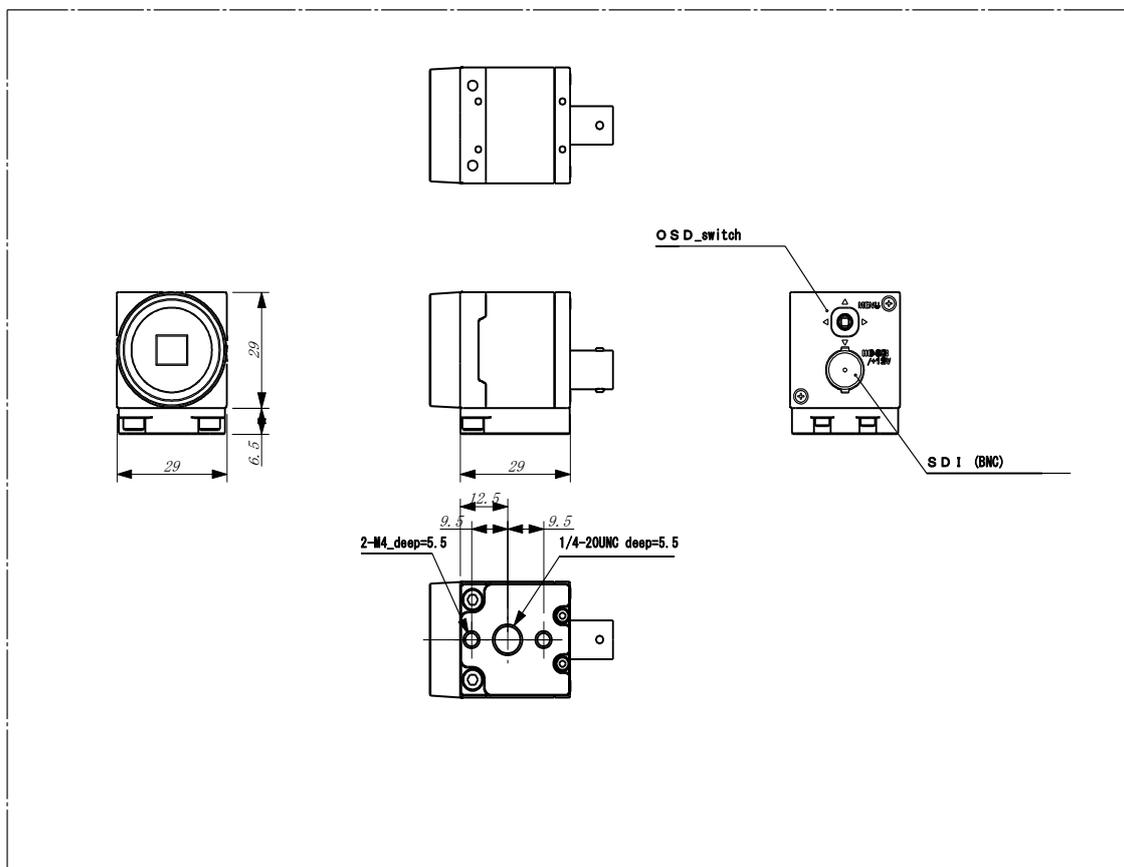
Chapter 3　Device Specification

3-1. Device Specification

Power

DC24V, 1.5A is supplied from a molding machine to I/O unit. After converting to DC12V in the I/O unit, power is supplied to the main unit through an IF connector.

Weight and Dimension

Weight: Approx. 1.4 kg

Dimension: 298 × 210 × 49 mm or less (excluding protrusions)

LCD (With Touch Panel)

10.4 type XGA color LCD **+ Touch Panel**

1024 × 768 (XGA TFT Color LCD 10.4 type)

Clock

Time stability: ±15 s/month 25°C ± 5°C

Backup battery: Lithium battery (BR2032: made by Panasonic)

Lifetime: 5 years

USB memory specification

USB memory

Power voltage: 5.0V

IF Connector

Connector: 9 pin • DSUB connector • • RDED-9P-LNA (4-40) (50), made by Hirose Electric

Unit system power supply: DC12V 2.2A

Camera 1/2, Camera 3/4 connectors

Connector: BNC type…..BCJ-BPLH2PA, made by Canare Electric

HD-SDI input, camera power superposition

Resolution (RGBY): 1920 (H), 1080 (V)

Frame rate: 60 cycles/sec

USB 3.0 Connector

Connector: made by Omron

Used for USB3.0

COM Connector

Connector：MJ8435　made by Marushin Electric Mfg.

3-2. Signal Time Chart

Mold opening limit input — 1:When unlocked / 0: When locked

Cycle interlock — 1: Lock enabled / 0: Lock disabled

Off state is maintained when NG is detected

Cycle start — 1: During cycle / 0: When unlocked

Timer 1

Inspection 1

Eject interlock — 1:Eject enabled / 0: Eject disabled

Off state is maintained when NG is detected

Molding machine eject — Enter / Exit

Eject complete signal Width ≥ 100 ms — 1: Complete / 0: OFF

Timer 2   Timer 2   Timer 2

Timer 2

Inspection 2 — NG   NG   OK

Re-eject and output — 1:Eject quired / 0: Eject OFF

3-3. Interface Circuit

J4
1	Red(A1)	Cycle interlock
2	White(A2)	
3	Yellow(C1)	Eject interlock
4	White(C2)	
5	Orange(D1)	Re-eject / Skip
6	White(D2)	
7	Green(H1)	Mold opening limit
8	White(H2)	GND
9	Blue(J1)	Ejector complete
10	White(J2)	GND

J5
1	Brow(B1)	Extractor start
2	White(B2)	
3	Black(F1)	Watch on/cycle start
4	White(F2)	
5	Ash(G1)	Output NG product
6	White(G2)	
7	Pink(K1)	Input safety door
8	White(K2)	GND

J6
1	Purple(E1)	Alarm
2	White(E2)	
3	Red(24V)	DC24V
4	Black(GND)	GND
5	Black (EARTH)	Case earth
6		NC

J3
10	Brow(L1)	Input spare
5	Pink(L2)	GND
9	Red(M1)	Input tool movement 1
4	Pink(M2)	GND
8	Orange(N1)	Input tool movement 2
3	Pink(N2)	GND
7	Yellow(P1)	Input alarm off
2	Pink(P2)	GND
6	Green(Q1)	Ejector complete signal
1	Pink(Q2)	GND

Note) Character string in the signal line indicates line color,

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Chapter 4　Warranty Condition

4-1. Warranty Condition

This product passed a stringent product inspection by Ushio Lighting. In the event of a failure under the normal usage by a customer within one year from the date of installation or arrival at your company, we will repair the failed part in accordance with the warranty condition. Please understand that a charge shall be incurred for the repair even during the warranty period in the following cases.

1. The warranty certificate is not presented.
2. Failure or damage caused by inappropriate handling by the customer, such as a shock, or fall during transportation.
3. Failure or damage caused by a natural disaster such as fire, earthquake or flood, or abnormal voltage.
4. Failure caused by failure of a device connected to this product, other than the devices specified by Ushio Lighting.
5. Failure caused due to installation which was not done by our company, nor by a party specified by Ushio Lighting.
6. Failure caused by handing in a way other than the methods specified in the user's manual, or by the handling methods specified by Ushio Lighting.
7. Repair, adjustment or improvement not done by Ushio Lighting.
8. When the mold is transferred or relocated without contacting Ushio Lighting.
9. Failure caused by the use under special conditions or environments.
10. Failure caused by improper construction equipment or lack of maintenance.

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