Tool Monitoring Device

PLUS-E

PE-600 Model

Operation Manual

Ushio Lighting, Inc.

Introduction

Thank you for purchasing Ushio Lighting's Tool Monitoring Device model PE600. This manual describes its functions and how to operate it.

Please read this manual before using model PE600, 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.

⚠ Warning

1. **Avoid using this device in a place under direct sunlight, near a heat source, or where it may be vibrated or hit. The air 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 it.
   - 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 specifications are subject to change without notice. Your understanding is appreciated.

Contents

Chapter 1　Description of Each Section

1-1　Components

1-1-1　Structure of Standard Set Parts

① PE600 Main Unit	1	Main monitoring device
② Camera	1	Standard CMOS camera
③ Magnetic camera stand	1	Standard magnetic camera stand. Camera platform (fixed camera stand) attached
④ I/O unit	1	Unit for connecting the linked input/output signals between the monitoring device and the molding machine
⑤ Camera cable	1	BNC cable for connecting the monitoring device unit to the camera
⑥ IF cable	1	Cable for connecting the monitoring device unit to the IO unit
⑦ I/O Cable	4	Cable for connecting the I/O unit to the molding machine
⑧ Magnet catch	2	Magnet to fix the main monitoring device
⑨ Operation Manual	1	
⑩ Operation pen & curly cord	1	A hole to accommodate the operation pen is provided on the right-hand side of the main unit

Standard Parts

1-1-2 Optional Parts (Sold Separately)

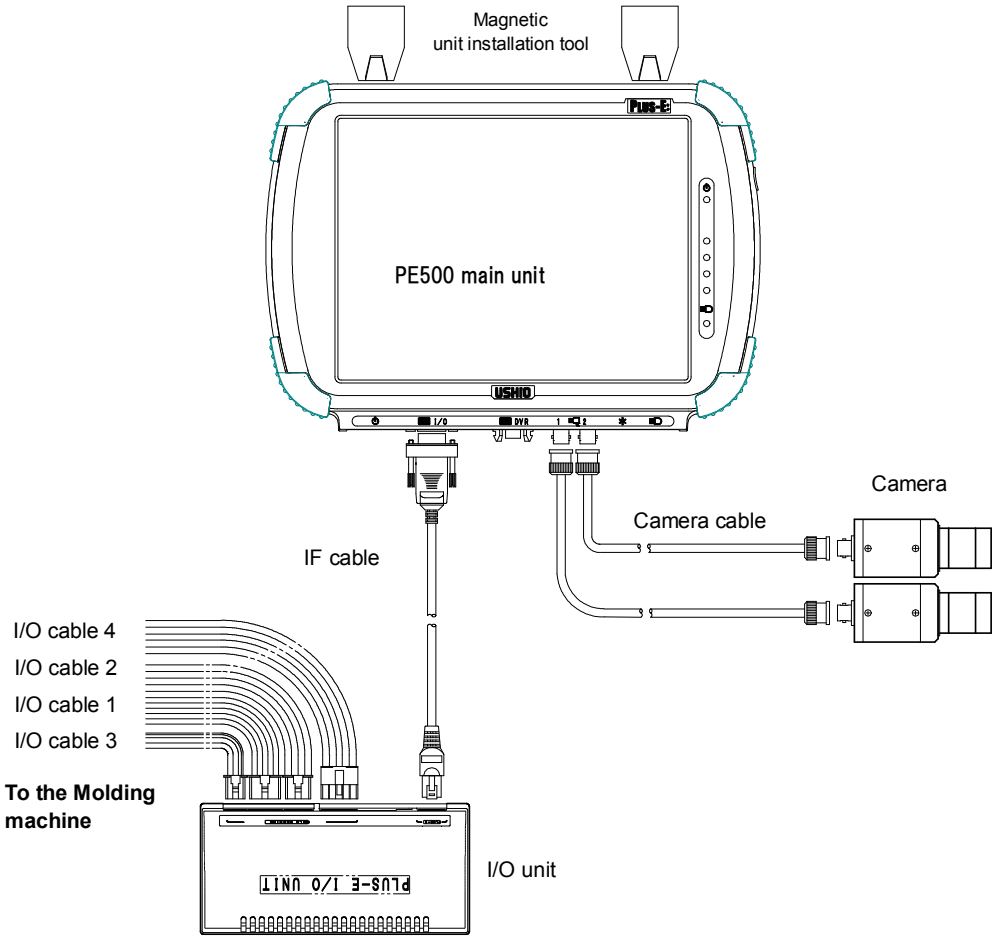
⑪ Lens	Lens for mega-pixel camera
⑫ LED lamp set	High-intensity lighting using LED
⑬ Halogen lamp set	High-intensity lighting using halogen
⑭ Infrared LED lamp set	Infrared LED lighting, lighting using IR filter (Infrared LED floodlight that illuminates wide area is also available.) It reduces the ambient light impact, and is effective for identifying black and gray products.
⑮ Standard camera set	Additional set for monitoring with 2 cameras. ②, ⑤ and ⑪ of the previous page are components of a set.
⑯ Wide lens	Wide-angle lens. Shoots a wide area.
⑰ Zoom lens	Zooms the imaging area
⑱ DVR (Video recorder)	CF card type　Motion pictures before and after NG can be recorded.
⑲ Dimming lamp set	Lighting can be adjusted by operating the screen on the main unit. *Currently under development
⑳ USB memory	NG monitoring image can be recorded automatically.

Optional lamps

Optional lenses

1-2 Connection with IO Unit and Camera

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



Note 1. Two cameras are used in the above figure.
(The 2nd camera, its lens, magnetic stand and camera cable are optional and sold separately.)

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

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

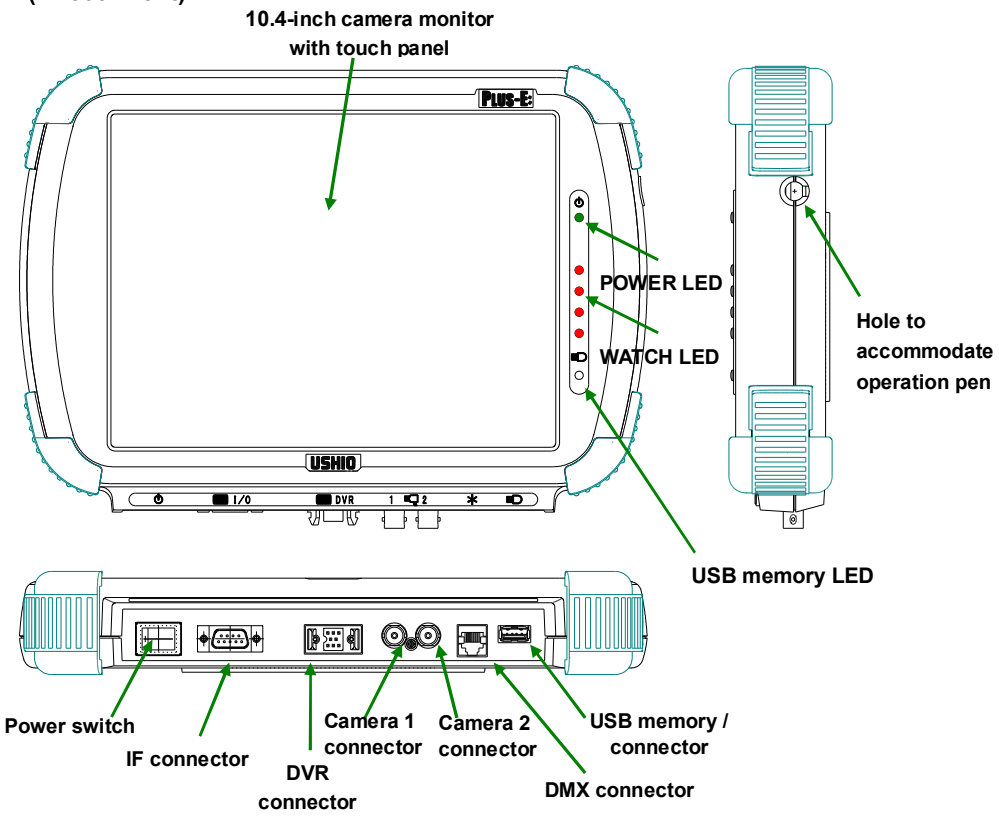
Note 4. Connect the IF cable from the PE600 main unit to the I/O unit.

Note 5. Connect the camera cable from the PE600 main unit to the camera.

1-3 Structure of Main Unit

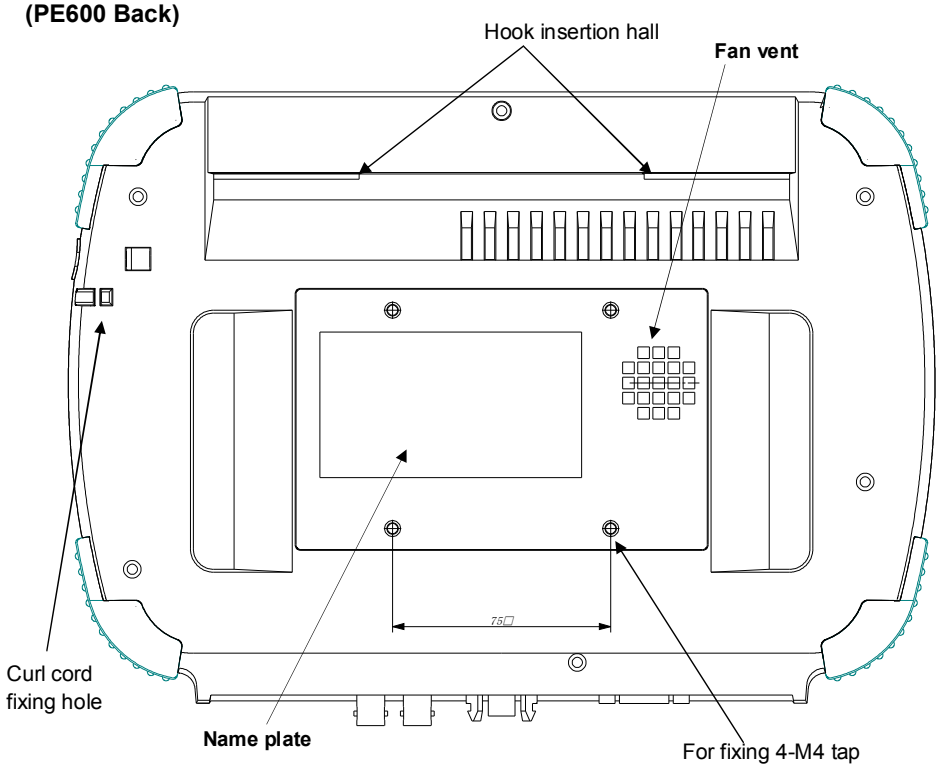
The PE600 main unit is shown here.

(PE600 Front)



① **POWER LED (green):** Lights up when the power is on.
② **WATCH LED (red):** Lights up during monitoring.
③ **Power switch:** Press the "●" mark to turn on the power.
④ **IF connector:** For connecting the IF cable. Connect it to the I/O unit.
⑤ **Camera 1 connector:** For connecting the 1st camera.
⑥ **Camera 2 connector:** For connecting the 2nd camera.
⑦ **DVR connector:** CF card type DVR RC-040K (Option) connector
Can record NG motion pictures when an NG occurs.
⑧ **USB memory / connector:** Insert **USB memory**.
Insert the **USB memory**, **reverse side up.**
(Power voltage: 3.3 V)
⑨ **USB memory LED:** Lights up when the **USB memory** is read or written to.
Note: Do not pull out the **USB memory** while the LED light is on.
⑩ **DMX connector:** It is a connector to dim the lamp (Option).
Can dim the camera lamp of the PE600 main unit.

(PE600 Back)



⑩ **Fan vent:** Vent for heat radiation.

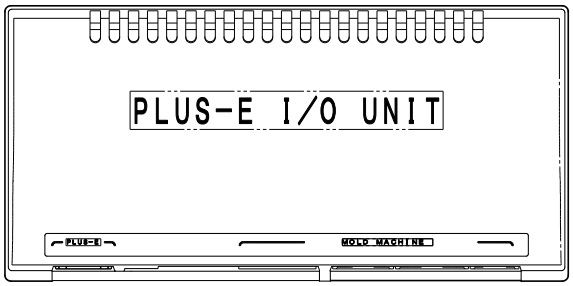
⑪ **Name plate:** The manufacturing number is written here.

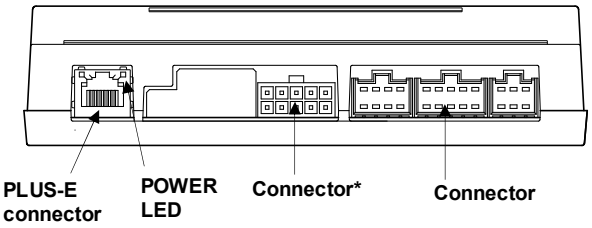
⑫ Curl cord fixing hole: A fixing hole to hang the curly cord for the operation pen.

1-4 I/O Unit

The I/O unit is described here.

The specifications of I/O unit are the same for PE500 and PE600.





① **POWER LED:** Lights up when the power is turned on.

② **IF connector:** For connecting the IF cable of **PLUS-E**.
Connect it to the **PLUS-E** main unit.

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

④ **IO connector***: 10-pin connector. Connect it to the molding machine 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 in Cycle IL and Eject IL)

I/O Cable Signal Specifications

- **It is possible to recombine 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 recombination).**

I/O Cable 1

Pin no.	Core wire identification color	Signal line type	Signal name (Indicates the case without signal recombination)	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 limit input)	H2
9	Blue	AWG22	IN2	J1
10	White	twisted pair line	(Ejector 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	(Extractor start output)	B2
3	Black	AWG22	OUT6	F1
4	White	twisted pair line	(Watch on/cycle start output)	F2
5	Ash	AWG22	OUT7	G1
6	White	twisted pair line	(Output NG 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	(Input spare 1_CM)	L2
9	Red	AWG22	IN5	M1
4	Pink	twisted pair line	(Input tool movement 1)	M2
8	Orange	AWG22	IN6	N1
3	Pink	twisted pair line	(Input tool movement 2)	N2
7	Yellow	AWG22	IN7	P1
2	Pink	twisted pair line	(Input molding machine automatic)	P2
6	Green	AWG22	IN8	Q1
1	Pink	twisted pair line	(Input alarm off (Input NG OFF_CM))	Q2

Chapter 2 Basic Operation Method

2-1 Power On and Initial Screen

① When power is turned ON, the logo is displayed, and then the Initial Screen (Screen 1) is displayed. You can select the display language.
(Page 8: ③ Turn ON the power switch to turn the power ON.)

② When the logo in the center is touched, if it is in manual run mode, the molding machine interlock signal is released, and the main menu (screen 3) is displayed.

(Screen 1) Initial Screen

USB memory properties

Capacity properties

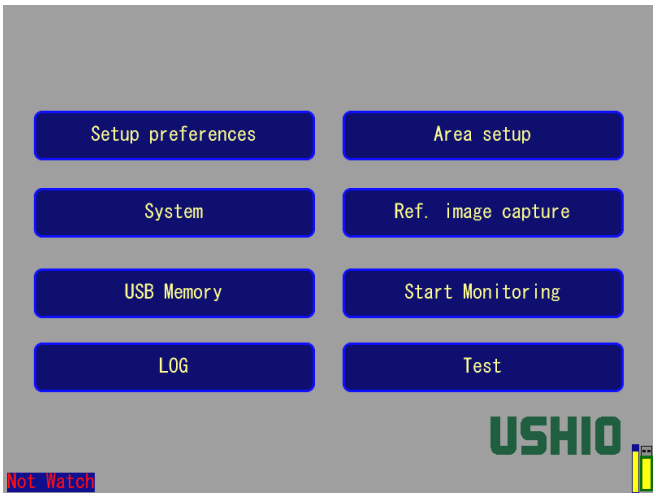
This is displayed only if the USB memory is inserted. The capacity used out of the full capacity is shown in a bar graph. When the USB memory is being accessed, it is displayed in red.

(Screen 2) Device Information Display

2-2 Main Menu Display and Explanation

Each item of the main menu is explained below.

(Screen 3)



Main Menu (Screen 3) Explanation

Setup preferences	▪ **Sets the basic settings for monitoring.** Selection of Camera number (Camera 1, Camera 2) and monitoring method (Inspection 1, Inspection 2) Each setting of pre-check, watch timer, Non-monitored run, Ref. image capture, Save NG image in USB memory, Save log file
System	▪ **Does the basic system setup.** Each setting of screen display, volume, lamp luminance, monitoring correction/monitoring filter function, password setting, Clock, Ejector complete signal, Output1, and Re-eject
USB memory	**USB memory Performs set-up for USB memory at insertion.**
Log	**Displays the unit log file, and writes a log file in the USB memory.**
Area setup	**Does the setup operation of the monitoring area.**
Ref. image capture	**Captures the reference image for each watch.**
Start Monitoring	**Starts monitoring.**
Test	**Starts the monitoring test.**

① In the above main menu display and other screens:

***When you select an option on the screen, its display changes to yellow-green.**

***If you touch it but it is not selected, that means the option is disabled.**

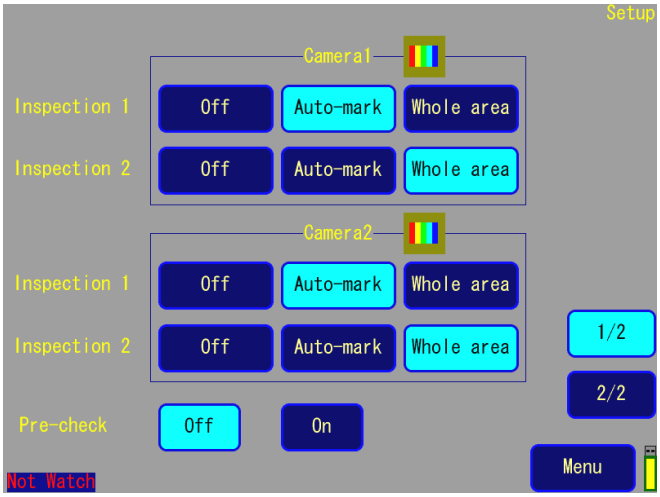
***When you select the Menu button, the screen goes back to the Main Menu screen.**

2-3 Setup Preferences

(1) Setup preferences

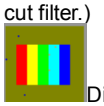
Select **Setup Preferences** in the Main Menu screen (Screen 3). When you touch Menu, the screen goes back to the Main Menu screen (Screen 3).

① Set the monitoring method of each connected camera. [Setup Preferences 1/2 screen] (Screen 4)



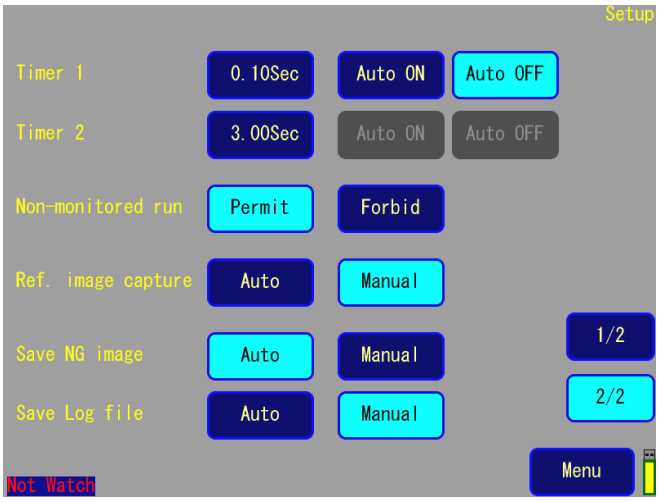
[Selectable parts are displayed in a yellow-green box on the screen]

Setup Preferences 1/2 (Screen 4) Explanation

Inspection 1	Before dropping, confirms that there is a molded product. Monitors any remaining part in the fixed side, etc.
Inspection 2	Confirms that there is no molded product after dropping. Confirms dropping on variable side, etc.
Auto-mark	Monitors only auto-mark (automatic monitoring detection point).
Whole area	Monitors whole monitoring area including the auto-mark.
Pre-check	Function starts from Inspection 2. Confirms that no molded product is remaining in the tool before starting Inspection 1, and that there is no abnormality. (When molding machine is in auto-run mode)
Camera designation	Designates color / monochrome image for Camera 1/Camera 2. (Monochrome image should be selected for infrared monitoring using a visible light cut filter.)  Displays the camera image as a color image. When you touch Image Button in this display, the screen is switched to a monochrome image.  Displays the camera image as a monochrome image. When you touch Image Button in this display, the screen is switched to a color image.

② Set Watch timers 1 and 2, and other setup. [Setup Preferences: 2/2]

(Screen 5)



■ Watch timer 1 and 2 setting method ■

1. Touch the Timer display part (unit: seconds).
2. Input the time from the Number input keypad screen (Screen 6) and press ENT to confirm.
3. Select whether the monitoring time should be shortened or not, with Auto ON or Auto OFF

Note 1. **The wait time becomes effective in Auto OFF.**
During **Auto On**, the monitoring is repeated with no wait time, and the moment an OK image is acquired, the monitoring ends to go to the next process. If OK is not acquired, **NG** is output at the time set in the timer.

Note 2. **Timer 1** is the wait time from molding complete until inspection image 1 is captured. If the time display part is touched, the keypad for setting the numerical value is displayed. Directly touch the number to input it, and finally set it by touching **ENT**. You can set any number between 0 to 99.99 seconds in units of 0.01 seconds.

Note 3. **Timer 2** is the wait time from molding complete or eject complete, until the inspection image 2 is captured. Set it in the same way as timer 1.

Note 4. Auto On of **Timer 2** can be selected **if Ejector complete signal** of page 20 **is On.**

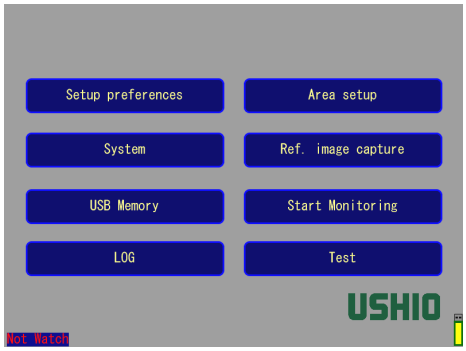
(Screen 6)

Setup Preferences 2/2 (Screen 5) Explanation

Timer 1	Wait time from molding complete until inspection image 1 is captured. Unit: seconds.
Timer 2	Wait time from molding complete or eject complete until inspection image 2 is captured. Unit: seconds.
Non-monitored run	**Disable:** When the molding machine is in auto-run mode, the interlock is released only during reference image capture and during monitoring. **Enable:** During auto-run, the interlock is released, even if not during reference image capture or monitoring.
Ref. image capture	**Auto:** After molding complete or eject complete, after the wait time (set in timer value) has passed, the reference image is captured automatically. **Manual:** Reference image is captured manually.
Save NG image	Set whether to save NG images in the USB memory **automatically or manually** when NG is detected. If it is to be 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 NG image which was detected that time.
Save Log file	Set whether to save the monitoring log information **automatically or manually** when monitoring ends.

Note 1. If the molding machine is run at other times besides reference image capture and monitoring, “Not Watch” blinks in red in the bottom left part of the screen.

(Screen 7)



Not watch

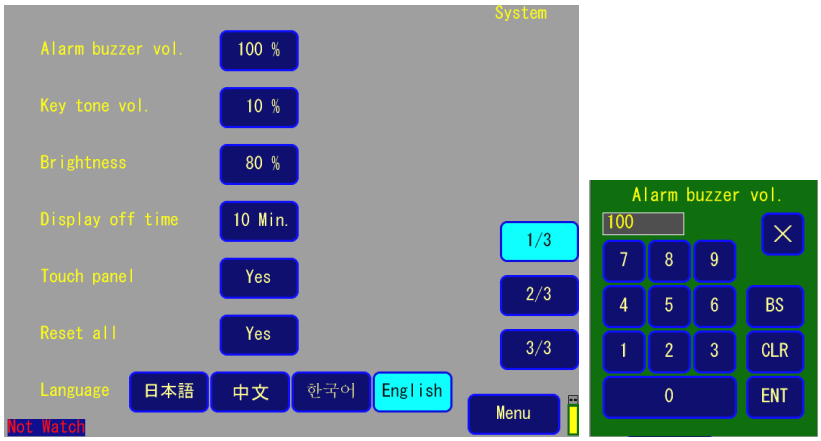
2-4 System Setting

(1) System Setting

① System Setting Screen 1 (1/3)

Touch **System** on the Main Menu Screen (Screen 3), and go to the System screen (Screen 8).

(Screen 8)



System Setting 1/3 Explanation of (Screen 8)

Alarm buzzer vol. and Key tone vol.	On touching a number, the key for setting the number is displayed. After inputting, touch **ENT** in the end to set the number. The volume can be increased or decreased between 0% and 100% in 1%-steps.
Brightness	Set the brightness of the whole screen.
Display off time	Set the time to turn off the display if the screen is not touched. The time can be increased/decreased to any time between 1 minute and 100 minutes in 1-minute steps.
Touch panel	On touching **Yes**, the touch panel is calibrated.
Lamp Brightness operation	**Designates Enable / Disable brightness setting of dimming LED lamp for monitoring.**
Reset all	On touching **Yes**, the set value is initialized.
Language	Touch to select a language button: **Japanese, Chinese, Korean (Hangul) or English.** (Multi-language support is optional.)

② System Setting Screen 2 (2/3)

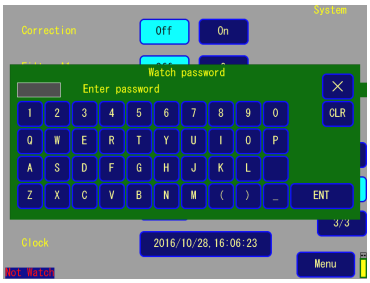
(Screen 9)

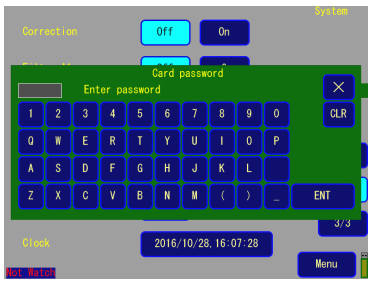
System Setting 2/3 Explanation of (Screen 9)

Correction	This function automatically corrects the stop position of the tool. It can be set to **On or Off**. This is enabled when On is selected.
Filter A1, Filter A2	Specify the size of 1 chain of NG to delete by the internal process, when determining NG. A value between 0 and 24 is set. 0 is no specification. 24 is approximately 1.4mm x 1.4 mm size. (Reference value) A1 is for Inspection 1. A2 is for Inspection 2. It is disabled when set to **Off** or if 0 is set.
Filter B	In each dot of auto-mark, if 1st is determined as NG and 2nd as OK, then the monitoring is considered as OK with this function. It is enabled when set to **On** and disabled when set to **Off**.
Password ・ Monitoring password ・ USB password	There are two types of passwords: a monitoring password and USB memory password. Set them if required. (Screens 10 and 11) ・ Password for protecting the monitoring state. Password must be input to exit from the monitoring screen. ・ Password for restricting access to the USB memory. Password must be input at time of USB Memory Screen confirmation.
Clock	For correcting the display time, touch the time display part to display the keypad for setting the time. Touch **ENT** after entering the time. (Screen 9 Right)

➢ On touching the boxes to the right of Monitoring Password or USB Password, the keys for letters and numbers are displayed. Input by touching the letters or numbers, and finally touch **ENT** to set them as the password.

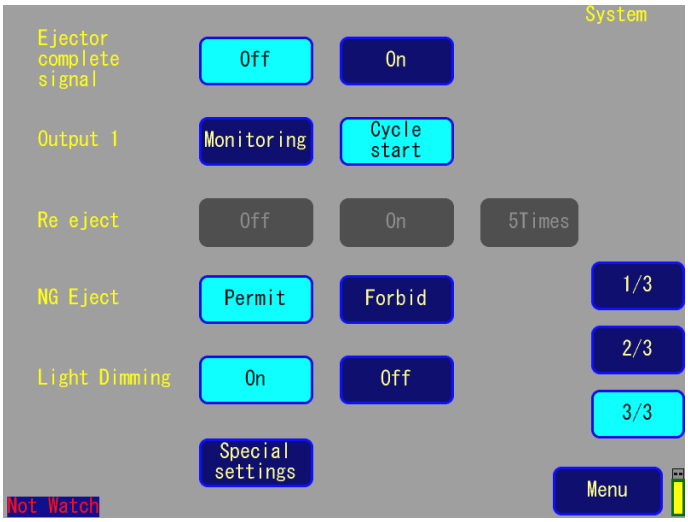
(Screen 10) (Screen 11)



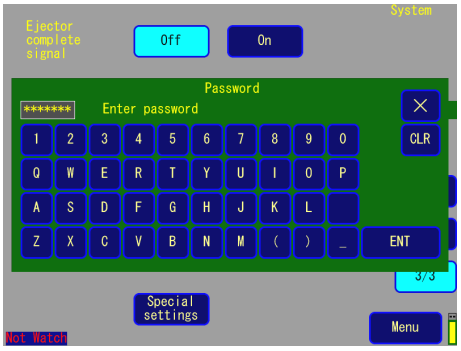


③ System Setting Screen 3 (3/3)

(Screen 12)



(Screen 13)



System Setting 3/3 Explanation of (Screen 12)

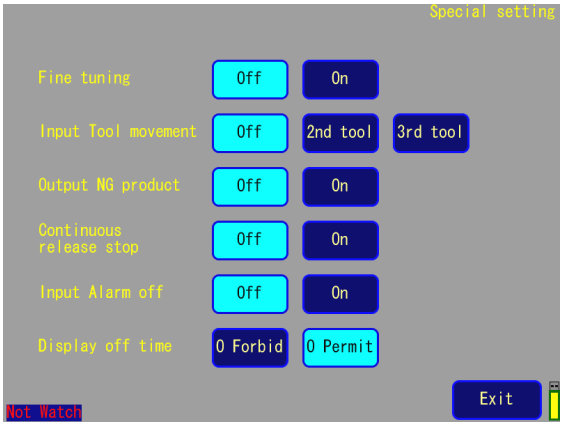
Ejector complete signal	Set to use the Ejector complete signal.
Output 1	Set monitoring/cycle start output signal to Monitoring On or Cycle On signal. (Normally, select Cycle Start.)
Re-eject	Set Re-eject. Select by **On or Off.** **(Note: It is enabled when enable is selected from "Disable/Enable Re-eject" of Special settings.)** The frequency of Re-eject can be set between 0 and 100.
Eject at NG	Designates eject at NG occurrence. Select Enable or Disable.
Lamp Brightness operation	**Designates Enable / Disable brightness setting of dimming LED lamp for monitoring.**
Special settings	Select this to set Special settings. See the next page for reference.

④ Special Settings

④-1. Special Settings Screen Display

Touch **Special Settings** of the 3rd system screen (Screen 12), and enter the password to display the **Special Settings Screen**.

(Screen 14) Special Settings Screen)



④-2. Special Settings Screen Explanation

Fine tuning	**Select ON or OFF of fine-tuning. See the next page for reference.**
Input tool movement	If 2 or 3 tools are used, it inputs the signal to show that the tool is switched. This function is enabled when it is set to **ON.** (See the table below for reference.)
Output NG product	If a molded product is determined as NG in Inspection 1, the result is output as an abnormal product output signal. It can be set to **On or Off**. The function is enabled when it is set to **On**.
Continuous release stop	The Continuous release stop function is selected by setting it to **On.** When an output NG product occurs 6 or more times consecutively, it stops Output NG product and displays Inspection 1 NG.
Input alarm off	When Input Alarm Off is selected by selecting **On**, an output NG product signal is released by the input alarm off signal from outside. If Input Alarm Off is set to **Off**, the output NG product signal is released at the time of ejecting and inputting of a return signal.
Display off time	Select the display Off setting. When Forbid is selected, the display will not turn off.

Input Tool Movement Signals and Tool Numbers

Input Tool Movement Signals and Tool Numbers

Number of tools	Input tool movement 1	Input tool movement 2	Tool no.
1	-	-	Tool 1
2	0	-	Tool 1
	1	-	Tool 2
3	1	0	Tool 1

	0	1	Tool 2
	0	0	Tool 3

④-3. **Fine tuning (in the Special Settings Screen)**

Normally, **Fine tuning Off (Setting at shipment)** is used, but if ① monitoring parts in more detail, ② separate areas need to be monitored in Inspection 1 and 2, ③ when there are detailed settings for the tool's reflecting surface, or ④ a vertical molding machine is used, etc., then it is possible to monitor by fine-tuning by setting **Fine tuning On**.

コメント [A1]: 原文は③ですが、参考資料から判断して④としています。

Fine tuning On/Off details

Fine tuning: **OFF** (**Standard setting at shipment**)	Types of areas (2 types)	W. area: Area to be monitored
		Masked area: Area not to be monitored
	Common area	Inspection 1 area and Inspection 2 area are common.
	Sensi. types (Sensi. 1 and 2)	・Sensi. 1: Monitoring sensi. value of the auto-mark part (automatic monitoring set points) ・Sensi. 2: Monitoring of the area excluding the auto-mark part in the monitoring area. Sensi. value
	Sensi. 3	Cannot be set
Fine tuning: **ON**	Types of areas (3 types)	Product area: Area for detailed monitoring of the product part, etc.
		S. area: Monitoring wide range of areas (tool surface, etc.)
		Masked area: Area not to be monitored
	Independent areas	Inspection 1 area and Inspection 2 area can be set separately.
	Explanation of each sensi. (Sensi.1, 2 and 3)	・Sensi. 1: Monitoring sensi. value of the auto mark part ・Sensi. 2: Monitoring sensi. value of dark side in the S. area excluding the auto-mark part of the product area ・Sensi. 3: Monitoring sensi. value of bright side in the S. area excluding the auto-mark part of the product area
	Sensi. 3	Can be set in the product area and S. area

[Additional Explanation of the Above Table]

① If Fine tuning is **Off⇒Standard setting at shipment.**

- Setting area is of two types: monitoring area and masked area. Set sensi. is of two types: Sensi. 1 and Sensi. 2.
- To monitor a part, monitor the auto-mark part with Sensi. 1.
- In whole-area monitoring, monitoring points detected by Sensi. 1 are combined with monitoring of non-monitoring points by Sensi. 2.

② If Fine tuning is **On**

- Setting area is of three types, product area, surface (S.) area and masked area. Setting sensitivity is of three types: Sensi. 1, 2 and 3
- Inspection 1 area and Inspection 2 area can be set separately.
  Inspection 1 and Inspection 2 areas must be set. Example: Usage of Copy All function, etc.

- Sensi. 2 and Sensi. 3 (distinction of sensitivity in dark and bright sides) are mainly applied in auto-mark specified in S. area.
- Regardless of whether the judgment of auto-mark or whole area is specified, S. area is monitored by the method of setting the range of light direction of the reference image. In order to prevent mistaken detection due to reflection of brightness on a metal surface, both dark side Sensi. 2 and bright side sensi. 3 are used for judgment.
- The auto-mark part in the product area is mainly monitored by Sensi. 1.
- When monitoring of the whole area is specified, and areas other than where monitoring points are detected are also monitored in addition to the auto-mark area, after the allowable Sensi. in both dark and bright directions are set by Sensi. 2 and 3.

2-5 Area Setup

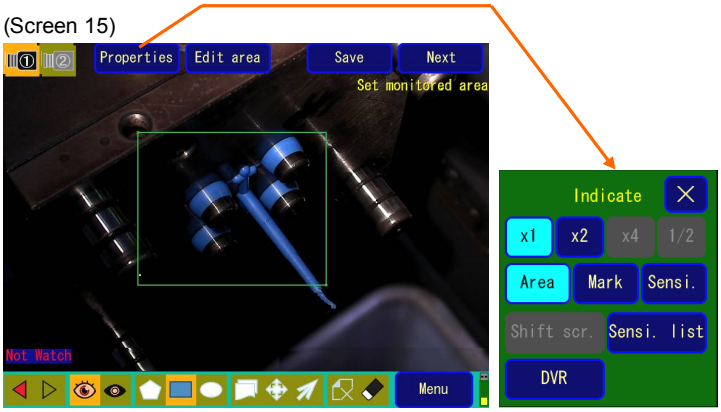
2-5-1 Area Set Up (Setting at shipment: If Fine tuning Is Off)

Touch Area set up on the Main Menu Screen (Screen 3) to go to the **Area set up** screen (Screen 15). Set the area to specify the target monitoring area from the camera image.

(1) Area set up screen

① Area set up screen

(Screen 15)



② Area set up Screen (See screens 15 and 16) - Explanation of each Properties part

Properties		Area information and camera image display setting
	① Magnify	Magnification when displaying a camera image. Select between 1 and 4 times (1/2 only when there are 2 cameras).
	② Properties	Area: Area frame display selection Mark: Auto mark display selection Sensi.: Displays the sensi. value of the touched area, and monitored values to ignore.
	③ Sensi. list	Display list of Area Sensi.
	④ DVR	DVR display read out. (Only when DVR option is connected)
Operation		Select edit area when creating or setting area.
	① New area	Select monitoring and masked areas of the new area.
	② Area	Selection of move, copy or delete area. Set Sensi.
	③ Corner	Selection of Add, move or delete corner.
Menu		Go back to main menu

③ Icon

Icon	Group	Icon name	Icon
	REDO-UNDO Icon	Repeat / Cancel operation	Repeat / Cancel the next or preceding operation
	Area type icon	Monitor area / Masked area	Designates type of Area setup. 2 types are available in simplified mode.
	Geometry Icon	Polygon / Quadrangle / Oval	Designates the geometry for creating an area from three types: Polygon / Quadrangle / Oval.
	Operation Icon	Copy / Move / Move of corner	Designates an operation for the area created.

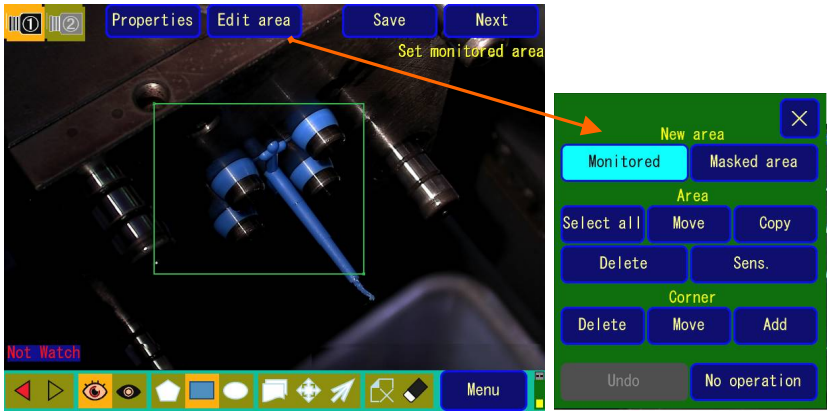
	Delete Icon	Delete area / Delete corner	Deletes a designated area (yellow frame) / Deletes a designated corner (only for a polygon).

(2) Area set up Procedure

① Create area

After selecting **Monitor Area-Icon for new area** and then selecting the geometry icon (Polygon, Quadrangle or Oval), touch corners one by one (if it is polygon) and select ENT in the end to create a monitor area.

If the geometry icon is a quadrangle, designate diagonal points (2 points). Similarly, if the geometry icon is an oval, designate a center point, Radius 1 and Radius 2 perpendicularly intersecting Radius 1. (Screen 16)



Note: In the case of a polygon, it is possible to designate a shape with up to 32 corners. The maximum number of areas is 20.

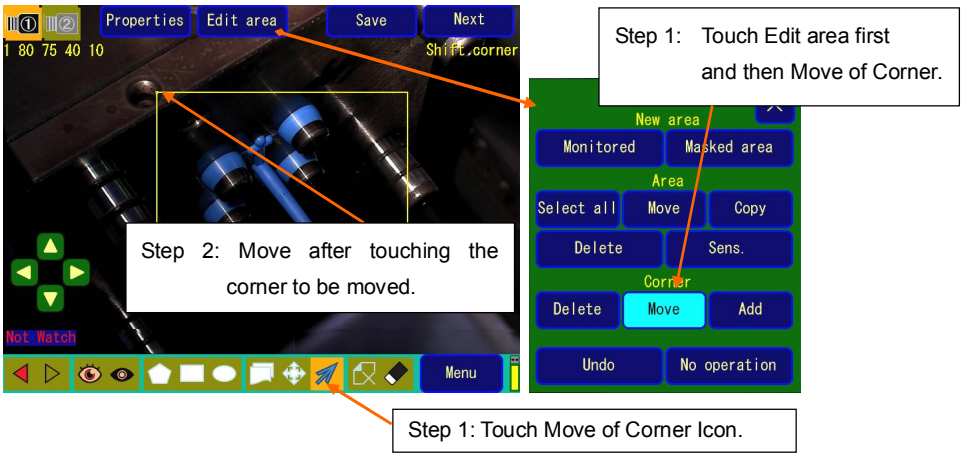
Select Masked area icon of New area to set the masked area.

② Moving, Adding or Deleting Corners

③ -1. How to Move Corners: 1

To move a corner of the area, after pressing **Move of** Corner **Icon**, move a corner while pressing it. Move of Corner can be read out also by touching the Edit area first and then Corner—Move.

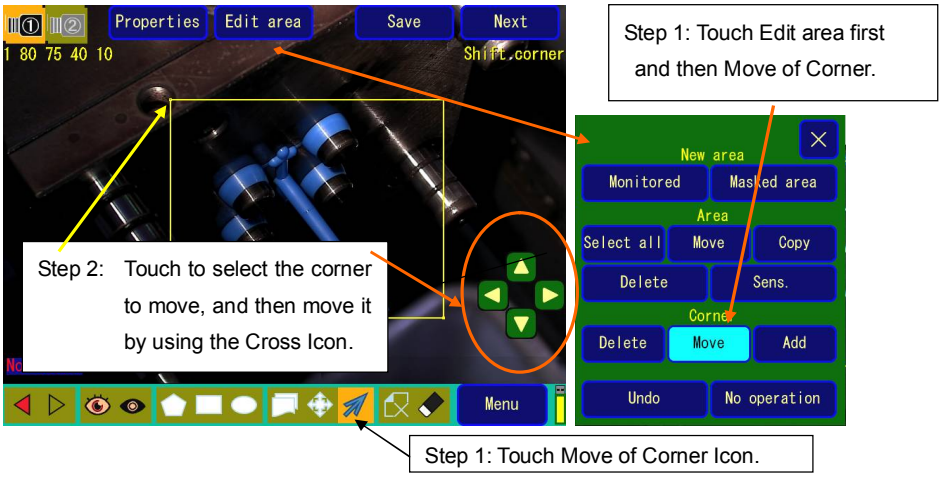
(Screen 17)


Properties
Edit area
Save
Next
1 80 75 40 10
Shift,corner
Step 1: Touch Edit area first and then Move of Corner.
New area
Monitored
Masked area
Area
Select all
Move
Copy
Delete
Sens.
Corner
Delete
Move
Add
Undo
No operation
Step 2: Move after touching the corner to be moved.
Not Watch
Menu
Step 1: Touch Move of Corner Icon.

②-2. How to Shift Corners: 2

To perform fine adjustment in Move of Corner, select a corner and then move to upper / lower / right / left directions by using the Cross Icon.

(Screen 18)



② -3. How to add or delete a corner

To add or delete a corner, touch the **Edit area, and then after pressing Add or Delete of** Corner, **touch each point.** It is possible to read out **Delete a Corner also with Delete of Corner Icon**.

③ Copy or Move Area

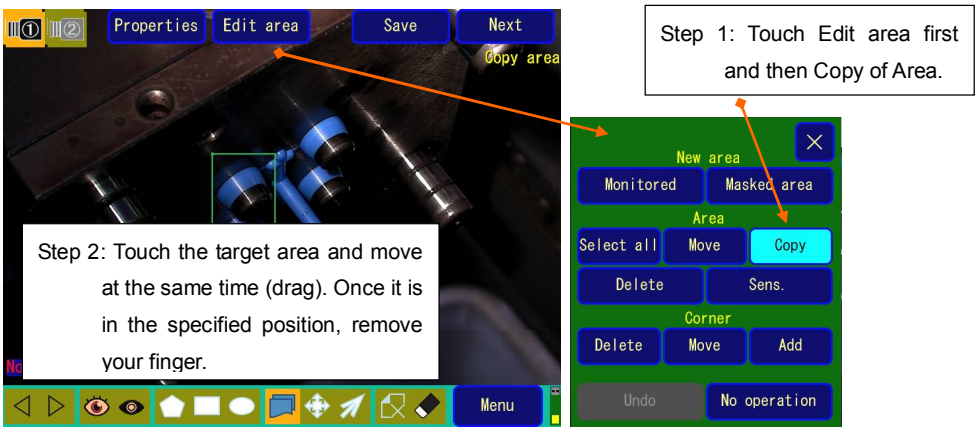
③ -1. Copy area

Touch the Copy Icon in (Screen 19) to display the new area (Screen 20).

If the border of area 1 to be copied or the angle is touched directly to move it as it is, copied area 2 is tracked and moved. The attributes of the area are also copied at this time.

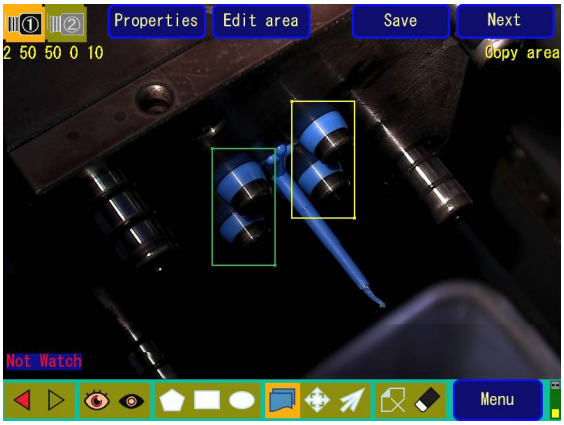
It is possible to read out Copy of Area Icon also by touching the **Edit area** first and then touching **Copy**.

(Screen 19)



Step 1: Touch Copy Icon.

(Screen 20)



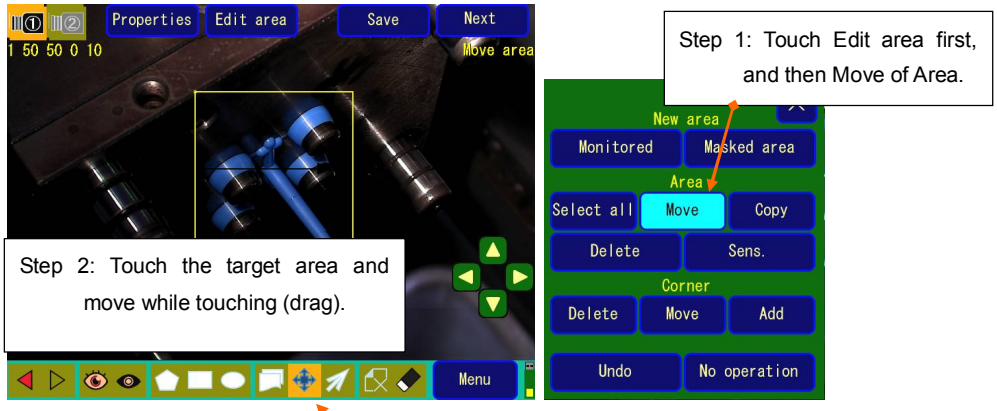
Step 3: Touch the area to be copied and move while touching (drag). Once you remove your finger, the area is copied in order.

③-2. Move area

Press **Edit area** and select **Move** of Area. Then, touch and move the area of the camera image.

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

(Screen 21)



* Number of areas which can be set: It is possible to individually set a total of 20 areas **from Area 1 to Area 20** and monitor them.

* Switching an area **while setting area**: Switch the selected area by touching the Area to move while moving or copying an area.

③-3. Copy A (Copy All) function when Fine tuning is On

(However, **Copy A** is limited to Special settings, **Fine tuning On** of System Screen 3/3.)

a. Function explanation

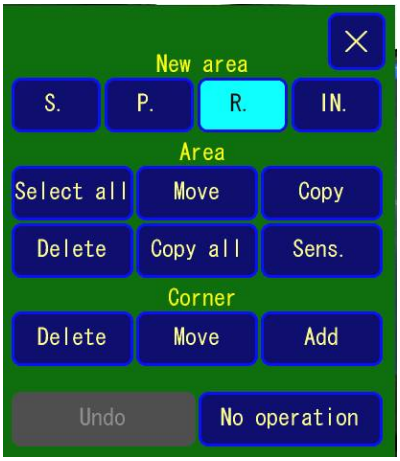
Copies the entire area set in the screen, at one time.

- Copies between Inspection 1 area set screen ⇔ Inspection 2 area set screen

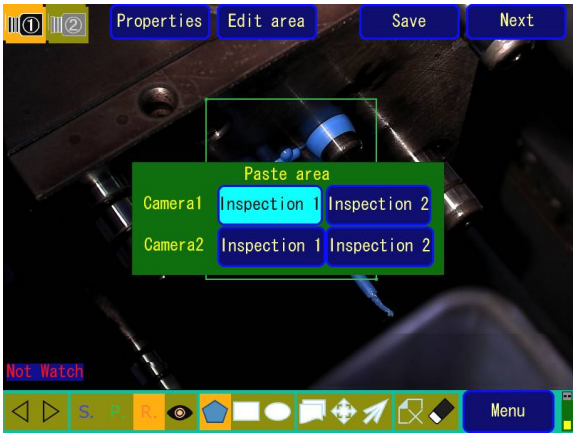
b. How to operate

If Inspection 1 area is to be copied in Inspection 2 area, touch **Edit area first and then Copy A** (Screen 22), and touch Paste area (Screen 23).

(Screen 22)



(Screen 23)



④ Method of changing area type

If you touch **Area set up** (Screen 3) → **Edit area** → **Sensi.** in this sequence and then touch the target area, Screen 24 is displayed. The currently set type of area is displayed on the top right of the numbers for setting sensi. If you touch the area type name, the area type switches (in order of **monitored area**, **masked area**) so touch it until it changes to the target area type name.

(Screen 24)

Set part of area type name

(If Fine tuning is OFF in system screen)

Area is of two types, **monitored area** and **masked area**.

Monitored area is where the product auto-mark or whole tool surface area etc. is monitored.

Monitoring judgment is carried out based on set values of Sensi. 1, Sensi. 2 and number of non-monitored areas.

Set the place which is not to be monitored, to **Masked area**.

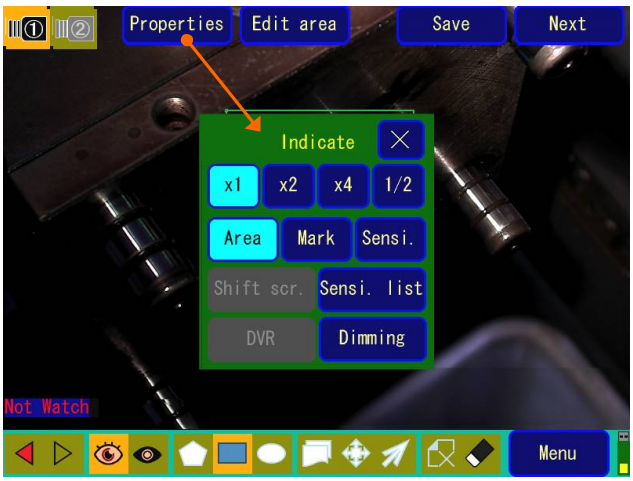
Allowed NG is the maximum number of NG which can be allowed in each monitored area.

It can be set to any number between 0 and 999. The range is between 0 and 100 to set it using the slider for Sensi. Adj. (See 2-8. How to Monitor).

⑤ Sensi. List Display

If you select **Area set up** (Screen 3) → **Properties** → **Sensi. list** (Screen 25), a maximum of 20 combinations of Area No., Sensi.1, Sensi. 2, Area type (monitored area/masked area), and ALLOWED NG are displayed in a list. (Screen 26)

(Screen 25)



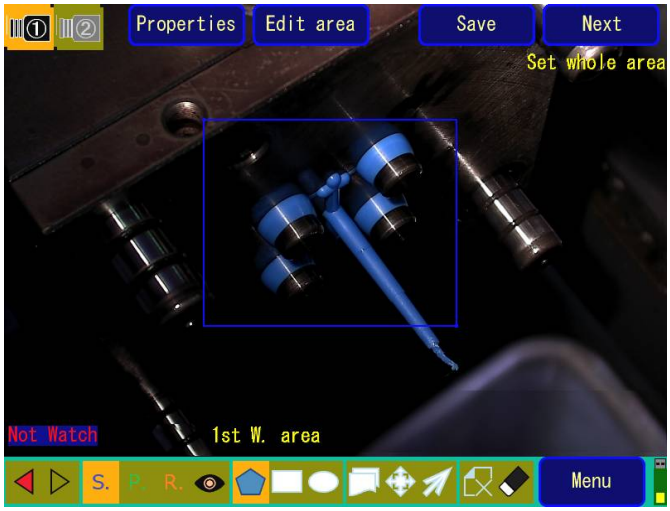
(Screen 26) Sensi. List Display

2-5-2 Area Set Up (If Fine tuning Is On)

(1) When Special Settings: Fine tuning is On

⇒See page 22: ④-3. **Fine Tuning (in the Special Settings Screen)**.

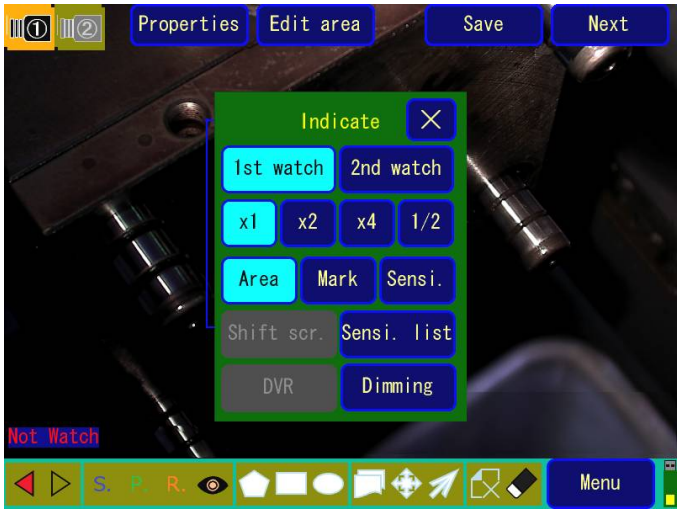
(Screen 27-1) Displays Area Set Up (If Fine tuning Is On)



Area type icon

It shows from the left, S: Surface area, P: Product area, R: Output NG product area, and  Masked area. Output NG Product area is enabled only on the special setup screen while Output NG Product is ON in Inspection 1.

(Screen 27-2) It is an example of “Operation Display” in “Displays Area Set Up (If Fine tuning Is On).



2-5-3 DVR Screen Display

As indicated in “Connection to 1-2-2 DVR (OPTION),” DVR screen is displayed by touching DVR (OPTION) **Area setting** (Screen 3) first, then touching **Display** and then **Select DVR** (Screen 25).

(Screen 27-3)

On the DVR screen, DVR operation is displayed on the camera image. (Operation by OSD)
See the Manual delivered with DVR for information about the operation of DVR.

(Screen 27-3)

Exit button will turn off the DVR display.

2-6 Reference Image Capture

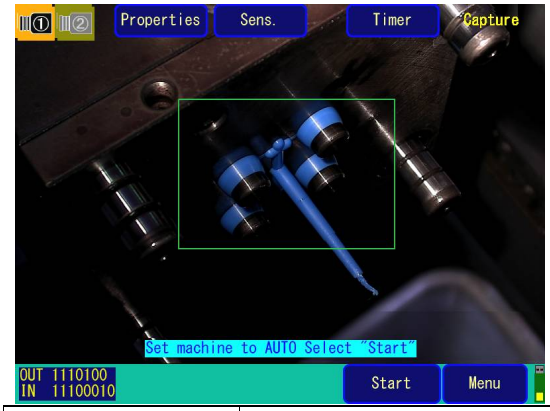
Captures the reference image to compare for monitoring.

(1) Reference Image Capture Screen

Touch **Ref. image capture** on the Main Menu Screen (Screen 3), to go to Reference Image Capture Screen. (Screen 28). (Before this, do **Area set up**.)

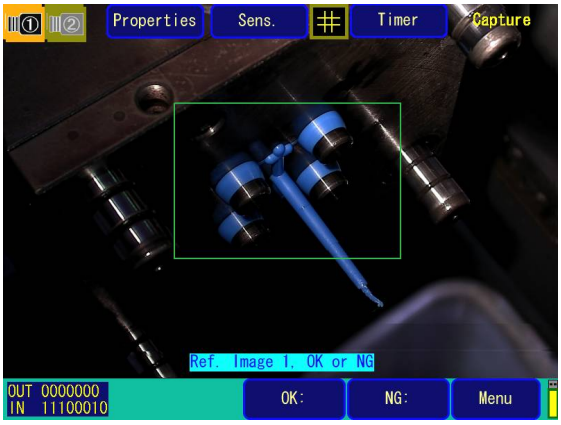
It is also possible to move to Reference Image Capture Screen (Screen 28) by touching Next Process first and then Reference Image Capture in the Area Setup screen.

(Screen 28) Reference Image Capture Screen



Extraction of reference color and adjustment of color sens.	**On the Ref. image capture screen, touch the product section on the screen to extract a reference color (resin color) and adjust color sens. adjustment.**
Sens.	Select **Sens.** to go to the sensitivity settings screen (Screen 29A). Adjust the sensitivity.
Timer setting	Select **Timer** to go to the wait time setting screen (Screen 30), then adjust Timer 1 and Timer 2.
Start	Starts capturing the reference image. The reference image capturing method differs depending on whether **manual or auto is set for** Ref. image capture in the Setup Preferences Screen (page 16, (Screen 5). See page 33 (4) Image Capture.

(Screen 28-1) Reference Image 1 Capture Screen



(2) Extraction of reference color and adjustment of color sens.

Touch Reference Color Extract button on Screen 28-1 to display Screen 28-1. The frame turns to orange to indicate the color extract status.

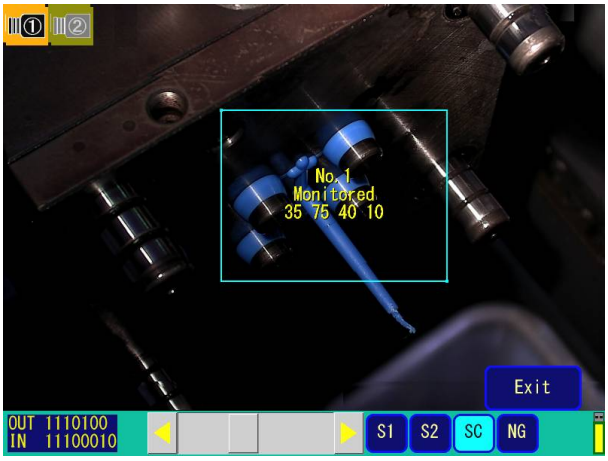
The Reference Color Extract button is displayed to indicate that the Color Extract screen has become active. Touch product section (resin) on the screen in this mode to display a mark on the camera screen indicating that the section is for extraction of reference color. The mark moves when you keep touching it and slide it. The standard color is displayed in the center of the Reference Color Extract button.

(Screen 28-2)

On the bottom of this screen, a slider for color sens. adjustment can be displayed from the Sens. button. Color sens. is the sens. for detection as resin section and designation is conducted between the range of 0% and 100%. A larger value indicates that it is more similar to the Reference Color / Brightness. At 0%, the color monitor function is turned off.

The section recognized as a product section is shown with a green mark. Therefore, it is possible to confirm the product mark by adjusting the color sens.

(Screen 28-3)

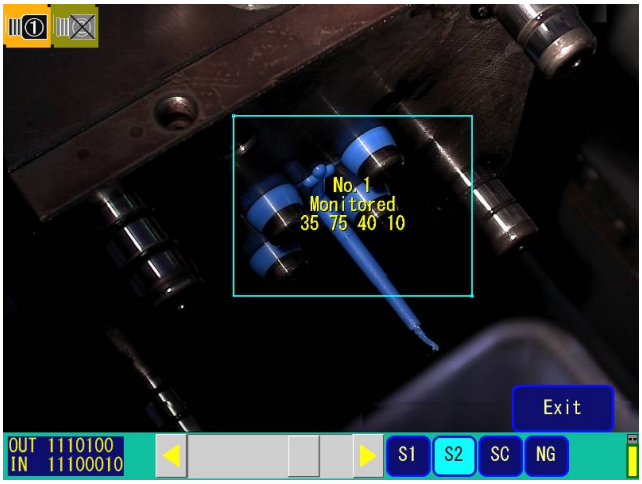

①
②
No.1
Monitored
35 75 40 10
Exit
OUT 1110100
IN 11100010
S1
S2
SC
NG

(3) Sens.

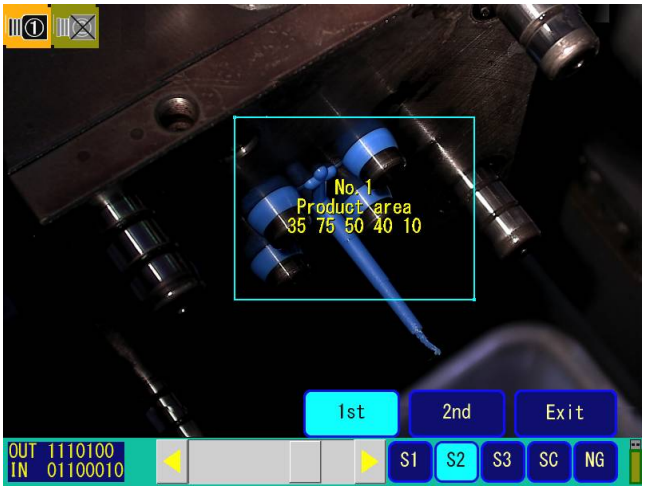
You can move the sliders displayed at the bottom of screen to adjust Sensi. 1 (S1), Sensi. 2 (S2), Sensi. Color (SC) and Allowed NG for Inspection 1 and Inspection 2 respectively.

Touch the area where you want to change the sensitivity, to specify the area.
Touch the slider box and drag it right to increase, or left to decrease the value.
If you touch the right (left) movement range, the value will increase (decrease) by 10 steps. If you touch the right (left) arrow, it will increase (decrease) by 1 step.

(Screen 29A) Sensitivity Adjust Screen: Setting at shipment (If Fine tuning is Off)



(Screen 29B) Sensitivity Adjust Screen: Fine tuning On



(4) Timer setting

After touching Timer 1 or Timer 2, use the keypad to enter the wait time which appears in the black letter part. Finally press the ENT key. The unit is seconds.

(Screen 30) Timer Setting

(5) Image capture

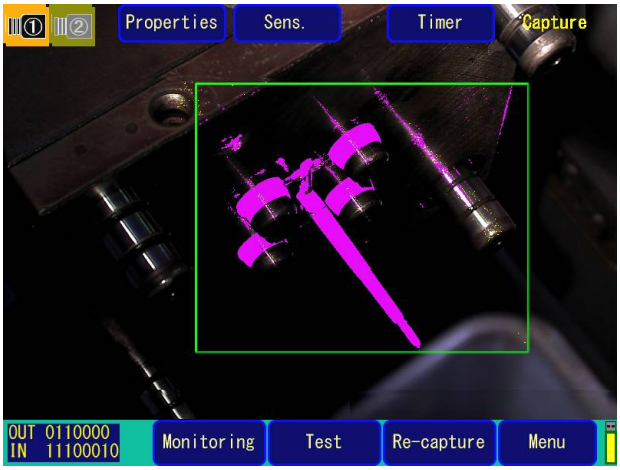
① Auto capture [If Ref. image capture is set to **Auto** in the Setup Preferences screen (page 16, Screen 5)]

If you touch **Start** in (Screen 28), on receiving the mold opening limit signal, after the wait time is over, it automatically captures the reference image of Inspection 1.

Next, after the product is dropped, similar to after the wait time is over, the reference image of Inspection 2 is automatically captured.

After capturing ends, the monitoring points of the product, etc. are auto marked and displayed in pink. (Screen 31)

(Screen 31)


Properties
Sens.
Timer
Capture
OUT 0110000
IN 11100010
Monitoring
Test
Re-capture
Menu

② Manual capture [If Ref. image capture is set to **Manual** in Setup Preferences Screen (page 16, Screen 5)]

a. If you touch **Start** in (Screen 28), on receiving the mold opening limit signal, after the wait time is over, the reference image of Inspection 1 is automatically captured (Screen 32).

(Screen 32) Reference Image 1 Capture Screen

b. If you touch **OK**, the reference image is captured. (The image is re-captured if it is **NG**.)

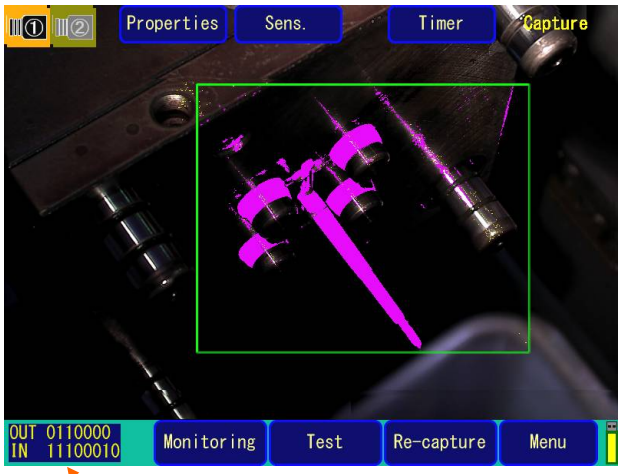
c. Next, after the product is dropped, similar to after the wait time is over, the Reference Image 2 is captured. (Screen 33)

(Screen 33) Reference Image 2 Capture Screen

d. If you touch **OK**, the reference image is captured. (The image is re-captured if it is **NG**.)

e. After capturing ends, the monitoring points are auto marked and displayed in pink.

(Screen 34)



*Note 1. If 2 cameras are used, the reference image is captured by camera 1 and 2 simultaneously.

*Note 2. To re-capture the reference image, select **Re-capture** on the above screen.

③ Expression of Signal Status on the Lower Left Part of the Screen (Displayed during reference image capture and monitoring)

1 and 0 rows in the lower left part of the above screen 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 limit
		2	Extractor start			**2**	Ejector complete
		3	Eject interlock			**3**	Alarm off
		4	Re-eject			**4**	Input spare
		5	External alarm			**5**	Input tool movement 1
		6	Watch on/Cycle start			**6**	Input tool movement 2
		7	NG product/Eject			**7**	Input molding machine automatic
						8	Alarm off

By touching this signal status properties section, it is possible to read out signal status detail properties.

(Screen 34-1)

Signal status properties are displayed also on a monitor screen and operated in the same manner.

(Screen 34-1)

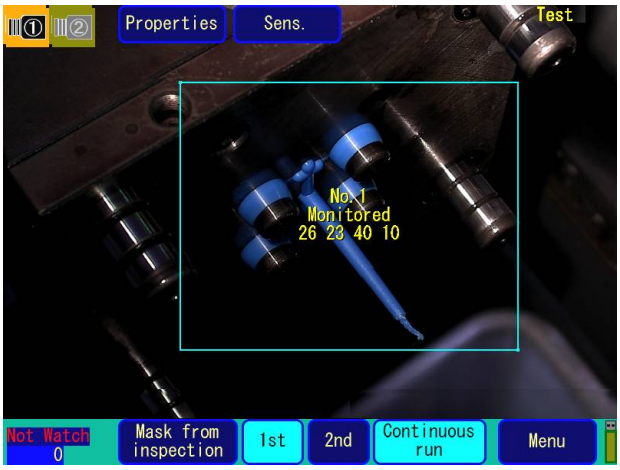
2-7 How to Test Monitoring

Touch **Test** on the Main Menu Screen (Screen 3), or touch **Test** on Screen 31 or Screen 34 after reference image capture, to go to the Test Screen (Screen 35).

On the Test Screen, sequentially compare reference images with actual images stored by reference image capture, and adjust the sensitivity while checking the monitoring NG part (red mark display) and auto-mark (Pink mark display).

By touching **Sensi**. on Screen 35, the slider for Sensi. Adj. is displayed in the same way as on the monitoring screen (Screen 40A and 40B described later). (Screen 36A, 36B)

(Screen 35) Monitoring Test Screen

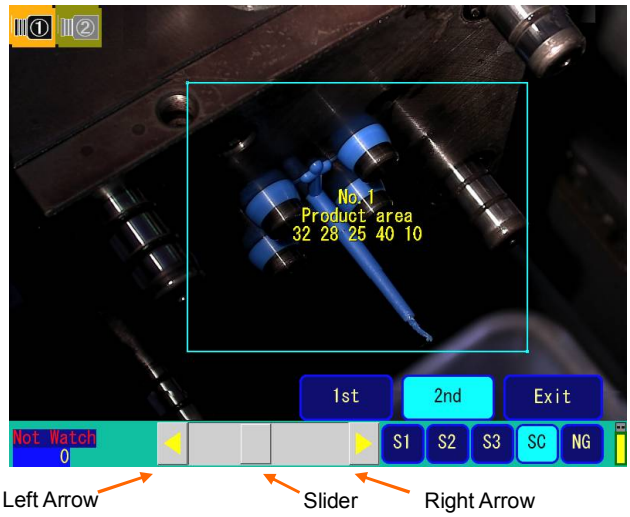


Monitoring Test (Screen 35) Explanation

Properties	Select switch camera, enlarge display, display/hide area mark/sensitivity.
Sens.	Sets the sensi./ disregarded NG for each specified area in the slider part, when the area is touched.
Mask from inspection	Deletes display NG parts, when Mask from inspection is touched. Returns to screen prior to Mask from Inspection when exit is selected.
Inspection 1	Selected in case of Inspection 1 testing.
Inspection 2	Selected in case of Inspection 2 testing.

Continuous run	When continuous run is selected, continuous run test is displayed as per the monitor's internal timer.
Menu	Return to the Menu Screen.

(Screen 36A) Test screen When Fine tuning is Off (Settings at Shipment)



(Screen 36B) Test Screen When Fine tuning is ON

Sensi. 1 (S1), Sensi. 2 (S2), Sensi. 3 (S3), and Allowed NG can be adjusted for Inspection 1 and Inspection 2 respectively, by moving the sliders.

Touch the area where you want to change the sensitivity, to specify the area.

Touch the slider box and drag it up to increase, or down to decrease the value.

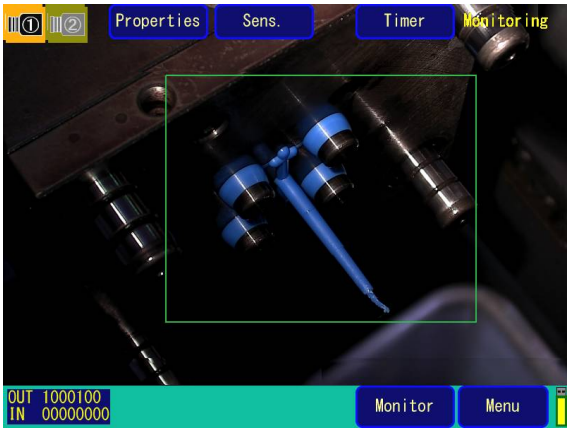
If you touch the upper (lower) movement range, the value will increase (decrease) by 10 steps. If you touch the ▲ (▼) arrow, it will increase (decrease) by 1 step.

2-8 How to Monitor

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

> In monitoring, while controlling the cycle and eject interlock signals, images before and after the molded product is dropped are captured by the mold opening limit signal and ejector complete signal, and these images are compared with the reference image. Be sure to capture the reference image before you start monitoring.
> (See 2-7. Reference Image Capture)

(Screen 37) Monitoring Screen



Operational Display during Monitoring (Screen 37) Explanation

Properties	Displays the monitoring image display settings, Sensitivity settings list, and monitoring information.
Sens.	Adjusts the sensitivity of each of the areas during monitoring, and sets up the number of NG to be ignored.
Timer	Resets the timer during monitoring.
Start Monitoring	Button displays for NG Inspection 1, and for restarting Inspection 2.
Menu	After monitoring is complete, you can select this if you want to return to the main menu.

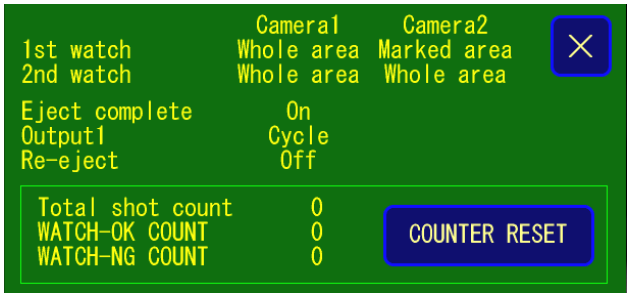
① Display Settings

・After touching **Properties** on Screen 37, touch **Area, Mark, or Sensi.** to display the area, auto mark, area number, area type, sensitivity, and number of allowed NG.

(Screen 38)

・If you touch **Properties, then Set list** on screen 37, the settings and total shot count, watch-OK count, and watch-NG count currently being counted are displayed (Screen 39). Touching **Counter Reset** resets all the counted values.

(Screen 39)



② Sensitivity Setting

If you touch **Sens.** on screen 37, the sliders for sensitivity adjustment are displayed. (Screen 40A, 40B).

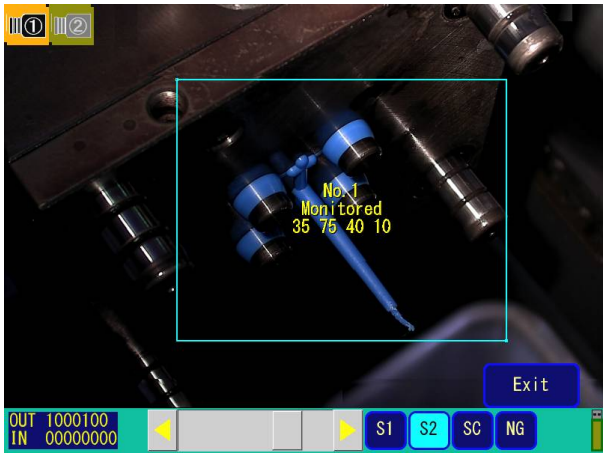
Sensi. 1 (S1), Sensi. 2 (S2), Sensi. 3 (S3), and Allowed NG (in the range of 0 - 100) can be adjusted for Inspection 1 and Inspection 2 respectively, by moving the slider. Touch the area where you want to change the sensitivity, to specify the area. (However, a maximum of 999 can be set during Area set up.)

Touch the slider box and drag it up to increase, or down to decrease the value.

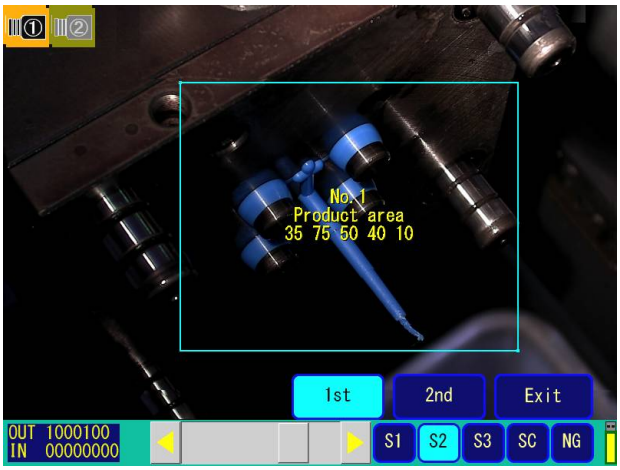
If you touch the upper (lower) movement range, the value will increase (decrease) by 10 steps. If you touch the ▲ (▼) arrow, it will increase (decrease) by 1 step.

The screen will return to the original Monitoring Screen if you touch **Exit.**

(Screen 40A) Monitoring Screen If Fine tuning is Off (Setting at Shipment)



(Screen 40B) Monitoring Screen If Fine tuning is ON



③ Timer Setting

You can set the Wait time by touching **Timer** on Screen 37, the same as described on page 33.

(Screen 41)

④ Monitoring Operation

④-1. Inspection NG Detected and Screen Display

When the monitoring results is determined to be NG (abnormal), the buzzer rings and at the same time “NG detected” is displayed.

(Screen 42)

④-2. Alarm off when NG detected

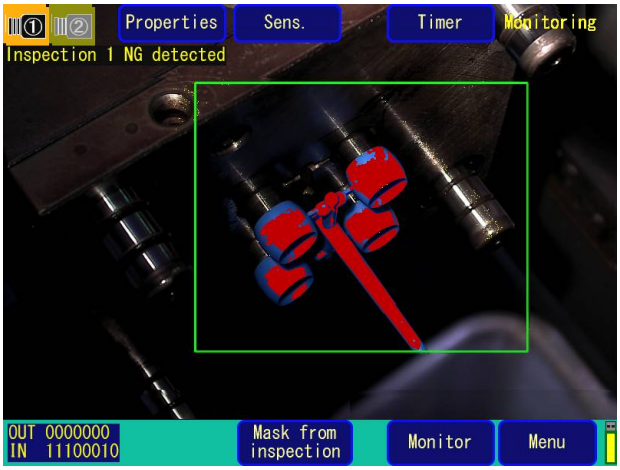
Touch anywhere on the screen to turn off the alarm and exit the “NG detected” display.

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

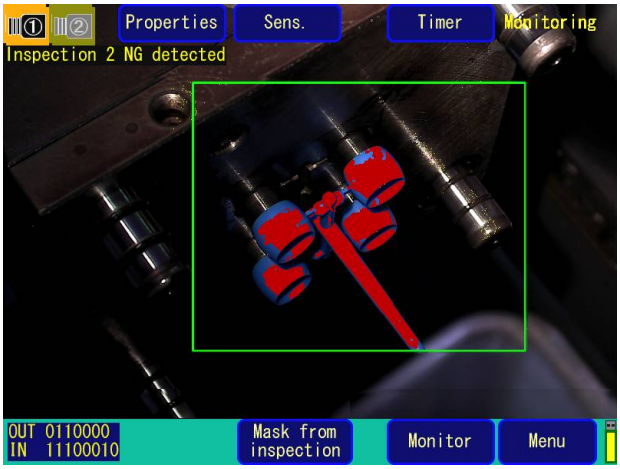
If 2 cameras are being used, it is automatically replaced by the image from the camera which saw the NG. (If there were NGs at the same time in both camera 1 and 2, priority is given to camera 1).

(Screens 43 and 44)

(Screen 43) Inspection 1 NG Screen



(Screen 44) Inspection 2 NG Screen



④-3. Returning to Monitoring

- You can return to monitoring by touching **Monitor** on screen 43 or 44.
- Touch **Mask from inspection** when the NG location is not to be monitored.
- When saving an NG image in the USB memory, touch **Save in USB Memory** on the **Save in USB Memory displayed.** (Manual setup for saving NG image is necessary on Screen 5.)

④-4. Monitoring Completion

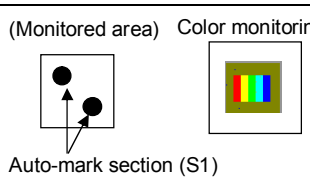
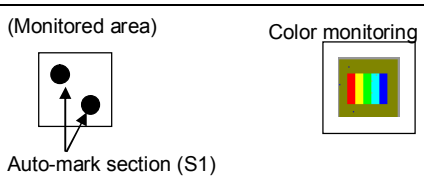
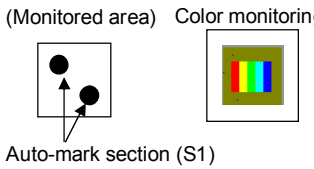
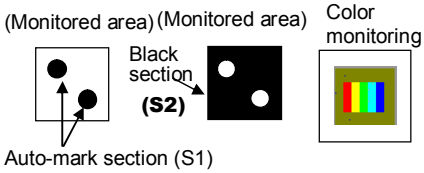
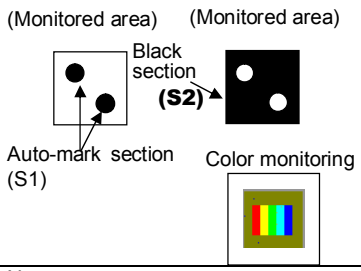
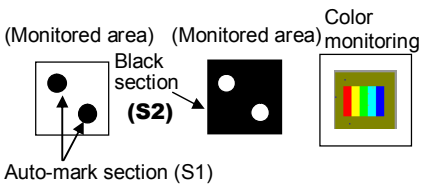
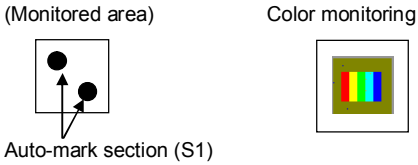
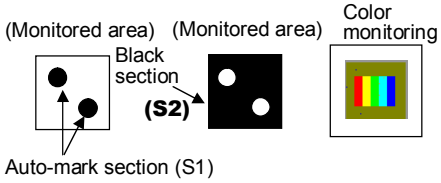
When monitoring is complete, after you touch **Menu**, you will be asked “Do you want to exit?” Select **Yes**.

Note: If a monitoring password is set, exit after entering the password.

[Examples of Combining Monitoring Methods: If Fine tuning is OFF]

Below are examples of combining monitoring methods for monitoring **areas** before and after a molded product is dropped.

The black dots represent monitoring locations. (Sensitivity settings for auto-mark section are monitored with **S1**, and other sections are monitored with **S2**.)

Setup preferences	Monitoring area before drop	Monitoring area after drop
Inspection 1: Auto mark Inspection 2: Auto mark		
Inspection 1: Auto mark Inspection 2: Whole area		
Inspection 1: Whole area Inspection 2: Whole area		
Inspection 1: OFF Inspection 2: Auto mark	None	
Inspection 1: OFF Inspection 2: Whole area	None	

Also, the settings can be changed to only do Inspection 1, with Inspection 2 Off.

Twenty areas, from area 1 to area 20 can be set as watch windows. Choose the most suitable combination.

In color monitoring, designate “1 - 100” for color sens. in the monitored area and execute monitoring with the camera for which the color is designated. In Inspection 1, a reference product geometry extracted by color comparison with reference image is compared with the product geometry extracted from Inspection

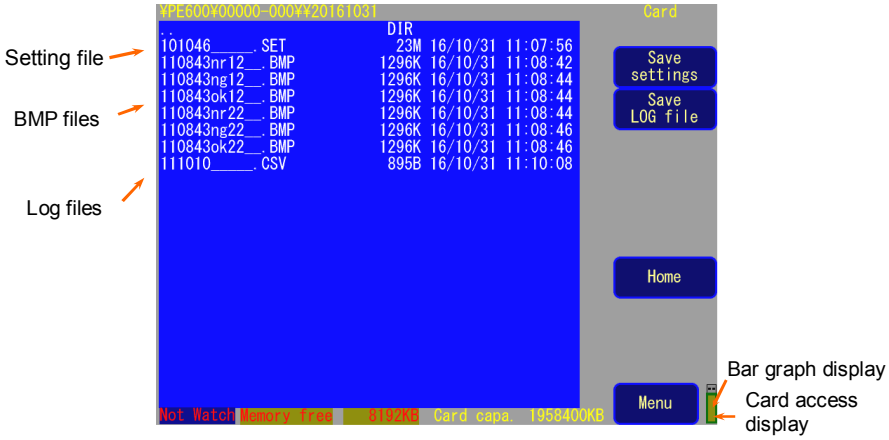
1 image. Similarly, in Inspection 2, inspection of residual resin on the tool surface is conducted.

2-9 How to Use USB memory

When a USB memory has been inserted, go to the USB Memory Screen (Screen 45) by selecting USB Memory from the Main Menu Screen (Screen 3).

(1) USB memory screen properties

(Screen 45) (If Setup, BMP, and Log files exist)

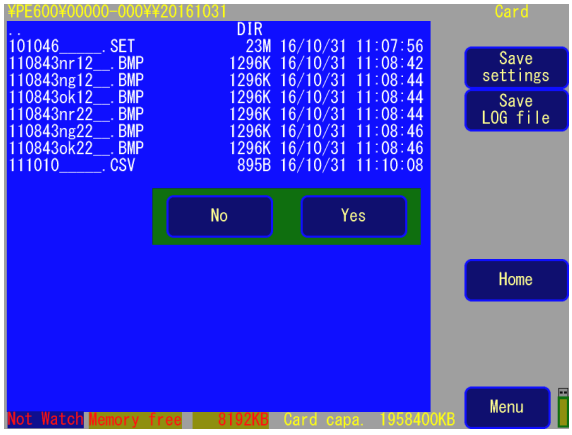


Note: The save directory of each file is /PE600/"8-digit device number (automatically set)" (Example: 59869-001).

(2) Save data in USB memory

If you directly touch **Save settings and Save Log file** on screen 45, **No and Yes** will be displayed (Screen 46). Touch **Yes** to save.

(Screen 46)



Explanation of **File Types** and **How to Save** in USB memory

Bar graph display	It is displayed when USB memory is inserted. Shows the total capacity and the capacity in use.
USB memory properties	While USB memory is being accessed, the red LED comes 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 explanation	**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 Screen, System Screen 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 explanation	**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 menu screen, 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 MNT (file)	Saves the MNT file (Maintenance file) in the USB memory.
MNT file explanation	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 ".MNT". (Example **:** 06095032_____.MNT)
BMP file explanation	**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 an inspection NG is detected. The filename includes YYMMDD:HHMMSS (Tool No.: 1 when not selected), Camera No.: Depends on type of monitoring.

[Log File Example]

(Device display screen example)	(Screen 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 tools (optional), the tool number is added before the camera number.

(Device display screen example)

101606095032ok112___.BMP
101606095032nr112___.BMP
101606095032ng112___.BMP

(Screen display contents explanation)

The meaning of each number and letter is explained below.

16: 2016 ,

0601: June 1

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

ok: Actual image just before NG (**nr**: actual image with NG removed, **ng**: actual image with NG)

1: Mold No. (Select Tool No. 1 or 2 when there are 2 tool specifications. 1 in case of standard specifications)

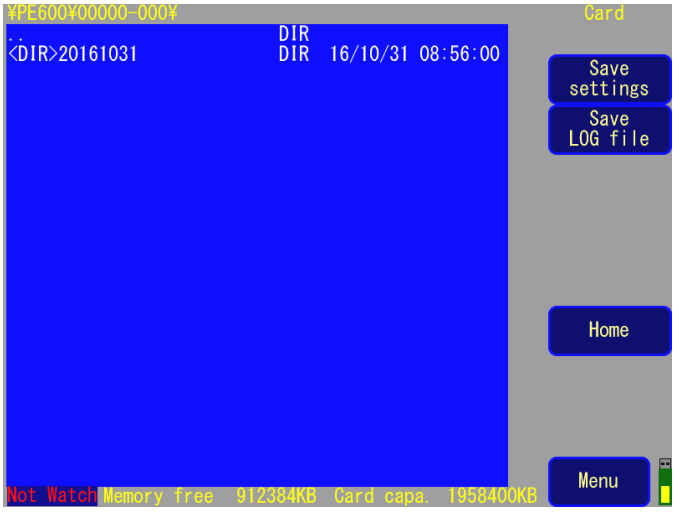
1: Camera 1 (**2**: Camera 2)

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

(3) How to manipulate files in USB memory

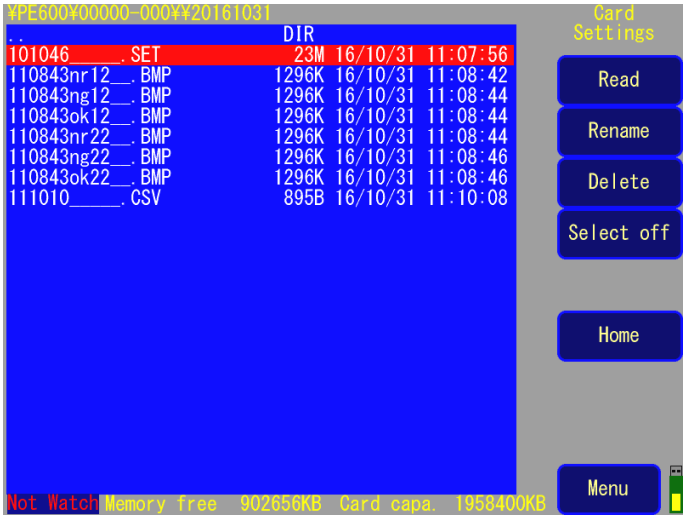
① If files are saved in the USB memory, touch the top left-hand side of Screen 47 in the following order: **<DIR> /→ Open → Yes, <DIR> PE600 → Open →Yes**. Next, touch in the following order: **<DIR> Device No. → Open → Yes**. The file list will be displayed. (Screen 48)

(Screen 47) Selection of Saved File 1



② When you select a file (displayed in red) on the USB memory screen, **Read, Rename and Delete** are displayed.

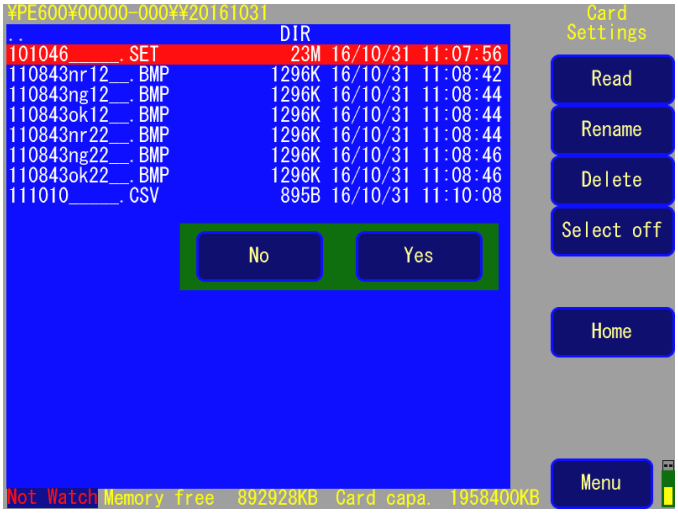
(Screen 48) Selection of Saved File 2



③ Read, rename, or delete a file.

Touch directly on **Read, Rename, or Delete**, and press **Yes**. (Screen 49)

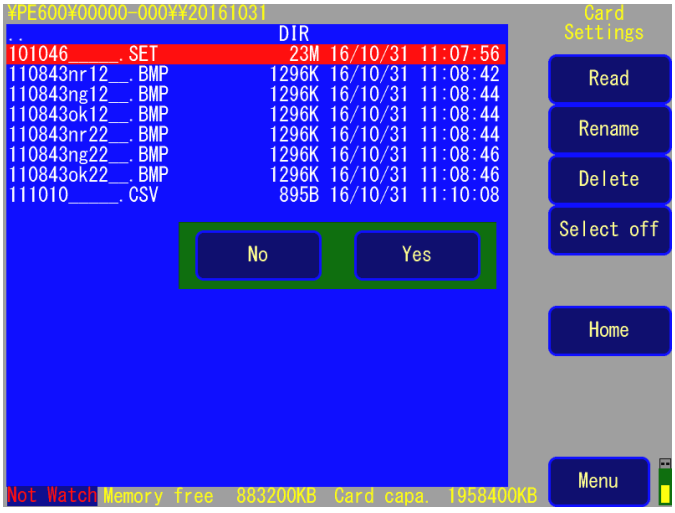
(Screen 49) Selection of File Operation



(4) Rename File

To rename the file, directly touch the filename and press **Yes** (Screen 50). A keyboard for renaming the file will be displayed (Screen 51). Directly touch the letters to enter a new filename, and finally press **ENT**.

(Screen 50) Selection of File to be Renamed



(Screen 51) Input the new name of the file

2-10 How to Display the Log

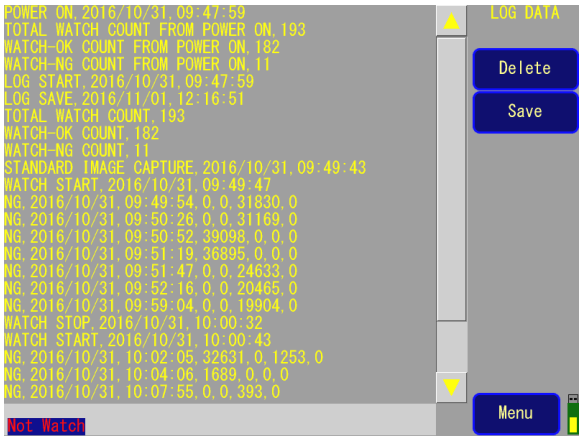
Select Log on the Main Menu Screen (Screen 3) to display the **Log Screen** like that shown on page 46 or Screen 52. The Log data is **a device operation record, including NG information saved in the device memory.**

1 How to operate

Delete	Deletes the log data.
Save	Saves the log data generated until now.
Menu	Returns to the Main Menu Screen.

*The saved log information can be transferred to USB memory if such memory has been inserted.

(Screen 52) Log Data Display



2-11 Camera Connection

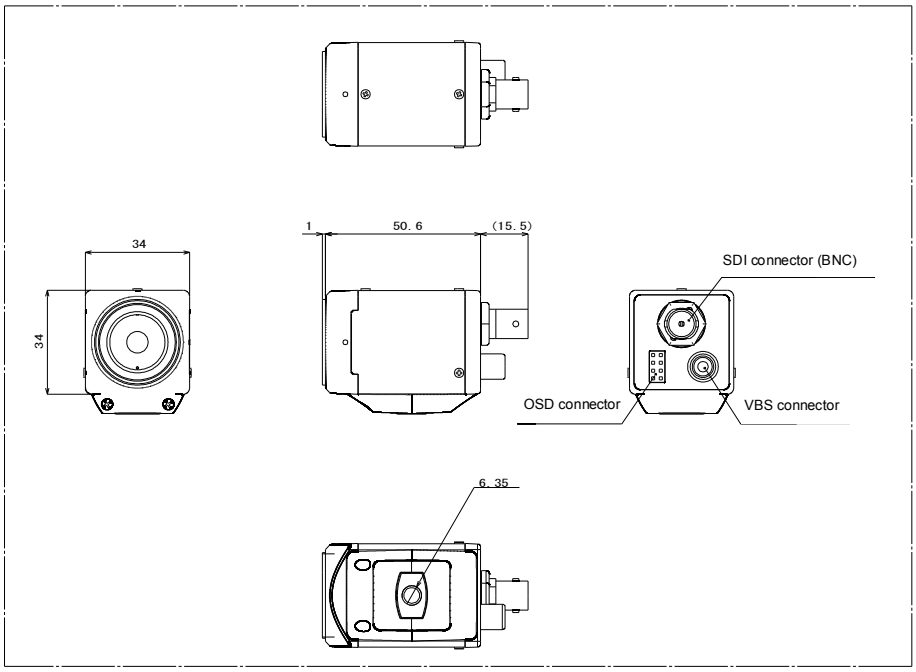
When connecting a camera to the main unit of PE600, always connect a camera cable to an SDI connector (BNC) before turning on the power. Because the camera connection is detected before power is turned on, connection or disconnection of camera cable after the power input should be avoided as it can cause a failure.

Once a camera is detected, camera power (CD12V) is supplied to each camera.

If DVR (option) is used, the image signal output from the VBS connector of the camera is transmitted to the DVR Ch1 - Ch2 video input connector with an RCA-BNC cable.

The next illustration shows the camera's appearance. To prevent dust from entering, a seal is attached to the OSD connector. Do not remove the seal when the product is in use. A dust-proof cap is fitted on VBS connector. If DVR is not used, keep the cap on in use.

(Camera appearance illustration)

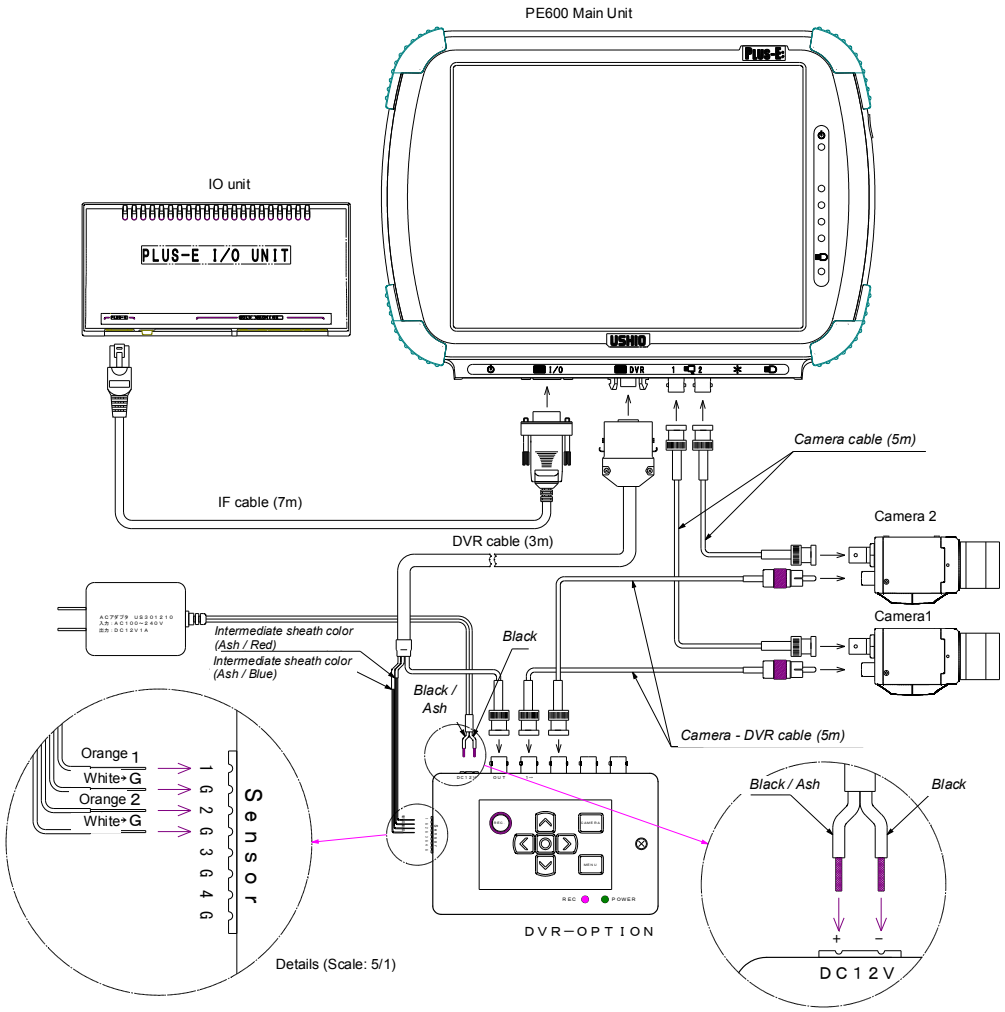


2-12 Connection with DVR (Option)

DVR (Option) allows automatic recording of several seconds (depending on the set point) before and after an NG event in a CF card by using an NG signal for tool monitoring (Camera 1: NG1 and Camera 2: NG2) as an event signal. The color monitor of the main unit of PE600 is used for DVR display, and it supports setup and operation with the OSD method, allowing you to monitor the record status and reproduced motion pictures. See the Manual delivered with the DVR for details.

Connection with the main unit is indicated in the following figure. An NTSC signal is directly transmitted to the DVR video input connector (Camera 1: VIDEO1, Camera 2: VIDEO2) from the VBS connector of the camera. Connection of the main unit of PE600 and DVR is conducted by using a DVR cable. Because the DVR side is divided into monitor output (BNC connector) and sensor input (Clamp type terminal block), connect them with each counterpart. (NG1: SENSOR1, NG2: SENSOR2)

(DVR connection diagram)


PE600 Main Unit
IO unit
PLUS-E I/O UNIT
USHIO
I/O
DVR
IF cable (7m)
DVR cable (3m)
Camera cable (5m)
Camera 2
Camera1
Intermediate sheath color
(Ash / Red)
Intermediate sheath color
(Ash / Blue)
Black
Black /
Ash
Camera - DVR cable (5m)
Orange 1
White+G
Orange 2
White+G
1 G 2 G 3 G 4 G
Sensor
Details (Scale: 5/1)
DVR−OPTION
Black / Ash
Black
+
−
DC12V

- DVR replay operation procedure

  With regard to event recording in DVR, 5 seconds before and after an NG event is recorded as external sensor recording by connecting an external sensor input with an external alarm output of the monitoring system. DVR operation is confirmed by using the LCD monitor of the monitoring system. Remove the DVR upper face cover to enable OSD keypad operation.

1. DVR Screen Display

   Display the DVR screen by touching Properties and DVR on the PE-600 screen being monitored.

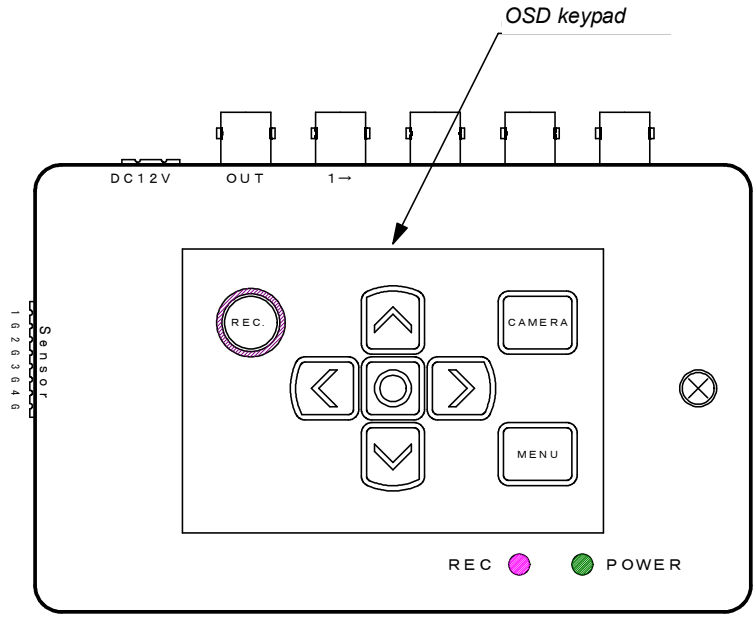
2. Read out monitor screen...Operation with OSD keypad of DVR.

   Display camera image (1/4) from MENU. A full image of each camera can be displayed with CAMERA.

3. DVR replay operation procedure...Operation with OSD keypad of DVR.

   Operate keys in the order of → O ← on Camera Image Properties to display the Event Search Screen. By using the up and down arrows ↑ ↓, indicate the start of event to replay. After doing this, use the O key to start replay. It returns to camera image from MENU.

(DVR upper surface drawing)



Chapter 3 Device Specifications

3-1 Device Specifications

① **Power Source**

DC24V, 1A is supplied to I/O unit from the molding machine. After conversion to DC12V in the I/O unit, power is supplied to the main unit through an IF connector.

② **Weight and Dimensions**

Weight: Approx. 1.4 kg

Dimensions: 298 × 210 × 49 mm or less (excluding projections)

③ **LCD (With Touch Panel)**

10.4 type x GA color LCD **+ Touch Panel**

Dot number 800 × 600 (XGA TFT Color LCD 10.4 type)

④ **Clock**

Time stability: ±60 s/month 25°C ± 5°C

Backup battery: Lithium battery (BR2032: made by Matsushita Electric)

Lifetime: 5 years

⑤ **USB memory specification**

USB memory

Power voltage: 3.3 V

⑥ **IF Connector**

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

Unit system power supply: DC12V 1A

⑦ **Camera 1, Camera 2 connectors**

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

HD-SDI input, camera power superposition

Resolution (RGBY): 1920 (H), 1070 (V)

Frame rate: 60 cycles/sec

⑧ **DVR connector**

Connector: MR-8RFA+, made by HTK

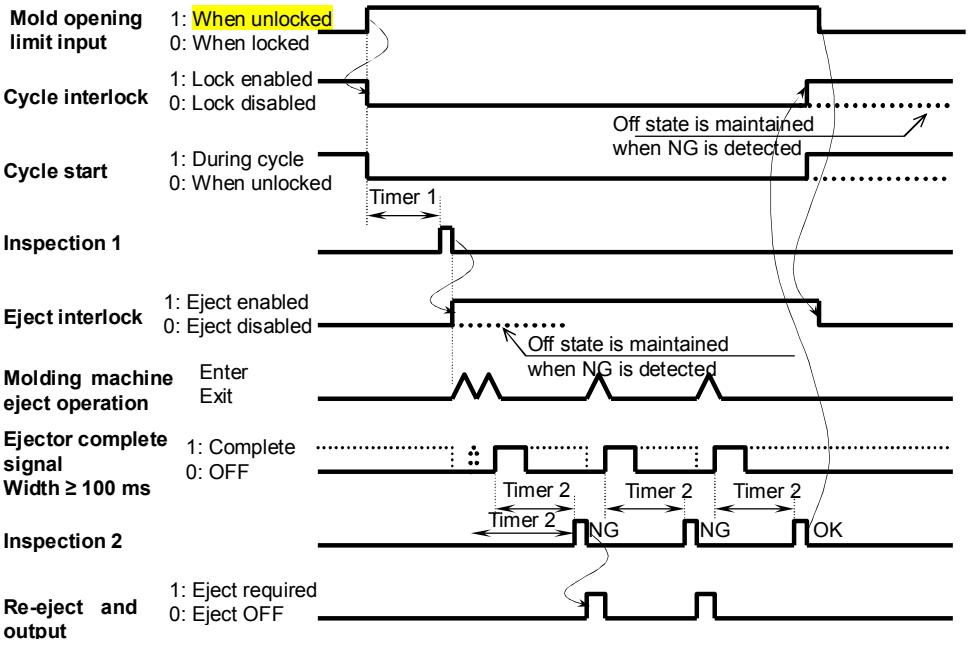
NTSC video input (OSD operation display and DVR motion picture are displayed on the LCD screen of the main unit) and 2-system NG output (NG output for Camera 1 / NG output for Camera 2) are connected to DVR “Sensor Input” to use it as trigger signal for motion picture recording.

⑨ **DMX connector**

Connector: Modular 11 type…..TM11R-5C-66(50), made by Hirose Electric

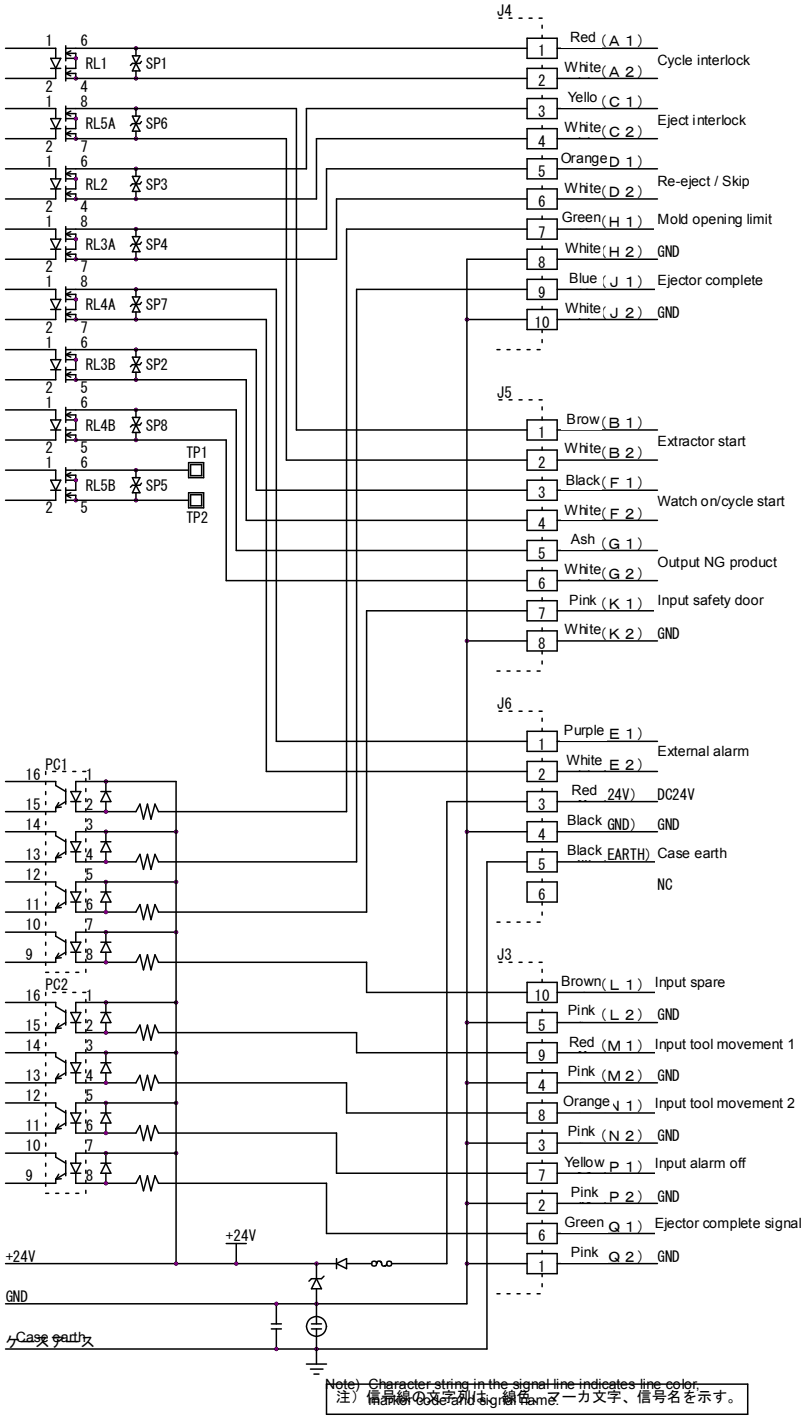
DMX dimming output to dimming LED lamp

3-2 Time Chart



コメント [A2]: 図の左から 2 列目の 1 番上のボックス（ハイライト箇所）について、参考資料では「１：型開中」の訳が「1: When locked」となっています。
（しかし、その他の箇所では「When unlocked」が使用されています。）
今回は原文の日本語に従い「1: When unlocked」としています。

3-3 Interface circuit



Chapter 4 Warranty Conditions Document

4-1 Warranty Conditions

This product has passed a stringent product inspection by our company. In the event of a failure under normal usage by the customer within one year from the date of installation or arrival at your company, we will repair the failed location in accordance with these warranty conditions. 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 a 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 our company.
5. Failure caused due to installation which was not done by our company, nor by a party specified by our company.
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 our company.
7. Repair, adjustment or improvement not done by our company.
8. When the tool is transferred or relocated without contacting our company.
9. Failure caused by use under special conditions or environments.
10. Failure caused by improper construction equipment or lack of maintenance.

USHIO

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