

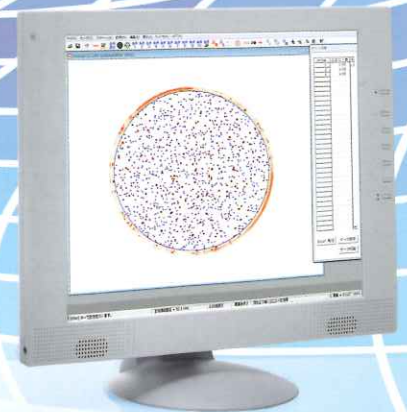
Accurately and instantly measures  
the number of colonies in a sample



*PSF-1100*



*PSF-2100*



# Automatic Colony Counter

**The World Latest Automatic Colony Counter**

# Improve your work efficiency with problem solutions.

Our Colony Counter solves these problems

Problem

1

**Manual counting methods take time and also there is huge quantities of specimen.**

- Manual counting takes too much time and delays other operations.
- Counting operation causes stiff neck and shoulders.

Problem

2

**Measuring method is not consistent due to visual measurement.**

- Accurate measurement is hard when in measuring coliform bacteria bigger than 0.5mm.
- Due to physical condition of the day, it may be possible to miss small colonies.

Problem

3

**Accurate measurement decreases when in measuring a widespread colony.**

- There might be possibly existing beneath the widespread colonies on the surface of pouring culture medium, however it counts as single colony.

Problem

4

**Existing measuring devices is unable to measure separately in terms of various color case.**

- In terms of manual counting, it uses different color marker to count, however this makes less work efficiency.

**10 minutes manual counting method makes just *5 seconds.***

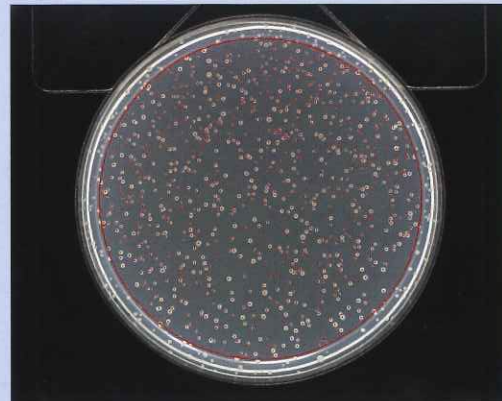
It may differ depending on the number and kind of the colonies.

## | What is the Automatic Colony Counter.

A device that enables to count immediately the number of colonies in a designated area.



▶ Original image

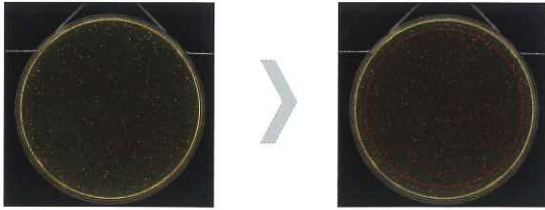


▶ Measured image

# Automatic Colony Counter will solve various problems.

## Manual counting methods take time and also there is huge quantities of specimen.

**1** Problem solution  
In case of more than 300 colonies in one petri dish, it takes 5 minutes by manual measurement, but it takes only 3 seconds by automatic measurement.

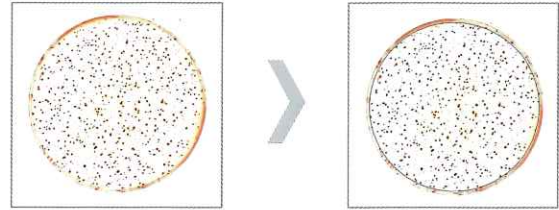


### Reason

High speed image processing makes quick operation. Without fatigue, it enables to complete with one single person even many specimen case.

## Measuring method is not consistent due to visual measurement.

**2** Problem solution  
Individual measurement with fixed size of colonies makes stable and consistent measurement.



### Reason

The area calculation of each colonies enabled to measure individually only designated diameter. As long as culture medium thickness is fixed, it enabled to measure only designated colony by fixed binary coefficient.

## Accurate measurement decreases when in measuring a widespread colony.

**3** Problem solution  
It measures only the area measured accurately and enables CFU conversion.

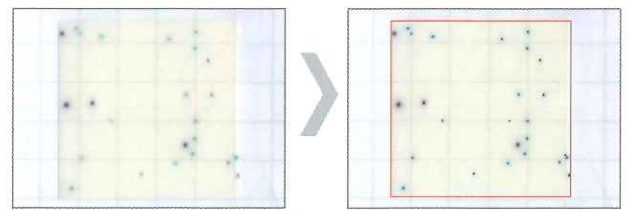


### Reason

In terms of automatic measurement, widespread colonies can be excluded automatically from measurement objects. Measurable areas are automatically calculated and it enables accurate CFU conversion.

## Existing measuring devices is unable to measure separately in terms of various color case.

**4** Problem solution  
Max 4 kinds of colonies can be measured individually. For example, "separate by 4 different colors", "separate by 2 different colors and sizes", "separate by different colors and brightness". it is possible to set conditions appropriately up to culture medium and colonies.



### Reason

This devices is equipped with color camera. Setting can be done easily by simple clicking the measurement objects on the display.

## We provide solution about further problems below.

Problems	Solutions
1 Various shape of colonies is possible to measure automatically?	Colonies are selected by the brightness and their color information, therefore it does not matter for the shape.
2 Colonies with residue are possible to measure?	As long as colonies and residues size are different, it is possible to measure.
3 Various size of colonies is possible to measure automatically?	It is possible to measure by expanding measurement area.
4 Very tiny and thin colonies are possible to measure?	It is possible to measure all as colony, for instance, brighter objects than culture medium.
5 Colonies are big and sticking together, then is it possible to measure under this condition?	It is possible to measure separately by overlap differentiation function.
6 Is it possible to compare visual measuring result and the result of automatic one.	It is possible to measure petri dishes marked with a pen by visual measurement.

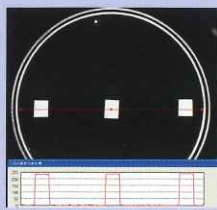
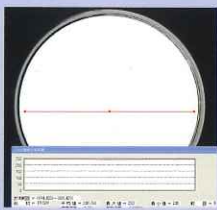
# It enables accurate measurement even culture media with unclear colonies or uneven thickness.

## Uniform light source solves slight difference between culture medium and colonies.

### Necessity of uniform light source over the whole petri dish.

In order to measure accurately, it is necessary to have hardware with even light source and adjustment by software even culture medium has uneven conditions. Uniform light source can be performed both hardware and software aspects.

High accurate measurement can be achieved by calibrating brightness of culture medium which has uneven thickness.



Even light source in 90 φ Petri dish exposed to both bright field and dark field.

Brightness graph in bright field and dark field.

Normal



Inclination can be seen on the background image with monochrome conversion.

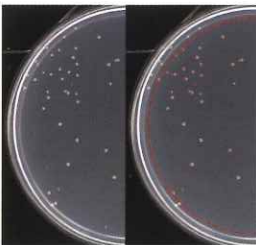
After calibration



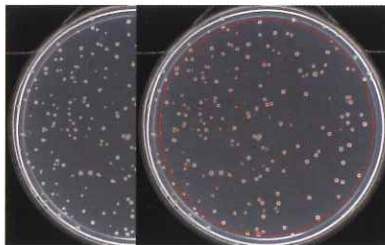
Background of monochrome image with calibration can be processed by software.

## Counting accuracy of colonies with different quantities

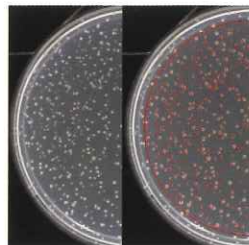
Colonies with approx. 50 units



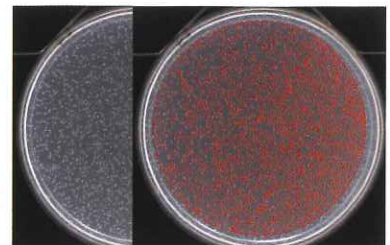
Colonies with approx. 200 units



Colonies with approx. 1000 units



Colonies with approx. 4000 units

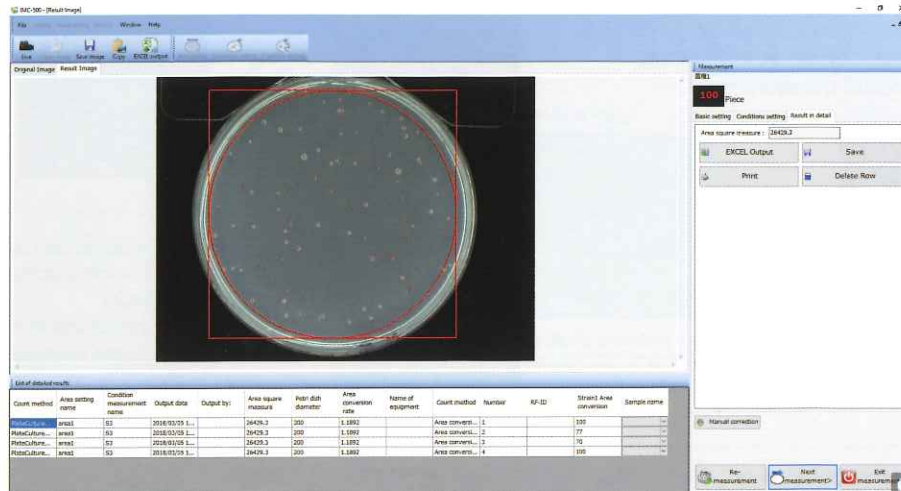


Under the same measurement condition, accurate counting can be achieved regardless of colony quantities.

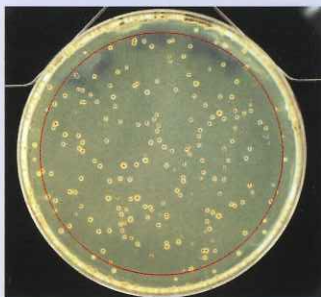
Moreover, accurate counting can be achieved even if there is residue or a sedimentation.



# High accurate counting can be achieved with various colony quantities



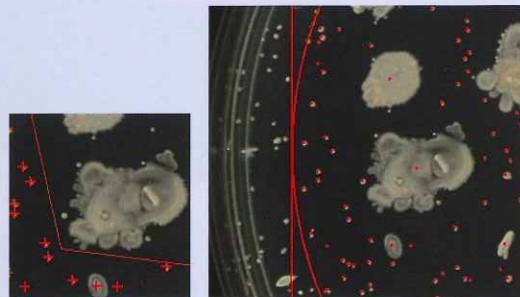
## Measurement functions when there is a residue or a sediment



Measured by the difference of the feature between colonies and others.

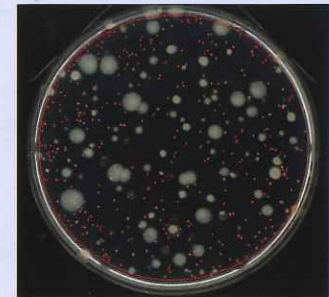
It is possible to measure if there is a difference in size, brightness or color between the colonies and residues or sediments.

## Automatic delete function for a widespread colony



Unclear part can be removed your designated area by PC's mouse. Removed part would be converted into area correction.

## Manual adjustment for measurement result



Automatic calculation with manual adjustment

1. Specify the size and range of target colony.
2. Area that needs to be checked by human can be added or deleted by manual mode. Combination of automatic and manual is possible.

## Measuring result can be displayed or transferred to Excel file.

In a default setting, Petri Dish No, the number of colonies and the measurement area will be displayed on a software. Measuring result can be transformed to Excel sheet or CSV file.

Count method	Area setting name	Condition measurement name	Output date	Output by:	Area square measure	Petri dish diameter	Area conversion rate	Name of equipment	Count method	Number	RF-ID	Stratified Area conversion	Sample name
PlateCulture...	area1	S3	2018/03/05 1...		26429.3	200	1.1892	Area convers...	1	100			
PlateCulture...	area1	S3	2018/03/05 1...		26429.3	200	1.1892	Area convers...	2	77			
PlateCulture...	area1	S3	2018/03/05 1...		26429.3	200	1.1892	Area convers...	3	76			
PlateCulture...	area1	S3	2018/03/05 1...		26429.3	200	1.1892	Area convers...	4	100			

Display on the software

Export to Excel file

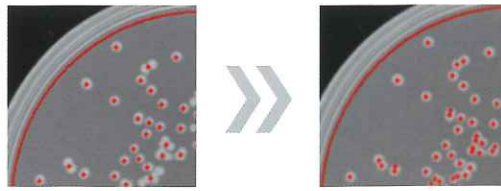
Colony Counter Inspection Report												
Date	2018/3/5 15:11		Name of equipment					Approval			Create	
Output by:			Count method	Plate culture medium								
Area square measure	26429.3		Petri dish diameter	200								
Area Conversion Rate	118.92		Count method	Area conversion								
Number	Strain 1	Strain 2	Strain 3	Strain 4	CFU/ml	Condition measurement	Sample name	Image link				
1	100	0	0	0	1	1	0.00 × 10 <sup>0</sup>	S3				
2	77	0	0	0	1	1	0.00 × 10 <sup>0</sup>	S3				
3	70	0	0	0	1	1	0.00 × 10 <sup>0</sup>	S3				
4	100	0	0	0	1	1	0.00 × 10 <sup>0</sup>	S3				

Display in Excel Data File

# Standard software can be managed various kind of specimen like circle, rectangle and spiral type.

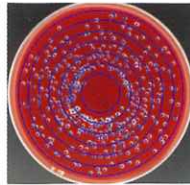
## Overlap differentiation function

Overlapping colonies can be automatically separated for individual measurement.



## Measurement on spiral plate

Standard software includes spiral plate measurement.



Any kind of spiral plater can be used by changing the area freely and it corresponds to 2 patterns (Ring type and Spiral type).

A ring type can output the number of colonies and spiral type can output cumulated colony within measurable area.

## Adjustment function for uneven brightness

Even if the thickness of culture medium is not uniform, the brightness can be adjusted and measured with high accuracy.



Image of uneven thickness



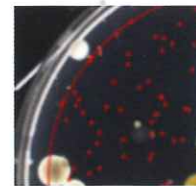
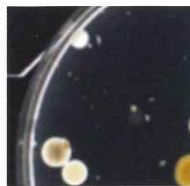
Simple binarized image



Image of adjustment function

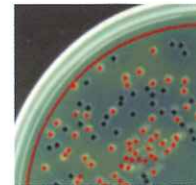
## Selective counting function by size

Due to selective counting function by size, it enables to count after removing scattered colonies.



## Separate measurement by color extraction

Up to four colors of colonies can be measured separately.



## Software

Functions	Common features of PSF-1100/ PSF-2100
Measurement result indicator	Bacteria Colony: Number of colony, measurement area
Binarization methods selection	Manual binarization, Binarization by color extraction
Preprocessing for binarization	Adjustment of uneven brightness (in case of uneven thickness of culture medium)
Offset	Offset of binarized colony
Selection by size (Options available)	Decide the range of target colony depending on size
Overlap differentiation	Automatically separate and measure overlapping colonies
Save process	Save process for each colony specimen recipe
Manual deletion function	Manually designated area deletion of colonies or dimension by a mouse
Manual calibration measurement	After automatic counting, it enables to calibrate manually adding or removing
Image saving	Original image, image with counting marks
Spiral plate counting	Counts the number of colonies on spiral plate
Data output/ saving	Output to Excel sheet/ save in a CSV format
Recalculation	Recalculation by retrieving saved images
Regular inspection function	For validation of the equipment, manual calibration is not allowed in the measurement

# Japan's top Automatic Colony Counter with wide variety of measurement cases.

## General viable bacteria

General viable bacteria cultured on agar media. All colonies in the measurement area were counted.

▶ Original image



Agar media, general viable bacteria



▶ Measured image



All colonies in the measurement area were counted. Image is without manual correction

## Lactic bacteria

▶ Original image



All colony counting with a petri dish cover. If condensation laminates as a small mist, it enables to measure with cover.



▶ Measured image



## Mutagen testing (Ames)

Even if the number of colonies increase or decreases by dilution, it enables to count accurately on the same setting regardless of the number of colonies.

▶ Original image



▶ Measured image



## Food industry and food distribution industry

▶ Original image



▶ Measured image

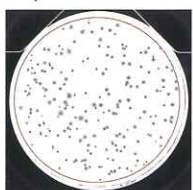


A measurement of general viable bacteria. All colonies in the measurement area were counted.

## Pharmaceutical industry

It enables to measure colonies, inhabitation zones in one device.

Plaque



Inhabitation zone measurement



Optional software is required for inhabitation zone measurement.

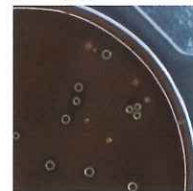
## Specimen examples for each machines

Compares to PSF-1100, PSF-2100 can shoot sharper image with high contrast of colonies and culture media, therefore it can enhance measurement accuracy of tiny colonies.

Image of PSF-1100 type with top light



Image of PSF-2100 type with top light



Due to clearer image of PSF-2100, it enables to enhance measurement accuracy for thin colony or same color colonies.

## Water Analysis industry

Desoxycholate medium, Original image of coliform bacteria

▶ Original image



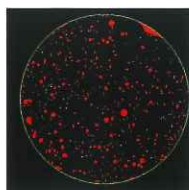
Desoxycholate medium, Original image of coliform bacteria



▶ Measured image



Desoxycholate coliform bacteria colonies. Measured image larger than 0.5mm



Selected image in setting condition. The area marked color is the colonies larger than 0.5mm.

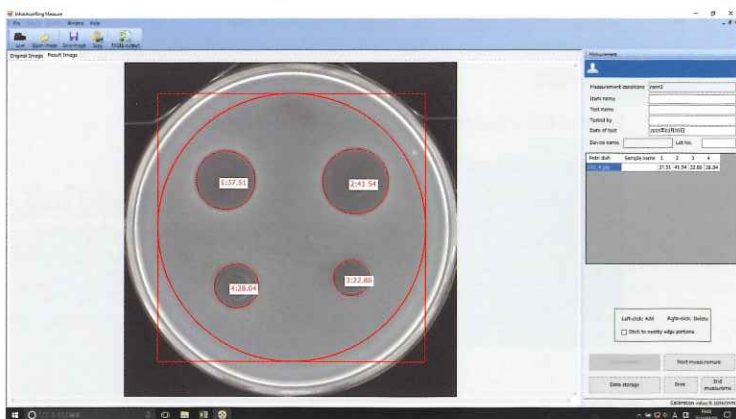
Hardware



	PSF-2100	PSF-1100
Dimensions of main unit	Approx. W280×D351×H630	
Weight	Approx. 19kg	
Power Source	AC 1φ 100-240V 50/60Hz	
System configuration	Main Unit, (PC and Monitor are sold separately)	
Operating environment	10-35°C, 20-80% humidity	
Camera Resolution	5.0- megapixel CMOS	3.0- megapixel CMOS
Specification of camera	Color camera	
Measurement object	Viable bacteria colonies on a petri dish	
Size of petri dish	90 mm diameter or less	
Measurement size	0.1 mm per 90 mm-viewing field	
Measurement time	Approx. 1 to 3 seconds per petri dish	
Maximum number of colonies	Approx. 8000 viable bacteria colonies	
Lighting method	Dark field, bright field, top light	

Option

Inhabitation Zone Measurement Software



Safety Precaution

- Make sure to read the instruction manual carefully before use.
- Specifications and appearance of products may change due to further improvement without prior notice.
- The actual color of the product may be slightly different from the printed picture in this brochure.

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Sales Distributor