OPTEX FA

Control FR S.A. de C.V.

Controller with touch panel display
MVS-DN

Color pattern matching camera unit
MVS-PM

Measurement camera unit
MVS-EM

Color OCR camera unit
MVS-OCR

Simple Touchscreen Operation
MVS-DN

Supports Up To Three Cameras!
Each Camera Has The Vision Processor Built-in
MVS-PM / MVS-EM / MVS-OCR

DIGITAL CCD VISION SENSOR
Color

CE

MULTI CAMERA

Multiple cameras for multiple inspections
Up to three Cameras can be connected to one controller

High Performance at a Low Cost! A separate controller is not required for each camera, one controller is able to support three cameras!

Each camera has a built-in vision processor that independently processes the image. The response time does not change if one, two or three cameras are used.

MVS SERIES LINE UP

PM MVS-PM
Color pattern matching camera unit

Using advanced technology, it is possible to inspect objects fast and reliably.
Objects can be inspected for Color, Color and Shape, Blob/Stain, Contour, Differentiation of picture, etc.

Direction of electronic parts   Quality of labeling   Page order of print

EM MVS-EM
Measurement camera unit

Reliable measurement of length and/or edge count.
Measure the distance between edges, measure the pitch of pins, count edges, etc.

Positioning of printed circuit board   Shape of condenser   Shape of parts for automobile
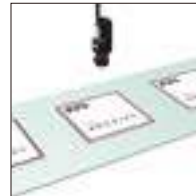
OCR MVS-OCR
Color OCR camera unit

Inspection of Date, Time and Text.
Verification of Expiration date, Time stamp, Lot number or text.

Shelf life of confection   Lot number of labels   Type mark of parts for automobile

MVS-DN
Controller

Connect up to three cameras.
Touchscreen operation.
USB and RS232 interface.
10 key data entry.
Onboard Lighting control.

Backlit buttons show which are active to assist in Setup and Adjustment.
Help functions can be accessed at any time by pressing the " ? " button.

Advanced Technology
High speed vision processing and cost savings

PM EM OCR Original LSI with CPU integrated
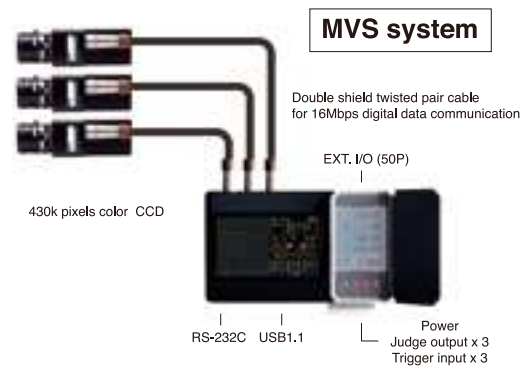### Eco-Engine: OPTimum CPU Ver.5

The MVS features an Optex original design LSI with CPU integrated, we were able to integrate the vision process engine into the camera unit. This solution provides high speed image processing and accurate inspection for a variety of applications. Each camera processes the image internally and transmits the result to the controller.

PM EM OCR No change in response speed when operating multiple cameras
Three Cameras inspect independently

We utilized a new technology in the MVS that features low heat generation and low power dissipation. This concept was originally developed for the CVS series as an all-in-one design, the same technique was carried over to the MVS.
There is no change in the response time when multiple cameras are used. The all-in-one design allows the camera to operate independent from the controller.

MVS system

Double shield twisted pair cable
for 16Mbps digital data communication

EXT. I/O (50P)

430k pixels color CCD

RS-232C USB1.1 Power
Judge output x 3
Trigger input x 3

PM EM OCR Integrated system technology
High Performance, Easy Installation and Low Cost

The controller has a built-in touchscreen interface, full color display and ten-key input panel. A power supply for control of the external lighting is also integrated into the controller. Simply connect the cameras and lights to the controller. There is no need for a console, external monitor or a separate power supply for lighting.

Camera

Controller

PM EM OCR Support is available from LED lighting to training

Lighting is the single most important factor to capturing a good quality image for inspection.
Optex FA offers a complete selection of lighting options. We can provide customer support for the selection of lighting, lenses, and training.

3

PM **EM** Up to 16 inspections can be done at the same time with one Camera
## 16 Inspection windows are available for each Camera

Each Camera can have a maximum of 16 inspection windows in one Bank of memory. Each inspection window can be set to inspect a different feature based on 6 inspection functions. The Inspection judgment output for each inspection window can be output through the 50 pin I/O connector.

OCR Up to 4 inspection windows

The parameters for each inspection window can be individually set.
Up to 2 Forms of each Date and Time are available for one window and up to 4 Forms of strings are available (max. total of 4 Forms).
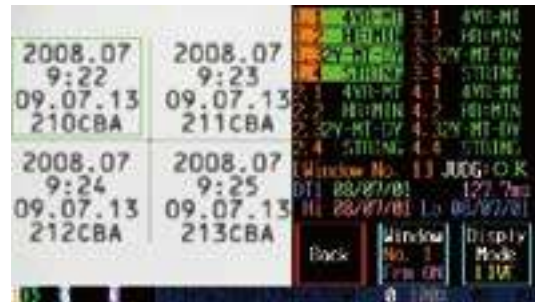
PM **EM** **OCR** Quick change over
32 Banks are available for one Camera

You can remotely select the bank to use by using a controller, PLC or the RS-232C I/F. The setup parameters for each bank are stored in memory and can be recalled when the product is run again.

PM **EM** **OCR** Lighting control without the need of a separate power supply
Controller has LED lighting control built in

Support for a total of three LED lights (12VDC, 24W total) is available.
The output connector for the power source is a quick connect/disconnect type.
The intensity level for each light can be adjusted separately.

STABLE OPERATION

For stable inspection and better process yield
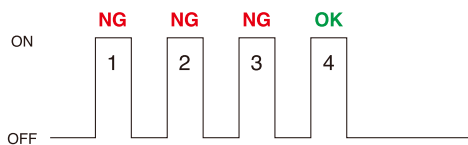## 5 functions are available

Continuous capture

When the camera checks the image it will automatically check up to 5 (EM) or 6 images (PM/OCR), looking for a good reading. This insures stable operation if the trigger is not stable or the position of the object changes slightly. If the result is found to be OK the inspection will stop prior to reaching the maximum number of inspections.

PM EM
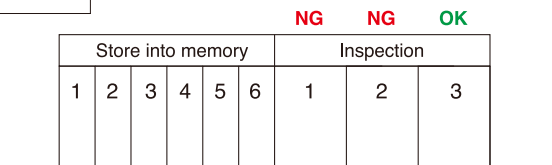
Trigger

ON

OFF

Inspection

NG NG NG OK

ON

1 2 3 4

OFF

OCR

Trigger

ON

OFF

Process

NG NG OK

Store into memory | Inspection

1 2 3 4 5 6 | 1 2 3

PM EM OCR Variable shutter speed

When the camera is checking the image using the Continuous Capture feature the shutter speed will automatically be adjusted up to +36% ~ -24%. This compensates for changes in the lighting.

PM EM OCR Search function

The image is searched not only in the X and Y direction but it also can be rotated up to +/- 180 degrees (PM/OCR) or +/- 45 degrees (EM). This is useful when the position or orientation of the object changes.

PM Scaling up/down

When the camera is checking the image using the Continuous Capture feature the image will automatically be scaled Up/Down by up to +/- 6%. This compensates for changes in the distance between the camera and object.

PM OCR Dark Compensation

For reliable inspection of color, the hue of each pixel is calculated. This function insures that captured images are stable even with variations in lighting or when the distance to the target changes.

When the light is from the top

The MVS calculates the hue of each pixel so it can get a homogenous color for each pixel. Regular vision sensors simply adjust the brightness so the upper part is brighter than the lower part.

| MVS series	regular vision sensor
light	
Original Modified	
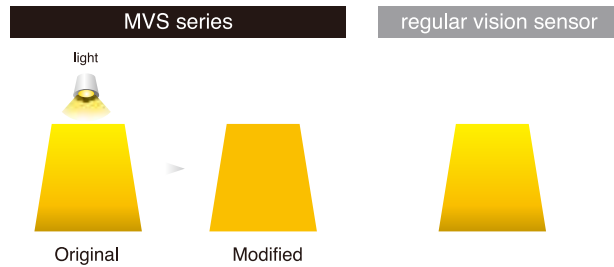
When a bright ambient light is present

The MVS can get a homogenous color for each pixel even if the object has an area which is brighter due to external ambient light.

MVS series	regular vision sensor
Original Modified	
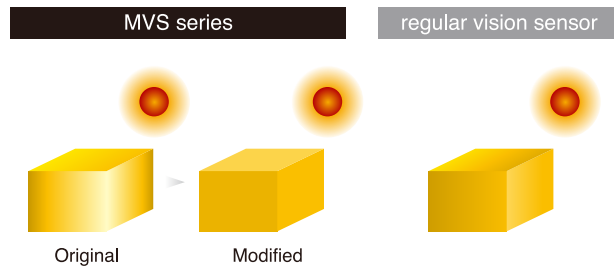
When the distance varies

The Dark Compensation function is effective when the object distance varies and its brightness changes.

MVS series	regular vision sensor
Original Modified	Available when specify the point to adjust
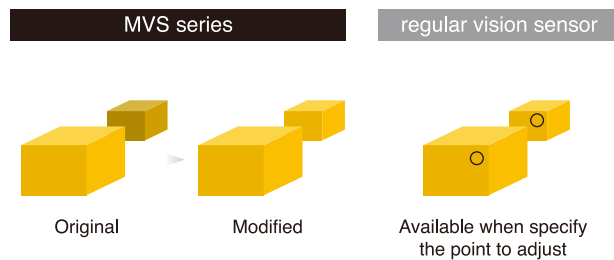
When the object is glossy

The Dark Compensation function helps to reduce bright spots on glossy surfaces.

MVS series	regular vision sensor
Original Modified	
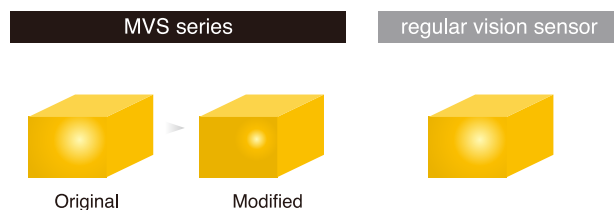
EASY SETUP

Simply follow the explanation on the display!
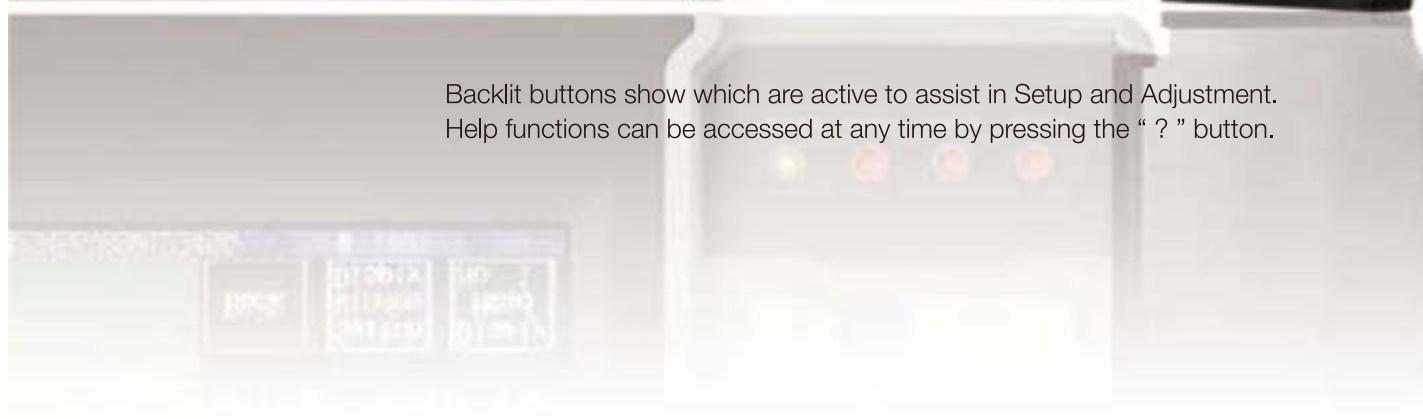**Fast and Easy "SETUP Menu"**

Concept : No operating manual required

button leads you to the SETUP menu where each step is clearly described.

Backlit buttons show which are active to assist in Setup and Adjustment.
Help functions can be accessed at any time by pressing the " ? " button.

CONTROL FR, S.A. DE CV.   E-FAX. (55) 5440-6185   E-Mail. ventas@controlfr.com   Web Site. http://www.controlfr.com

1. Touch [Setup] button

2. Select "Bank" and "Trigger mode"

3. Adjust shutter speed

4. Adjust brightness and direction of the image

5. Storing captured image

6. Select Color mode or Black and White mode

7. Determine search area and its function

8. Setup inspection windows

9. Setup inspection function

Select function from
Stain/Color Area/Full Color/Differential/Contour/Color Shape

10. Touch [Finish] to exit setup menu

MVS-PM INSPECTION MODE

Inspection for Color, Flaw, Blob, Shape, etc.
6 inspection modes are available

Stain

The camera compares the differential ratio of the stored master image with the differential result of the target image to determine the Stain value.
When this value exceeds the upper limit or is less than the lower limit, it is defined as NG.
This is used to detect the presence of stain (flaws) on the surface of metal objects or defects in plastic materials.

OK (label present)
processed

Differential   Original

NG (no label)
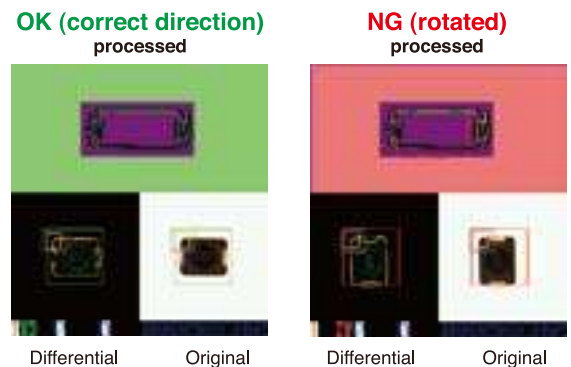processed

Differential   Original
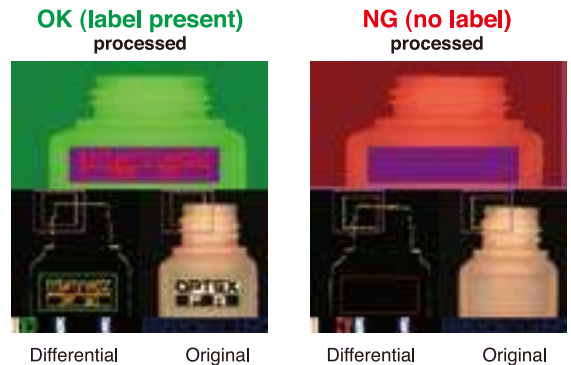
Contour

The camera compares the contour of the stored differential master image with the contour of the target object. It counts the number of pixels that do not match the Target contour to determine the Contour value (Lack of pixels). It counts the number of pixels outside of the Target contour area (background) which have the selected color to determine the Stain value.
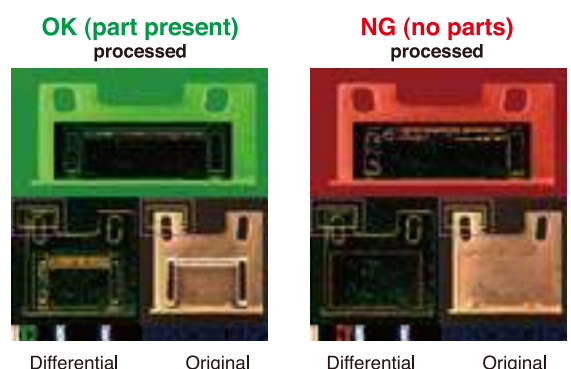If either value exceeds the threshold, it is defined as NG.
This function is used when the contrast of the target object is high and inspecting the contour produces a more accurate result.

OK (correct direction)
processed

Differential   Original

NG (rotated)
processed

Differential   Original

Differential

The camera compares the stored differential master image with the target object. If the difference exceeds the threshold it is defined as NG.
This function is used to inspect metal parts with uneven lighting. It is not good for detecting color or its depth.

OK (part present)
processed

Differential   Original

NG (no parts)
processed

Differential   Original

CONTROL FR, S.A. DE CV.   E-FAX. (55) 5440-6185   E-Mail. ventas@controlfr.com   Web Site. http://www.controlfr.com

Color Shape

The camera inspects the shape of the area that contains the selected color.
It counts the number of pixels that have a different color in this area to determine the Contour value (Lack of pixels).
It counts the number of pixels outside of the area (background) which have the selected color to determine the Stain value.
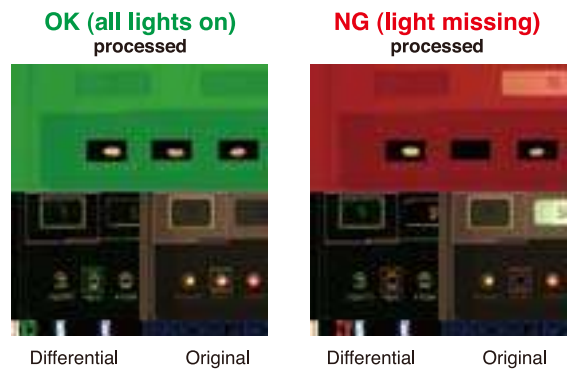If either value exceeds the threshold, it is defined as NG.
This is used when the target color is close to the background and is difficult to inspect by its contour or differential image.
This is not good for checking black and white objects.

OK (matches)
processed

Differential   Original

NG (corner missing)
processed

Differential   Original
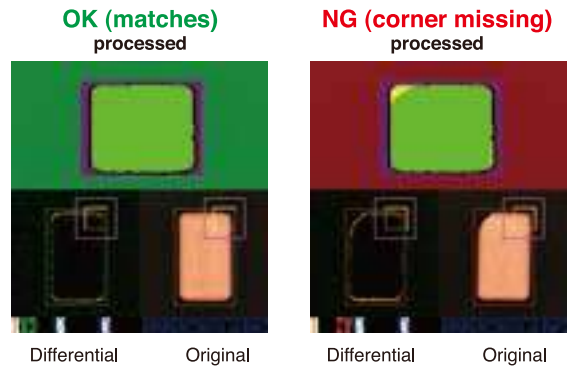
Color Area

The camera calculates the ratio of the number of pixels that have the selected color to all the pixels in the inspection window. When it exceeds the upper limit or is less than the lower limit, it is defined as NG.
This is used to detect color differences, especially when the color is not stable and that there is no need to detect object shape.

OK (all lights on)
processed

Differential   Original

NG (light missing)
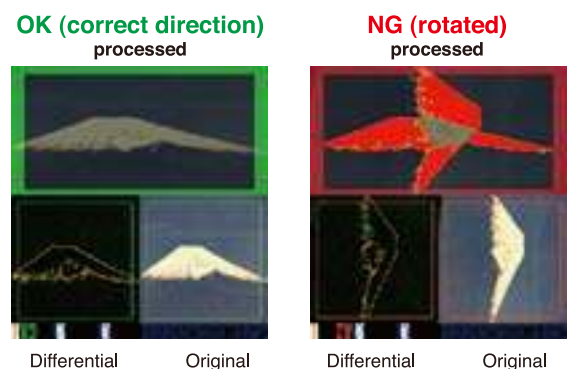processed

Differential   Original

Full Color

The camera will compare the difference between the full color image of the target and the stored image.
If the sum of the difference exceeds the threshold value it is defined as NG.
This is used to inspect color and depth of pictures and prints under stable lighting.

OK (correct direction)
processed

Differential   Original

NG (rotated)
processed

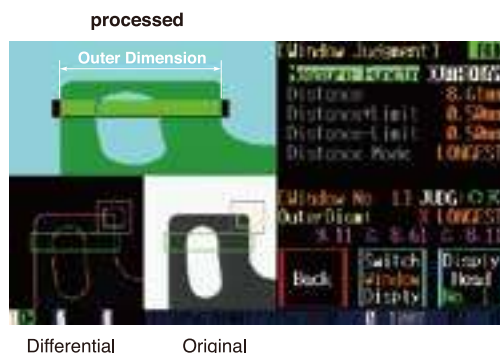Differential   Original

MVS-EM INSPECTION MODE

Measurement of Inner / Outer Dimension, Edge position,
Counting edges, etc.

6 inspection modes are available

Outer Dimension

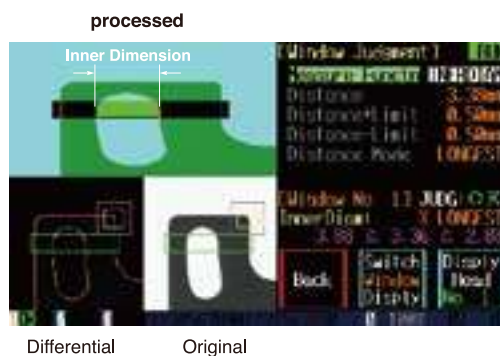The camera measures the distance between the two
outermost edges.
Choose between the longest, shortest or the mean value in
the selected inspection window.

processed

Differential   Original

Inner Dimension

The camera measures the distance between the two
innermost edges.
Choose between the longest, shortest or the mean value in
the selected inspection window.

processed

Differential   Original

Position

Measures the distance between two edges in two different
inspection windows. This function is useful for detecting the
displacement of edges. Choose between the longest,
shortest or the mean value in the selected inspection
window.

processed

Differential   Original
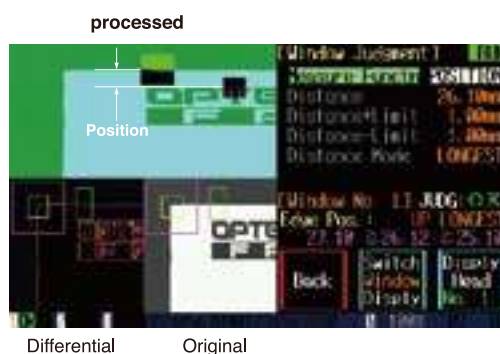
Number of Edges

The camera counts the number of edges in the inspection window. Choose the edges to count based on the transition of light to dark, dark to light or all of the edges.
In the processed image, a red line means a light to dark transition and a blue line means dark to light.

processed

Count Red / Blue / Both edges

Differential   Original
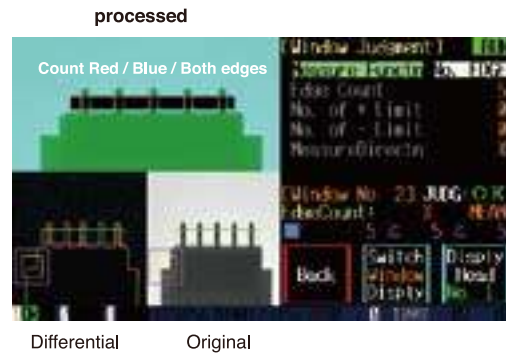
Multiple Edges

The camera measures the distance between edges in the inspection window. Choose the edges of a light part (blue line to red line) or a dark part (red line to blue line).
It judges by longest limit, shortest limit or the mean value.

processed

Measure between Red and Blue edges

Differential   Original

Center Pitch

The camera measures the pitch between the centers of the edges in the selected inspection window.
It judges by longest limit, shortest limit or the mean value.

processed

Measure between center of Red and Blue edges

Differential   Original
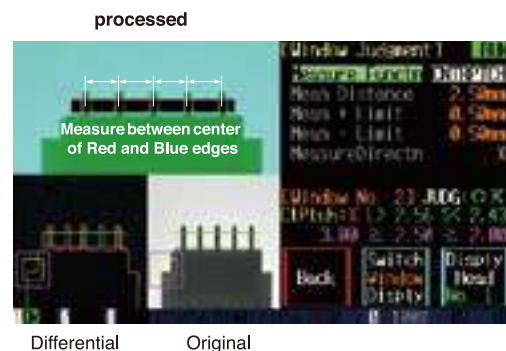
MVS-OCR FEATURE

Optical Character Recognition
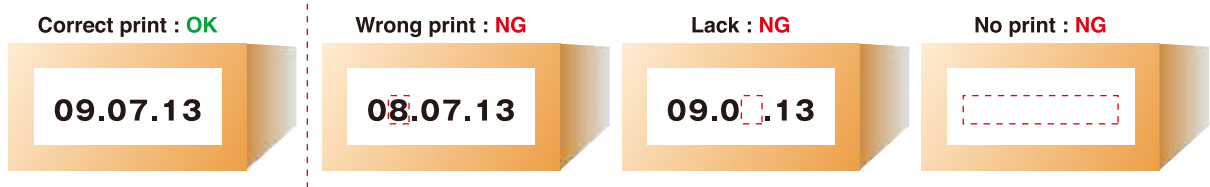## Recognizes Alphabetic, Numberic and Special Characters

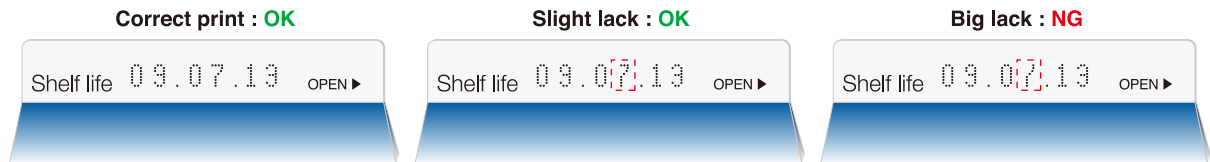Standard distionary characters intergrated

0 ~ 9 A ~ Z . / :

User defined characters can be loaded
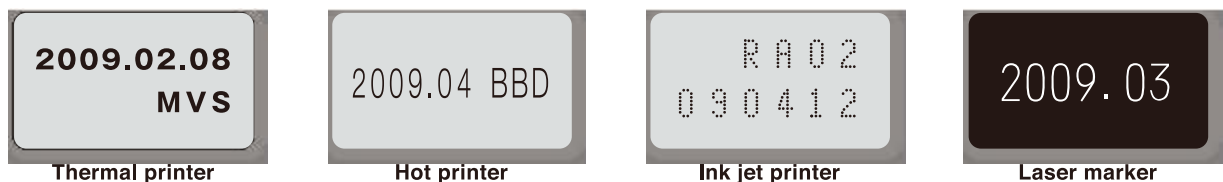
! # $ % & ( ) * + - ; < = > ? @ [ ] ^ _ ` a~z ~

All the characters are correct : OK
One character is not correct : NG

Correct print : **OK**	Wrong print : **NG**	Lack : **NG**	No print : **NG**
09.07.13	**08.07.13**	**09.0 .13**	

Error level can be set

Correct print : **OK**	Slight lack : **OK**	Big lack : **NG**
Shelf life 0 9 . 0 7 . 1 3 OPEN ▶	Shelf life 0 9 . 0 7 . 1 3 OPEN ▶	Shelf life 0 9 . 0 7 . 1 3 OPEN ▶

Recognizes various printer fonts

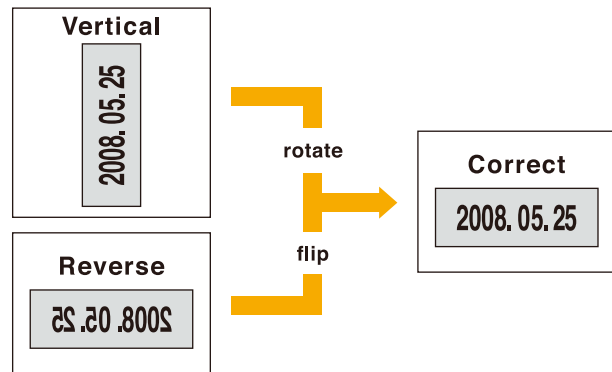| **2009.02.08** **M V S**	2009.04 BBD	R A 0 2 0 3 0 4 1 2	2009.03
Thermal printer	**Hot printer**	**Ink jet printer**	**Laser marker**

Change the image direction

The image direction for each bank can be set. This makes it possible to read reverse printed characters such as printing on the opposite side of a transparent sheet.

Vertical

2008. 05. 25

Reverse

2008. 05. 25

rotate

flip

Correct

2008. 05. 25

Recognize connected characters

Characters that are connected can be separated by adjusting the character width.

"0" and "0" are connected

2009.05.30

Separate

2009.05.30
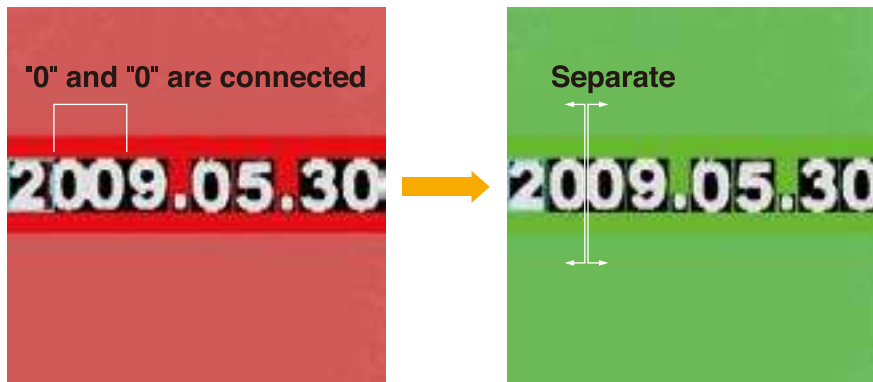
Built-in Calendar

The date and time are automatically updated.
The tolerance of the date and time transition timing can be set.

Tolerance per character

The tolerance for each character can be set (ex. the numbers "6" an "8" are very close in shape and need to be checked closely).
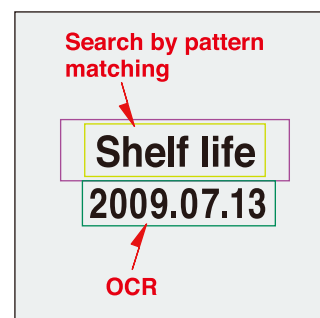

OCR regardless of color

The MVS-OCR is able to detect characters regardless of the color of the background.

Search function

The MVS-OCR is able to search in both the X and Y directions, it also can do a rotational search of +/- 0 ~ 180 degrees.
Fullcolor pattern matching and matching of extracted character modes are available.

Search by pattern matching

Shelf life
2009.07.13

OCR

CONTROL FR, S.A. DE CV.   E-FAX. (55) 5440-6185   E-Mail. ventas@controlfr.com   Web Site. http://www.controlfr.com

User defined characters

The MVS-OCR can recognize lower case letters and special symbols defined by the user dictionary.
For example it can be used to distinguish between "H" and "M" when the font that is used makes these letters hard to distinguish.

Code recognition

It can recognize Code of Month/Date/Hour/Minute.
Example: "CAO H" → "March 15th, 7 O'clock"

Conversion list example   You can modify on the controller.

Month		Date						Hour				Minute					
1	A	1	AA	11	AK	21	AU	0	A	12	M	0	A	C	E	G	I	K
2	B	2	AB	12	AL	22	AV	1	B	13	N	1	A	C	E	G	I	K
3	C	3	AC	13	AM	23	AW	2	C	14	O	2	A	C	E	G	I	K
4	D	4	AD	14	AN	24	AX	3	D	15	P	3	A	C	E	G	I	K
5	E	5	AE	15	AO	25	AY	4	E	16	Q	4	A	C	E	G	I	K
6	F	6	AF	16	AP	26	AZ	5	F	17	R	5	B	D	F	H	J	L
7	G	7	AG	17	AQ	27	BA	6	G	18	S	6	B	D	F	H	J	L
8	H	8	AH	18	AR	28	BB	7	H	19	T	7	B	D	F	H	J	L
9	I	9	AI	19	AS	29	BC	8	I	20	U	8	B	D	F	H	J	L
10	J	10	AJ	20	AT	30	BD	9	J	21	V	9	B	D	F	H	J	L
11	K					31	BE	10	K	22	W		+00	+10	+20	+30	+40	+50
12	L							11	L	23	X							

TROUBLESHOOTING ASSISTANCE

Useful support functions aid in operation
5 support functions

Trouble Shoot

 button leads you to the Trouble Shooting menu. From this menu, you are able to view what corrections need to be done.

Help function

 button on the ten-key panel shows what the parameter means and what adjustments can be done.

Auto Threshold setting

Sample a good object to reset the threshold value. The level of accuracy can be selected from the sampled data.

Offline analyzer

 button leads you into offline analyzer menu. You can load the NG image and investigate why the image was NG, you can also try changing parameters with the NG image to correct the problem.

Storing NG images

The controller stores up to 63 NG images in memory (after the 63rd image the controller will re-start at the beginning overwriting the oldest images). You can also download the images into a PC and use these for troubleshooting or e-mail to Optex-FA tech support.

SYSTEM PART NUMBERS

Camera unit

Model No. : MVS-PM/MVS-EM/MVS-OCR
Image sensor : CCD (color)
Capture mode : Color / Monochrome

※ Lens is not included.
　Please order separately.

Controller

Model No. : MVS-DN
Camera No. : Max 3
I / F : Touch panel display,
　　　　Ten-key

※ PNP output type is MVS-DP

CCTV lens (C mount)

Model No. : FASV-03514
Focal Length : 3.5mm
F No. : F 1.4
Filter size : ─

Model No. : FASV-0813
Focal Length : 8mm
F No. : F 1.3
Filter size : M25.5 P0.5

Model No. : FASV-1214
Focal Length : 12mm
F No. : F 1.4
Filter size : M27 P0.5

Model No. : FASV-1614
Focal Length : 16mm
F No. : F 1.4
Filter size : M27 P0.5

Model No. : FASV-2514
Focal Length : 25mm
F No. : F 1.4
Filter size : M27 P0.5

Model No. : FASV-5018
Focal Length : 50mm
F No. : F 1.8
Filter size : M30.5 P0.5

Camera cable

MVS-C2S : 2M Cable
MVS-C5S : 5M Cable
MVS-C5E : 5M Extension Cable
MVS-C5SR : 5M Robotic cable
MVS-C5ER : 5M Extension Robotic cable
MVS-C5W : 5M Cable with wiring for light
　　　　　　　(need MVS-LC05)

External light

Model No. : MVS-LW60
Method : Direct ring
Spec : White LED x 60
Cable : 500mm

Filters for light

PL-MVS-LW60 : Polarizing filter for use
　　　　　　　　with MVS-LW60 light
DF80-MVS-LW60 : Diffuse filter for use
　　　　　　　　with MVS-LW60 light

Polarizing filter

Model No. : FASV-PL255-RS
size : M25.5 P0.5

Model No. : FASV-PL270-RS
size : M27 P0.5

Model No. : FASV-PL305-RS
size : M30.5 P0.5

IR cut filters

Model No. : FASV-IR255
size : M25.5 P0.5

Model No. : FASV-IR270
size : M27 P0.5

Model No. : FASV-IR305
size : M30.5 P0.5

Light holder

OPAU-150A : Mounting bracket accessory
　　　　　　　for use with MVS-LW60

Cable for light

MVS-LC05 : Controller to lighting connection
　　　　　　　cable, 500mm length
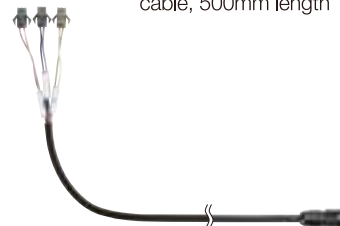
OP-CB1-2 : 2m Extension cable for light
OP-CB1-3 : 3m Extension cable for light
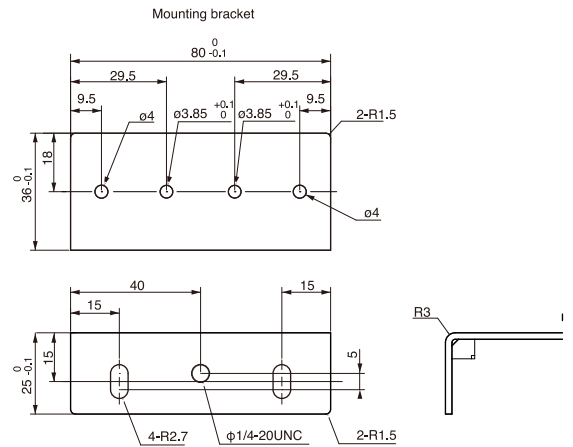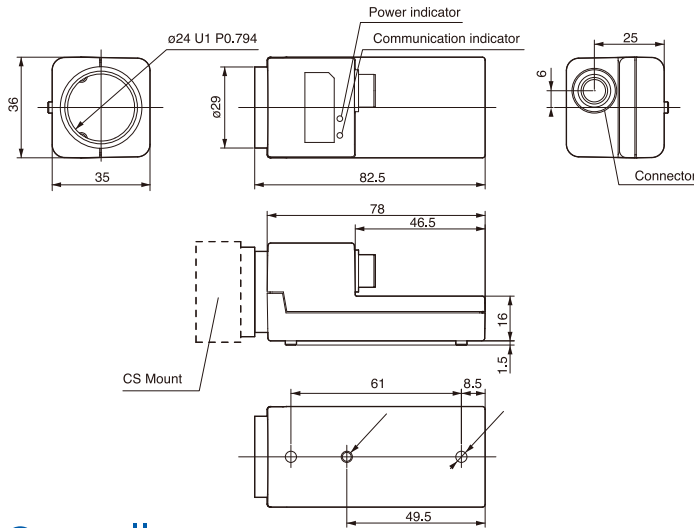**OP-CB1-5** : 5m Extension cable for light

Extension ring set

Model No. : FASV-EXR-LT
5 piece set

0.5mm　　1mm　　5mm　　10mm　　22mm

Mounting bracket for light

BKT-MVS-LW60 : Mounting bracket for
　　　　　　　　MVS-LW60

I/O Connector cable

MVS-C3I0 : 3m IEEE1284 half pitch 50p

Touch panel protective sheet

MVS-TP

DIMENSIONS

Camera unit

Model No. : MVS-PM / MVS-EM / MVS-OCR

ø24 U1 P0.794

Power indicator
Communication indicator

36
35
ø29
82.5
25
6

Connector

Mounting bracket

80 0 -0.1
29.5
29.5
9.5
ø4
ø3.85 +0.1 0
ø3.85 +0.1 0
9.5
2-R1.5
18
36 0 -0.1
ø4

78
46.5
16
1.5

CS Mount

61
8.5
49.5

40
15
15
15
25 0 -0.1
5

4-R2.7
φ1/4-20UNC
2-R1.5

R3

Controller

Model No. : MVS-DN

Panel mount adaptor installation

13.8
22.9
22.9
22.4
51.4

39.3
35.7

HEAD 1
HEAD 2
HEAD 3
LIGHT
EXP. I/O

26.7
30.7
R50

107
99.3
71
71
46.8
19.6

15.9

179
12.7
42.5

Panel mount adaptor

12
171.6
12

34.2
28.7
14.7

RS232

26.2
38.15
USB
47
I/O, POWER

112.3

102

173
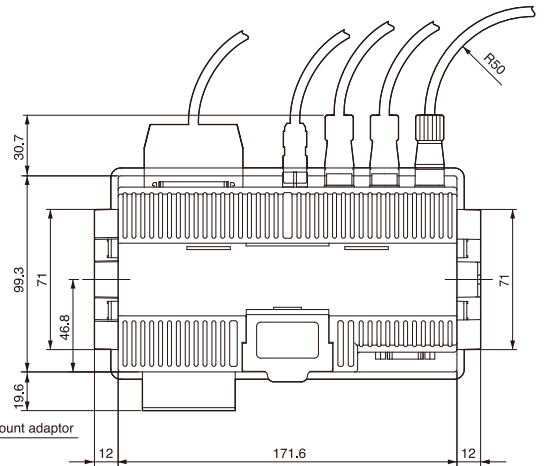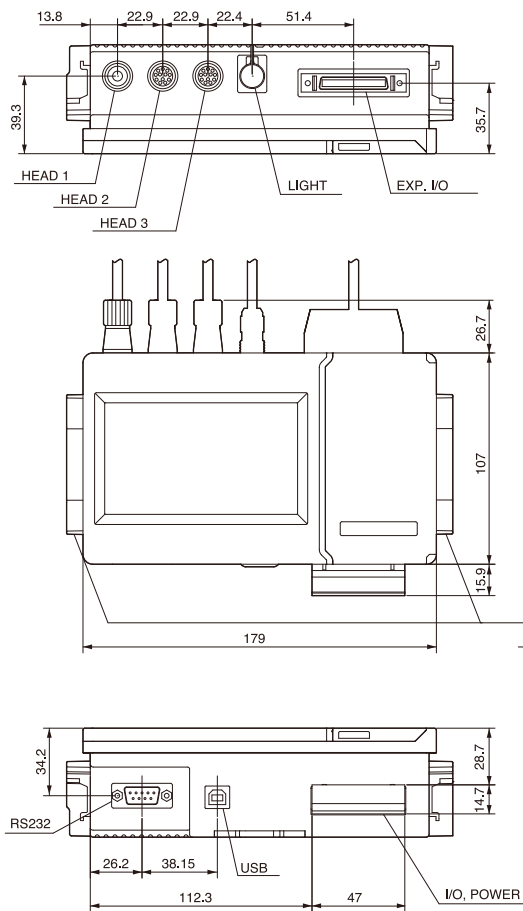
Recommended opening for mounting

Lens

Model No. : FASV-03514
Focal Length : 3.5mm
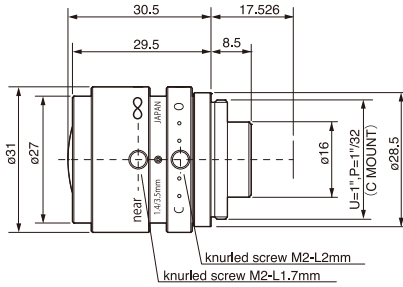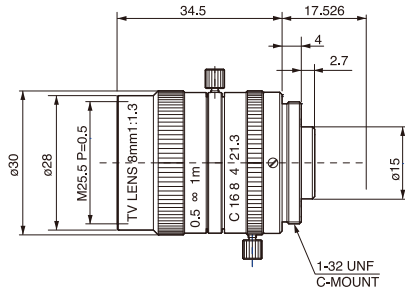
30.5
29.5
8.5
17.526
ø31
ø27
ø16
U=1" P=1"/32 (C MOUNT)
ø28.5
near
1.4/3.5mm
C
JAPAN
knurled screw M2-L2mm
knurled screw M2-L1.7mm

Model No. : FASV-0813
Focal Length : 8mm

34.5
17.526
4
2.7
ø30
ø28
M25.5 P=0.5
TV LENS 8mm1:1.3
0.5 ∞ 1m
C 16 8 4 2 1.3
ø21.3
ø15
1-32 UNF C-MOUNT

Model No. : FASV-1214
Focal Length : 12mm

34.5
17.52
ø30
ø29.3
M27, P=0.5
TV LENS 12mm 1:1.4
1 2 ∞ m
C 16 8 4 2 1.4
M=1", P=1"/32"
ø29.4

Model No. : FASV-1614
Focal Length : 16mm

24.5
17.52
4
1.4
ø30
ø29.3
M27, P=0.5
TV LENS 16mm 1:1.4
1 ∞ m
C 16 8 4 2 f.4
ø16
M=1", P=1"/32"
(C MOUNT)
ø29.4

Model No. : FASV-2514
Focal Length : 25mm

24.5
17.52
4
1.6
ø30
ø29.3
M27, P=0.5
TV LENS 25mm 1:1.4
2 5 ∞ m
C 16 8 4 2 1.4
ø16
M=1", P=1"/32"
(C MOUNT)
ø29.4

Model No. : FASV-5018
Focal Length : 50mm

37
17.526
4
ø32
M30.5, P=0.5
TV LENS 50mm 1:1.8
2 5 ∞ m
C 16 8 4 1.8
U=1", P=1"/32
(C MOUNT)
ø29.4
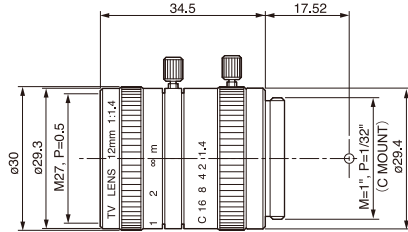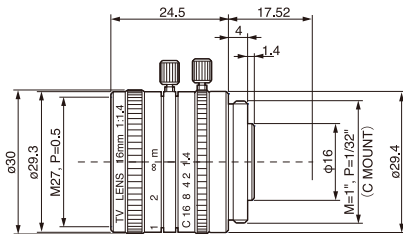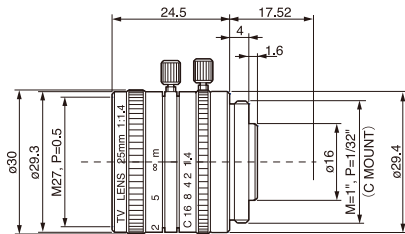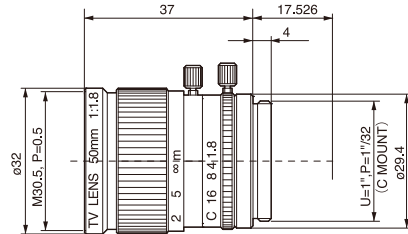
Extension ring set

Model No. : FASV-EXR-LT

0.5mm - 1.0mm
0.5
1
ø31
ø26
L

5mm - 22mm
5
10
22
ø22
L
4
M25.4 P=1"/32
M25.4 P=1"/32(C MOUNT)
ø30
ø29
M25.4 P=1"/32

Polarizing filter

7.7
(A)
(A)
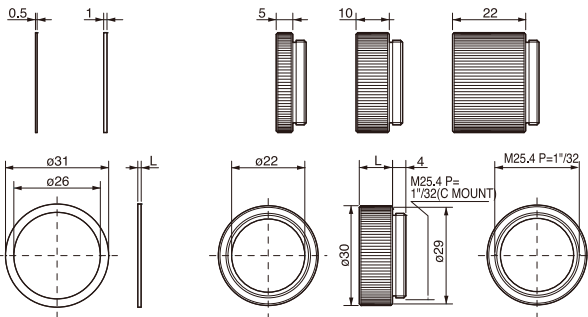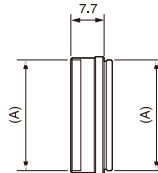
Model No. : FASV-PL255-RS
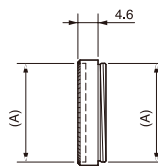(A) size : M25.5 P0.5

Model No. : FASV-PL270-RS
(A) size : M27 P0.5

Model No. : FASV-PL305-RS
(A) size : M30.5 P0.5

IR cut filters

4.6
(A)
(A)

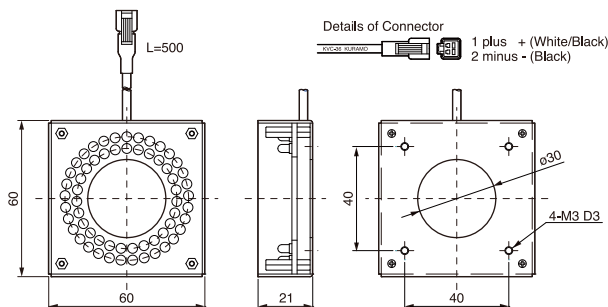**Model No. : FASV-IR255**
(A) size : M25.5 P0.5

Model No. : FASV-IR270
(A) size : M27 P0.5
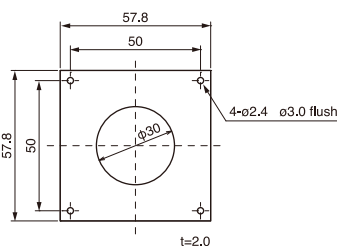
Model No. : FASV-IR305
(A) size : M30.5 P0.5

External light

Model No. : MVS-LW60

L=500
60
60
21
40
40
ø30
4-M3 D3

Details of Connector
KVC-36 KURAMO
1 plus + (White/Black)
2 minus - (Black)

Diffusing plate
Model No. : PL-MVS-LW60

57.8
50
57.8
50
ø30
4-ø2.4 ø3.0 flush
t=2.0

Polarizing plate
Model No. : DF80-MVS-LW60

57.8
50
57.8
50
ø30
4-ø2.4
t=0.8
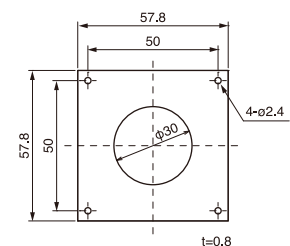
SPECIFICATONS

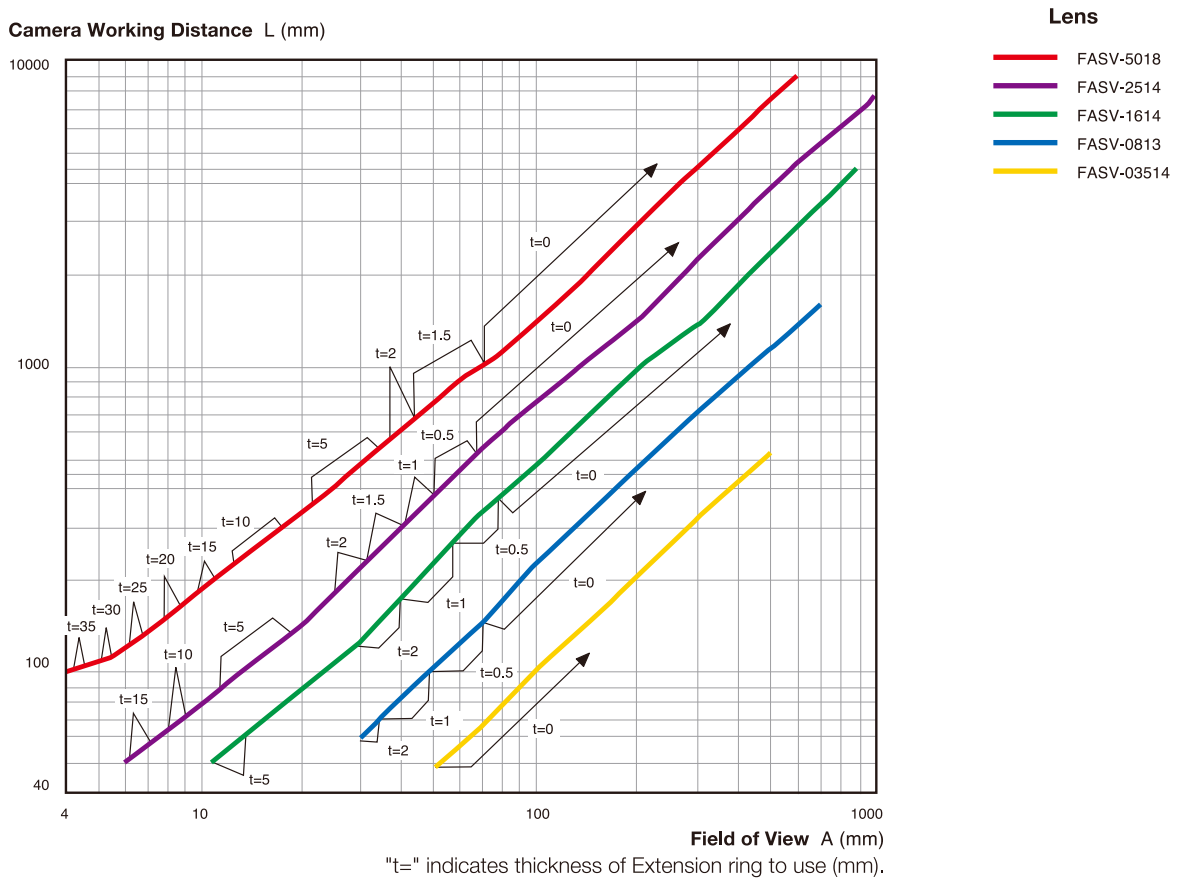| Model	MVS-PM MVS-EM Common
Supply Voltage	DC 6V ±10% (From Controller)
Power consumption	Max. 100mA / 24V DC (in Controller)
Image sensor	430000 Pixel 1/3" CCD Color Image Sensor
Resolution	512 X 512 (512 X 256 by interlace processing)
Pixel size	H: 6.5 X V: 6.3µm (512 X 512 => 3.33 X 3.23 mm)
Lens type	CS mount (C mount adapter is included)
Communication I/F	LVDS (100Mbps) dedicated to Controller (Max. 10m)
Indicator	LED (Power, Status)
Operating Temp./Humid.	0~50°C, 35~85%/RH (Non Condensing)
Storage Temp., Humid	-20~70°C, 25~95%/RH (Non Condensing)
Vibration, Shock	Vibration : 10~ 55Hz /1.5mm, Shock : 15G
Conformity	CE (EN55011 Class-A, EN61000-4-2~6), RoHS
Material	Aluminum
Protection Category	IP50
Weight	Approx. 90g
Accessories	C mount adapter, mounting bracket

Model	MVS-PM
Image processing function	• Rotation Search up to +/- 180 degree • 16 Inspection Window • Judgment of Contour and Background, Color Normalized Correlation, Differential Normalized Correlation, Color Shape, Color Area, Stain • Variable shutter speed with continuous capture (up to 6 times) • Automatic Color/Black&White changeover • External Teaching (Auto-Shutter/Threshold/Color Extracting)

Model	MVS-EM
Measurement function	• Rotation Search up to +/- 45 degree • 16 Inspection Window • Measuring Outer/Inner size, Counting number of Edges, Measuring position of Edge, Measuring Edge to Edge, Measuring pitch of Edges • Variable shutter speed continuous capture (up to 5 times) • Black&White capturing • External Teaching (Auto-Shutter/Threshold/Auto function selection)

| Model	MVS-OCR
Supply Voltage	DC 6V ±10% (From Controller)
Power consumption	Max. 100mA / 24V DC (in Controller)
Image sensor	430000 Pixel 1/3" CCD Color Image Sensor
Resolution	512 X 512 (512 X 256 by interlace processing)
Pixel size	H: 6.5 X V: 6.3µm (512 X 512 => 3.33 X 3.23 mm)
Lens type	CS mount (C mount adapter is included)
Communication I/F	LVDS (100Mbps) dedicated to Controller (Max. 10m)
Indicator	LED (Power, Status)
Response time	Approx. 45ms
Operating Temp./Humid.	0~50°C, 35~85%/RH (Non Condensing)
Storage Temp., Humid	-20~70°C, 25~95%/RH (Non Condensing)
Vibration, Shock	Vibration : 10~ 55Hz /1.5mm, Shock : 15G
Conformity	CE (EN55011 Class-A, EN61000-4-2~6), RoHS
Material	Aluminum
Protection Category	IP50
Weight	Approx. 90g
Accessories	C mount adapter, mounting bracket
Image processing function	• Rotation Search up to +/- 180 degree • 4 Inspection Window • Up to 6 lines and up to 60 characters per one inspection window. • Up to 2 DATE and 2 TIME and 4 strings (total 4) • Maximum of 250 user defined characters • Available Date/Time code recognition: Month: 1 character, Date: 2 char., Hour: 1 char., Minutes: 1 char. • Variable shutter speed continuous capturing (up to 6 times) • Automatic Color/Black&White changeover • External Teaching (Auto-Shutter/Threshold/Color Extracting)

Model	MVS-DN/DP
Supply Voltage	DC 24V ±10% (DC 12V is possible without external Light)
Power consumption	Controller : Max. 80mA / 24V DC
	With external light : max 1.5A (Light power consumption X 150%)+ Power consumption of all camera heads
Number of camera	Max. 3 heads
Output	NPN/PNP open collector Residual voltage is less 1.0V
	OK, NG : 1 each for every camera head (Total: 6) max. 100mA Auxiliary output : Total 20, max. 50mA
Input	Synchronous: 3, Auxiliary : 10
I/O connector	Power/OK/NG/Synchronous : Terminal block 12P
	Expansion I/O : IEEE1284 half pitch connector 50P
External Light out	12V PWM control (87kHz, 256steps) Out: 3, Total 24W
Communication I/F	USB1.1 (max 12Mbps) : USB standard connector
	RS232 (max 500kbps) : D-Sub 9P
Display, Control device	4.3" wide TFT LCD, Touchscreen, Panel SW Indicator : Power, Camera No.LED
Timer accuracy	-45sec. ~ +1min. 15sec. Per Month (Typical)
Timer backup battery	primary cell : 5 year with power off (Typical)
	secondary super capacitor : 7.8 year (Typical with 3 days backup)
Operating Temp./Humid.	0~50°C, 35~85%/RH (Non Condensing)
Storage Temp., Humid	-20~70°C, 25~95%/RH (Non Condensing)
Vibration, Shock	Vibration : 10~ 55Hz /1.5mm, Shock : 15G
Approvals	CE (EN55011 Class-A, EN61000-4-2~6), RoHS
Material	polycarbonate
Protection	IP20
Weight	Approx. 570g
Attachment	Panel mount bracket

WORKING DISTANCE vs. FIELD OF VIEW

Camera Working Distance L (mm)

Lens

▬▬	FASV-5018
▬▬	FASV-2514
▬▬	FASV-1614
▬▬	FASV-0813
▬▬	FASV-03514

Field of View A (mm)

"t=" indicates thickness of Extension ring to use (mm).

How to utilize the graph

1. Determine Working distance (L) and Field of view (A).
2. Choose the appropriate lens and extension ring
   according to the graph.

Camera

CS/C adapter
Extension ring

Lens

Camera working distance (L)

Field of view (A)
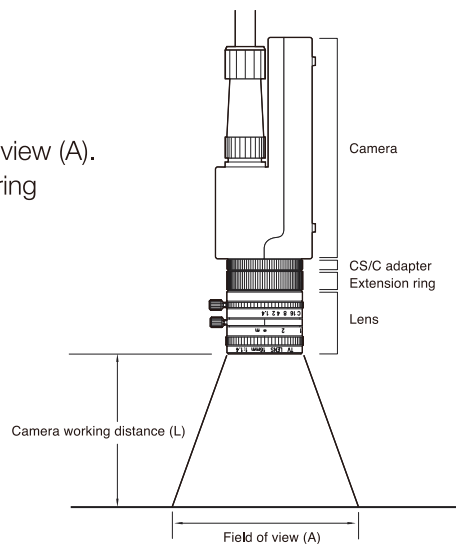
● **Specifications are subject to change without prior notice.**
● **Specifications and technical information not mentioned here are written in Operation Manual. Or visit our website for details.**
● **All the warnings and cautions to know prior to use are given in Operation Manual.**