TOP SPEED

Industry’s First Multi-task Processing System Offering Greatest Sensing Performance

FZ3-900 Series
Speed Beyond Expectation

Significantly Shorter Inspection / Startup Time Thanks to Dual Mega ARCS Engines and Greatest Sensing Performance

The manufacturing environment is changing every second. OMRON’s FZ3-900 series is a vision sensor system perfect for manufacturers who wish to flexibly meet these changing needs to make better products.

Greatest Sensing Performance of FZ3 + Dual Mega ARCS Engines.

The industry’s first multi-task processing, the FZ3-900 series not only realizes fast, accurate inspection/measurement flows, but it significantly reduces man-hours and allows more efficient introduction of your vision sensor system as well as its operation from setting adjustment to data collection and analysis.

All inspection steps become faster, while the startup time and initial cost are reduced, which means that the FZ3-900 series vision sensor adds value to your entire manufacturing process.
Fastest Processing

Quicker measurement time
Adopting the industry’s first parallel processing algorithms, the FZ3-900 series significantly reduces the total processing time from image input to result output.

Trigger intervals
OMRON’s unique multi-input function enables ultra-high speed processing. Triggers are input at one-half the intervals of a comparable system, resulting in double the tact performance one-half the tact time.

First-ever Multi-task Processing

One controller performs inspections that normally require two units
One controller can independently process triggers for multiple lines. This feature not only significantly reduces the initial equipment cost, but you also need the installation space for only one unit.

Faster acquisition of more image measurement data
100% image measurement logging is possible even in inspection processes requiring high accuracy, high speed and multiple cameras. Inspection images can be saved as quality data and utilized in developing suitable manufacturing methods.

Zero downtime for setting adjustment
Even when a defect or abnormal trend occurs, you can check the condition and adjust the relevant settings without stopping the line.

Greatest Sensing Performance

Dynamic range  Simple lighting environment for ideal imaging
The conventional difficulty in setting and adjusting lighting conditions is ascribed to the limited dynamic ranges of cameras. FZ3’s HDR (High Dynamic Range) function has achieved a high dynamic range, 5000:1 maximum. This function solves existing problems in setting for lighting.

High resolution  High accuracy & wide measurement field
The FZ3-900 series is equipped with a camera offering industry’s highest resolution of 5 million pixels. More precise inspections and measurements are enabled by measuring high-resolution images with an advanced image-processing algorithm.

Detecting edges and scratches by slightest color differences
An entirely new imaging technology where a total of 16.77 million colors are captured in a RGB 256 full-color mode for high-speed processing. Color information is processed exactly the same way as when the subject is viewed by human eyes, which means that colors can be accurately differentiated even when the contrast between the background and work is low or the color difference is small.
The FZ3-900 series is equipped with Dual Mega ARCS Engines to process data twice as fast as when one Mega ARCS Engine is used. This engine achieves multi-task, high-speed processing not heretofore possible.

With conventional serial systems, each process can not be started until the previous process is completed. Under the Dual Mega ARCS architecture, two engines perform multiple tasks in parallel to dramatically reduce the inspection time. As a result, you can process more data over a shorter time compared to conventional systems.

**Only the Dual Mega ARCS architecture can realize a completely parallel processing of measurement, adjustment and logging tasks!**

The key feature of Dual Mega ARCS Engines is that they enable completely parallel processing. Parallel processing not only speeds up inspection but it also allows the system to behave like having two brains (heads) by letting you inspect two completely different lines with a single vision sensor or adjust parameters during inspection.

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**What is ARCS?**

Short for “Advanced Real Color Sensing,” ARCS is OMRON's patented imaging engine capable of processing images in real colors. The FZ3 series real color processing captures and quickly processes vast amounts of color information to achieve ideal sensing close to what human eyes can. It realizes accurate, stable inspection unthinkable with simple filtering. The ARCS processing capability continues to advance with the progress of the FZ series.  P. 5 Real Color Sensing
Fastest measurement  Highspeed mode (parallel operation)

Multiple measurements are processed in parallel with the system making decisions automatically to minimize the total measurement processing time from image input to result output. This significantly reduces the time to output result following a trigger input. This feature is ideal for inspections where more data must be processed or higher resolution is needed.

**[Conventional flow]**

- 0. Camera image input
- 1. Search
- 2. Search
- 3. Position compensation
- 4. Labeling
- 5. Scratch and soiling
- 6. Number of edges
- 7. Area gravity center

**[Flow in high speed mode]**

- 0. Camera image input
- 1. Search
- 2. Search
- 3. Position compensation
- 4. Labeling
- 5. Scratch and soiling
- 6. Number of edges
- 7. Area gravity center

Parallel measurement flows significantly reduce the measurement time. This function is particularly useful in inspections using high-pixel camera that otherwise take a long measurement time.

- A shorter tact time can be achieved after consolidating lines or when the utilization ratio is to be improved at subsequent production increases.
- Alignment data and other measurement results can be sent to subsequent processes more quickly.

Short trigger intervals  High speed mode (single line)

OMRON’s unique multi-input function has become more advanced. Combined with the parallel processing capability of Dual Mega ARCS Engines, this function halved the trigger intervals of conventional systems. You can add inspection items without affecting the current processing time, which gives you scalability to meet future needs.

**[Conventional system]**

- Without multi-input
  - 1st Image capture
  - 2nd Image capture
  - 3rd Measurement processing
  - 4th Measurement processing
  - 5th Measurement process 1
  - 6th Measurement process 2

- With multi-input
  - 1st Image capture
  - 2nd Image capture
  - 3rd Image capture
  - 4th Measurement process 1
  - 5th Measurement process 2
  - 6th Measurement process 2

**[High speed mode]**

- Trigger intervals have been halved!

- 1st Image capture
- 2nd Image capture
- 3rd Image capture
- 4th Measurement process 1
- 5th Measurement process 2
- 6th Measurement process 2

**Issues**

- Camera images can also be captured during measurement. If image inputs exceed the buffer capacity, however, trigger intervals cannot be shortened because the minimum trigger interval depends on the measurement processing time.

**Resolution**

- Parallel measurement processing halves the trigger intervals of conventional systems. As a result, the inspection tact time is also reduced to a half.

**Appearance inspection of caps**

- (Example) The flow shown below halves the trigger intervals of conventional system to only 26 ms.

- Camera image input
- Color gray filter
- Shape search
- Processing before measurement

- Position compensation
- Background trimming
- Processing before measurement
- Color gray filter
- Fine matching

- The processing flows for first and second triggers are processed in parallel to halve the trigger interval.

**Effect**

- Shorter trigger intervals shorten the inspection cycle time.


**Benefit of a Multi-task System**

Reduce the time and cost for setup and operation

One unit performs inspections that normally require two units  Multi-line random trigger mode

Conventional imaging systems cannot perform two inspection processing simultaneously. With Dual Mega ARCS Engines, one controller accepts two trigger inputs simultaneously or randomly to process two different setups parallely or independently.

![Image](image1.png)

**Issues**

Before, two controllers were needed to inspect two locations, processes or lines within the required tact time, which added to introduction cost.

**Resolution**

With the FZ3-900 series, on the other hand, two triggers can be input randomly to run two independent inspection processing in parallel.

**Effect**

You can reduce the number of controllers to be installed to save installation space, introduction cost and current consumption.

All images can be saved even during measurement  High speed logging mode

Complete parallel processing of measurement and logging means you can also connect high-speed, large-capacity (up to 2 terabytes) hard disk drives. Accordingly, you can save all images on high-speed tact lines, which was difficult to do with conventional systems (*1).

**Issues**

Since logging was not possible during measurement, the user had to choose either measurement or logging. Accordingly, not all images could be saved or image input triggers had to be delayed depending on the measurement trigger intervals.

**Resolution**

Measurement and image logging are processed completely in parallel. As a result, you can save all images.

**Effect**

All images you have saved can be utilized for trend analysis to help establish an appropriate manufacturing method quickly for a new product or a line adopting a new manufacturing method.

- When a NG occurs, the cause can be identified and remedial actions taken quickly.
- Saving all images leads to more efficient traceability control.

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*1 All images can be saved under the following conditions:
- 300,000-pixel camera x 1 unit  Measurement time: 33 ms
- Images can be saved continuously for approx. one week when a 2-terabyte HDD is used (based on 8 hours of operation a day)
Zero downtime for setting adjustment  Non-stop adjustment mode

You can check conditions and reconfigure settings while measurement is still in progress if dimensional variations of works, changes in external environment, etc., require adjustments and checks. Since adjustment is possible without stopping the line/inspection, you can eliminate downtime, need to add visual inspections to identify uninspected products, and cost increase associated with them.

Parallel processing of inspection and adjustment

Continuous inspection without stopping line operation

A NG occurs.

Check saved images to identify the cause.

NG analyzer

Change the settings.

Measure again in a trial run to confirm the settings.

Downtime Loss cost Zero

Identify the cause and adjust the settings.

Printing / soiling inspection of sheets

Loss cost can be reduced. Ideal for mass-production processes with a higher unit production volume or 24-hour lines.

Effect

• Results can be checked and adjustment can be made with zero downtime.
• Because the line is not stopped, there is less idle time associated with restarting of the line.

Doubly effective when combined with the Non-stop adjustment mode NG analyzer

You can display in a structured manner a graph showing the results measured at once on logging images. This lets you identify the cause of a given NG much more quickly. You can also measure all images again after changing a given setting, to check the reliability of the new setting. Adjustment and troubleshooting has never been so quick, simple and reliable.

Processed items and parameters that generated an erroneous judgment can be identified at a glance.

You can check the detailed results of parameters to identify the cause of the NG.

Select a desired measurement result on the graph to switch to the adjustment mode.
Eliminate the side effects of lighting

High Dynamic Range Function

FZ3’s high dynamic range minimizes the effects of lighting such as halation and allows highly precise inspections.

**Conventional images**

**HDR image**

**Defects Undetectable Due to Overexposure or Underexposure**

Any spot outside the dynamic range is blurred by halation or shadow.

**Reflective and shadowy areas can be reproduced simultaneously under the same lighting conditions.**

**The surfaces of metal workpieces can be reproduced accurately.**

**Defects Detectable Even on Reflective or Shadowy Surfaces**

The surface of the workpiece is accurately reproduced and detected even with overexposure or underexposure.

**The reflective surfaces of cylindrically-curved workpieces in which conventional vision sensors have had difficulty can be reproduced.**

**The influence of changing lighting conditions from day to night are effectively minimized.**
HDR Image Generation Technology

Dynamic range means the imaging hardware’s ability to manage differences in lighting. The higher dynamic range the hardware scores, the clearer images it can generate when imaging objects with a strong contrast in luminosity. Featuring the HDR Image Generation technology, FZ3 can take two or more images of a workpiece at different levels of luminosity by automatically changing its shutter speed and synthesizes them into a single image rapidly. As a result, the bright field where image capture is possible expands 5,000 times in LD ratio compared to a general CCD camera. Accordingly, you can obtain vivid images not possible in processing flows where images are color-depth filtered one by one in real time.

HDR High-Contrast Mode

The HDR function that quickly produces multiple composite images offers the high-contrast mode. In this mode, images captured at a constant shutter speed are layered on top of one another and output. Before, each image had to be enlarged to increase contrast, and consequently the noise component of the image was also amplified. In the HDR high-contrast mode, on the other hand, multiple images are combined together and then averaged to reduce their noise component, after which the images are enlarged. This way, only the contrast of the area of interest and its background can be increased.

Technology of HDR High-Contrast Mode

There is a low contrast in brightness between the background noises and the thing to be inspected.

The contrast is enhanced by integrating and enlarging two or more images.
High Resolution Image Generation

**Higher Resolutions and Wider Fields of Vision**

5 Million-Pixel Cameras

The new 5 million-pixel cameras allow high precision appearance inspections and measurements that cannot be handled by conventional 2 million-pixel cameras.

- **Color Type** FZ-SC5M
- **Black and White Type** FZ-S5M

**1.5-times wider field of vision**

Even a large workpiece can be imaged at one time and the details are very clear.

**Reducing Set-up Time**

Thanks to the cameras' wider fields of vision, you don't have to move their positions during set up on a production line for different products in different sizes.

**Reducing Tact Time**

FZ3 takes a single wide-view image of a large workpiece used be imaged in multiple pieces and thus reduces inspection tact time.

**Making Invisible Defects Visible**

The improved resolution of the system's cameras allows you to detect very slight defects that were impossible for its predecessor to catch.

**High measurement accuracy Lens of over 5 mega pixels**

A lineup of high-accuracy lenses is available to fully utilize the high-resolution camera of 5 million pixels or more and thereby realize accurate inspection. The resulting greater contrast and higher resolution ensure accurate positioning check, scratch inspection and other inspection applications where higher accuracy is required.

*Please contact your OMRON sales representative.*
Autofocus Camera / Intelligent Camera with illumination

**Autofocus Camera**
- **Color**: FZ-SZC100, FZ-SZC15

These image processing cameras for FA needs are equipped with auto focus functions and lights. You can remotely control the focus, aperture, field of vision and lighting of the cameras installed at a distant from the controllers. You can apply a set of lighting conditions for any particular inspection to different lines by saving the setting data for the inspection into the controller. This function allows prompt setting for each inspection procedure. It also helps reduce setting variations among individual operators.

**Intelligent Camera**
- **Color**: FZ-SLC100, FZ-SLC15

You can control the brightness levels of up to 8 lights in 256 gradations. Since you can register the most appropriate setting for each lighting task, stable lighting conditions are always ensured. *Function available only with FZ-SLC100 and FZ-SLC15

**Intelligent Lighting**
- **Lighting Patterns**: 8 places can be controlled
- **Brightness Levels**: 256 gradations

**Innovative zoom function**
With this function, the camera can flexibly respond to inspections on mixed production lines or any changes in its field of vision for additional inspections.

**Ultra-compact Pen-shaped Camera / Ultra-slim Flat Camera**
Our high-performance, high-speed 300,000-pixel cameras have been remarkably downsized. They can be installed in spaces which are too small for conventional cameras.

**2-million-Pixel camera**
- **Color**: FZ-SC2M, FZ-S2M

This high-resolution 2-million-pixel camera (1600 x 1200 pixels) boasts the fastest image capture speed in its class. It is equivalent to the speed of 300,000-pixel cameras. Furthermore, the camera can capture 1-million-pixel images (1600 x 600 pixels) at a speed of 60 fps in the partial capture mode.

**High speed image capturing of 30 fps**
- **Ordinary 2-million-pixel camera**: 10fps(6.6ms)
- **2-million-pixel camera of FZ3 Series**: 30fps(33.3ms)
- **Partial capture of 1-million-pixel images**: 60fps(16.6ms)

**300,000-pixel Camera**
- **Color**: FZ-SC, FZ-S

This camera achieves an image capture speed of 80 fps with full VGA resolution of 640 x 480 pixels, saving input time about 4 ms. It features high speed with highest cost performance. Furthermore, it allows faster image capturing in the partial capture mode.

**High speed image capturing of 80 fps**
- **Ordinary double speed camera (Resolution: 512 x 480)**: 60fps(16.7ms)
- **Ultra-high-speed Camera of FZ3 Series (Resolution: 480 x 480)**: 80fps(12.5ms)

**Partial capture function**
This function allows you to specify any part of the workpiece and capture images thereof at a faster speed. Image capturing at a speed of 3 ms maximum is possible.

**Strobe Controller to manage the Lighting Without Complex Wiring and Additional Power Supply**
You can easily control lighting by connecting this strobe controller to the camera and the light using a single cable. Unlike ordinary lighting control units built on controllers, you do not need any complex wiring for this strobe controller. This makes the system very easy to handle. You can control all lighting sequences with this controller.

**Application Examples**
- **The strobe controller installed on a robot is ideal for robotic inspections.**
- **The controller can prevent mutual interference between different cameras by controlling lighting.**
- **Data of specific lighting conditions can be saved in the controller. In this way, you can save the time setting lighting conditions before conducting each inspection.**

**Easy Installation**
No Additional Power Supply Needed
Simple System With Simple Wiring
Controlling Lighting from the Controller
Real-time Image Generation Technology

Ideal for Inspection

Correcting distorted images shot from an angle. High-precision inspections are ensured even when images are taken from an angle or the carrying process is unstable.

Wide Panorama

Images taken by two to four 2-million-pixel cameras are put together like a line camera to generate a single image as if it is taken by a single camera when inspecting a horizontally long workpiece.

Synthesis of up to four images

Up to four images can be synthesized horizontally and vertically in accordance with the shape of the workpiece.

Cross shots image capture is possible

FZ3 allows space-saving line designs since cameras can be mounted in any small spaces at any angle. Furthermore, you would have no difficulty in finding appropriate spaces for an additional camera for an additional inspection item.

Coping with any flutter in the carrying process

High-precision inspections are ensured even when there is flutter in the carrying process. Unlike the conventional vision sensors, FZ3 can also correct perspective distortions.

Even when the subject inclines due to the movement of the arm, its position can be compensated.

Precise Inspections of Large Workpieces in Whole

Ultra-Wide Panorama Image Processing

When taking images of a large workpiece in multiple pieces using two or more cameras, a conventional vision sensor processes the images taken by the cameras separately in order to secure a satisfactory level of resolution. FZ3’s panoramic image processing*1 capability allows the measurement of a large or long workpiece in whole by synthesizing the images taken by camera and generating a single image from them.

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Synthesis of up to four images

Up to four images can be synthesized horizontally and vertically in accordance with the shape of the workpiece.

*1 This feature can be performed with cameras of 2 million pixels or less.
*2 The images of four 2 million-pixel cameras overlap each other at their edges, with each overlapping area covering 25% of the entire area of each image.
Eliminating reflection of light on the surfaces of moving workpieces

High-speed Halation Prevention Filter

This feature detects blurs caused by halation or unstable lighting, and automatically make corrections. It is very useful when workpieces to be inspected are moving at a high speed or inspections are made through a transparent film.

Analyzing images by subtraction and detecting only subtle changes as defects.

The filter removes fringes in the background and detects defects only even when fringes is as big as defects.

Removing fringes to detect defects

Fringe-killer Filter

Other than detecting defects by subtraction, FZ3 can also remove some peculiar patterns such as fringes in the background for more stable inspections.
New generation processing items (approx. 60)

Filters to optimize input images / Position Correction

**Color shadings elimination filter**  
First in the industry  
The filter eliminates specific background color data that may hamper the detection of defects. It also improves the accuracy of inspection to detect scratches or dirt. This cutting-edge function is made possible only with FZ3’s Real Color Sensing technology.

![Image of color shadings elimination filter](image1)

You can easily and immediately eliminate color shading just choose a specific color on the screen.

**Color extracting filter**

The filter allows the extraction of any specific color from the image. Since you can register up to eight colors, as the colors to be eliminated, you do not need to adjust settings for different processing items. The filter works in two modes, one for extracting the color specified and the other for extracting all colors other than the specified one. You can flexibly switch between the two modes according to requirements for individual inspections.

![Image of color extracting filter](image2)

You can easily specify any color by just clicking it on the screen. The color chart on the screen, that shows the color you have chosen, enables intuitive operation even for fine adjustments.

**Elimination of Background**

A minimum value and a maximum value are set for each of the RGB colors. Any color depth under the minimum value is specified as "0," and any depth over the maximum value as "255." Then all other depths between them are stretched into a 0 to 255 scale. An area to be inspected is visualized with high contrast while the effects of depths outside this scale are eliminated.

![Image of elimination of background](image3)

You can easily specify any color by just clicking it on the screen. The color chart on the screen, that shows the color you have chosen, enables intuitive operation even for fine adjustments.

**Rectangular Development of Circular Images**  
First in the industry  
This function allows recognition of characters printed along the circumferences of circular surfaces by converting circular images into rectangular forms. The characters can be inspected with the same resolution even after such rectangular development.
High Precision Inspections of Defect

**Inspections of Scratches and Dirt**

Subtle scratches and dirt can be detected with more fine-tuned conditions compared to conventional inspections. Since you can clearly distinguish defects to be detected from the background, the failure detection rate can be decreased. Combined with our 5 million-pixel camera, this function enables much more precise inspections of scratches.

Color images taken by the camera are processed after being converted into black and white pixels. The color extracted is represented as white, and the other colors as black. Based on minimum information, high speed processing is possible. Since color data is limited only to brightness, however, it takes a long time to make optical adjustments for extracting color features.

**Fine Matching / Defect**

With our Real Color Sensing technology, FZ3 can accurately recognize and process subtle variations in color. This feature helps you detect unpredictable scratches and dirt. High precision defect inspections are possible by using both Fine Matching and Defect flexibly according to the background of each image.

Color images are converted into 256 levels of black-and-white brightness and the contrasts of specific colors is enhanced. More precise, stable results can be produced compared to color segmentation. However, this method has difficulty in capturing subtle variations in color because all colors are converted into black-and-white brightness levels. Therefore, it is difficult to detect subtle changes in images with low contrast.

Different colors are represented as different positions in the 3D RGB space. Subtle variations in color can be recognized by representing them as distances between different color pixels comprising this space. Thus, scratches and dirt can be detected accurately even in images with low contrast.

**What is Real Color Sensing?**

In order to secure stable measurements in different inspection environments, FZ Series feature Omron’s proprietary Real Color Sensing processing, in addition to the conventional color image processing.

**Color Segmentation Processing**

Color images taken by the camera are processed after being converted into black and white pixels. The color extracted is represented as white, and the other colors as black. Based on minimum information, high speed processing is possible. Since color data is limited only to brightness, however, it takes a long time to make optical adjustments for extracting color features.

**Color Image Processing**

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**Real Color Sensing**

Different colors are represented as different positions in the 3D RGB space. Subtle variations in color can be recognized by representing them as distances between different color pixels comprising this space. Thus, scratches and dirt can be detected accurately even in images with low contrast.
New generation processing items (approx. 60)

**High Speed / High Precision Pattern Recognition**

**Shape Search**
The geometry correlation search for conducting search based on the profile information of the workpiece ensures greater absorption of dimensional variations among individual works (changes in background, contrast, etc.) and consequently achieves stable detection.

The detection speed is approx. 20 times that of a conventional processing system, which allows for high-speed detection even when images are captured with high-resolution camera.

**Sensitive Search**
This allows the recognition of very subtle differences that cannot be detected through ordinary search processes, by dividing the registered model image into several pieces and carefully matching them. Thus you don’t have to spend a lot of time for delicate threshold setting.

**Flexible Search**
When inspecting workpieces with some variations in shape, such variations are sometimes recognized erroneously as defects. Flexible Search ensures accurate searches regardless of some variations in print quality or shape, by registering several images of non-defective products as models. It helps you decrease your inspection failure rate by rejecting defective products only.

**Area / Labeling**

**Dynamic segmentation and high-performance labeling**
This item features a dynamic segmentation in addition to the conventional labeling. This function ensures the accurate detection of labels by automatically sensing any uneven color depth in the same image and changing thresholds locally.

**Easy to sort, Wide variety of conditions to be extracted**
- Area
- Gravity (x, y)
- Main axial angle
- Major axis, minor axis and ratio of an ellipse
- Width, height and coordinate (x, y) of a circumscribed rectangle
- Perimeter
- Circularity
- Major axis and minor axis of a rotating rectangle
- Radius of an inscribed circle
- Radius of a circumscribed circle
- Number of holes

**High Performance Edge Detection**

**Scan Edge Position, Scan Edge Width**
Edge positions and widths can be accurately detected by dividing the area to be inspected into several segments. Scan Edge Position measures the points closest and farthest to the edge as well as the inclination and surface conditions of the workpiece to be inspected. Scan Edge Width measures the local and average widths of the workpiece. This allows the accurate measurement of the positions of the workpiece’s peripheral parts as well as its bore diameters. Edge detection method can be chosen from the intensity projection method and the differentiation method.
Character / Code Recognition

Read Bar Codes / 2D Codes
It allows the detection of the types of products before inspections as well as the collection and accumulation of information on inspections.

Switching among different inspection items according to the types of products
Different sets of inspection items can be automatically set for different types of products detected through code reading processes. The item, that covers all processes from product type detection to inspections without involving the host, can save time for interconnection and programming.

Collecting and accumulating information on inspections in real time
You can collect the serial numbers of components and measuring results in real time while they are being inspected. The causes of defects can be tracked down immediately by consolidating such serial numbers and measuring results at the host.

Reading different codes at a time
Two or more different codes in the same field of vision can be read by utilizing a high resolution camera. This function contributes to the reduction of inspection tact time.

Character Inspection / Date Verification
This item allows easy inspections of characters by registering specific characters in the model dictionary and specifying areas to be inspected.

Calendar function
Character strings to be inspected are automatically updated by specifying duration of use. It can allow the inspections of encrypted dates (such as "X" representing 10).

Items supporting measurement

High Precision Calibration
This is a function corresponding to trapezoidal distortion correction. High precision measurements are possible even when cameras are installed at an angle.

Coping with geometric computation
Circle/Line Regression
With this item, you can cope with geometric computation in addition to functional computation. It allows you to relate coordinates very easily while looking at images.
Designing

Easy to use

Flow menu

Basic processing items required for various inspections such as image input, measurement, display and output are packaged. FZ3 can immediately support any process, from the initial setup to the launch of a new line, with the setting screen for each processing item from which the user can set the required threshold values and parameters.

Examples of Processing Flow Customization

Defect Inspection for Workpieces Carried at Different Angles to the Camera

In order to inspect workpieces placed and carried at different angles to the camera, the most appropriate settings can be made automatically for each angle.

Useful Functions in Flow Menu

Flow Group function

Processing items can be named and grouped. You can efficiently manage a long workflow by assigning a folder to each processing item.

Performing different processing items at a time

You can copy or delete two or more processing items at a time by just checking them on the screen.

Copy & paste processing items from another scene

You can set up a new flow menu by combining different processing items copied from other scenes. When you want to utilize the setting of other scene, you do not need to make adjustments.

Test Measurement and Setting and Adjustment On Your PC Without Stopping the Operation

You can use simulation software that operates in the same environment as the controller, to perform all tasks from flow design and test measurement to setting adjustment. You can make adjustments without stopping the line. This saves a lot of time at the production site.

Useful Functions for Test Measurement

Continuous test measurement function

Settings must be verified with as many images as possible. With OMRON’s FZ3, continuous measurements of hundreds of images can be performed by a single click. Checking the results of continuous measurement in a graph

Judgment monitoring function

Continuous measurement stops automatically when a defect occurs. Once the measurement stops, you can select the next course of action right away for efficient testing and verification. If a defect occurs, measurement stops automatically \( \rightarrow \) Select the course of action.
Easy to use

Designing

Easy set-up
Flow menu
Basic processing items required for various inspections such as image input, measurement, display and output are packaged. F23 can immediately support any process, from the initial setup to the launch of a new line, with the setting screen for each processing item from which the user can set the required threshold values and parameters.

Examples of Processing Flow Customization
Detect inspection for workpieces carried at different angles to the camera
In order to inspect workpieces placed and carried at different angles to the camera, the most appropriate settings can be made automatically for each angle.

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Processing items can be named and grouped. You can efficiently manage a long work flow by assigning a label to each processing item.

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You can copy or delete two or more processing items at a time by just checking them on the screen.

Copy & paste processing items from another scene.
You can set up a new flow menu by combining different processing items copied from other scenes. When you want to utilize the setting of other scenes, you do not need to make adjustments.

Test Measurement and Setting and Adjustment On Your PC Without Stopping the Operation
You can use simulation software that operates in the same environment as the controller, to perform all tasks from flow design and test measurement to setting adjustment. You can make adjustments without stopping the line. This saves a lot of time at the production site.

Useful Functions for Test Measurement
Continuous test measurement function
Settings can be verified as a whole. With "VisionOptimizer", continuous measurement of hundreds of images can be performed by a single click.
Checking the results of continuous measurement in a graph
You can check and measure the test results by selecting the measurement on the display and displaying the graph.

Judgment monitoring function
Continuous measurement stops automatically when a defect occurs. Once the measurement stops, you can select the test area of the chart right away for efficient testing and verification.

Easy Creation of Ladder Programs Improved PLC
Link Function
There are now more models supporting the PLC function that lets you perform serial data communication with the PLC link via simple input operation. This reduces the design man-hours because creating ladder programs for the PLC has become much easier.

On-site Installation / Adjustment

Optimal Focus / Aperture Settings
Focus and brightness, whose adjustment has depended on experience and feeling, can now be set numerically and visualized in a graph view. Anyone can find optimal focus and aperture settings quickly, which in turn eliminates setting variations among different individuals and therefore allows more severe inspection accuracy.

Optimal Focus / Aperture Settings
Examples of Processing Flow Customization
Detect inspection for workpieces carried at different angles to the camera
In order to inspect workpieces placed and carried at different angles to the camera, the most appropriate settings can be made automatically for each angle.

Operation

Customizable Screens for User-friendly Operation
Operating screens can be customized freely and easily according to the inspection details and actual environment of the site. A full set of customization functions are available to let you not only prevent malfunctions and unexpected downtimes on site, but also take immediate actions should you encounter sudden defects.

Useful Functions for Test Measurement
Continuous test measurement function
Settings can be verified as a whole. With "VisionOptimizer", continuous measurement of hundreds of images can be performed by a single click.
Checking the results of continuous measurement in a graph
You can check and measure the test results by selecting the measurement on the display and displaying the graph.

Judgment monitoring function
Continuous measurement stops automatically when a defect occurs. Once the measurement stops, you can select the test area of the chart right away for efficient testing and verification.

Measurement information
Measurement information to be chosen on operating screen can be changed as you like. You can change the items to be displayed as well as the position and font size of each item.

Display of Processing Items
You can set "No Display" of any processing items during operation.

Display of the latest NG image
You can arrange a set of shortcut buttons as you like according to the number of cameras and their purposes. You can display a detail of a workpiece when a defect is detected, and go straight to the next step when an NG image is detected. It is possible to set whether to display the NG image actually being inspected or the image actually being inspected.

Useful Functions for Test Measurement
Continuous test measurement function
Settings can be verified as a whole. With "VisionOptimizer", continuous measurement of hundreds of images can be performed by a single click.
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Basic Configuration

Controllers

Best performance for each application

NEW Dual-task, High-grade, High-speed Controllers
Adopting the industry’s first dual-engine architecture, these models can process high grade items via dual parallel flows.

<table>
<thead>
<tr>
<th>Controllers</th>
<th>Two-camera controllers</th>
<th>Four-camera controllers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated with LCD</td>
<td>FZ3-H900 (NPN) / FZ3-H905 (PNP)</td>
<td>FZ3-H900-10 (NPN) / FZ3-H905-10 (PNP)</td>
</tr>
<tr>
<td>Box-type Controllers</td>
<td>FZ3-H950 (NPN) / FZ3-H955 (PNP)</td>
<td>FZ3-H950-10 (NPN) / FZ3-H955-10 (PNP)</td>
</tr>
</tbody>
</table>

NEW Dual-task, High-speed Controllers
Adopting the industry’s first dual-engine architecture, these models can process standard items faster.

<table>
<thead>
<tr>
<th>Controllers</th>
<th>Two-camera controllers</th>
<th>Four-camera controllers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated with LCD</td>
<td>FZ3-900 (NPN) / FZ3-905 (PNP)</td>
<td>FZ3-900-10 (NPN) / FZ3-905-10 (PNP)</td>
</tr>
<tr>
<td>Box-type Controllers</td>
<td>FZ3-950 (NPN) / FZ3-955 (PNP)</td>
<td>FZ3-950-10 (NPN) / FZ3-955-10 (PNP)</td>
</tr>
</tbody>
</table>

Cameras and Accessories

Digital cameras

<table>
<thead>
<tr>
<th>5 million-pixel</th>
<th>2 million-pixel</th>
<th>300,000-pixel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color FZ-SC5M</td>
<td>Color FZ-SC2M</td>
<td>Color FZ-SC</td>
</tr>
<tr>
<td>Black &amp; White FZ-S5M</td>
<td>Black &amp; White FZ-S2M</td>
<td>Black &amp; White FZ-S</td>
</tr>
</tbody>
</table>

Small digital cameras

<table>
<thead>
<tr>
<th>300,000-pixel flat type</th>
<th>300,000-pixel pen type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color FZ-SFC</td>
<td>Color FZ-SPC</td>
</tr>
<tr>
<td>Black &amp; White FZ-SF</td>
<td>Black &amp; White FZ-SP</td>
</tr>
</tbody>
</table>

Lenses

- High-resolution, low-distortion lenses FZ-LEH Series
- CCTV lens 3Z4S-LE Series
- Small lens FZ-LES Series

Camera Cables

- Camera Cables FZ-VS
- Bend resistant camera cables FZ-VSB
- Right-angle camera cable FZ-VSL
- Long-distance camera cable FZ-VS2
- Long-distance right-angle camera cable FZ-VSL2
High-grade, High-speed Controllers

With the industry’s fastest CPU, the controllers promptly process cutting-edge, high grade processing items. Not only a 2 million-pixel camera but also a 5 million-pixel camera can also be connected to the controllers.

<table>
<thead>
<tr>
<th>Controllers integrated with LCD</th>
<th>Two-camera controllers</th>
<th>FZ3-H700 (NPN) / FZ3-H705 (PNP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box-type Controllers</td>
<td>Four-camera controllers FZ3-H700-10 (NPN) / FZ3-H705-10 (PNP)</td>
<td></td>
</tr>
</tbody>
</table>

High-speed Controllers

High-resolution 5 million-pixel cameras can be connected to the controllers with the industry’s fastest CPU. They are ideal for high speed processing of standard inspection items.

<table>
<thead>
<tr>
<th>Controllers integrated with LCD</th>
<th>Two-camera controllers</th>
<th>FZ3-700 (NPN) / FZ3-705 (PNP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box-type Controllers</td>
<td>Four-camera controllers FZ3-700-10 (NPN) / FZ3-705-10 (PNP)</td>
<td></td>
</tr>
</tbody>
</table>

High-grade Controllers

These standard controllers feature our cutting-edge High Grade algorithm. They allow flexible defect solving capability and high speed processing at the same time.

<table>
<thead>
<tr>
<th>Controllers integrated with LCD</th>
<th>Two-camera controllers</th>
<th>FZ3-H300 (NPN) / FZ3-H305 (PNP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box-type Controllers</td>
<td>Four-camera controllers FZ3-H300-10 (NPN) / FZ3-H305-10 (PNP)</td>
<td></td>
</tr>
</tbody>
</table>

Standard Controllers

They cover all standard functions and processing items. Their performance is more than adequate.

<table>
<thead>
<tr>
<th>Controllers integrated with LCD</th>
<th>Two-camera controllers</th>
<th>FZ3-300 (NPN) / FZ3-305 (PNP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box-type Controllers</td>
<td>Four-camera controllers FZ3-300-10 (NPN) / FZ3-305-10 (PNP)</td>
<td></td>
</tr>
</tbody>
</table>

Peripheral devices

- **Intelligent cameras**
  - Narrow field of vision FZ-SLC15
  - Wide field of vision FZ-SLC100

- **Autofocus cameras**
  - Narrow field of vision FZ-SLC15
  - Wide field of vision FZ-SLC100

- **Cable extension unit**
  - FZ-VSJ

- **Strobe controller**
  - FZ-VP
  - Strobe controller designed specifically for FZ Series 3Z4S-LT MLEK-C100E1TS2. Manufactured by MORITEX Corporation

- **Intelligent camera diffusion plate**
  - Narrow field of vision FZ-SLC15-DL
  - Wide field of vision FZ-SLC100-DL

- **Halation cut illumination**
  - Integrated unit combining light, strobe controller and camera FZ-SLDCBP/101/BP-46

- **LCD monitor**
  - FZ-M08

- **Monitor cable**
  - FZ-VM

- **Parallel cable**
  - FZ-VP

- **USB memory**
  - FZ-MEM1G

- **VESA attachment**
  - FZ-VESA

- **Desktop controller stand**
  - FZ-DS

- **Controller stand**
  - FZ-DS
## Ordering Information

### FZ3 Series

<table>
<thead>
<tr>
<th>Item</th>
<th>Descriptions</th>
<th>Model</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Controllers</strong></td>
<td>Controllers integrated with LCD</td>
<td>Two-camera controllers NPN/NPN</td>
<td>FZ3-H900/FZ3-H905</td>
</tr>
<tr>
<td></td>
<td>Four-camera controllers NPN/NPN</td>
<td>FZ3-H900-10/FZ3-H905-10</td>
<td>With touch pen</td>
</tr>
<tr>
<td></td>
<td>Box-type controllers</td>
<td>Two-camera controllers NPN/NPN</td>
<td>FZ3-H950/FZ3-H955</td>
</tr>
<tr>
<td></td>
<td>Four-camera controllers NPN/NPN</td>
<td>FZ3-H950-10/FZ3-H955-10</td>
<td></td>
</tr>
<tr>
<td><strong>Controllers</strong></td>
<td>Controllers integrated with LCD</td>
<td>Two-camera controllers NPN/NPN</td>
<td>FZ3-900/FZ3-905</td>
</tr>
<tr>
<td></td>
<td>Four-camera controllers NPN/NPN</td>
<td>FZ3-900-10/FZ3-905-10</td>
<td>With touch pen</td>
</tr>
<tr>
<td></td>
<td>Box-type controllers</td>
<td>Two-camera controllers NPN/NPN</td>
<td>FZ3-950/FZ3-955</td>
</tr>
<tr>
<td></td>
<td>Four-camera controllers NPN/NPN</td>
<td>FZ3-950-10/FZ3-955-10</td>
<td></td>
</tr>
<tr>
<td><strong>Controllers</strong></td>
<td>Controllers integrated with LCD</td>
<td>Two-camera controllers NPN/NPN</td>
<td>FZ3-H700/FZ3-H705</td>
</tr>
<tr>
<td></td>
<td>Four-camera controllers NPN/NPN</td>
<td>FZ3-H700-10/FZ3-H705-10</td>
<td>With touch pen</td>
</tr>
<tr>
<td></td>
<td>Box-type controllers</td>
<td>Two-camera controllers NPN/NPN</td>
<td>FZ3-H750/FZ3-H755</td>
</tr>
<tr>
<td></td>
<td>Four-camera controllers NPN/NPN</td>
<td>FZ3-H750-10/FZ3-H755-10</td>
<td></td>
</tr>
<tr>
<td><strong>Controllers</strong></td>
<td>Controllers integrated with LCD</td>
<td>Two-camera controllers NPN/NPN</td>
<td>FZ3-300/FZ3-305</td>
</tr>
<tr>
<td></td>
<td>Four-camera controllers NPN/NPN</td>
<td>FZ3-300-10/FZ3-305-10</td>
<td>With touch pen</td>
</tr>
<tr>
<td></td>
<td>Box-type controllers</td>
<td>Two-camera controllers NPN/NPN</td>
<td>FZ3-350/FZ3-355</td>
</tr>
<tr>
<td></td>
<td>Four-camera controllers NPN/NPN</td>
<td>FZ3-350-10/FZ3-355-10</td>
<td></td>
</tr>
<tr>
<td><strong>Intelligent cameras</strong></td>
<td>Wide field of vision</td>
<td>Color</td>
<td>FZ-SLC100</td>
</tr>
<tr>
<td></td>
<td>Narrow field of vision</td>
<td>Color</td>
<td>FZ-SLC15</td>
</tr>
<tr>
<td><strong>Autofocus cameras</strong></td>
<td>Wide field of vision</td>
<td>Color</td>
<td>FZ-SZC100</td>
</tr>
<tr>
<td></td>
<td>Narrow field of vision</td>
<td>Color</td>
<td>FZ-SZC15</td>
</tr>
<tr>
<td><strong>Digital cameras</strong></td>
<td>300,000 Pixels</td>
<td>Monochrome</td>
<td>FZ-S</td>
</tr>
<tr>
<td></td>
<td>2 million pixels</td>
<td>Monochrome</td>
<td>FZ-S2M</td>
</tr>
<tr>
<td></td>
<td>5 million pixels</td>
<td>Monochrome</td>
<td>FZ-S5M</td>
</tr>
<tr>
<td></td>
<td>5 million pixels</td>
<td>Color</td>
<td>FZ-S5C</td>
</tr>
<tr>
<td><strong>Small digital cameras</strong></td>
<td>300,000-pixel flat type</td>
<td>Monochrome</td>
<td>FZ-SF</td>
</tr>
<tr>
<td></td>
<td>Color</td>
<td>FZ-SFC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300,000-pixel pen type</td>
<td>Monochrome</td>
<td>FZ-SP</td>
</tr>
<tr>
<td></td>
<td>Color</td>
<td>FZ-SPC</td>
<td></td>
</tr>
<tr>
<td><strong>Intelligent camera diffusion plate</strong></td>
<td>Wide field of vision</td>
<td>FZ-SLC100-DL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Narrow field of vision</td>
<td>FZ-SLC15-DL</td>
<td></td>
</tr>
<tr>
<td><strong>CCTV Lenses</strong></td>
<td>3Z4S-LE Series</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Extension Tubes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Low-distortion Lenses</strong></td>
<td>FZ-LEH5/LEH8/LEH12/LEH16/LEH25/LEH35/LEH50/LEH75/LEH100</td>
<td>Low distortion lens for 2-million pixel cameras and 5-million pixel cameras</td>
<td></td>
</tr>
<tr>
<td><strong>Lenses for small camera</strong></td>
<td>FZ-LES3/LES6/LES16/LES30</td>
<td>Lens for 300,000-pixel small cameras</td>
<td></td>
</tr>
<tr>
<td><strong>Extension Tubes for small camera</strong></td>
<td>FZ-LESR</td>
<td>Extension Tubes for 300,000-pixel small cameras</td>
<td></td>
</tr>
<tr>
<td><strong>Halation cut illumination</strong></td>
<td>FZ-SXCRB7018BR-4S</td>
<td>Integrated unit combining special Halation cut illumination, strobe controller and camera (without lens)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FZ-LTRCRB7018BR-4S</td>
<td>Integrated unit combining special Halation cut illumination and strobe controller</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FZ-LTRB7018BR-4S</td>
<td>Special Halation cut illumination only</td>
<td></td>
</tr>
</tbody>
</table>
### System configuration

**Controllers integrated with LCD**

- **RS-232C connected**
- **Parallel I/O**
- **Ethernet**
- **Analogue RGB**
- **Input device**
  - Mouse
  - Touch pen (accessory attached)
  - USB connection
- **Camera connected**

**Box-type Controllers**

- **Input device**
  - Mouse
  - Touch pen (accessory attached)
  - USB connection
- **Camera connected**
- **Analogue RGB**
- **Ethernet**
- **Parallel I/O**

### Lenses

#### High-resolution, Low-distortion Lenses

<table>
<thead>
<tr>
<th>Model</th>
<th>FZ-LEH6</th>
<th>FZ-LEH6</th>
<th>FZ-LEH12</th>
<th>FZ-LEH16</th>
<th>FZ-LEH18</th>
<th>FZ-LEH35</th>
<th>FZ-LEH50</th>
<th>FZ-LEH100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>F2.8</td>
<td>F1.4</td>
<td>F1.4</td>
<td>F1.4</td>
<td>F1.4</td>
<td>F2</td>
<td>F2.8</td>
<td>F2.8</td>
</tr>
<tr>
<td><strong>Brightness</strong></td>
<td>M40.5</td>
<td>P0.5</td>
<td>M37.0</td>
<td>P0.5</td>
<td>M37.0</td>
<td>P0.5</td>
<td>M37.0</td>
<td>P0.5</td>
</tr>
<tr>
<td><strong>Filter size</strong> (mm)</td>
<td>30</td>
<td>25</td>
<td>20</td>
<td>15</td>
<td>25</td>
<td>20</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td><strong>Effective diameters</strong></td>
<td>70.0</td>
<td>51.0</td>
<td>55.0</td>
<td>43.0</td>
<td>36.5</td>
<td>39.5</td>
<td>36.5</td>
<td>37.0</td>
</tr>
</tbody>
</table>

#### CocoaTV Lenses

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>F1.4</td>
<td>F1.4</td>
<td>F1.4</td>
<td>F1.4</td>
<td>F1.4</td>
<td>F1.4</td>
<td>F1.4</td>
<td>F1.4</td>
</tr>
<tr>
<td><strong>Brightness</strong></td>
<td>M67</td>
<td>M67</td>
<td>M67</td>
<td>M67</td>
<td>M67</td>
<td>M67</td>
<td>M67</td>
<td>M67</td>
</tr>
<tr>
<td><strong>Filter size</strong> (mm)</td>
<td>55</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td><strong>Effective diameters</strong></td>
<td>23</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

#### Extension Tubes

<table>
<thead>
<tr>
<th>Model</th>
<th>3Z4S-LE ML-EXR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contents</strong></td>
<td>Set of 7 tubes(40 mm, 20 mm, 10 mm, 5 mm, 2.0 mm, and 0.5 mm) Maximum outer diameter: 30 mm dia.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>FZ-LESR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contents</strong></td>
<td>Set of 3 tubes(15 mm, 10 mm, 5 mm) Maximum outer diameter: 12 mm dia.</td>
</tr>
</tbody>
</table>

Note 1: This Cable has a L-shaped connector on the Camera end.
Note 2: The 10-m cable cannot be used for the intelligent camera, autofocus camera and 5 million-pixel camera.
Note 3: The 15-m cable cannot be used for the intelligent camera, autofocus camera and 5 million-pixel camera.
Note 4: The 5-mm Extension Tubes (3Z4S-LE ML-EXR) cannot be used with FZ-LEH5 Lenses.
Note 5: The maximum cable length depends on the Camera being connected, and the model and length of the Cable being used.
Do not install the firmware for FZ2 in any High Grade High Speed or High Grade controller of the FZ3 series. It will lead to the failure of the controller. For software download, please contact your Omron representative.

The operating mode can be switched from the Controller Menu settings.

When the strobe controller is connected to the lights, the controller uses power as much as it does when connected to the intelligent camera.

The image logging capacity changes when multiple cameras of different types are connected at the same time.

The operation mode can be changed on the controller menu.

### Ratings and Specifications (Controllers)

#### Dual-task, High-grade, High-speed Controllers and Dual-task, High-speed Controllers

<table>
<thead>
<tr>
<th>Model</th>
<th>NPN Output</th>
<th>PNP Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>FZ3-905</td>
<td>FZ3-905-10</td>
<td>FZ3-H905</td>
</tr>
<tr>
<td>FZ3-905</td>
<td>FZ3-905-10</td>
<td>FZ3-H905</td>
</tr>
<tr>
<td>FZ3-905</td>
<td>FZ3-905-10</td>
<td>FZ3-H905</td>
</tr>
<tr>
<td>FZ3-905</td>
<td>FZ3-905-10</td>
<td>FZ3-H905</td>
</tr>
<tr>
<td>FZ3-905</td>
<td>FZ3-905-10</td>
<td>FZ3-H905</td>
</tr>
<tr>
<td>FZ3-905</td>
<td>FZ3-905-10</td>
<td>FZ3-H905</td>
</tr>
</tbody>
</table>

Connected Camera

Please refer to the "Camera Connection" table in Page 26.

<table>
<thead>
<tr>
<th>No. of Cameras</th>
<th>Processing resolution</th>
<th>No. of scenes</th>
<th>Number of logged images (See note 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>When connected to a 3,000,000-pixel camera: 640(H)×480(V)</td>
<td>32</td>
<td>Connected to 1 camera: Color camera: 256, Monochrome Camera: 256</td>
</tr>
<tr>
<td>4</td>
<td>When connected to a 2 million-pixel camera: 1600(H)×1200(V)</td>
<td>4</td>
<td>Connected to 2 cameras: Color camera: 125, Monochrome Camera: 126</td>
</tr>
<tr>
<td>4</td>
<td>When connected to a 5 million-pixel camera: 2448(H)×2044(V)</td>
<td>4</td>
<td>When connected to a 3 million-pixel camera: Color camera: 83, Monochrome Camera: 84</td>
</tr>
</tbody>
</table>

Codes that can be read with FZ3

- < Bar Codes > JAN/EAN/UPC (including add-on codes), Code 39, Codabart (NW-7), ITF (Interleaved 2 of 5), Code 93, Code 128, GS1-128, GS1 DataBar (RSS-14 / RSS Limited / RSS Expanded)
- < 2D Codes > Data Matrix (ECC200), QR Code

#### High-grade, High-speed Controllers and High-speed Controllers

<table>
<thead>
<tr>
<th>Model</th>
<th>NPN Output</th>
<th>PNP Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>FZ3-705</td>
<td>FZ3-705-10</td>
<td>FZ3-H705</td>
</tr>
<tr>
<td>FZ3-705</td>
<td>FZ3-705-10</td>
<td>FZ3-H705</td>
</tr>
<tr>
<td>FZ3-705</td>
<td>FZ3-705-10</td>
<td>FZ3-H705</td>
</tr>
<tr>
<td>FZ3-705</td>
<td>FZ3-705-10</td>
<td>FZ3-H705</td>
</tr>
<tr>
<td>FZ3-705</td>
<td>FZ3-705-10</td>
<td>FZ3-H705</td>
</tr>
<tr>
<td>FZ3-705</td>
<td>FZ3-705-10</td>
<td>FZ3-H705</td>
</tr>
</tbody>
</table>

Connected Camera

Please refer to the "Camera Connection" table in Page 26.

<table>
<thead>
<tr>
<th>No. of Cameras (See note 1)</th>
<th>Processing resolution</th>
<th>No. of scenes</th>
<th>Number of logged images (See note 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>When connected to a 3,000,000-pixel camera: 640(H)×480(V)</td>
<td>32</td>
<td>Connected to 1 camera: Color camera: 256, Monochrome Camera: 256</td>
</tr>
<tr>
<td>4</td>
<td>When connected to a 2 million-pixel camera: 1600(H)×1200(V)</td>
<td>4</td>
<td>Connected to 2 cameras: Color camera: 125, Monochrome Camera: 126</td>
</tr>
<tr>
<td>4</td>
<td>When connected to a 5 million-pixel camera: 2448(H)×2044(V)</td>
<td>4</td>
<td>When connected to a 3 million-pixel camera: Color camera: 83, Monochrome Camera: 84</td>
</tr>
</tbody>
</table>

Codes that can be read with FZ3

- < Bar Codes > JAN/EAN/UPC (including add-on codes), Code 39, Codabart (NW-7), ITF (Interleaved 2 of 5), Code 93, Code 128, GS1-128, GS1 DataBar (RSS-14 / RSS Limited / RSS Expanded)
- < 2D Codes > Data Matrix (ECC200), QR Code

#### Operation

- Touch pen, mouse, etc.
- Mouse or similar device

#### Settings

Create series of processing steps by editing the flowchart (Help messages provided).

#### Serial communications

- RS-232C/422A/1CH

#### Network communications

- Ethernet 10BASE-T/10BASE-T

#### Parallel I/O

- (When used in Multi-line random-trigger mode) T inputs (RESET, STEP, ENTRIG, 20, STEP, ENTRIG, 21, DS40 to 1, ENTRIG, B0 to 0, D0 to 7), 29 outputs (RUN, BUSY, GATE, OR, READY, ERROR, STGOUT0 to 3, D0O to 15) (When used in other mode) 13 inputs (RESET, STEP, ENTRIG, 20, DS40, ENTRIG, A0, ENTRIG, B0 to 0, D0 to 7), 26 outputs (RUN, BUSY, GATE, OR, OR, READY, ERROR, STGOUT0 to 3, D0O to 15)

#### Monitor interface

- Integrated Controller and LCD 12.1 inch TFT color LCD
- (Resolution: XGA 1,024 × 768 dots)
- Integrated RGB video output, 1 channel
- (Resolution: XGA 1,024 × 768 dots)

#### USB interface

- 4 channels (supports USB 1.1 and 2.0)

#### Power supply voltage

- 20.4 to 26.4 VDC

#### Current consumption

- (See note 3.)
- (See note 4.)

#### Ambient temperature range

- Operating: 0 to 45°C
- Storage: −20 to 65°C (with no icing or condensation)

#### Weight

- Approx. 3.2 kg
- Approx. 3.4 kg
- Approx. 1.8 kg
- Approx. 1.9 kg

#### Accessories

- Touch pen (one, inside the front panel)
- Please Read
- First, Instruction Manual (Setup), 6 mounting brackets
- Please Read First, Instruction Manual (Setup)

Note 1: The image logging capacity changes when multiple cameras of different types are connected at the same time.

Note 2: The operation mode can be changed on the controller menu.

Note 3: The current consumption when the maximum number of cameras supported by each controller are connected. If a single controller model is connected to a lamp, the current consumption is as high as when an intelligent camera is connected.

Note 4: The current consumption when the maximum number of cameras supported by each controller are connected. If a single controller model is connected to a lamp, the current consumption is as high as when an intelligent camera is connected.

Note 5: When connecting 5 million-pixel cameras, up to two cameras can be connected. 2. The number of logged images will vary when connecting multiple Cameras with different modes.

Note 6: The operating mode can be switched from the Controller Menu settings. 4. When the strobe controller is connected to the lights, the controller uses power as much as it does when connected to the intelligent camera.

Note 7: Do not install the firmware for FZ2 in any High Grade High Speed or High Grade controller of the FZ3 series. It will lead to the failure of the controller. For software download, please contact your Omron representative.
### Ratings and Specifications (Cameras)

#### Intelligent cameras, autofocus cameras

<table>
<thead>
<tr>
<th>Model</th>
<th>FZ-SL100</th>
<th>FZ-SL15</th>
<th>FZ-SZC100</th>
<th>FZ-SZC15</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Image elements</strong></td>
<td>Interline transfer reading all pixels, 1/3-inch CCD image elements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Color/Monochrome</strong></td>
<td>Color</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Effective pixels</strong></td>
<td>640(H)×480(V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pixel size</strong></td>
<td>4.4(μm)×4.4(μm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shutter function</strong></td>
<td>Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Partial function</strong></td>
<td>12 to 480 lines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Frame rate (image read time)</strong></td>
<td>80fps(12.5ms)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Field of vision (See note 1)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Installation distance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LED class (See note 3.) (lighting)</strong></td>
<td>Class 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient temperature range</strong></td>
<td>Operating: 0 to 50°C, Storage: −25 to 65°C (with no icing or condensation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient humidity range</strong></td>
<td>Operating and storage: 35% to 85% (with no condensation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 670 g</td>
<td>Approx. 760 g</td>
<td>Approx. 150g</td>
<td>Approx. 140g</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>Instruction sheet and hexagonal wrench</td>
<td>Please Read First, Instruction Manual (Setup)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
1. Tolerance: ±5% max.
2. The length of the visual field is the lengths along the Y axis.

#### Digital cameras

<table>
<thead>
<tr>
<th>Model</th>
<th>FZ-S</th>
<th>FZ-SC</th>
<th>FZ-S2M</th>
<th>FZ-SC2M</th>
<th>FZ-SM</th>
<th>FZ-SC5M</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Image elements</strong></td>
<td>Interline transfer reading all pixels, 1/3-inch CCD image elements</td>
<td>Interline transfer reading all pixels, 1/1.8-inch CCD image elements</td>
<td>Interline transfer reading all pixels, 2/3-inch CCD image elements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Color/Monochrome</strong></td>
<td>Monochrome</td>
<td>Color</td>
<td>Monochrome</td>
<td>Color</td>
<td>Monochrome</td>
<td>Color</td>
</tr>
<tr>
<td><strong>Effective pixels</strong></td>
<td>640(H)×480(V)</td>
<td>1600(H)×1200(V)</td>
<td>2448(H)×2048(V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pixel size</strong></td>
<td>4.4(μm)×4.4(μm)</td>
<td>3.49(μm)×3.49(μm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shutter function</strong></td>
<td>Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s</td>
<td>Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s</td>
<td>Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Partial function</strong></td>
<td>12 to 480 lines</td>
<td>12 to 480 lines</td>
<td>12 to 2044 lines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Frame rate (image read time)</strong></td>
<td>80fps(12.5ms)</td>
<td>30fps(33.3ms)</td>
<td>16fps(62.5ms)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Field of vision, installation distance</strong></td>
<td>Selecting a lens according to the field of vision and installation distance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient temperature range</strong></td>
<td>Operating: 0 to 50°C, Storage: −25 to 65°C (with no icing or condensation)</td>
<td>Operating: 0 to 40°C, Storage: −25 to 65°C (with no icing or condensation)</td>
<td>Operating: 0 to 40°C, Storage: −25 to 65°C (with no icing or condensation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient humidity range</strong></td>
<td>Operating and storage: 35% to 85% (with no condensation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 3.2 kg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>Instruction manual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Small digital cameras

<table>
<thead>
<tr>
<th>Model</th>
<th>FZ-SF</th>
<th>FZ-SCF</th>
<th>FZ-SP</th>
<th>FZ-SPC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Image elements</strong></td>
<td>Interline transfer reading all pixels, 1/3-inch CCD image elements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Color/Monochrome</strong></td>
<td>Monochrome</td>
<td>Color</td>
<td>Monochrome</td>
<td>Color</td>
</tr>
<tr>
<td><strong>Effective pixels</strong></td>
<td>640(H)×480(V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pixel size</strong></td>
<td>4.4(μm)×4.4(μm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shutter function</strong></td>
<td>Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Partial function</strong></td>
<td>12 to 480 lines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Frame rate (image read time)</strong></td>
<td>80fps(12.5ms)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Field of vision, installation distance</strong></td>
<td>Selecting a lens according to the field of vision and installation distance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient temperature range</strong></td>
<td>Operating: 0 to 50°C (camera amp)</td>
<td>Operating: 0 to 40°C (camera head)</td>
<td>Operating: 0 to 40°C (camera head)</td>
<td></td>
</tr>
<tr>
<td><strong>Ambient humidity range</strong></td>
<td>Operating and storage: 35% to 85% (with no condensation)</td>
<td>Operating and storage: 35% to 85% (with no condensation)</td>
<td>Operating and storage: 35% to 85% (with no condensation)</td>
<td></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 1.5kg</td>
<td>Approx. 1.5kg</td>
<td>Approx. 1.5kg</td>
<td></td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>Instruction manual, installation bracket, Four mounting brackets(M2)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Ratings and Specifications (LCD Monitor, Cable)

### LCD Monitor

- **FZ-M08**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td>8.4 inches</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Liquid crystal color TFT</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>1,024 x 768 dots</td>
</tr>
<tr>
<td><strong>Input signal</strong></td>
<td>Analog RGB video input, 1 channel</td>
</tr>
<tr>
<td><strong>Power supply voltage</strong></td>
<td>21.6 to 26.4 VDC</td>
</tr>
<tr>
<td><strong>Current consumption</strong></td>
<td>Approx. 0.7 A max.</td>
</tr>
<tr>
<td><strong>Ambient temperature range</strong></td>
<td>Operating: 0 to 50°C Storage: 0 to 65°C (with no icing or condensation)</td>
</tr>
<tr>
<td><strong>Ambient humidity range</strong></td>
<td>Operating: 35 to 85%RH (no condensation)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 16.2 kg</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>Instruction Sheet and 4 mounting brackets</td>
</tr>
</tbody>
</table>

### Camera Cables

- **FZ-VS (2m)**
- **FZ-VSB (2m)**
- **FZ-VSL (2m)**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shock resistiveness</strong></td>
<td>10 to 150Hz single amplitude 0.15mm 3 directions, 8 strokes, 4 times</td>
</tr>
<tr>
<td><strong>Ambient temperature range</strong></td>
<td>Operation: 0 to +50°C Storage: 0 to +65°C (with no icing or condensation)</td>
</tr>
<tr>
<td><strong>Ambient humidity range</strong></td>
<td>Operation and storage: 35 to 85%RH (with no condensation)</td>
</tr>
<tr>
<td><strong>Ambient atmosphere</strong></td>
<td>No corrosive gases</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Cable sheath, connector: PVC</td>
</tr>
<tr>
<td><strong>Minimum bending radius</strong></td>
<td>69mm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 170g</td>
</tr>
</tbody>
</table>

### Monitor Cables

- **FZ-VM**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vibration resistiveness</strong></td>
<td>10 to 150Hz single amplitude 0.15mm 3 directions, 8 strokes, 4 times</td>
</tr>
<tr>
<td><strong>Ambient temperature range</strong></td>
<td>Operation: 0 to +50°C Storage: -25 to 65°C (with no icing or condensation)</td>
</tr>
<tr>
<td><strong>Ambient humidity range</strong></td>
<td>Operation and storage: 35 to 85%RH (with no condensation)</td>
</tr>
<tr>
<td><strong>Ambient atmosphere</strong></td>
<td>No corrosive gases</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Cable sheath: heat-resistant PVC Connector: PVC</td>
</tr>
<tr>
<td><strong>Minimum bending radius</strong></td>
<td>75mm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 170g</td>
</tr>
</tbody>
</table>

### Halation cut illumination

**General specifications**

- **FZ-XKC RB7018BR-4S**
- **FZ-LTC RB7018BR-4S**
- **FZ-LT RB7018BR-4S**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current consumption</strong></td>
<td>18 W or less (12 VDC, 1.5 A max.)</td>
</tr>
<tr>
<td><strong>Vibration resistance</strong></td>
<td>10 to 150Hz single amplitude 0.3mm (maximum acceleration 50m/s²) 3 directions, 8 strokes, 10 times</td>
</tr>
<tr>
<td><strong>Impact resistance</strong></td>
<td>150N²m² 6 directions, 3 times</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>Operating: 0 to 50°C Storage: -25 to 65°C (with no icing or condensation)</td>
</tr>
<tr>
<td><strong>Ambient humidity</strong></td>
<td>Operation and storage: 35 to 85%RH (with no condensation)</td>
</tr>
<tr>
<td><strong>Ambient atmosphere</strong></td>
<td>No corrosive gases</td>
</tr>
<tr>
<td><strong>Protective structure</strong></td>
<td>16C0209PA 9/20</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Case: zinc-coated steel plate Cover: acrylic board Clasp: stainless steel plate</td>
</tr>
<tr>
<td><strong>Weight including cables</strong></td>
<td>Approx. 600 g</td>
</tr>
</tbody>
</table>

### Camera Connection Table

**Type of camera**

- **Intelligent cameras**
- **Autofocus cameras**
- **Digital cameras**
- **Small digital cameras**

<table>
<thead>
<tr>
<th>Type of camera</th>
<th>Model</th>
<th>Resolution</th>
<th>Standard Controllers (F2, F3-3, F3-4, F3-5)</th>
<th>High-grade Controllers (F2, F3-4, F3-5)</th>
<th>High-speed Controllers (F2, F3-4, F3-5)</th>
<th>High-grade, High-speed Controllers (F2, F3-4, F3-5)</th>
<th>Dual-task, High-speed Controllers (F2, F3-4, F3-5)</th>
<th>Dual-task, High-grade, High-speed Controllers (F2, F3-4, F3-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intelligent cameras</td>
<td>FZ-SLC100</td>
<td>300,000 Pixels</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>FZ-SLC15</td>
<td>300,000 Pixels</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>FZ-SZC100</td>
<td>300,000 Pixels</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>FZ-SZC15</td>
<td>300,000 Pixels</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>FZ-SL03000</td>
<td>300,000 Pixels</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>FZ-SL0203</td>
<td>2 million pixels</td>
<td>x</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>FZ-SLSM</td>
<td>5 million pixels</td>
<td>x</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>FZ-SSM</td>
<td>5 million pixels</td>
<td>x</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Small digital cameras</td>
<td>FZ-SFM</td>
<td>300,000 Pixels</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>FZ-SFM</td>
<td>300,000 Pixels</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>FZ-FSP</td>
<td>300,000 Pixels</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>FZ-SP</td>
<td>300,000 Pixels</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

**Note:** 1. When connecting 5 million-pixel cameras, up to two cameras can be connected.

### Cable Extension Unit

- **FZ-VS(15m)**
- **FZ-VSL(15m)**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shock resistiveness</strong></td>
<td>10 to 150Hz single amplitude 0.15mm 3 directions, 8 strokes, 4 times</td>
</tr>
<tr>
<td><strong>Ambient temperature range</strong></td>
<td>Operation: 0 to +50°C Storage: -25 to 65°C (with no icing or condensation)</td>
</tr>
<tr>
<td><strong>Ambient humidity range</strong></td>
<td>Operation and storage: 35 to 85%RH (with no condensation)</td>
</tr>
<tr>
<td><strong>Ambient atmosphere</strong></td>
<td>No corrosive gases</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Cable sheath, connector: PVC</td>
</tr>
<tr>
<td><strong>Minimum bending radius</strong></td>
<td>93mm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 160g</td>
</tr>
</tbody>
</table>

### Parallel Cable

- **FZ-VP**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vibration resistiveness</strong></td>
<td>10 to 150Hz single amplitude 0.15mm 3 directions, 8 strokes, 4 times</td>
</tr>
<tr>
<td><strong>Ambient temperature range</strong></td>
<td>Operation: 0 to +50°C Storage: -25 to 65°C (with no icing or condensation)</td>
</tr>
<tr>
<td><strong>Ambient humidity range</strong></td>
<td>Operation and storage: 35 to 85%RH (with no condensation)</td>
</tr>
<tr>
<td><strong>Ambient atmosphere</strong></td>
<td>No corrosive gases</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Cable sheath: heat-resistant PVC Connector: resin</td>
</tr>
<tr>
<td><strong>Minimum bending radius</strong></td>
<td>75mm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 160g</td>
</tr>
</tbody>
</table>

### Illumination specifications

- **Source** Blue LED (wavelength: Approx. 470nm) Red LED (wavelength: 630mm)
- **Illumination system** 8 blocks luminous intensity variation illumination
- **Average lifetime** 5,000 hours (Time it takes from manufacture for a 50% reduction in luminous intensity at an ambient temperature of 25°C, maximum brightness, and continuous illumination.)
### Processing Items

#### Inspections / Measurement

- **Search**
  - Used to identify the shapes and calculate the position of measurement objects.

- **Flexible Search**
  - Recognizing the shapes of workpieces with variation and detecting their positions.

- **Sensible Search**
  - Search a small difference by dividing the search model in detail, and calculating the correlation.

- **ECM Search**
  - Used to search the similar part of model from input image. Detect the evaluation value and position.

- **Es Circle Search**
  - Extract circles using “round ” shape information and get position, radius and quantity in high preciseness.

- **Shape Search**
  - Used to search the similar part of models from input image. Detect the evaluation value and position.

- **Classification**
  - Used when various kinds of products on the assembly line need to be sorted and identified.

- **Edge Position**
  - Measure position of measurement objects according to the color change in measurement area.

- **Edge Pitch**
  - Detect edges by color change in measurement area. Used for calculating number of pins of IC and connectors.

- **Scan Edge Position**
  - Measure peak/bottom edge position of workpieces according to the color change in separated measurement area.

- **Scan Edge Width**
  - Measure max/min/average width of workpieces according to the color change in separated measurement area.

- **Color Data**
  - Used for detecting presence and mixed varieties of products by using color average and deviation.

- **Gravity and Area**
  - Used to measure area, center of gravity of workpieces by extracting the color to be measured.

- **Labeling**
  - Used to measure number, area and center of gravity of workpieces by extracting registered color.

- **Labeling+**
  - Detecting one region of extracted Labelimg, and get that measurement. Area and Gravity position can be got and judged.

- **Defect**
  - Used for appearance measurement of plain-color measurement objects such as defects, stains and burrs.

- **Exact Defect**
  - Parameters for extraction defect can be set precisely.

- **Fine Matching**
  - Difference can be detected by overlapping and comparing(matching) registered line images with input images.

- **Character Inspection**
  - Recognize character according correlation search with model image registered in (Model Dictionary).

- **Date Verification**
  - Reading character string is verified with internal date.

- **Model Dictionary**
  - Register character pattern as dictionary. The pattern is used in [Character Inspection].

- **Barcode**
  - Recognize barcode, verify and output decoded characters.

- **2DCode**
  - Recognize 2D code, verify and output decoded characters.

- **Circle Angle**
  - Used for calculating angle of inclination of circular measurement objects.

- **Camera Image Input**
  - To input images from cameras. And set up the conditions to input images from cameras.

- **Camera Image Input OPCs**
  - Create high-dynamic range images by acquiring several images with different conditions.

- **Camera Switching**
  - To switch the cameras used for measurement. Not input images from cameras again.

- **Measurement Image Setting**
  - To measure images used for measurement. Not input images from camera again.

- **Post Correction**
  - Used when positions are differed. Correct measurement is performed by correcting position of input images.

- **Trapezoidal Corrections**
  - Rectify the trapezoidal deformed image.

- **Filtering**
  - Used for processing images input from cameras in order to make them easier to be measured.

---

#### Correcting images

- **Background Suppression**
  - To enhance contrast of images by extracting color in specified brightness.

- **Color Gray Filler**
  - Color image is converted into monochrome images to emphasize specific color.

- **Extract Color Filler**
  - Convert color image to color extracted image or binary image.

- **Anti Color Shading**
  - To remove the irregular color/pattern by uniformizing max.2 specified colors.

- **Stripes Removal Filler+**
  - Remove the background pattern of stripes.

- **Halation Cut+**
  - Remove halation from input image.

- **Panorama+**
  - Combine multiple image to create one big image.

- **Polar Translation**
  - Rectify the image by polar transformation. Useful for OCR or pattern inspection printed on circle.

- **Calculation**
  - Used when using the judge results and measured values of ProcItem which are registered in processing units.

- **Line Regression**
  - Used for calculating regression line from plural measurement coordinates.

- **Circle Regression**
  - Used for calculating regression circle from plural measurement coordinates.

- **Calibration+**
  - Transform (X,Y) position to the real coordinate system.

- **Set Unit Data**
  - Used to change the ProcItem data (setting parameters, etc.) that has been set up in a scene.

- **Get Unit Data**
  - Used to get one data (measured results, setting parameters, etc.) of ProcItem that has been set up in a scene.

- **Set Unit Figure**
  - Used for re-setting the figure data (model, measurement area ) registered in an unit.

- **Get Unit Figure**
  - Used for getting the figure data (model, measurement area ) registered in a unit.

- **Trend Monitor**
  - Used for displaying the information about results on the monitor, facilitating to avoid NG and analyze causes.

- **Image Logging**
  - Used for saving the measurement images to the memory and USB memory.

- **Elapsed Time**
  - Used for calculating the elapsed time since the measurement trigger input.

- **Wait**
  - Processing is stopped only at the set time. The standby time is set by the unit of [ms].

- **Focus**
  - Focus setting is supported.

- **Iris**
  - Focus and aperture setting is supported.

#### Branching processing

- **Conditional Branch**
  - Used where more than two kinds of products on the production line need to be detected separately.

- **End**
  - This ProcItem must be set up as the last processing unit of a branch.

- **DI Branch**
  - Some as ProcItem “Branch”. But you can change the targets of conditional branching via external inputs.

- **Data Output**
  - Used when you need to output data to the external devices such as PLC or PC via serial ports.

- **Paralleled Data Output**
  - Used when you need to output data to the external devices such as PLC or PC via parallel ports.

- **Target Judgement Output**
  - Used when the judge results and measured values of ProcItem which are registered in processing units.

- **Result Display**
  - Used for displaying the texts or the figures in the camera image.

- **Display Image File**
  - Display selected image file.

- **Display Last NG Image**
  - Display the last NG images.

---

*The items in red are High Grade processing items.*
The 5-mm Extension Tubes (3Z4S-LE ML-EXR) cannot be used with FZ-LEH25 Lenses.

The 5-mm Extension Tubes (3Z4S-LE ML-EXR) cannot be used with FZ-LEH25 Lenses.
Meaning of Optical Chart
The X axis of the optical chart shows the field of vision (mm)(Note1), and the Y axis of the optical chart shows the camera installation distance (mm)(Note2).

Note1: The vertical axis represents WD, not installation distance.

Intelligent camera, autofocus camera with wide field of vision FZ-S C100

Field of vision (mm)

Camera distance (mm)

Field of vision (mm)

Note1: The lengths of the fields of vision given in the optical charts are the lengths of the Y axis.
Note2: The vertical axis represents WD for small cameras.

* The value in parentheses is for the camera installation distance when using an Intelligent Camera.

*The value in parentheses is for the camera installation distance when using an Intelligent Camera.
*Be sure to check the Instruction Sheet packed with the product before using an Intelligent Camera or Autofocus Camera.
Quantitatively Deriving Optimal Setting Conditions

Industry's First VisionOptimizer Software [Patent Pending]

This PC software works in conjunction with simulation software to derive optimal setting conditions.

A large amount of image data is used to run inspections on a trial basis while changing the settings.

The results are statistically processed to let you select optimal parameters and conforming models quantitatively and with minimum man-hours.

1. Automatic verification of saved images
2. Quantitative checking of results
3. Reflection of optimal setting conditions

Improved inspection quality
Fewer setting man-hours
Quantifiable setting know-how

This document provides information mainly for selecting suitable models. Please read the document User’s Manual (Z285) carefully for information that the user must understand and accept before purchase, including information on warranty, limitations of liability, and precautions.

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