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TECHNOLOGY GROUP

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Find the *OMRON F150-VS* at our website: ***Click HERE***

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OMRON

Vision sensor

F150-3

Establish settings with a conversational feel. The dialog menu artist "talks" with you.



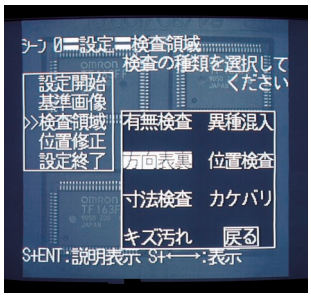
Features

The dialog menu lets you acomplish tasks with certitude.

Is this a "presense inspection"?
Is this "direction front-back"?
If "direction front-back", is this "shape of work"?
Settings can be accomplished with certitude by simply entering the information that the F150 requests, and setup man-hours can be reduced.

Select from seven types of applications

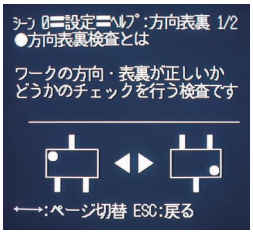
The type of inspection can be set for up to 16 areas, enabling support of multiple-type inspections.



*The screen may differ from actual screens.

Displays an image of the application.

You can verify whether the desired inspection has been selected without error.





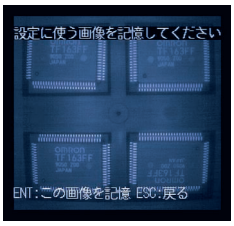
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Features

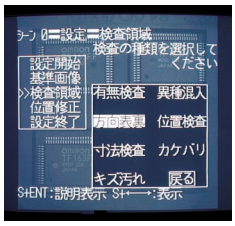
The dialog menu guides you through operations with ease.

1 Storing the reference image

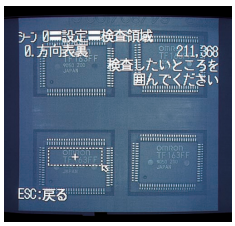


Place the work to be inspected so that it appears in the screen, and save the image as the reference image. When saving the image, lighting and shutter speed settings can be selected from the menu while viewing the image.

2 Inspection item/area settings

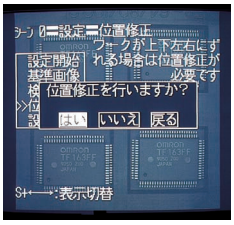


Seven types of applications are displayed in the screen. While viewing the application diagram, select the most suitable inspection items.



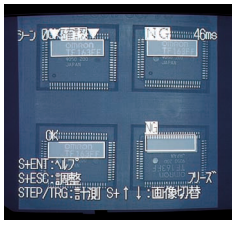
Next, set the inspection area. A variety of shapes can be selected for the area, including round and rectangular. Up to 16 areas can be set, and inspection items selected for each.

3 Select yes or no for position change



If the work does not remain in a fixed position during inspection, position changes must be performed. The area that serves as the reference for the position change and the method of change are set automatically. These settings can be changed or adjusted later as needed.

4 Verification and measurement

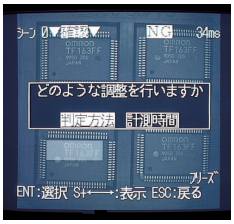


Verifies whether inspection will be carried out correctly according to the set conditions.

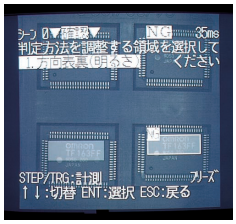
Enhanced adjustment functions make fine adjustment possible after settings have been completed.

Fine adjustments can be made as necessary from the dialog menu after settings have been completed.

1 Selection of adjustment item



2 Selection of detection area



3 Fine adjustment

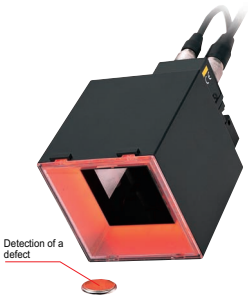


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Intelligent lighting

Various types of lighting control make it possible to obtain a clear, stable image that suits the inspection. The dome shape minimizes the effects of external light, making damage inspection possible. Red and green light is mixed to allow inspection of a wide range of work.





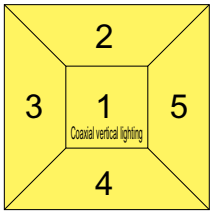
Inspection of button battery defect

Variety of lighting methods

The direction of lighting and the brightness can be changed. Coaxial lighting is also possible with the F150-SLC20. The optimum lighting method for the work can be selected.

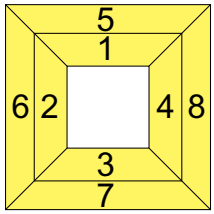
F150-SLC20
(Field of vision: 20 mm)

Light intensity can be set separately to one of 8 levels for 5 illuminated areas.



F150-SLC50
(Field of vision: 50 mm)

Light intensity can be set separately to one of 8 levels for 8 illuminated areas.



Control lighting from the menu

- The illumination area and light intensity are controlled from the controller menu. Settings can be easily changed without handling the lighting.
- The lighting is also treated as scene data, and thus can be changed along with other conditions when the model is changed.
- The controller manages the lighting setting as a digital value. This increases the reproducibility of the setting.

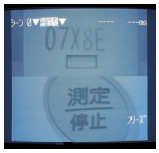
Integrated camera and lens

Camera setup is easy because the object-imaging camera is integrated into a single unit with the lighting apparatus and lens.

2-camera unit

We have made bi-directional, 2-line inspection easy and inexpensive.

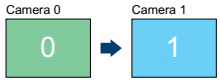




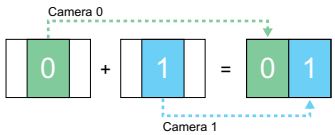
A variety of image read-in methods

Images from two cameras can be read in at the same timing. Read-in methods include successive changeover between the two cameras, and combination of the image from each camera into a single image.

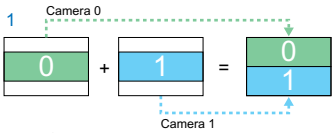
Two-camera Switching



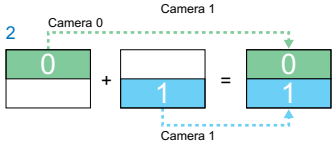
Vertical Composition



Horizontal Composition 1



Horizontal Composition 2



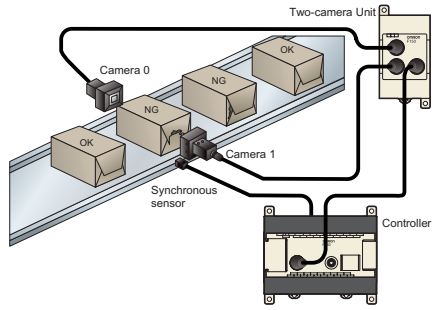
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Features

Example of application using two cameras

Inspecting Boxes From Both Side
Simultaneously inspect both sides of a box using two cameras.



PCB Positioning
Determine the coordinates of position marks using two fields of vision.

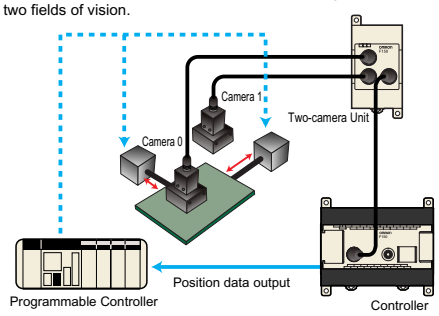


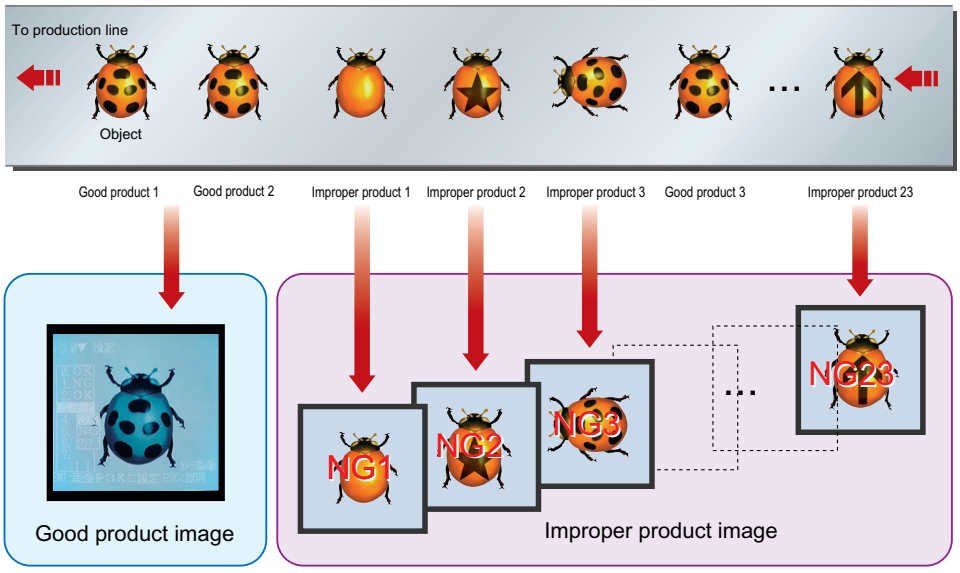
Image memory function

Up to 23 images of defective works can be stored*.

You can check the image to see what kind of defect occurred. This serves as an aid to maintaining and improving the production line.

With respect to a stored image, measurement can be repeated and measurement conditions changed. This enables a dramatic reduction in setup time during initial installation.

*Can be stored before power is turned off. Storage of all images, including "good" images, is also possible.



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Features

Compact frame shutter camera

- Compact with high resolution.
- An all-pixel reading method and square lattice CCD make it possible to obtain a clear and detailed image that is suitable for image processing.
- Equipped with an electronic shutter to handle high-speed lines.
- The shutter speed can be adjusted for each scene from the menu. Select the optimum shutter speed for the line speed and work.



Image pre-processing

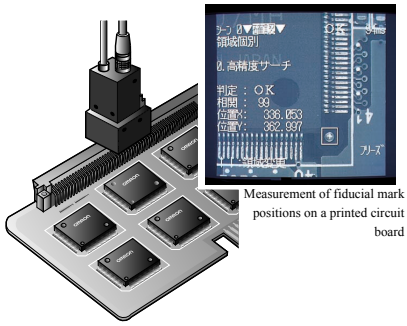
- Preprocessing such as smoothing, edge enhancement, edge extraction, and background cut-off allow you to obtain the optimum image for the inspection.
- Preprocessing can be performed in real time (simultaneously with image read-in).

Original image Edge extraction



High-precision gray search

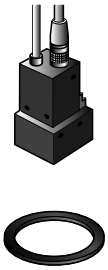
- Position measurement at sub-pixel precision is possible using 256-gradiation gray search processing. This feature is ideal for high-precision positioning applications.

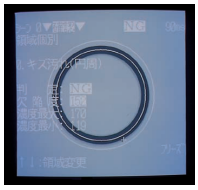


Measurement of fiducial mark positions on a printed circuit board

Damage/dirt inspection

- Omron's proprietary algorithm enables fast and detailed inspection for visual defects such as chips, nicks, burrs, and dirt.
- Linear, circular and rectangular areas can be set, enabling inspection for a variety of defect shapes.



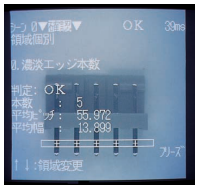


Rubber packing flare inspection

Gray edge measurement

- High-precision (sub-pixel) measurement of work edge position is possible. Ideal for width and dimension inspection.
- Includes edge number and pitch measurement functions for support of IC and connector lead inspection.



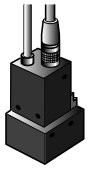


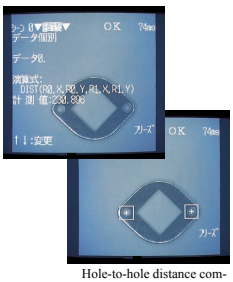
Connector pin-pitch inspection



Output computation functions

- Measurement data computations such as the four arithmetical operations, minimum, maximum, distance between two points, and angle can be set from the menu.
- Up to 24 computations can be set, and decision and data output can be performed based on the computation results.



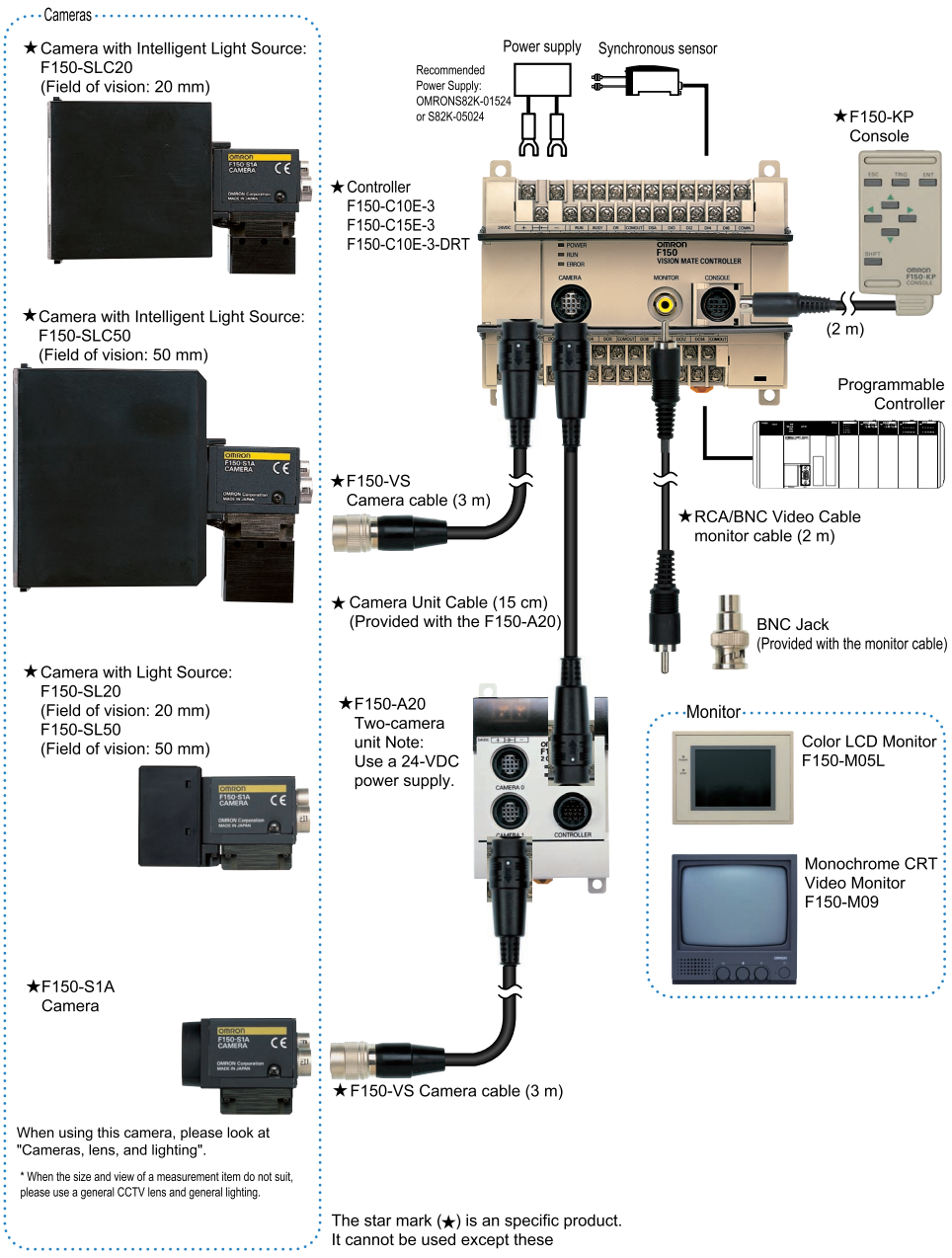


Hole-to-hole distance com-

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System configuration



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OMRON

Camera with lighting

Camera with intelligent lighting



Model

View: 20 mm	F150-SLC20
View: 50 mm	F150-SLC50

*A lens and intelligent lighting are installed on the special camera (F150-S1A) for the F150.

Camera with lighting



View: 20 mm	F150-SL20A
View: 50 mm	F150-SL50A

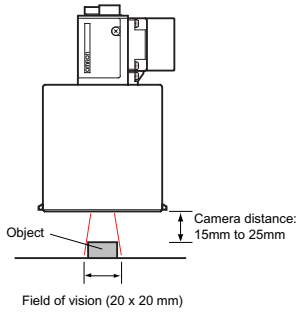
*A lens and lighting are installed on the special camera (F150-S1A) for the F150.

Distance to inspection object and field of vision

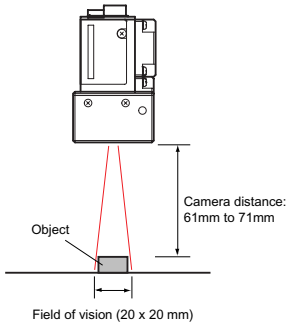
The camera distance is fixed.

Fix the camera at a distance that allows correct imaging of the inspection object.

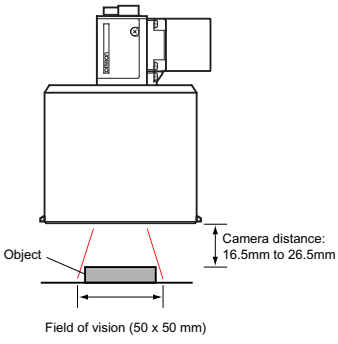
F150-SLC20



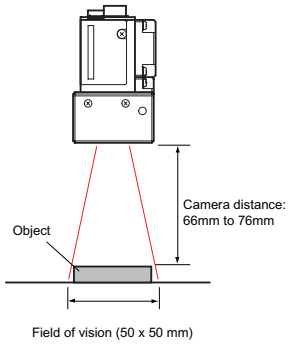
F150-SL20A



F150-SLC50



F150-SL50A



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Ordering Information

Name		Model
Controller		F150-C10E-3 (NPN) F150-C15E-3 (PNP)
		F150-C10E-3-DRT
Camera	Camera with intelligent lighting	F150-SLC20
		F150-SLC50
	Camera with lighting	F150-SL20A
		F150-SL50A
	Camera only	F150-S1A
2-camera unit		F150-A20
Console		F150-KP
LCD monitor		F150-M05L
Video monitor		F150-M09
Camera cable 3 m		F150-VS
Monitor cable 2 m		F150-VM

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Rating/performance

Controller: F150-C10E-3/C15E-3 and F150-C10E-3-DRT

Item	Specifications	
	Dialog menu	Expert menu
Number of connected cameras	1 unit	1 unit / 2 units (using the F150-A20)
Processing resolution	512(H) × 484(V)	
Number of scenes	16 scenes (can be saved to a computer through the RS-232C)	
Image memory function	Up to 23 screens can be saved	
Processing method	Dark-light/2-value method	
Image pre-processing	---	Smoothing, edge enhancement, edge extraction, background cut-off
2-value level	Automatic setting	256 levels (per measurement area)
Position correction function	Auto/manual setting	Correction directions: X, Y, θ Detection modes: 2-value center of gravity / main axis angle, 2-area middle point, dark-light search (1/2 models), edge position
Number of measurement areas	16 areas/scene	
Applications	Select from seven types (Presence inspection, direction front-back, dimension inspection, damage/dirt, foreign object, position inspection, chip/burr)	---
Measured data	Automatic selection depending on the application	Area center of gravity, main axis angle, dark-light correlation value, dark-light search position, defect degree, edge position, edge number, darkness average, relative position
Calculation functions	---	Four arithmetic operations, distance, maximum value / minimum value, absolute value, others
Result output	Overall decision, decision for each measurement area	Overall decision, computation result (decision) per measurement area, measurement/computation data (RS-232C and parallel output possible)
Monitor I/F	1 ch (supports pin jack and over-scan monitor)	
RS-232C I/F	1 ch (Dsub 9-pin, female)	
CompoBus/D I/F	F150-C10E-3 and F150-C15E-3: None F150-C10E-3-DRT: 1 ch	
Parallel input/output	F150-C10E-3 and F150-C15E-3: Inputs: 11points, outputs: 21 points F150-C10E-3-DRT: Inputs: 1 point, outputs: 5 points (including control inputs/outputs)	
Power supply voltage	20.4 to 26.4 VDC	
Current consumption	Approximately 0.5 A	
Ambient temperature	Operating: 0 to +50°C, storage: -25 to +65°C (no ice formation or condensation)	
Ambient humidity	Operating/storage: 35 to 85% RH (with no condensation)	
Weight (Packed state)	Approximately 940 g (controller: 390 g)	
Accessories	Three manuals, CompoBus/D connector (DRTtype only)	

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Camera
Camera with intelligent lighting: F150-SLC20/50
Camera with lighting: F150-SLC20A/50A
Camera: F150-SL20A/50A

Item		Specifications
Camera	Image pick-up	1/3 inch CCD
	Effective pixels	659(H) × 494(V)
	Shutter function	Electronic frame shutter Shutter speed: 1/100, 1/500, 1/2000, 1/10000 sec (can be changed from the menu)
Lens	Installation distance	F150-SLC20: 15 to 25 mm□F150-SLC50: 16.5 to 26.5 mm□F150-SL20A: 61 to 71 mm□F150-SL50A: 66 to 76 mm
	Field of view	F150-SLC20/SL20A:20 mm□□F150-SLC50/SL50A:50 mm□
Lighting unit	Light source	F150-SLC20/50: Red LED - green LED mixed F150-SL20A/50A: Red LED
	Light emission method	Pulse emission (sychronized with camera shutter)
Ambient temperature		Operating: 0 to +50°C, storage: -25 to +60°C (no ice formation or condensation)
Ambient humidity		Operating/storage: 35 to 85% RH (with no condensation)
Weight * Unit only		F150-SLC20: Approximately 280 g F150-SLC50: Approximately 370 g F150-SL20A/50A: Approximately 135 g F150-S1A: Approximately 80 g
Accessories		Instruction manual

Two-camera unit: F150-A20

Item	Specifications
Number of connected cameras	2 units
Camera mode	Two-camera switching, vertical division composite, horizontal division composite 1/2, one camera standalone (camera 0/1)
Power supply voltage	20.4 to 26.4 VDC
Current consumption	Approximately 0.3 A
Ambient temperature	Operating: 0 to +50°C, storage: -25 to +65°C (no ice formation or condensation)
Ambient humidity	Operating/storage: 35 to 85% RH (with no condensation)
Weight * Unit only	Approx. 220 g
Accessories	Operation manual, camera unit cable (1)

Note: Can be connected to an F150-C10-3 controller.
Cannot be connected to an F150-C10 or F150-C10-2.

Monitor

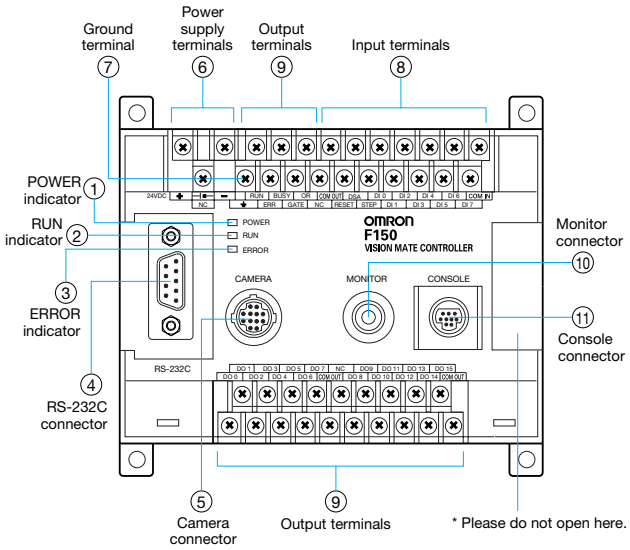
Item / Product name / Model	LCD monitor F150-M05L	Video monitor F150-M09
Size	5.5 type	9 inches
Type	TFT color LCD	CRT monochrome
Resolution	320 × 240 dots	800TV or higher (center)
Input signal	NTSC composite video (1.0 V / 75 Ω)	
Power supply voltage	20.4 to 26.4 VDC	100 to 240 VAC (-15%, +10%)
Current consumption	Approx. 700 mA	Approx. 200 mA
Ambient temperature	Operating: 0 to +50°C, storage: -25 to +65°C (no ice formation or condensation)	Operating: -10 to +50°C, storage: -20 to +65°C (no ice formation or condensation)
Ambient humidity	Operating/storage: 35 to 85% RH (no ice formation or condensation)	10 to 90–RH (No condensation)
Weight * Unit only	Approx. 1 kg	Approx. 4.5 kg
Accessories	Operation manual, clamps (4)	Instruction manual

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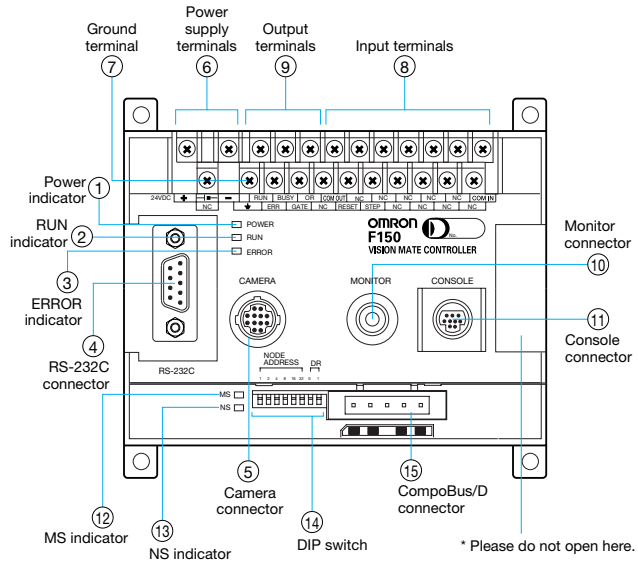
Part Names/Functions

F150-C10E-3/F150-C15E-3



① Lit while power is ON.
② Lit while the F150 is in Run Mode.
③ Lit when an error has occurred.
④ Connects the F150 to external devices such as personal computers or programmable controllers.
⑤ Connects the F150 to camera or two-camera unit.
⑥ Connects to the power supply.
⑦ Connects to the ground wire.
⑧ ⑨ Connects to the F150 to external devices such as synchronous sensors or programmable controllers.
⑩ Connects to the monitor.
⑪ Connects to the console.

F150-C10E-3-DRT (CompoBus/D (DeviceNet) type)



① Lit while power is ON.
② Lit while the F150 is in Run Mode.
③ Lit when an error has occurred.
④ Connects the F150 to external devices such as personal computers or programmable controllers.
⑤ Connects the F150 to camera or two-camera unit.
⑥ Connects to the power supply.
⑦ Connects to the ground wire.
⑧ ⑨ Connects to the F150 to external devices such as synchronous sensors or programmable controllers.
⑩ Connects to the monitor.
⑪ Connects to the console.
⑫ Indicates the state of F150 in CompoBus/D communication.
⑬ Indicates the state of F150 in CompoBus/D communication.
⑭ Set up the node address and communication speed of CompoBus/D communication.
⑮ Connects to the communication cable of a CompoBus/D network.

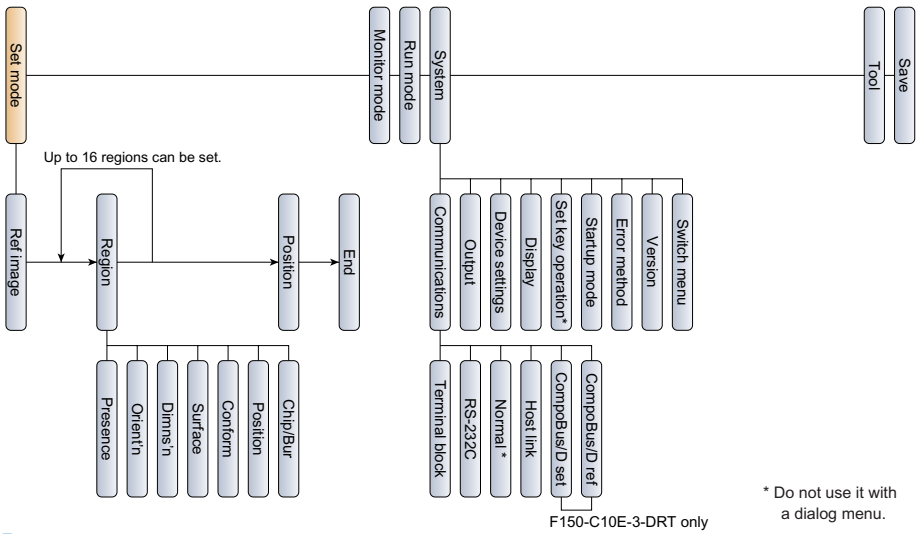
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F150V3(2002).FM Seite 57 Samstag, 23. März 2002 11:29 11

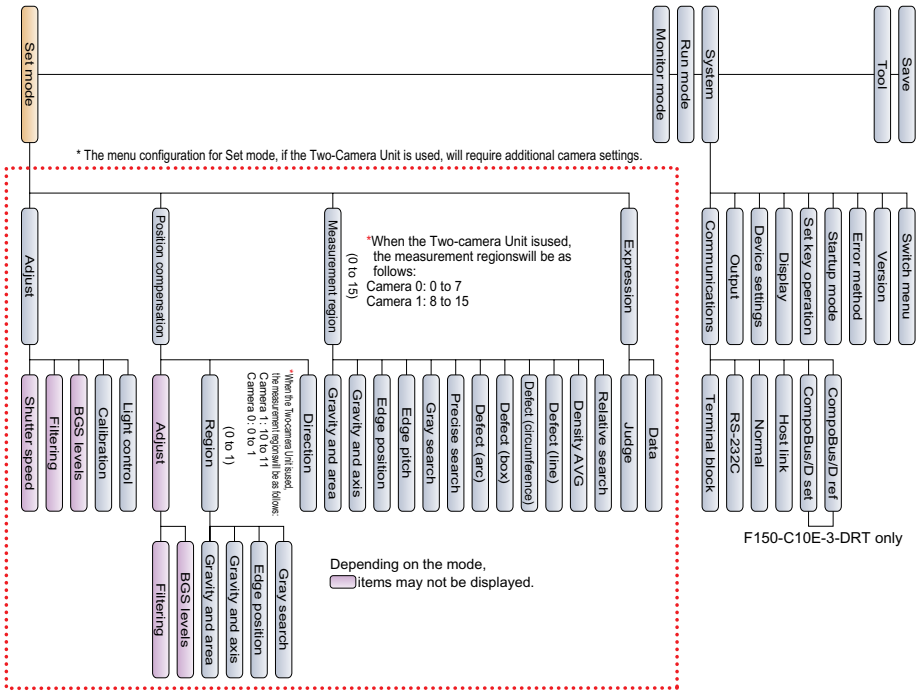
Function menu

Menu structure diagram

Dialog menu



Expert menu



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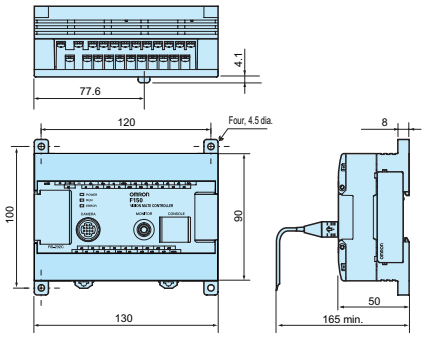
F150V3(2002).FM Seite 58 Samstag, 23. März 2002 11:29 11

Dimensions (Unit: mm)

Controller

F150-C10E-3, F150-C15E-3

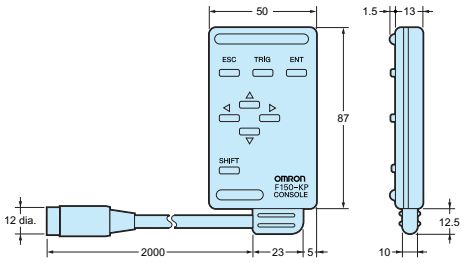
CAD file F150_01



Console

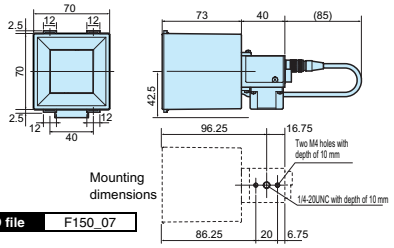
F150-KP

CAD file F150_02



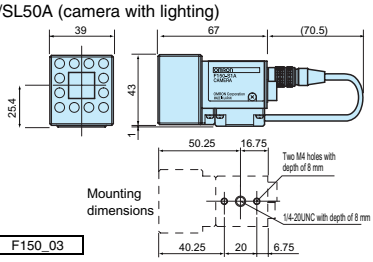
Camera

F150-SLC20 (camera with F150-LTC20 intelligent lighting)



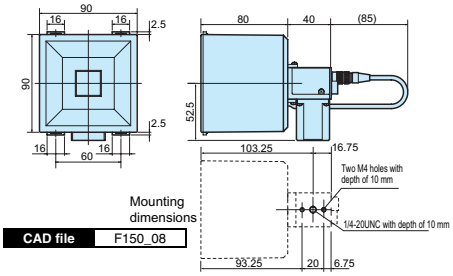
CAD file F150_07

F150-SL20A/SL50A (camera with lighting)



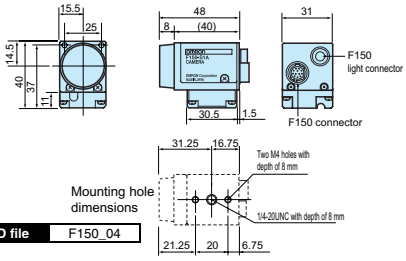
CAD file F150_03

F150-SLC50 (camera with F150-LTC50 intelligent lighting)



CAD file F150_08

F150-S1A (camera only)



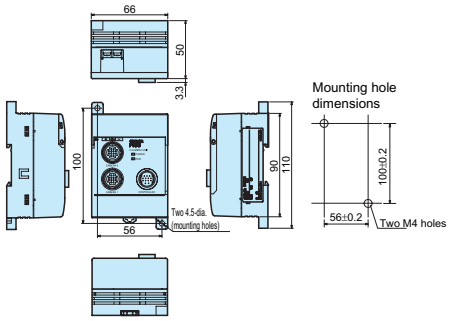
CAD file F150_04

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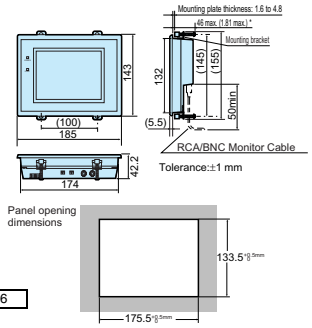
2-camera unit

F150-A20



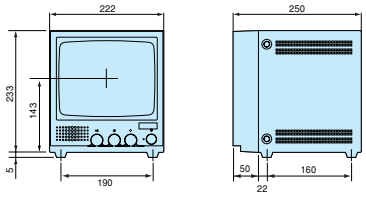
LCD monitor

F150-M05L



CAD file F150_06

F150-M09



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Integrated control software for F150-3

Vision Composer

"Vision Composer" control software makes it easy to achieve the optimum inspection in flowchart format





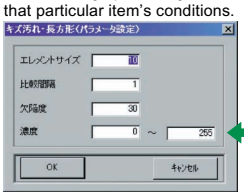
Features

Revolutionizing inspection based on image processing

Although visual sensors can be used based on simple menu settings, they have tended to lack functionality. On the other hand, full-featured advanced image processing devices are capable of a variety of functions, but special programming is necessary. The Vision Conposer makes it easy to achieve the optimum inspection in flowchart format.

a dialog box for item's conditions

Double-click on a box in the flow chart to bring up a dialog box for that particular item's conditions.

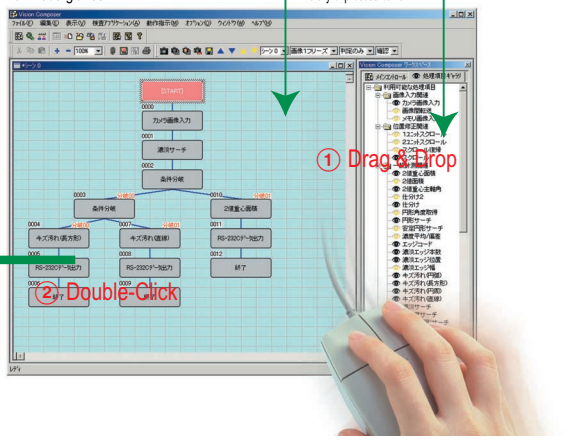


Inspection application edit window

The contents of inspection are displayed by the flow chart. The flow of processing is known at a glance.

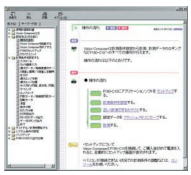
Processing item gallery

The list of processing items is displayed. Operators can create flow charts by dragging and dropping items from a library of process items.



Easy operation without a manual

Operation is guided by abundant help/guidance displays. It is not necessary to operate it in manual one hand.



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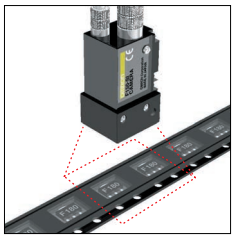
Features

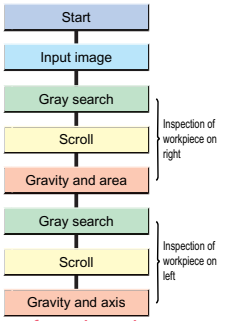
A flexible processing flow can be created in Windows.

Individual position corrections inside each area

Supports individual position corrections inside each inspection area.

● Inpection of chip components inside embossed taping





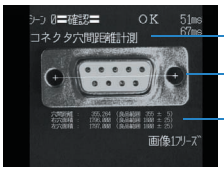
Enhanced screen editing functions increase ease of use.

Editing of scene names

Scene data can be saved using a name that describes the inspection for easy searching and management. Scene data, "no good" images, and other data can be exchanged between the F180 and a computer.



Freely create the measurement screen.



Screen example

Display any character string (measurement description, etc.) in any position

Display a line segment linking holes

Reduced display of measurement results

The menu screen can also be edited.

A text editor can be used to change the names and show/hide of menu items.

Before editing



After editing



Speed bar

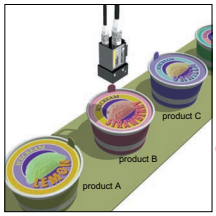
Frequently used processing tasks can be displayed as icons on the toolbar.
Smoother operation.

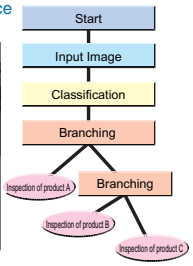


Branch processing

The type of inspection can be changed by model based on the results of model sorting.

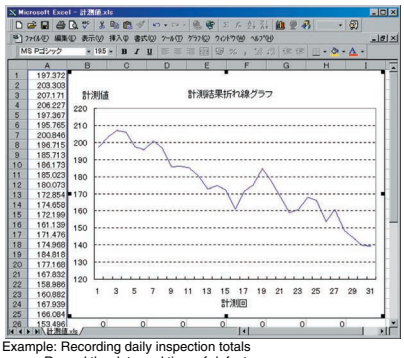
● Inspection of printing on ice cream lids





Manage measurement results on a computer.

Measurement results can be transferred to a computer, making it possible to manage and process data using a spreadsheet or other software program.



Example: Recording daily inspection totals

- Record the date and time of defect occurrences.
- Print out each day's inspection data.
- Transfer inspection data over a network
- Use a spreadsheet or other tool for statistical processing.

Print and output files of flowcharts and processing setting lists.

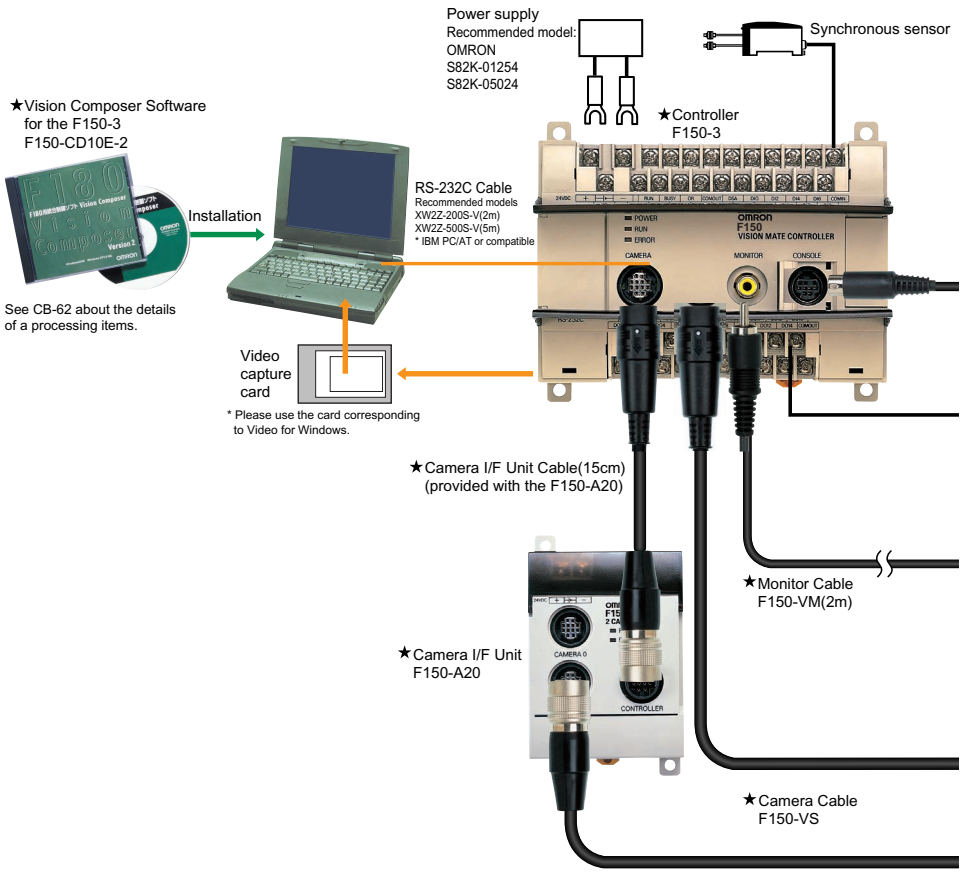
- Settings can be verified at a glance.
- Import data into a word processor program for easy creation of reports.



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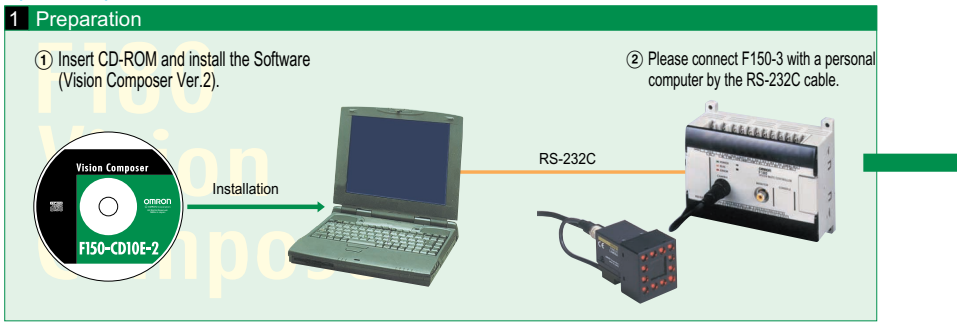
OMRON

System configuration Items marked by ★ are special-use items.

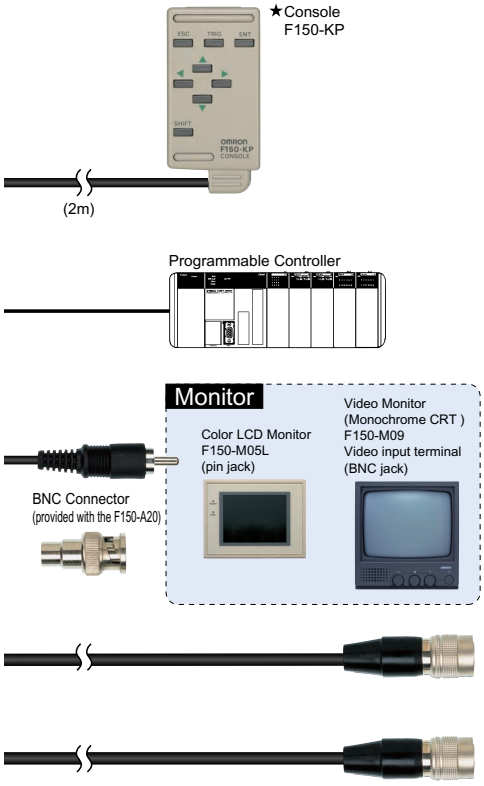


Operation procedure

1 Preparation



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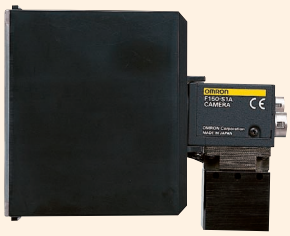


Camera

★Camera with Intelligent Light Source
F150-SLC20
(field of vision 20mm)



★Camera with Intelligent Light Source
F150-SLC50
(field of vision 50mm)



★Camera with Light Source
F150-SL20A
(field of vision 20mm)
F150-SL50A
(field of vision 50mm)



★Camera
F150-S1A *

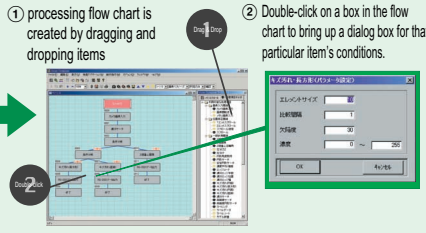


* See the page of "cameras, lens and lighting" when using the lens and lighting for this camera.
* When the size and view of a measurement item do not suit, use a common CCTV lens and common lighting.

2 Set

① processing flow chart is created by dragging and dropping items

② Double-click on a box in the flow chart to bring up a dialog box for that particular item's conditions.



3 Operation and adjustment

Even if there is no PC, change/adjustment of conditions can be performed using a console.



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Vision Composer Integrated Control Software for the F150-3

List of processing items

The red background item is a new addition to Version 2.

Image input related	Camera image input	Input images from the camera
	Memory image input	Input an image from the storage memory to the image memory
	Image transfer	Transfer an image between image memories. Enables multi-stage preprocessing and background cut-off.
Postion correction related	Scrolling	Image scrolling for position correction
	One-unit scrolling	Easy position correction (using one unit)
	Two-unit scrolling Scrolling reset	Easy position correction (using two units) Resets scrolled image memory to original position
General measurement related	2-value area	Obtains only 2-value area at high speed
	2-value center of gravity and area	Obtains 2-value center of gravity and area
	2-value center of gravity and main axis angle	Obtains 2-value center of gravity, area, and main axis angle
	Dark-light search	Searches stored model images
	High-precision search	Searches the stored model images and obtains the search coordinates in sub-pixel units.
	Damage and dirt (linear)	Inspects for damage and dirt on a straight line
	Damage and dirt (circular)	Inspects for damage and dirt on a circle
	Damage and dirt (circular arc)	Inspects for damage and dirt on a circular arc
	Damage and dirt (rectangular)	Inspects for damage and dirt inside a rectangular area
	Dark-light edge position	Obtains the edge position by dark-light processing
	Dark-light edge number	Obtains the number of objects by dark-light edge detection processing.
	Dark-light edge width	Obtains the distance between two edges
	Darkness average/deviation	Obtains the average darkness and deviation of a specified area
	Revolution search	Searches objects that tilt or have a variable profile.
	Obtains angle of circular object	Obtains the angle of a circular object at high speed
	Sorting	Sorts up to eight models
	Model dictionary	Used with "Sort 2"; up to 16 types are sorted
	Sort 2	Used with "Model dictionary"; up to 16 types are sorted
	Labelling	Obtains the number of objects by label processing.
	Label sorting	Rearranging based on the label area and center of gravity of each object
	Label data	Obtains the area and center of gravity of each label
	Edge code	Generates an edge code image as a preprocessing step for execution of a circle search or high-precision circle search.
	Circle search	Searches for circular objects
	Stable circle search	Stable circle search without regard to the size of the circle.
	High-precision circle search	Searches for circular objects and obtains the search coordinates on the order of sub-pixels.
Measurement supplement related	Computation	Based on the selected computation equation, computations are carried out using the measurement results of each processing item.
	Calibration	Converts camera coordinates to actual coordinates
	Obtains processing unit data	References parameter settings of processing unit
	Processing unit data settings Elapsed time	The parameter settings of the processing unit can be changed as desired Obtains the elapsed time after input of the measurement trigger.
	Wait	Processing waits during the specified time
Branch control related	Condition-based branching	Processing is divided into branches based on the specified conditions
	DI input branching	Processing is divided into branches based on input from the terminal block
	End	Ends processing
Result output related	DO decision output	Outputs the measurement decision result to the terminal block.
	DO data output	Outputs measurement data to the terminal block
	RS-232C data output	Outputs measurement data to the RS-232C
	RS-232C data output 2	Outputs data in a free format to the RS-232C
	Higher link data output	Outputs data using the higher link protocol
	Data locking output	Outputs data for locking the measurement result in Vision Composer to the RS-232C
Result display related	Value display	Displays any value in any position on the screen (for customization of the measurement screen)
	Value display (small font)	Displays a value in a small font on the screen (for customization of the measurement screen)
	Line display	Displays a line of any length in any position on the screen (for customization of the measurement screen)
	Rectangle display	Displays a rectangle of any size in any position on the screen (for customization of the measurement screen)
	Circle display	Displays a circle of any size in any position on the screen (for customization of the measurement screen)
	Cross-hair cursor display	Displays a cross-hair cursor in any position on the screen (for customization of the measurement screen)

Operating environment

OS	Windows 95/98/NT 4.0 Japanese version (does not operate in Windows 3.1/NT3.5/2000)
WWW browser	Microsoft Internet Explorer 4.0 or higher
CPU	Pentium II 266 MHz or higher
Memory	64 MB or higher (recommended)
Free hard disk space	50 MB or higher
Display image	1024 × 768 dots 256 colors or higher
CD-ROM drive	4× or higher

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Ordering Information

Name		Model
Controller		F150-3
Vision Composer Integrated Control Software for the F150		F150-CD10E-2
Camera	Camera with intelligent lighting	F150-SLC20
		F150-SLC50
	Camera with lighting	F150-SL20A
		F150-SL50A
	Camera only	F150-S1A
2-camera unit		F150-A20
Console		F150-KP
LCD monitor		F150-M05L
Video monitor		F150-M09
Camera cable 3m		F150-VS
Monitor cable 2 m		F150-VM

Rating/performance

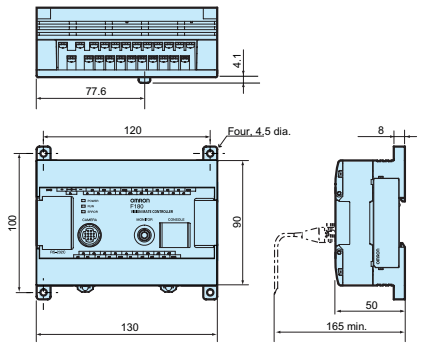
Controller: F150-3

Item	Specifications
Number of connected cameras	1 unit / 2 units (using the F150-A20)
Processing resolution	512(H) × 484(V)
Monitor I/F	1 ch (pin jack)
RS-232C I/F	1 ch (Dsub 9-pin, female)
Parallel input/output	Input: 11points, output: 21 points (including control inputs/outputs)
Power supply voltage	20.4 to 26.4 VDC
Current consumption	Approximately 0.5 A
Ambient temperature	Operating: 0 to +50°C, storage: -25 to +65°C (no ice formation or condensation)
Ambient humidity	Operating/Storage: 35% to 85% RH (with no condensation)
Weight *Unit only	Approximately 390 g
Accessories	Operation manual (1)

*For the camera, 2-camera unit, and monitor rating/performance, see the F150-3.

Dimensions (Unit: mm)

Controller
F150-3



*For the dimensions of the console, camera, 2-camera unit, and monitor, see the F150-3.

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