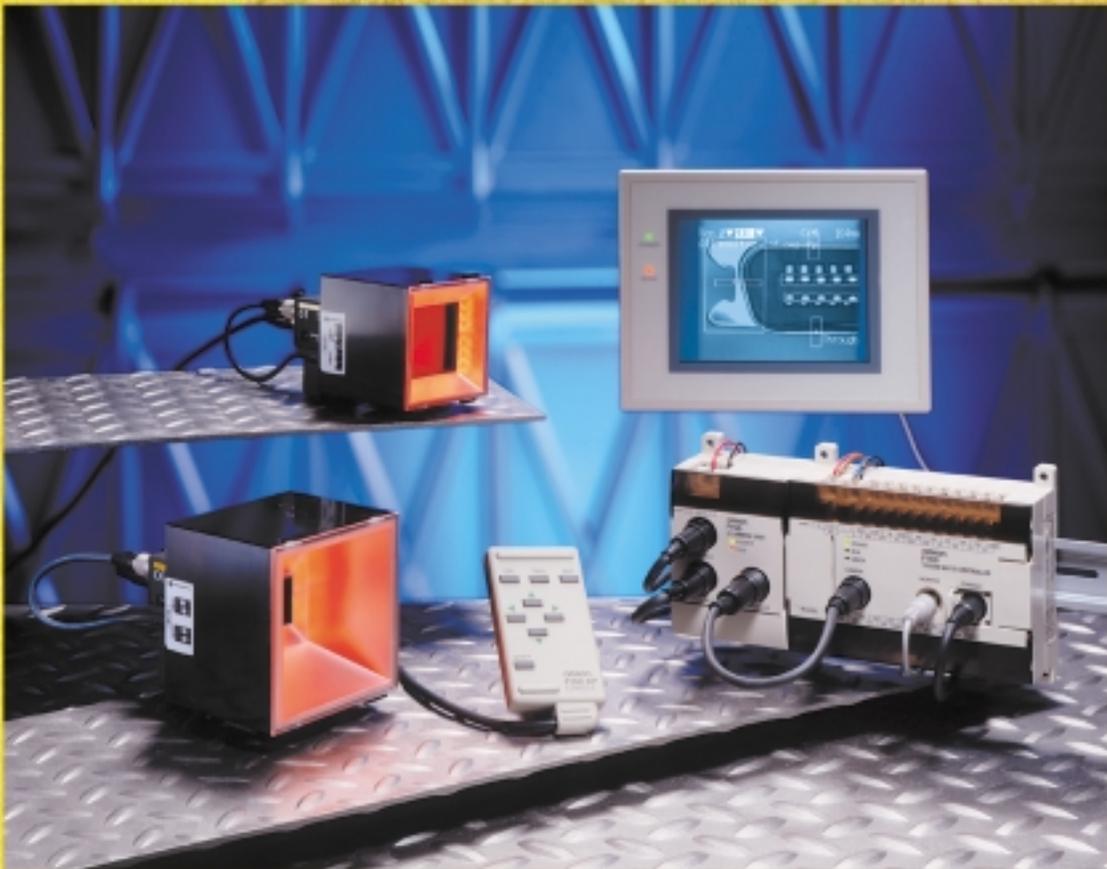


F150-3 Vision Sensor

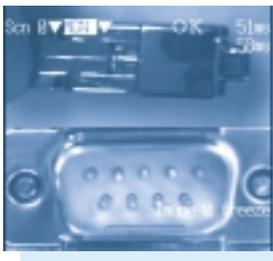
EASY-TO-USE MACHINE VISION,
NOW WITH TWO-CAMERA PERFORMANCE



OMRON[®]
the problem solvers[™]

Simplified Two-Camera Machine Vision

Omron's compact F150-3 lets you handle a wide variety of single-camera and now two-camera applications with simple on-screen setup. The two-camera unit fully integrates images from both cameras for the controller and monitor without any special programming. The intuitive setup with easy-to-use pull-down menus takes place over real-time camera images displayed, so you never



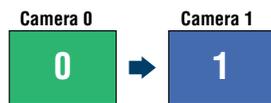
lose sight of what is happening. In addition to the self-contained vision

controllers, Omron offers cameras with built-in lighting, lensing and monitors; sensors for synchronizing viewing; and programmable controllers to integrate the vision sensor into your production line. Optional Windows®-based Vision Composer software gives more sophisticated functionality and capabilities in a drag-and-drop, flow-chart like setup environment, requiring no programming skills.



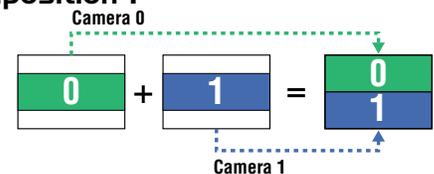
Flexible 2 Camera Inspection Options

Two-camera Switching

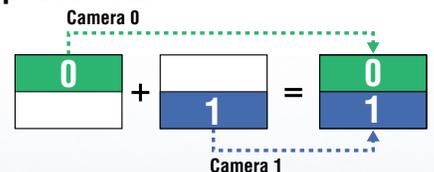


Operators have the option of configuring the F150-3's two cameras to process images for speed with partial field-of-views or full-screen resolutions, depending on the application's requirements. For applications involving large inspection areas or needing a higher degree of accuracy, the controller processes images from the cameras in sequence. The controller will process an image from camera 0 first, then process the image from camera 1.

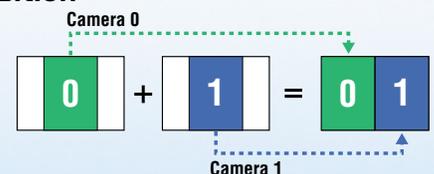
Horizontal Composition 1



Horizontal Composition 2



Vertical Composition

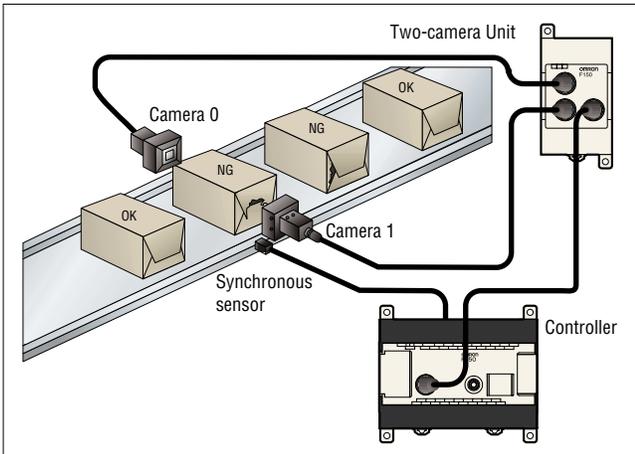


In applications requiring higher-speed inspections, or with a smaller inspection area, operators can configure the controller to process and combine images from both cameras simultaneously.

Two-Camera Inspection Applications

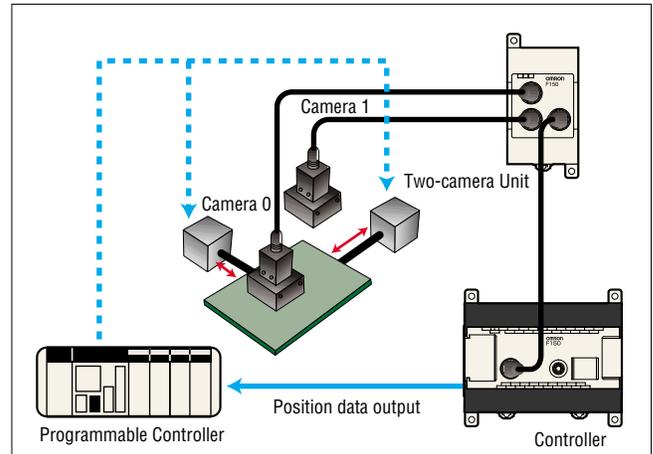
Inspecting Boxes From Both Sides

Simultaneously inspect both sides of a box using two cameras.



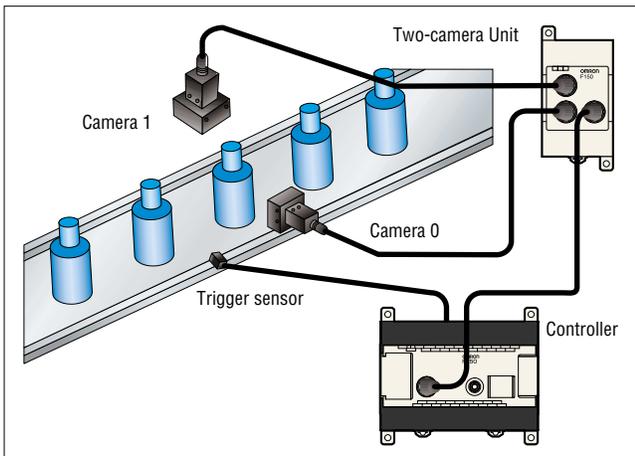
PCB Positioning

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



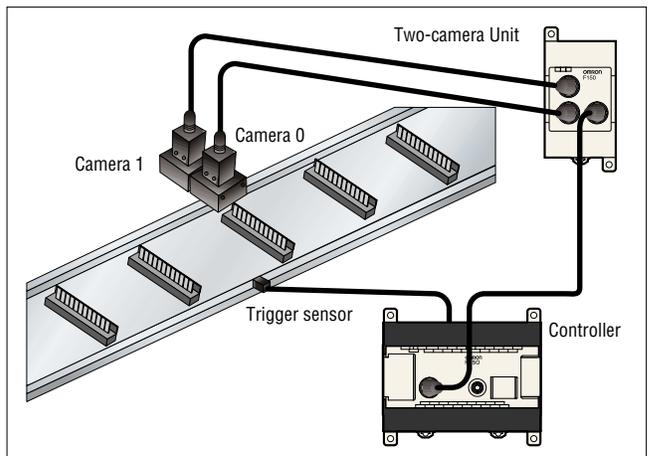
Inspecting Bottles

Inspect both dimensions and shape.



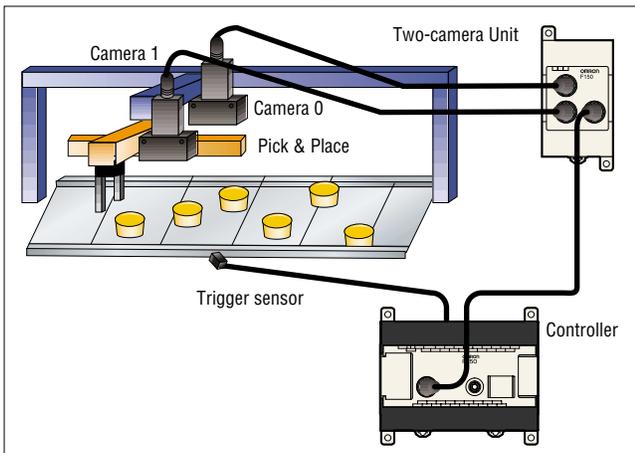
Inspecting Connectors

Inspect long electronic connectors for pin presence.



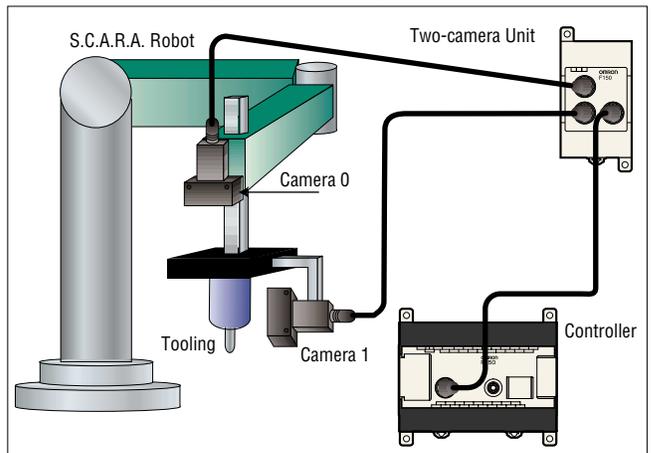
Position Reference

Report random product positioning on a conveyor.



Robotic Tool Guidance

Report tool and part alignment positioning to robot.



Advanced Image Processing

The F150-3 lets operators choose from a suite of advanced image enhancements and measurement functions that improve the accuracy of detection and measurement in their applications.

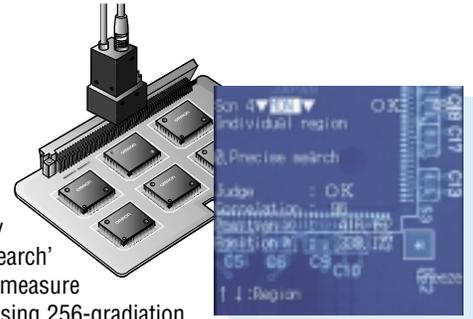
Filtering

The F150-3 can perform filtering functions including smoothing, edge enhancement, edge extraction, and background suppression in real time.



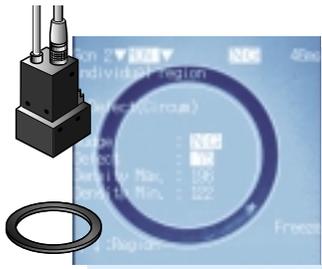
Gray Search

For applications requiring high-accuracy positioning, the 'gray search' function lets operators measure position in sub-pixels using 256-gradation gray search processing.



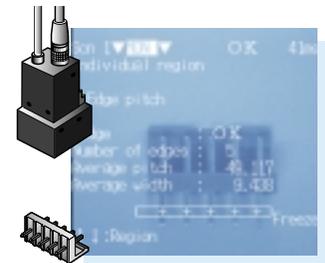
Surface Defects

Quickly inspect for surface defects including scratches, dirt, etc. with Omron's unique algorithm. This algorithm allows users to set the F150-3 to inspect for defects along lines, around circumferences, or inside of boxes.



Gray Edge Measurement

The gray edge measuring function delivers sub-pixel accuracy when inspecting widths or dimensions.



Output Calculations

The F150-3 gives you several ways to display and interpret data from inspection results. Using the menus, users can find minimum and maximum values, calculate distances between points, and obtain angles between lines. To customize an output, set up to 24 expressions (data operations) and perform judgements and data output based on results.

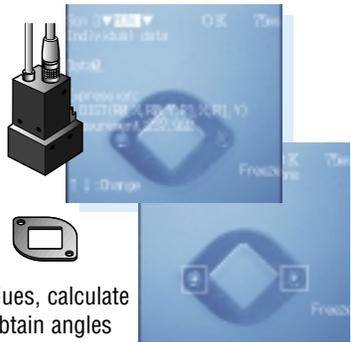


Image Storage Capability

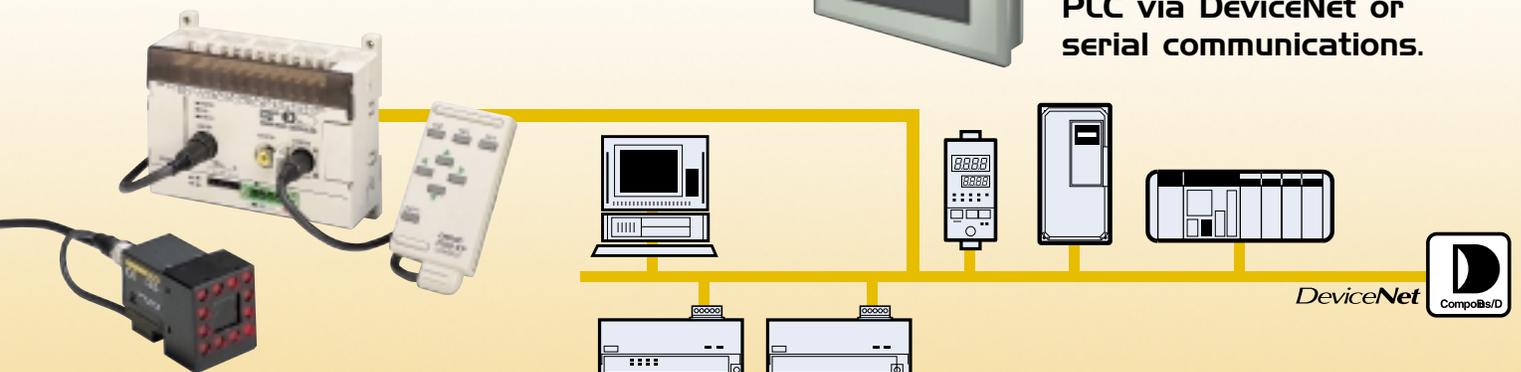
The F150-3's image storage complements the measurement and output calculation functions by storing up to 23 different good or bad images. These stored images make it easier to fine-tune your production process and track production errors.



When the data has been collected, it can be clearly displayed on our 5.5 inch TFT color monitor



and shared with your PLC via DeviceNet or serial communications.



The Right Lights & Camera For Your Action

Omron's compact shutter camera is perfect for high-speed inspection applications and can be fitted with several different light sources, depending on the application.



Unique, Intelligent Light Sources

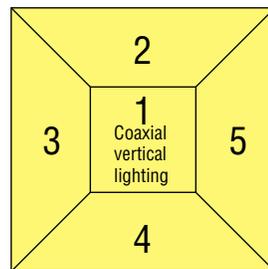


Our Intelligent Light Source cameras are designed to enhance and simplify your applications. They use a hood shape that reduces external interference, making conditions ideal for highly accurate inspections. Their combination of red and green light sources also enable the F150-3 to inspect a wide range of workpieces. One option complements the adjustable ring-light source with adjustable coaxial vertical lighting. This lighting method allows the brightness and the lighting direction to be changed depending on the application's requirements.



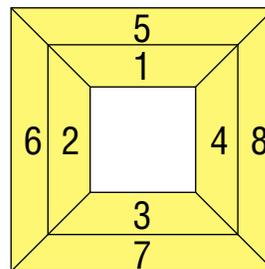
F150-SLC20
(Field of vision: 20 mm)

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

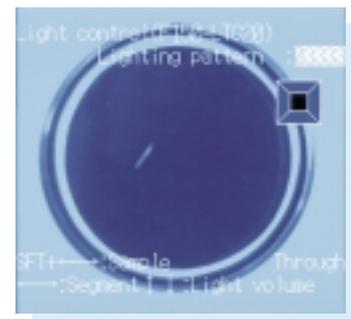


F150-SLC50
(Field of vision: 50 mm)

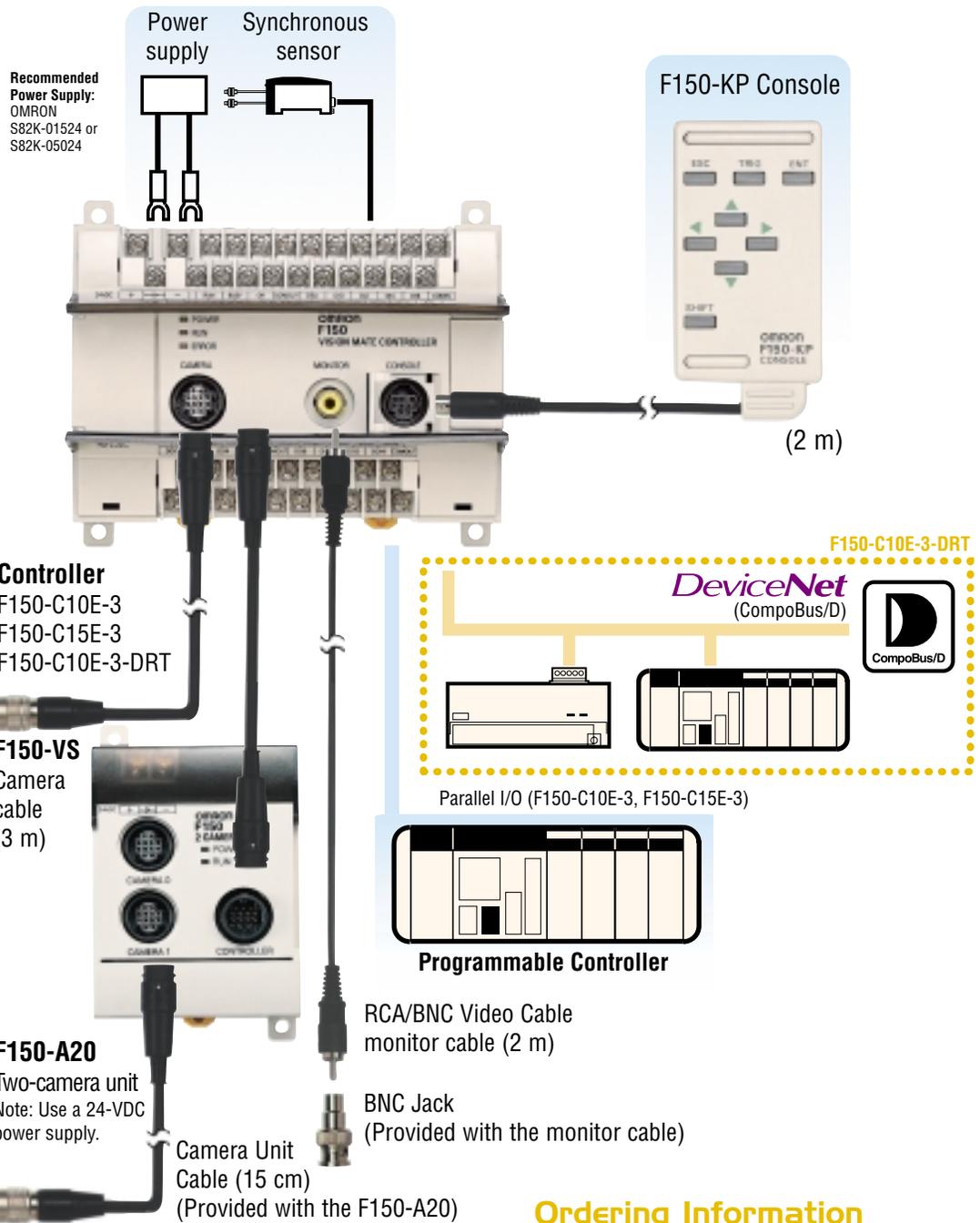
Light intensity can be set separately to one of 8 levels for 8 illuminated areas.



With an Intelligent Light Source camera, the F150-3's controller menus take all of the guesswork out of proper lighting. Operators can control the illuminated area and light intensity from the controller menus. The settings are easily changed without direct adjustment to the light source. Lighting positioning is stored with other scene data so operators can change the lighting conditions to match different operating environments. Because the settings are numeric data, it is possible to recreate the lighting conditions from machine to machine.



System Configuration



Ordering Information

Name		Model number
Controller		F150-C10E-3
		F150-C15E-3
		F150-C10E-3-DRT
Cameras	Cameras with Intelligent Light Source and Lens	F150-SLC20
		F150-SLC50
	Cameras with Simple Light Source and Lens	F150-SL20
	F150-SL50	
	Camera only	F150-S1A
Two-camera Unit		F150-A20
Console		F150-KP
Color LCD Monitor		F150-M05L
Camera Cable (3m)		F150-VS
Monitor Cable (2m)		RCA/BNC Video Cable

Specifications

Rating/Function

Controllers: F150-C10E-3, F150-C15E-3, F150-C10E-3-DRT

Item	Specifications			
Number of connectable cameras	1 or 2 (when using F150-A20)			
Number of pixels	512(H) x 484(V)			
Number of scenes	16 (can be backed up to a personal computer via RS-232C)			
Image storage function	Maximum of 23 images stored			
Processing method	Gray/Binary			
Filtering	Smoothing, edge enhancement, edge extraction, background suppression			
Number of binary levels	256 levels per region			
Position displacement compensation	Compensation directions: X,Y, and θ directions; Detection methods: Binary center of gravity, axis angle, midpoint, gray search (1 model or 2 models), gray edge position			
Number of measurement regions	16 regions/scene			
Measurement data	Binary center of gravity and area, axis angle, correlation value, gray search position, defect, edge position, edge pitch, density averaging, relative search			
Data operation functions (expressions)	Arithmetic calculation, distance, angle, maximum/minimum value, absolute value, etc.			
Results output	Overall judgment, judgments for measurement/expression results for each region, measurement/expression results (can be output via RS-232C in parallel)			
Monitor interface	1 channel (pin jack, compatible with over-scan monitor)			
RS-232C interface	1 channel (D-sub, 9-pin, female)			
CompoBus/D interface	F150-C10E-3, F150-C15E-3 : None; F150-C10E-3-DRT: 1 channel			
Parallel I/O	11 inputs and 21 outputs including control I/O points	1 input and 5 outputs including control I/O points		
	Input/Output type	NPN	F150-C10E-3	F150-C10E-3-DRT
		PNP	F150-C15E-3	-
Power supply voltage	20.4 to 26.4 VDC (including ripple)			
Current consumption	Approx. 0.5 A			
Ambient temperature	Operating: 0 to 50°C (32 to 122°F) with no icing or condensation, Storage: -25 to +65°C (52 to 149°F) with no icing or condensation			
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)			
Weight (with packaging)	Approx. 940 g (Controller only: 390 g)			
Accessories	2 manuals and CompoBus/D connector (F150-C10E-3-DRT only)			

Cameras Cameras with Intelligent Light Source and Lens: F150-SLC20, F150-SLC50
 Cameras with Simple Light Source and Lens: F150-SL20, F150-SL50
 Camera: F150-S1A (with C-mount Lens Ring and no light source)

Item	Specifications	
Camera	Picture element	1/3" Interline CCD (reading all pixels)
	Effective pixels	659 x 494 (H x V)
	Shutter	Electronic frame shutter: 1/100, 1/500, 1/2,000, or 1/10,000 s
Lens	Setting distance	F150-SLC20: 15 to 25 mm, F150-SLC50: 16.5 to 26.5 mm, F150-SL20: 61 to 71 mm, F150-SL50: 66 to 76 mm
	Field of view	F150-SLC20/SL20: 20 mm (0.79 in), F150-SLC50/SL50: 50 mm (1.97 in)
Lighting	Light sources	F150-SLC20/SLC50: Red LED and green LED, F150-SL20/SL50: Red LED
	Flash	Pulse flash (synchronized with camera shutter)
Ambient temperature	Operating: 0 to 50°C (32 to 122°F); Storage: -25 to 60°C (52 to 140°F) with no icing or condensation	
Ambient humidity	Operating or storage: 35% to 85% (with no condensation)	
Weight (Camera only)	F150-SLC20: Approx. 310 g; F150-SLC50: Approx. 425 g F150-SL20/50: Approx. 135 g; F150-S1A: Approx. 70 g	
Accessories	F150-SLC20/SLC50: Instructions manual (one), F150-SL20/SL50: Instructions manual (one)	

F150-A20 Two-camera Unit

Item	Specifications
Number of connectable cameras	2
Camera modes	Two-camera switching; vertical composition, horizontal composition 1 and 2; single camera (camera 0 or 1)
Power supply voltage	20.4 to 26.4 VDC
Current consumption	Approx. 0.3 A
Ambient temperature	Operating: 0 to 50°C (32 to 122°F); Storage: -25 to 65°C (52 to 149°F) with no icing or condensation
Ambient humidity	Operating or storage: 35% to 85% (with no condensation)
Weight (Camera only)	Approx. 220 g
Accessories	Instructions manual (one), Camera Unit Cable (one)

F150-M05L Color, Panel Mount LCD Monitor

Item	Specifications
Size	5.5 inches; 111.36 x 83.52 mm (H x V)
Type	Liquid crystal color TFT
Resolution	320 x 240 dots
Input signals	NTSC composite video (1.0 V/75 Ω termination)
Power supply voltage	20.4 to 26.4 VDC (including ripple)
Current/Power consumption	Approx. 700 mA max.
Ambient temperature	Operating: 0 to 50°C (32 to 122°F); Storage: -25 to +65°C (52 to 149°F) with no icing or condensation
Ambient humidity	Operating or storage: 35% to 85% (with no condensation)
Weight (Monitor only)	Approx. 1 kg
Accessories	Instructions manual (one), mounting brackets (four)

Cameras With Light Sources



Cameras with Intelligent Light Source

Models

Field of vision: 20 mm	F150-SLC20
Field of vision: 50 mm	F150-SLC50

A lens and Intelligent Light Source are mounted on the F150-S1A Camera.



Cameras with Simple Light Source

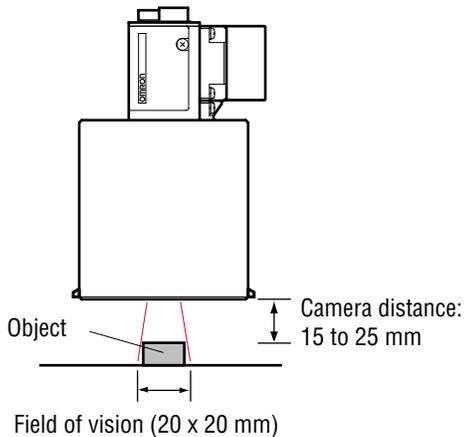
Field of vision: 20 mm	F150-SL20
Field of vision: 50 mm	F150-SL50

A lens and light source are mounted on the F150-S1 Camera.

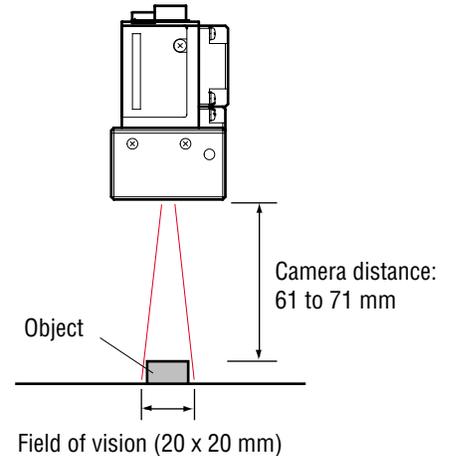
Sensing Distance & Field of Vision

Mount the Camera within the fixed sensing distance, then fix the Camera at the position where a clear image is obtained.

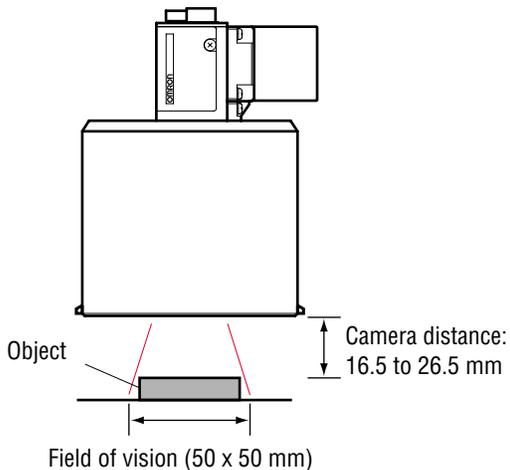
F150-SLC20



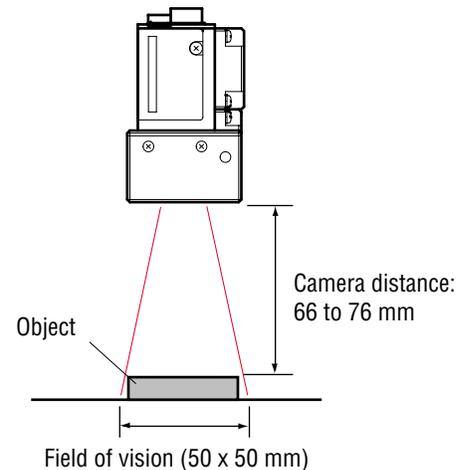
F150-SL20



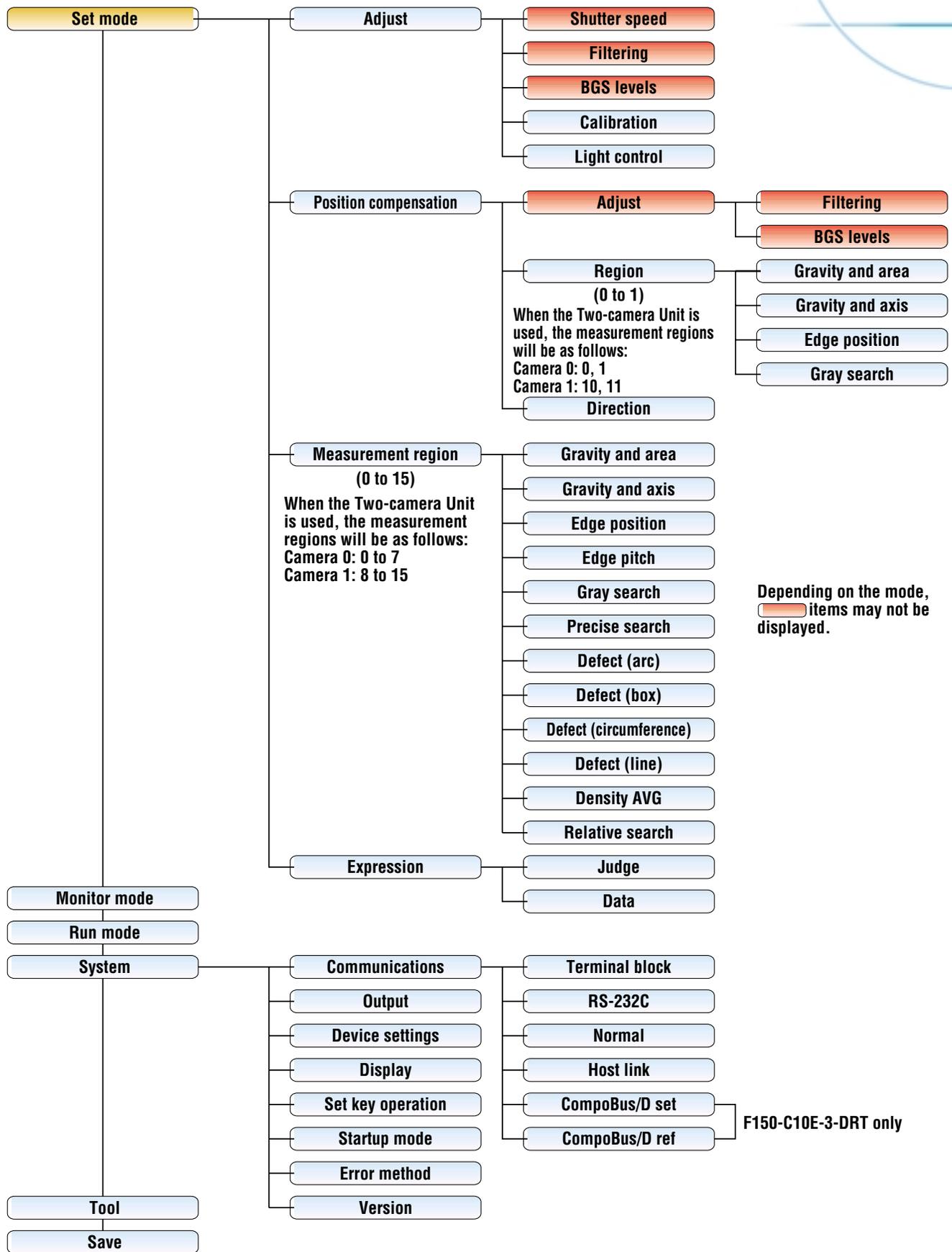
F150-SLC50



F150-SL50



Menu Tree

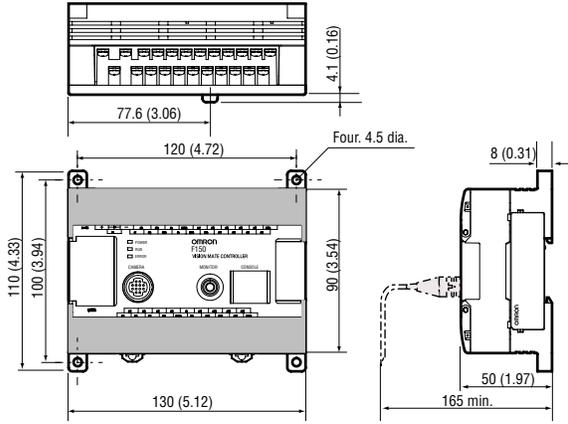


Depending on the mode, items may not be displayed.

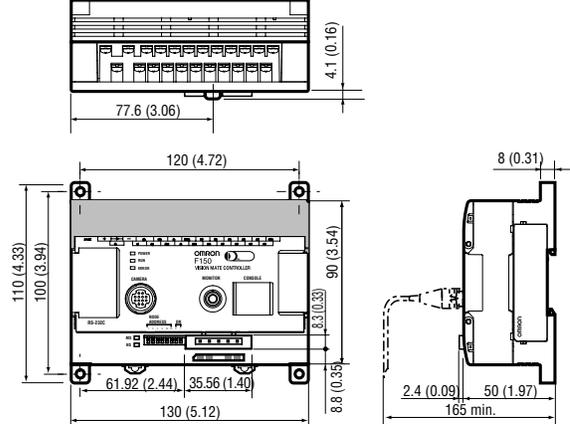
The menu configuration for Set mode, if the Two-Camera Unit is used, will require additional camera settings.

Dimensions Unit: mm (inches)

Controller F150-C10E-3, F150-C15E-3

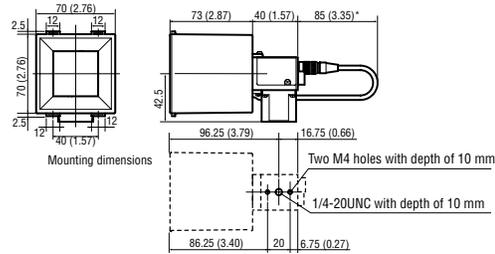


F150-C10E-3-DRT

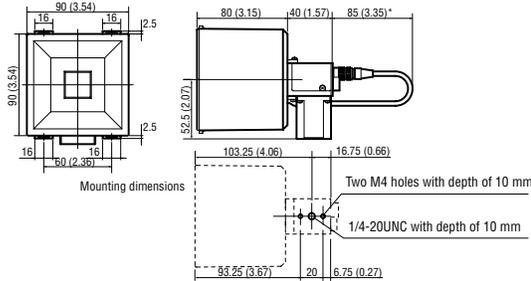


Cameras

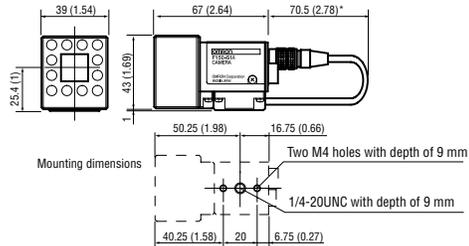
F150-SLC20 Camera with F150-LTC20 Intelligent Light Source



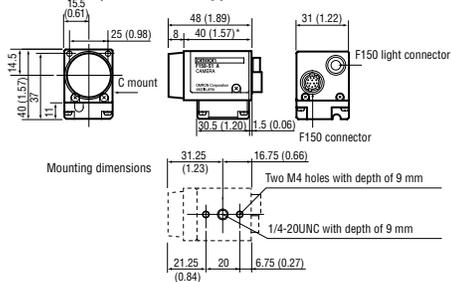
F150-SLC50 Camera with F150-LTC50 Intelligent Light Source



F150-SL20/SL50 Camera with Light Source

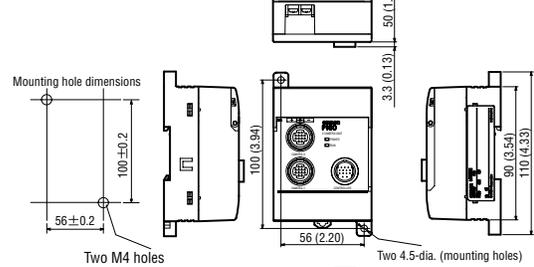


F150-S1A Camera (Camera Only)



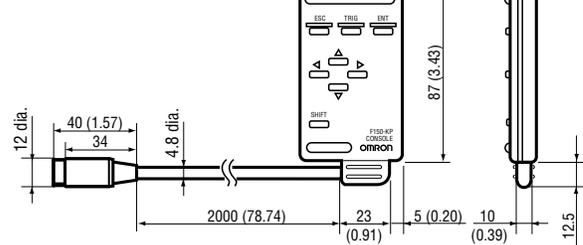
Two-camera Unit

F150-A20



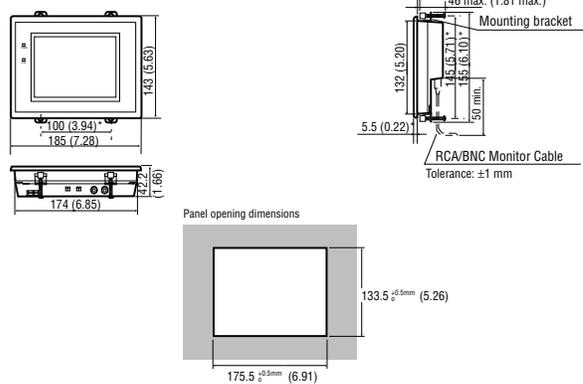
Console

F150-KP



Color, Panel Mount LCD Monitor

F150-M05L



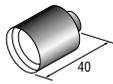
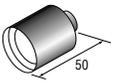
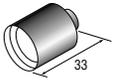
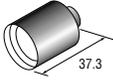
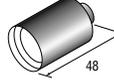
*These dimensions are provided for reference.

Lens

CCTV Lens

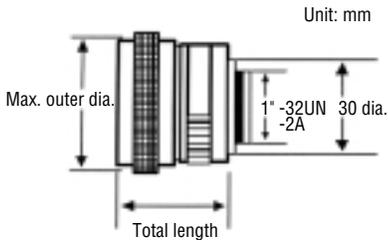
Refer to the following optical graph and select the field of vision, Camera distance, and Extension Tube.

Note: Omron reserves the right to change lens suppliers and specification without notification. Please verify all lenses with sales personnel.

Model	F150-L8	F150-L12	F150-L16	F150-L25	F150-L50	F150-L75
Dimensions	42 dia. 	42 dia. 	30 dia. 	30 dia. 	48 dia. 	62 dia. 
Focal Length	8.5 mm	12.5 mm	16.0 mm	25.0 mm	50.0 mm	75.0 mm
Brightness	F1.5	F1.4	F1.4	F1.4	F1.4	F1.4

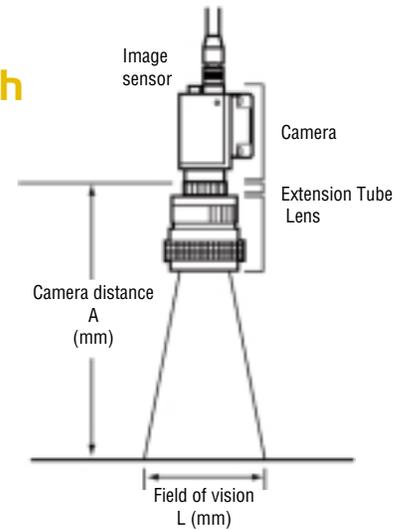
Extension Tubes

Model	Length
F150-EXT	A set of six Extension Tubes that are 40, 20, 10, 5, 1, and 0.5 mm in length respectively



Meaning of Optical Graph

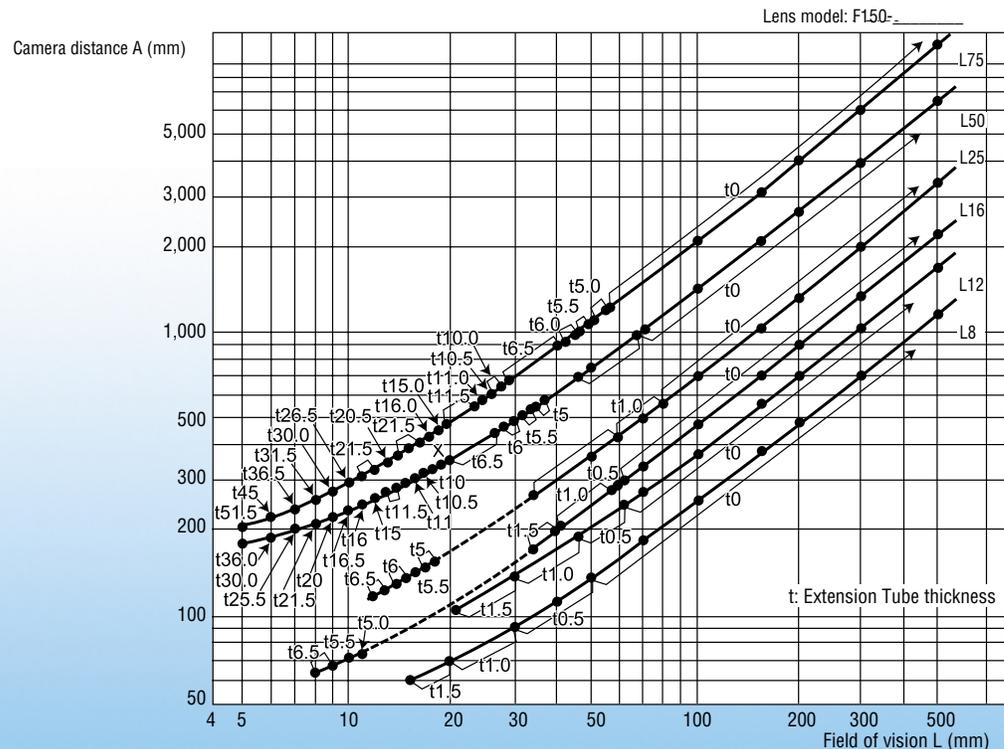
The X axis of the graph shows field of vision L (mm), and the Y axis shows the camera distance A (mm). The curves on the graph indicate different lenses, and the "t" values indicate the lengths of the Extension Tubes.



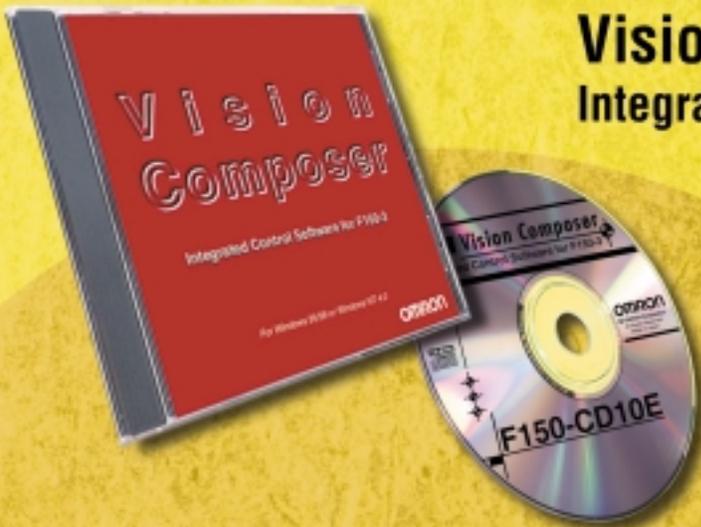
Note: Extension tube length should not exceed 10% of the focal length of the lens. When looking at other manufacturer's lenses, please remember the F150 has a 1/3-inch CCD.

Optical Graph

All values are approximate values. It is recommended that the camera distance be adjusted by sliding the Camera forward or backward in actual operation.

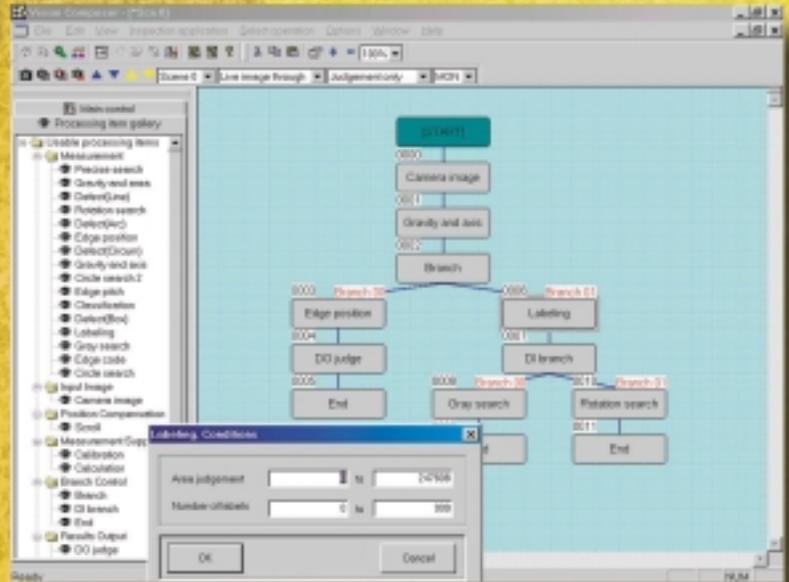


Easy Operation with Visual Simplicity



Vision Composer Integrated Control Software for F150-3

Easy-to-use Windows®-based software that can provide more sophisticated functionality and capability to the F150-3 using a drag-and-drop, flow-chart like setup environment requiring no programming skills.



OMRON
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