High-performance Vision Sensor

F250

Advanced algorithm enables ultra high speed and maximum flexibility

F250

CE

Features

Inspection and positioning that was difficult with previous vision sensors is now surprisingly easy!
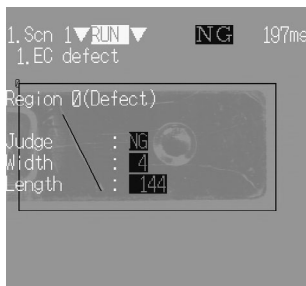
ED defect inspection

High-precision detection of minute defects that could not be detected previously .

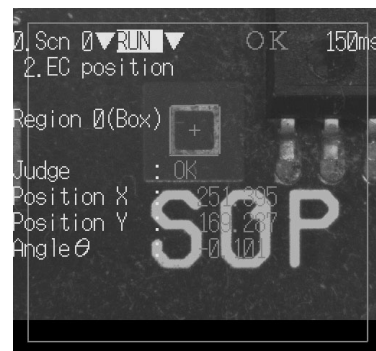Certain detection of rubber packing deformities.

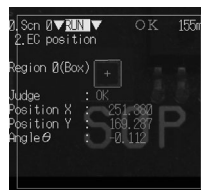Detection of low-contrast defects on metal surfaces

EC positioning

High-precision position measurement even if the inside of the work changes or the view changes.
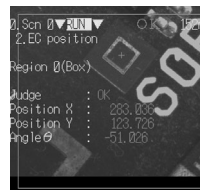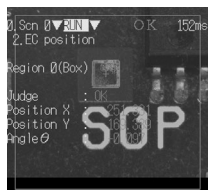
● Positioning of PWB fiducial marks

Low contrast

Revolution

Internal dirt

Features

QUEST character checking

Even if the shape or size of a character varies, "QUEST Logic" finds printed characters with certainty. The built-in dictionary makes "simple settings" possible.

● No need to store a character dictionary

Various character fonts for factory automation have been pre-stored. This eliminates the need to store a dictionary or model names, and allows a dramatic reduction in man-hours for initial setup.
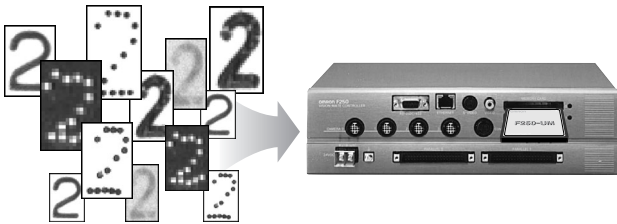
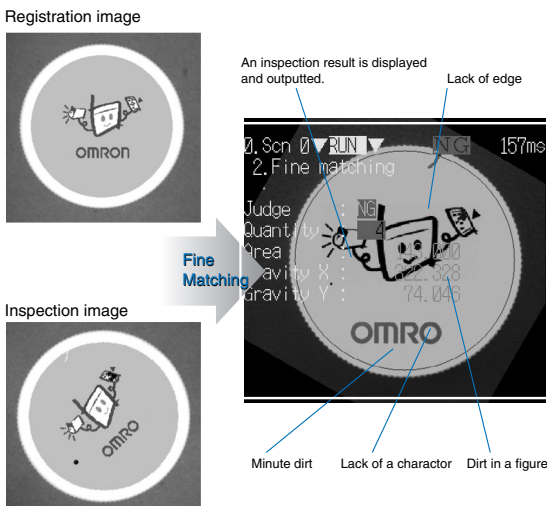### ● The "six character variations" can also be recognized with certitude.

Checks characters printed on the production line such as "Best before" dates and lot numbers. Even if there are deviations in shape, size, or line width, the characters are accurately checked.
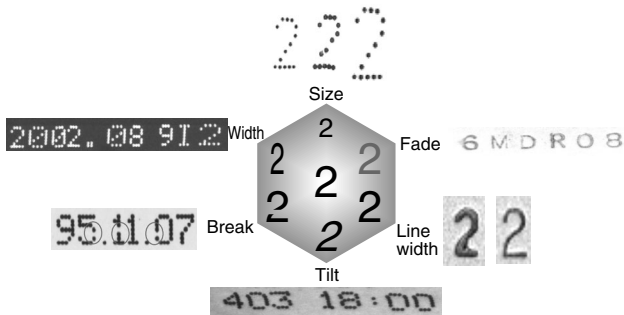
Fine matching

Detects differences from the stored "good" image quickly and with high accuracy. Dramatic improvement in ability to inspect characters and patterns with minute border defects.
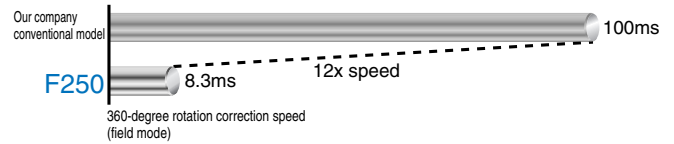
● Example of application to soft drink cap inspection

Registration image

An inspection result is displayed and outputted.

Lack of edge

Inspection image

Fine Matching

Minute dirt   Lack of a charactor   Dirt in a figure

For fast increasing line speeds and ever stricter quality demands.

● Real time Revolution Search is amazing

Executes a real time search of 72 models. Even with works that rotate 360°, positioning corrections are completed at the same time as image read-in.

Our company conventional model   100ms

F250   8.3ms   12x speed

360-degree rotation correction speed (field mode)

● Fast image processing

Inspection functions following camera image read-in are also up to 10 times faster thanks to a newly developed parallel processing technology.

Our company conventional model

F250   2 to 10 times
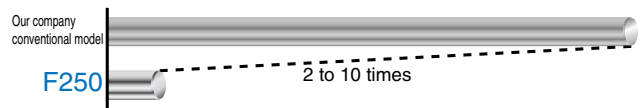
● Fast image read-in

The F160-S1 double-speed camera achieves a maximum image read-in speed of 8.3 ms.

"Non-stop" adjustment without stopping the line

All settings can be adjusted and reset while inspection continues. There is no need to stop the line for adjustments, subsequently, no capacity drops.

Scene 0▼ Measurement▼   NG

7. Trend Monitor
0. Label Position X

It adjusts checking an inspection history by the trend monitor.

Scene 0▼ Measurement▼   NG

0. Position Measurement of Label

Position X: 286.344
Position Y: 207.457

Test measurement is performed as compared with previous NG picture.
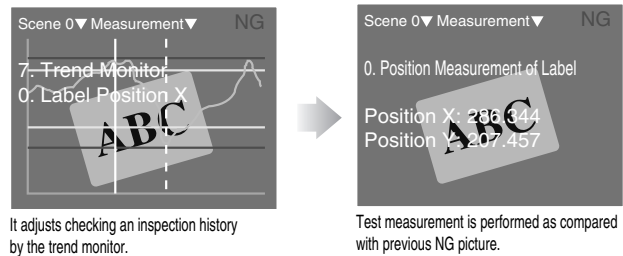
● Easy and flexible settings by means of software application

1. Functions needed for inspection are selected and installed from the software application.

EC position compensation

QUEST Optical Character Recognition

Fine matching

Expression

F250-UM E application software

F250-UM

Scene 0= setting =

Camera setting
0. Camera Picture Input
1. EC Position compensation
2.2 value defective inspection
3. QUEST Optical Character Recognition
4. DO Judging Output
5. Trend Monitor

ENT: Set SFT+ESC: Edit
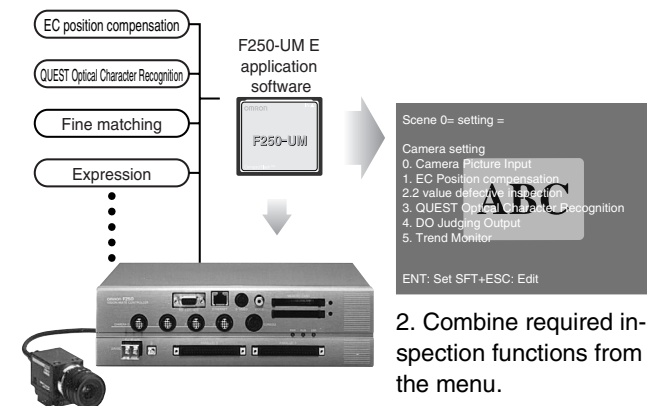
2. Combine required inspection functions from the menu.

OMRON

System configuration

Monitor

Monitor with S-video terminal

Color LCD Monitor
F150-M05L

Monochrome CRT Video Monitor
F150-M09

Personal computer

Ethernet (Cross cable)

RS-232C/422

Monitor cable
F150-VM

Memory card
F160-N64S (64MB)

Application software
F250-UM3☐E

Console

F160-KP   F150-KP

Controller
F250-C50/C55

Power supply

Synchronous sensor

Programmable controller

Parallel cable
F160-VP

Camera cable
F150-VS

Double-speed Camera

Camera with Intelligent Lighting
F160-SLC20
F160-SLC50

Camera
F160-S1
F160-S2

Compatible F150 Cameras

Camera with Intelligent Lighting
F150-SLC20
F150-SLC50

Camera with Light
F150-SL20A
F150-SL50A

Camera
F150-S1A

F250

Ordering Information

Name		Model	Remarks
Controller		F250-C50	NPN Input/Output
		F250-C55	PNP Input/Output
Double-speed camera	Camera with intelligent lighting	F160-SLC20	
		F160-SLC50	
	Camera only	F160-S1	
		F160-S2	Includes Partial Scan functionality
F150 Compatible cameras	Camera with intelligent lighting	F150-SLC20	
		F150-SLC50	
	Camera with lighting	F150-SL20A	
		F150-SL50A	
	Camera only	F150-S1A	
Console		F160-KP	
		F150-KP	
LCD monitor		F150-M05L	
Video monitor		F150-M09	
Memory card		F160-N64S(S)	Memory capacity 64 MB
Application software		F250-UM3ME	with Macro function
		F250-UM3FE	without Macro function
Camera cable		F150-VS	Length of cable for double-speed camera and F150 common camera: 3 m
Monitor cable		F150-VM	Cable length: 2 m
Parallel cable		F160-VP	Length of pigtail cable for parallel input/output connector: 2 m

Rating/Performance

Controller: F250-C50/C55

Connected camera	F150-S1A/SL20A/SL50A/SLC20/SLC50, F160-S1/S2/SLC20/SLC50
Number of connectable cameras	4
Processing resolution	512(H) x 484(V)
Number of scenes	32 scenes (expansion possible using memory card)
Image storage function	Maximum 35 images
Image pre-processing	Smoothing (strong/weak), edge enhancement, edge extraction (horizontal, vertical, both), erosion, dilation, median, background deletion
Operation and Settings	Install measurement routines from a software application, combine and establish settings for measurement routines from menus.
Menu language	Japanese/English (changeable)
Operation customization function	Password function, short-cut key function
Screen customization function	Display items: Character strings (measured values, decisions, time, any character string, measurement area names), graphics (straight lines, rectangles, circles, cross-hair cursors) Parameters specified: display color, postion, size
Non-stop adjustment function	Yes
Trend monitor function	Yes
Memory card slot	2 slots
Monitor	Composite video output: 1 CH, S-video output: 1 CH
Ethernet	10Base-T 1CH
Serial communication	RS-232C/422A 1CH
Parallel input/output	Inputs: 21 points, outputs: 46 points
Strobe	4 CH (included in parallel outputs)
Power supply voltage	20.4 to 26.4 VDC
Current consumption	Approximately 3.7 A (when four F160-SLC50 units are connected)
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)
Dimensions	270(W) x 81(H) x 197(D)
Weight	Approximately 3.1kg (unit only)

Double-speed camera: F160-S1/S2
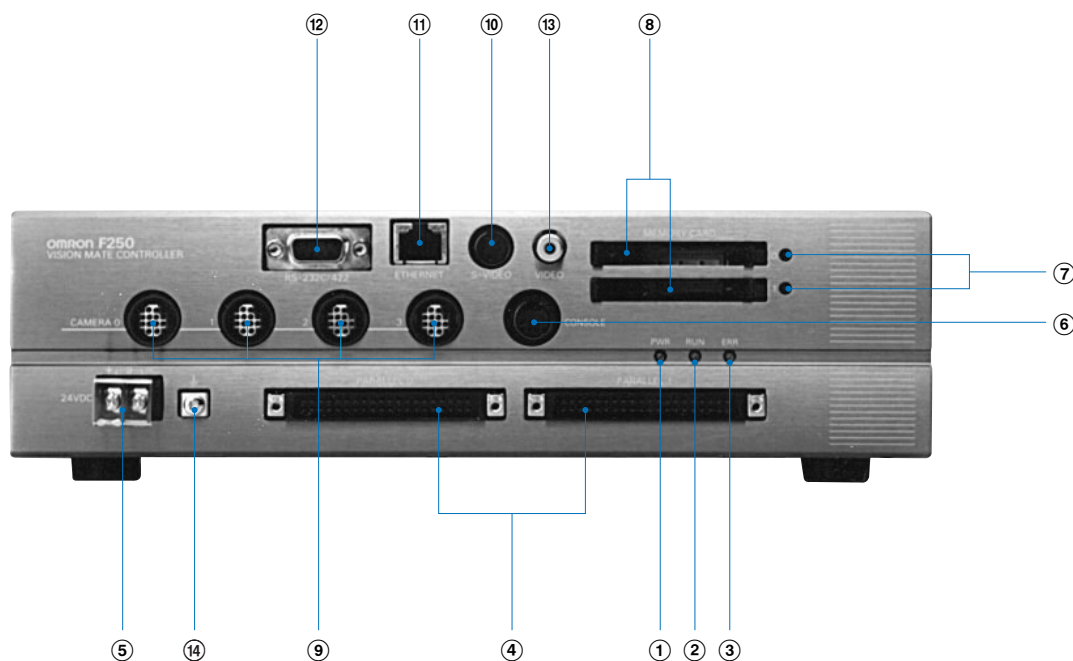
Picture element	1/3" Interline CCD
Effective pixels	659 x 44 (H x V)
Scanning method	1/60-s non-interlace (frame) mode, 1/120-s 2:1 interlace (field) mode
Shutter	Electronic shutter; select from 8 shutter-speed settings (1/120 to 1/20,000 s) using menu
Camera with Intelligent Lighting	F160-SLC20 (field of vision: 20 mm), F160-SLC50 (field of vision: 50 mm)
Ambient temperature	Operating: 0 to +50°C Storage: -25 to +60°C (with no icing or condensation)
Ambient humidity	Operating and Storage: 35 to 85% RH (with no condensation)
External Dimensions	31 x 40 x 54.5 (W x H x D) mm (not including connectors and other protruding parts)
Weight	Approx. 85 g (Camera only)

Monitor

Model number Item Name	F150-M05L Color LCD monitor	F150-M09 Monochrome CRT Video Monitor
Size	5.5 inches	9 inches
Type	Liquid crystal color TFT	CRT monochrome
Resolution	320 x 240 dots	800TV or min. (at center)
Input signal	NTSC composite video (1.0 V / 75)	
Power supply voltage	20.4 to 26.4 VDC	100 to 240 VAC (-15%, +10%)
Current consumption	Approx. 700 mA	Approx. 400 mA
Ambient temperature	Operating: 0 to +50°C Storage: -25 to +65°C (with no icing or condensation)	Operating: -10 to +50°C Storage: -20 to +65°C (with no icing or condensation)
Ambient humidity	Operating or storage: 35% to 85% (with no condensation)	Operating or Storage: 10% to 90% (with no condensation)
Weight (Monitor only)	Approx. 610 g	Approx. 4.5 kg
Accessories	Instruction manual and 4 mounting brackets	Instruction manual

F250

Name and function of each part

Controller: F250-C50/C55

① **POWER LED (green)**

Illuminates while the power is on.

② **RUN LED (orange)**

Illuminates while the system is in measurement mode.

③ **ERROR LED (red)**

Illuminates when a problem occurs.

④ **Input connectors 0, 1**

Connects to a synchronous sensor or programmable controller.

⑤ **Power terminal**

Connects to a DC power supply.

⑥ **Console connector**

Connects to the console.

⑦ **Memory card LEDs 0, 1**

Illuminates while power is supplied to the memory card.

⑧ **Memory card slots 0, 1**

A memory card or software application is inserted here.

⑨ **CAMERA 0 - 3 connectors**

Connects to a camera.

⑩ **Monitor connector (S-Video output)**

Connects to a monitor with an S-Video input

⑪ **Ethernet connector**

Connects to a computer.

⑫ **RS-232C/422 connector**

Connects to a computer or programmable controller.

⑬ **Monitor connector (composite video output)**

Connects to a monitor.

⑭ **Ground terminal**

Connect the ground wire to this terminal.

Function menu

Processing routine list

The F250-UME application software contains approximately 50 processing routines.

Image input related

Camera image input
Camera switch
Pre-processing change
Repeat preprocessing

Position compensation related

Binary position correction
Model position correction
Circular work position correction
Edge position correction
EC position correction
Scroll return
Scroll

General measurement related

QUEST character checking	Dark-light edge position
Binary defect inspection	ECM search
Density defect inspection	EC positioning
Fine matching	Lot number checking 1
Pattern inspection	Dark-light edge number
Sorting	Density average/deviation
EC defect inspection	
EC circular piece count inspection	Labeling
Rotation positioning	Label data

Measurement supplement related

Computing
Acquire processing unit data
Set processing unit data
Wait
Elapsed time
Trend monitor

Branch control related

Condition branch
DI branch
End

Result output related

Memory card data output
DO data output
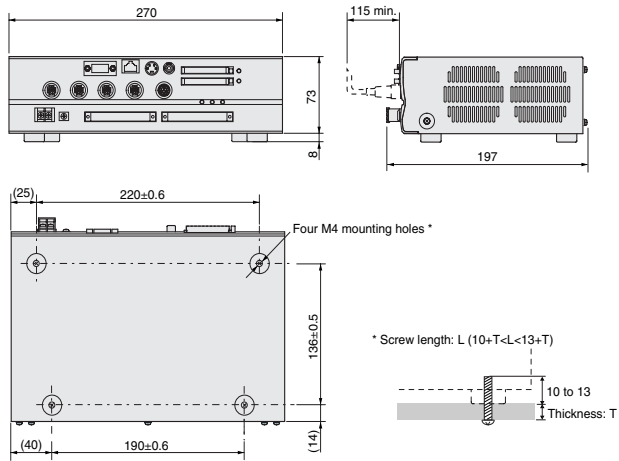Significant link data output
Non-protocol data output
DO decision output

Result display related

Any character display
Measured value display
Decision character display
Processing task name display
Measurement time display
Fixed graphic display
Straight line result display
Rectangle result display
Circle result display
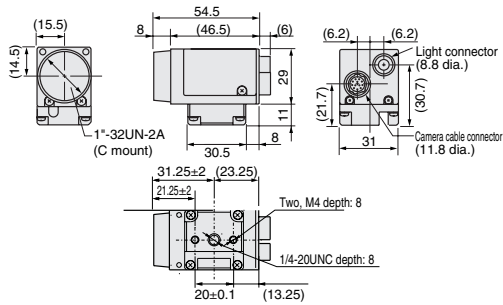Cross-hair cursor result display
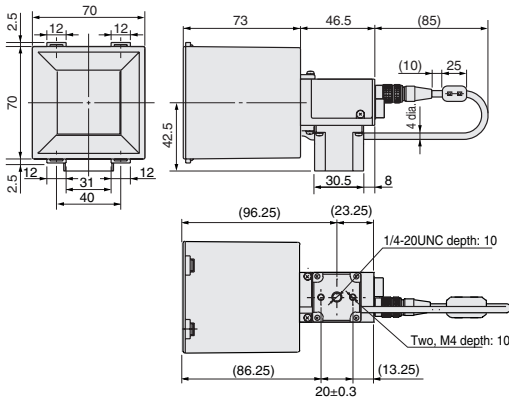
F250

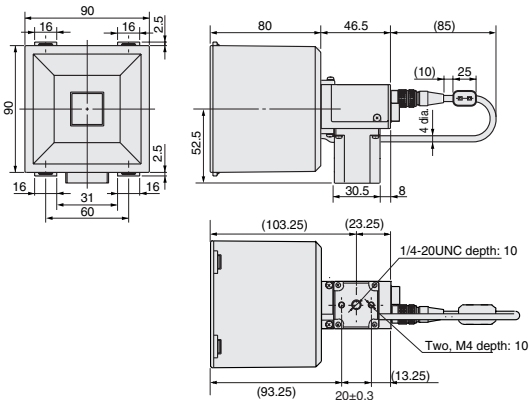# Dimensions (Unit: mm)

Controller
F250-C50/C55

270

115 min.

73

8

197

(25) 220±0.6

Four M4 mounting holes *

136±0.5

* Screw length: L (10+T<L<13+T)

10 to 13
Thickness: T

(40) 190±0.6 (14)

Double-speed camera
F160-S1/S2

(15.5)

(14.5)

8 54.5 (6)

(46.5)

29

11

8

1"-32UN-2A
(C mount)

30.5

(6.2) (6.2)

Light connector
(8.8 dia.)

(21.7)

(30.7)

31

Camera cable connector
(11.8 dia.)

31.25±2 (23.25)

21.25±2

Two, M4 depth: 8

1/4-20UNC depth: 8

20±0.1 (13.25)

F160-SLC20 (with F150-LTC20 intelligent lighting)

2.5

70

12 12

70

2.5

12 31 12

40

73 46.5 (85)

(10) 25

4 dia

42.5

30.5 8

(96.25) (23.25)

1/4-20UNC depth: 10

Two, M4 depth: 10

(86.25) (13.25)

20±0.3

F160-SLC50 (with F150-LTC50 intelligent lighting)

90

16 16 2.5

90

2.5

16 31 16

60

80 46.5 (85)

(10) 25

4 dia

52.5

30.5 8

(103.25) (23.25)

1/4-20UNC depth: 10

Two, M4 depth: 10

(93.25) (13.25)

20±0.3

Console
F160-KP

(29.7)

48

20

135.5

12 dia.

40 2000

F150-KP

50 1.5 13

ESC TRIG ENT

87

SHIFT OMRON
F150-KP
CONSOLE

12 dia.

2000 23 5 10 12.5

LCD monitor
F150-M05L

Attachable thickness: 1.6 to 4.8

(46 max.)

Mounting bracket

143

132

(145)

(155)

(5.5)

50min.

(100)

185

Monitor cable (F150-VM)

42.2

174

Tolerance:±1 mm
( ) dimensions are reference value

Panel cut figure

133.5$^{+0.5mm}_{0}$

175.5$^{+0.5mm}_{0}$

Video monitor
F150-M09

222 250

233

143

5

190 50 160

22
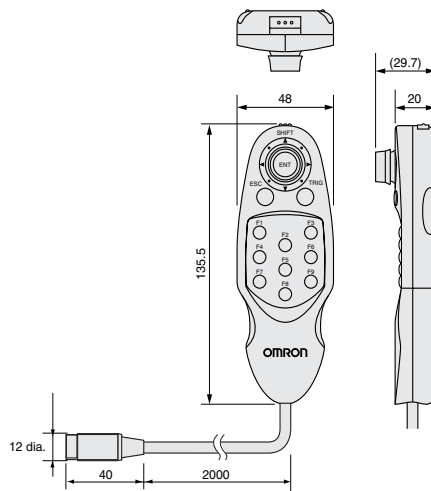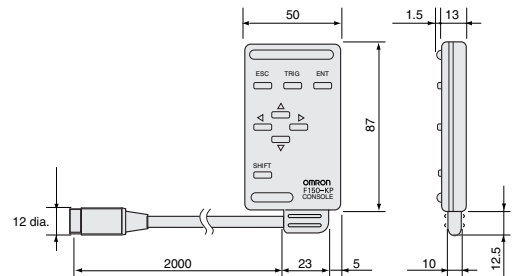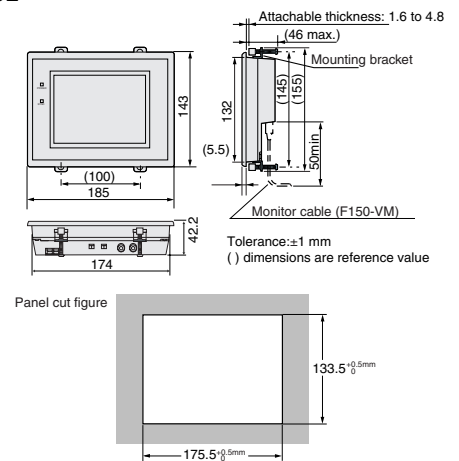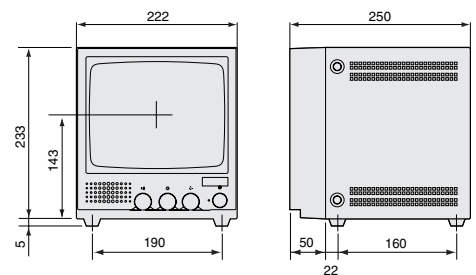
ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.