

OPTICON

Portable Terminal

OPH 1004



The OPH 1004 is a portable terminal with a built-in laser scan engine.

Specifications Manual

All information subject to change without notice.

Document History

Model Number:	OPH 1004	Specification Number:	
Edition:	1A	Original Spec Number:	SS06146
Date:	2009		

Copyright 2009 Opticon. All rights reserved.

This manual may not, in whole or in part, be copied, photocopied, reproduced, translated or converted to any electronic or machine readable form without prior written consent of Opticon.

Limited Warranty and Disclaimers

PLEASE READ THIS MANUAL CAREFULLY BEFORE INSTALLING OR USING THE PRODUCT.

Serial Number

A serial number appears on all Opticon products. This official registration number is directly related to the device purchased. Do not remove the serial number from your Opticon device. Removing the serial number voids the warranty.

Warranty

Unless otherwise agreed in a written contract, all Opticon products are warranted against defects in materials and workmanship for two years after purchase. Opticon will repair or, at its option, replace products that are defective in materials or workmanship with proper use during the warranty period. Opticon is not liable for damages caused by modifications made by a customer. In such cases, standard repair charges will apply. If a product is returned under warranty and no defect is found, standard repair charges will apply. Opticon assumes no liability for any direct, indirect, consequential or incidental damages arising out of use or inability to use both the hardware and software, even if Opticon has been informed about the possibility of such damages.

Packaging

The packing materials are recyclable. We recommend that you save all packing material to use should you need to transport your scanner or send it for service. Damage caused by improper packaging during shipment is not covered by the warranty.

Trademarks

Trademarks used are the property of their respective owners.

Opticon Inc. and Opticon Sensors Europe B.V. are wholly owned subsidiaries of OPTOELECTRONICS Co., Ltd., 12-17, Tsukagoshi 4-chome, Warabi-shi, Saitama, Japan 335-0002. TEL +81-(0) 48-446-1183; FAX +81-(0) 48-446-1184

SUPPORT

USA

Phone: 800-636-0090

Email: support@opticonusa.com

Web: www.opticonusa.com

Europe

Email: support@opticon.com

Web: www.opticon.com

Contents

- 1. Abstract 5**
- 2. Overview 5**
- 3. Physical Features 6**
 - 3.1. Dimensions 6
 - 3.2. Weight 6
- 4. Environmental Specifications 7**
 - 4.1. Operating Temperature and Humidity 7
 - 4.2. Charging Temperature 7
 - 4.3. Storage Temperature and Humidity 7
 - 4.4. Ambient Light Immunity 7
- 5. Controls 8**
- 6. Electrical Specifications 9**
 - 6.1. Electrical Characteristics 9
 - 6.2. Main Battery 9
- 7. Optical Specifications 10**
 - 7.1. Laser Scan Specifications 10
 - 7.1.1. Tilt of Laser Scan Line 10
 - 7.1.2. Curvature of Scan 10
- 8. Technical Specifications 11**
 - 8.1. Print Contrast Signal (PCS) 11
 - 8.2. Minimum Resolution 11
 - 8.3. Scan Area and Resolution 12
 - 8.3.1. Depth of Field 12
 - 8.4. Pitch, Skew, and Tilt 13
 - 8.4.1. Pitch Angle 13
 - 8.4.2. Skew Angle and Dead Zone 14
 - 8.4.3. Tilt Angle 15
 - 8.5. Curvature 16
- 9. Interface Specifications 17**
 - 9.1. Infrared Transmission (IrDA) 17
 - 9.1.1. Specifications 17
 - 9.1.2. Transmission speed 17

10. Serial Number	17
11. Packaging Specifications	18
11.1. Individual Packaging Specification	18
11.2. Collective Packaging Specification	19
12. Durability	20
12.1. Static Electricity	20
12.2. Shock	20
12.3. Vibration Strength	20
12.4. Dust and Drip Proof.....	20
12.5. Cable Bending.....	20
13. Regulatory Compliance	21
13.1. Laser Safety	21
13.2. Product Safety.....	21
13.3. EMC	21
13.4. RoHS.....	21
14. Safety	22
14.1. Shock	22
14.2. Temperature Conditions.....	22
14.3. Foreign Materials	22
14.4. Other	22
15. Mechanical Drawing	23

Table of Figures

Figure 1: Scan tilt and curvature.....	10
Figure 2: Depth of field	12
Figure 3: Pitch angle.....	13
Figure 4: Skew angle and dead zone	14
Figure 5: Tilt angle	15
Figure 6: Curvature.....	16
Figure 7: Serial number label	17
Figure 8: Individual packaging.....	18
Figure 9: Collective packaging.....	19
Figure 10: Mechanical drawing.....	23

1. Abstract

This manual provides specifications for the OPH 1004 portable terminal (hereafter referred to as “scanner”).

2. Overview

The OPH 1004 is a portable terminal with a built-in laser scan engine. Barcodes and data input are stored in the terminal’s internal memory using various keys. Stored data can be sent to a host via infrared transmission (IrDA version 1.2) using the CRD 1001 dedicated cradle or the CRD 1002 analog modem cradle or the CRD 1003 GSM modem cradle.

Features

- IrDA-equipped, batch-type portable terminal
- Satisfies IP54 requirements; drop-resistant to 1.5 m
- Small, compact chassis

Supported symbologies:

Linear (1D)

JAN/UPC/EAN, incl. add-on
Codabar/NW-7
Code 11
Code 39
Code 93
Code 128
GS1-128 (EAN-128)
GS1 Databar (RSS)
IATA
Industrial 2of5
Interleaved 2of5
ISBN-ISMN-ISSN
Matrix 2of5
MSI/Plessey
S-Code
Telepen
Tri-Optic
UK/Plessey

Postal

Chinese Post
Korean Postal Authority Code

2D

Composite Codes
MicroPDF417
PDF417

An application development kit for the development of a customer's original application is available as an option.

Development language: C language.

[Contents]

- Application Development Specification Manuals
- Development Library

3. Physical Features

3.1. Dimensions

W 55.0 x D 23.0 x H 136.0 mm

3.2. Weight

140 g (including battery)

4. Environmental Specifications

4.1. Operating Temperature and Humidity

Temperature: -10 to 50° C

Humidity: 20% to 85% RH

4.2. Charging Temperature

Temperature: 0 to 40° C

4.3. Storage Temperature and Humidity

Temperature: -20 to 60° C

Humidity: 20% to 85% RH

4.4. Ambient Light Immunity

Decoding performance is guaranteed when the range of illumination on a barcode surface is between zero and the following values:

Incandescent light	4,000 lx
Fluorescent light	4,000 lx
Sunlight	80,000 lx

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS = 0.9, Resolution = 0.25 mm, Quiet Zone = 15 mm, Symbology = 9-digit Code 39, N/W Ratio = 1:2.5	
Distance	96 mm from the edge of the scanner
Angle	$\alpha = 0^\circ \beta = 15^\circ \gamma = 0^\circ$
Curvature	$R = \infty$

Direct light or specular reflection from a light source should be prevented from entering the acceptance area.

Note: α , β and γ respectively represent pitch, skew and tilt. Please see section 8 for how these values are defined.

5. Controls

Items	Specifications		Remarks
CPU	Type	ARM7TDMI 32-bit MCU with Flash	STR710F
	Internal ROM	256 + 16 KB	
	Internal RAM	64 KB	
	Clock frequency	48 MHz	
Memory	FLASH ROM	4 MB	
	SRAM	16 MB	
	NAND Flash	64 MB	
LCD	Active area	W 32 x H 32 mm	
	Number of dots	W 128 x H 128	Dot pitch 0.25 mm
	Diode	FSTN semi-transmissive LCD	
	Backlight	White LED	
	Type of characters	Tiny/Small/Medium/Large/Huge	
	Character construction	Tiny font: 6 dots x 6 dots Small font: 8 dots x 8 dots Medium font: 6 dots x 12 dots Large font: 8 dots x 16 dots Huge font: 12 dots x 24 dots	
Other display	LED	Two-color LED (red/green)	When lit at the same time, red and green appear as orange
	Buzzer	Adjustable volume, tone	
Operations	Keys	UP, DOWN, SCAN, SHIFT, BS, CLEAR, POWER, 10Keys, Dot, ENTER, #, END, CLR, RET	
RTC (Clock)	Built-in RTC	YY/MM/DD/HH/MM/SS (Leap-year supported) Accurate within 90 seconds per month	

6. Electrical Specifications

6.1. Electrical Characteristics

Parameter	Typ	Unit	Remarks
Operating voltage	3.6–4.2	V	Lithium-ion battery
Operating current	100	mA	When laser emitting
Stand-by current	<22	mA	
Sleep current	<5	mA	When the power is OFF

6.2. Main Battery

The main battery is a lithium-ion battery:

- Nominal capacity: 1100 mAh
- Nominal voltage: 3.7 V.
- Low voltage: Less than 3.4 V
- Usable time: 50 hours (barcode scan frequency: 2x/10 s)
- Data hold time: 7 days

The spare battery is an 11 mAh second-generation battery.

7. Optical Specifications

7.1. Laser Scan Specifications

Parameter	Specification	Unit
Light-emitting element	Red laser diode	—
Emission wavelength	650 ±10 (25° C)	nm
Light output	1.0 or less	mW
Scanning method	Bi-directional scanning	—
Scanning speed	100 ±20	scans/s
Scan angle	Scan angle: 54 ±5	°
	Read angle: 44 (Min)	°

Notes:

Refer to chapter 8, “Technical Specifications,” to read about scanning performance.

7.1.1. Tilt of Laser Scan Line

Maximum tilt between both ends of laser scan line.

Less than 1.2° upward tilt from the scan origin.

Maximum of 3.1 mm when measured at a point 150 mm away from the scan origin. (The skew angle of this measurement was 0°.)

Measurement was done from the center of the scan line.

7.1.2. Curvature of Scan

Maximum gap between the straight line connecting both ends of laser scan line and the actual laser scan line.

Less than 1.27° curvature from the scan origin.

Maximum of 3.3 mm curvature when measured at a point 150 mm away from the scan origin.

Measurement was done from the center of the scan line.

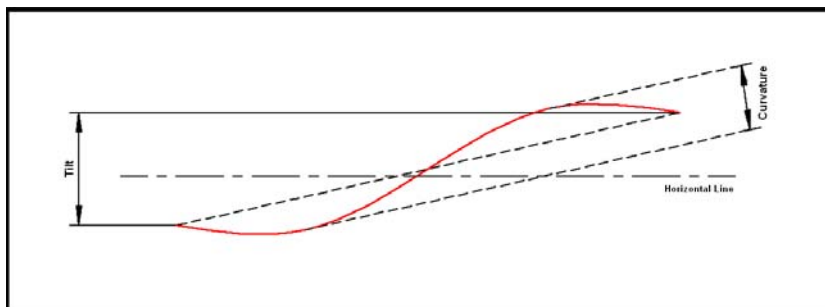


Figure 1: Scan tilt and curvature

8. Technical Specifications

The conditions for technical specifications are as follows, unless otherwise specified in each section.

Conditions

Ambient temperature and humidity:	Room temperature (5 to 35° C) Room humidity (45% to 85% RH)
Ambient light:	500 to 900 lx
Background:	Barcode = black Space = white Margin = white Background of label = black
Decoding test:	Approve the performance when decoding is successful in all ten tests. (Decoding is deemed successful when completed in 0.5 seconds or less.)

8.1. Print Contrast Signal (PCS)

0.45 or higher (over 70% of reflectivity of space and quiet zone).

$$\text{PCS} = \frac{\text{Reflectance of white bar} - \text{Reflectance of black bar}}{\text{Reflectance of white bar}}$$

Scanning performance may decline if dirt or scratches mar the optical window. Keep the optical window clean.

8.2. Minimum Resolution

0.15 mm

8.3. Scan Area and Resolution

8.3.1. Depth of Field

The depth of field is measured from the edge of the scanner. The scanning range is within the circular arc centered on the scan origin.

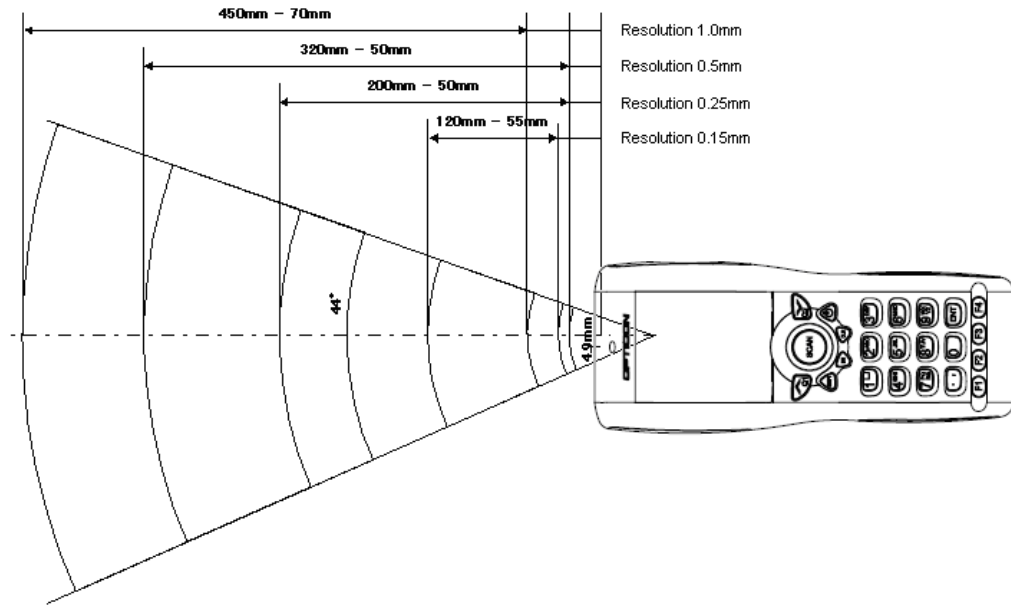


Figure 2: Depth of field

Symbology	Resolution (mm)	Decode Depth (mm)	PCS
Code 39	1.0	70 – 450	0.9
Code 39	0.5	50 – 320	0.9
Code 39	0.25	50 – 200	0.9
Code 39	0.15	55 – 120	0.9

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

N/W Ratio: 1:2.5

Angle: $\alpha = 0^\circ, \beta = 15^\circ, \gamma = 0^\circ$

Curvature: $R = \infty$

Resolution (mm)	Symbology	PCS	Quiet Zone	Digits
1.0	Code 39	0.9	25 mm	1
0.5	Code 39	0.9	18 mm	3
0.25	Code 39	0.9	10 mm	8
0.15	Code 39	0.9	7 mm	10

8.4. Pitch, Skew, and Tilt

8.4.1. Pitch Angle

$\alpha = \pm 35^\circ$

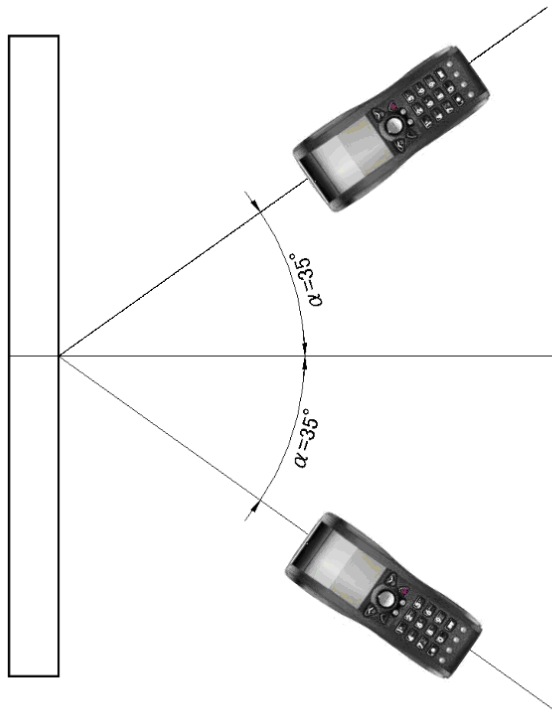


Figure 3: Pitch angle

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

Distance	96 mm from the edge of the scanner
Label	Pitch Angle, Skew Angle, Dead Zone PCS = 0.9, Resolution = 0.25mm, Symbology = 9-digit Code 39, Quiet Zone = 10 mm, N/W Ratio = 1:2.5 Tilt Angle PCS = 0.9, Resolution = 0.26mm, Symbology = 13-digit JAN, Quiet Zone = 10mm
Angle	Pitch: Skew $\beta = +15^\circ$; Tilt $\gamma = 0^\circ$ Tilt: Pitch $\alpha = 0^\circ$; Skew $\beta = +15^\circ$ Skew Dead Zone: Pitch $\alpha = 0^\circ$; Tilt $\gamma = 0^\circ$
Curvature	$R = \infty$

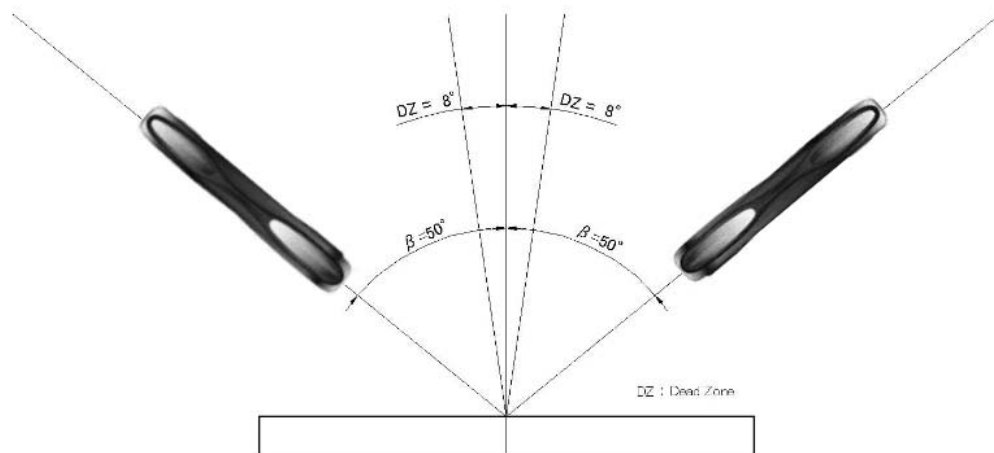
8.4.2. Skew Angle and Dead ZoneSkew: $\beta = \pm 50^\circ$ (Excluding dead zone)Dead zone: $\beta = \pm 8^\circ$ (There are some areas in which decoding fails due to specular reflection)

Figure 4: Skew angle and dead zone

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

- Distance 96 mm from the edge of the scanner
- Label **Pitch Angle, Skew Angle, Dead Zone**
 PCS = 0.9, Resolution = 0.25mm, Symbology = 9-digit Code 39,
 Quiet Zone = 10 mm, N/W Ratio = 1:2.5
Tilt Angle
 PCS = 0.9, Resolution = 0.26mm, Symbology = 13-digit JAN,
 Quiet Zone = 10mm
- Angle **Pitch:** Skew $\beta = +15^\circ$; Tilt $\gamma = 0^\circ$

Tilt: Pitch $\alpha = 0^\circ$; Skew $\beta = +15^\circ$

Skew Dead Zone: Pitch $\alpha = 0^\circ$; Tilt $\gamma = 0^\circ$
- Curvature R = ∞

8.4.3. Tilt Angle

$\gamma = \pm 20^\circ$

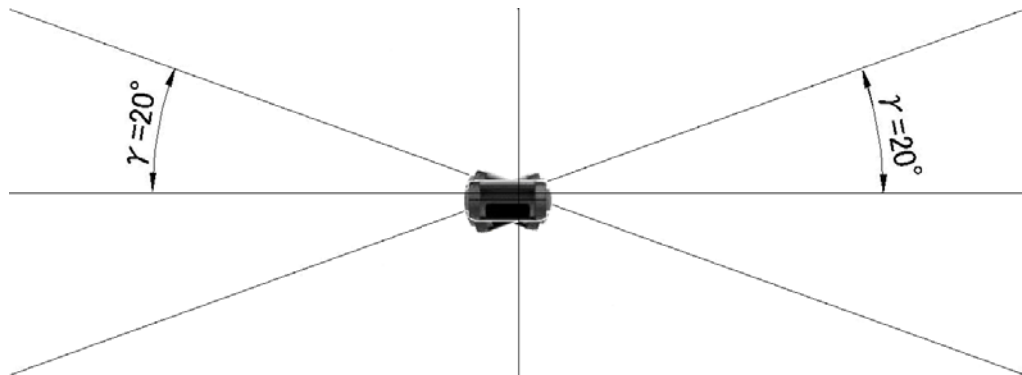


Figure 5: Tilt angle

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

- Distance 96 mm from the edge of the scanner
- Label **Pitch Angle, Skew Angle, Dead Zone**
 PCS = 0.9, Resolution = 0.25mm, Symbology = 9-digit Code 39,
 Quiet Zone = 10 mm, N/W Ratio = 1:2.5
Tilt Angle
 PCS = 0.9, Resolution = 0.26mm, Symbology = 13-digit JAN,
 Quiet Zone = 10mm
- Angle **Pitch:** Skew $\beta = +15^\circ$; Tilt $\gamma = 0^\circ$

Tilt: Pitch $\alpha = 0^\circ$; Skew $\beta = +15^\circ$

Skew Dead Zone: Pitch $\alpha = 0^\circ$; Tilt $\gamma = 0^\circ$
- Curvature R = ∞

8.5. Curvature

With 8-digit JAN/UPC/EAN barcodes, decoding performance is guaranteed when $R \geq 15$ mm.

With 13-digit JAN/UPC/EAN barcodes, decoding performance is guaranteed when $R \geq 20$ mm.

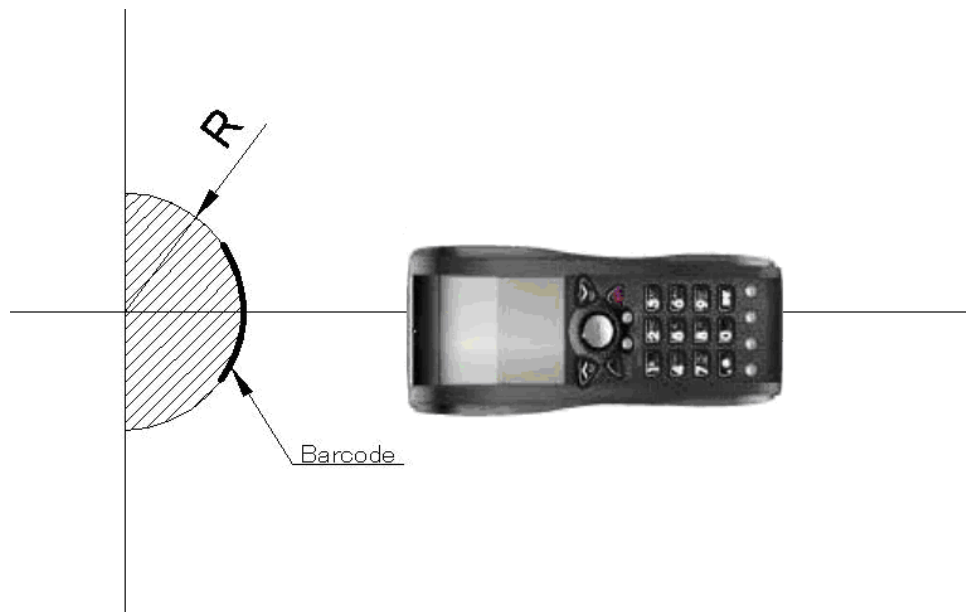


Figure 6: Curvature

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS = 0.9, Resolution = 0.26 mm, Quiet Zone = 10 mm

Distance 96 mm from the edge of the scanner

Angle Skew Angle $\beta = +15^\circ$

9. Interface Specifications

9.1. Infrared Transmission (IrDA)

9.1.1. Specifications

IrDA version 1.2 standard (physical layer only).

9.1.2. Transmission speed

Transmission speeds: 115.2 kbps, 38.4 kbps, 19.2 kbps, 9600 bps, 4800 bps, or 2400 bps.

10. Serial Number

The serial number as shown below is affixed to the scanner.



Figure 7: Serial number label

11. Packaging Specifications

11.1. Individual Packaging Specification

After putting a scanner in a plastic bag, pack it in a separate box with the accessories.
Put a label on the side of the individual packing box.

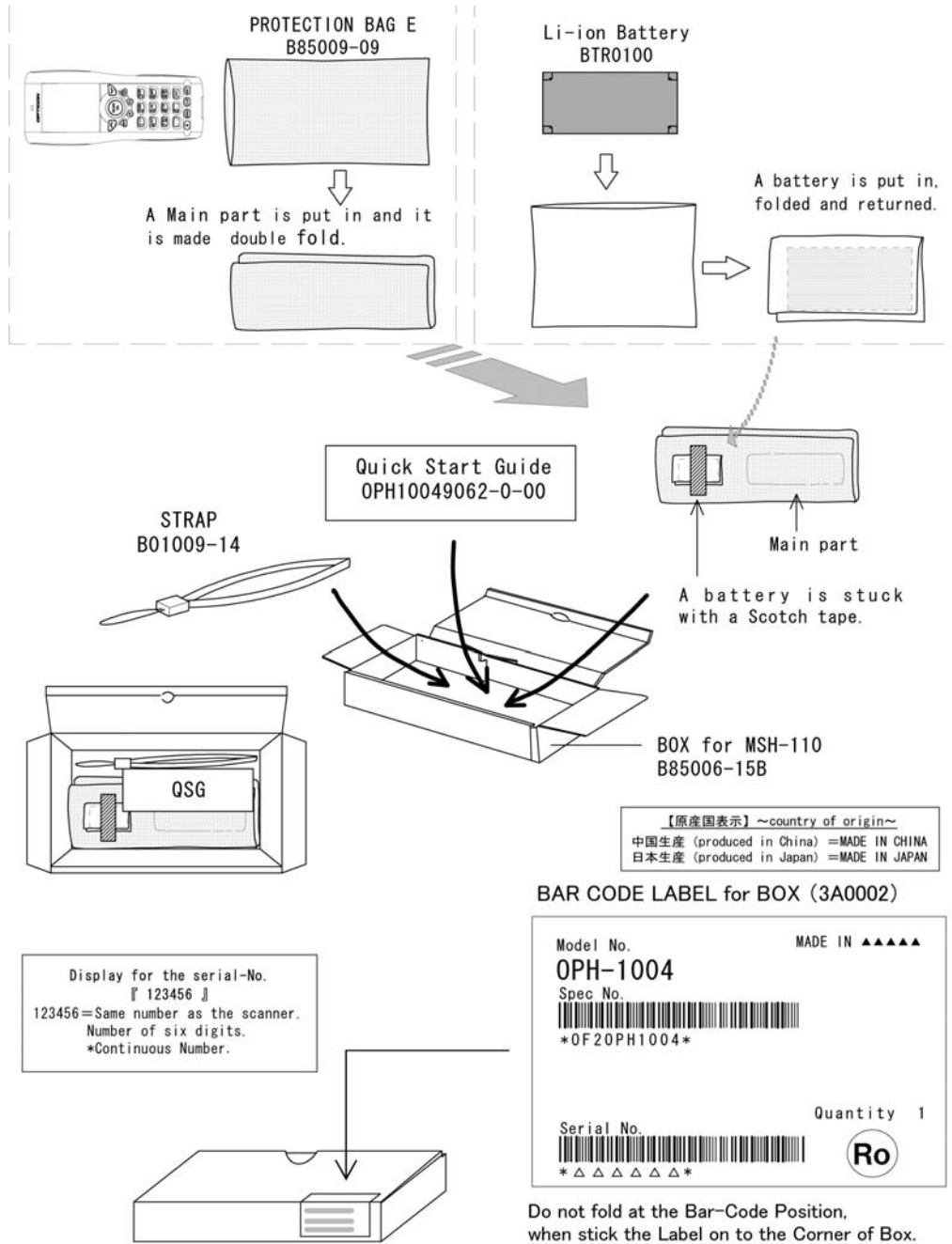


Figure 8: Individual packaging

11.2. Collective Packaging Specification

Put 50 individual boxes with scanners inside a box.

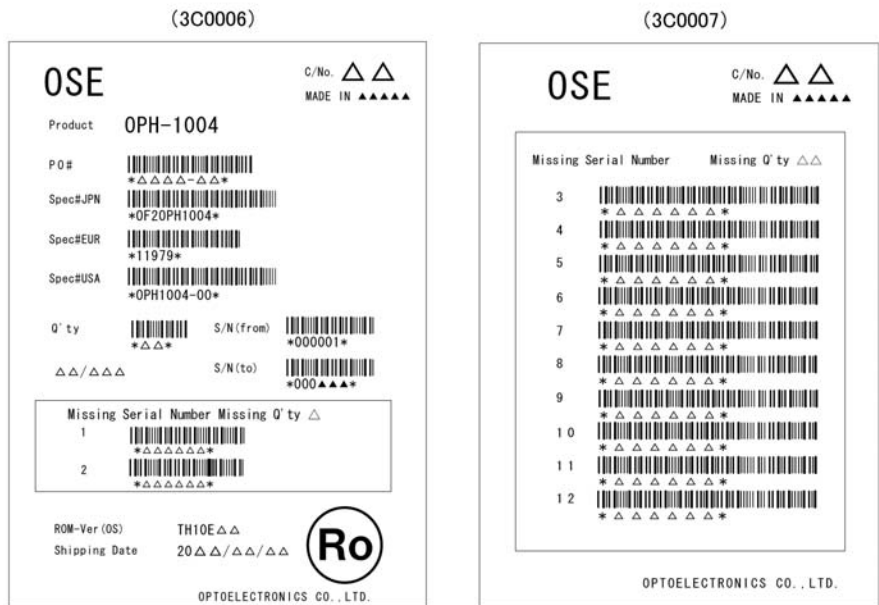
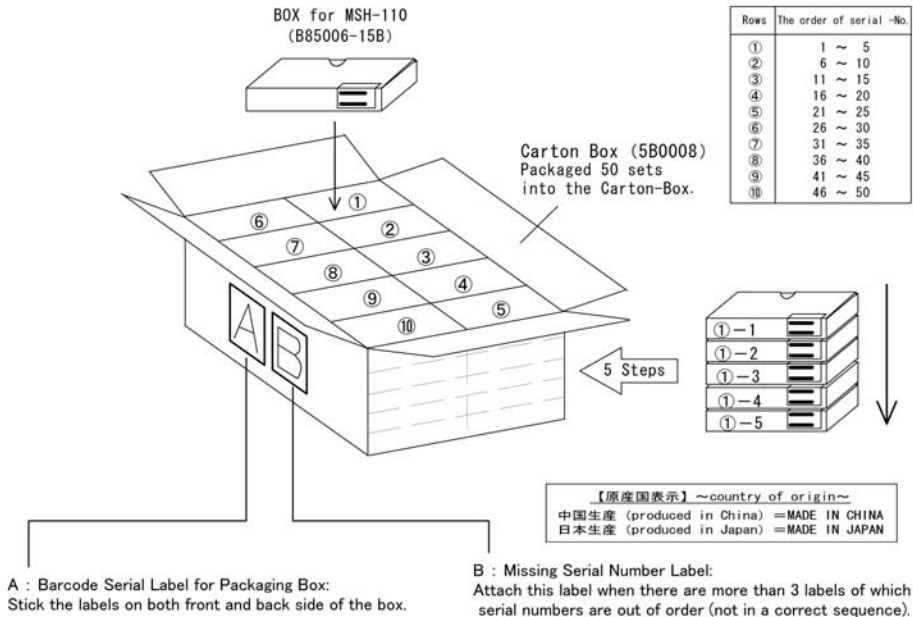


Figure 9: Collective packaging

Note: The “RO” mark labeled on the package tray or package box guarantees that the applicable product has passed our test of RoHS restrictions compliance (the restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95 EC). However, this document does **not** have any legal weight in the European Union.

12. Durability

12.1. Static Electricity

Air discharge:	± 8 kV MAX (No malfunction) ± 15 kV MAX (No destruction)
Contact discharge:	± 4 kV MAX (No malfunction) ± 8 kV MAX (No destruction)

12.2. Shock

There was no sign of malfunction with the scanner’s structural performance after the following shock test.

Drop Test: Drop the scanner from 1.5 M above the concrete floor (6 sides, 3 times each).

Scratches or discoloration of the casing do not decrease product performance.

12.3. Vibration Strength

There was no sign of malfunction with the scanner’s operation after the following vibration test in the non-operating state.

Vibration Test: Increase the frequency of the vibration from 10 Hz to 100 Hz with accelerated velocity 19.6 m/s² (2G) for 1 hour each in X-direction, Y-direction and Z-direction.

12.4. Dust and Drip Proof

IP54

Dust Prevention

Level	Details
5	Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment; complete protection against contact.

Water Prevention

Level	Details
4	Water splashing against the enclosure from any direction shall have no harmful effect.

12.5. Cable Bending

Cable bending resistance is not warrantable.

13. Regulatory Compliance

13.1. Laser Safety

The scanner emits laser beams.

JIS C6802: 2005: Laser Class 2

IEC 60825-1+A2:2001 Laser Class 2

CDRH Laser Class 2

FDA CDRH Laser class II. Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50 dated June 24, 2007.

Class II laser devices are not considered to be hazardous when used for their intended purpose. Avoid staring into the laser beam.

13.2. Product Safety

EN60950-1:2001

IEC60950-1:2001

13.3. EMC

EN55022

EN55024

VCCI Class B: This is a Class B product, to be used in a domestic environment based on the Technical Requirement of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Please install and use the equipment according to the instruction manual.

FCC Part 15 Subpart B Class B: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

13.4. RoHS

RoHS: The restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95 EC.

14. Safety

Handle this product carefully. Do not deliberately subject it to any of the following.

14.1. Shock

Do not throw or drop the scanner.

Do not place heavy objects on the cables.

14.2. Temperature Conditions

Do not use the scanner at temperatures outside the specified range.

Do not pour boiling water on the scanner.

Do not throw the scanner into the fire.

Do not forcibly bend the cables at low temperatures.

14.3. Foreign Materials

Do not immerse the scanner in liquids.

Do not subject the scanner to chemicals.

14.4. Other

Do not plug/unplug the connectors before disconnecting the power.

Do not disassemble this product.

Do not place the product near a radio or a TV receiver, as the scanner may cause reception problems.

The scanner may be damaged by voltage drops.

The scanner may not perform properly in environments when placed near a flickering light, such as a computer monitor, television, etc.

15. Mechanical Drawing

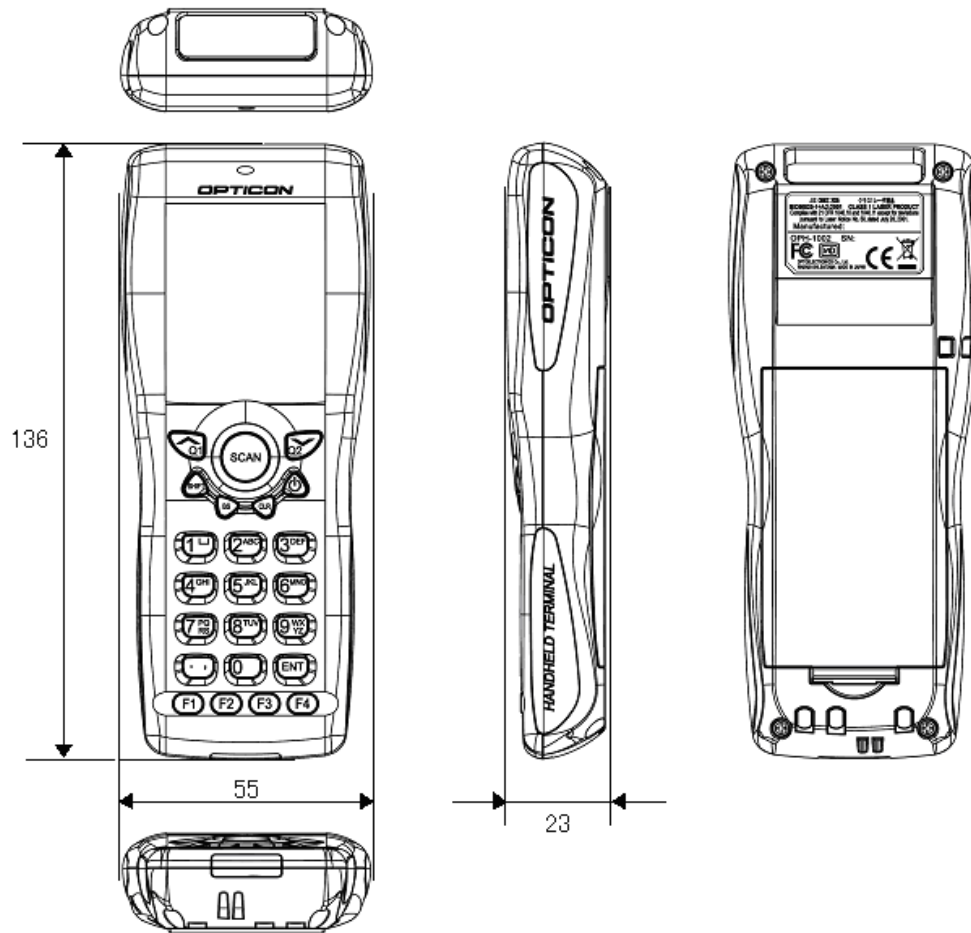


Figure 10: Mechanical drawing