

# OPR 3001

## Rugged Handheld Laser Scanner

**OPTICON**

# Specifications Manual



All information subject to change without notice.

## Document History

|                      |            |                              |         |
|----------------------|------------|------------------------------|---------|
| <b>Model Number:</b> | OPR 3001   | <b>Specification Number:</b> | SS06106 |
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## 1. Abstract

This manual provides specifications for the OPR 3001 handheld laser barcode scanner.

## 2. Overview

The OPR 3001 is a rugged handheld laser barcode scanner with protection against dust and splashing water to ensure reliable operation in harsh environments. The OPR 3001 is enclosed in a rugged housing sealed to IP-54 standards that withstands repeated drops of up to two meters onto concrete.

Short-wavelength red laser beams enhance the visibility of scanning lines for easier aiming under adverse lighting conditions. The OPR 3001 is available in USB, RS-232C, and Wedge interfaces.

Supported symbologies:

- JAN/UPC/EAN/all add-on
- Codabar/NW-7, including ABC and CX
- Chinese Post Matrix 2 of 5
- Code 39: Normal Code 39 / Full ASCII Code 39 / Italian Pharmaceutical
- Code 11
- Code 93
- Code 128: EAN-128
- IATA
- Industrial 2of5
- Interleaved 2of5
- ISBN-ISMN-ISSN
- Korean Postal Authority code
- Matrix 2of5
- MSI/Plessey-UK/Plessey
- RSS: RSS-14 (incl. CC-A/B) RSS-Limited (incl. CC-A/B)/ RSS-Expanded (incl. CC-A/B)
- Composite Codes: UCC/EAN-128 (incl. CC-A/B/C)
- S-Code
- Telepen
- Tri-Optic
- PDF417
- MicroPDF417

### 3. Physical Features

#### 3.1. Dimensions

W 68 X D 150 X H 155 mm (except protruding portion)

#### 3.2. Weight

230 g max (excluding cable).

### 4. Environmental Specifications

#### 4.1. Operating Temperature and Humidity

Temperature: -10 to +60° C

Humidity: 5 to 90% RH

#### 4.2. Storage Temperature and Humidity

Temperature: -30 to +70° C

Humidity: 5 to 90% RH

#### 4.3. 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 | to 4,000 lx  |
| Fluorescent light  | to 4,000 lx  |
| Sunlight           | to 80,000 lx |

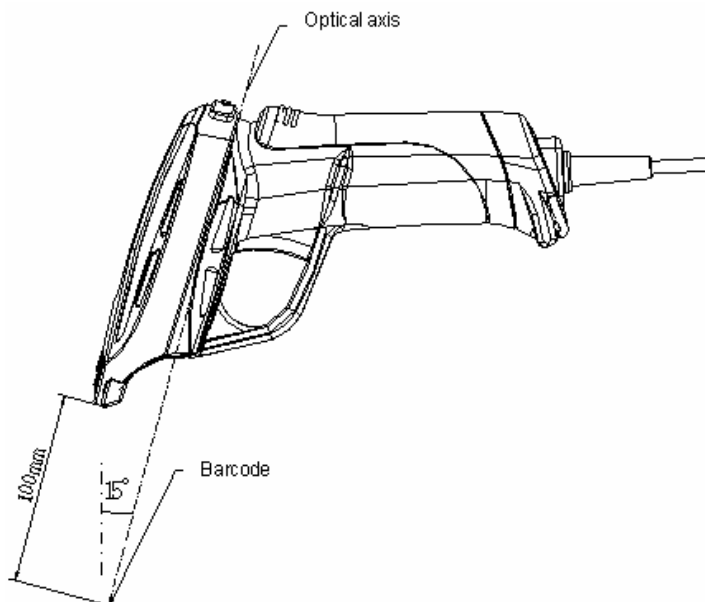


Figure 1: Ambient light immunity

## Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

|                       |  |
|-----------------------|--|
| PCS:                  | 0.9  |
| Resolution:           | 0.25 mm  |
| Symbology:            | 9-digit Code-39                                      |
| Quiet Zone:           | 10 mm  |
| N/W Ratio:            | 1:2.5  |
| Distance:             | 100 mm from the edge of scanner                      |
| Angle:                | $\alpha = 0^\circ \beta = 15^\circ \gamma = 0^\circ$ |
| Curvature:            | $R = \infty$   |
| Power supply voltage: | 6.0 V  |

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

## 5. Electrical Specifications

### 5.1. Electrical Characteristics

| Parameter            | Symbol     | Min | Typ | Max | Unit | Remarks                           |
|----------------------|------------|-----|-----|-----|------|-----------------------------------|
| Power supply voltage |            | 5.4 | 6.0 | 6.6 | V    | RS-232C                           |
|                      |            | 4.5 | 5.0 | 5.5 | V    | USB and Wedge                     |
| Operating current    | $I_{OP}$   | -   | 96  | 130 | mA   | RS-232C when emitting             |
|                      |            | -   | 90  | 125 | mA   | USB and Wedge when emitting laser |
| Rush current         | $I_{PEEK}$ | -   | 400 | 600 | mA   | RS-232C                           |
|                      |            | -   | 300 | 500 | mA   | USB and Wedge                     |
| Stand-by current     | $I_{PRE}$  | -   | 35  | 60  | mA   | RS-232C                           |
|                      |            | -   | 30  | 55  | mA   | USB and Wedge                     |

#### Conditions:

- Connect 1Ω resistance to a power supply line in series and measure the current by the voltage between both ends of resistance.
- Power supply voltage is measured at a connector terminal area.
- The current value depends on the host computer to which the device is connected.



## 6. Optical Specifications

### 6.1. Laser Scanning Specification

| 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              | °       |
|                        | Effective scan angle: 44 (Min) | °       |

### 6.2. Laser Scanning Standard

#### 6.2.1. Laser Scanning Tilt

Laser scanning tilt is the vertical difference between both ends of a laser scan line. Measure it in the middle of the laser scan line.

- Up to 1.2 degrees angle in vertical direction from the scan origin (mirror motor).
- Up to 3.1 mm at 150 mm from the scan origin.

#### 6.2.2. Scanning Curvature

The maximum difference between the laser scan line and the line between both ends of the laser scan line. Measure it in the middle of the laser scan line.

- Up to 1.27 degrees angle in vertical direction from the scan origin (mirror motor).
- Up to 3.3 mm at 150 mm from the scan origin.

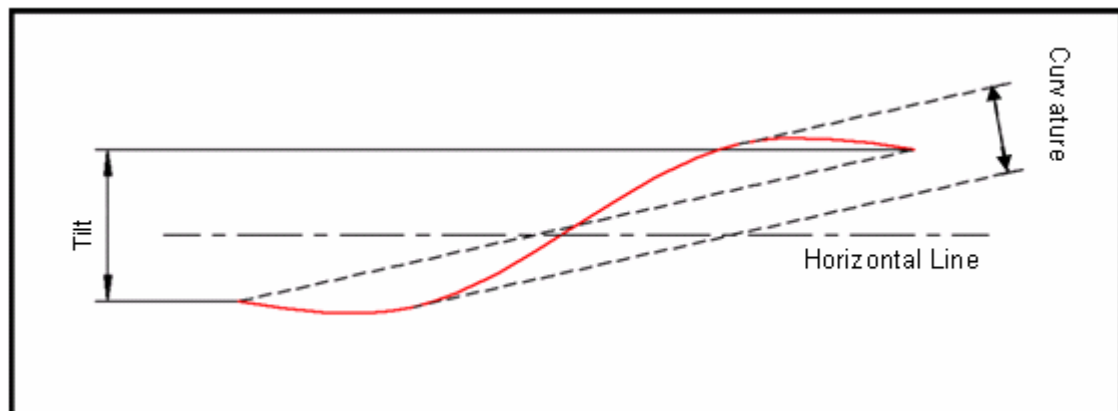


Figure 2: Laser scanning tilt and curvature

## 7. Technical Specifications

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

### Conditions

|                                  |  |
|----------------------------------|--|
| Ambient Temperature and Humidity | 21° C/70° F, 60% RH  |
| Ambient Light                    | 500 to 900 lx  |
| Background                       | Barcode = black<br>Space = white<br>Margin = white<br>Background of label = black  |
| Power Supply Voltage             | 6.0 V (RS-232C) / 5.0 V (USB and Wedge)  |
| Decoding Test                    | Approve the performance when decoding is successful in all ten tests.<br>(Decoding is deemed successful when completed in 0.5 second or less.) |

### 7.1. Print Contrast Signal (PCS)

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

## 7.2. Scan Area and Resolution

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.

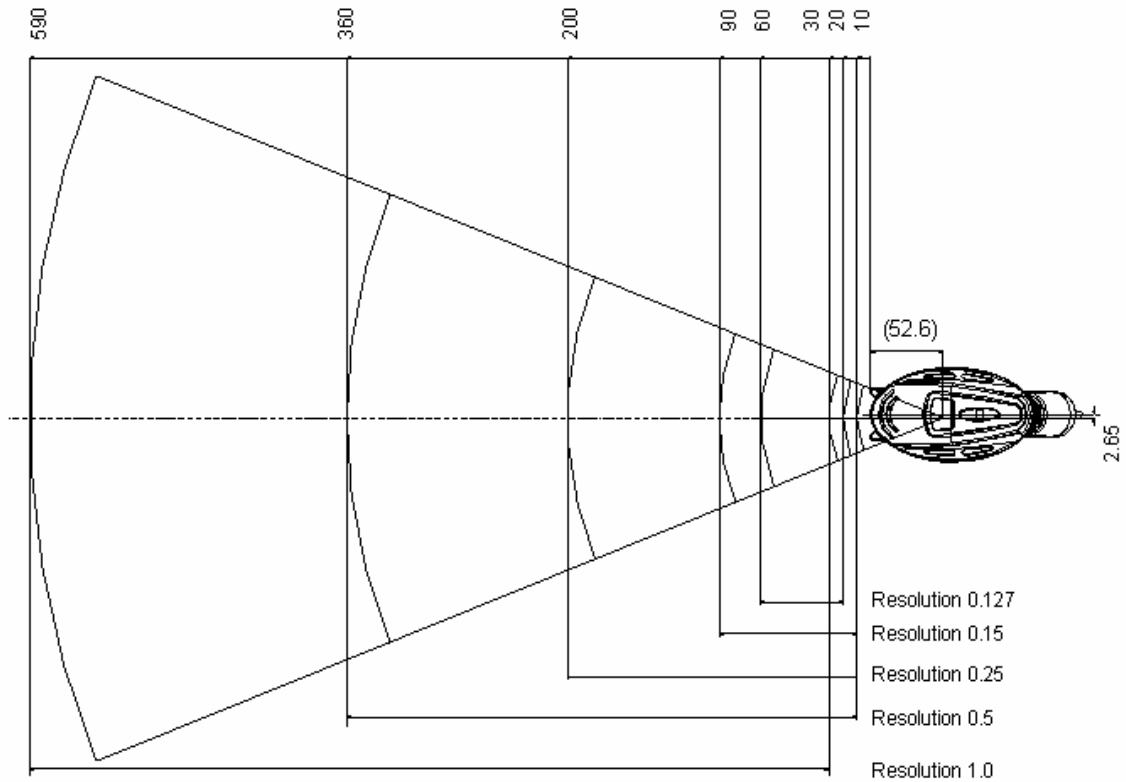


Figure 3: Scan area and resolution (in mm)

| Resolution | Symbology | PCS | Quiet Zone | Digit | Decode depth (mm) |
|------------|-----------|-----|------------|-------|-------------------|
| 1.0 mm     | CODE-39   | 0.9 | 25 mm      | 1     | 30 - 590          |
| 0.5 mm     | CODE-39   | 0.9 | 18 mm      | 3     | 10 - 360          |
| 0.25 mm    | CODE-39   | 0.9 | 10 mm      | 8     | 10 - 200          |
| 0.15 mm    | CODE-39   | 0.9 | 7 mm       | 10    | 10 - 90           |
| 0.127 mm   | CODE-39   | 0.9 | 5 mm       | 4     | 20 - 60           |

### Conditions:

Barcode Sample: OPTOELECTRONICS Test Sample

N/W Ratio: 1:2.5

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

Curvature:  $R = \infty$

### 7.3. Pitch, Skew, and Tilt

#### 7.3.1. Pitch Angle

$$\alpha = \pm 35^\circ$$

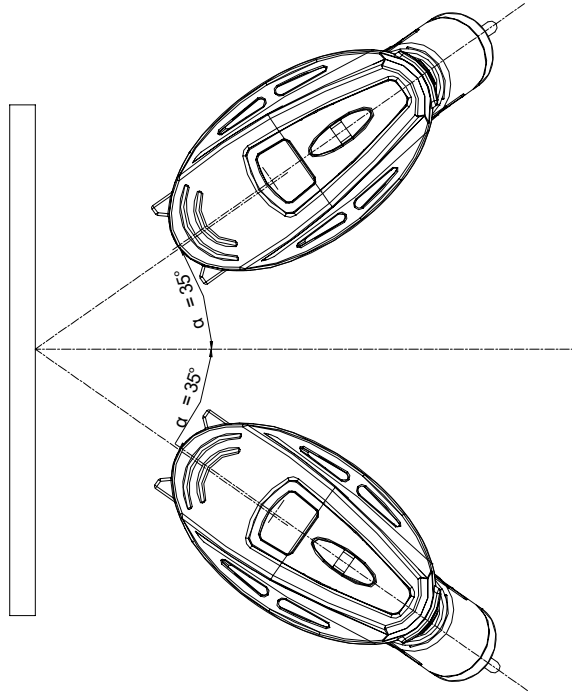


Figure 4: Pitch

### 7.3.2. Skew Angle and Dead Zone

Skew angle:  $\beta = \pm 50^\circ$  (Excluding dead zone)

Dead zone:  $\beta = \pm 8^\circ$  (There are some areas in which decoding fails due to specular reflection)

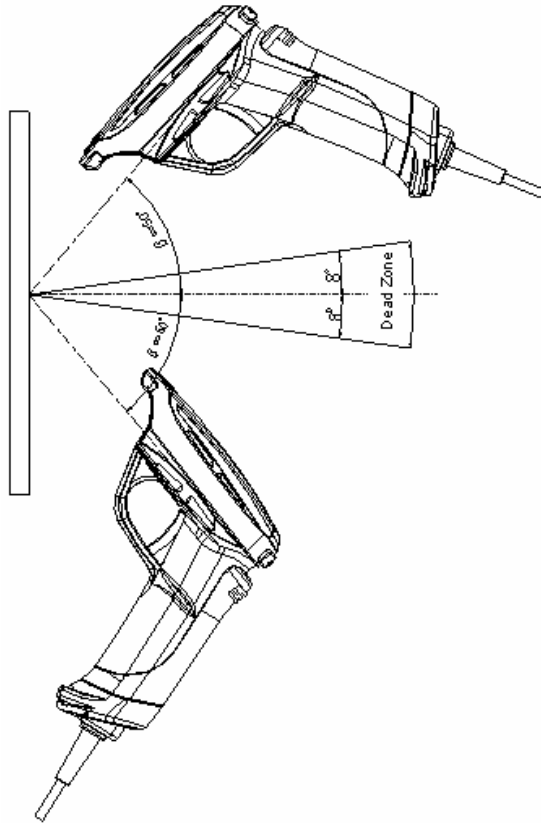


Figure 5: Skew angle and dead zone

### 7.3.3. Tilt Angle

$$\gamma = \pm 20^\circ$$

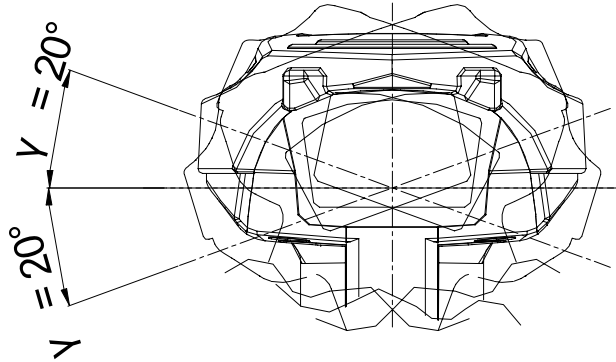


Figure 6: Tilt angle

### Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

Distance: 60 mm from the edge of the scanner

Label: **Pitch Angle, Skew Angle, Dead Zone**

PCS = 0.9, Resolution = 0.25 mm, Symbology = 9-digit Code-39, Quiet Zone = 10 mm  
N/W Ratio = 1:2.5

**Tilt Angle**

PCS = 0.9, Resolution = 0.26 mm, Symbology = 13-digit JAN, Quiet Zone = 10 mm

Angle: **Pitch Angle:** Skew Angle  $\beta = +15^\circ$ , Tilt Angle  $\gamma = 0^\circ$

**Tilt Angle:** Pitch Angle  $\alpha = 0^\circ$ , Skew Angle  $\beta = +15^\circ$

**Skew Angle, Dead Zone:** Pitch Angle  $\alpha = 0^\circ$ , Tilt Angle  $\gamma = 0^\circ$

Curvature:  $R = \infty$

## 7.4. 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.

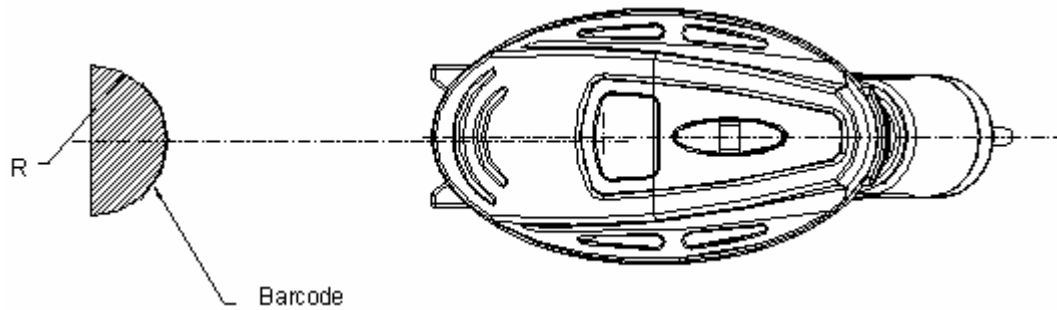


Figure 7: Curvature

## Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

|   |                                    |
|---|------------------------------------|
| PCS = 0.9, Resolution = 0.26 mm, Quiet Zone = 10 mm |                                    |
| Distance:   | 60 mm from the edge of the scanner |
| Angle:  | Skew Angle $\beta = +15^\circ$     |

## 8. Interface Specifications

### 8.1. RS-232C Interface Specification

#### 8.1.1. Settings and Communication

Reading menu barcodes [ZZ] + [U2] + [ZZ] can set the RS-232C interface default.

| Item                  | [U2] setting |
|-----------------------|--------------|
| Baud rate             | 9600 BPS     |
| Start/stop bits       | 1 bit        |
| Data bits             | 8 bits       |
| Parity bits           | No parity    |
| Handshaking           | No handshake |
| Flow Control Time Out | Indefinitely |

- You can change the communication condition using the menu barcode.

#### 8.1.2. Signal Level

| Signal Name | I/O | RS-232C Level (V) |           |
|-------------|-----|-------------------|-----------|
|             |     | Mark/OFF          | Space/ON  |
| TxD         | OUT | -5 to -15         | +5 to +15 |
| RxD         | IN  | -3 to -15         | +3 to +15 |
| RTS         | OUT | -5 to -15         | +5 to +15 |
| CTS         | IN  | -3 to -15         | +3 to +15 |



**8.1.3. Interface Circuit**

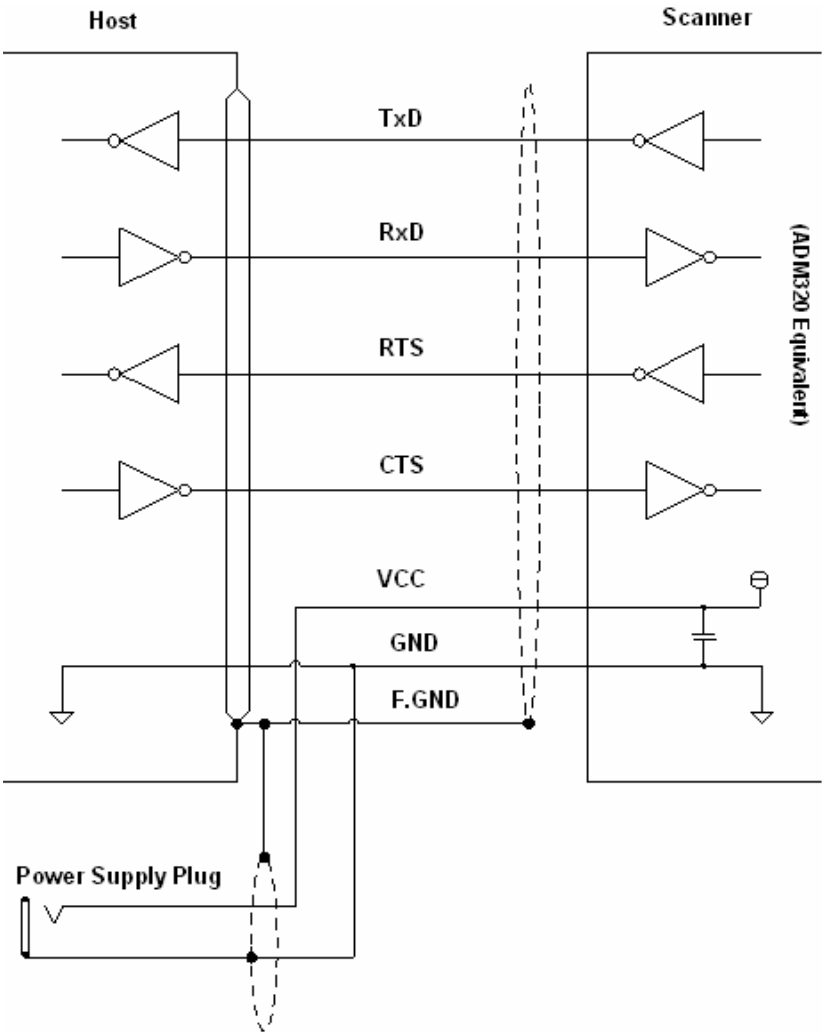


Figure 8: Interface circuit

**8.1.4. Character Format**

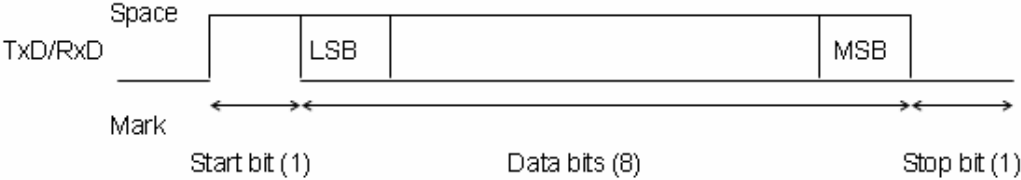


Figure 9:Character format (same for both sending and receiving)

### 8.1.5. Communication Format

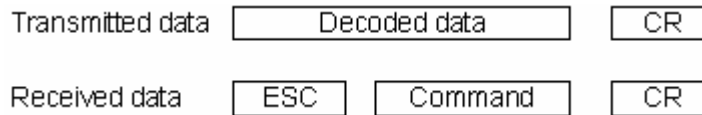


Figure 10: Communication format

### 8.1.6. Handshaking

Select handshaking options using the menu or command listed below.

| Handshaking         | Menu/Command |
|---------------------|--------------|
| No handshake        | P0           |
| BUSY/READY          | P1           |
| MODEM               | P2           |
| ACK/NAK             | P3           |
| ACK/NAK NO RESPONSE | P4           |

#### a) No Handshaking

The scanner attempts the communication regardless of the state of the host computer.



Figure 11: No handshaking

#### b) BUSY/READY

The scanner and the host computer notify each other of their state and whether they can receive data with BUSY/READY through an RTS line. They can communicate state to each other through a CTS line when connected as in the following figure.

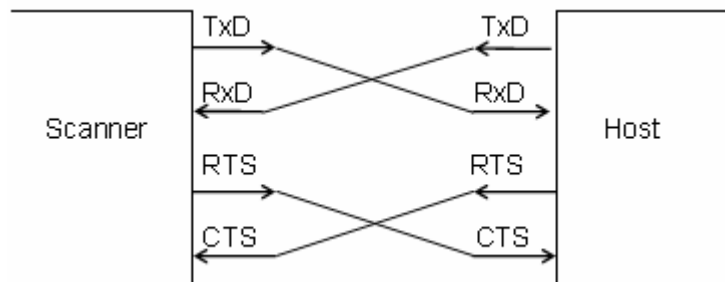


Figure 12: Busy/Ready communication

The scanner stays ON (is able to receive data) except during certain parts of the process, such as receiving data (buzzer command execution), transmitting data, and menu processing. The scanner checks the CTS line before transmitting data. When it is ON, the scanner transmits data. When it is OFF, the scanner waits for it to turn ON within a set time. The scanner will abort transmission with an error indication (buzzer) when the CTS line is not ON within a specified period. The Flow Control time-outs are as follows, and the default setting is "indefinitely" (I0).

| Flow Control Time Out | Menu/Command |
|-----------------------|--------------|
| Indefinitely          | I0           |
| 100 ms                | I1           |
| 200 ms                | I2           |
| 400 ms                | I3           |

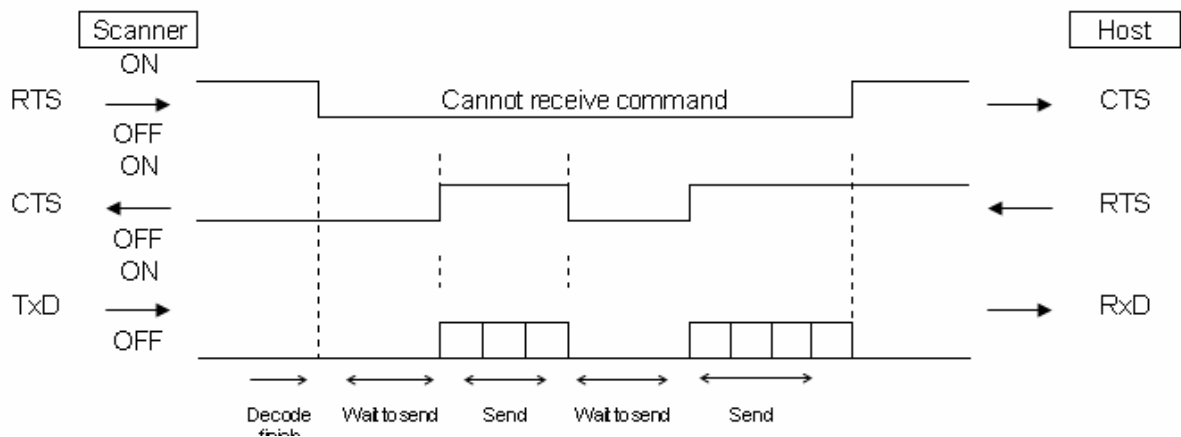


Figure 13: Cannot receive command

### CTS, TxD signal timing

When the CTS line is turned OFF while sending a TxD signal, the scanner transmits one character and waits. When the RTS signal is turned ON while transmitting a character, the character will be transmitted.



Figure 14: Signal timing

Note: When using loopback (wire connection) for CTS, RTS line of the scanner in this setting, *No handshake* is not enabled.

**c) MODEM**

The scanner turns CS line ON before transmitting data. Other processes are the same as BUSY/READY.

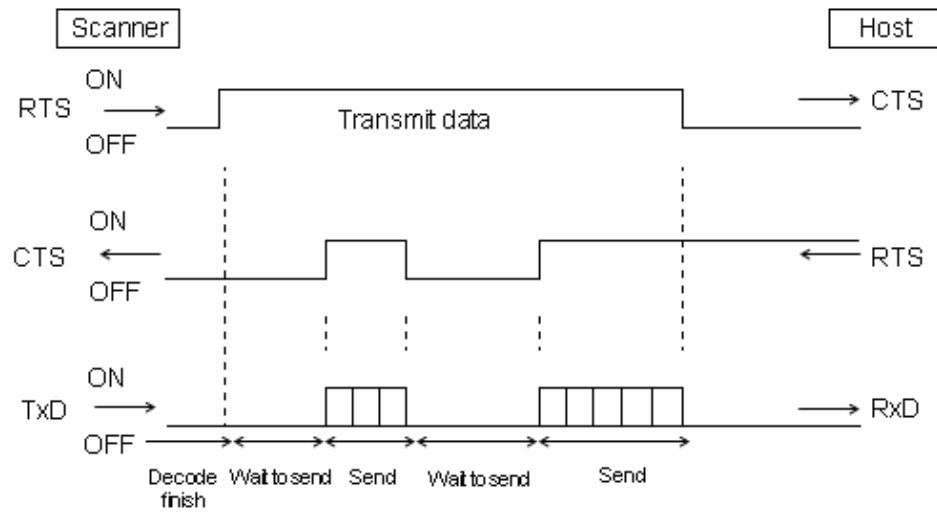


Figure 15: Modem transmit data

**d) ACK/NAK**

After data has been transmitted, the scanner expects to receive one of the following responses from the host:

- *ACK* response—Action: The scanner completes transmission with the good-read buzzer and returns to the initial state.
- *NAK* response—Action: The scanner sends the data again and waits for the response from the host.
- *DC1* response—Action: The scanner returns to waiting for the trigger, if it has a trigger (the initial state).
- *None* response—Action: The scanner sounds the error buzzer and returns to the initial state.

ACK/NAK timeout can be set as follows using the menu or commands.

| ACK/NAK timeout        | Menu / Command |
|------------------------|----------------|
| Indefinitely (default) | XI4            |
| 100 ms                 | XI5            |
| 500 ms                 | XI6            |
| 1000 ms                | XI7            |

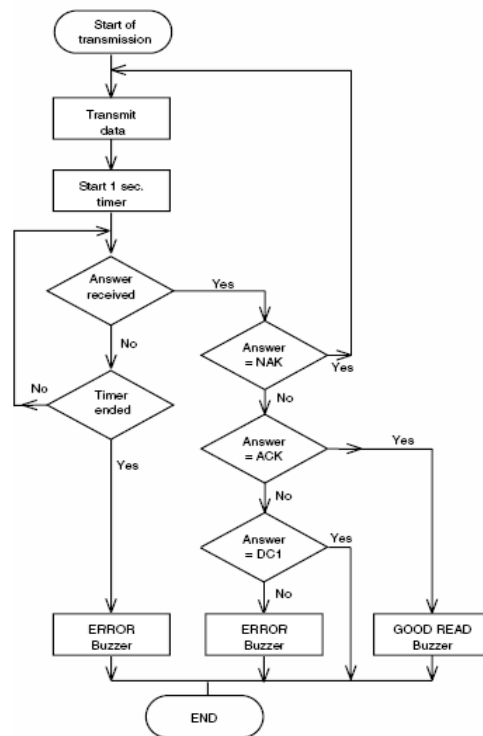


Figure 16: ACK/NAK

**e) ACK/NAK NO RESPONSE**

When no response from the host is received within the setting time, the scanner assumes an ACK response, and returns to the initial state without the error buzzer. The other actions are the same as ACK/NAK.

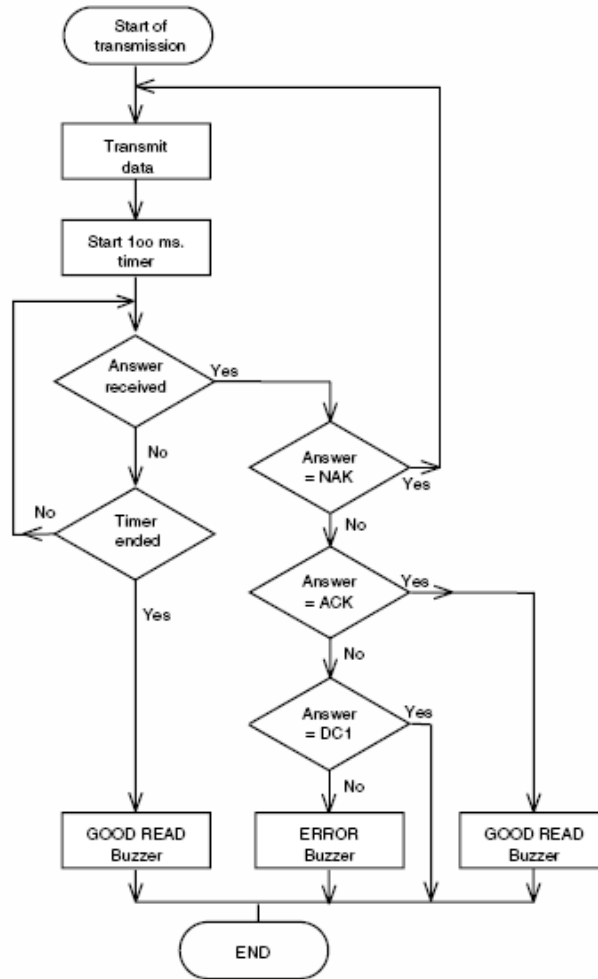


Figure 17: ACK/NAK—No response

## 8.2. USB Interface Specification

### 8.2.1. Settings and Communication

Reading menu barcodes [ZZ] + [SU] + [ZZ] can set the USB interface default.  
 The OPR 3001 USB model uses a full-speed USB interface.

### 8.2.2. Interface Circuit

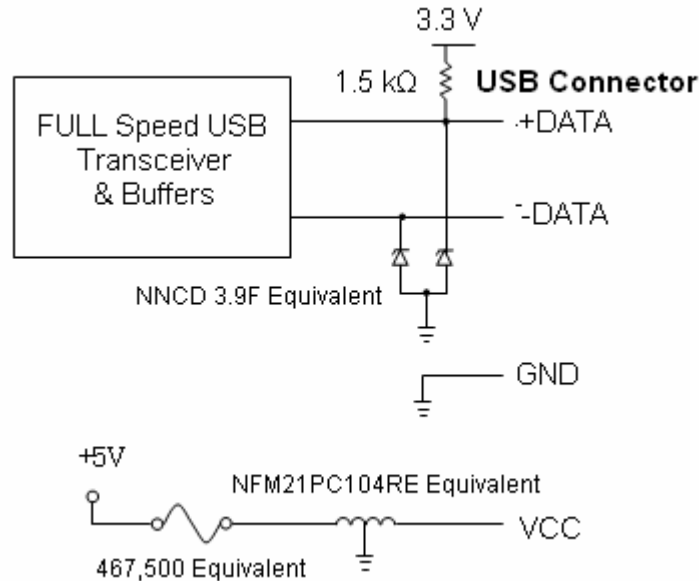


Figure 18: USB interface circuit

Do not operate the keyboard while the scanner is transmitting the data to the host; it may cause data transactions to fail.

## 8.3. Wedge Interface Specification

### 8.3.1. Settings and Communication

#### a) With desktop PC (using external keyboard)

Reading menu barcodes [ZZ] + [UB] + [KM] + [ZZ] can set the DOS/V Wedge interface default.

#### b) With notebook PC (not using external keyboard)

Reading menu barcodes [ZZ] + [UB] + [KL] + [ZZ] can set the DOS/V Wedge interface default.

Do not operate the keyboard while the scanner is transmitting the data to the host; it may cause data transactions to fail.

## 9. Cable and Connector

### 9.1. Cable Specifications

#### 9.1.1. RS-232C Cable

(Standard specification)

|           |                                      |
|-----------|--------------------------------------|
| Type:     | Straight                             |
| Diameter: | $\Phi 4.8 \pm 0.5$ mm                |
| Length:   | $1500 \pm 50$ , $-0$ mm              |
| Cores:    | 8 insulated wires, 1 conductive wire |
| Weight:   | Approximately 80 g                   |

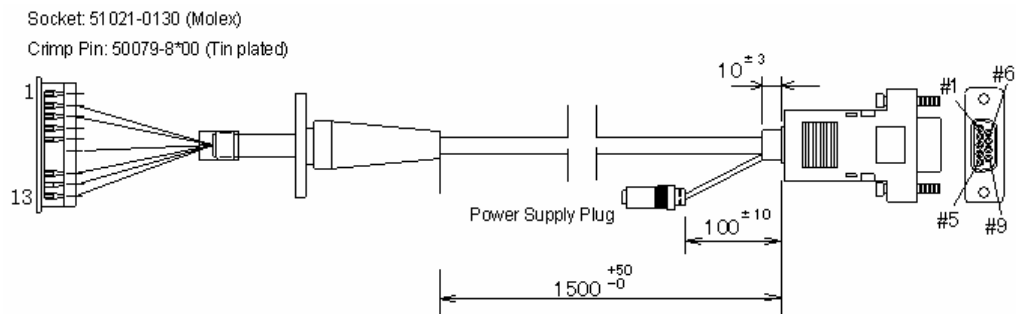


Figure 19: RS-232C cable

#### a) Pin Assignment

| Pin No | Signal Name | Notes                |
|--------|-------------|----------------------|
| 1      | NC          | Open (not assigned)  |
| 2      | TXD         |                      |
| 3      | RXD         |                      |
| 4      | ---         | Pin no. 6 and jumper |
| 5      | GND         |                      |
| 6      | ---         | Pin no. 4 and jumper |
| 7      | CTS         |                      |
| 8      | RTS         |                      |
| 9      | NC          | Open (not assigned)  |

Connector: A connector with a plug for external power supply (D-sub, 9-pin, female)

Power Supply:  $\phi 4.0$  (inside diameter:  $\phi 1.7$ )

Exterior electrode of the plug is GND and interior electrode is +.



### 9.1.2. USB Cable

(Standard specification)

|           |                                      |
|-----------|--------------------------------------|
| Type:     | Straight                             |
| Diameter: | $\Phi 4.8 \pm 0.5$ mm                |
| Length:   | $1500 \pm 50, -0$ mm                 |
| Cores:    | 4 insulated wires, 1 conductive wire |
| Weight:   | Approximately 60 g                   |

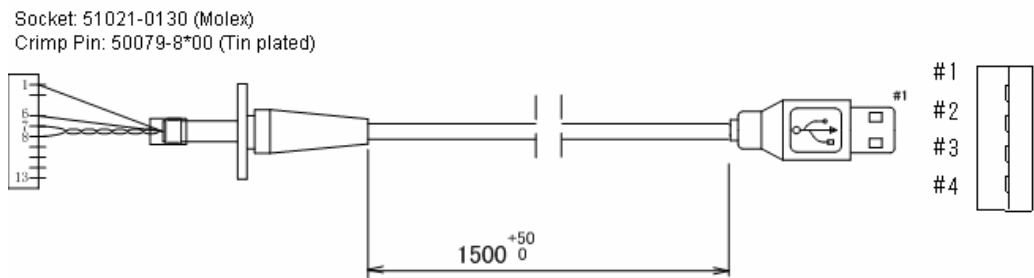


Figure 20: USB cable

#### a) Pin Assignment

| Pin No | Signal Name |
|--------|-------------|
| 1      | VCC         |
| 2      | -DATA       |
| 3      | +DATA       |
| 4      | GND         |

### 9.1.3. Wedge Cable

(Standard specification)

|           |                                      |
|-----------|--------------------------------------|
| Type:     | Y cable                              |
| Diameter: | $\Phi 4.8 \pm 0.5$ mm                |
| Length:   | $1500 \pm 50$ , -0 mm                |
| Cores:    | 8 insulated wires, 1 conductive wire |
| Weight:   | Approximately 80 g                   |

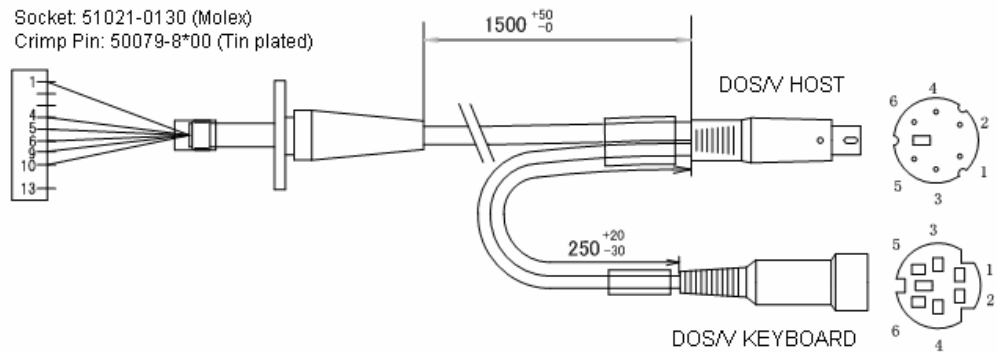


Figure 21: Wedge cable

#### a) Pin Assignment

| DOS/V Host Side |             |  | DOS/V Keyboard Side |             |
|-----------------|-------------|--|---------------------|-------------|
| Pin No          | Signal Name |  | Pin No              | Signal Name |
| 1               | CPU_DATA    |  | 1                   | KEY_DATA    |
| 2               | ---         |  | 2                   | ---         |
| 3               | GND         |  | 3                   | GND         |
| 4               | VCC         |  | 4                   | VCC         |
| 5               | CPU_CLK     |  | 5                   | KEY_CLK     |
| 6               | ---         |  | 6                   | ---         |

## 9.2. Scanner Connector Specification

CN801 (13-pin)



| Pin Number | Signal Name |      |          |
|------------|-------------|------|----------|
|            | RS-232C     | USB  | Wedge    |
| 1          | NC          | VCC  | VCC      |
| 2          | R×D         | NC   | NC       |
| 3          | T×D         | NC   | NC       |
| 4          | NC          | NC   | CPU_CLK  |
| 5          | NC          | NC   | CPU_DATA |
| 6          | GND         | GND  | GND      |
| 7          | NC          | USB+ | NC       |
| 8          | NC          | USB- | NC       |
| 9          | NC          | NC   | KB_DATA  |
| 10         | NC          | NC   | KB_CLK   |
| 11         | CTS         | NC   | NC       |
| 12         | RTS         | NC   | NC       |
| 13         | VCC         | NC   | NC       |

## 10. Readable Barcodes

### 10.1. Menu Barcodes: Default Settings




Default menu barcodes set the scanner to factory defaults.

#### RS-232C Default





| Functions                             | Menu labels   | Menu codes |
|---------------------------------------|---|------------|
| SET                                   |  | ZZ         |
| RS-232C                               |  | U2         |
| Single tone<br>buzzer: 3 kHz*         |  | W1         |
| Buzzer duration:<br>50 ms*            |  | W7         |
| Read mode<br>options: Single<br>read* |  | S0         |
| END                                   |  | ZZ         |

\* If you are using software version TS01Y04 or later, it is not necessary to configure the foregoing settings.





### USB-HID Default

| Functions   | Menu labels  | Menu codes |
|-------------|--|------------|
| SET         | <br>z z | ZZ         |
| USB default | <br>s u | SU         |
| END         | <br>z z | ZZ         |

### Wedge Default (with external keyboard)

| Functions                         | Menu labels  | Menu codes |
|-----------------------------------|--|------------|
| SET                               | <br>z z   | ZZ         |
| AT Wedge default                  | <br>u b   | UB         |
| Keyboard layout:<br>with keyboard | <br>k m  | KM         |
| END                               | <br>z z | ZZ         |

### Wedge Default (without external keyboard)

| Functions                            | Menu labels  | Menu codes |
|--------------------------------------|--|------------|
| SET                                  | <br>z z | ZZ         |
| AT Wedge default                     | <br>u b | UB         |
| Keyboard layout:<br>without keyboard | <br>k l | KL         |
| END                                  | <br>z z | ZZ         |

## 10.2. Default Settings 1: Readable Codes

| Code type                | Reading | Transmit Code Length | Transmit CD | Calculate CD | Prefix | Suffix | Transmit Other     |
|--------------------------|---------|----------------------|-------------|--------------|--------|--------|--------------------|
| UPC-A                    | ■       | X                    | ■           | ■            | -      | CR     |                    |
| UPC-A Add-on             | X       | X                    | ■           | ■            | -      | CR     |                    |
| UPC-E                    | ■       | X                    | ■           | ■            | -      | CR     |                    |
| UPC-E Add-on             | X       | X                    | ■           | ■            | -      | CR     |                    |
| EAN-13                   | ■       | X                    | ■           | ■            | -      | CR     |                    |
| EAN-13 Add-on            | X       | X                    | ■           | ■            | -      | CR     |                    |
| EAN-8                    | ■       | X                    | ■           | ■            | -      | CR     |                    |
| EAN-8 Add-on             | X       | X                    | ■           | ■            | -      | CR     |                    |
| Code-39                  | ■       | X                    | ■           | X            | -      | CR     | Not transmit ST/SP |
| Code-39 Trioptic         | ■       | X                    | ■           | X            | -      | CR     | Not transmit ST/SP |
| NW-7 (CODABAR)           | ■       | X                    | ■           | X            | -      | CR     | Not transmit ST/SP |
| Industrial2of5           | ■       | X                    | ■           | X            | -      | CR     |                    |
| Interleaved2of5          | ■       | X                    | ■           | X            | -      | CR     |                    |
| Code-93                  | ■       | X                    | ■           | ■            | -      | CR     |                    |
| Code-128                 | ■       | X                    | ■           | ■            | -      | CR     |                    |
| EAN-128                  | X       | X                    | ■           | ■            | -      | CR     |                    |
| S-Code                   | ■       | X                    | ■           | X            | -      | CR     |                    |
| MSI/Plessey              | ■       | X                    | ■CD1        | ■CD1         | -      | CR     |                    |
| UK/Plessey               | ■       | X                    | ■           | ■            | -      | CR     |                    |
| Telepen                  | ■       | X                    | X           | ■            | -      | CR     |                    |
| Matrix2of5               | X       | X                    | ■           | X            | -      | CR     |                    |
| Chinese Post Matrix 2of5 | X       | X                    | ■           | X            | -      | CR     |                    |
| IATA                     | ■       | X                    | ■           | X            | -      | CR     |                    |
| RSS-14                   | X       | X                    | ■           | ■            | -      | CR     |                    |
| RSS-limited              | X       | X                    | ■           | ■            | -      | CR     |                    |
| RSS-expanded             | X       | X                    | ■           | ■            | -      | CR     |                    |
| PDF417                   | X       | X                    | -           | -            | -      | CR     |                    |
| MicroPDF417              | X       | X                    | -           | -            | -      | CR     |                    |
| Code 11                  | X       | X                    | X           | ■            | -      | CR     |                    |

**Notes:**

- In the “Reading” column, “■” means “Enable reading” and “X” means “Disable reading.”
- In the “Transmit code length” column, “■” means “Transmit code length” and “X” means “Do not transmit code length.”
- In the “Transmit CD” column, “■” means “Transmit check digit” and “X” means “Do not transmit check digit.”
- In the “Calculate CD” column, “■” means “Calculate check digit” and “X” means “Do not calculate check digit”.

**10.3. Default Settings 2: Read Options, Trigger, Buzzer**

| Item                             | Default Setting               |
|----------------------------------|-------------------------------|
| Setting the number of characters | Fixed length OFF all codes    |
| Read mode                        | Multiple read                 |
| Multiple read reset time         | 500 ms                        |
| Add-on wait mode                 | 500 ms                        |
| Multiple read                    | Disable multiple read         |
| Multiple columns read            | Disable multiple columns read |
| Redundancy                       | Read 1 times, redundancy = 0  |
| Trigger switch                   | Enable trigger                |
| Trigger repeat                   | Disable trigger repeat        |
| Auto trigger                     | Disable auto trigger          |
| Read time                        | 2 seconds                     |
| Margin check                     | Margin check normal           |
| Buzzer duration                  | 50 ms                         |
| Buzzer tone                      | 3 kHz (single tone)           |
| Buzzer loudness                  | Maximum                       |
| Buzzer timing                    | Buzzer before transmission    |
| Startup buzzer                   | Enable startup buzzer         |
| Indicator duration               | 200 ms                        |

## 11. Serial Number

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



Figure 22: Serial number diagram

## 12. Packaging Specifications

### 12.1. Individual Packaging Specification

Put the scanner in a protective foam bag and place it in a single packing box.

The scanner shown is an RS-232C unit. Descriptions on an individual packaging box label differ, depending on the interface type. The "RO" mark may be indicated on the upper side of the individual packaging box label.

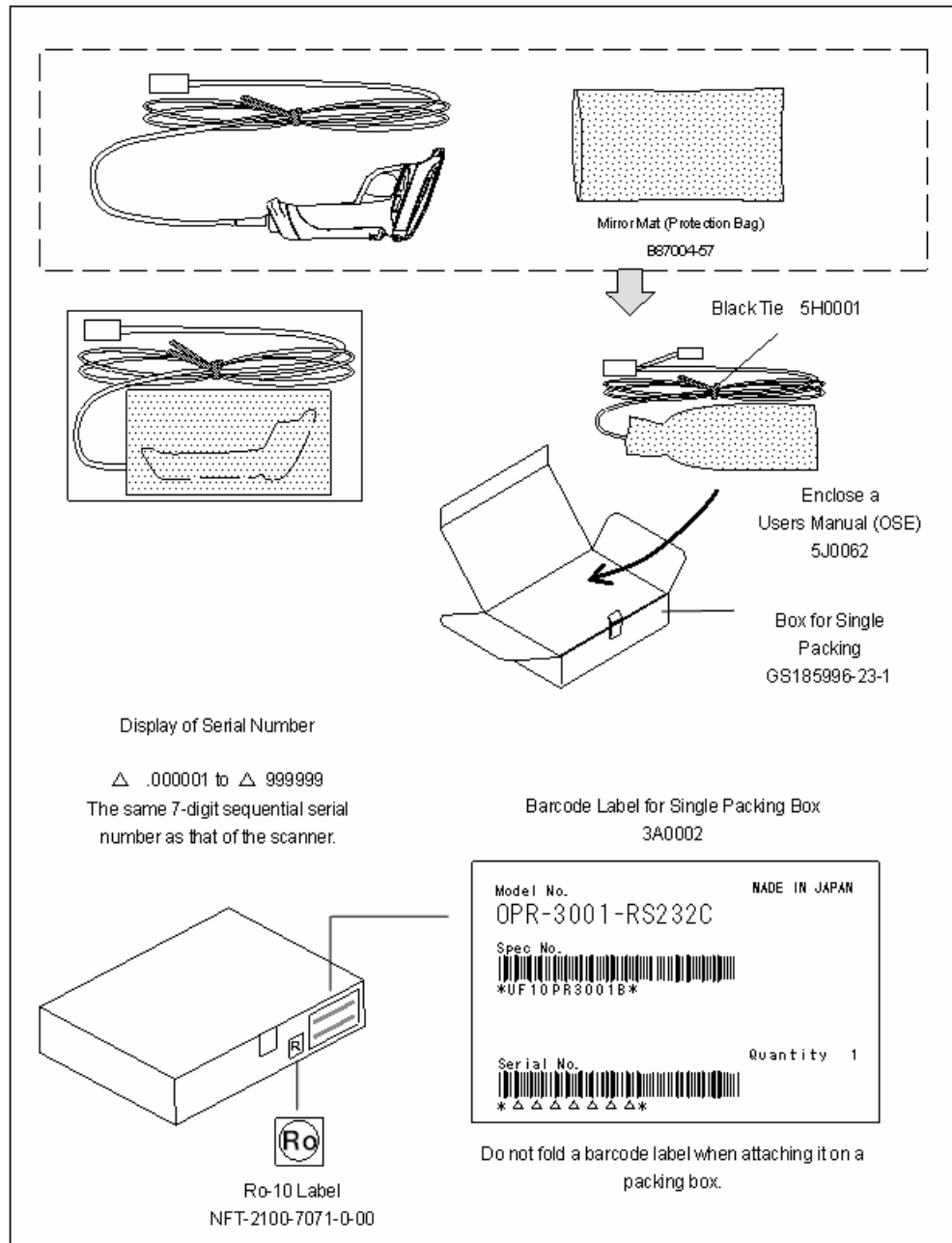


Figure 23: Individual packaging



## 12.2. Collective Packaging Specification

The scanner shown is an RS-232C unit. Descriptions on a collective packaging box label differ, depending on the interface type. The “RO” mark may be indicated on the upper side of the individual packaging box label.

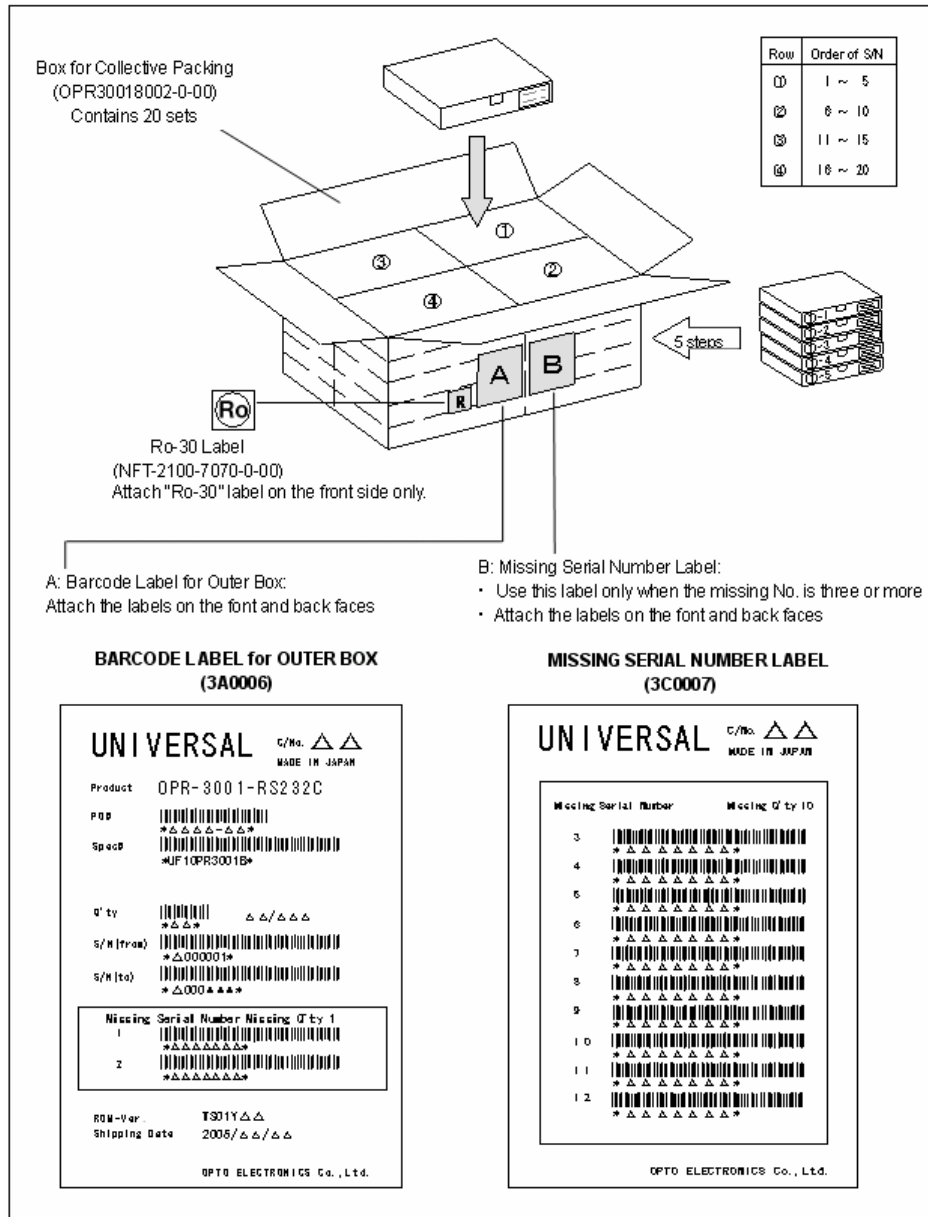


Figure 24: Collective packing

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.

## 13. Durability

### 13.1. Electrical Noise

No malfunction should occur when sinusoidal electrical noise (10Hz -100kHz, < 0.1Vpp) is added to a power supply line.

#### Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

|                       |  |
|-----------------------|--|
| PCS:                  | 0.9  |
| Resolution:           | 0.25 mm  |
| Symbology:            | 9-digit Code-39                                      |
| Quiet Zone:           | 10 mm  |
| N/W Ratio:            | 1:2.5  |
| Distance:             | 100 mm from the edge of scanner                      |
| Angle:                | $\alpha = 0^\circ \beta = 15^\circ \gamma = 0^\circ$ |
| Curvature:            | $R = \infty$   |
| Power Supply Voltage: | 6.0 V (RS-232C) / 5.0 V (USB and Wedge)              |

### 13.2. Static Electricity

|                          |   |
|--------------------------|---|
| Air discharge:           | 8 kV max (No malfunction)<br>15 kV max (No destruction)       |
| Contact discharge:       | 6 kV<br>Contact discharge at the hook and the screw           |
| Measurement environment: | Use electrostatic testing device compliant with IEC 61000-4-2 |
| Discharge resistance:    | 330 $\Omega$  |
| Capacitor charging:      | 150 pF  |

## 13.3. Shock

### 13.3.1. Product Drop Test

No malfunction should occur after the following drop test.

As shown below, drop the scanner from 200 centimeters above the concrete floor (three times from each of 6 angles).

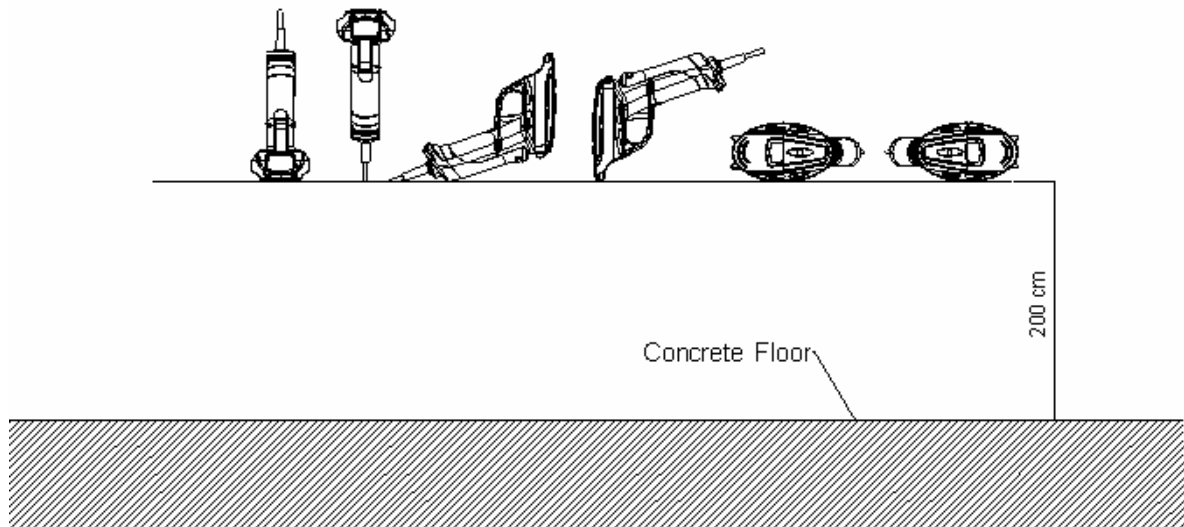


Figure 25: Product drop test

### 13.3.2. Shock: Individual Package Drop Test

No malfunction should occur after the following drop test.

Drop the individual package box from 150 centimeters above the concrete floor (ten times from random angles: on its top, bottom, front, back, left, right, top-left, top-right, bottom-left, bottom-right).

## 13.4. Vibration Strength

### 13.4.1. Vibration (without packaging)

Swept with 10 Hz to 100 Hz, acceleration  $19.6 \text{ m/s}^2$  (2.0G). Added a vibration to each X, Y and X direction for 30 minutes (1 cycle = 60 minutes) under non-operational conditions. Observed no abnormality in either appearance or performance.

### 13.4.2. Vibration (individual packaging)

Swept with 10 Hz to 100 Hz, acceleration  $19.6 \text{ m/s}^2$  (2.0G). Added a vibration to each X, Y and X direction for 30 minutes (1 cycle = 60 minutes) with individual packaging. Observed no abnormality in either appearance or performance.

## 13.5. Dust and Water Proof

IEC IP54

## 13.6. Cable Strength

### 13.6.1. Cable Pull Strength

Affixed the scanner to an immovable object and pulled it using a force of 49N (5.0 kgf) for 1 minute. Observed no abnormality in either structure or performance.

### 13.6.2. Cable Bend Strength

As shown below, added a load of 4.9N (500 g) to a cable then bent it at an angle of 90 degrees to both right and left. Count 1 time by bending to either side; repeated this 3 million times on RS-232C and Wedge cables and repeated 1 million times on USB cable. Observed no abnormality in either structure or performance. Note: Cable bending resistance is not warrantable.

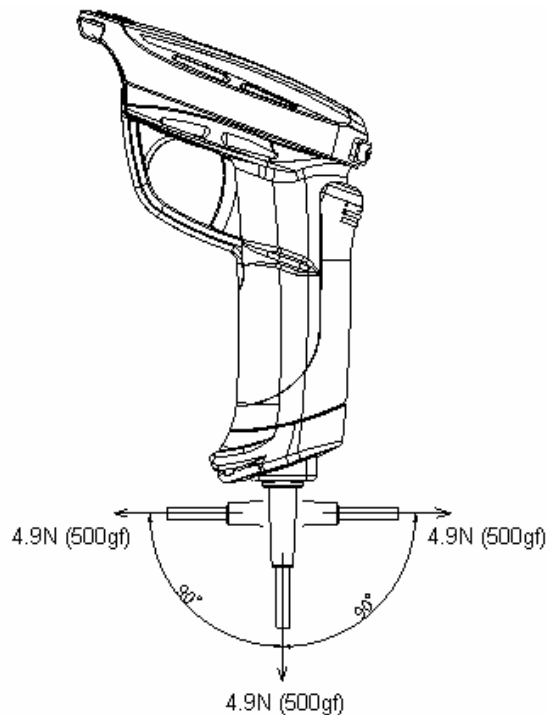


Figure 26: Cable bend strength

## 14. Reliability

MTBF (mean time between failures) of this product except for the laser diode and the mirror motor scan unit is 30,000 hours.

Life cycle of the laser diode is 10,000 hours and that of the mirror motor scan unit is also 10,000 hours.

The estimate of MTBF and product life cycle is based on standard operation of the product within the recommended temperature range and without extreme electronic or mechanical shock.

## 15. Auto Trigger (Option)

The OPR 3001 has an optional auto trigger setting, which starts barcode reading automatically by using sensor detection. When auto trigger is enabled, a laser beam is emitted and points to the auto trigger area. The scanner starts barcode reading after detecting reflection from the surface when the auto trigger is used.

Auto trigger distance: 40 mm from the edge of the scanner.

### Conditions

|   |  |
|---|--|
| Moving Speed:                           | 100 ±10 mm/s   |
| Angle:                                  | Skew angle, excluding pitch angle and dead zone  |
| Environmental Temperature and Humidity: | Room temperature and humidity  |
| Environmental luminance:                | 500 to 900 lx  |
| Conditions for the auto trigger:        | <ol style="list-style-type: none"> <li>Barcode sheet: OPTOELECTRONICS Test Sheet (white)<br/>Background: OPTOELECTRONICS Test Sheet (black)</li> <li>Barcode sheet: OPTOELECTRONICS Test Sheet (black)<br/>Background: OPTOELECTRONICS Test Sheet (white)</li> </ol> |

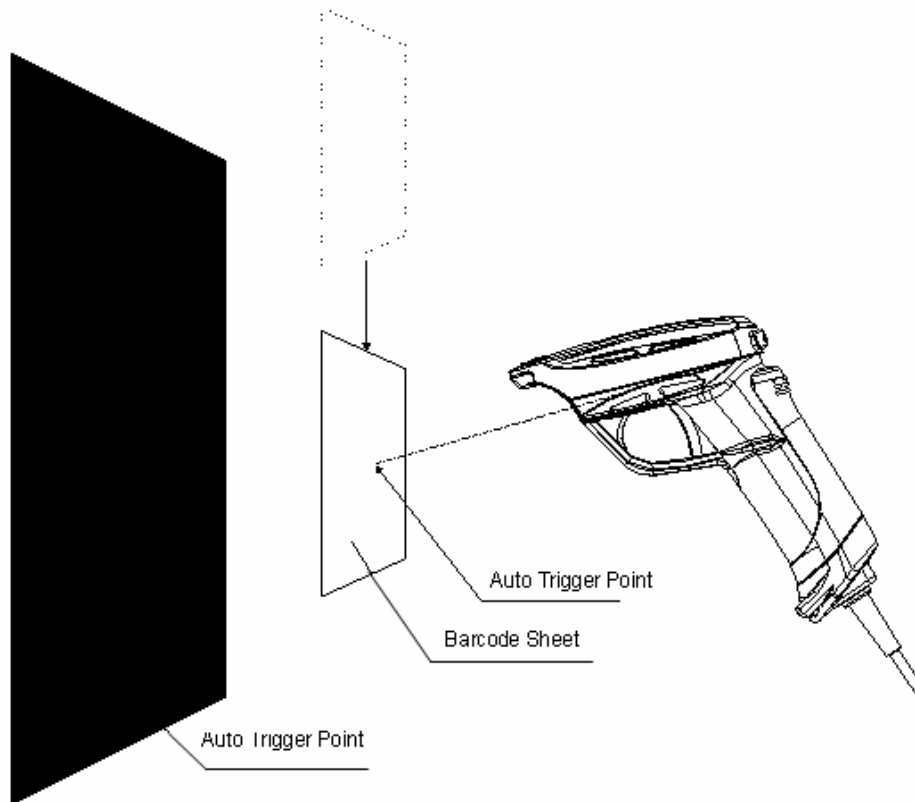






Figure 27: Auto trigger

### 15.1.1. Auto Trigger Settings

| Functions            | Menu labels   | Menu codes |
|----------------------|---|------------|
| SET                  |  | ZZ         |
| Disable auto trigger |  | +F         |
| Enable auto trigger  |  | +I         |
| END                  |  | ZZ         |

## 16. Regulatory Compliance

### 16.1. Laser Safety

The scanner emits laser beams.

- JIS C6802: 2005: Laser class 1
- IEC 825-1/EN 60825-1: Laser class 1
- FDA CDRH Laser class I. Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50 dated July 26, 2001

Class 1 laser devices are not considered to be hazardous when used for their intended purpose. Avoid staring into the laser beam.

### 16.2. Product Safety

EN60950-1: 2001

IEC60950-1: 2001

### 16.3. EMC

EN55022

EN55024

FCC Part15 Subpart B Class B: This device complies with part 15 of 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.

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.

### 16.4. RoHS

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

## 17. Safety

### 17.1. Shock

- Do not throw or drop the scanner.
- Do not place heavy objects on the cables.

### 17.2. 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.

### 17.3. Foreign Materials

- Do not immerse the scanner in liquids.
- Do not subject the scanner to chemicals.

### 17.4. Other

- Do not plug/unplug the connectors before disconnecting the power.
- Do not disassemble this product.
- Do not use the scanner near a radio or a TV receiver. It 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.

### 18. Mechanical Drawing

Dimensions: 3 W 68 X D 150 X H 155 (mm) (except protruding portion)

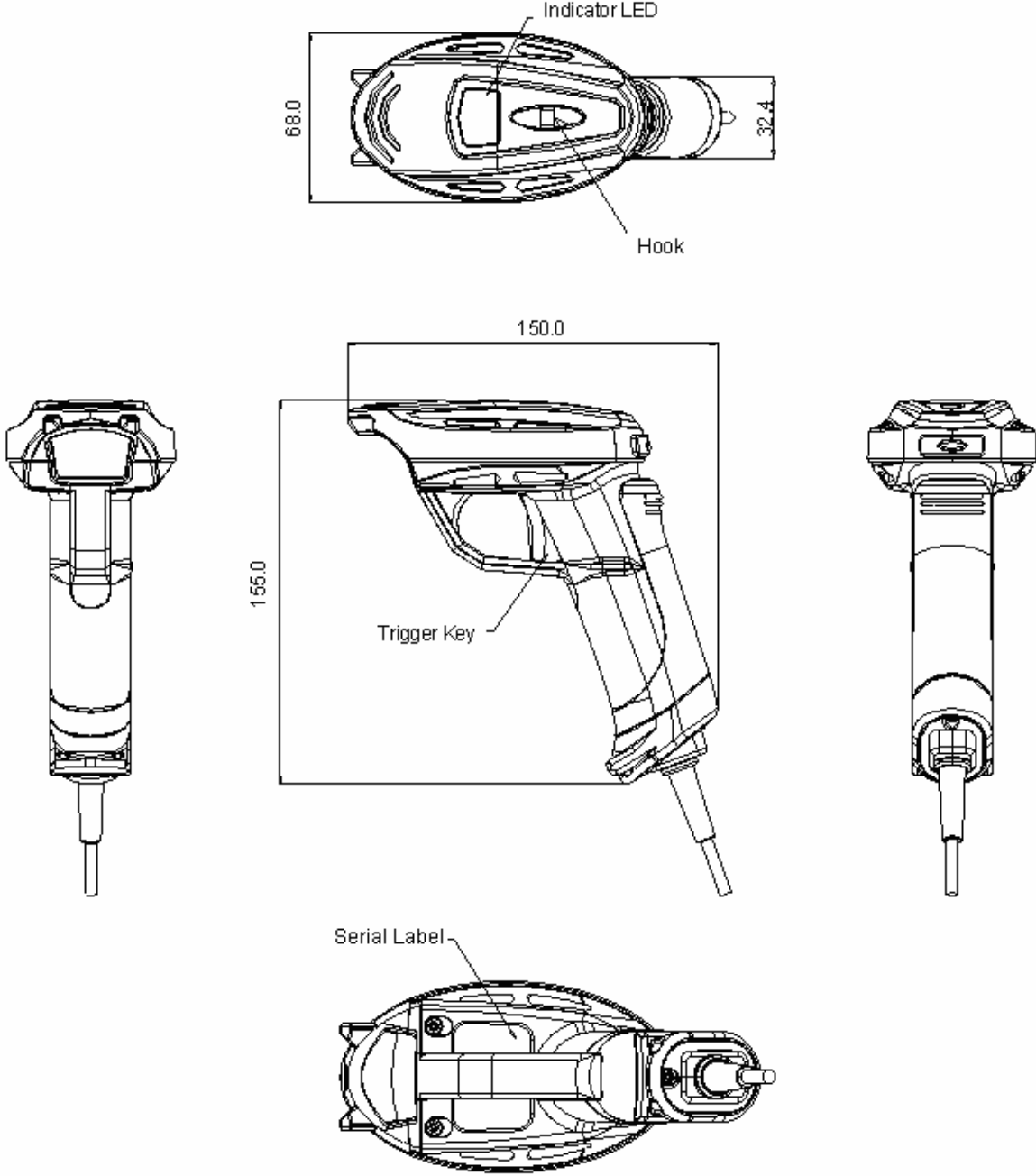


Figure 28: Mechanical drawing



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