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## **Hanshow Nebular Series Product Manual**

**V2.0.0**

**HS-ESL-EPDN0001**

# STATEMENT

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# ABOUT THE MANUAL

This document describes Nebular series, including features, specification, package and precautions, etc.

Please read this manual carefully before using the device in first, retain the manual for subsequent use or for the next owner. If the instructions contained in this manual are insufficient to resolve issues that occur during device operation or maintenance, please contact Hanshow Technical Customer Service Center (China: 400-0365-305; Netherlands: 0800-022-5037; Belgium: 0800-71-335; France: 0800-91-7602; Thailand: 1800-011-185) directly, we will provide you with multi-channel technical services.

## TARGET USERS

This document provides engineers with necessary data and related guidelines of Nebular series. Users have to master the basic knowledge on communication and network and so on. This manual is applicable for the below engineers:

- Testing Engineer
- Technical Support Engineer
- After Sales Engineer
- Installation Engineer

## SYMBOL DESCRIPTION

| Icon                                                                              | Description                                                                                                               |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
|  | Information indicated with this icon should be paid special attention and attached great importance by the reader.        |
|  | Information indicated with this icon is the explanation on the formal text for the readers to comprehend the text better. |
| [X-X]                                                                             | It means special noun definition is provided here.                                                                        |

## EXPLANATION OF TERMS

| Acronym        | Expanded form                | Description                                                                                              |
|----------------|------------------------------|----------------------------------------------------------------------------------------------------------|
| PriSmart       | PriSmart Smart Retail System | Manage all store product data and issue price update command, as well as support multi-store management. |
| ESL-Working    | ESL-Working System           | Manage all the APs and ESLs in store, and ESL-Working 3.0 and above supports multi-store management.     |
| ESL Controller | ESL Controller               | Also called AP that is used for data interaction between ESL-Working and ESL Controller.                 |
| ESL            | Electronic Shelf Label       | Used for displaying product information like promotion information, price and grade, etc.                |

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# 1 Overview

Nebular series are an Electronic Shelf Label (ESL) researched and developed independently by Hanshow. They adopt E-ink and communicate with ESL Controller based on 2.4GHz frequency band to achieve pricing, page switch, flashing and others. Nebular series have highlights of ultra-thin, long life and high-definition visual effects, widely serving traditional retail, new retail, apartment store and fashion, medicare, culture and entertainment, etc.

## 1.1 System architecture

Hanshow ESL system includes ESL, ESL Controller, ESL-Working, PriSmart/ShopWeb, Database, Integration, CloudMonitor and Hand-hold Terminal (PDA), as shown in [Figure 1-1](#). Specifically, ESL is an integral part of Hanshow ESL system, which is responsible for displaying production information like name, price, place, unit, grade, phone number, barcode, QR code and so on.

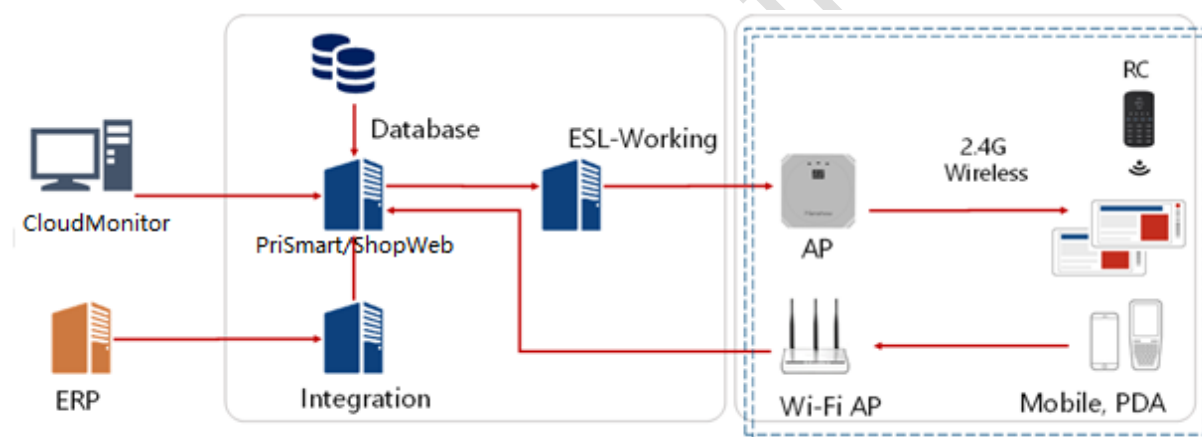


Figure 1-1 Hanshow ESL system architecture

## 1.2 Features

Nebular series have the features below:

- Support for 8 sizes: 1.54", 2.13", 2.66", 2.9", 3.5", 4.2", 5.83" and 7.5".
- Full series support tricolor display involved Black-White-Red (BWR) and Black-White-Yellow (BWY), but only support Black-White for freezer ESLs.
- Operating frequency band is 2402MHz ~ 2480MHz.
- IP68 waterproof and dustproof design.
- Embedded LED indicator that can display 7 colors, to assist in realizing product search, promotion reminder, low stock reminder, power reminder, etc.
- Embedded NFC chip that supports NFC devices like mobile phone, PDA and remote control to implement ESLs operations directly, realizing Bind/Unbind, Flashing and Page switch, etc.
- Freezer ESLs with 2.13" and 2.66" support low temperature environment (-25°C ~ 0°C).
- Support multiple business functions, including Bind/Unbind, Update, Fast-flashing, Multi-page storage, Page switch, Geolocation, Temperature acquisition, NFC function and so on.
- Support AES-128 encryption.
- Support wireless upgrade.

## 2 Product view

This chapter describes product view and mechanical drawing of Nebular series.

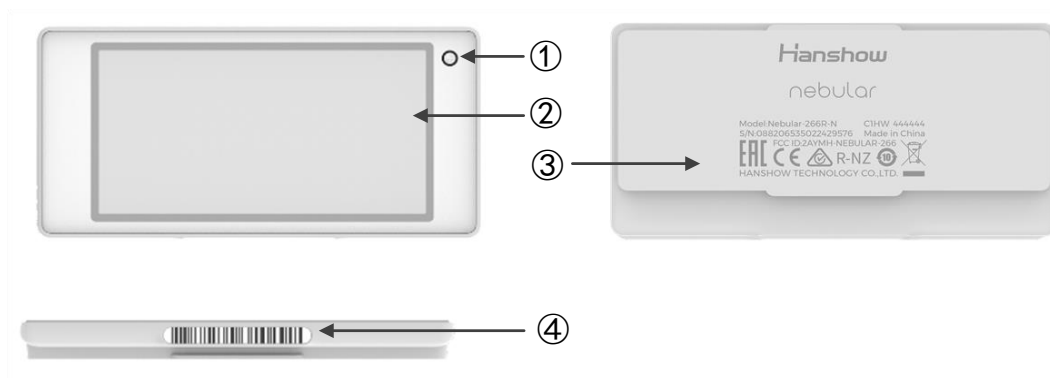
### 2.1 Product appearance

Nebular family is shown in [Figure 2-1](#).



Figure 2-1 Nebular family

Each area of Nebular and its description is shown in [Figure 2-2](#) and [Table 2-1](#).



**Figure 2-2 Key area of Nebular**

**Table 2-1 Each area description of Nebular**

| No. | Name               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | LED indicator      | Supports 7 colors flashing.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2   | Active screen area | <p>Uses E-ink that supports display effect of BWR or BWY.</p> <ul style="list-style-type: none"> <li>● Flexible display information such as text, digit, images, barcode, QR code and others.</li> <li>● All product information involved such as name, price, place, unit, grade, phone number, barcode, QR code, etc. And support custom display position and settable font-size.</li> <li>● Supports 8 pages for storage content and page switch feature.</li> </ul> |
| 3   | Nameplate          | Product information mark, including Model, S/N and certifications.                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4   | Barcode area       | 18 digits barcode used for product binding and maintenance.                                                                                                                                                                                                                                                                                                                                                                                                             |

## 2.2 Mechanical drawing

This chapter describes Nebular series' mechanical drawing.

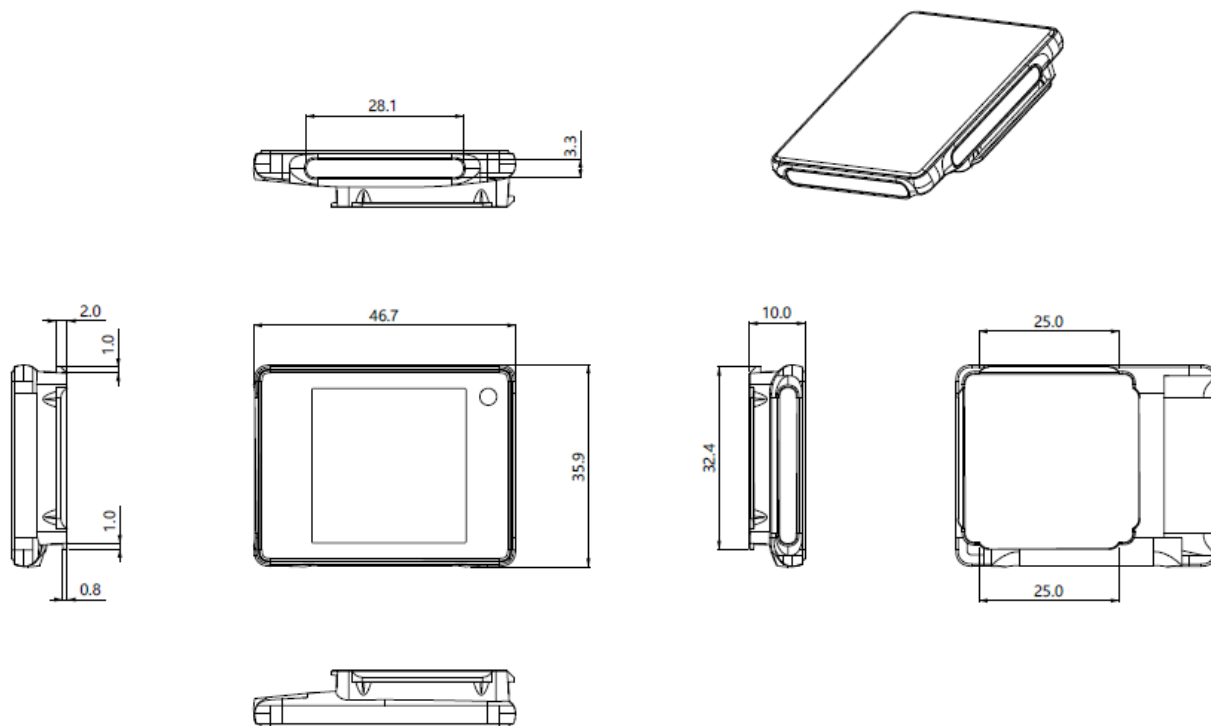


Figure 2-3 Mechanical drawing for 1.54"

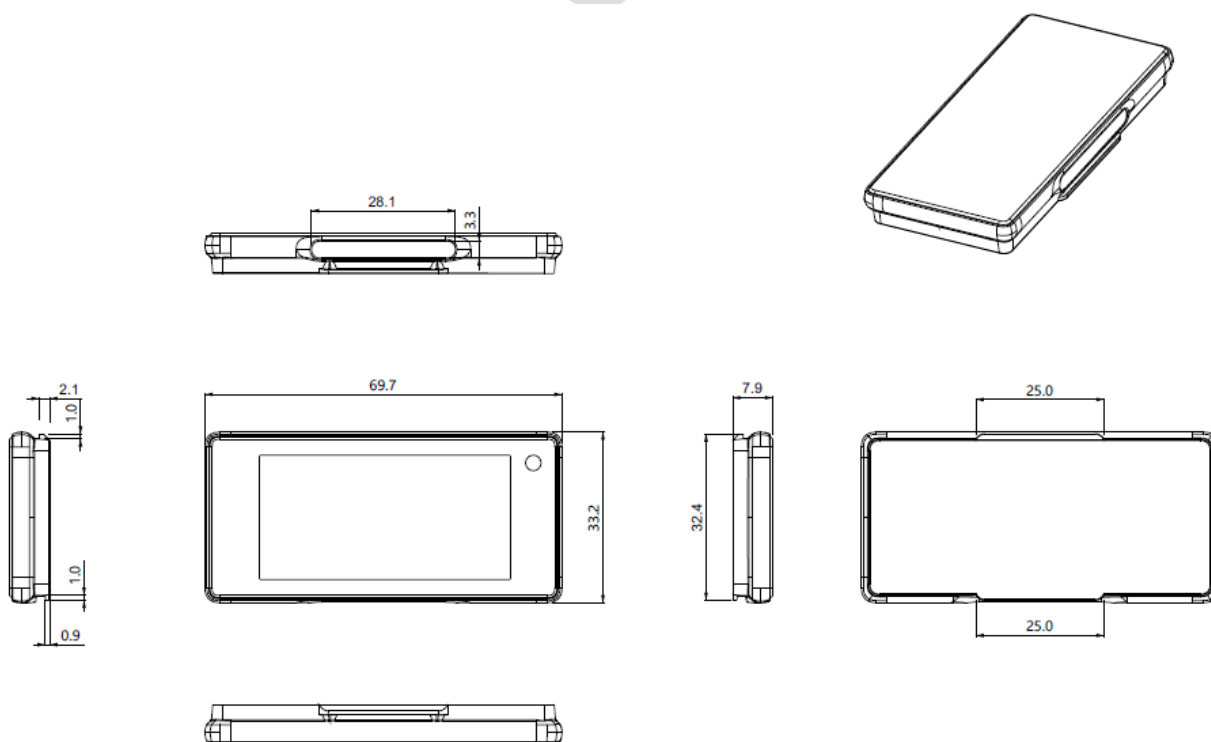


Figure 2-4 Mechanical drawing for 2.13"

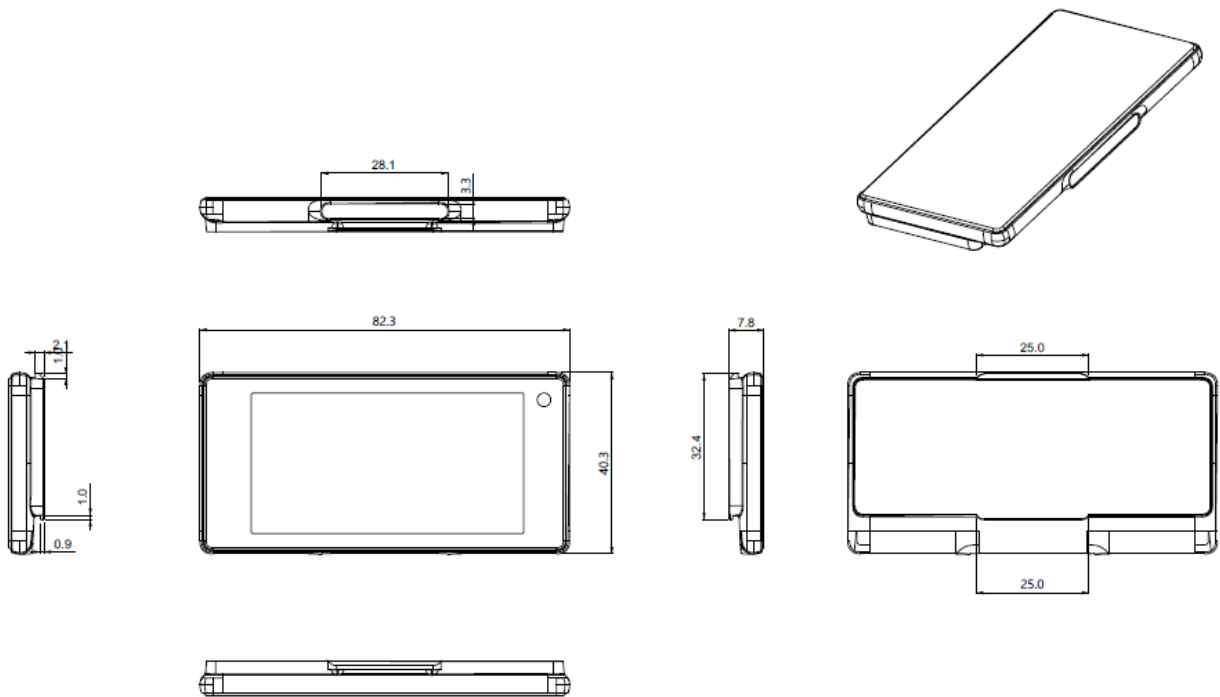


Figure 2-5 Mechanical drawing for 2.66"

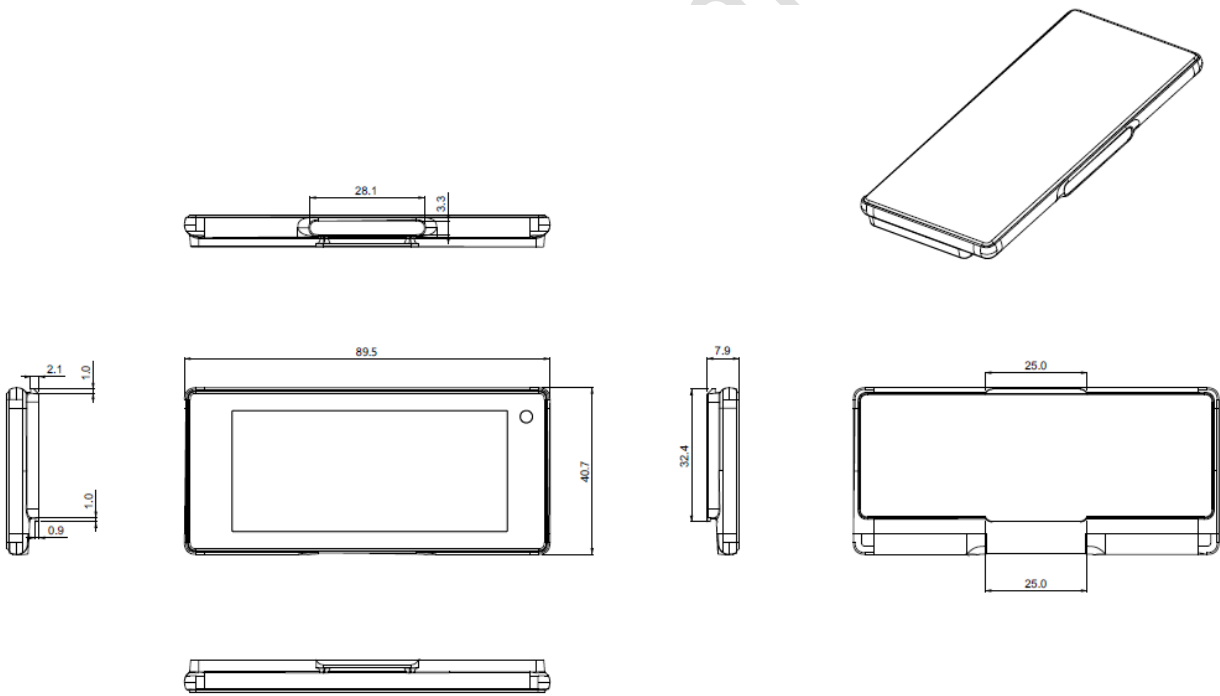


Figure 2-6 Mechanical drawing for 2.9"

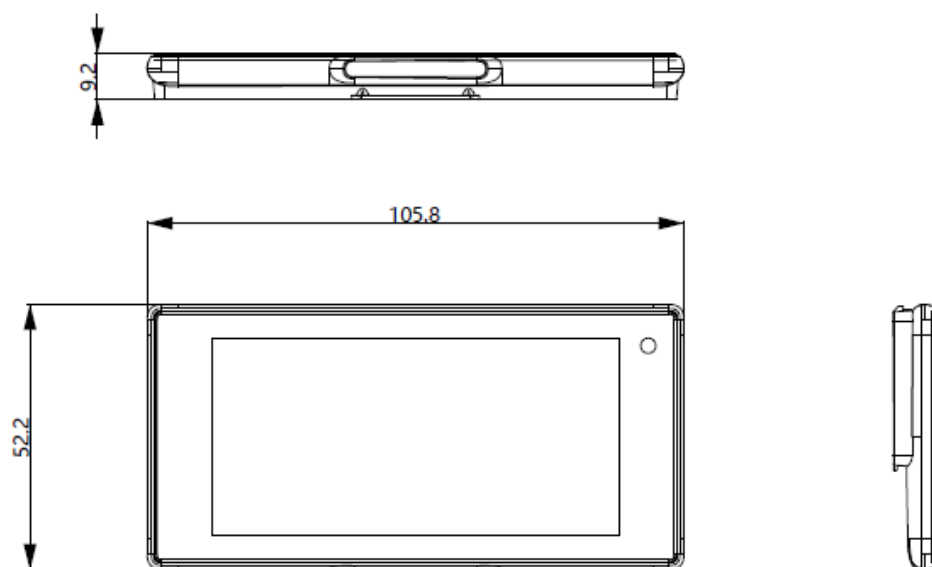


Figure 2-7 Mechanical drawing for 3.5"

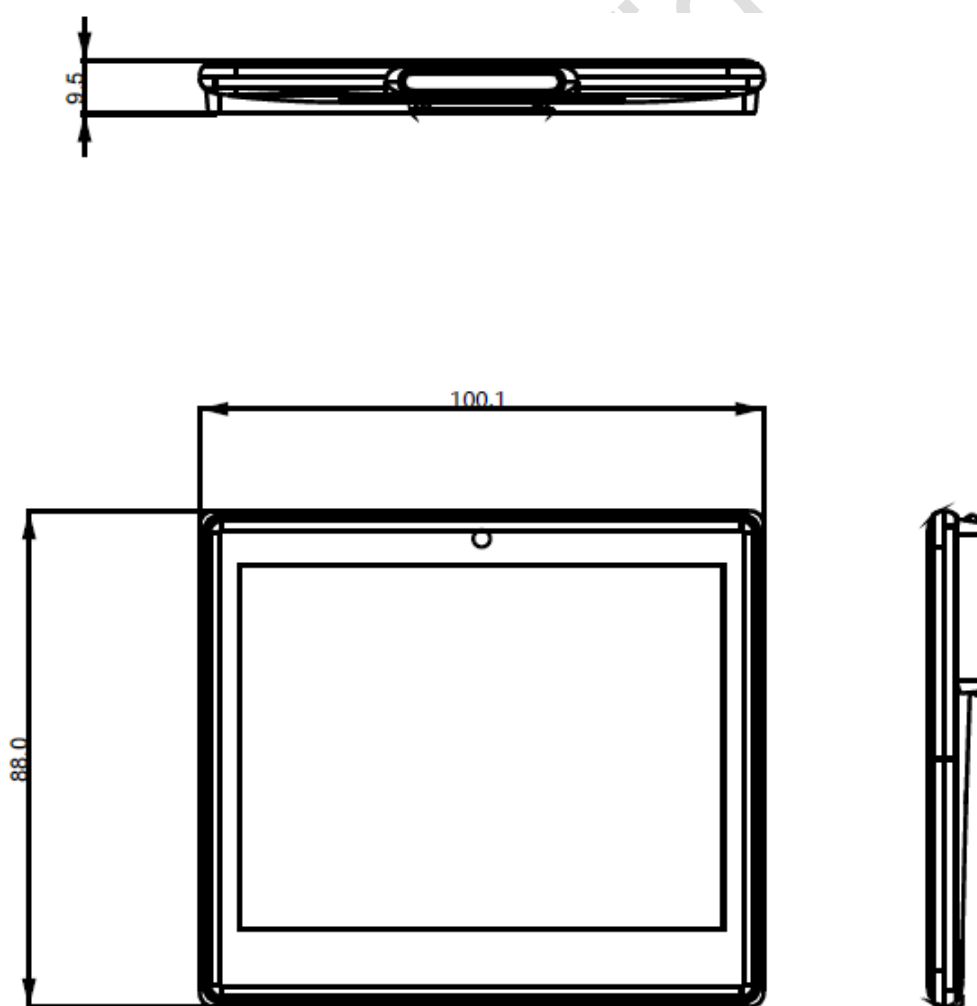


Figure 2-8 Mechanical drawing for 4.2"

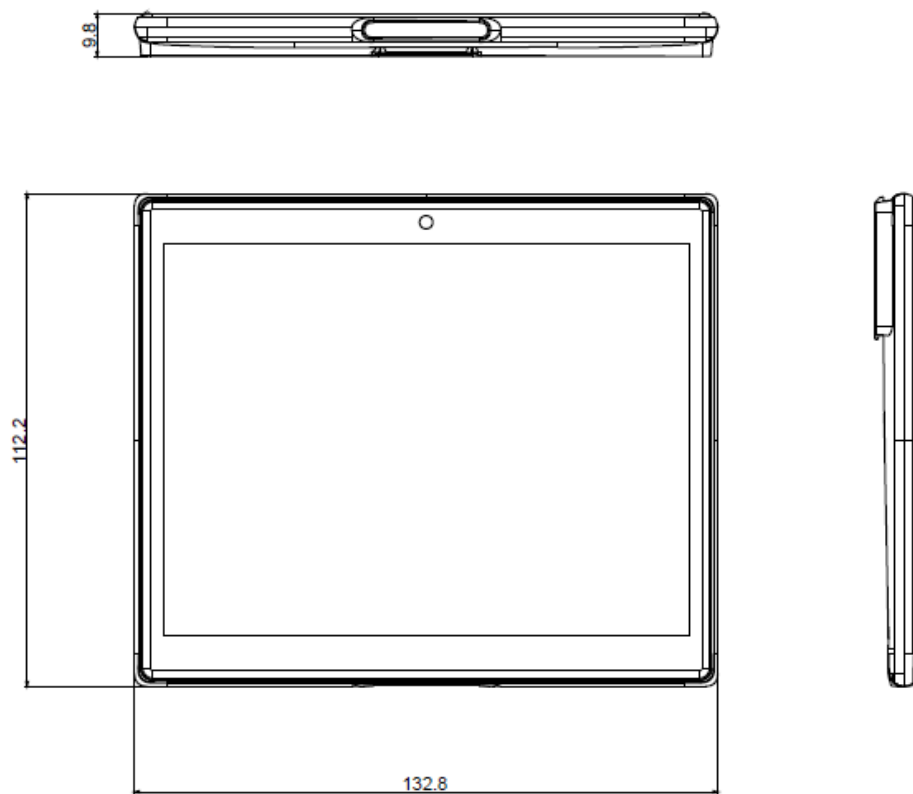


Figure 2-9 Mechanical drawing for 5.83"

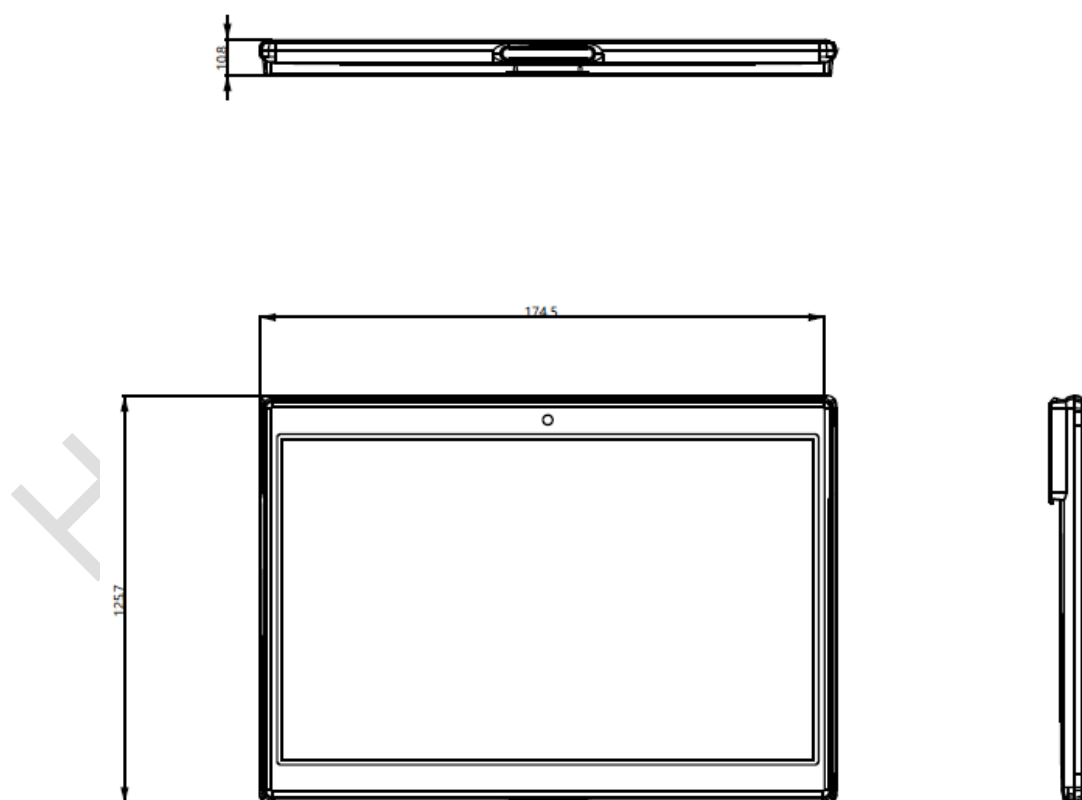


Figure 2-10 Mechanical drawing for 7.5"

## 3 Hardware performance

This chapter describes Nebular series information, including specifications, NFC specification, naming rules and nameplate.

### 3.1 Specifications

Nebular specs are shown in [Table 3-1](#).

Table 3-1 Nebular series specs

| Name                                   | 1.54"              | 2.13"/<br>2.13" Freezer | 2.66"/<br>2.66" Freezer | 2.9"              | 3.5"/<br>3.5" Freezer | 4.2"               | 5.83"               | 7.5"                 |
|----------------------------------------|--------------------|-------------------------|-------------------------|-------------------|-----------------------|--------------------|---------------------|----------------------|
| Product dimensions<br>(mm*mm*mm)       | 46.7*35.8<br>*10.0 | 69.7*33.2*7.8           | 82.3*40.3*7.8           | 89.5*40.7<br>*7.8 | 105.8*52.0<br>*9.2    | 100.1*88.0<br>*9.5 | 132.8*112.2<br>*9.8 | 178.1*125.7<br>*10.8 |
| Active display area<br>(mm*mm)         | 27.0*27.0          | 48.6*23.7               | 60.1*30.7               | 67.6*29.6         | 79.7*38.2             | 81.5*47.0          | 118.8*88.2          | 163.2*97.9           |
| Product weight (g)                     | 15.9               | 23.8                    | 31.0                    | 33.1              | 47.5                  | 79.6               | 159.5               | 225.7                |
| Display size (inch)                    | 1.5                | 2.13                    | 2.66                    | 2.9               | 3.5                   | 4.2                | 5.83                | 7.5                  |
| Resolution<br>(pixel) <sup>[3-1]</sup> | 200*200            | 296*144                 | 360*184                 | 384*168           | 384*184               | 400*300            | 648*480             | 880*528              |
| DPI <sup>[3-1]</sup>                   | 188                | 156                     | 153                     | 144               | 123                   | 120                | 138                 | 137                  |
| Display color                          | BWR, BWY           |                         |                         |                   |                       |                    |                     |                      |
| Viewing angle                          | Nearly 180 degree  |                         |                         |                   |                       |                    |                     |                      |

| Name                                   | 1.54"    | 2.13"/<br>2.13" Freezer | 2.66"/<br>2.66" Freezer | 2.9"     | 3.5"/<br>3.5" Freezer   | 4.2"     | 5.83"     | 7.5"      |
|----------------------------------------|----------|-------------------------|-------------------------|----------|-------------------------|----------|-----------|-----------|
| Battery life <sup>[3-2]</sup>          | 15 years |                         |                         |          |                         |          |           |           |
| Page switch                            | 8 pages  |                         |                         |          |                         |          |           |           |
| Battery specification                  | 650mAh   | 1030mAh                 | 1030mAh                 | 1030mAh  | 1030mAh                 | 1350mAh  | 2*1030mAh | 2*1030mAh |
| Protection level                       | IP68     |                         |                         |          |                         |          |           |           |
| Operating temperature <sup>[3-3]</sup> | 0°C~40°C | 0°C~40°C /<br>-25°C~0°C | 0°C~40°C /<br>-25°C~0°C | 0°C~40°C | 0°C~40°C /<br>-25°C~0°C | 0°C~40°C | 0°C~40°C  | 0°C~40°C  |
| Storage temperature <sup>[3-3]</sup>   | 0°C~40°C | 0°C~40°C                | 0°C~40°C                | 0°C~40°C | 0°C~40°C                | 0°C~40°C | 0°C~40°C  | 0°C~40°C  |
| Humidity (%RH)                         | 30 ~ 70  |                         |                         |          |                         |          |           |           |

 **Note:**

- [3-1]: The resolution and DPI vary with different screen supplied by vendors.
- [3-2]: Battery life under following scenarios: For 1.54" / 2.13" Freezer / 2.66" Freezer / 3.5" Freezer, update twice a day, the life is 10 years; for 2.13"/2.66"/2.9"/4.2"/5.83"/7.5", update twice a day, the life is 15 years.
- [3-3]: Room-temperature ESLs support operating temperature of 0°C ~ 40°C, while Freezer ESLs support operating temperature of -25°C ~ 0°C. If ESLs are stored or used outside of above operating temperature and humidity, their screen life will be affected.

## 3.2 NFC specification

NFC feature of ESL supports the following features:

- ESL binding/unbinding
- Flashing control
- Page switch control
- Data operation for private and public area
- Greatly lift batch data transmission rate of ESLs with the same template.

NFC specs are shown in [Table 3-2](#).

Table 3-2 NFC specs

| Name | Standard             | Data format | Memory                                         | Communication distance |
|------|----------------------|-------------|------------------------------------------------|------------------------|
| NFC  | ISO/IEC 14443 Type A | NFC NDEF    | 200 byte storage space, and write configurable | 1cm                    |

## 3.3 Product naming rules

Naming rules and description for Nebular series, as shown in [Figure 3-1](#).

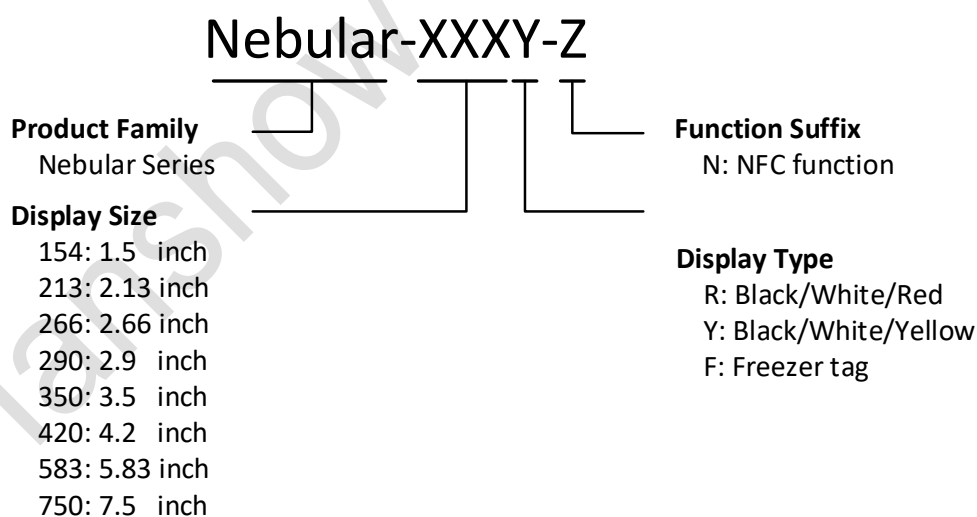


Figure 3-1 Naming rules for Nebular series

### 3.4 Product nameplate

Nebular series' nameplate is shown in [Figure 3-2](#).



**Figure 3-2 Nameplate of Nebular**

**Note:**

- Each type of ESL's Model and S/N is different.
- The above nameplate content is for reference only, please see actual product.

## 4 Package and accessories

This chapter describes Nebular series' package and needed accessories.

### 4.1 Product packaging

The package and specific product quantity of Nebular family are shown in [Figure 4-1](#).

| Screen size (inch) | ESLs qty in an inner box (M pcs) | Inner box qty N (Box) |
|--------------------|----------------------------------|-----------------------|
| 1.54               | 25                               | 8                     |
| 2.13               | 25                               | 8                     |
| 2.66               | 25                               | 8                     |
| 2.9                | 25                               | 8                     |
| 3.5                | 20                               | 5                     |
| 4.2                | 20                               | 5                     |
| 5.83               | 20                               | 5                     |
| 7.5                | 2                                | 5                     |

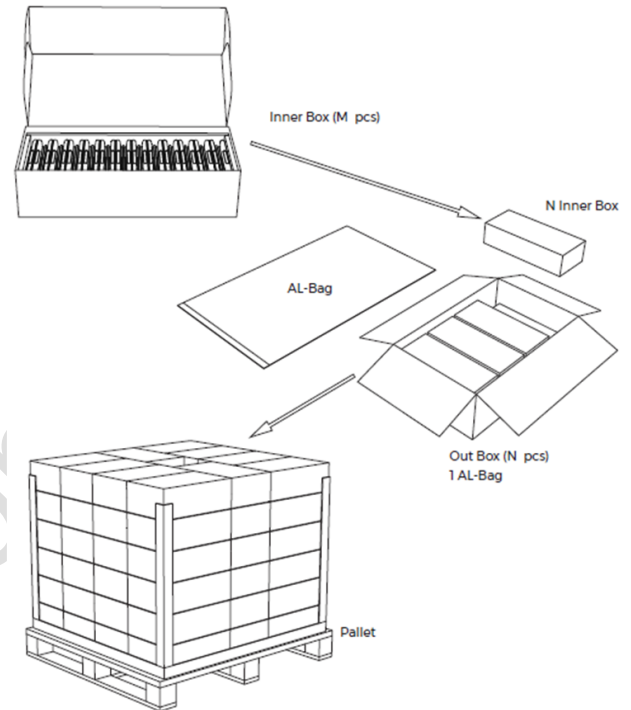
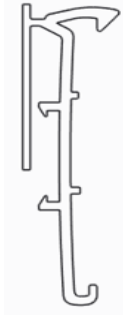
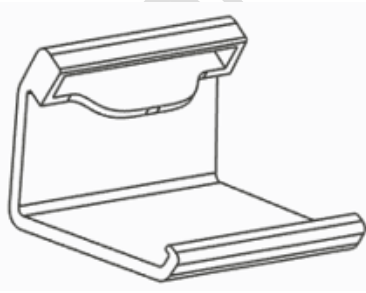
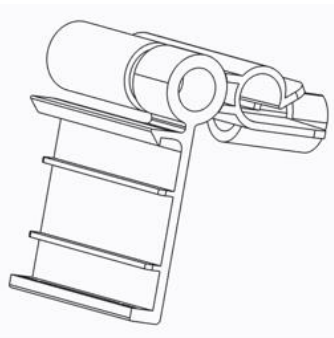
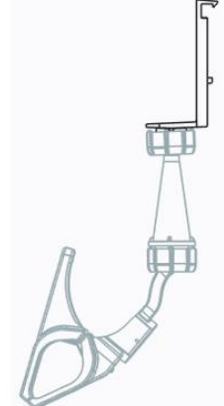


Figure 4-1 Nebular family package diagram

## 4.2 Product accessories

Common accessories of Nebular series are shown in [Table 4-1](#).

**Table 4-1 Common accessories of Nebular series**

|                   |                                                                                      |
|-------------------|--------------------------------------------------------------------------------------|
| Rail              |   |
| Table             |   |
| T-type hook       |  |
| Fruit basket clip |  |

## 5 Application scenarios

Nebular series are available to various zones and shelves of hypermarket, supermarket and retail stores. The main zones are:

- Regular shelf racking zone
- Regular shelf hook zone
- Regular fence zone
- Regular promotion table zone

## 6 Precautions

During transportation and usage of Nebular series, please note the following precautions.

### 6.1 Transportation consideration

Transportation considerations are:

- Note waterproof and no water to avoid ESLs damaged during transporting.
- Do not extrude ESLs to avoid screen broken during transporting.
- Temperature never exceed 40°C during transporting.

### 6.2 Precautions for use

Follow the precautions:

- Keep strictly room-temperature ESLs operating at 0°C ~ 40°C, while freezer ESLs operate at -25°C ~ 0°C.
- Do not make storage or operation temperature of ESLs over 50°C.
- Environment temperature has a great impact on battery life of ESLs, and the output capacity will down differently due to low temperature environment.
- ESLs must be kept working within standard temperature range. If ESLs are working out of the nominal temperature range, screen will be damage and battery life will be shortened.
- Frequent communications, updates and page switch may shorten batter life during usage process.
- Do not throw, tapping or rough handling ESLs during usage process, otherwise the circuit board will be damaged.
- Do not disassemble the entire ESLs without permission.
- Keep ESLs environment dry as possible. The rainwater, moisture, and liquids possibly contain mineral substances, which corrode the electronic circuit. If the device is wetted, please deal with it quickly.
- The screen of ESLs should be treated promptly to avoid affecting the screen display effect, and even causing permanent effects on the shell and lenses, such as cosmetics, perfume, etc.
- Clean ESLs' screen regularly and maintain cleanliness.

- Do not use chemical detergent to wipe the screen.
- Do not install ESLs in a strong magnetic environment.
- ESLs use 2.4GHz frequency band for wireless communication network. Radio communications may be limited or affected by other APPs that share the same frequency band such as Wi-Fi, BT, Zigbee, etc.
- Do not place ESLs near heating kitchen appliances such as a stove or a microwave, or the vicinity of high-pressure vessel.

## 7 FCC ID warning

### 7.1 Warning for nameplate

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.

### 7.2 Warning for product manual

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.