



Hanshow Nebular Series Product Manual

V1.0.0

HS-ESL-EPDN0001

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ABOUT THE MANUAL

The manual describes Nebular series, including features, specification, package and precautions



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	To manage all store product data and issue price update command, as well as support multi-store management.
ESL-Working	ESL-Working System	To manage all the APs and ESLs in store, and 3.0 and above supports multi-store.
ESL Controller	ESL Controller	Also named AP that is used for data interaction between ESL-Working and ESL Controller
ESL	Electronic Shelf Label	ESL is used for displaying product information like promotion information, price, 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 update price and product information timely and efficiently.

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.

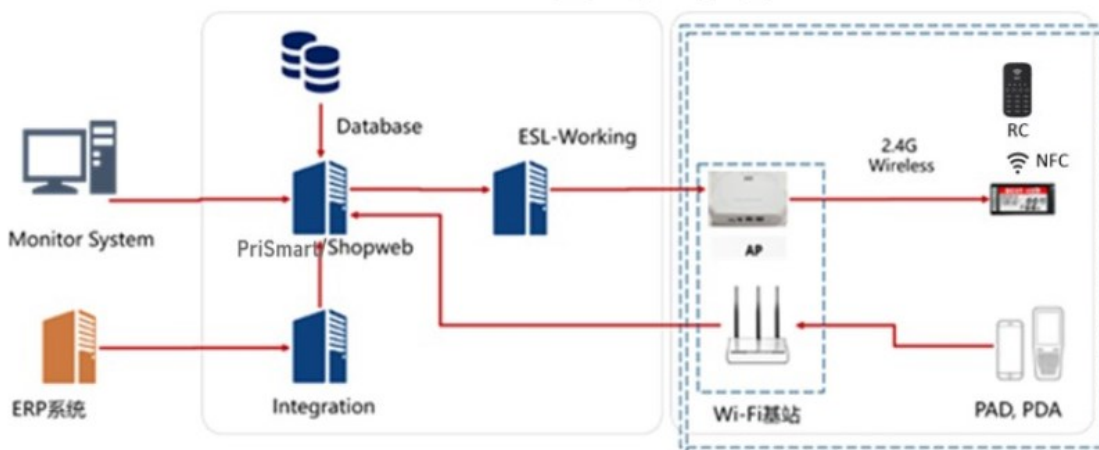


Figure 1-1 Hanshow ESL system architecture

1.2 Features

Nebular series have the following features:

- 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, battery power reminder, etc.

- Embedded NFC chip that supports NFC devices like mobile phone, PDA and remote control to implement ESLs operations, 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*.

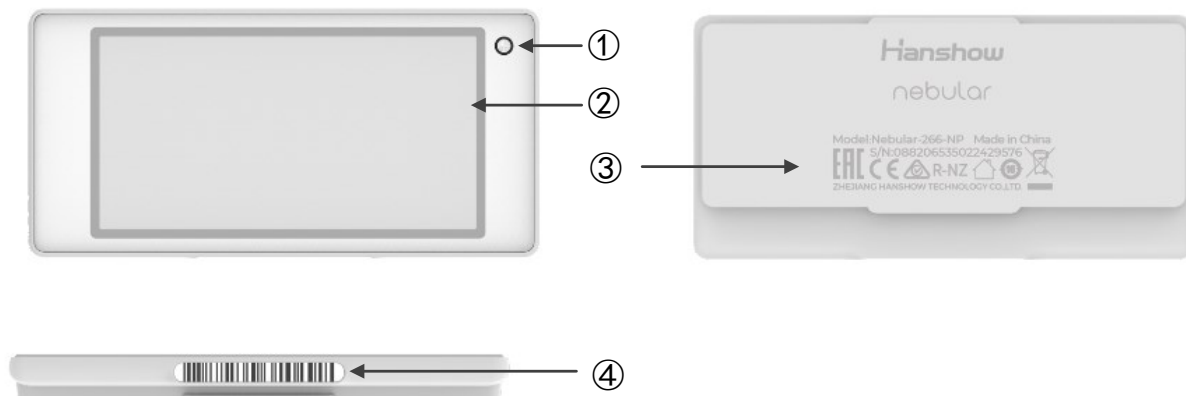


Figure 2-2 Key area of Nebular

Table 2-1 Each area description of Nebular

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

2.2 Mechanical drawing

This chapter describes Nebular series' mechanical drawing.

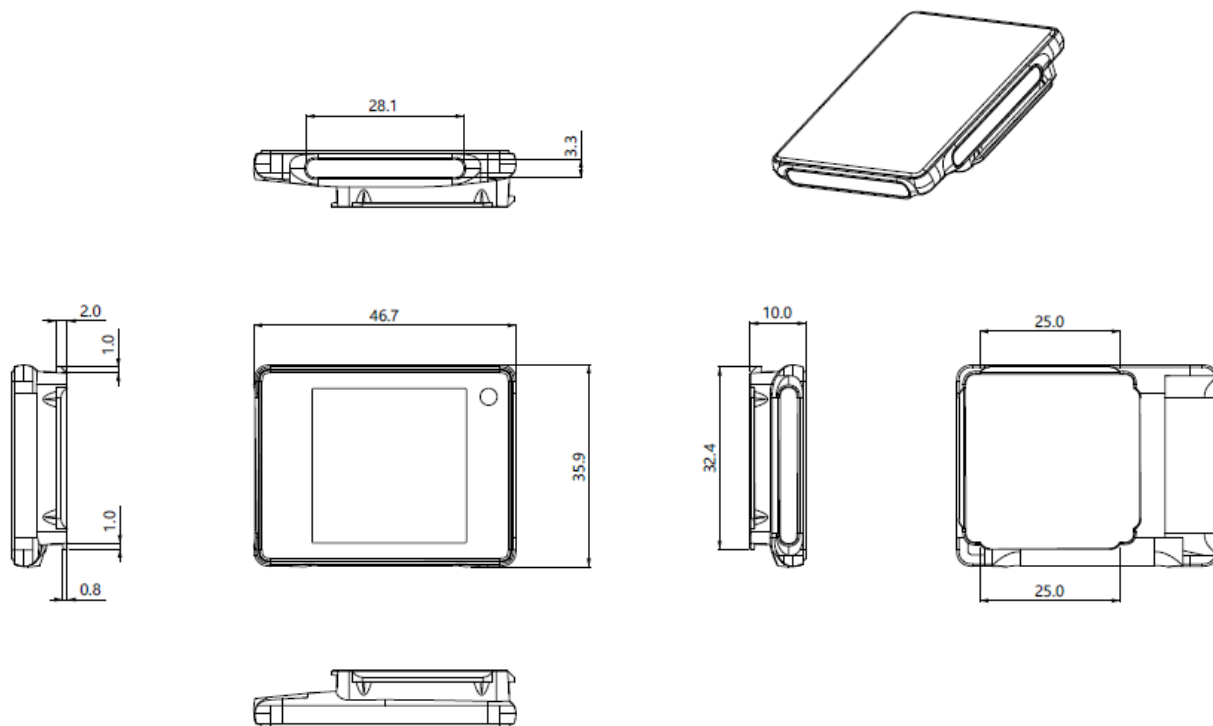


Figure 2-3 Mechanical drawing for 1.54”

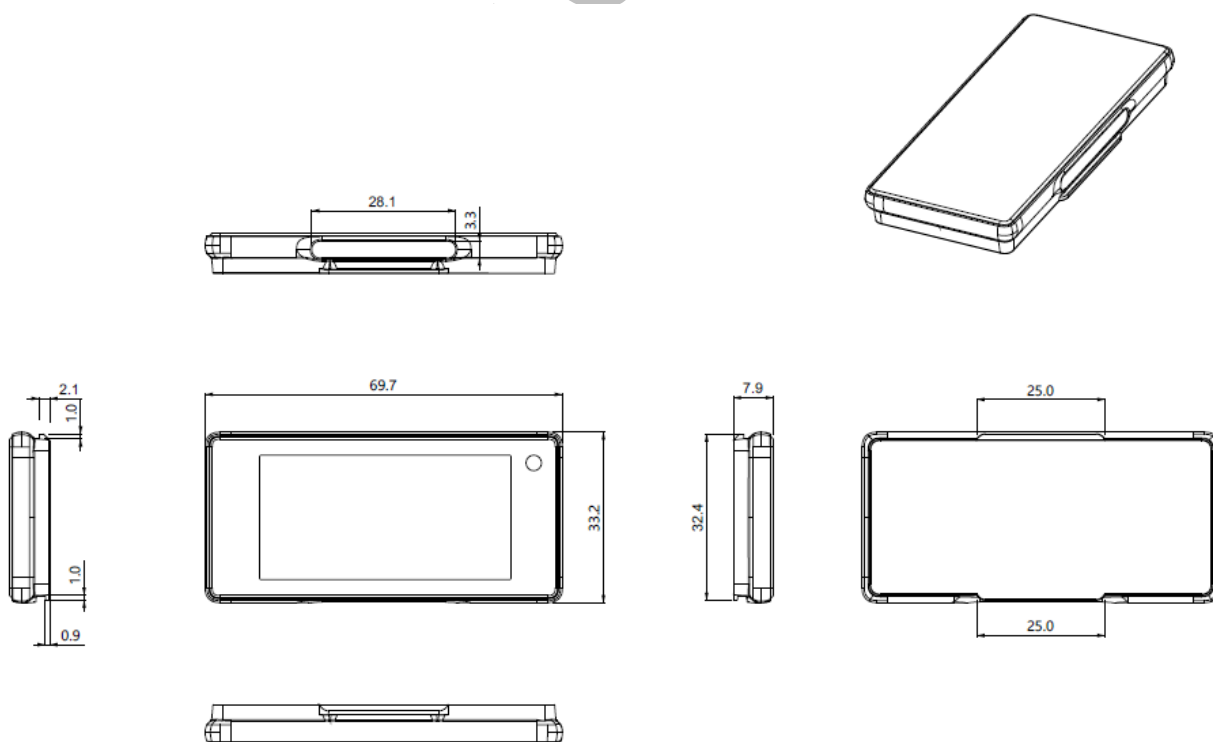


Figure 2-4 Mechanical drawing for 2.13”

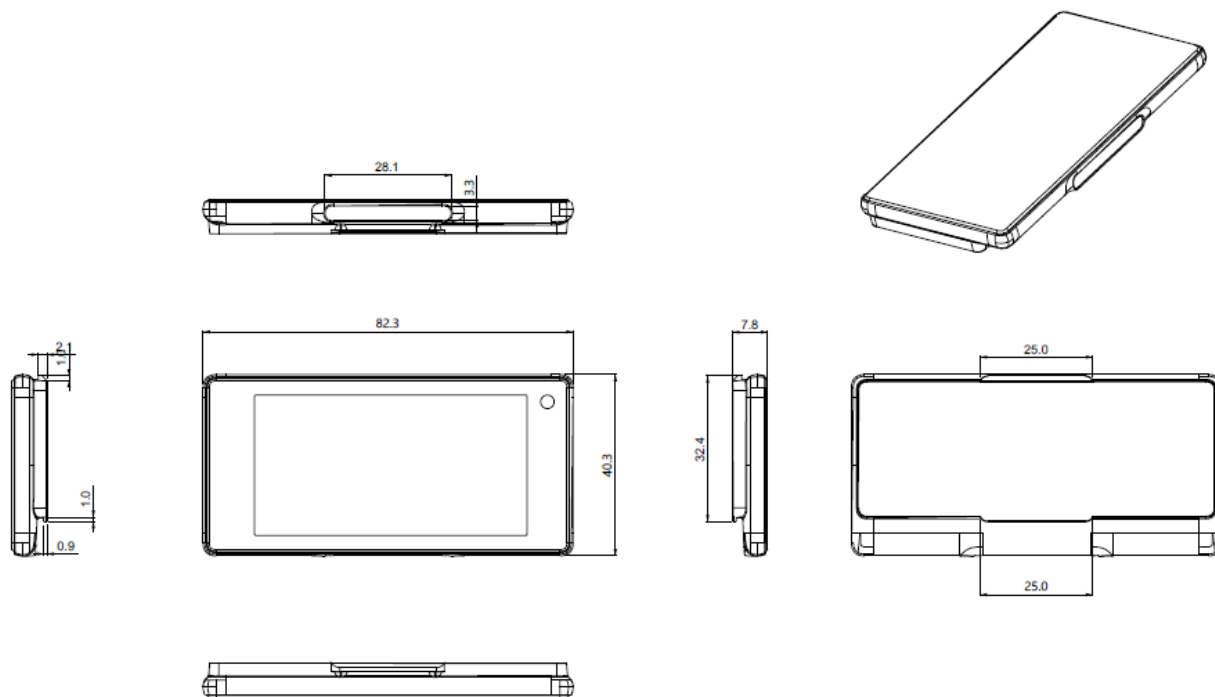


Figure 2-5 Mechanical drawing for 2.66"

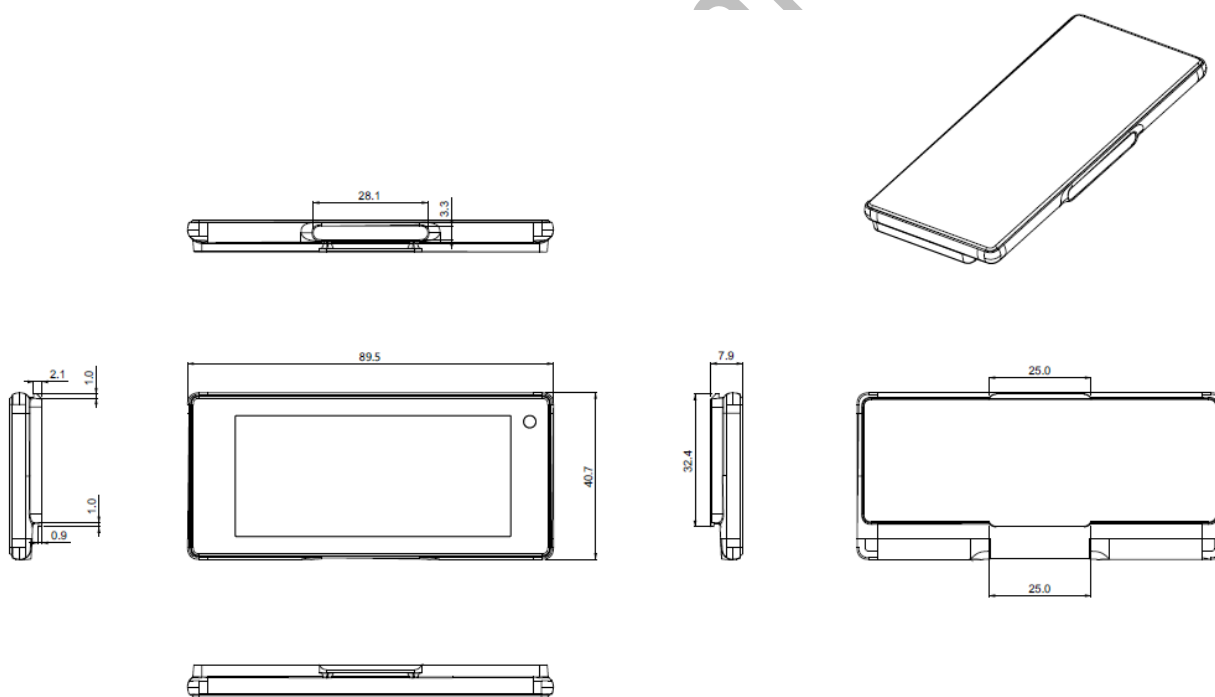


Figure 2-6 Mechanical drawing for 2.9"

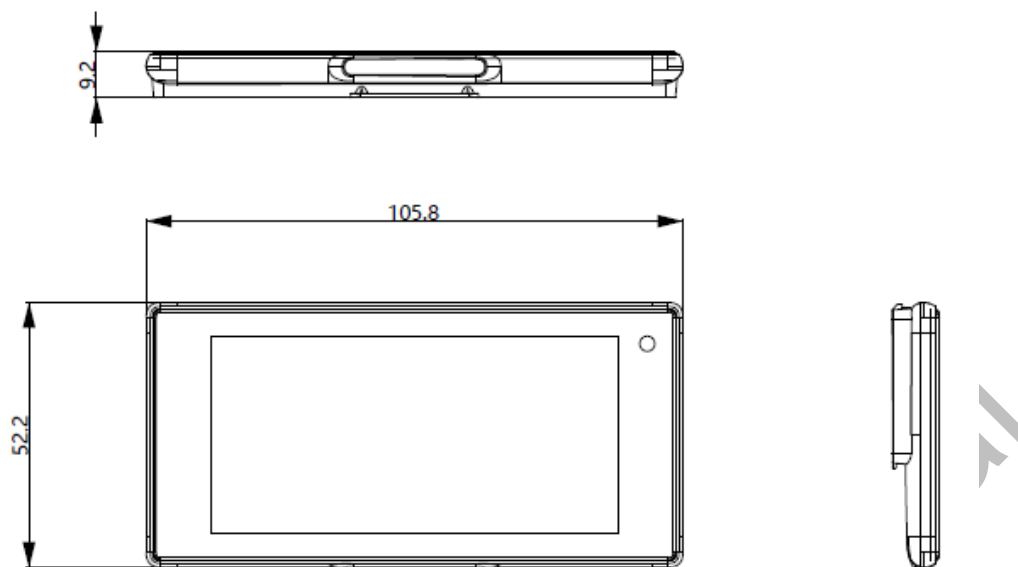


Figure 2-7 Mechanical drawing for 3.5"

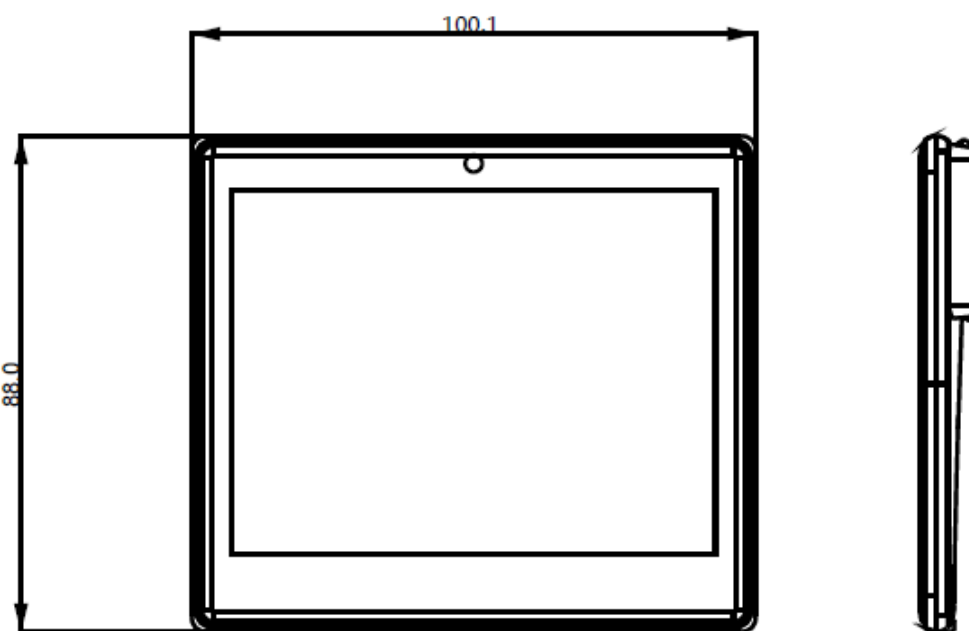


Figure 2-8 Mechanical drawing for 4.2"

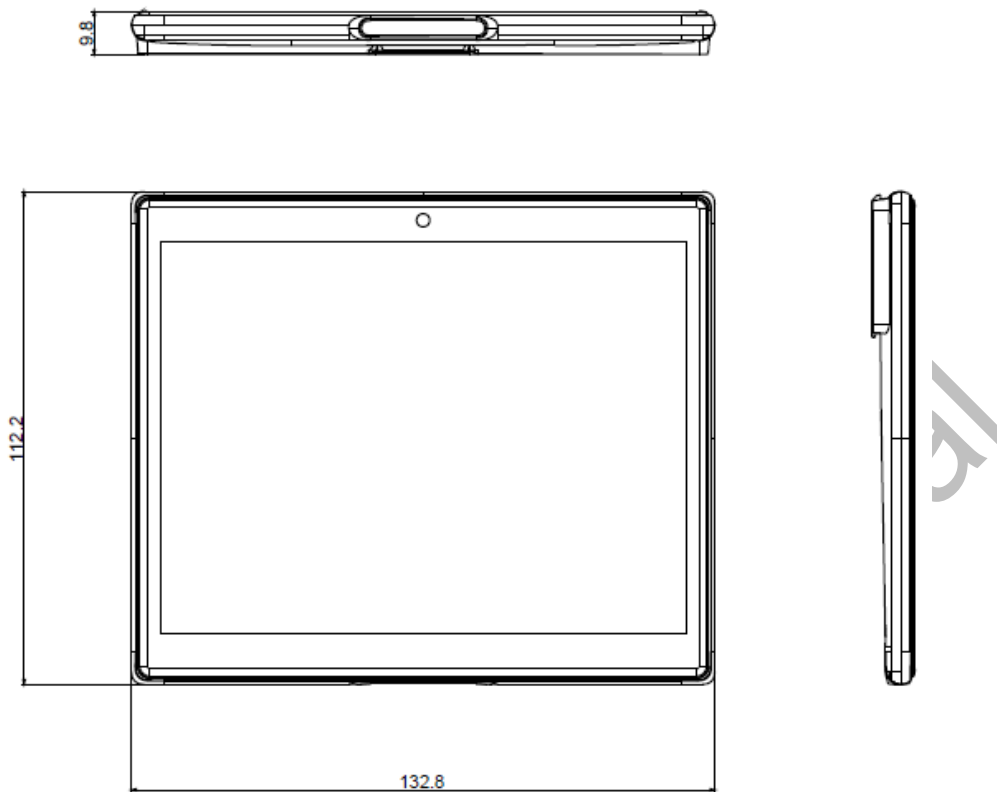


Figure 2-9 Mechanical drawing for 5.83"

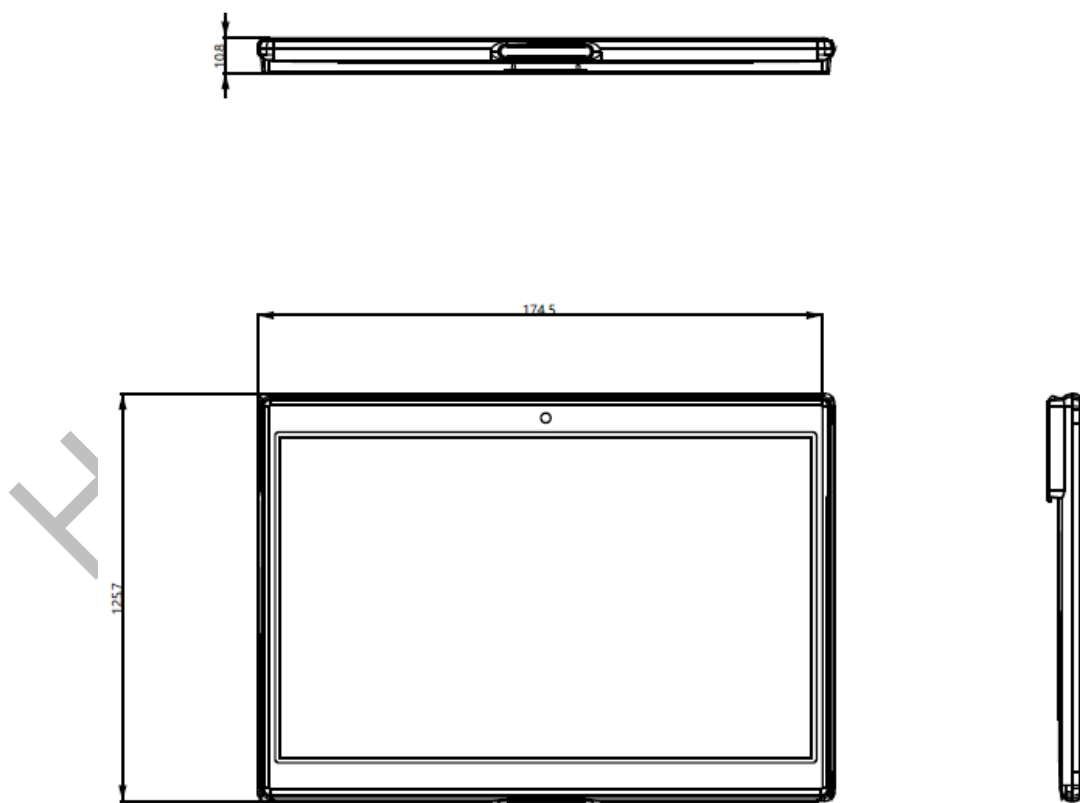


Figure 2-10 Mechanical drawing for 7.5"

3 Hardware performance

This chapter describes Nebular series information, including specifications, NFC specification, usage standard, 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"/ 2.13" Freezer	2.66"/ 2.66" Freezer	2.9"	3.5"/ 3.5" Freezer	4.2"	5.83"	7.5"
Product dimensions (mm*mm*mm)	46.7*35.8 *10.0	69.7*33.2*7.8	82.3*40.3*7.8	89.5*40.7 *7.8	105.8*52.0 *9.2	100.1*88.0 *9.5	132.8*112.2 *9.8	178.1*125.7 *10.8
Active display area (mm*mm)	27.0*27.0	48.6*23.7	60.1*30.7	66.9*29.1	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	200*200	250*122	296*152	296*128	384*184	400*300	648*480	880*528

Name	1.54"	2.13"/ 2.13" Freezer	2.66"/ 2.66" Freezer	2.9"	3.5"/ 3.5" Freezer	4.2"	5.83"	7.5"
(pixel) ^[2-1]								
DPI ^[2-1]	188	131	125	112	123	120	138	137
Display color	BWR, BWY							
Viewing angle	Nearly 180 degree							
Battery life ^[2-2]	10 years							
Page switch	8 pages							
Battery specification	650mAh	1030mAh	1030mAh	1030mAh	1030mAh	1350mAh	2*1030mAh	2*1030mAh
Protection level	IP68							
Operating temperature ^[2-3]	0°C~40°C	0°C~40°C / -25°C~0°C	0°C~40°C / -25°C~0°C	0°C~40°C	0°C~40°C / -25°C~0°C	0°C~40°C	0°C~40°C	0°C~40°C
Storage temperature ^[2-3]	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:**

- [2-1]: The resolution and DPI vary with different screen supplied by vendors.
- [2-2]: Battery life calculated based on following scenarios: 1.54" / 2.13" Freezer / 2.66" Freezer / 3.5" Freezer updates once per day and flashing for 30 minutes; 2.13"/2.66"/2.9"/4.2"/5.83"/7.5" updates four times per day and flashing 30 minutes.

- [2-3]: Room-temperature ESLs support operation temperature of 0°C ~ 40°C, while Freezer ESLs support operation temperature of -25°C ~ 0°C. If ESL is stored or used outside of above operating temperature and humidity, its screen life will be affected.

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3.2 NFC specification

NFC feature of ESL supports the following features:

- ESL binding/unbinding
- Flashing control
- Page switch control
- Private and Public area data operation
- 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 Usage standard

Nebular series support flashing and updating function. Specific usage standard is shown in [Table 3-3](#).

Table 3-3 Usage standard for Nebular series

Name	Description
LED flashing	30 minutes/day
Frequency of update	4 times/day

3.4 Product naming rules

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

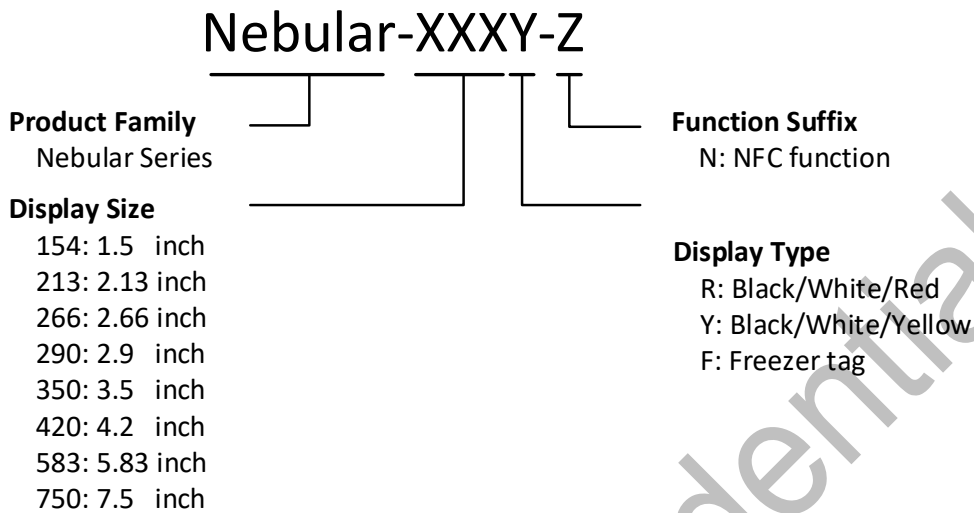


Figure 3-1 Naming rules for Nebular series

3.5 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 required accessories.

4.1 Product packaging

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

Table 4-1 Nebular series package list

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

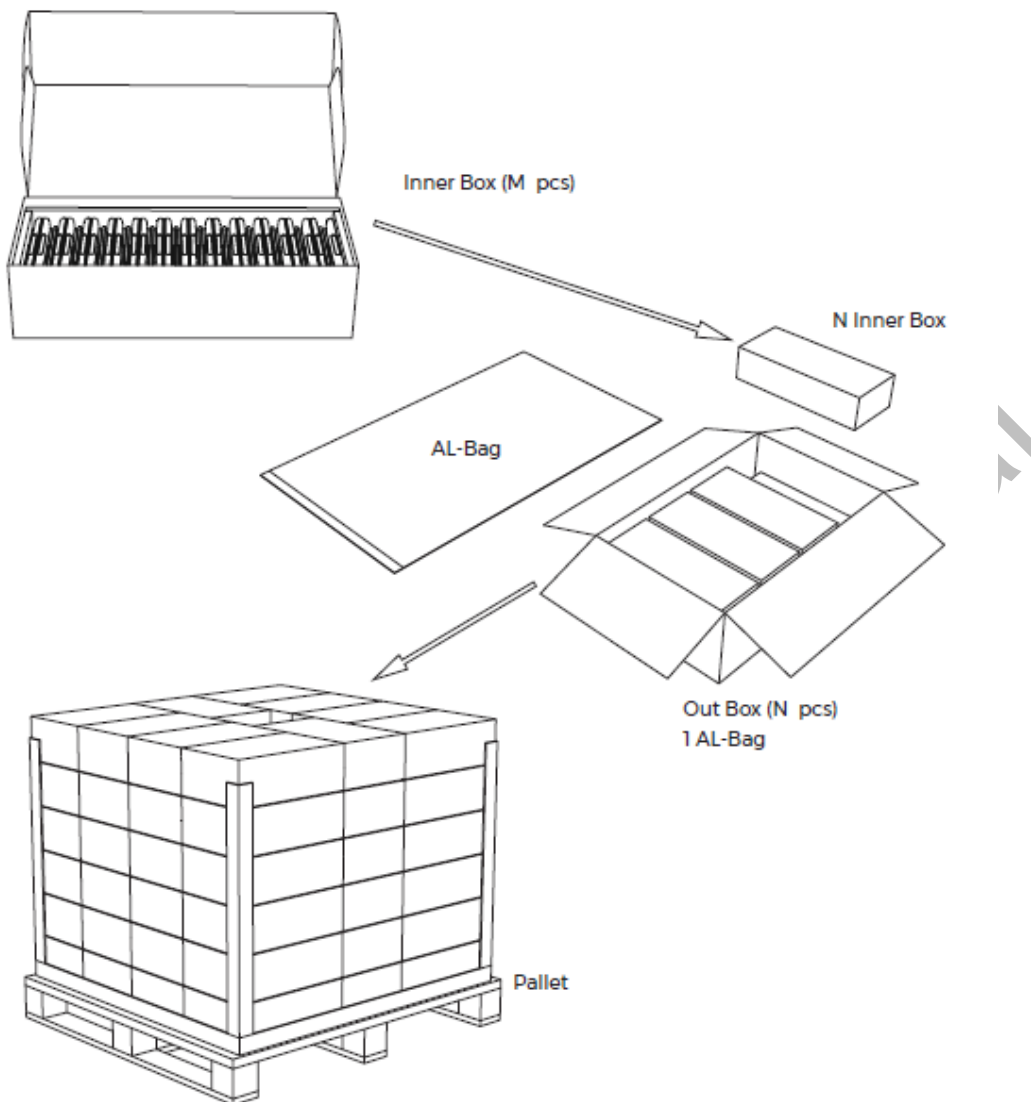
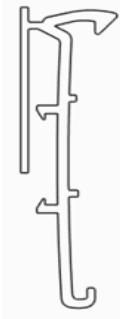
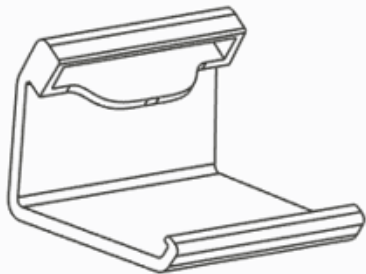
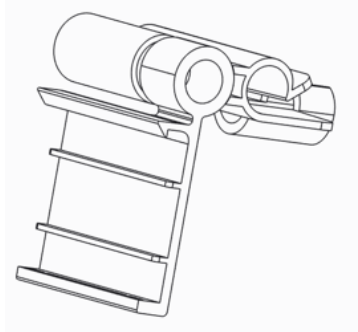
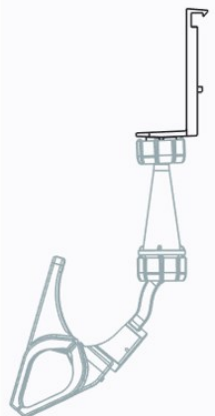


Figure 4-1 Nebular family package diagram

4.2 Product accessories

Common accessories of Nebular series are shown in [Table 4-2](#).

Table 4-2 Common accessories of Nebular series

<p>Rail</p>	
<p>Table</p>	
<p>T-type hook</p>	
<p>Fruit basket clip</p>	

5 Application scenarios

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

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

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6 Precautions

During transportation and usage of Nebular series, please follow 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 have a different level of decline 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.
-