BeneFusion eSP

Syringe Pump

Data Sheet

Digitally signed by Prodan Sveatoslav
Date: 2024.06.14 15:51:53 EEST
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Location: Moldova

Physical Specifications

Weight	≤ 1.6kg
Size	≤ 257x 150 x73mm
Screen	3.5 inch touchscreen TFT color LCD, 200x400 pixels
Brightness	1-8 levels, adjustable
Display	Infusion status (drug name, major infusion parameters, real-time pressure status) System status information (alarm information, infusion mode, battery status, relayed status, syringe brand or bed number)
Indicator on the door	Infusion status indicator

Parameters Specifications

Accuracy	≤ ±1.8%
Mode	Rate mode, Dose Mode, Dose Time Mode, Time mode, Sequential Mode, Intermittent Mode, Loading Dose Mode, Ramp Mode, Micro-infusion Mode Optional: TIVA Mode, PCA Mode, TCI Mode
Flow rate	0.01-2300ml/h
Increment	0.01ml/h (0.01-99.99ml/h), 0.1ml/h (100.0-999.9ml/h), 1ml/h (1000-2300ml/h)
Preset volume (VTBI)	0.01 ml - 9999.99 ml, increment: 0.01mL
Preset time	00:00:01-99:59:59
Accumulated volume	0.00 ml - 99999.99 ml
KVO	0.01 to 5.0ml/h, increment: 0.01ml/h
Purge rate	0.01-2300ml/h
Bolus rate	0.01-2300ml/h (automatic or manual)
Occlusion detection	50-1125mmHg (15 levels selectable, respectively are 50, 150, 225, 300, 375, 450, 525, 600, 675, 750, 825, 900, 975, 1050, 1125mmHg) default is 450mmHg, Pre-alarm: an alert will pop out when the pressure is continuously going up Auto-restart: On/Off, restart the infusion when the occlusion pressure is reduced. 4 units of pressure selectable: mmHg/kPa/bar/psi
Anti-bolus	Unexpected bolus reduced when the occlusion occurs
Dose rate units	ng/kg/min, ng/kg/h, ng/kg/24h, ug/kg/min, ug/kg/h, ug/kg/24h, mg/kg/min, mg/kg/h, mg/kg/24h, g/kg/min, g/kg/h, g/kg/24h, mU/kg/min, mU/kg/h, mU/kg/24h, U/kg/min, U/kg/h, U/kg/24h, kU/kg/min, kU/kg/h, kU/kg/24h, EU/kg/min, EU/kg/h, EU/kg/24h, mmol/kg/min, mmol/kg/h, mmol/kg/24h, mol/kg/min, mol/kg/h, mol/kg/24h, mcal/kg/min, mcal/kg/h, mcal/kg/24h, cal/kg/min, cal/kg/h, cal/kg/24h, kcal/kg/min, kcal/kg/h, kcal/kg/24h, mEq/kg/min, mEq/kg/h, mEq/kg/24h
Auto-lock time	1 - 5 minutes selectable, ON/OFF switchable
Drug library	Up to 5000 drugs, 30 categories, support color-coding drug name
History log	Up to 3500 events
Volume collection	Available in 4 methods: 24h total, current total, period, timing volume, supports history rate review
DERS (Dose Error Reduction System)	Available, definition of dose limits, automatic alarms when reaching dose limits

Syringes

Compatibility	1/2/3/5/6/10/12/20/30/35/50/60ml, automatic recognition of syringe size

Alarms

Type	Audible and visual alarm
2 Levels	High: Occlusion/ Syringe Empty/ Syringe Disengaged/ Plunger Grippers Error/ Battery Depleted/ VTBI Complete/ KVO Finish/ Relay Invalid/ System Error/ No Syringe Low: Extension Line Detached/ KVO Running/ Battery in Use/ Battery Error/ CMS/eGW Disconnected/ Standby Time Expired/ Dock Connection Interrupted/ System Time Error/ Relay Invalid Soon/ Time Near End/ Reminder/ Low Battery/ Syringe Near Empty
Sound volume	1-8 levels selectable, default is level 6
Reminder	1-5 minutes selectable, ON/OFF switchable

Connectivity

Communication	Wired/wireless
USB	Support drug library import, patient data import/export, history record export, calibration data import/export
Multifunctional connector	RS232, nurse call connector, DC adapter
Integration	Connect with BeneFusion nCS infusion central station Connect with BeneVision Central Monitoring System

Battery

Operating time	≥ 5 hours at 5ml/h (≥ 11 hours at 5ml/h for smart battery)
Charging time	≤ 5 hours to full capacity (≤ 6 hours for smart battery)

Power Supply

Voltage 100-240 V~, frequency 50/60Hz, current 0.5-0.21A

Work Environment

Temperature	5-40ºC for operating, -30-70 ºC for storage
Relative humidity	15-95% for operating, 10-95% for storage
Atmosphere pressure	57.0-107.4 kPa for operating, 16.0-107.4 kPa for storage
Classification	Type CF, Class I, IP33
Stackability	Supported with stack rack, maximum of 3 pumps can be stacked

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P/N: ENG-BeneFusion eSP Datasheet-210285x2P-20201125

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BeneFusion eSP/eVP/eDS

Infusion System

Efficiency in every droplet

www.mindray.com

P/N:ENG-BeneFusion eSP/eVP/eDS-210285X8P-20201225

mindray

healthcare within reach

Wide visible angle screen
ensures clear display even from side

Corrosion-resistant material
supports 49 kinds of
disinfectants

Ingenious extension line holder
for better management

Independent light
for clear status
observation

Modular docking design
enables tool-free extension

Seamless design
for easy clean

Efficiency in Workflow

Intuitive interaction

- 3.5" Colored capacitive touchscreen brings users an excellent experience with smooth operation.
- Intuitive user interface enables quick programming of key parameters, making workflow process much easier.

Fast preparation

SmartRapid™

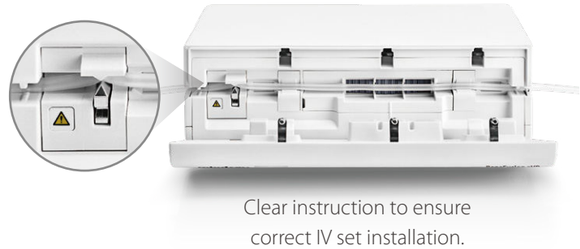
SmartRapid™ ensures timely infusion by significantly shortening the start-up time, from turning on the pump to delivering the first drop of medication.

Turn On	Syringe Loading	First Drop Delivery
2s	**4s**	**3s**

Efficient IV set loading process

BeneFusion eVP is designed to simplify the process of loading an IV set, making it more efficient and streamlined.

Automatic tubing clamp ensures the anti-free flow protection.



Status checking to ensure IV set is successfully loaded.

Clear instruction to ensure correct IV set installation.

SafeDose™

- The color coding of drug name assists users to easily select and verify the correct drug.
- SafeDose™ Info software enables programming infusion parameters automatically to enhance efficiency.
- SafeDose™ DERS helps prevent dosing error with hard or soft limits restriction.

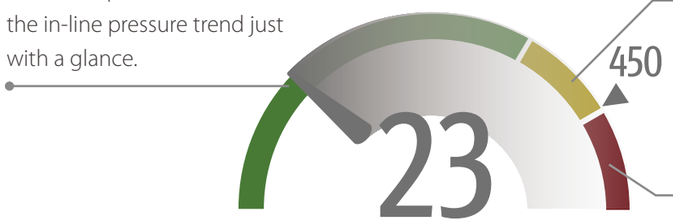
Flexible infusion adjustment

Easily adjusting the infusion therapy within 3 steps.

Quick problem solving

Dynamic Pressure System

Speedometer style indicator with numerical pressure to monitor the in-line pressure trend just with a glance.

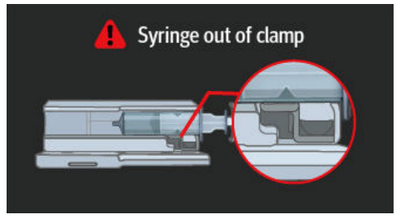


Alert with a visual message about the possible occlusion before interrupting the infusion.

Auto-attempting mechanism enables infusion resume as early as possible to ensure continuous infusion.

Intuitive Alarm System

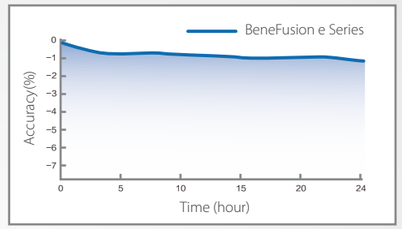
Instructional animation pops up to guide users to quickly solve the problem.



Efficiency in Safety

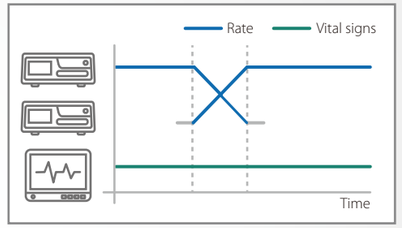
Precise infusion performance

- High accuracy: eSP ±1.8%; eVP ±5%
- Long-hour accuracy assured



Automatic multi-channel relay

- BeneFusion e series supports both circular and customized relay to make sure the continuity of infusion.
- Smooth relay workflow ensures stable and seamless drug-giving process.



SmartAIR™

With SmartAIR™, BeneFusion eVP significantly enhances the safety level of IV administration.

- Dual ultrasound sensor to detect the air bubbles more precisely, avoiding missing or false air-in-line alarm.
- 15ul air bubble detection size on BeneFusion eVP, ensuring patient safety throughout the infusion, even for neonates.

Efficiency in Application

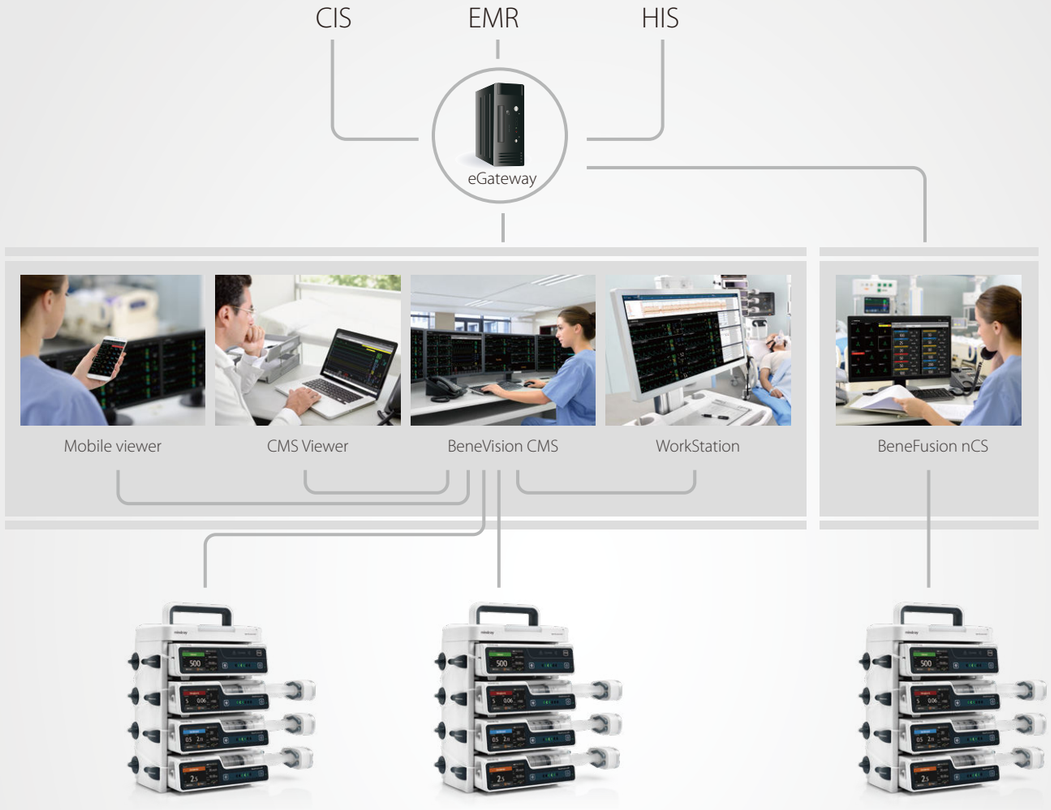
All in one

BeneFusion eSP and eVP satisfy various infusion purposes by combining all functions together.

Flexible docking solution

- Modular docking design of BeneFusion eDS enables easy expansion from 2 to 16 slots.
- Ingenious design ensures easy plug-in of pumps.

Efficiency in Informatics



BeneFusion e series | BeneFusion e series | BeneFusion e series

Integrated central monitoring

BeneVision CMS™ offers one-stop monitoring of all patients' vital sign and infusion treatment details, providing comprehensive information for clinical workers to improve the quality of patient care.

Easy management with multi-beds

Comprehensive data for single bed

BeneFusion eSP

BeneFusion eSP ex

BeneFusion eSP Neo

Syringe Pump

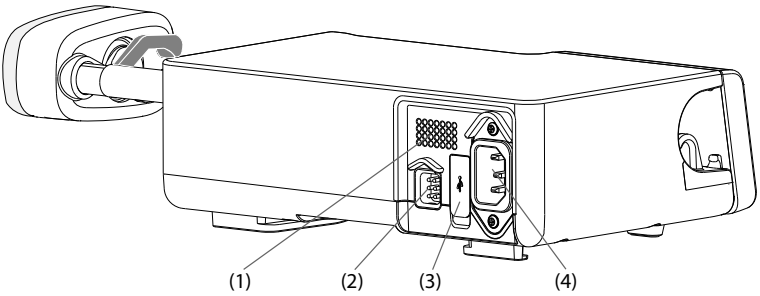
Operator's Manual

CE 0123

Release date: March 2022

Revision: 5.0

2.3.2 Rear View



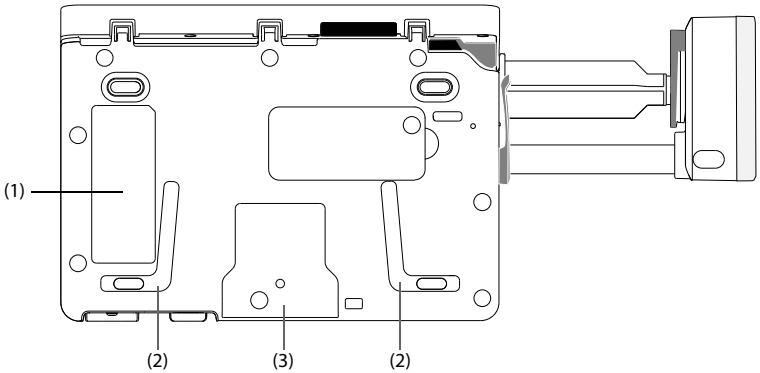
(1) Speaker
Provides sound for audible alarms and reminder.

(2) Multifunctional connector
- Connects the equipment to the hospital's nurse call system through the nurse call cable.
- Uses as a DC power input connector when the equipment is connected to the dock.
- Uses as a RS232 connector for connecting the external devices.
- Connects the PCA controller.

(3) USB connector:
Connects the USB device.

(4) AC power input connector
Connects the AC power cord.

2.3.3 Bottom View



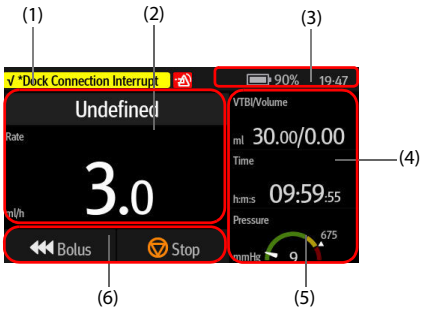
(1) Product label

(2) Placement area for stacking pumps
This area is for stacking the pumps with the handle.

(3) Placement area for pole clamp
This area is for mounting the pump to a pole clamp.

2.4 Screen Display

The screen may look slightly different in different infusion modes. The following figure shows the infusion screen of the rate mode:



(1) System status information area
Displays the alarm information, infusion mode, syringe brand, or bed number.

(2) Infusion status area
Displays the drug name and major infusion parameters.

(3) System status information area
Displays the battery status, network status, relayed status, and system time. For more information, see ***2.4.1 On-screen Symbols***.

(4) Infusion status area
Displays other infusion parameters and pressure status.

(5) Pressure status area
Displays the real-time pressure status.
- Green: Pressure is normal.
- Yellow: Pressure is near the threshold for the infusion.
- Red: Pressure is beyond the threshold for the infusion.

(6) Key area
Displays keys. For more information, see ***2.4.3 Operation Keys***.

2.4.1 On-screen Symbols

The following table lists the on-screen symbols:

Symbol	Description	Symbol	Description
	Audible alarm tones are paused.		Alarms are acknowledged and the alarm is reset.
	Alarms are acknowledged and the reminder sound is given.		Night mode
	Wireless network is connected. The solid part indicates network signal strength.		Wireless network is not connected.
	Customized relay		Circular relay
	The battery works correctly. The solid portion represents the remaining charge.		The battery is being charged.

4 Getting Started

4.1 Quick Start Guide

1. Press the power switch  to turn on the pump.
2. Load the syringe. For detailed information, see ***4.3 Loading the Syringe***.
3. Set the infusion parameters. For detailed information, see ***4.4 Starting Infusion***.
4. If required, purge the line. For detailed information, see ***4.5 Purge***.
5. Connect the extension set to the patient access device.
6. Press  to start infusion.
7. Press  to pause infusion.

4.2 Setting Up the Pump

Before getting started, ensure that the pump is properly set up:

- The pump is placed on a stable surface or secured in the Dock, or properly mounted to an IV pole using the pole clamp.
- The pump is plugged into a properly-grounded AC power outlet. See ***3.4.1 Connecting the AC Mains***.
- Press the power switch  to turn on the pump. The pump automatically performs a self test at startup. Check that the alarm tone is heard and the alarm lamp illuminates, one after the other, in red and yellow. This indicates that the visible and audible alarm indicators function correctly. The loading guide screen displays. If required, select **Exit** to enter the infusion parameters setting or drug selection screen, set infusion parameters or select drug before loading the syringes.
- If the pump is run on battery power, ensure that the battery is adequately charged.

WARNING

- **Before putting the system into operation, the operator must verify that the equipment, connecting cables and accessories are in correct working order and operating condition.**
- **Check that visual and auditory alarm signals are presented correctly when the equipment is powered on. Do not use the equipment if you suspect it is**

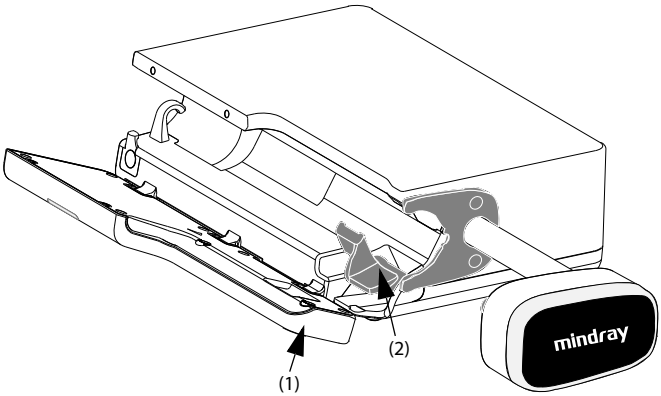
not working properly, or if it is mechanically damaged. Contact your service personnel or us.

NOTE

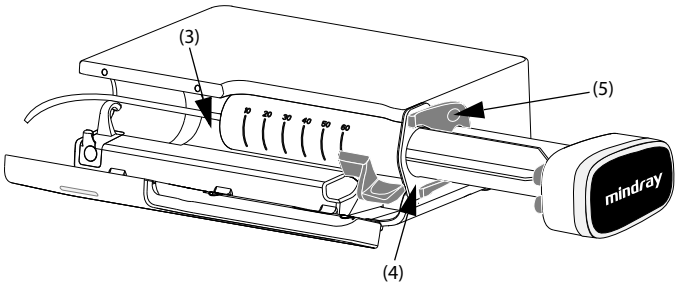
- **Stay within 1 meter (39 inches) of the pump while setting it up and operating it, making sure that you have a clear view of the pump interface.**
- **The equipment uses a mains plug as isolation means to the mains power. Do not locate the equipment in a place difficult to operate the mains plug.**

4.3 Loading the Syringe

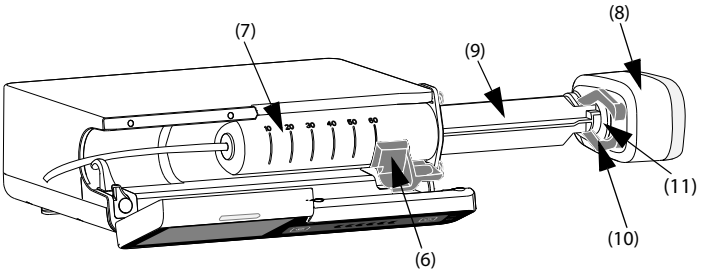
1. Pull the door (1) open, and pull down the syringe clamp (2).



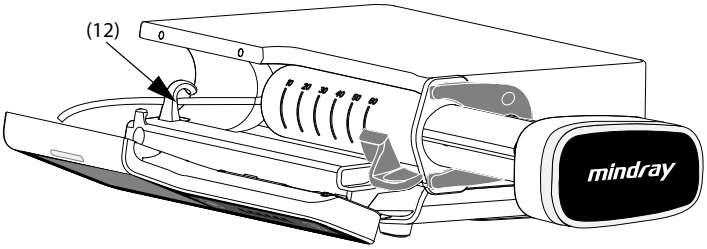
2. Place the syringe into the syringe slot (3), ensuring that the barrel flange (4) is in the space between the pump and the flange retainer (5).



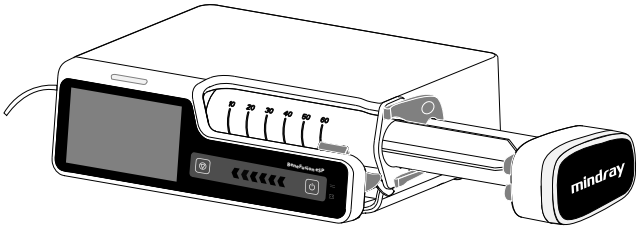
3. Lift the syringe clamp (6) until it locks the syringe barrel (7). The driver head (8) automatically slides left until it reaches the plunger (9) end, and the plunger grippers (10) automatically squeezes the plunger flange (11).



4. Place the extension line into the extension set holder (12)



5. Close the pump door.



If the syringe is properly loaded, the syringe pump automatically identifies the syringe size and displays the volume in the brand selection area.

WARNING

- **Check that the syringe and the extension set are securely connected and there is no leakage.**
- **It is recommended that standard, single-use extension sets and syringes with Luer lock connections are used.**
- **We recommend you to use syringes and extension sets of the types and brands stated in this manual. If a non-recommended syringe must be used, perform the calibration and performance test before use. Otherwise, the accuracy of the infusion and the performance of the pump may be adversely affected.**
- **To ensure the accuracy of rate and alarm detection, the syringe size and brand should be calibrated using this pump before first use.**
- **The pump must be mounted within 51 ± 5 cm above the patient's heart. The most accurate pressure monitoring in the extension set is achieved when the pump is positioned close to the patients heart level.**
- **As the volume of fluid contained in the extension set and retained in the syringe at the end of infusion will not be infused, allow for this "dead space" volume when initially loading the syringe.**
- **Single use accessories are not designed to be reused. Reuse may cause a risk of contamination and affect the measurement accuracy.**

CAUTION

- **Secure the extension set using the extension set holder. This provides protection against accidental dislodging of the syringe from the pump.**

NOTE

- **The extension set and the pump should be placed in the same horizontal level before connected to the patient.**

4.4 Starting Infusion

The setup screen displays after the syringe is loaded properly.

1. Select the drug. If the prescribed drug is not available, exit the drug selection screen, or select **Other Drug**.
2. If required, set the infusion mode. For more information, see chapter ***8 Infusion Modes***.
3. Set infusion parameters.

12.6 The Brand Management

Menu Item	Default Setting	Function
Common Brand	/	Checks or unchecks the brand, and select **Confirm**. The checked brand will be displayed in the brand list.
Add Brand	/	Adds a brand by this procedure: input the brand name → select a type (**Regular**, or **Light-sensitive**) → select the syringe volume → select **Confirm**. The added brand is displayed in the **Common Brand** menu.
Delete Brand	/	Selects the undesired brand, and select **Confirm** to delete this brand. **Note:** The build-in brand is not allowed to be deleted.
Modify Brand	/	Selects the brand that needs modifying, modify this brand and select . **Note:** The build-in brand is not allowed to be modified.

NOTE

- **Up to 12 brands are available in this pump.**

12.7 The Time and Language Settings

Menu Item	Default Setting	Function
Date	2018/1/1	Sets the current date.
Time	0:00:00	Sets the current time.
Date Format	yyyy-mm-dd	Sets the date format.
24 h	On	Sets the time format. If you want to use the 12-hour mode, switch off 24 hour time.
Language	/	Sets the language. **Note:** This setting is effective after the pump has been restarted.

15 Accessories

The accessories listed in this chapter comply with the requirements of IEC 60601-1-2 when in use with the equipment. For details about the accessories, refer to the instructions for use provided with the accessory.

WARNING

- **Use accessories specified in this chapter. Using other accessories may cause damage to the equipment or not meet the claimed specifications.**

CAUTION

- **The accessories may not meet the performance specifications if stored or used outside the specified temperature and humidity ranges. If accessory performance is degraded due to aging or environmental conditions, contact your service personnel.**
- **Check the accessories and their packages for any sign of damage. Do not use them if any damage is detected.**
- **Use the accessories before the expiry date if their expiry date is indicated.**

PN	Description
0020-20-12522	Power cord, 10A, 250V, 2.5m, International
009-001075-00	Power cord, 250V, 10A, 3m, Brazil
009-001791-00	Power cord, 250V, 16A, 3m, South Africa
009-002636-00	Power cord, 10A, 1.5m, Australia standard
009-007190-00	Power cord, 3m, India
DA8K-10-14452	Power cord, USA
DA8K-10-14453	Power cord, UK
DA8K-10-14454	Power cord, Europe
009-009837-00	Serial port adapting cable
009-009838-00	Nurse call cable
009-011163-00	DC power cord

PN	Description
115-070532-00	Stack rack
115-074974-00	Quick install pole clamp
115-074975-00	Standard pole clamp
045-001434-00	Multi-pump bracket

A Product Specifications

A.1 Classifications

The equipment is classified, according to IEC60601-1:

Type of protection against electrical shock	CLASS I EQUIPMENT, equipment energized from an internal electrical power source.
Degree of protection against electrical shock	Defibrillation-proof type CF applied part (direct cardiac application)
Mode of operation	Continuous
Degree of protection against harmful ingress of water	IP33
Degree of safety of application in the presence of flammable anesthetic mixture with air or with oxygen or nitrous oxide	The equipment is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide
Degree of mobility	Portable

A.2 Environmental Specifications

Item	Temperature (°C)	Relative humidity (noncondensing)	Barometric (kPa)
Operating conditions	5 to 40	15% to 95%	57.0 to 107.4
Storage conditions	–30 to 70	10% to 95%	16.0 to 107.4

Storage Conditions: Corrosive-free and ventilated

WARNING

- **The pump may not meet the performance specifications if stored or used outside the specified temperature and humidity ranges. If the performance of the equipment is degraded due to aging or environmental conditions, contact your service personnel.**

A.3 Power Supply Specifications

A.3.1 External Power Supply Specifications

Item	External AC Power Supply	External DC Power Supply
Voltage	100 VAC to 240 VAC	10 VDC to 16 VDC
Current	0.5A to 0.21A	3 A to 1.88A
Frequency	50/60 Hz	/

A.3.2 Battery

Battery Type	Rechargeable lithium-ion
Run time	At least 11 hours for smart battery and at least 5 hours for normal battery (operating at a rate of 5ml/h, under standard operating conditions*)
Charge time	⩽ 20 hours for smart and normal battery (operating at a rate of 5 ml/h, charged by the Dock) ⩽ 6 hours for smart battery and ⩽ 5 hours for normal battery (the pump is off, and charged by the AC power supply).
Shutdown delay	At least 30 minutes after first low battery alarm (operating at a rate of 5ml/h, under standard operating conditions*)
*Operating with a fully charged new battery at 20°C ± 2°C, screen brightness configured to 2, default volume, Wi-Fi disabled.	

A.4 Physical Specifications

Item	Maximum Weight (kg)	W × H × D (mm)	Remark
Main Unit	⩽ 1.6	⩽ 257x 150 x73	with battery, without accessories

A.5 Hardware Specifications

A.5.1 Displays

Type	Size (diagonal)	Resolution
Color TFT LCD	3.5 inches	⩾ 200x400 pixels

A.5.2 LEDs

Alarm lamp	1 (two color coded: yellow and red)
External power LED	1 (green)
Battery LED	1 (green)

A.5.3 Audio Indicator

Speaker	Gives alarm tones (sound pressure 50 to 65 dB). Supports multi-level tone modulation. Alarm tones comply with IEC 60601-1-8.

A.5.4 Interface Specifications

Power input connector	1
Multifunctional connector	1
USB connector	1

A.5.5 Signal Output Specifications

Multifunctional connector	
Standard	Meets the requirements of IEC 60601-1 for short-circuit protection and leakage current
Nurse Call Signal	
Driving mode	Relay drive
Electric specification	⩽ 60W, ⩽ 2A, ⩽ 36VDC, ⩽ 25VAC
Isolation voltage	>1500VAC
Action mode	Normally open or normally closed (optional)

A.6 Wireless Network

Standards	IEEE 802.11a/b/g/n
Modulation mode	BPSK,QPSK, QAM
Operating frequency	2.412 GHz to 2.484 GHz 5.18 GHz to 5.24 GHz 5.745 GHz to 5.825 GHz
Data rate	IEEE 802.11a: 6 to 54 Mbps IEEE 802.11b: 1 to 11 Mbps IEEE 802.11g: 6 to 54 Mbps IEEE 802.11n: 6.5 to 65 Mbps
Transfer power	< 20 dBm (CE requirement: detection mode – RMS) < 30 dBm (FCC requirement: detection mode – PEAK)
Operating mode	Transmitting data through the wireless access point (AP)
Data security	Standard: WPA-PSK and WPA2-PSK Encryption: TKIP and AES
System capacity	Number of the pumps supported by a single AP: ⩽ 16
Data transmission delay between the pump and the CMS	Total data transmission delay time between the pump and the CMS is ⩽ 8s
Interruption number and time between the pump and the CMS	Total interruption duration ⩽ 0.01* total communication time (Test within 24 hours, with 16 pumps, in which three pumps are roaming for 30 times)
Delay time of network disconnection alarm	⩽ 14 s

A.7 Infusion Specifications

Compatible syringe sizes	1ml, 2ml, 3ml, 5ml/6ml, 10ml/12ml, 20ml, 30ml/35ml, 50ml/60ml (1ml is optional)

Accuracy	Mechanical accuracy: ⩽ ±0.5% Infusion accuracy* (0.01ml/h ⩽ rate < 0.1ml/h): ⩽ ±5% Infusion accuracy* (0.1ml/h ⩽ rate ⩽ 2300ml/h): ⩽ ±1.8% or ± 0.005ml/h, whichever is greater Bolus accuracy: ⩽ ±2% or 0.05ml, whichever is greater (under standard operating conditions, test in accordance with IEC60601-2-24:2012) *Infusion accuracy use Double-Dove and B.Braun Original Perfusor Syringe, under standard operating conditions, test in accordance with IEC60601-2-24:2012)
Set range of the infusion rate/ purge rage/bolus rate	Range of rate: 0.01 to 50ml/h(1ml syringe) 0.01 to 150ml/h (2/3ml syringe) 0.01 to 300ml/h (5/6ml syringe) 0.1 to 800ml/h (10/12ml syringe) 0.1 to 1200ml/h (20ml syringe) 0.1 to 1500ml/h (30/35ml syringe) 0.1 to 2300ml/h (50ml/60ml syringe and 60ml syringe) Resolution: 0.01ml/h (0.01 to 99.99ml/h) 0.1ml/h (100.0 to 999.9ml/h) 1ml/h(1000 to 2300ml/h)
Occlusion pressure	15 levels selectable*: 50 mmHg, 150 mmHg, 225 mmHg, 300 mmHg, 375 mmHg, 450 mmHg, 525 mmHg, 600 mmHg, 675 mmHg, 750 mmHg, 825 mmHg, 900 mmHg, 975 mmHg, 1050 mmHg (not applicable for 50ml/60ml syringe), and 1125 mmHg (not applicable for 50ml/60ml syringe) The maximum occlusion pressure is 1350 mmHg.
* For the 2 ml syringe or syringes larger than 2ml, the selectable pressure ranges are as follows: • 0.01ml/h ⩽ rate < 0.1 ml/h: the selectable levels are 50 to 225 mmHg; • 0.1ml/h ⩽ rate < 100ml/h: the selectable levels are 50 to 1125 mmHg; • 100ml/h ⩽ rate ⩽ 2300ml/h: the selectable levels are150 to 1125 mmHg. For the 1 ml syringe, the occlusion pressure is 975 mmHg.	
Occlusion alarm tolerance	⩽ ±75 mmHg (for 50 mmHg level, 0.01ml/h ⩽ rate ⩽ 100 ml/h) ⩽ ±20% or ±125 mmHg, whichever is greater (for 150 to 1125 mmHg levels, 0.1ml/h ⩽ rate ⩽ 2300ml/h)
Maximum volume (under single fault conditions)	⩽ 0.2ml
KVO rate	0.01 to 5.0ml/h Minimum resolution: 0.01ml/h

Time set range	00:00:01 to 99:59:59
VTBI set range	0.01 to 9999.99 ml Resolution: 0.01ml
Weight set range	0.1 to 499.0 kg/0.2 to1100.1 lb
Drug Amt. set range	0.001 to 99999
Drug Amt. unit set range	ng, µg, mg, g, mU, U, kU, EU, mmol, mol, mcal, cal, kcal, mEq
Volume set range in Dose Time Mode/Dose Mode/TIVA Mode	0.10 to 9999.99ml
Conc. set range	0.001 to 9999.99
Conc. unit set range	ng/ml, µg/ml, mg/ml, g/ml, mU/ml, U/ml, kU/ml, EU/ml, mmol/ml, mol/ml, mcal/ml, cal/ml, kcal/ml, mEq/ml
Dose Rate set range	0.001 to 99999

WARNING

- **The infusion accuracy and pressure detection is affected by viscosity of liquids and disposables used (for example diameter, plunger, material, and needle).**

NOTE

- **The infusion accuracy tests and occlusion pressure tests are performed in accordance with IEC60601-2-24:2012 (test temperature: 20°C ± 2°C).**

A.8 Recommended Syringes

Product Name	Size	Manufacturer
Sterile Hypodermic Syringes for Single Use	1ml, 5ml, 10ml, 20 ml, 30 ml, 50 ml	Double-Dove
B. Braun Original Perfusor Syringe	20ml, 50ml	B. Braun Melsungen AG
B. Braun Omnifix Luer Lok Solo	2ml, 3ml	B. Braun Melsungen AG