

MS37 Plus Syringe Pump

User Manual

Version: 2.2

Contents

1 Symbols, Graphics and Warnings	5
1.1 Descriptions of Graphics and Symbols	5
1.2 Warning	6
2 Terms and definitions	12
3 Brief Introduction and Scope of Application	12
3.1 Brief Introduction	12
3.2 Intended Purpose	13
3.3 Benefits	13
3.4 Risks	14
3.5 Side effects	14
4 Important Features	14
5 Specifications	15
5.1 Basic Specifications	15
5.2 Main Performance	15
5.3 Main Functions and Common Functions	19
6 Structure and Operation Interface	20
6.1 Structural Composition	20
6.2 Display and Operation Interface	22
7 Operation Instructions	23
7.1 Installation of Syringe Pump	23
7.2 Power on and Device Safety Self-test	23
7.2.1 Power on and off	23
7.2.2 Device safety self-test	24
7.3 Quick Use Guide	24










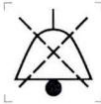
7.3.1 Install/replace syringe	24
7.3.2 Select syringe	25
7.3.3 Set infusion parameters	26
7.3.4 Purge	27
7.3.5 Start infusion	28
7.3.6 Infusion completed	28
7.4 Pause or Stop Infusion	29
7.5 Bolus	30
7.5.1 Automatic bolus	30
7.6 Lock and Unlock Screen Function	31
7.7 Infusion Mode Selection and Setting	31
7.7.1 Dose mode	32
7.7.2 Drug Library mode	34
7.7.3 RTM mode	35
7.7.4 Sequence Mode	36
7.7.5 Loading Dose Mode	37
7.7.6 Intermittent mode	38
7.7.7 Micro mode	39
7.7.8 Relay mode	39
7.8 View Log	39
8 Alarms	40
8.1 No Syringe Alarm	45
8.2 Occlusion Alarm	46
8.3 Empty Of Syringe Alarm	46
8.4 End Of Infusion Alarm	47
8.5 Pusher Setup Fail Alarm	47







8.6 Battery Empty Alarm	47
8.7 Battery&External Power Disconnect Alarm	48
8.8 Motor Error Alarm	48
8.9 Pusher Position Error Alarm	49
8.10 Battery Error Alarm	49
8.11 KVO Alarm	49
8.12 KVO End Alarm	50
8.13 Standby End Alarm	50
8.14 Communication Error Alarm	50
8.15 Call Back Alarm	51
8.16 Low battery Alarm	51
8.17 Near End Of infusion Alarm	52
8.18 Near Empty Of Syringe Alarm	52
8.19 No AC Power Alarm	53
9 System Parameter setting	53
9.1 Bed number	53
9.2 Brightness	53
9.3 Alarm Sound Volume	54
9.4 Occlusion Pressure Level	54
9.5 Bolus Setting	55
9.6 Purge Setting	55
9.7 Call Back Time Setting	55
9.8 KVO Setting	56
9.9 Auto Screen Lock Time	57
9.10 Near End Of Infusion Time Setting	57
9.11 Prime prompt switch	58

9.12 Night mode Setting	58
9.13 Day/Time Setting	58
9.14 History mode switch	59
9.15 Syringe brand	60
9.16 System Maintenance	60
10 Accuracy Calibration for syringe	61
10.1 Enter The Syringe Calibration Page	61
10.2 Accuracy calibration for Syringe	61
11 Precautions for Using Disposable syringe	62
12 Technical Specification	63
13 Restore to factory setting	69
14 Use, Maintenance and Removal of the Internal Battery	70
15 Service and Maintenance	70
16 Waste Disposal	72
16.1 Battery	72
16.2 Syringe sets	72
16.3 Syringe pump	72
17 Electromagnetic Compatibility	72
18 Antistatic Precautions	79
19 Packaging and Accessories	80

1 Symbols, Graphics and Warnings

1.1 Descriptions of Graphics and Symbols

	<p>Caution</p>		<p>Read the User Manual</p>
	<p>Defibrillation prevention Type CF device</p>	<p>RoHS</p>	<p>Compliant to RoHS standards</p>
	<p>Date of manufacturing</p>		<p>Class II device</p>
	<p>Serial Number</p>		<p>Classified collection, uncontrolled discard not allowed</p>
<p>IP24</p>	<p>Ingress Protection Grade</p>		<p>AC (Alternating Current)</p>
	<p>DC (Direct current)</p>		<p>Mute</p>

	<p>Lithium battery</p>		<p>Non-ionizing electromagnetic radiation</p>
	<p>Manufacturer</p>		<p>European Representative</p>
	<p>CE mark demonstrating compliance with RoHS and other EU directives</p>		<p>Medical device marking</p>

1.2 Warning

Please read the following information carefully, operation that does not strictly follow the guidance will possibly damage the device or do harm to patients' health.

- 1) The Syringe Pump is intended for clinical intravenous infusion. It must either be used with a syringe that is from the list of the recommended brands or with one from other brands after calibration is performed on the device.
- 2) Untrained personnel are not allowed to operate the device. The operator must carefully read this User's Manual, so as to prevent medical accidents caused by improper operation.
- 3) To prevent fire or explosion, it is forbidden to use this device in an environment where flammable or explosive matters are present.
- 4) Do not stack and use other devices that may generate external

radio frequency interference or electromagnetic radiation that may affect the safe operation of this device.

- 5) The operator must use the recommended syringe calibrated in accordance with the requirements described in Section 10 Accuracy Calibration for Syringe in this manual, and make sure that the correct syringe brand and type are selected.
- 6) Unauthorized syringes are not recommended to use for infusion, otherwise it may lead to infusion inaccuracy and even become unusable.
- 7) The installation height of this device should not be more than 1 meter above or below the patient's heart. It is recommended that the syringe pump be placed at the same height as the patient's heart when used.
- 8) It is forbidden to reuse the same syringe on another infusion device.
- 9) This device cannot be used as a portable device.
- 10) It is forbidden to use sharp objects to press on the buttons or the touch screen.
- 11) The Syringe Pump must be serviced and calibrated by trained professional technicians. Before maintenance, make sure to unplug the power cable that supplies power to the device. Untrained personnel are strictly prohibited from opening the device casing, otherwise the eligibility for warranty of the device will be lost.
- 12) Please make sure to use only the parts and accessories provided by manufacturers.
- 13) When hit hard or dropped, the pump should not be used until it has been checked by trained technical staff.

- 14) Except for wiping the outer surface of the device according to Section 15 Service and Maintenance in this manual, no other part of the device shall be serviced or maintained by users. If there is any abnormality in the device, please contact the customer service of manufacturers.
- 15) During the use of the device, the device should be placed smoothly and fixed firmly.
- 16) After loading the syringe, the operator is required to check whether the liquid medicine in the syringe leaks. If there is leakage, stop using the syringe and notify the customer service of manufacturers.
- 17) Operator should set the infusion parameters strictly based on the doctor's prescriptions. Mistakes in infusion parameter settings may cause harm to patients.
- 18) When an ordinary syringe is used continuously, the syringe needs to be replaced after the infusion task is completed or the syringe is emptied to maintain a higher injection accuracy.
- 19) The pump will stop operation automatically when there is an alarm. Press the Start/Stop key to resume operation after the alarm causing condition is removed.
- 20) To avoid failure or false alarm caused by a dirty occlusion sensor, operator should wipe clean the pump on a regular basis to keep it clean. Disconnect equipment from MAIN supply before cleaning.
- 21) If the sound pressure level of the audible alarm is less than the environmental noise, the operator should turn the alarm volume up to ensure the alarm sound can be heard.
- 22) Pump or accessories may not be usable if their lifetime for use has expired (the lifetime for pump is 8 years). Contact manufacturers to

upgrade to new products.

- 23) The device has a internal rechargeable lithium battery and its lifetime is 2 years.
- 24) Please check the voltage of the internal battery before using it for pump operation. The battery must be replaced and maintained by trained technical personnel in accordance with Section 14 Use, Maintenance and Removal of the Internal Batteries in this manual. Replacing the battery by personnel without sufficient training will lead to risks such as over temperature, fire or explosion.
- 25) Please do not connect any other device to the USB and Type-C port other than the included DC power adapter shipped with the pump. Do not put the AC/DC adapter above the patient.
- 26) For different types of patients, different occlusion pressure Level should be set. For details, please refer to the doctor's advice.
- 27) Healthcare professional should check on the device during operation on a regular basis, and he/she should also pay attention to medication solution in the infusion set before starting the device to make sure the right medicine is in the right infusion channel.
- 28) When using this device, please do not place the power plug or other independent plug in a difficult place when it is used as a disconnecting measure.
- 29) The needle on the syringe extension line is the application part of this product.
- 30) While in normal operation, an alarm will be triggered if the pump door is opened. Please contact company for service if this alarm fails to appear.
- 31) If the sticker on the screw hole is removed, then consider the fact

that the pump has been tampered with, and discontinue use.

- 32) The product is not AP or APG type device and should not be used in flammable gas environment.
- 33) Don't near active HF SURGICAL device and the RF shielded room of an ME SYSTEM for magnetic resonance imaging, where the intensity of EM DISTURBANCES is high.
- 34) Use of this device adjacent to or stacked with other device should be avoided because it could result in improper operation. If such use is necessary, this device and the other device should be observed to verify that they are operating normally.
- 35) Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this device could result in increased electromagnetic emissions or decreased electromagnetic immunity of this device and result in improper operation.
- 36) Portable RF communications device (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the MS37 Plus, including cables specified by the manufacturer. Otherwise, degradation of the performance of this device could result.
- 37) The EMISSIONS characteristics of this device make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this device might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or reorienting the device.

- 38) The ME device or ME SYSTEM is suitable for professional healthcare facility environments.
- 39) If the device needs to be used on the move (transport within the hospital): make sure the device is securely fixed and placed. If the device is changed in position, or the pump is severely shaken, the accuracy of the infusion may be affected.
- 40) Do not use unapproved cleaners, materials or chemicals as they may damage device surfaces, labels, or cause device failures.
- 41) Do not route LVP supply bag or administration set right above the pump.
- 42) Do not route the administration set in a way that presents tripping hazard and administration set break off.
- 43) Do not change the height of pump during infusion, otherwise the infusion accuracy may be affected.
- 44) When the device is powered by the internal battery, the charging indicator light is blue; When the device is powered through the net power supply, the external power indicator light will turn green. At this time, if the battery is not fully charged, the charging indicator light will turn green at the same time, and the charging indicator light will not turn on when the battery is fully charged.
- 45) Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.
- 46) Do not modify this device without authorization of the manufacturer.
- 47) If this device is modified, appropriate inspection and testing must be conducted to ensure continued safe use of the device.

- 48) If necessary, please contact the company's customer service staff to provide the relevant information of maintenance.

2 Terms and definitions

Operator: A professionally trained and qualified member of medical staff.

Keep vein open (KVO): After infusion is completed based on the preset parameters, the pump will automatically switch to a mode with extremely low flow rate and continue to run (this mode virtually does not have any treatment effect), which is to keep the IV push set and vein unobstructed and to avoid the blood flowing backwards.

Intermediate rate: An infusion flow rate of 5.00 mL/h.

Minimum rate: An infusion flow rate of 1.00 mL/h.

Free-flow: Drug solution is flowing out in an uncontrolled manner under the effect of gravity.

VTBI: Volume to be infusion.

3 Brief Introduction and Scope of Application

3.1 Brief Introduction

MS37 Plus syringe pump is a high-accuracy smart infusion device. It is mainly consisted of an electrical control module and a mechanical actuation module, including subsystems such as a control system, a motor driver system, a sensing and monitoring system, an alarm system, a display system, a power system and etc.

3.2 Intended Purpose

Intended use: By controlling the flow rate, the syringe pump is intended to be used for intravenous therapy at clinical service facilities on adults, pediatrics for the intermittent or continuous delivery of drug solution, medications via IV infusion route. Light and sound alarms help the users use the pumps properly.

Indication for use: N/A.

Contraindications: Not known.

Intended patient population: The target population is adults, pediatrics who need intravenous therapy, no other specific requirements.

Intended users of the device: The device is intended to be used by trained healthcare professionals in medical institution environments.

3.3 Benefits

Expected clinical benefit: Syringe pumps provide a variety of advantages compared to manual IV push, such as:

Automated delivery

Precision dosage

Avoiding medication errors

Reducing the workload of nursing staff

Syringe pumps can deliver much smaller amounts of medicine than a manual IV push.

Thus, the use of syringe pumps could provide reliable, automated, contact-free dosing to patients with severe cases, and this helped to ease the burden on ICU nurses and other clinicians without compromising care quality,

3.4 Risks

Syringe pumps appear to enhance overall safety and care quality compared to manual IV administration, they are not without risk. Design issues, software bugs, and user errors continue to compromise patient safety.

We have carry out risk management throughout the design and development stage.

3.5 Side effects

The unintended bolus of medication might cause possible inflammation and pain at the infusion site and potential source of infection.


4 Important Features

- 1) **Compatible syringe sizes:** A wide range of syringe types can be automatically identified, including 2/3, 5, 10, 20, 30 and 50/60 mL.
- 2) **Accuracy:** The accuracy for both infusion flow rate and volume are kept within 2%.
- 3) **Flow rate:** Infusion flow rate can be adjusted from 0.01 mL/h to 2100mL/h in a continuous manner, which makes MS37 Plus capable of meeting various flow rate requirements in different infusion situations.
- 4) **Touchscreen interface:** Infusion parameters can be set by using the touch screen on the device, even with gloves on.
- 5) **Electric Drive head:** Use electric drive head to eliminate the mechanical gap when the device is started, so that the first drop of liquid medicine can be injected into the patient's body as soon as possible.

- 6) **External power supply:** An external power adapter is used, which not only removes the safety concerns of using an internal switching power source but also makes the device lighter and smaller in size.
- 7) **Battery capacity:** The rechargeable internal high-capacity Lithium battery can support normal operation for 8 hours, which is conveniently helpful during patient transport or power outage.
- 8) **Display:** An LCD touch screen display offers high contrast and great visibility. Clearly visible from 5 meters away.
- 9) **Occlusion removal:** When the infusion line is occluded, the stepper motor will rotate reversely to release the pressure accumulated in the infusion line.

5 Specifications

5.1 Basic Specifications

Dimensions	277mm×136mm×72 mm (width x depth x height)
Weight	1.43 kg
Power supply	Network power supply: ~ 100V-240 V, 50/60 Hz Internal battery:  7.4 V rechargeable Lithium battery
Rate of work	55 VA
Syringe requirements	Refer to Section 11 Precautions for Using Disposable Syringes
Maximum flow rate	2100.00mL/h

5.2 Main Performance

Infusion Rate range	2/3 mL syringe: 0.01-100.00 mL/h;
---------------------	-----------------------------------

	<p>5 mL syringe: 0.01-150.00 mL/h; 10 mL syringe: 0.01-400.00 mL/h; 20 mL syringe: 0.01-600.00 mL/h; 30 mL syringe: 0.01-1000.00 mL/h; 50/60 mL syringe: 0.01-2100.00 mL/h; resolution is 0.01 mL/h.</p>
VTBI range	0 ~ 9999.99 mL with resolution of 0.01 mL
Injection accuracy	±2%
Purge Rate / Bolus Rate	<p>2/3 mL syringe: 1 ~ 100 mL/h; 5 mL syringe: 1 ~ 150 mL/h; 10 mL syringe: 1 ~ 400 mL/h; 20 mL syringe: 1 ~ 600 mL/h; 30 mL syringe: 1 ~ 1000 mL/h; 50/60 mL syringe: 1 ~ 2100 mL/h; resolution is 1 mL/h.</p>
Purge VTBI / Bolus VTBI	0.10mL-50.00mL, with resolution of 0.01 mL.
KVO Rate	<p>This syringe pump provides two KVO modes to ensure venous patency while guaranteeing infusion safety:</p> <p>1.Constant KVO Mode (V_{KVO} rate setting range: 0.10-5.00 mL/h, minimum step value 0.01 mL/h)</p> <p>-When the infusion rate is $>V_{KVO}$: After the infusion task is completed, the pump automatically runs at the V_{KVO} rate to maintain venous patency.</p> <p>-When the infusion rate is $\leq V_{KVO}$: After the</p>

infusion task is completed, the pump continues to run at the infusion rate to maintain venous patency.

2.Variable Speed KVO Mode (V_{KVO} rate setting range: 0.10-5.00 mL/h, minimum step value 0.01 mL/h)

Users need to set the V_{KVO} rate separately for three scenarios:

- (a) $V_{KVO}(>10)$ rate for infusion rates > 10 mL/h,
- (b) $V_{KVO}(1-10)$ rate for infusion rates between 1-10 mL/h, and
- (c) $V_{KVO}(\leq 1)$ rate for infusion rates ≤ 1 mL/h.

The system will automatically matches the KVO rate based on the infusion rate:

-When the infusion rate is > 10 mL/h: After the infusion task is completed, the pump automatically runs at the $V_{KVO}(>10)$ rate to maintain venous patency.

-When the infusion rate is between 1-10 mL/h: After the infusion task is completed, the pump automatically runs at the $V_{KVO}(1-10)$ rate to maintain venous patency.

-When the infusion rate is ≤ 1 mL/h and the infusion rate is $> V_{KVO}(\leq 1)$ rate: After the infusion task is completed, the pump continues to run at the $V_{KVO}(\leq 1)$ rate to maintain venous patency.

-When the infusion rate is ≤ 1 mL/h and the

	infusion rate is $\leq V_{KVO}(\leq 1)$ rate: After the infusion task is completed, the pump continues to run at the infusion rate to maintain venous patency.
Infusion Time range	00:00:00~99:59:59, with resolution of 1 s.
Occlusion threshold	9 levels, with the lowest being 26kPa \pm 20 kPa, and the highest being 130 kPa \pm 20 kPa.
Maximum infusion pressure generated by the device	150 kPa
Triggering time of occlusion alarm and Bolus	<p>When operated at minimum flow rate: < 1 h when the occlusion alarm pressure threshold is set to the lowest pressure; or < 3 h 30 min when the occlusion alarm pressure threshold is set to the highest pressure.</p> <p>When operated at intermediate speed: < 15 min when occlusion alarm pressure threshold is set to the lowest pressure, and the Bolus produced during occlusion is < 0.20 mL; < 45 min, when the occlusion alarm pressure threshold is set to the highest pressure, the Bolus during occlusion is not more than 0.50 mL.</p> <p>(Tested when an occlusion was created 1 meter away from the syringe outlet)</p>
Syringe brand	6 brands of syringes are recommended, including Kangjin, Wego, Kindly, BD, Shinva,

	B.Braun. 10 brands can be customized.
Supported infusion modes	9 modes, RVT mode, Drug Library mode, Loading Dose mode, Micro mode, Dose mode, RTM mode, Sequence mode, Intermittent mode, Relay mode.
Syringe sizes	2/3mL, 5mL, 10mL, 20mL, 30mL, 50/60mL
Battery life	When fully charged, the battery can run continuously for 8h10min in maximum rate(2100.00mL/h).
Alarm Mute Time	2min ± 10s
Call Back Time	1min~60min ± 10s
Classification	Type II CF continuous operating volumetric syringe pump with internal power supply; Grade IP24.
Ambient temperature and humidity	Ambient temperature of transportation and storage: -20 °C ~ + 55 °C Ambient temperature for operation: 5°C ~ + 40 °C Ambient humidity for transportation, storage and operation: 20% ~ 90% Ambient pressure for transportation, storage and operation: 700 hPa ~ 1060 hPa
Software version	MS37 Plus-V1
Service lifetime	8 years

5.3 Main Functions and Common Functions

- 1) Automatic identification for syringe type

- 2) Set infusion flow rate, injection volume preset and real-time data display function
- 3) Displays the function of remaining injection volume and remaining injection time
- 4) Purge/Bolus
- 5) Alarms
- 6) The flow rate will be automatically changed to KVO flow rate after the VTBI complete alarm is activated
- 7) Temporary mute for alarm sound and timer for alarm sound recovery
- 8) Displays the accumulated quantity injected and supports clearance
- 9) A variety of brands for syringes are supported
- 10) Built-in battery, Display battery remaining
- 11) External power adapter
- 12) Contains Dose-Error Reduction Software
- 13) Electric Drive head

6 Structure and Operation Interface

6.1 Structural Composition

The structure of the equipment consists of a pump casing, a motor drive system, an input system, a storage system, a control system, a display system, a sensing and monitoring system, an alarm system and a power supply system.

Names for parts and components:

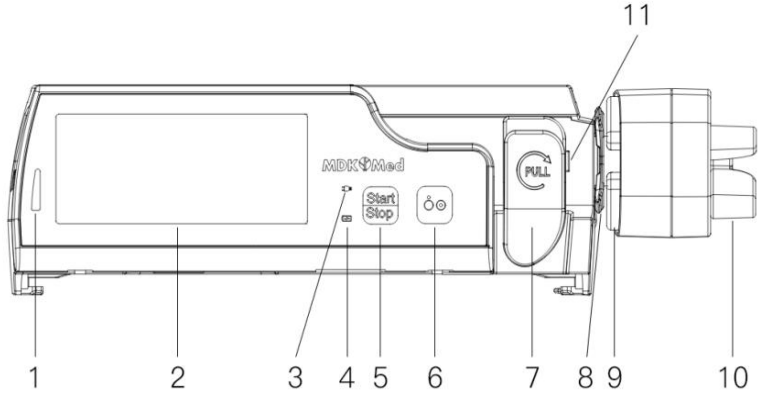


Figure 6-1-1 Front view

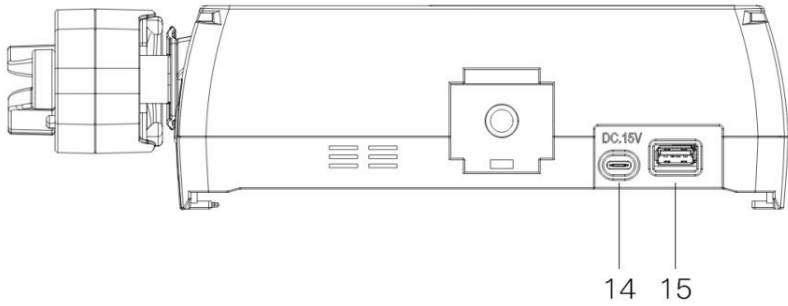


Figure 6-1-2 Rear view

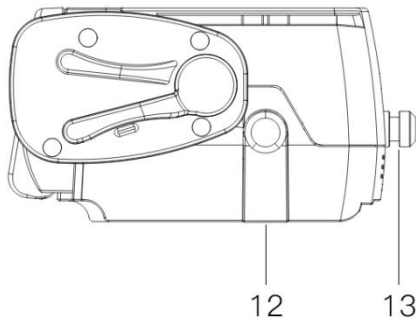


Figure 6-1-3 Side view

1	Operation status indicator	2	Touch screen display	3	External power indicator
4	Charging indicator	5	Start-Stop key	6	Power On/Off key
7	Syringe clamp	8	Stopper plate	9	swing arm
10	Finger grips	11	Syringe in position sensor	12	Stack slot
13	Mounting bolt	14	DC Power port	15	Data Communication port

6.2 Display and Operation Interface

The interface during operation is shown in Figure 6-2.

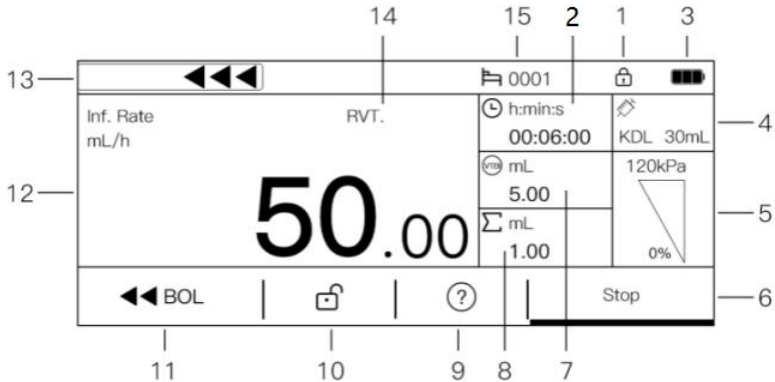


Figure 6-2 Operation interface on the screen

1	Lock screen	2	Time remaining	3	Battery
4	Brand	5	Occlusion pressure	6	Start/Stop button

7	Remaining volume	8	Infused volume	9	more information
10	Unlock	11	Purge/Bolus	12	Rate
13	Infusion stater	14	Infusion mode	15	Bed number

7 Operation Instructions

Install syringe pump → Power on → Device safety self-test
 → Install syringe → Select syringe brand → Parameters setting
 → Prime/Purge → Start infusion → Infusion completed →
 Remove accessories → Power off.

Before infusion starts, please confirm that the syringe in use matches the current syringe setting selected in the menu. Any syringe which brand is not included in the list of recommended brands must be calibrated before being used.

7.1 Installation of Syringe Pump

First loosen the locking screw, install the clamp to the pole of the infusion stand, adjust the height of the clamp, and then tighten the locking screw. The operator must make sure that the syringe pump is positioned in a secure, stable and reliable manner.

7.2 Power on and Device Safety Self-test

7.2.1 Power on and off

Before connecting to the mains power, check if there is any foreign matter inside the power outlets (such as drug solution residue).

Connect to the mains power, check the power indicator on the

pump front panel. If the indicator is not lit up, check the connection of power cable and the pump, or check if there is a power outage. Then press the power button on the front panel to turn the device on.

After infusion therapy is completed, press the power key and click Power-Off button to turn the device off. Do not power off when the device is in operation mode, otherwise the infusion therapy will be stopped.

Please remove the syringe before turning the device off.

7.2.2 Device safety self-test

The pump will perform an automatic safety self-test after powered on, if the test is passed then there will be two short beeps and the operation status indicator will be lit up in stable green color. If a continuous alarming sound is initiated or there is no any sound at all, then the device cannot be used, please contact the customer service at MDKMed immediately.

7.3 Quick Use Guide

7.3.1 Install/replace syringe

After the device is power on, the electric drive head will automatically retreat to the far right to facilitate the next step of loading the syringe.

Open the syringe pump door, pull the syringe clamp out and turn it clockwise for 90° to the horizontal position, place the syringe barrel flange in the slot between the pump casing and the syringe press plate, pull the syringe clamp out again and turn it

counterclockwise for 90° to the upright position, release it to clamp the syringe tight in position; straighten the syringe extension line, place it inside the hook behind the pump door to prevent it from being pressed, then close the pump door. When the device detects that the syringe clamp pressed the syringe, the drive head automatically moves from right to left to the place where the syringe presses the hand.

As disposables, syringes must be replaced after being used for once.

To replace the syringe, the device should be stopped, open the syringe pump door, Pinch and hold the finger grips on the drive head, slide it to the right and release the finger grips, pull the syringe clamp out and rotate it 90° clockwise, remove the syringe and the extension line.

7.3.2 Select syringe

After the syringe pump is powered on and the safety self-test is passed, Syringe specifications will be monitored continuously. When the syringe is properly installed, the syringe brand confirmation page will be entered. The brand and model of the syringe will be identified and displayed on the screen. You can also click the Brand button in the upper right corner to enter the syringe brand selection page.

After clicking a syringe to make a selection, the system will automatically return to the parameter setting page. Please check if the syringe displayed on the right side of the screen matches the set that is being used.

It is possible that the syringes from the same brand may have different characteristics if they are from different lots, which will affect their injection accuracy if they are not calibrated before use. In that case, calibration of the syringe is recommended, which is described in Section 10.2 Accuracy Calibration for Syringes.

Syringe Brands		
KDL 30mL		^
		—
		v
		—
		↶

Figure 7-3-2 Syringe brand confirmation

7.3.3 Set infusion parameters

General method:

When the syringe pump is standby, click "☑" on the touch screen to enter the RVT mode parameter setting interface. Click "Inf. rate" on the touch screen, a numeric button board appears on the screen, click to enter the value of the flow rate to be set, and press "√" on the screen to complete the input.

Setting the injection volume and infusion time is the same as setting the infusion rate above.

Quick setting method:

When the syringe pump is standby, click "Inf. rate" on the touch screen, and a numeric button board appears. Click to enter the value of the flow rate to be set, and press "√" on the screen to

complete the input.

RVT.			
Inf. Rate	---	mL/h	✓
VTBI	---	mL	
Inf. Time	--:--:--	H:M:S	
			↶

Figure 7-3-3-1 Set infusion parameters

1	2	3	⌫
4	5	6	↶
7	8	9	✓
.	C	0	

Figure 7-3-3-2 Input values using keypad

7.3.4 Purge

When the pump is standby, confirm that the tube is disconnected from the patient and click the Bolus button. The device pops up "Please disconnect tube!", after clicking "✓" on the touch screen, the device will run at the flow rate and total amount set by the system, quickly purge the air in the infusion pipeline. Click the pause button can stop purging. Repeat until there are no bubbles.

The total amount of the purge is not included in the infused volume statistics of the infusion note.

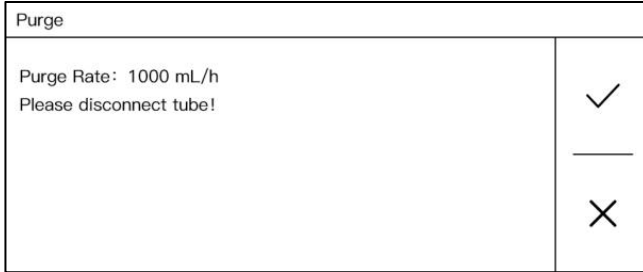


Figure 7-3-4 Purge syringe

7.3.5 Start infusion

Press the Start-Stop key or click the start button and the pump will start to operate according to the set infusion parameters, as shown in the following figure.

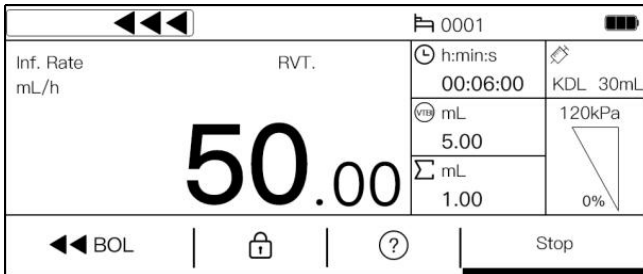


Figure 7-3-5 Infusion operation interface

7.3.6 Infusion completed

When the total injection volume (the incremental of infused volume) reaches the set value, the device completes the infusion.

If KVO is turned on, the device will convert to the KVO flow rate to continue running automatically and trigger high priority alarm at the same time, make an alarm sound. Click the "✓" on the touch screen to exit the KVO infusion status.

If KVO is not turned on, the device will trigger an "End Of Infusion" alarm, accompanied by an high priority alarm sound. Click the "√" on the touch screen eliminates alarm.

After the infusion is completed, remove the infusion accessories that are no longer used following the steps described in Section 7.3.1. Press the power on/off key, click power-off button to turn off the device. Pull the ring on the base of the mounting clamp upward and pull the syringe pump body outward to remove it.

7.4 Pause or Stop Infusion

Infusion normal operation status see Figure 7-3-5.

Press the Start-Stop key or click the stop button during infusion operation can pause the operation, as shown in the following figure.

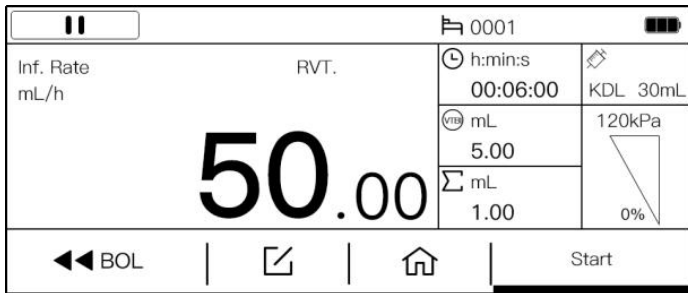


Figure 7-4 Infusion pause

On the Infusion pause page, Press the Start-Stop key or click the start button again can start the device operation, and the device will will continue to infuse the remaining volume based on the set flow rate.

During the infusion pause, any parameter of the infusion flow rate, total volume, and time is modified will be considered a new

infusion task, and when Press the Start-Stop key or click the start button again, the infusion task will be completed according to the new infusion parameters.

When the device triggers an alarm, makes an alarm sound, presses the "Mute" button on the screen can pause the alarm sound, and after 2 minutes, if the alarm source is not lifted, the alarm sound is automatically restored.

7.5 Bolus

7.5.1 Automatic bolus

In the infusion operation state, click the "Bolus" button, enter the Hand Off Bolus page, set the bolus parameters, press the "√" button, the syringe pump enter into bolus infusion state until the bolus injection volume is completed, the syringe pump returns to the normal infusion state continue the infusion, the bolus volume is included in the infusion accumulative volume.

Hand Off Bolus			
Bolus Rate	---	mL/h	✓
Bolus VTBI	---	mL	
Bolus Time	--:--:--	H:M:S	
			↩

Figure 7-5-1-1 Bolus Settings interface

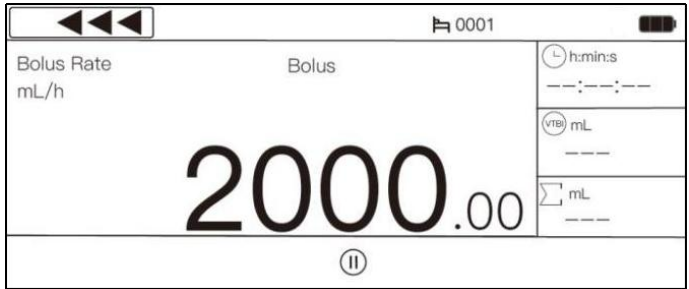


Figure 7-5-1-2 Bolus running interface

7.6 Lock and Unlock Screen Function

The device automatically locks the screen after running for a period of time. When the device is in the lock screen, clicking the screen will pop up a prompt on whether to unlock the screen, click the "✓" button to unlock the screen.

Auto Lock time settings See Home - Setting - Auto Screen Lock.

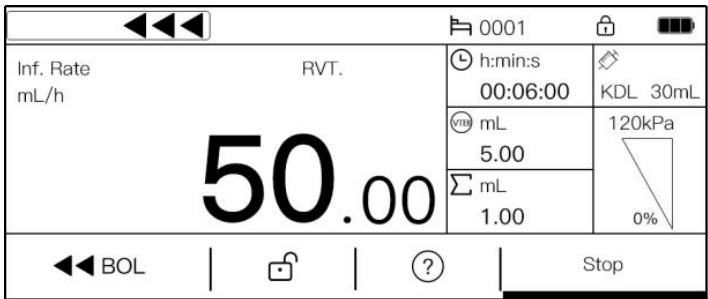


Figure 7-6 Lock Screen

7.7 Infusion Mode Selection and Setting

Except for the RVT mode on the home screen, there are 8 infusion modes on the Infusion Mode page: Drug Library mode,

Loading Dose mode, Micro mode, Dose mode, RTM mode, Sequence mode, Intermittent mode, Relay mode. Relay Mode can be used in infusion workstation.

In the RVT setting page, the infusion rate, injection volume and infusion time can be set in a variety of combinations, forming the following four combinations of infusion mode: rate + volume (R+V) Mode , rate + time (R+T) Mode, volume + time (V+T) Mode, rate (R) Mode.

Therefore, there are 11 different infusion modes for the device in total.

The setting of the RVT mode should follow the instructions in the 7.3 "Quick Use Guide" above. The settings for the other modes are outlined below.

7.7.1 Dose mode

Enter the Dose mode settings interface, as shown in the following figures. After setting the Dose, Solution, Concentration, Dose Rate, Weight, VTBI and Infusion Rate, click " $\sqrt{\quad}$ " to confirm the parameters and return to the infusion interface, and then the dose mode infusion runs after pressing the Start-Stop key or clicking the start button.

In the main interface of Dose mode, click the "unit" in the upper left corner to switch the display of "Dose Rate" and "Infusion rate".

Dose	1/2		
Dose	---	mg	✓
Solution	---	mL	^
Conc.	---	mg/mL	✓
Dose Rate	---	mg/kg/h	↶

Figure 7-7-1-1 Dose mode setting 1

Dose	2/2		
Weight	---	kg	✓
VTBI	---	mL	^
Inf. Rate	---	mL/h	✓
			↶

Figure 7-7-1-2 Dose mode setting 2

In the Dose Mode Settings interface, click "Unit" to the right of any parameter in "Dose", "Concentration" and "Dose Rate" to select different unit expression modes, and the other two corresponding units will be automatically adjusted.

Concentration and Infusion Rate are calculated as follows:

Concentration calculation formula:

$$\text{Concentration(mg/mL)} = \frac{\text{Dose (mg)}}{\text{Solution (mL)}}$$

Infusion rate calculation formula:

Infusion Rate(mL/h)

$$= \frac{\text{Dose Rate (mg/kg/h)} \times \text{weight (kg)} \times \text{Solution (ml)}}{\text{Dose (mg)}}$$

$$\text{Infusion Rate (mL/h)} = \frac{\text{Dose Rate (mg/h)} \times \text{Solution (ml)}}{\text{Dose (mg)}}$$

7.7.2 Drug Library mode

Enter the drug library mode settings interface. First, select the name of the drug that requires infusion, and then select the specific specifications of the drug.

The device goes to the drug library mode settings page and automatically brings in the drug-related parameters. At this point, the drug name and drug specifications are displayed in the title bar of the parameter settings page. Once the parameters are set, click the "√" button to confirm the infusion parameters, press the Start-Stop button or click the Start button to start the infusion.

ADREnaline		1/2	
Conc.	---	mg/mL	✓
Weight	---	kg	^
Dose Rate	---:--	mg/kg/mL	∨
Inf. Rate	---	mL/h	↶

Figure 7-7-2-1 Drug library mode setting 1

ADREnaline		2/2	
VTBI	---	mL	✓
			^
			∨
			↶

Figure 7-7-2-2 Drug library mode setting 2

The Drug library mode has built-in DERS(Dose-error Reduction Software) functionality to reduce medication errors and improve infusion safety.

7.7.3 RTM mode

Enter the RTM mode(Ramp and Taper Mode) settings interface, as shown in Figure 7-7-3.

RTM.		1/2	
Total Time	---:---:---	H:M:S	✓
Up Time	---:---:---	H:M:S	^
Dwon Time	---:---:---	H:M:S	∨
VTBI	---	mL	↶

Figure 7-7-3-1 RTM mode setting 1

RTM.		2/2	
Plateau Rate	---	mL/h	✓
			^
			∨
			↶

Figure 7-7-3-2 RTM mode setting 2

In the RTM mode parameters, the total amount, up time, and down time must be set. Plateau rate and total time can be calculated automatically after setting one of them. After parameter

setting, press the Start-Stop button or click the Start button to start the infusion.

7.7.4 Sequence Mode

Enter the Sequence Mode settings interface to set the number of sequences (up to 10 groups), click the "∨" button to enter the infusion parameter settings interface, as shown below.

Sequence		1/3
Seq. Count	1	✓
		^
		∨
		↶

Figure 7-7-4-1 Sequence Mode Setting 1

Sequence		2/3
S1-Inf. VTBI	--- mL	✓
S1-Inf. Time	--:--:-- H:M:S	^
S1-Inf. Rate	--- mL/h	∨
		↶

Figure 7-7-4-2 Sequence Mode Setting 2

Sequence		3/3
Total VTBI	--- mL	✓
Inf. Time	--:--:-- H:M:S	^
		∨
		↶

Figure 7-7-4-3 Sequence Mode Setting 3

As shown in the figure, flow rate, time, volume, any two of the three parameters are set to automatically calculate another parameter.

After setting 1 to 9 different infusion parameters according to clinical needs, click the "√" button to confirm the infusion parameters, press the Start-Stop button or click the Start button to start the infusion.

When the device completes the Group 1 infusion parameter, the flow rate is automatically switched to complete the 2nd set of parameters until all the setup parameters are completed the infusion.

7.7.5 Loading Dose Mode

Enter the Loading Dose mode settings interface.

Loading Dose		1/2	
VTBI	---	mL	✓
Loading VTBI	---	mL	^
Loading Rate	---	mL/h	∨
Maintain Rate	---	mL/h	↶

Figure 7-7-5-1 Loading Dose mode setting 1

Loading Dose		2/2
Loading Time	---	mL/h
Maintain Time	--:--:--	H:M:S
		✓
		^
		∨
		↶

Figure 7-7-5-2 Loading Dose mode setting 2

As shown in the figure, two groups of infusion rate and time are set respectively, when the device completes the Group 1 infusion parameter, automatically switch the flow rate to complete the 2nd set of parameters, and the 2nd set of infusions is completed ,the device stops running.

7.7.6 Intermittent mode

Enter intermittent mode settings interface.

As shown in the figure, set the single VTBI volume, single infusion rate, infusion interval time and maintain infusion flow rate. After the device is started, the infusion will start at the single rate. When the infused volume is equal to the single VTBI volume, the device will automatically continue infusion according to the maintain rate. When the maintain rate is set to 0, the device will suspend operation. The device operates at maintain rate until the infusion time is equal to the interval time. Then, the device will automatically switch to the single rate to continue infusion. This cycle is repeated.

Intermittent			
Single VTBI	---	mL	✓
Single Rate	---	mL	
Inter Time	---	mL/h	↶
Maintain Rate	---	mL/h	

Figure 7-7-6 Intermittent mode

7.7.7 Micro mode

Enter Micro mode settings interface. Set two of the three parameters of infusion rate, total infusion, and infusion time, the device automatically calculates the third parameter (The infusion rate should not exceed 100mL/h). After the device is started, the infusion starts at the set infusion rate. When the infused volume is equal to the total infusion, the infusion will be stopped automatically.

When the user only sets the infusion rate, device runs at the infusion rate until the user stops the infusion or the device triggers a high priority alarm to stop the infusion.

7.7.8 Relay mode

The MS37 Plus Syringe Pump can be installed on our infusion workstation for advanced application functions such as relay infusion and drug library management through the Infusion Information Collection System.

7.8 View Log

On the Home - Event Log Page, event logs such as device

infusion status and alarm can be displayed. Click this event can view the detailed event information such as infusion flow rate, total volume, time, Alarm priority and time.

Through the infusion information collection system, all infusion and alarm log information can be stored and queried in unlimited, and the log information can be printed out on the Internet to facilitate the needs of medical management.

With the Pump Log APP,you can connect your device to your phone, download logs to your phone for administrative viewing, printing, and more.

8 Alarms

Alarm refers to the infusion changes caused by the abnormal infusion circuit or the failure of the syringe pump itself, which leads to the failure of the infusion to the patient. The syringe pump prompts the medical staff through sound, light, screen signs and other ways.

Alarm classification prompts of the equipment:

No.	Alarm	Priority	Alarm category	Alarm conditions
8.1	No syringe	High	Latching	1. Syringe fall off . 2. The syringe rear barrel ear is not mounted between the syringe pump housing and the syringe pressure plate.

8.2	OCCL (Occlusion)	High	Latching	When the infusion line is occluded.
8.3	Empty Of Syringe	High	Latching	When the syringe is pushed to the end.
8.4	End Of Infusion	High	Latching	The cumulative amount of a single time reaches the preset amount.
8.5	Pusher Setup Fail	High	Latching	When pump is running, the syringe push handle without touch the pressure conduction block.
8.6	Battery Empty	High	Latching	When the internal battery is running out.
8.7	Battery&Ext ernal Power Disconnect	High	Unlatching	When the device is running, the battery/external power is disconnected at the same time.
8.8	Motor Err.	High	Latching	In the event of a motor failure.
8.9	Pusher Position Error	High	Latching	The actual injection volume exceeded the expected injection volume during the machine is running

8.10	Battery Error	High	Latching	The device does not detect battery signal or battery disconnect when plug in the external power.
8.11	KVO	High	Latching	The infusion is complete and the KVO is turned on.
8.12	KVO End	High	Latching	KVO Status Run for 30 minutes when the KVO task is complete.
8.13	Standby End	High	Latching	When standby is end.
8.14	Com. Err. (Communication error)	High	Latching	Monitor the CPU for communication handshake errors.
8.15	Call Back	Low	Unlatching	There is no operation when powering on the machine for the set time.
8.16	Low battery	Low	Unlatching	When the internal battery power is low.
8.17	Near End Of Infusion	Low	Unlatching	When the remaining time is less than or equal to the preset alarm time.
8.18	Near Empty Of Syringe	Low	Unlatching	The remaining volume of the syringe should

				be less than 10% or the time from emptying should be less than 3 minutes.
8.19	No AC Power	Low	Unlatching	Disconnect external power and use the battery running.

The device alarm indicator characteristics:

Alarm priority	Indicator color	Flicker frequency		Rate
High priority	Red	2Hz	0.7Hz (Battery & External Power Disconnect)	50%
Medium priority	/	/		/
Low priority	Yellow	Normally turned on		100%

High-priority and low-priority alarms are distinguished in sound and light according to standard requirements. When an alarm occurs, the operator can accurately detect it at 1m away from the alarm system. The delay time of triggering the alarm signal is not more than 2s.

After powering on, the status indicator lights up, and the device automatically conducts a safety check. After passing the self-check, you will hear two short beeps of "DiDi", which means that the alarm system is normal. If the status indicator does not light up or you hear a continuous alarm sound or no prompt sound after booting, it

means that the alarm system is faulty and the equipment cannot be used normally. It can be put into use after being repaired.

The sound pressure range of the audible alarm signal is 60-95dB.

Note that this device prohibits access to the change or storage change alarm function. In the process of adjusting the alarm limit or alarm preset, the operation of the alarm system still runs according to the last setting. This equipment alarm is a technical alarm state.



caution

Latching alarm signal: The alarm signal that continues to be generated after the trigger event no longer exists, and does not stop until the operator deliberately acts (click the "√" button);

Unlatching alarm signal: When the related trigger event is no longer When it exists, automatically stop the alarm signal generated.

Device alarm announcement sequence:

High priority alarm sound priority principle, that is, when the device is in the low priority alarm sound state, when a high priority alarm is generated, the original low priority alarm sound is interrupted, the high priority alarm sound is broadcast, and the high priority alarm sound is displayed at the same time Level alarm prompt information.

The device is in a high priority alarm. When a low priority alarm is generated, the high priority alarm continues to broadcast without being interrupted.

The device is in low priority alarm. When a low priority alarm is generated, it still reports a low priority tone and displays the latest alarm prompt information.

The device detects that a visual alarm and an audible alarm appear immediately.

When the power loss time is less than 30 seconds, the alarm settings before the power loss will automatically restore.



8.1 No Syringe Alarm

Cause: When the syringe clamp is accidentally pulled open while the device is running, or when the syringe rear clamp is not installed between the syringe pump casing and the stopper plate, the device will trigger an alarm, stop running, make a high priority alarm sound, the screen appear with the message "No syringe" and the operation status indicator flash red at the same time.

Solution: Click the "✓" button on the screen to clear the alarm, the word "No syringe" disappears, and returns to the infusion pause interface. Check the syringe clamp and reinstall the syringe to continue using.

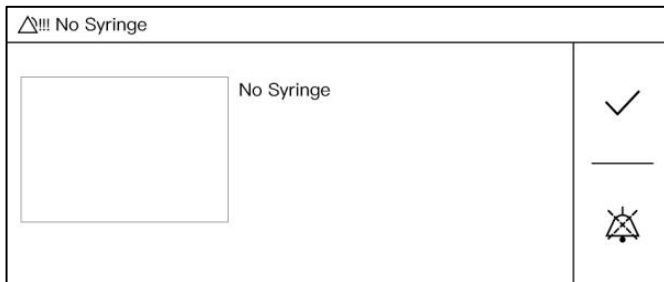


Figure 8-1 No Syringe Alarm

8.2 Occlusion Alarm

Cause: When the infusion line is occluded, occlusion sensor detects that it is exceeding the set value, the device will trigger an alarm, stop running, make a high priority alarm sound, the screen appear with the message "OCCL" and the operation status indicator flash red at the same time.

At the same time, as a infusion safety protection mechanism, the motor reverses back to pump a small amount of liquid medicine to reduce the dose of the bolus before occlusion relief.

Solution:

- 1) Click the "√" button on the screen to clear the alarm and the message "OCCL" disappear.
- 2) Check whether the syringe extension line is bent, whether the patient presses into the syringe extension line and other issues, eliminate the problem and restart the infusion.
- 3) If there is still an occlusion alarm, open the pump door, remove the syringe, replace the syringe and restart the infusion.

8.3 Empty Of Syringe Alarm

Cause: When the remaining liquid amount of syringe is 0, the device will trigger an alarm, stop running, make a high priority alarm sound, the screen appear with the message "Empty Of Syringe" and the operation status indicator flash red at the same time.

Solution: Click the "√" button on the screen to clear the alarm and the message "Empty Of Syringe" disappears. After reinstalling a new syringe with enough of the same drug, press the Start/Stop

key or the start button to complete the remaining infusion tasks.

8.4 End Of Infusion Alarm

Cause: When the accumulated injection volume shown in the display window reaches the preset value, the device will trigger an alarm, stop running, make a high priority alarm sound, the screen appear with the message "End Of Infusion" and the operation status indicator flash red at the same time.

As a infusion security mechanism, if the user turns on the KVO feature, the device will automatically convert to "KVO" flow rate to continue the infusion.

Solution: Click the "√" button on the screen to clear the alarm and the message "End of Infusion" disappears. The device can be set up and used again.

8.5 Pusher Setup Fail Alarm

Cause: When the syringe pump is running, the finger grips of the drive head was accidentally pinched and pulled out, result in the syringe push handle without touch the pressure conduction block, the device will trigger an alarm, stop running, make a high priority alarm sound, the screen appear with the message "Pusher Setup Fail" and the operation status indicator flash red at the same time.

Solution: Click the "√" button on the screen to clear the alarm sound and the message "Pusher Setup Fail" disappears. Check the drive head, reinstall the syringe to continue using.

8.6 Battery Empty Alarm

Cause: When the internal battery is running out, the device will trigger an alarm, stop running, make a high priority alarm sound, the screen appear with the message "Battery Empty" and the operation status indicator flash red at the same time, and the device will stop running and power off after 3 minutes.

Solution: Power should be supplied immediately from external power. When plugged in, the battery charge light goes on and the battery starts charging. When the battery is fully charged, the battery charge indicator goes out.

8.7 Battery&External Power Disconnect Alarm

Cause: When the syringe pump is running, the external power is disconnected, and the battery is completely exhausted or the battery is removed, the device will trigger an alarm, the screen is black, the operation status indicator flash red at the same time, and the sound and light continue to alarm for 3 minutes before the device automatically power off.

Solution: Use external power supply or battery supply.

8.8 Motor Error Alarm

Cause: When an error is detected in the motor feedback signal (too slow or too fast, or wrong direction of motor operation etc.), or the sensor detection of push handle position does not match the cumulative amount of infusion, the device will trigger an alarm, stop running, make a high priority alarm sound, the screen appear with the message "Motor Error" and the operation status indicator flash red at the same time.

Solution: Click the "√" button on the screen to clear the alarm. Start the infusion again, still report the fault alarm, please contact our service personnel.

8.9 Pusher Position Error Alarm

Cause: When the syringe pump is running, the actual injection volume exceeds the expected injection volume, the device will trigger an alarm, stop running, make a high priority alarm sound, the screen appear with the message "Pusher Position Error" and the operation status indicator flash red at the same time.

Solution: When the alarm of "Pusher Position Error" occurs, click "√" button on the screen to clear the alarm sound. Check the drive head and syringe specifications, reinstall the syringe to continue using.

8.10 Battery Error Alarm

Cause: When the external power is inserted on the device, the device does not detect the battery signal or the battery is disconnected unexpectedly, the device will trigger an alarm, stop running, make a high priority alarm sound, the screen appear with the message "Battery Error" and the operation status indicator flash red at the same time.

Solution: Click "√" button on the screen to clear the alarm sound. Press the Power on/off key to shut down the device and restart the device. If the fault alarm is still reported, please contact our service personnel.

8.11 KVO Alarm

Cause: Start infusion until end of infusion. When KVO is turned on, the device will trigger high priority alarm and sound alarm. "KVO" will appear on the top of the screen, and the operation status indicator will flash red at the same time.

Solution: Click the "√" button on the screen to clear the alarm. The message "KVO" disappear. The device can be reset according to operating steps.

8.12 KVO End Alarm

Cause: The KVO state runs for 30 minutes. When the KVO task is completed, the device will trigger high priority alarm and sound alarm. The message "KVO End" will appear on the top of the screen and the operation status indicator will flash red at the same time.

Solution: Click the "√" button on the screen to clear the alarm. The message "KVO End" disappear. The device can be reset according to operating steps.

8.13 Standby End Alarm

Cause: Start standby and set a short time. When the standby is over, the device will trigger high priority alarm and sound alarm. "Standby End" will appear on the top of the screen and the operation status indicator will flash red at the same time.

Solution: Click the "√" button on the screen to clear the alarm.

8.14 Communication Error Alarm

Cause: When the communication of the device monitoring

CPU is incorrect, the device will trigger an alarm, stop running, make a high priority alarm sound, the screen appear with the message "Communication Error" and the operation status indicator flash red at the same time.

Solution: Long press and hold the power on/off key to shut down the device after restarting, still report the fault alarm, please contact our service personnel.

8.15 Call Back Alarm

Cause: When the equipment is ready to start infusion, but infusion is not performed, if the user does not operate within the preset time, the device will trigger an alarm, make a low priority alarm sound, "Call Back" will appear on the top of the screen and the operation status indicator steady on yellow at the same time.

Solution: Click the "√" button on the screen to clear the alarm.

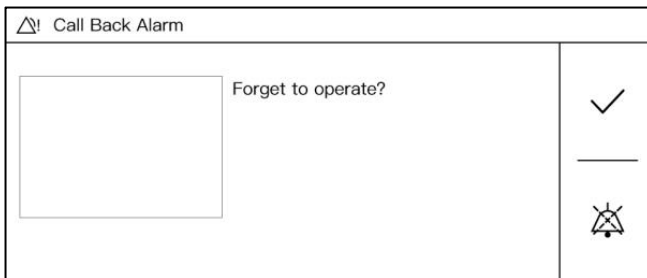


Figure 8-15 Call Back Alarm

8.16 Low battery Alarm

Cause: When the internal battery is low, the device will trigger an alarm, make a low priority alarm sound, the screen appear with the message "Low Battery" and the operation status indicator

steady on yellow at the same time. If the syringe pump is infusion, the device will not stop infusion.

Solution: Power should be supplied immediately from external power. When plugged in external power, the battery charge indicator lights up, the battery starts charging, and the message "Low battery" disappears, the battery icon shows the dynamic effect of charging. When the battery is fully charged, the battery charge light goes out.

8.17 Near End Of infusion Alarm

Cause: When the remaining time less than the preset alarm time, the device will trigger an alarm, make a low priority alarm sound, the screen appear with the message "Near End Of Infusion" and the operation status indicator steady on yellow at the same time, and the syringe pump continues to infusion does not stop.

Solution: Click the "√" button on the screen to clear the alarm. Focus on the amount of fluid remaining in the syringe pump and the time remaining, and wait for the syringe pump infusion to complete.

8.18 Near Empty Of Syringe Alarm

Cause: If the device is running at the current rate, when the remaining volume of the syringe should be less than 10% or the time from emptying should be less than 3 minutes, the device will trigger an alarm, make a low priority alarm sound, the screen appear with the message "Near Empty Of Syringe" and the operation status indicator steady on yellow at the same time, and

the syringe pump continues to infusion without stopping.

Solution: Click the "√" button on the screen to clear the alarm. Pay attention to the amount of remaining liquid in the syringe and replace the syringe in time.

8.19 No AC Power Alarm

Cause: When the device is powered on with battery and without the external power, the device will trigger an alarm, make a low priority alarm sound, the screen appear with the message "No AC Power" and the operation status indicator steady on yellow at the same time.

Solution: Click the "√" button on the screen to clear the alarm.

9 System Parameter setting

9.1 Bed number

The Bed number can be set on the Home-Setting- Bed number page.

9.2 Brightness

On the Home- Setting- Bright page, brightness of the display can be adjusted between 1 and 10 by clicking on the + or – sign on the upper left or upper right corner. After brightness setting is completed, click the "√" button to return to the previous page.

User to evaluate the environment to determine appropriate display brightness setting.

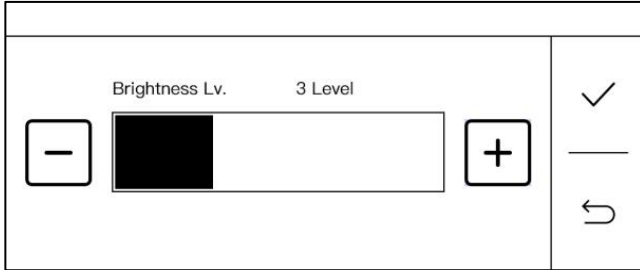


Figure 9-2 Brightness setting

9.3 Alarm Sound Volume

Alarm sound volume can be set on the Home- Setting- Volume- page. Drag the slider along the horizontal axis between 1 and 5 to adjust the volume, which can also be done by clicking on the + or – sign. After sound volume setting is completed, click the "✓" button to return to the previous page.

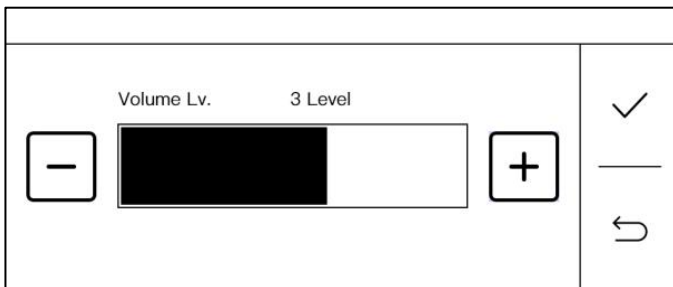


Figure 9-3 Volume setting

9.4 Occlusion Pressure Level

The occlusion pressure Level can be set on the Home- Setting- Level Setting page. Click + or - sign on the screen to choose a pressure level. Click the "✓" button to return to the previous page.

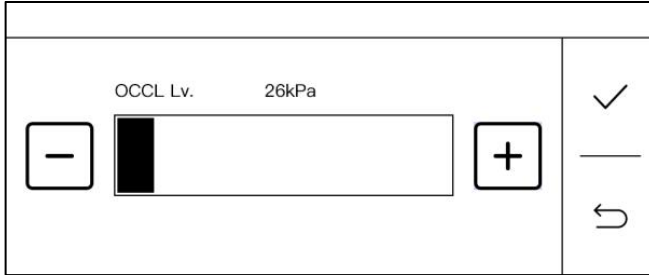


Figure 9-4 Occlusion pressure level setting

Level	1	2	3	4	5	6	7	8	9
OCCL value	26kPa	39kPa	52kPa	65kPa	78kPa	91kPa	104kPa	117kPa	130kPa

9.5 Bolus Setting

The flow rate and volume for bolus can be set on the Home-Setting- bolus page. Click on the flow rate or volume to set their values respectively.

9.6 Purge Setting

The flow rate and volume for purge can be set on the Home-Setting- Purge page. Click on the flow rate or volume to set their values respectively. The values set in the Purge setting will not affect the flow rate and volume in Bolus mode.

9.7 Call Back Time Setting

On the Home- Setting- Call Back Time page, can set the call back alarm time for placing the device when the device is not running.

9.8 KVO Setting

On the Home- Setting - KVO page, set the KVO Mode and KVO Rate after the End Of Infusion.

Select the Constant KVO mode and the device will operate according to the currently set KVO Rate.

Select the Adaptive KVO mode, the device will automatically determine the KVO Rate level according to the current Infusion rate of the infusion operation, and run according to the KVO Rate of the currently set Infusion rate level.

Constant KVO Mode (V_{KVO} rate setting range: 0.10-5.00 mL/h, minimum step value 0.01 mL/h)

-When the infusion rate is $>V_{KVO}$: After the infusion task is completed, the pump automatically runs at the V_{KVO} rate to maintain venous patency.

-When the infusion rate is $\leq V_{KVO}$: After the infusion task is completed, the pump continues to run at the infusion rate to maintain venous patency.

Variable Speed KVO Mode (V_{KVO} rate setting range: 0.10-5.00 mL/h, minimum step value 0.01 mL/h)

Users need to set the V_{KVO} rate separately for three scenarios:

- (a) $V_{KVO}(>10)$ rate for infusion rates > 10 mL/h,
- (b) $V_{KVO}(1-10)$ rate for infusion rates between 1-10 mL/h, and
- (c) $V_{KVO}(\leq 1)$ rate for infusion rates ≤ 1 mL/h.

The system will automatically matches the KVO rate based on the infusion rate:

-When the infusion rate is > 10 mL/h: After the infusion task is completed, the pump automatically runs at the $V_{KVO}(>10)$ rate to

maintain venous patency.

-When the infusion rate is between 1-10 mL/h: After the infusion task is completed, the pump automatically runs at the $V_{KVO}(1-10)$ rate to maintain venous patency.

-When the infusion rate is ≤ 1 mL/h and the infusion rate is $> V_{KVO}(\leq 1)$ rate: After the infusion task is completed, the pump continues to run at the $V_{KVO}(\leq 1)$ rate to maintain venous patency.

-When the infusion rate is ≤ 1 mL/h and the infusion rate is $\leq V_{KVO}(\leq 1)$ rate: After the infusion task is completed, the pump continues to run at the infusion rate to maintain venous patency.

9.9 Auto Screen Lock Time

On the Home- Setting- Auto Screen Lock page, set the time for displaying the screen and entering the lock state when the device infusion is running.

If you set the lock screen time to 0, you can turn off the auto-lock screen function.

You can also manually lock the device by clicking the "Lock screen" button at the lower left corner of the running status screen when the device infusion is running. The screen is locked. Click the "Unlock" button on the screen to unlock it. In a locked screen, except for the power button and unlock button, other buttons and screen areas are unavailable.

9.10 Near End Of Infusion Time Setting

The near end of infusion time can be set on the Home- Setting- NEOI page.

9.11 Prime prompt switch

On the Home- Setting- Prime prompt switch page, can choose whether to enable the Prime prompt, if this function is enabled, the "Prime" prompt page will appear when a new infusion task starts after each syringe change.

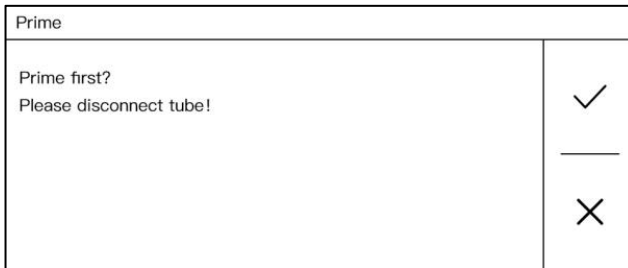


Figure 9-11 Prime prompt

9.12 Night mode Setting

On the Setting- System Maintenance- Night Mode page, can set the brightness or sound volume for daytime or nighttime, the setting method is the same as that for brightness and sound level. When completed, restart the device.

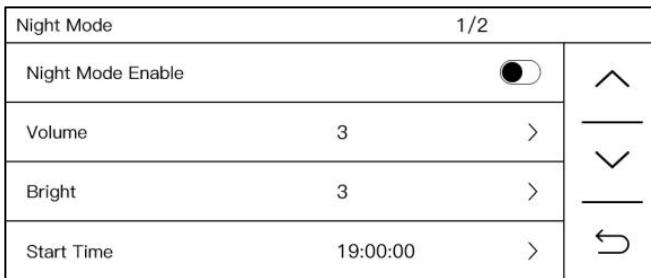


Figure 9-12 Night mode setting

9.13 Day/Time Setting

The device of Time and date can be set on the Setting - System Maintenance- Date/Time page.

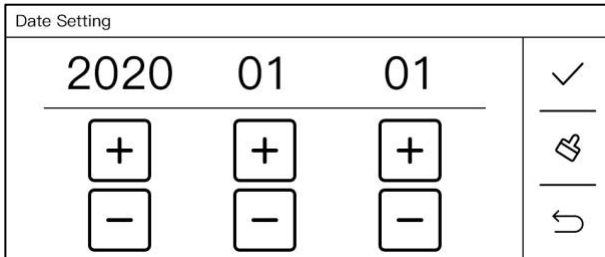


Figure 9-13-1 Date Setting

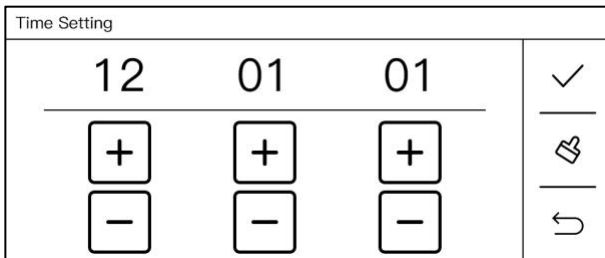


Figure 9-13-2 Time Setting

9.14 History mode switch

On the Home- Setting- History mode switch page, can choose whether to enable the History mode, if this function is enabled, the "Sure to load last treatment?" prompt page will be displayed after each power on.

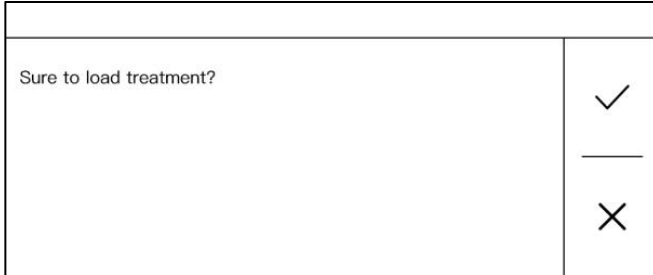


Figure 9-12 Sure to load last treatment

9.15 Syringe brand

When the device is not running, click the syringe brand on the upper right corner of the interface, select the corresponding syringe name, and the device will return to the infusion page. The selected brand for the syringe will be shown on the upper right corner of the infusion page, which can remind the operator to use the right syringe to maintain high injection accuracy. Below are the compatible syringe brands of the device.

SN	Brand
1	Kangjin
2	Wego
3	Kindly
4	BD
5	Shinva
6	B.Braun

The calibration operation of corresponding syringes, see Section 10.2 Accuracy calibration for Syringe.

9.16 System Maintenance

Maintain the device in "Setting - System Maintenance", including the calibration of syringe accuracy, system time settings, system language settings, factory resets, etc. Entering the system maintenance interface requires entering the engineer's maintenance password, password please consult the company's sales and service personnel.

Syringe precision calibration operation instructions see Section 10 of this manual.

10 Accuracy Calibration for syringe

Using an uncalibrated brand model specification syringe, or a calibrated syringe that has been calibrated but belongs to a different production batch, calibrate the accuracy of this syringe before use. The syringe is recalibrated every 6 months during normal use of the device.

10.1 Enter The Syringe Calibration Page

The accuracy of the syringe is calibrated in "Setting - System Maintenance - Consumables Maintenance - Calibration Consumables".

10.2 Accuracy calibration for Syringe

- 1) The operation is the same as normal infusion, install the syringe first, place the scalp needle in a 10mL measuring tube with scale, and enter the System Maintenance - Consumables Maintenance - Calibration Consumable page.
- 2) Click Brand, select the syringe brand that needs to be calibrated,

and return to the page of Calibration consumable.

3) Click Specification, select the syringe specification that needs to be calibrated, note that select the same as specification for the current syringe, and return to the page of Calibration consumable.

4) Click Calibration Start/Stop, and the remaining volume of Volume Output appears on the same line, The remaining volume is gradually reduced until complete.

5) View the amount of solution(take the concave surface of the liquid as standard) in the measuring cylinder (minimum range 10mL, accuracy 0.2mL) , click "√" at right to turn the page to the last page, and enter the actual amount of solution in the Volume Output.

6) Click OK, the selection interface appears, select "√" to enter the save data waiting interface, wait for the save to be completed and automatically return to the page of consumable maintenance; select "X" to return to the calibration page without saving the current consumable calibration data.

7) After the calibration is completed, return to normal infusion to verify whether the accuracy of the syringe accuracy is accurate.

11 Precautions for Using Disposable syringe

The device is to be used in combination with syringe sets so as to achieve its intended use.

It's suggested to use the recommended Syringe sets. The ambient temperature should be kept at least at 5°C or above when a recommended Syringe is used. The injection accuracy will be

compromised if ambient temperature is lower than 5°C.

The recommended Syringe sets are listed in the table below:

No.	Brand	Injection accuracy	Ambient temperature
1	Kangjin	±2%	+5°C ~ +40°C
2	Wego	±2%	+5°C ~ +40°C
3	Kindly	±2%	+5°C ~ +40°C
4	BD	±2%	+5°C ~ +40°C
5	Shinva	±2%	+5°C ~ +40°C
6	B.Braun	±2%	+5°C ~ +40°C

The syringe used must have a medical device product registration certificate, and the syringe specifications are selected in the same specification as the recommended syringe brand. Syringe Installation Methods See 7.3.1 Install/replace syringe.

In order to ensure injection accuracy, when the ambient temperature changes significantly, the equipment needs to be re-calibrated, calibration method See Section 10 Accuracy Calibration for Syringe.

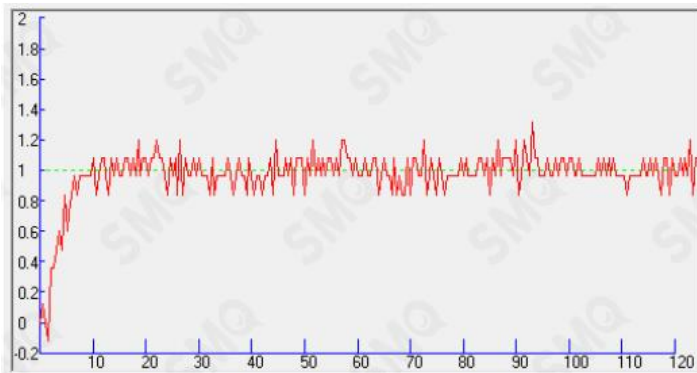
Please strictly follow the requirements described in Section 10 to calibrate and use the Syringe when change to a new Syringe from a different manufacturer. Otherwise, the injection accuracy may be compromised.

12 Technical Specification

According to IEC 60601-2-24 standard, we tested and obtained the trumpet and flow rate graphs under the conditions of 1mL, 5mL, positive and negative back pressure, etc. The specific

data are reflected in the IEC 60601-2-24 test reports, and the relevant graphs will update in this section accordingly.

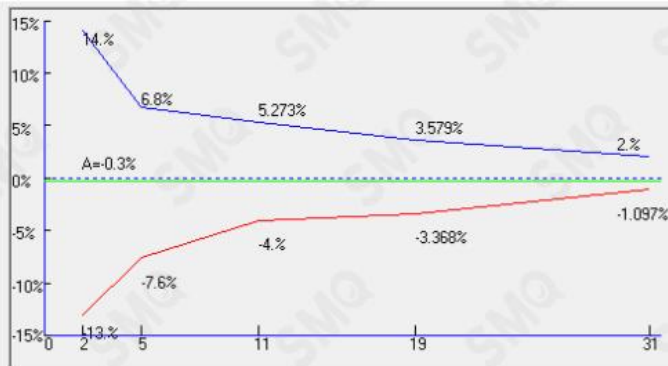
- 1) The methods of controlling Bolus volume before occlusion: The pressure in the occlusion pipeline is released to control the bolus volume by controlling the inversion of the stepper motor.
- 2) Storage time for the electronic memory after power off: same as the product lifetime.
- 3) The maximum volume that the pump can deliver under a single fault condition: 0.3 mL.
- 4) Device calibration is measured in ml.
- 5) Minimum flow rate performance curve (1 mL/h)
 - a. The rising curve for KDL syringe with the minimum flow rate during the first two hours of operation.



In the above figure, the dashed line shows the set flow rate (1 mL/h in this figure), and the solid line is the continuous connection line for the average flow rate during a sampling period.

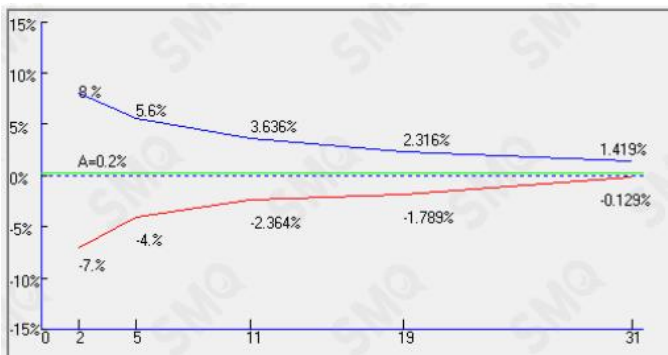
- b. The trumpet curve for KDL syringe with the minimum flow rate

during the second hour of operation.



The dashed line in green color is the final value that the infusion error of the device is eventually converging to. The solid blue line above the dashed line is the maximum positive deviation during the second hour of operation. The solid red line below the dashed line is the maximum negative deviation during the second hour of operation.

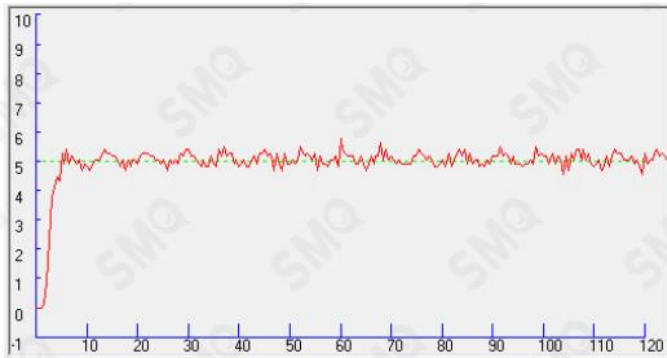
- c. The trumpet curve for KDL syringe with the minimum flow rate during the last hour of the run.



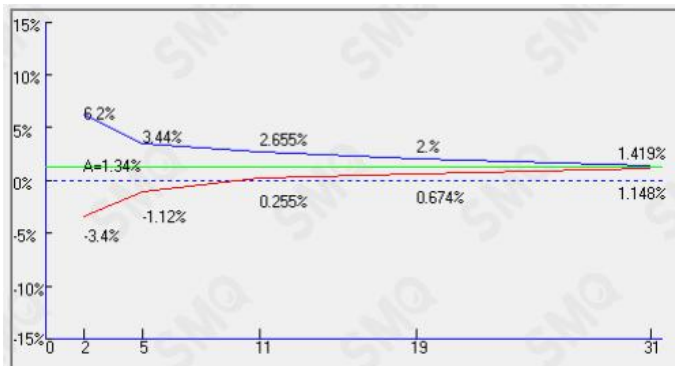
The green dashed line is the value where the device perfusion error finally converges. The solid blue line above the dashed line is

the maximum positive deviation within the hour of the run. The solid red line below the dashed line is the maximum negative deviation within the last hour.

- 6) Intermediate flow rate performance curve (5 mL/h)
 - a. The rising curve for KDL syringe with the intermediate flow rate during the first two hours of operation.



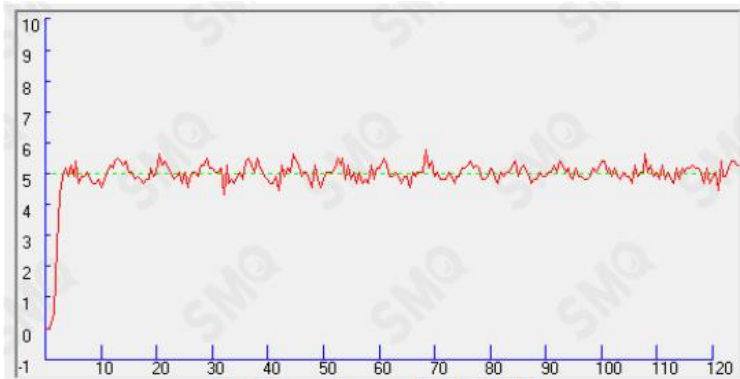
- b. The trumpet curve for KDL syringe with the intermediate flow rate during the second hour of operation.



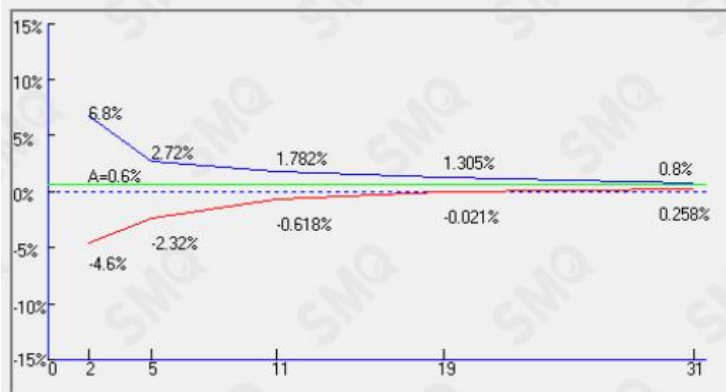
- c. The trumpet curve for KDL syringe with the intermediate flow rate during the last hour of the run.



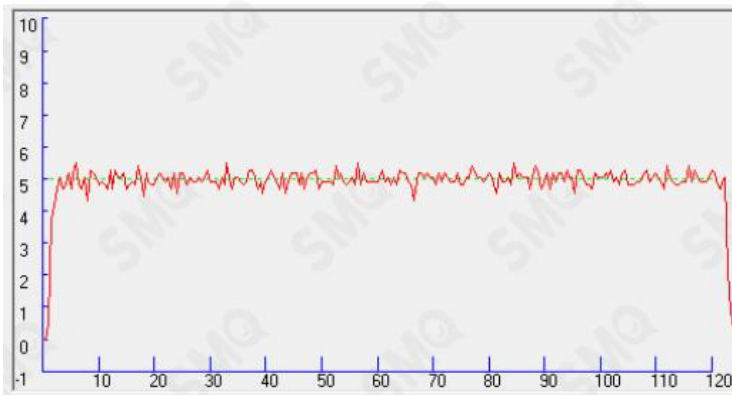
- 7) Intermediate flow rate and back pressure +13.33kPa performance curve
 - a. The rising curve for KDL syringe with the Intermediate flow rate and back pressure +13.33kPa during the first 2h of the test period.



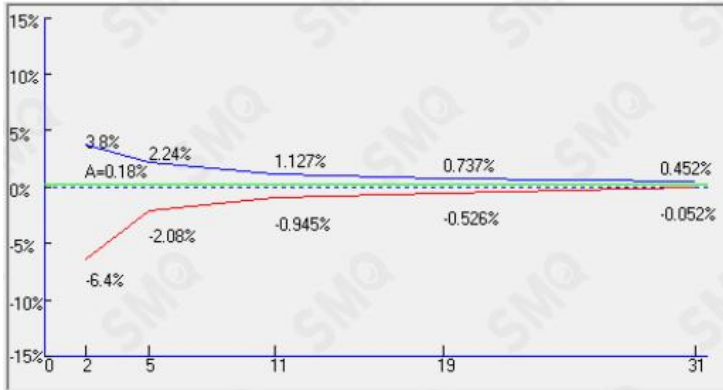
- b. The trumpet curve for KDL syringe with the Intermediate flow rate and back pressure +13.33kPa during the second hour of the test period.



- 8) Intermediate flow rate and back pressure -13.33kPa performance curve.
- a. The rising curve for KDL syringe with the Intermediate flow rate and back pressure -13.33kPa during the first 2h of the test period.



- b. The trumpet curve for KDL syringe with the Intermediate flow rate and back pressure -13.33kPa during the second hour of the test period.



13 Restore to factory setting

Default factory setting as below:

No.	Parameter	Factory presets
1	Brightness level	Level 3
2	System sound level	Level 3
3	Night mode sound level	Level 3
4	Night mode brightness level	Level 3
5	Occlusion pressure level	56kPa
6	Night mode	Close
7	Infusion mode	Rate mode
8	KVO	Constant KVO
9	KVO rate	1.00 mL
10	Call Back Time	2 min
11	Near End Of Infusion time	5 min
12	Auto screen lock time	5 min
13	Night mode start time	19:00:00
14	Night mode end time	09:00:00
15	Bolus rate	1200.00 mL/h

16	Purge rate	1200.00 mL/h
17	Bolus volume	5.00 mL
18	Purge volume	15.00 mL

14 Use, Maintenance and Removal of the Internal Battery

The device has an internal rechargeable lithium battery with the following specification: 21700/4800mAh*2PCS.

Daily maintenance of the battery:

When the pump is not used for a long time, the internal battery should be fully charged at least once for every 3 months by connecting the device to the mains power to help saving the battery life.

Contact the customer service at MDKMed immediately if the internal battery cannot be charged or cannot work normally. Do not disassemble it by yourself. For the healthcare providers who have the ability to repair a device, MDKMed will provide training to the related personnel from these facilities. Then a device can be disassembled and the battery can be changed at these facilities. Use only recommended batteries.

The device has a internal disposable coin cell battery designed to last longer than 8 years, when the set time is exceeded, need to be disposed with the device in accordance with the instructions for waste disposal in this manual 16.

15 Service and Maintenance

Check the pump before use:

- 1) Check if there are foreign objects inside the power outlet (such as

drug solution residue). Confirm that the system has passed the self-test after the pump is powered on.

- 2) Select the correct syringe type. check the battery level. Charge the battery if necessary.

During use:

- 1) To avoid giving an incorrect dosage of drug to a patient, please disconnect the pump from the patient before changing a device.
- 2) Please make sure that the infusion line is not kinked. Insert the needle to the vein on a part of the patient's body where it is not likely to be squeezed or pressed.
- 3) To prevent the spilled drug solution on the pump surface from getting into the inside of the device, wipe it dry immediately if there is a spill.

Storage and daily maintenance:

- 1) To keep the device clean, wipe it clean for at least once a month, which can prevent the corrosion caused by the drug solution and avoid the mobility of the mechanical parts being affected by the dried solution.
- 2) Disconnect equipment from patient before cleaning or service. Use a clean and damp cloth or an alcohol pad to wipe clean the device. Take caution to avoid any liquid from entering the device.
- 3) Check the low power alarm time of the equipment at least once a month, and make the equipment standby when the power is low in non-clinical use. Start timing when you hear the alarm of "low battery", and the alarm time should be more than 30 minutes.

Disinfection method:

If disinfection is required, commonly used disinfectants can be

used. After using the disinfectant, after wetting with a soft cloth in water, wring out the soft cloth for scrub treatment. When using disinfectants, follow their instructions.

16 Waste Disposal

16.1 Battery

Please follow local regulations to dispose of used batteries.

16.2 Syringe sets

After use, please dispose of the syringe sets in accordance with the relevant medical waste disposal regulations.

16.3 Syringe pump

This device is designed to last 8 years and should be scrapped after it has exceeded the lifetime. End-of-life syringe pumps can be sent back to the dealer who sold the product or to the Company for proper recycling.

17 Electromagnetic Compatibility

Special precautions regarding Electromagnetic Compatibility (EMC) are required for this equipment. Must install and use in accordance with the electromagnetic compatibility information specified in this instruction.

Portable and mobile RF communication devices may have an impact on this device.

Must use the cables and accessories provided together with the equipment, and the cable information as follows:

The name of the cable	Length
-----------------------	--------

The power adapter	2.9 m
-------------------	-------

In addition to cables (transducers) sold as spare parts for internal components, the use of accessories and cables (transducers) other than specified may result in an increase in equipment or system emission or a decrease in immunity.

Devices or systems should not be used close to or stacked with other devices, and if they must be accessed or stacked, observe to verify that they can run normally in the configuration they are using.

The basic performance is to operate on a network power supply (including an internal battery) connection.

Name	Specific Description
The network power supply (including the internal battery) is connected to run	At intermediate rate 5.00mL/h, the total $\geq 10\text{mL}$, start normal operation, injection accuracy error less than $\pm 2\%$ and the process runs normally, there should be no abnormal phenomena and failures.

Note: The emissions characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

Guidance and manufacture’s declaration – electromagnetic emission
The syringe pump MS37 Plus is intended for use in the electromagnetic environment specified below. The customer or the user of the syringe pump MS37 Plus should assure that it is used in such and environment.

Emissions test	Compliance
RF emissions CISPR 11	Group 1
RF emissions CISPR 11	Class A
Harmonic emissions IEC 61000-3-2	Not applicable
Voltage fluctuations / flicker emissions IEC 61000-3-3	Not applicable

Guidance and manufacture's declaration – electromagnetic immunity

The syringe pump MS37 Plus is intended for use in the electromagnetic environment specified below. The customer or the user of syringe pump MS37 Plus should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level
Electrostatic discharge (ESD) IEC 61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV signal input/output	±2 kV for power supply lines Not Applicable
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode Not Applicable
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0 % UT; 0,5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°. 0 % UT; 1 cycle and 70 % UT; 25/30 cycles; Single phase: at 0°. 0 % UT; 250/300 cycle	0 % UT; 0,5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°. 0 % UT; 1 cycle and 70 % UT; 25/30 cycles; Single phase: at 0°. 0 % UT; 250/300 cycle
Power frequency (50/60Hz) magnetic field	30 A/m 50Hz/60Hz	30 A/m 50Hz/60Hz

IEC 61000-4-8

Note: U_T is the a.c. mains voltage prior to application of the test level.

Guidance and manufacture's declaration – electromagnetic immunity

The syringe pump MS37 Plus is intended for use in the electromagnetic environment specified below. The customer or the user of syringe pump MS37 Plus should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level
Conducted RF IEC61000-4-6	3 V 0,15 MHz – 80 MHz 6 V in ISM bands between 0,15 MHz and 80 MHz	3 V 0,15 MHz – 80 MHz 6 V in ISM bands between 0,15 MHz and 80 MHz
Radiated RF IEC61000-4-3	3 V/m 80 MHz – 2,7 GHz	3 V/m 80 MHz – 2,7 GHz

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

^a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the syringe pump MS37 Plus is used exceeds the applicable RF compliance level above, the syringe pump MS37 Plus should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the syringe pump MS37 Plus.

^b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Guidance and manufacturer's declaration - electromagnetic Immunity

The syringe pump MS37 Plus is intended for use in the electromagnetic environment

specified below. The customer or the user of the syringe pump MS37 Plus should assure that it is used in such an environment.

Radiated RF IEC61000-4-3 (Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communications equipment)	Test Frequency (MHz)	Band a) (MHz)	Service a)	Modulation b)	Modulation b) (W)	Distance (m)	IMMUNITY TEST LEVEL (V/m)
	385	380-390	TETRA 400	Pulse modulation b) 18 Hz	1,8	0,3	27
	450	380-390	GMRS 460, FRS 460	FM c) ± 5 kHz deviation 1 kHz sine	2	0,3	28
	710	704	LTE	Pulse modulation b) 217 Hz	0,2	0,3	9
	745	-	Band				
	780	787	13, 17				
	810	800	GSM 800/900	Pulse modulation b) 18 Hz	2	0,3	28
	870	-	,				
	930	960	TETRA 800, iDEN 820, CDMA 850, LTE Band 5				

	1720	1	GSM	Pulse modulati on b) 217 Hz	2	0,3	28
	1845	700	1800;				
	1970	– 1 990	CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS				
	2450	2 400 – 2 570	Bluetoot h, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulati on b) 217 Hz	2	0,3	28
	5240	5	WLAN				
	5240	100	802.11				
	5785	– 5 800	a/n				

NOTE: If necessary to achieve the IMMUNITY TEST LEVEL, the distance between the transmitting antenna and the ME EQUIPMENT or ME SYSTEM may be reduced to 1 m. The 1 m test distance is permitted by IEC 61000-4-3.

a) For some services, only the uplink frequencies are included.

b) The carrier shall be modulated using a 50 % duty cycle square wave signal.

c) As an alternative to FM modulation, 50 % pulse modulation at 18 Hz may be used because while it does not represent actual modulation, it would be worst case.

The MANUFACTURER should consider reducing the minimum separation distance, based on RISK MANAGEMENT, and using higher IMMUNITY TEST LEVELS that are appropriate for the reduced minimum separation distance. Minimum separation distances for higher IMMUNITY TEST LEVELS shall be calculated using the following equation:

$$E = \frac{6}{d} \sqrt{P}$$

Where P is the maximum power in W, d is the minimum separation distance in m, and E is the IMMUNITY TEST LEVEL in V/m.

Guidance and manufacturer’s declaration - electromagnetic Immunity

The syringe pump MS37 Plus is intended for use in the electromagnetic environment specified below. The customer or the user of the syringe pump MS37 Plus should assure that it is used in such an environment

Radiated fields in close proximity IEC61000-4-39 (Test specifications for ENCLOSURE PORT IMMUNITY to proximity magnetic fields)	Test Frequency	Modulation	IMMUNITY Test Level (A/m)
	30 kHz	CW	8
	134.2 kHz	Pulse modulation 2.1 kHz	65
	13.56 MHz	Pulse modulation 50 kHz	7.5

Guidance and manufacturer’s declaration - electromagnetic Immunity

The syringe pump MS37 Plus is intended for use in the electromagnetic environment specified below. The customer or the user of the syringe pump MS37 Plus should assure that it is used in such an environment

Radiated fields in close proximity IEC61000-4-39 (Test specifications for ENCLOSURE PORT	Test Frequency	Modulation	IMMUNITY Test Level (A/m)
	30 kHz	CW	8
	134.2 kHz	Pulse modulation 2.1 kHz	65

IMMUNITY to proximity magnetic fields)	13.56 MHz	Pulse modulation 50 kHz	7.5
--	-----------	----------------------------	-----

18 Antistatic Precautions

The MS37 Plus Syringe pump has been tested and comply with medical device standard IEC 60601-1-8.

When using this device, the user should not touch the pins of connectors marked with an electrostatic discharge warning symbol and should not connect to these connectors unless electrostatic discharge precautions are used.

The operator should be aware of the following things:

a) Unless appropriate preventive measures have already been taken, do not use hand or hand tool to touch connectors with electrostatic discharge warning signs. Preventive measures include:

1. Methods for preventing electrostatic charge accumulation (such as air conditioning, air humidification, floor conductive coating or synthetic clothing);
2. Discharge electrostatic charge from human body to the framework of equipment, or to the ground, or to a large piece of metal;
3. Use a wrist band to connect human body to the equipment or to the ground.

b) All staff who may be in contact with connectors with electrostatic discharge warning signs should receive training, including all clinical/biomedical engineering and healthcare personnel.

c) Electrostatic discharge training should include the introduction of static charges in the theory of physics, the voltage that may be produced in normal practice, and the damage to the

electronic components caused by the electrostatic charge from an operator. Further, methods for how to prevent electrostatic charge accumulation should be provided, as well as how and why to discharge the electrostatic from human body to the framework of equipment or to the ground, and how to use wrist band to connect someone’s body to the equipment or to the ground.

19 Packaging and Accessories

The list of recommended accessories for use with this device (single unit) is as follows:

Attachment	Quantity	Unit
User manual	1	Book
Power adapter	1	Set
Other accessories can be found in the packing list.		



Legal manufacturer: MDKMed Medical Technology Co., Ltd.

Address: 502A, Building 7, No. 22, Xinyan Road, Donghu Street,
Linping District, Hangzhou City, Zhejiang Province, P. R China 311323

After sale service: MDKMed Medical Technology Co., Ltd.

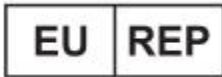
Tel: 400-880-8392

Email: sales@graseby.com

Web: <http://www.graseby.com>

Revision date: 07-08-2025

Part No.: 07.01.0218A



European Authorized Representative:

MedNet EC-REP C IIb GmbH

Borkstrasse 10

48163 Münster, Germany