

User Manual

Triumph SP12 Syringe Pump

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1. Safety Instructions

Warnings



- Before using, please check the equipment. Connect the power cord and accessories to ensure that it works normally and safely. If there's anything abnormal, immediately stop using the equipment and contact Triumph Medical Service Department. Additionally, the adhesion or intrusion of fluid/drug may possibly cause the equipment fault and malfunction. Therefore, please clean the equipment after use, and store it correctly.
- This equipment must be operated by trained professional medical care personnel.
- This equipment is not applicable to blood transfusion.
- It is not allowed to put and use the equipment in the environment with anesthetic and other inflammable or explosive articles to avoid fire or explosion.
- It is not allowed to store or use the equipment in the environment with active chemical gas (including gas for disinfecting) and moist environment. This may influence the inside components of the syringe pump and may possibly cause performance drop or damage of the inside components.
- The operator shall guarantee that the inputted infusion parameters of this equipment are the same as the medical advice before starting infusion.
- Please do not only depend on alarm system during use, please periodically check the equipment to avoid accident.
- If the syringe extension tube is twisted, filter or needle is obstructed, or there is blood in the needle which may obstruct the syringe then the pressure in the tube will rise. When removing such occlusion, it may possibly cause "bolus injection" (temporary excess infusion) to the patient. The correct method is to tightly hold or clamp the extension tube near the puncturing position, then loosen the tube, solve the reason of occlusion, and restart infusion. If infusion is restarted when the occlusion reason exists, then this may cause occlusion alarm persistently. The pressure in the syringe tube may keep rising, and may break or cut off the tube, or hurt the patient.
- This equipment has the occlusion detection function for detecting and alarming when the syringe needle deviates the position in the vein or the needle is not correctly punctured in the vein. However, it only alarms when the occlusion pressure has reached certain numerical values. The puncturing part may possibly have become reddish, swelling or bleeding. It is possible that the device doesn't alarm for a long period if the actual occlusion pressure is lower than the alarm threshold value, therefore, please periodically check the puncturing site. If there's any abnormal phenomenon for the puncturing site, please take suitable measures

- Only sterile hypodermic syringes for single use and other medical components that meet the local laws and regulations and the requirements covered in and this User Manual can be used. It is suggested to adopt the syringe with same brand as defaulted in this equipment. Accuracy cannot be guaranteed if an unsuitable syringe line is used. Please use the syringe and the extension tube with a luer lock.
- It is not allowed to disassemble or refit this equipment or use it for other purposes except normal infusion.
- No one is allowed to repair this equipment except Triumph Medical Services.
- To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth

2. Specifications

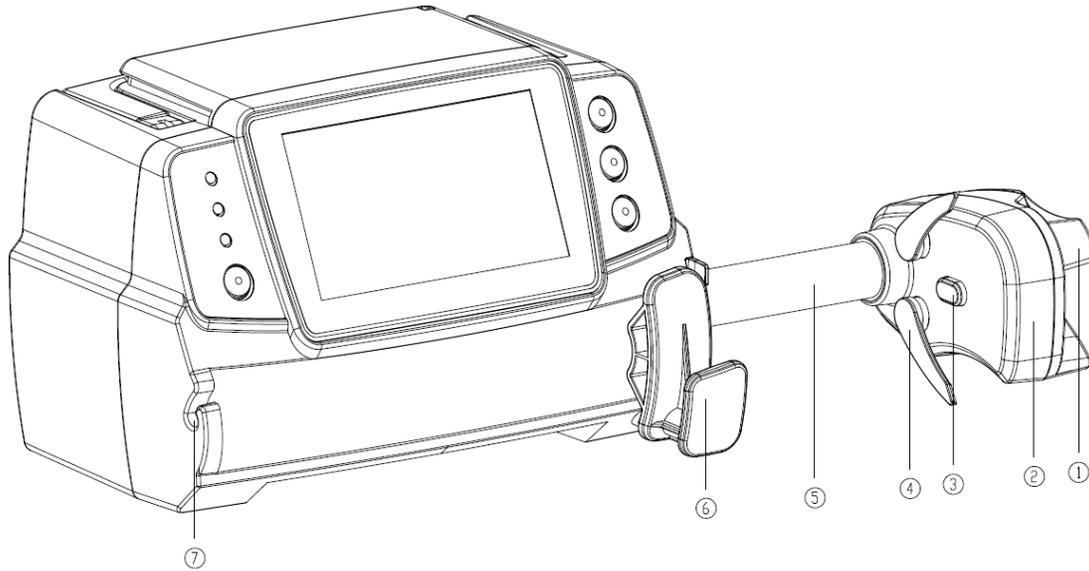
Safety Classification	
Electric protection Type	Class I
Electric protection Level	Defibrillation proof type CF applied Part
Ingress Protection	IP34 (Prevent solid objects larger than 2.5mm in diameter and water intrusion from splashing in all directions)
Working mode	Continuous
Classification	Portable equipment, non-portable syringe pump
Specification Parameters	
Compatible Syringes	3ml (most major brands), 5/6ml, 10/12ml, 20ml, 30/35ml, 60ml
System Accuracy	$\geq 1\text{ml/h}$, $\pm 3\%$ $< 1\text{ml/h}$, $\pm 5\%$
Infusion Rate	Syringe size 3ml: (0.1-100) ml/h Syringe size 5/6ml: (0.1-150) ml/h Syringe size 10/12ml: (0.1-300) ml/h Syringe size 20ml: (0.1-600) ml/h Syringe size 30/35ml: (0.1-900) ml/h Syringe size 60ml: (0.1-1500)ml/h
Bolus Rate	Syringe size 3ml: (0.1-100) ml/h Syringe size 5/6ml: (0.1-150) ml/h Syringe size 10/12ml: (0.1-300) ml/h Syringe size 20ml: (0.1-600) ml/h Syringe size 30/35ml: (0.1-900) ml/h Syringe size 60ml: (0.1-1500)ml/h
Bolus preset value	Min: 0.1ml Max: max rate of accordingly loaded syringe size
KVO Rate	0-5.00ml/h
Micro mode setting range	Syringe size 3ml: (100-100) ml/h Syringe size 5/6ml: (100-150) ml/h Syringe size 10/12ml:(100- 300) ml/h Syringe size 20ml: (100-600) ml/h Syringe size 30/35ml: (100-900) ml/h Syringe size 60ml: (100-1500) ml/h
Minimum flow rate increment	0.01ml/h
VTBI	0-9999.99ml, minimum step is 0.01ml
Total Volume Infused	0-9999.99ml, minimum step is 0.01ml

Time Range	1min-99hrs59min
Fuse Type	slow fuse 2A 250V
Dimensions	242.5(W)*111(D)*126.5(H) mm
Weight	1.7kg
Power Supply	
AC power supply	100-240V 50/60Hz
Input power	50VA
DC power supply	DC 12V
Battery Specifications	Specification: 7.4V 2500mAh Charging time: 5h. (under OFF status) Working time: over 9h. (after completely charging the new battery, when the environment temperature is 25°C and flow rate is 5ml/h, the constantly working time)
Alarm	
Alarm signal sound pressure level	When the sound is set at lowest level, alarm signal sound pressure level $\geq 50\text{dB(A)}$ When the sound is set at highest level, alarm signal sound pressure level $\leq 80\text{dB(A)}$
Alarm information	VTBI near end, Syringe near empty, VTBI infused, Syringe empty, Pressure high, Battery nearly empty, Battery empty, no battery inserted, Battery in use, Check syringe, Reminder alarm, Standby time expired, KVO finished, Drug limit exceeded, Maintenance Reminder
Environment	
Non AP/APG type equipment	Do not use it in the environment with inflammable anesthetic gas mixed with air, and inflammable anesthetic gas mixed with oxygen or nitrous oxide
Operating	(1) temperature: 5-40°C (2) humidity: 15-95%, non-condensable (3) atmospheric pressure: 57-106kPa
Transport & Storage	(1) temperature: -20-60°C (2) humidity: 10-95%, non-condensable (3) atmospheric pressure: 50-106kPa

Safety Standard	
Main Standards	<p>Safety</p> <p>IEC 60601-1:2005+A1:2012 Medical Electrical Equipment, Part 1: General Requirements for basic safety and essential performance</p> <p>IEC60601-2-24:2012 Medical electrical equipment – Part 2-24: Particular requirements for the safety of syringe pumps and controllers</p> <p>IEC60601-1-8: 2006 +A1: 2012 Medical electrical equipment –Part 1-8: General requirements for basic safety and essential performance –Collateral Standard: General requirements, tests and guidance for alarm systems in medical electrical equipment and medical electrical systems</p> <p>EN60601-1-2:2007+AC:2010 Medical Electrical Equipment - Part1-2: General requirements for basic safety and essential performance-Collateral standard:Electromagnetic compatibility-Requirements and tests</p>

3. Appearance

FRONT VIEW



① Handle

Control syringe pump push-pull sliding box and clip.

② Slider box

③ Pressure sensor

Detect the pressure of the syringe

④ Syringe clip

Clamp the syringe plunger

⑤ Lead-screw

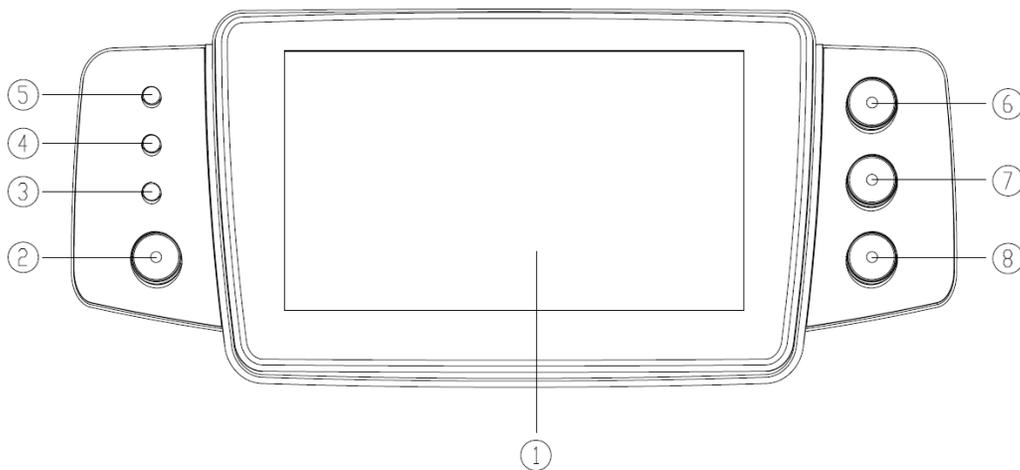
⑥ Syringe fixture lever

Pull forward then turn right, install the syringe into the slot.

⑦ Tube line Clamp

Keep the extension line in line and neat

OPERATION PANEL



① Touch Screen

② **【Power】**

Pump power switch, press and hold for 3 seconds to turn pump on, pump power off, and standby selection button.

③ AC indicator light

When connecting with AC power supply, AC indicator lights on.

④ Alarm indicator light

While pump alarms, indicator light flashes, different levels indicate different frequency and color, more information please **refer to section 8 and 9.**

⑤ Running lights

⑥ **【Start/stop】**

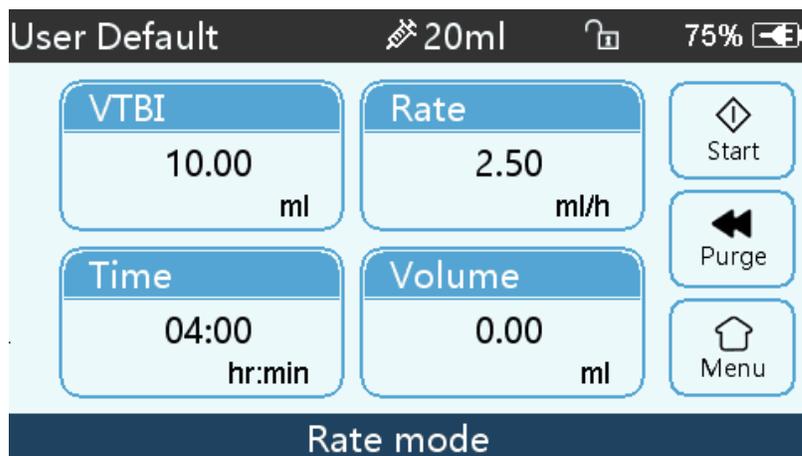
⑦ **【Bolus/Purge】**

⑧ **【Home】**

Enter system home page.

Display Screen

The display screen interface layout composes of title bar and typical interface.



Title Bar

Title bar displays real-time information and is not touchable, the left upper corner displays the name of current editing parameter.

Title Bar Icon

Icon	Paraphrase	Description
	Syringe apparatus indication icon	Syringe apparatus indication icon
	Lock screen indication icon	Unlock state icon is 
	WIFI indication icon	Indicate WIFI connection state.
	Battery charging indication icon	Display the current battery charging state
	Battery status indication icon	The percentage numerical value at the left side of the icon displays the remained battery. Since the remained battery may change, it may show the following states: 

Typical Interface

During pre-infusion and infusion, the typical interface will display the following: main interface, working interface, alarm interface, prompt interface, control panel, parameters setting, input method, standby interface etc.

Typical Interface Icon Paraphrase

Icon	Paraphrase	Description
	Start	Click this icon, start infusion
	Stop	Click this icon, infusion stop
	Bolus/Purge	1. During infusion, it is a 『Bolus』 function, click it to start bolus infusion 2. Before starting infusion, it is a 『Purge』 function, click it to exhaust air from the syringe
	Home	Click this icon, return to the main interface

Input Method Interface

The input method interface composes of the title bar, input box, and editing box.



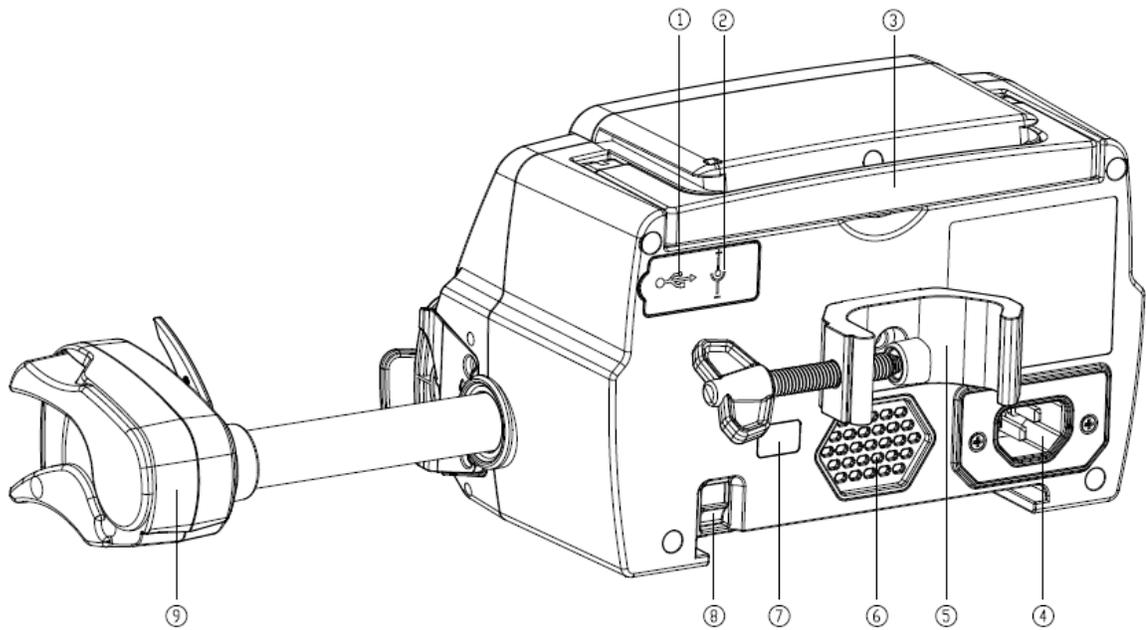
- 1) Title bar: displays the name of current editing parameter.
- 2) Input box: real-time display of the input content.
- 3) Editing box: Is composed of the main button area and function button area.

The main button area composes of numerical values, letters, and icons.

The function button area composes of the clear button, cancel button, , ,  and 『Shift』.

Icon	Paraphrase	Description
	Backspace button	Click it to backspace delete
Shift	Shift button	Click it to switch the capital and lowercase English letters
	Cancel button	Click it to cancel editing and exit
	OK button	Click it to save editing and exit

Rear View



- ① USB Port
Port only for software upgrade
- ② DC Input Port
External 12V DC power supply
- ③ Handle
- ④ A/C Adapter Port
External 100-240V 50/60Hz AC power supply
- ⑤ Pole Clamp
Using for fixing the equipment to an infusion stand
- ⑥ Loudspeaker
- ⑦ IrDA
Used for communicating with infusion docking station (Optional)
- ⑧ Latch for stackable function
- ⑨ Slider box

4. Installation

Unpacking and Checking

- 1) Please check the appearance before unpacking. If broken, please contact the transportation company or Triumph Medical as soon as possible.
- 2) Please carefully open the package to avoid damaging the equipment and relevant accessories.
- 3) After unpacking, please check the objects according to the packaging list. If there are insufficient or damaged accessories, please contact Triumph Medical as soon as possible.
- 4) Please keep relevant accessories and warranty card.
- 5) Please keep the packing case and packing materials for future transportation or storage.



Warning: Please put the packing materials out of reach of children. Please obey local laws and regulations or the hospital waste treatment system to handle the packing materials.

Installation



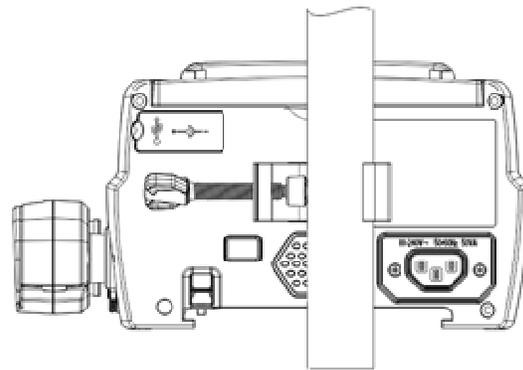
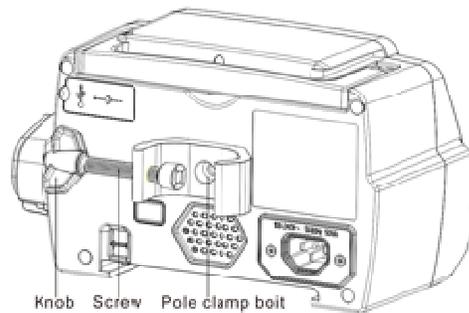
Warning:

- This equipment shall be installed by the designated technicians.
- All devices that connect with this equipment must pass the designated IEC standards (for example: IEC60950 information technology equipment safety and IEC60601-1 medical electric device safety) certification. All devices must be connected according to the valid version of IEC60601-1-1 system. The technician who takes charge of connecting to additional devices with the equipment interface is responsible for meeting the IEC60601-1-1 standard. Please contact Triumph Medical if you have any question.
- When connecting this equipment with other electrical devices in special circumstances and the combination can't be confirmed dangerous or not, please contact Triumph Medical or an electrical expert to ensure safety.
- This equipment must be used and stored in the environment regulated by the terms of this manual.

Install the syringe Pump Pole Clamp

(1) Install pole clamp/cage mount using provide hex wrench and screw.

(2) If using as a cage mount then leave rotary knob off of pole clamp and install the mount vertically as shown below leaving the “split” side of pole clamp at the top. Ready to mount to cage. If using as a pole clamp please proceed to step 3.



(3) If mounting on pole rotate the pole clamp screw(knob) and unscrew to leave space. Lock the Pole Clamp on the infusion stand, adjust the position of the infusion pump, tighten the pole clamp to fix the infusion pump on the infusion stand (shown in drawing to the right). Hold the infusion pump when tightening and loosening the fixing clamp.

(4) The pole clamp supports the vertical pole at default state. To adjust the pole clamp direction, please remove the bolt from the pole clamp screwdriver, take out the pole clamp and adjust the direction, then tighten the bolt.

5. Basic Operation

Operation Flow

1. ☒ Mount the syringe pump on the IV Pole or Cage
2. ☒ Power on: press  two seconds
3. ☒ Install syringe
4. ☒ Confirm syringe brand and size: or select syringe brand
5. ☒ Remove air bubble in the line
6. ☒ Select infusion mode: select infusion modes according to requirement
7. ☒ Set infusion Parameters: set infusion parameters according to requirement
8. ☒ Connect infusion line with patient
9. Confirm all Settings and Parameters
10. ☒ Start infusion: press 
11. ☒ Infusion finish
12. ☒ Remove syringe
13. ☒ Power off or Standby

6. Infusion Operation

Equipment Installation

Mount the device on a pole or level surface, connect the power cord and check the AC indicator lights. Battery will start to charge once AC power is connected.

Starting and Self-test

- 1) Press  two seconds
- 2) After powering on, the system will automatically check the motor, sensor, battery, memorizer, CPU communication, and alarm indicator.
- 3) After passing the self-test, pump enters into rate mode interface.

 Warning: ● If self-test failed, pump cannot operate properly and cannot be used for patient infusion, please contact Triumph Medical.

Install Syringe

- (1) Hold the clutch and pull the slider to the right side.
- (2) Pull the syringe fixture lever, turn 90° right or left.
- (3) Insert the syringe flange fully into slot (flange holder), turn syringe fixture lever 90° to spring back to tighten the syringe.
- (4) Hold the clutch and push left, release after it touches the plunger firmly.
- (5) Put the extension line of syringe into the extension line hook.
- (6) Confirm Syringe Brand/Size or if necessary Click 『Setting』 → 『Commonly used Syringe brand』 to choose syringe brand.

 Warning:

- Recommend to use a syringe brand preinstalled in this syringe pump.
- Make sure the syringe brand and size in the display screen is the same as the one in use.

 Caution:

- Check to ensure no air bubbles in syringe.
- Make sure syringe is correctly installed. Otherwise accuracy will not assured and may do harm to patient due to no infusion or over infusion due to a siphon.

Set Infusion Parameters

Remove Air bubble

Under the parameters setting interface, Press **【Bolus】** button and hold on, or touch the purge icon  on the product panel, eliminate the air bubble in the line.

The purge total volume is not calculated in the Total Volume Infused.

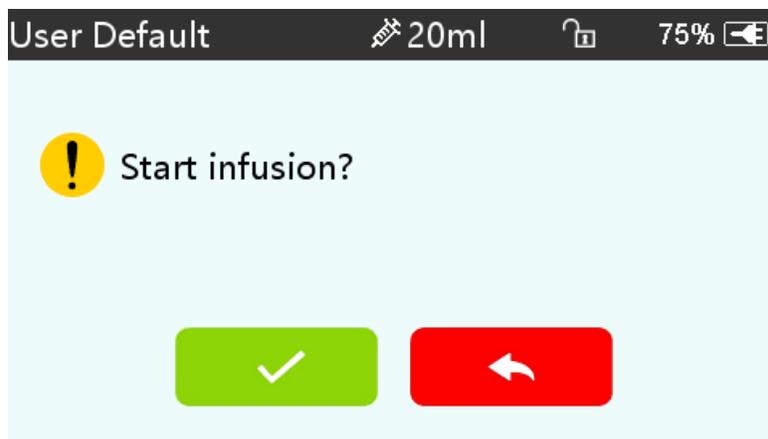
 Cautions:

- Before purging air, double check to confirm the infusion line is not connected to the patient.
- Purge rate is the max rate of the syringe size, when purge volume $\geq 5\text{ml}$, purge will automatically stop.

Start Infusion

Connect IV tube to patient, confirm infusion parameters, Press **【Start】** button , click **【yes】**

 in the pop-up prompt interface, start infusion.



Change the Rate During Infusion

Under the running interface, click the rate number on the touch screen or **【Stop】** , and then enter parameters setting interface. Reset target infusion rate.

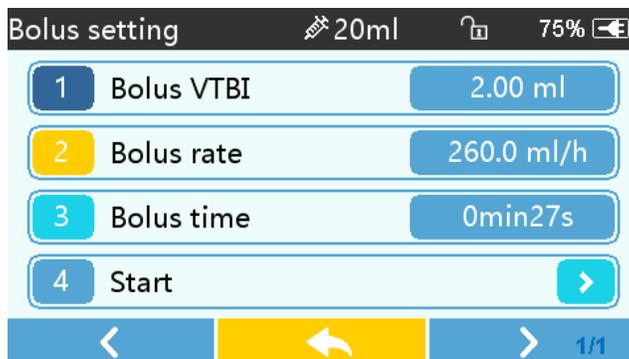
 Note: • Only the *rate mode*, *time mode* and *Body weight mode* support online rate modification function during infusion without pressing **【Stop】** .

Bolus Application

In operation, Bolus functions have two operation modes: Manual bolus and Automatic bolus.

(1) **Manual bolus:** press and hold the **【Bolus】** button on the **product panel**. Pump will work at the max flow rate of current syringe size, or set max bolus rate under setting interface. Release the button, pump will go back to the previous set infusion rate.

(2) **Automatic bolus:** Under the running interface, click **『Bolus』** on **touch screen**. Set two parameters among bolus infusion volume, rate and time, click **『Start』**. It will beep at every 1ml infused. After bolus infusion is finished, the equipment goes back to the previous infusion rate.



Infusion Completion

When remaining infusion time is near preset volume to be infused completion time, pump will alarm (This alarm can be adjusted or turned off in settings). If you ignore it, the system will keep alarming until VTBI is completed.

After VTBI completed, it activates VTBI infused alarm. If KVO function is ON, the equipment automatically starts KVO function. Click **『OK』** in the alarm interface to stop KVO and eliminate alarm.

The default working time of the KVO system is 30 minutes. After reaching that time, it will activate a KVO completion alarm and stop infusion.

Stop Infusion

During infusion or after infusion, click **⊖**, infusion stop. It will return to the parameter setting interface display.

Remove the syringe

Disconnect the extension line from the patient, then remove the syringe.

Power OFF or Standby

Method 1: hold the  【Power】 Button till the screen is OFF.

Method 2: press the  【Power】 Button to enter into OFF interface.

- (1) Turn off the equipment: click 『Power off』 icon, the equipment is turned OFF.
- (2) Standby: click 『Standby』 icon to enter into standby time setting interface and set the standby time. Under standby state, the screen brightness will be at the lowest setting. After standby, the screen brightness will be recovered.
- (3) Cancel: click 『Cancel』 , return to the interface before OFF setting.



Note: • The equipment has a standby function only under the non-working state.

Set Infusion Parameters

Introduction to Infusion Parameters Setting

- (1) The drug information can be displayed in the infusion running interface only when the drug library is under active state.
- (2) Click 『Settings』 icon in the main interface to enter sub-menu, find 『Drug Library』 menu item, click to enter then select drug. To remove drug information from running interface go back to Drug library and select “none”. Please refer to Drug Library on [Page 21](#) for more info.
- (3) For both the rate set in infusion parameter and the rate calculated by the system, the range is the system default flow rate of the current working syringe specification.
- (4) If the user didn't set a VTBI (Volume to be infused), this means the syringe will infuse until empty. Infusion Parameters Setting Range

Infusion Parameter	Parameter Range
VTBI	0-9999.99ml
Rate	(0.1-100) ml/h for 3ml syringes (0.1-150) ml/h for 5/6ml syringes (0.1-300) ml/h for /12 syringes (0.1-600) ml/h for 20ml syringes (0.1-900) ml/h for 30/35ml syringes (0.1-1500) ml/h for 60ml syringes
Time	1min-99hrs59min
Weight (Body weight)	0.1-300kg
Active Agent (Drug mass)	0.01-99999.99
Conc. Unit (Concentration unit)	ng、mcg、mg、g、U、kU、IU、IE、mmol、mol、kcal
Volume (Fluid amount)	0.01-9999.99ml
Dose rate	0.1-9999.99
Dose rate unit	Unit (/kg)/min, Unit(/kg)/h, the Unit is Conc. unit

Infusion Mode Setting

After starting the equipment and self-test, the equipment automatically enters into the rate mode parameters setting interface. To select other modes, click 『Menu』 icon  to enter into the main interface. Click 『Modes』 icon to enter into the mode selection menu interface, and select preset infusion mode.

Rate Mode

Under this mode set two parameters: Rate and VTBI (Volume to be infused). Set the two parameters, and the system will automatically calculate the time parameter. If the VTBI is 0, then the equipment works at the set rate till stopped with alarm.

Time Mode

Under this mode, set two parameters (Volume to be infused) and Time. The system will automatically calculate the speed, $\text{speed} = \text{Volume(ml)} / \text{time(min)}$.

Body Weight Mode

Under this mode, set the Weight (body weight), Conc. unit (concentration unit), Active agent (drug mass), Volume (fluid volume), Dose rate, Dose unit, and VTBI.

The system will automatically calculate the flow rate from the specified dose rate (ug/kg/min, mg/kg/min, ug/kg/h, mg/kg/h,...etc) according to related formula $\{\text{dose rate} \times \text{weight}\} / \{\text{Active agent (drug mass)} / \text{Volume(fluid volume)}\}$, and automatically calculate the time according to $(\text{VTBI}) / (\text{flow rate})$.

Drug library mode

Under this mode, Select Drug, set the Weight (body weight), Conc. Unit (concentration unit), Dose and VTBI (Volume to be infused). The speed will automatically be calculated according to parameters. Drug Library Editable (see below in System Settings).

7. System Settings

Settings

Click 『Settings』 icon in the main interface to enter into parameters setting interface.

Drug Library

Click on the preset drug name, the selected drug will be reflected in infusion mode parameters.

To remove drug name from infusion mode parameters, select “none” in drug library. To Edit drugs, go to Settings – Drug Library – DrugLib maintenance – Enter Password 8888 – Edit/Add/Delete 2 different groups of drugs. Default Groups labeled “Commonly Used” and “Others”. There are 32 total spots available for drugs, 16 in each group.

KVO Rate

Click 『KVO rate』, input the numerical value, after confirming, click 『OK』.

Bolus Rate

Set the default Manual Bolus rate under Settings.

Commonly used syringe brand

For the pre-installed syringe brands, after installing the syringe, click 『Commonly used syringe brand』 to enter into the syringe brand selecting interface. Then click one of the pre-installed syringe brands.



● The syringe of a different brand may possibly cause flow rate deviation. When using, please confirm if the displayed information in the interface is accordant with the actual syringe brand in use.

Occlusion Pressure

Click 『Occlusion pressure』 to enter into occlusion level setting interface. Move the long box to the preset level, after confirming, click 『OK』.

The higher the level, the higher the occlusion level, it is suggested to select a suitable occlusion pressure according to actual requirement.

 Warning:

- When adopting fluid/drug of a high viscosity and the occlusion pressure is set at low level, it is possible that the system will report occlusion alarm even when the line is not obstructed. Under this condition, please carefully observe the pressure indication icon in the display screen and infusion line, and raise the occlusion pressure if needed.
- When the occlusion pressure is set to high grade, the large amount of pressure inside the pipeline is likely to pop out the extension line connected to the syringe. Please confirm that the extension line is securely attached to the syringe.
- When the occlusion pressure is set at high level, it may possibly cause the patient discomfort. After raising the occlusion pressure, please carefully observe the condition of the patient, and immediately take measure if there's any abnormality.
- Under the equipment fault state, the max pressure generated by the infusion line is 900 mmHg. Under single fault state, the max infusion volume is 2ml.

Occlusion Pressure Level: 3 levels					
Level	Pressure Intensity (mmHg)	Level	Pressure Intensity (mmHg)	Level	Pressure Intensity (mmHg)
1	300	2	600	3	900

Pressure Unit

Click 『Pressure unit』 to enter into pressure unit select setting interface, four units are available: mmHg, kPa, bar, PSI, click the preset unit option.

 Note: ● Please carefully confirm when changing the current pressure unit.

Unit Mark	Unit Conversion
kPa	1 kPa=7.5mmHg=0.145psi=0.01bar
PSI	1psi=51.713mmHg=6.895kpa=0.069bar
Bar	1bar=787.5mmHg=15.225psi=105kPa

Reminder Alarm

Click 『Reminder alarm』 to enter into the time for reminder alarm setting interface. Click the preset time option to set the reminder alarm time.

Finish Pre-alarm

Time for pre-alarm refers to the time of activating near completion alarm when the fluid/drug infused volume is nearly reaching the preset value.

Click 『Finish pre-alarm』 to enter into the time for pre-alarm setting interface. Click the preset time option to set the finish pre-alarm time.

Micro Mode

Click 『Micro mode』 to enter into micro mode setting interface. ON/OFF is optional in this function. Under the ON mode, set the rate limit, then the infusion rate under any infusion mode is not allowed to exceed this limit.

Syringe Size	Max Rate Range
3ml	100-100ml/h
5/6ml	100-150ml/h
10/12ml	100-300 ml/h
20ml	100-600 ml/h
30/35ml	100-900 ml/h
60ml	100-1500 ml/h

Reset Total Volume

Click 『Reset total volume』, the interface displays the operation confirming prompt box, click 『Yes』 to confirm reset, otherwise, please click 『No』.

General

In the main interface, click 『General』 to enter into the General equipment setting interface.

Date & Time

Click 『Date & Time』 to enter into the date and time setting interface. It allows to set the date, time and format in this interface.

When setting date and time, directly input the numerical value in the input method interface. For example, to preset date “10-24-2019”, input “10242019”; to preset the time “13: 34”, input “1334”.

The time can be displayed in 24h format or 12h format. The date can be displayed in British type, American type or Chinese type. Please set according to the requirement.

Brightness

Click 『Brightness』 to enter into display brightness setting interface. The brightness has 10 levels. The equipment has the function of automatic brightness adjustment if external power supply is unavailable. When there is no external power supply, and the power is supplied by battery, if it is not operated within 3min, the system will automatically adjust the brightness to the lowest level. When it is touched or a button is clicked by user or when there's an alarm, it will automatically recover the brightness.

Sound

Click 『Sound』 to enter into the sound parameters setting interface. The volume has 10 levels. The lowest volume is off, and the highest volume is ≤ 80 dB. Move the long box to the preset value, after confirming, click 『OK』



Note: ● If volume is turned off Audible Alarms will be disabled.

Screen Lock

Click 『Screen lock』 to enter into automatic lock screen setting interface, select ON or OFF. Automatic lock screen time can be set at 15s, 30s, 1min, 2min, 5min, 10min, or 30min and so on. This means that the equipment will automatically lock the screen if it is not touched or a button is not pressed within corresponding time after starting. Unlock: directly click 『Cancel』 in the lock screen interface.



Note: ● The equipment will automatically unlock if there's high Level alarm.

Night Mode

Click 『Night mode』 to enter into night mode switch setting interface to set the start and end time of the night mode and the night brightness. At night, the system automatically adjusts the brightness to the user defined value.

Battery capacity display

Turn it on to show the battery life in the upper right corner of the screen, and turn it off to show the percentage of remaining battery life.

History entries

Click 『Records』 in the main interface to enter submenu, click the “History entries” menu item into history records query interface. The equipment saves over 5000 history records, and can display the event name, event date and time (permanent preservation). When it is full, the new records will cover the old records with first in first out principle.

Last Therapies

Click [Records] then [Last therapies] to enter last therapies interface. System will store 20 of the previous most recent therapies to select.

8. Alarm Prompt and Troubleshooting

Introduction to Alarm Levels

During infusion preparation and infusion, this equipment will alarm when reaching or exceeding the set alarm threshold value and prompt with sound, light and text. According to the importance of alarm information as well as the emergency and safety, the alarm is divided into three levels: high, middle and low. Please refer to table below for details:

Alarm Level	Sound Signal Interval	Light color /flash frequency
High alarm	10s	Red indicator flashes /2.0±0.6Hz
Middle alarm	15s	Yellow indicator flashes / 0.6±0.2Hz
Low alarm	Once, not repeated	Yellow indicator lights on

If there's an alarm, the system will display the alarm interface. If the alarm level is high, click [OK], stop the alarm, and exit the alarm interface. If the alarm level is middle or low, click [OK], the sound signal will stop, and exit the alarm interface.

Click [Mute] to mute, if alarm is not eliminated, the alarm sound will be sent out 2 minutes later.



Warning: • Some alarm threshold values of this equipment can be set by the user, for example: occlusion pressure, reminder alarm, VTBI infused pre-alarm, alarm sound volume and so on. The user shall confirm the parameters when setting the alarm threshold value. Otherwise, it may possibly influence the alarm function or infusion safety.

Multilevel Alarm Rules

When there're several alarms, the system will alarm according to the following rules:

Multilevel Alarm	Rules
Several alarms of different levels generate simultaneously	Display the alarms of highest level with sound, light and text, the reports middle alarm after eliminating all alarms of highest level
Several alarms of same level generate simultaneously	Alarm circularly displays by turns, the time interval is 1s

Note: When alarming, the corresponding alarm information will display on the title of the screen.

Alarm Treatment



Warning: •When there's an alarm, please check the conditions of the patient, remove the reason of the alarm and then continue working.

Fault Analysis and Solution

When there's a fault, the syringe pump screen will display the fault alarm information. This item is an alarm of high level. Please eliminate the fault alarm according to the prompt. If it can't be eliminated, please stop the equipment, contact Triumph Medical to repair and test the equipment. Do not put it into operation before the equipment has passed the inspection, otherwise, it may possibly cause unpredictable harm if it works with a fault.

If the equipment is on fire/burns for unknown reason, or has other abnormal conditions, the user shall immediately cut off power supply and contact Triumph Medical.

9. Maintenance

If pump displays the following: “Scheduled Maintenance Recommended Contact Triumph Medical” this means your pump is do for its yearly calibration. Please proceed to Triumphmed.com and fill out the Veterinary RMA form located at the top of the home page.

Cleaning, disinfecting and sterilizing



Warning: • Please cut off power supply and unplug the DC /AC power wire before cleaning the equipment.

• During cleaning and disinfecting, please keep the equipment horizontal and upwards to protect the equipment and accessories from fluid.

Cleaning

- (1) The daily maintenance consists of cleaning the shell and pump body. It is inevitable that fluid/drug may flow in the equipment during infusion. Some fluid/drug may corrode the pump and cause a fault. After infusion, please clean the equipment, wipe it with moist and clean soft fabric. Let the pump dry.
- (2) When cleaning the equipment interface, please wipe it with dry and soft fabric. Confirm the interface is dry before using.
- (3) Please do not soak the equipment in water. When fluid splashes on the equipment, please check if it works normally even though the equipment has a certain waterproof function. Perform insulation and electric leakage test if needed.

Disinfecting

- (1) Disinfecting may possibly cause harm to the equipment. It is recommended to disinfect the equipment only if it is needed.

Please disinfect the equipment with common disinfecting agent such as 50% sodium hypochlorite, cidex 2% glutaraldehyde + activating agent, 70% ethanol, 70% isopropyl alcohol and so on. Please follow the instructions of the disinfecting agent.

- (2) After disinfecting, wet soft fabric with warm water, wring the excess liquid from the fabric, and then wipe the equipment with it.

- (3) Do not sterilize the equipment with a high-pressure steam sterilizer. Do not dry the equipment with a dryer or similar product.

 Warning: • Please do not adopt Cidex OPA orthophthalaldehyde, methyl ethyl ketone or similar solvent, otherwise, it may corrode the equipment.

Repair

Please contact Triumph Medical (888-388-3344 ext 3) to repair if there's any fault. Do not disassemble and repair the equipment.

Alarm and Solution

Alarm Type	Alarm Level	Reason	Solution
VTBI near end	Low	During infusion, the remaining time of preset value reaches or is less than the set nearing completion time	This alarm can't be eliminated, and waits till infusion completes
Syringe near empty	Low	The syringe is near empty status which is calculated by checking the liquid medicine remaining in the syringe by current flow rate.	This alarm cannot be eliminated, must wait till syringe is empty.
VTBI infused	High	The preset value infusion Completion	Press【Stop】button to stop alarm
Syringe empty	High	The liquid medicine in the syringe is empty.	Press 【Stop】 button to stop the alarm
Pressure near threshold	Middle	Pipeline pressure increases close to the preset blocking level.	Check the connection of the pipeline, press 『OK』 button to continue infusion
Pressure drop	Middle	When the pipeline pressure is high,the pressure suddenly decreases.	Check the connection of the infusion pipeline, press 『OK』 button to continue infusion
Pressure high	High	1. Line occlusion during infusion	Click 『 Mute 』 to silence, manually remove the reason of occlusion, Press 【Start】 button to continue infusion

		2. Fluid/drug in the actual infusion line has high viscosity, but the system occlusion level is set too low	Raise the alarm Level, Press 【 Start 】 button to continue infusion
		3. The pressure sensor is damaged	Please contact Triumph Medical
Battery nearly empty	Low	1. When power is supplied only with the built-in battery, under low battery, the alarm duration is >30min	The alarm automatically eliminates after connecting the external power supply.
		2. Battery ageing or the equipment charging circuit is fault.	Please contact Triumph Medical.
Battery empty	High	When power is supplied by the built-in battery only, under low battery, the alarm duration is >30min	Immediately connect with external power supply.
		2. Battery ageing or the equipment charging circuit is faulty.	Please contact Triumph Medical
No battery inserted	Low	Battery is removed	Keep connected to external power supply or reinstall the battery
No power supply	Low	Under ON state, AC power supply is adopted, but the AC power wire is dropped during the process	The alarm automatically eliminates after connecting the external power supply.
No battery and No power supply	High	Battery is removed and the AC power wire is dropped	reinstall the battery or connect the power supply
Check syringe	High	Syringe drop off during infusion	Reinstall the syringe
Reminder alarm	Low	After installing syringe tube, under non-working or alarm state, it is not operated within the set time of the system	Click any button to stop
Standby time expired	Middle	During standby, after reaching the standby time	Press 【 Stop 】 button to stop alarm
KVO finished	High	KVO working time reaches 30min, syringe pump stops working	Press 【 Stop 】 button to stop alarm

System Error	High	Internal failure or software exception	Turn off and Restart, if the alarm still exists, please contact Triumph Medical

Note: When alarm rings, click the [Mute] icon on the screen to temporarily stop sound alarm for 2min.

Warranty

Warranty for both parts and labor is 12 Months from date of purchase. See extended warranty card inside box for more information or visit Triumphmed.com.

