User Manual

Triumph IP12 Infusion Pump

Contents

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 working and contact Triumph Medical's service department. Additionally, the adhesion or intrusion of fluid/drug may possibly cause the equipment to 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 **i**s 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 gasses (including gasses for disinfecting) and moist environment since it may influence the inside components of the infusion 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 correctly install the infusion line according to the infusion indication direction of this equipment, ensure that the infusion tube is placed smoothly and straightly cross the creep device. Otherwise, it may possibly suck blood from the patient or fail to reach the expected performance.

- Please do not only depend on the alarm system during use. Periodically check the equipment to avoid any accidents.

- Tightly fix the equipment on the infusion stand/pole and ensure the stability of the infusion stand/pole. Be careful when moving the infusion stand and this equipment to avoid the equipment dropping and infusion stand/pole falling or knocking the surrounding objects.

- If the infusion tube is twisted, or the filter or needle are obstructed, or blood is in the needle which may obstruct the infusion, the pressure in the infusion 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 infusion tube near the puncturing position, then open the door to drop the pressure in the infusion tube. Then loosen the infusion tube, solve the reason of occlusion, and restart infusion. If infusion is restarted when the occlusion reason exists, then it may cause occlusion alarm persistently, and the pressure in the infusion tube may keep rising, and may break or cut off the infusion tube, or hurt the patient.

- This equipment injects fluid/drug through extruding the infusion tube, but it can't detect the leakage if

the infusion line is cut off or broken. Therefore, please periodically check the equipment it to avoid above fault during the working period.

- During infusion, periodically check the dripping state of the fluid and the fluid/drug in the intravenous infusion bag/container, so as to ensure it is working correctly during infusion. This equipment doesn't directly measure the quantity of infusion fluid; therefore, it is possible that this equipment can't detect the free infusion flow under abnormal conditions. Even if the drop sensor is adopted, it is possible that this equipment can't detect the free infusion flow which is less than the specific value for the demands of tolerance.

- This equipment has the occlusion detection function for detecting and alarming when the infusion 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 value. As a result, the puncturing part may possibly have become reddish, swelling or bleeding. Additionally, 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 part. If there's any abnormal phenomenon for the puncturing part, please timely take suitable measures, such as puncturing again.

- Only the infusion line, infusion needle and other medical components that meet the local laws and regulations and the requirements covered in this User Manual can be adopted. It is suggested to use the infusion lines with same brand as preinstalled in this equipment. Infusion accuracy cannot be guaranteed if a infusion line brand that is not preinstalled is used. The drop sensor is based on infrared sensor technology, if the drip sensor function is turned on, then the light-proof pipeline is not applicable.

- It is not allowed to disassemble, refit, or use this equipment for other purposes except normal infusion.

- No one is allowed to repair this equipment except Triumph Medical Services LLC.

- To avoid risk of electric shock,the equipment must only be connected to a supply mains with protective earth.

2. Product Specification

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 infusion pump
Specification Parameters	
Infusion line specification	10-60 drops
System Accuracy	±5%
Drip Infusion Rate Accuracy	±5% or ±1drops/min
Infusion Rate	0.10-1500ml/h
Drip mode range	1~500drops/min
Bolus Rate	0.1-1500ml/h
Bolus preset	0.1-50ml
KVO Rate	0.1-5.00ml/h
Micro mode setting range	100-1500ml/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	199(W)*111(D)*126.5(H) mm
Weight	1.4kg
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 8h.(after completely charging the new battery, when the environment temperature is 25℃ and flow rate is 25ml/h, the constantly working time)
Alarm	
Alarm signal sound pressure level	When the sound is set at lowest level, alarm signal sound pressure level ≥50dB(A) When the sound is set at highest level, alarm signal sound pressure level ≤80dB(A)
Alarm information	VTBI near end, VTBI infused, Pressure high, Battery nearly empty, Battery empty, No battery inserted, No power supply, Reminder alarm, Standby time expired, KVO finished, Drop sensor connection, Drop error, Air bubble, Door Open, Confirm Drops Are Flowing in Drip Chamber, Drug limit exceeded, Maintenance Alarm
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℃ (2) humidity: 20-90%, non-condensable (3) atmospheric pressure: 86-106kPa
Transport & Storage	(1) temperature: -20-60℃ (2) humidity: 10-95%, non-condensable (3) atmospheric pressure: 50-106kPa
Safety Standard	
Main Safety Standards	IEC 60601-1:2005+A1:2012 Medical Electrical Equipment, Part 1: General Requirements for basic safety and essential performance IEC60601-2-24:2012 Medical electrical equipment – Part 2-24: Particular requirements for the safety of infusion pumps and controllers 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 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

3. Appearance

Front View
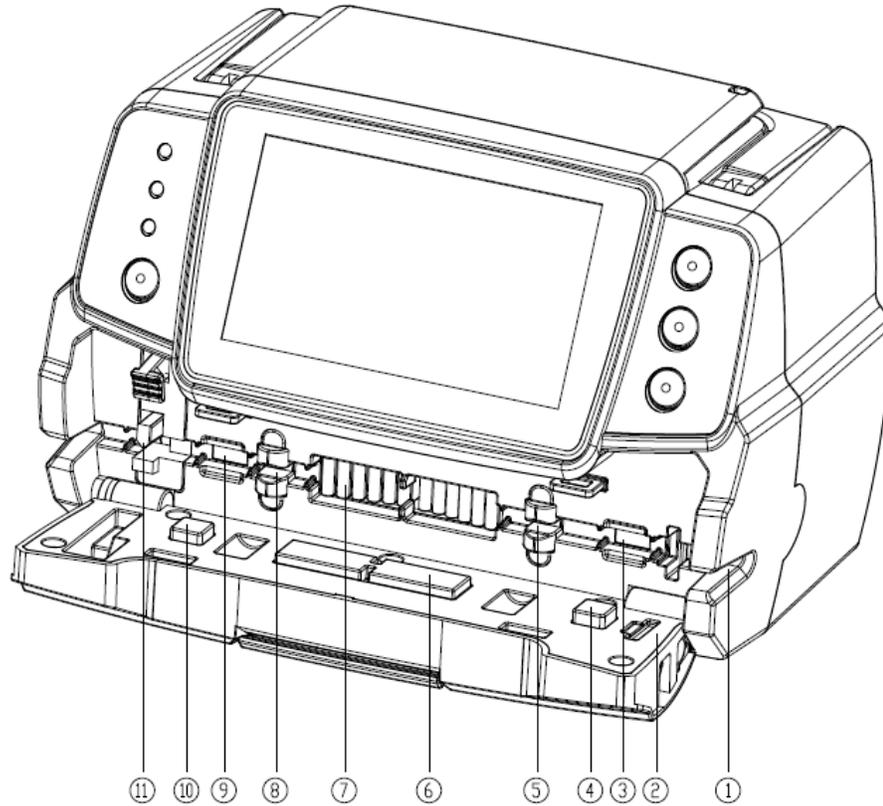
① Tubing guide

② Pump door

④⑥⑩ Pressure Plate

③Pressure sensor-UPSTREAM (if applicable)

⑦ Pump tablets

⑨ Pressure sensor-DOWNSTREAM

⑤⑧Air–in-line sensor

⑪Anti-free flow clamp

Operation Panel
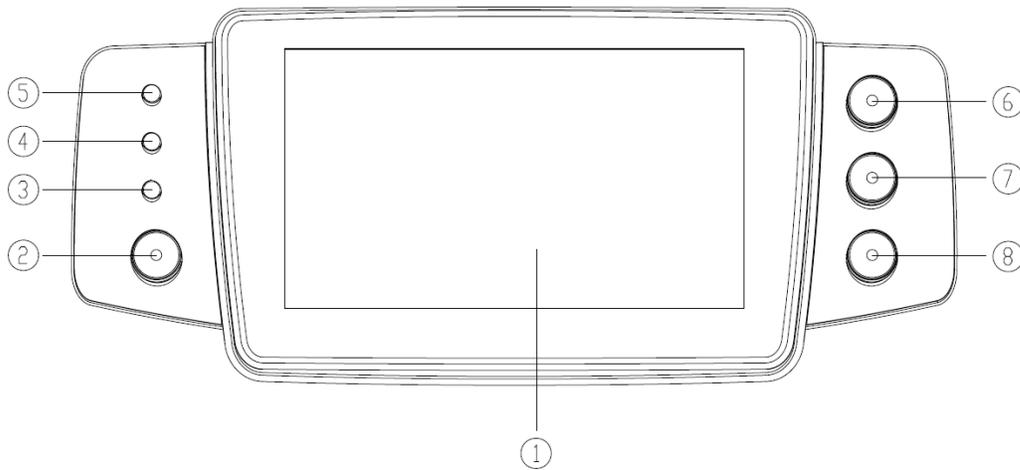
① Touch Screen

②【Power】

Pump power switch, press and hold for 3 seconds, pump power off. Standby selection button.

③ AC indicator light

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

④ Alarm indicator

While pump alarms, indicator light glitter, different level different frequency and color, more information please **refer to Chapter 10.1**

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

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

Icon	Paraphrase	Description
	Infusion line indication icon	Infusion line indication icon
	Lock screen indication icon	Unlock state icon is
	WIFI indication icon	Indicates WIFI connection state.
	Battery charging indication icon	Displays the current battery charging state
	Battery status indication icon	The percentage numerical value at the left side of the icon displays the remaining battery. Since the remaining battery may change, it may possibly 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

Table3.3.2.1-1

Icon	Paraphrase	Description
◇	Start	Click this icon, start infusion
▽	Stop	Click this icon, infusion stop
▶▶	Bolus/Purge	1. During infusion, it is 『Bolus』 function, click it to start fast infusion 2. Before infusion starting, it is 『Purge』 function, click it to exhaust air from the IV set
⌂	Home	Click this icon, return to the main interface

Input Method Interface

The input method interface composes of the title bar, input box, 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: It composes of the main button area and function button area.

The main button area is composed of the numerical values, and letters and icons.

The function button area is composed 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
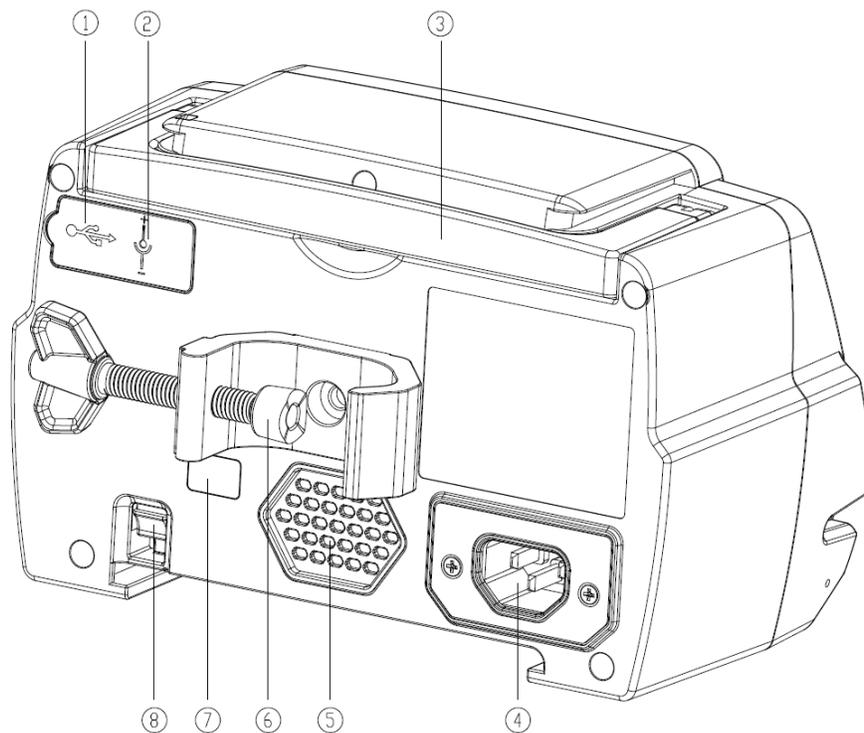
① USB Port

Port for software upgrade and drop sensor

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 Loudspeaker

⑥ Pole Clamp

Using for fixing the equipment on the infusion stand

⑦ IrDA

Using for communicating with infusion docking station(Optional)

⑧ Latch for stackable function

4. Installation

Unpacking and Checking

1) Please check the appearance of the equipment when unpacking, if damaged please contact the Shipping company or Triumph Medical service department 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 extended 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 qualified personnel.

● 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, and 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 enquiry.

● When connecting the equipment with other electrical devices in special circumstances, and if the combination can't be confirmed dangerous or not, please contact our company or an electrical expert to ensure that necessary safety measures are taken.

● This equipment must be used and stored in the environment according to specifications in Section 2 of this manual.

Installing the Infusion Pump and Pole Clamp

(1) Install the pole clamp/cage mount using provided 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 a pole please proceed to step 3.
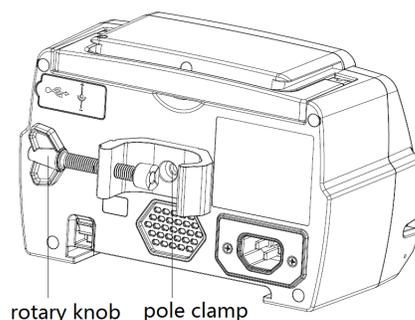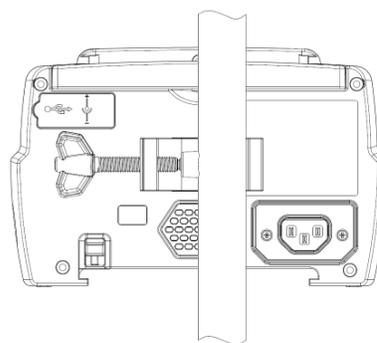
(3) If mounting on pole, rotate the pole clamp screw(knob) and unscrew to leave space. Lock the Pole Clamp on the infusion stand, adjust the position of the infusion pump, tighten the pole clamp to fix the infusion pump on the infusion stand (shown in drawing to the right). Hold the infusion pump when tightening the fixing clamp; loose it after tightening to avoid falling.

(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.

rotary knob   pole clamp

5. Basic Operation

Operation Flow

¤ Mount the infusion pump on the IV stand:

¤ Power on: press ⬤ for two seconds, Power on equipment

¤ Install IV Set

¤ Confirm IV set brand name: Select infusion tube brand

¤ Remove air bubble from the line

¤ Select infusion mode: Select infusion modes according to requirement

¤ Set infusion parameters: set infusion parameters according to requirement

¤ Connect the infusion line with the patient

¤ Start infusion: press ◇ , start infusion

¤ Infusion finish

¤ Remove the IV Set

¤ Power off or Standby

6. Infusion Operation

Equipment Installation

Mount the device on the infusion stand/pole, connect with AC power supply，check that the AC indicator lights are on. Battery will start to charge once AC power connected.

Starting and Self-test

1) Press ⊙/⊙ for two second to power on the equipment.
2) After powering on, the system will automatically check the motor, sensor, battery, memorizer, CPU communication, alarm indicator.
3) After passing the self-test, pump will enter into the rate mode interface.

⚠Warning: ● If self-test failed, the pump cannot be used, please contact Triumph Medical.

Infusion Line Installation

1) Connect the IV line with the infusion bottle/bag.
2) Extrude the drip chamber, when the fluid has reached 1/2 position of the drip chamber, open the roller clamp.
3) Fill fluid/drug to the injection needle to remove air, then close the roller clamp.
4) Pull the lock switch/door handle in the middle of the pump door from the lower side, then open the door.
5) Push up anti-free flow clamp to open it.
6) Install the infusion tube in the infusion tube slot according to direction indicator on the pump, press the IV set in the pump inwards to make it attach to the peristaltic pump. Ensure that items 1-8 shown in Drawing below are correctly installed.
7) Manually push the pump door with both thumbs on left and right side, it will make an audible "click" sound after it is correctly closed.
8) Verify correct IV Administration Brand.

⚠Warning: ● It is suggested to use one of the Infusion lines calibrated on this pump.

Lock Switch

Syop clip   peristaltic pump   lock for door

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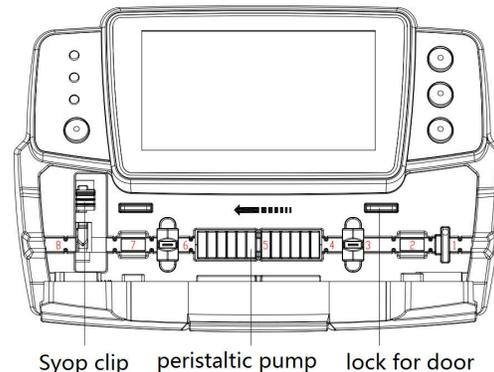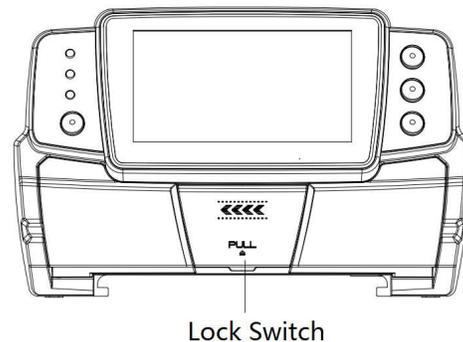
● Please confirm that the infusion line brand and specification displayed in the display screen is accordant with the actual one in use.
● If infusion accuracy is in question, the user is strongly suggested to contact Triumph Medical.

9) Install Drop sensor

Please install. After installing, click 『Settings』→ 『Drop sensor』to activate the drop sensor function.

⚠ Caution ● The default state of drop sensor function is OFF, this function can be manually activated by the user when the drop sensor is adopted.

Set Infusion Parameters

Purge Air

Under the parameters setting interface, Press 【Bolus】button on product panel and hold on, or touch the screen purge icon ◀◀ to 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** with the patient.
● Purge rate is set to the max flow rate, when purge volume ≥5ml, purge will automatically stop.

Start Infusion

Connect IV tube with patient, confirm IV Line Brand, confirm infusion parameters, Press【Start】

button ◇, click 『yes』✅ in the pop-up prompt interface, start infusion.
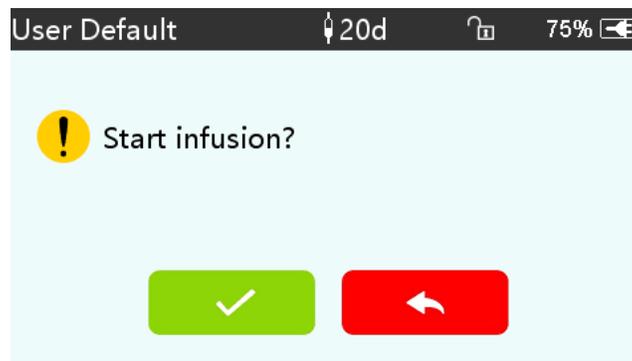
Changing the Rate During infusion

Under the running interface, click rate number in touch screen and reset target infusion rate. Or

【Stop】 ⊘ , and enter the parameters setting interface, then reset target infusion rate.

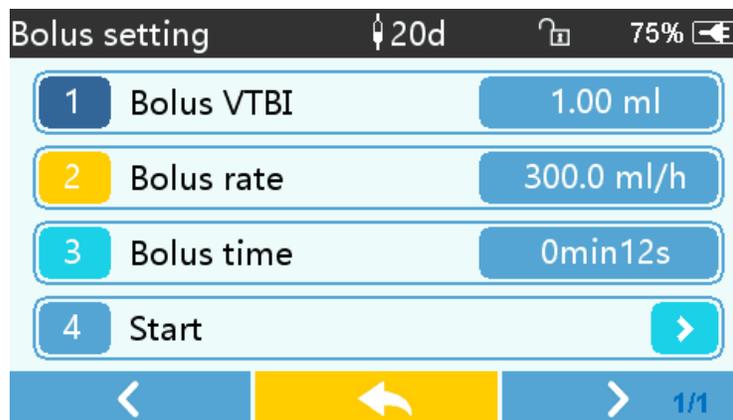⚠️Note: ●Only the ***rate mode, drip mode*** and ***Body weight mode*** support online rate modification function during infusion without pressing【Stop】 ⊘

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 product panel, pump will work at the max flow rate or set max bolus rate under the setting interface, release the button, pump will go back to the previous setting 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.

Bolus setting	⧗20d	🔒	75% 🔋
1 Bolus VTBI			1.00 ml
2 Bolus rate			300.0 ml/h
3 Bolus time			0min12s
4 Start			❯
❮	↩		❯ 1/1

Infusion Completion

When remaining infusion time is near preset volume to be infused completion time, pump will alarm. If ignored, the system will keep alarming until complete VTBI infusion.

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 30min, after reaching the time, it will activate 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 Total Volume Infused and adjustable parameters.

Remove the Infusion Line

Disconnect the IV set's extension line from the patient, then remove the IV set.
Replace IV set

Power OFF or Standby

Method 1: hold the 🔘 【Power】Button till the screen is OFF, the equipment 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, set the standby time. Under standby state, the screen brightness will be lowest, 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 available while not infusing.

Replace Infusion Line/Infusion Container

- Please replace the infusion tube assembly according to the following steps:
- Close the flow rate adjuster of the infusion tube assembly, open the infusion pump door, and then remove the infusion tube assembly.
- Prefill and install the new infusion tube assembly.
- Operate to restart infusion according to the above infusion steps if needed.
- Please replace the fluid/drug container according to the following steps:
- Close the flow rate adjuster of the infusion tube assembly.
- Remove the fluid/drug container from the infusion tube assembly.
- Connect the infusion tube with the new fluid/drug container.
- Restart infusion according to the above steps of replacing infusion tube assembly.

⚠️Warning: ● The infusion tube will distort if it is used for a long period of time and could result in inaccuracy or flow rate error, it is suggested to replace the pumping position or infusion tube assembly after working for 8 hours or before depending on flow rate.

# 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 the 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 infusion line specification.

(4) If no VTBI (Volume to be infused) is Set then the fluid/drug in the infusion container will be completely used.

Infusion Parameters Setting Range

Infusion Parameter	Parameter Range
VTBI	0-9999.99ml
Rate	0.1-1500ml/h
Time	1min-99hrs59min
Weight(Body weight)	0.1-300kg
Conc.unit(Concentration unit)	mcg/ml, mg/ml, g/ml, U/ml, kU/ml, IU/ml, EU/ml, mmol/ml, mol/ml, kcal/ml
Volume(Fluid amount)	0.1-9999.99ml
Dose rate	0.1-9999.99
Dose unit	Unit(/kg)/min, Unit(/kg)/h,the Unit is Conc.unit
Drop rate	1-500 drops/min

7. Infusion Mode Setting

After starting the equipment and self-test, the equipment automatically enters into the rate mode parameters setting interface. To select the 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.
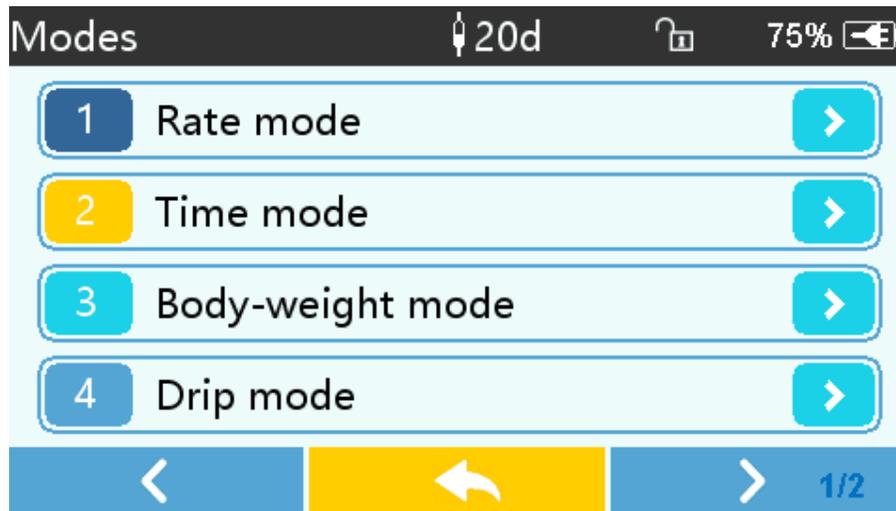
Rate Mode

Under this mode it allows you to set rate and volume to be infused. Set the two parameters, and the system will automatically calculate the third parameter. If volume to be infused is "0" pump will work until pumps alarms.

Time Mode

Under this mode, it allows to set VTBI (Volume to be infused) and time. The system will automatically calculate the speed, speed = Volume(ml) /time(min)

Body Weight Mode

Under this mode, set the Weight (body weight), Active agent (drug mass), Conc. unit (concentration unit), Volume (fluid volume), Dose rate, Dose unit, 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 {dose rate × weight}/{Active agent (drug mass)/Volume(fluid volume)}, and automatically calculate the time according to (VTBI) /(flow rate).

Drip mode

Under this mode, set the VTBI and drop rate, and the system will automatically calculate the infusion flow rate and time. Drip Sensor not included.

⚠️Note: ● The flow rate under drip mode is calculated according to the specification of the current infusion line.　Before adopting the drip mode, please confirm that the specification of the current infusion line is accordant with the specification displayed in the interface title bar display. If it is not accordant, please contact the equipment maintenance technician to modify.　Otherwise, it may cause serious deviation of 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).

System Settings

Settings

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

Drug Library

Select Drug Library in Settings.　Options to select "None", "Commonly used", "Others", or "DurgLib maintenance".　Select a drug from "Commonly Used" or "Others" to view parameters and have the drug name displayed on screen while infusing. (Note: if you are trying to utilize the Drug Library mode then make that selection under the menu "Modes".
To remove drug name from infusion running interface, 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.　This is accessible in Settings

Bolus Rate

Set the default Bolus rate under Settings.

IV Admin Brands

For the built-in infusion line brand of the system, after installing the infusion line, click『IV Admin Brands』to enter into the infusion line brand selecting interface, and click the preset brand option.

⚠ ● The infusion line of different brands may possibly cause flow rate deviation. When using, please confirm if the displayed information in the interface is accordant with the actual infusion line in use.

Occlusion Pressure

Click『Occlusion pressure』to enter into occlusion pressure 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 suitable occlusion pressure according to actual requirement.

⚠Warning:

● When adopting fluid/drug of 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 at a 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 measures 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.

(Table: Relation of Occlusion level and Pressure)

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

Bubbles Size

Click 『Bubbles size』to enter into air bubble size setting interface, move the long box to the preset level, confirm and then click 『OK』.

The air bubble detector has 7 levels, when the volume of single air bubble or the total air bubbles within 15min in the line reach the preset air bubble alarm threshold value, it will activate air bubble alarm. The air bubble testing sensitivity is 20ul. It is suggested to select a suitable level according to the actual requirement.

Air Bubble detector level	Alarm Threshold Value
Level 1	50ul
Level 2	100ul
Level 3	200ul
Level 4	300ul
Level 5	450ul
Level 6	600ul
Level 7	800ul

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.

Drop Sensor

Click 『Drop sensor』to set ON or OFF.

The "Drop error " alarm function is only available only when the drop sensor is installed (not included)

⚠️Note: ● The default state for drop sensor function system is OFF. It can be manually turned on by the user when the drop sensor should be adopted. If the function is ON when the drop sensor is not installed, then the system will report "Drop sensor connection" alarm.

Drop sensor level

The sensitivity of the drop sensor can be adjusted in three levels. The higher the level is, the more sensitive the detection will be.

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.

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 one date "10-24-2019", input "10242019"; to preset the time "13: 34", input "1334".
The time is displayed in 24h format or 12h format, the date is 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, power is supplied by battery, and is not

operated within 3min, the system will automatically adjust the brightness to the lowest level. When it is touched or 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』. There is an option to turn Sound off completely, but please note that alarms will not sound when activated.

⚠ 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, which means that the equipment will automatically lock the screen if it is not touched.
Unlock: Click『Cancel』in the lock screen interface.

⚠Note: ● The equipment will automatically unlock if there's a 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 to enter the history records query interface. The equipment supports to save 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 Level

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 reoccur in 2 minutes.

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

Multilevel Alarm Rules

When there are 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, report middle alarm after eliminating all alarms of highest level
Several alarms of same level generate simultaneously	Alarm circularly by turns, the time interval is 1s

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 alarm and then continue working. See Alarm and Solution section on pages 29-31

Fault Analysis and Solution

When there's a fault, the infusion pump screen will display the fault alarm information, this item is a high level alarm. 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 continues to operate under fault contition.

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.

● Note: Under single fault state, the max infusion volume is 2ml. See Alarm and Solution section on pages 29-31 for all solutions

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
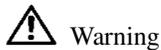
● Please cut off power to power supply and unplug the DC /AC power wire before cleaning the equipment.
● During cleaning and disinfecting, please keep the equipment horizontal and upwards to protect the equipment and accessories from fluid.

Cleaning

(1) The daily maintenance is mainly to clean 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 working faults. After infusion, please timely clean the equipment, wipe it with a moist and clean soft fabric, and then naturally dry it.

(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. Although this equipment has certain waterproof function, when fluid splashes on the equipment, please check if it works normally.   If uncertain of fluid intrusion please contact Triumph Medical.

Disinfecting

(1) Disinfecting may possibly cause harm of certain degree to the equipment; it is suggested to disinfect the equipment if it is needed.

Note: 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 the soft fabric with warm water, wring out excess fluid from 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 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 or damage. 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 reaches or is less than the set nearing completion time	This alarm can't be eliminated, and waits till infusion completes
VTBI infused	High	The preset value infusion Completion	Press 【Stop】 button to stop alarm
Pressure high	High	1. Line occlusion during infusion	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	Rise the alarm Level, Press 【Start】button to continue infusion
		3. The pressure sensor is damaged	Please contact Triumph Medical
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
Check upstream (if applicable)	High	The upper part of the line is obstructed during infusion, and in turn drops the line pressure intensity	Check if the rate regulating adjuster or fluid stopping device is opened at the upper part of the line, Press【Stop】

			button to stop alarm
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 fault.	Please contact Triumph Medical
Alarm	**Alarm Level**	**Reason**	**Solution**
No battery inserted	Low	Battery is removed	Keep connecting with external power supply, contact Triumph Medical
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	Connect power supply, Contact Triumph Medical
Reminder alarm	Low	After installing infusion 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, infusion pump stops working	Press 【Stop】 button to stop alarm
Drop sensor connection	Low	When turning on the drop sensor, the equipment is not connected with the drop sensor	Connect the drop sensor, or turn off the drop sensor in the menu
Drop error	High	The angle of inclination of the drip cup is too big or drop sensor is installed lower than the drip cup fluid level	Check the installation of drop sensor or drip cup fluid level, Press 【Stop】 button to stop alarm
		The specification of infusion line is not accordant with the specification displayed in the interface, which causes drop rate error.	Check if the infusion line specification is accordant with displayed parameters, if it is not accordant, it shall be

			modified by professional maintenance technician
Air bubble	High	Air bubble in the infusion line	Press【Stop】button to stop alarm, disconnect the line from the patient, exhaust air with air exhaust function, or open the infusion pump door to manually remove the air bubbles
Door Open	High	During infusion, the infusion pump door is opened	Close the infusion pump door to stop this 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.