



ProMAX IV

Touch Digital Infusion Pump

User Manual

Infusion Pump for Veterinary Use



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Preface

Application Scope

Applicable to the Covetrus® ProMAX IV Touch Digital Infusion Pump.

This user manual describes the product's most complete configuration. For more detailed information, please contact Covetrus.

Use Instructions

This user manual covers the basic information on the safety and effectiveness of the product for guiding the operator to correctly install, test, operate, use, and maintain the product. Please read this manual thoroughly before use to ensure correct usage and carefully store it for future use.

Covetrus is responsible for the reliability and performance of the equipment only if all the following conditions are met:

1. Use the equipment according to this user manual.
2. The equipment can only be disassembled, assembled, replaced, tested, improved, and repaired by Covetrus or Triumph Medical.
3. All components and accessories, as well as consumables for repair, are provided by Covetrus or Triumph Medical.

Paraphrase

【】 Mechanical button

『』 Touch button

() Information

- Inapplicable

√ Accordant

→ Operation steps

Bolus: Infuse large volume of liquid in a short time.

KVO: Keep vein open, prevent blood back to the Infusion set.

Anti-bolus: Motor automatically reverses when there is high pressure.

Accessories: suitable for use with the equipment in order to achieve the expected purpose or provide convenience for attaining the desired purpose.

Description of Revision of User Manual









This manual may be revised occasionally as product improvements are made, etc. All revisions will be documented in the new version of the instructions.

Safety Instructions

Warnings

	Before using, please check the equipment, connecting wire, and accessories to ensure they can work normally and safely. If there's anything abnormal, immediately stop working and contact Triumph Medical. Additionally, the adhesion or intrusion of fluid/drug may cause the equipment to fault and malfunction. Therefore, please clean the equipment after use, and store it correctly.
	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 an environment with active chemical gas (including gas for disinfecting) or a moist environment since it may influence the inside components of the Covetrus® ProMAX IV Touch Digital Infusion Pump and may cause performance drop or damage to the inside components.
	Please correctly install the infusion set according to the infusion indication direction of this equipment and ensure that the infusion set is placed smoothly and straight across the creep device.
	If the sound level of the alarm signal is lower than the environmental noise, the operator may not hear the alarm.
	Please do not depend only on the alarm system during use; please periodically check it to avoid an accident.
	Tightly fix this equipment on the infusion stand and ensure its stability of the infusion stand. Be careful when moving the infusion stand and this equipment to avoid the equipment dropping and infusion stand falling or knocking the surrounding objects.
	If the infusion set is twisted, the filter or needle is obstructed, or blood in the needle which may obstruct the infusion, the pressure in the infusion set will rise. Removing such occlusion may cause a "bolus infusion" (temporary excess infusion) to the animal. The correct method is to tightly hold or clamp the infusion set near the puncturing position, then open the door to drop the pressure in the infusion set. Then loosen the infusion set, solve the reason for occlusion, and restart infusion.
	This equipment injects fluid/drug through extruding the infusion set, but it can't detect the leakage if the infusion set is cut off or broken. Therefore, please periodically check it to avoid above fault during the working period.
	During infusion, please periodically check the dripping state of the fluid and the fluid/drug in the intravenous infusion bag/container to ensure the pump is working correctly during infusion. Therefore, this equipment doesn't directly measure the quantity of the infusion fluid. It is possible that this equipment can't detect the free infusion flow under exceptional conditions.
	This equipment has an occlusion detection function for detecting and alarming when the infusion needle deviates from the position in the vein or the needle is not correctly punctured in the vein.
	Disassembling or refitting this equipment or using it for other purposes except normal infusion is prohibited.
	No one is allowed to repair this equipment except Triumph Medical.
	To avoid the risk of electric shock, this equipment must only be connected to a supply main with grounding.

Cautions






	Before its first use after purchase, or if the equipment is not used for a long period, please charge the equipment with AC power supply. If it is not fully charged, under a power failure, the equipment may not continue to work with built-in battery power supply.
	Under general conditions, please use AC power supply as much as possible since it can prolong the service life of the battery to a certain degree. When using AC power supply, ensure that the grounding wire is reliably connected to the ground, and only the AC power cord attached to this equipment shall be used. Please pay attention to the plug position of the power cord to ensure that you can disconnect it at any time. The built-in battery can only be used as an assistant power supply when the AC power supply can't reliably connect with the ground and is not under normal conditions (power failure or in-transport infusion).
	Before connecting this equipment with the power supply, please keep the power socket and plug dry. The power voltage and frequency must meet the requirements listed on the equipment label or in this User Manual.
	The equipment is equipped with an audible and visual alarm system, the red and yellow alarm indicators will light on by turn, and the speaker makes the "beep" sound.
	Please keep the equipment at a certain distance from the AC power socket to prevent the chemical liquid from splashing or dripping into the socket and causing a short circuit fault.
	Please use the fluid/drug after it has reached or nearly reached room temperature. When the fluid/drug is used at low temperatures, the air which is dissolved in the fluid/drug may cause more air bubbles and result in frequent air bubble alarms.
	It is not allowed to press and operate the button with a sharp object (such as a pencil tip and nail). Otherwise, it may cause early damage to the button or surface film.
	Please do not use the same infusion set over 8 hours at the same pumping position. Infusion set may distort after use for a long time and cause a flow rate error. It is suggested to replace the pumping position or directly replace the infusion set once every 8 hours.
	Please tightly close the flow rate adjuster of the infusion set before taking out the infusion set to avoid infusion free flow.
	Under the condition of low flow rate infusion, please pay particular attention for an occlusion. The lower the infusion flow rate, the longer the time to detect an occlusion, which may cause a long-time infusion stoppage during this period.
	If the equipment is damaged from dropping or impact, please stop using it immediately, and contact Covetrus®. The equipment's inside components may be damaged even if the appearance is not damaged and abnormality does not occur when working.
	When using this pump, other infusion control equipment cannot be installed on the same infusion tube. Otherwise, it may cause errors.







Dialogue Windows

Dialogue window mainly includes operation select, operation confirm, and information.

Symbols

Not all of the below symbols exist in the equipment you have purchased.

Marks	Description
	Lot Number
	Attention, consult accompanying documents
	Both direct and alternating current
	Environment-friendly use period (20 years)
	Date of Manufacture
	Bell, cancel temporary
	Serial Number

Marks	Description
	Protective earth
	Alternating Current
	Input and output
	Handle with care
	Manufacturer
	Selection; affirmative acknowledgement; success; ACK
IP34	Ingress Protection (Prevent solid objects larger than 2.5 mm in diameter and water intrusion from splashing in all directions)

Overview

Application Scope

Expected Purpose

This product is used for constant-speed intravenous infusion in a hospital.

Expected Working Environment

Including but not limited to the operation room and surgery table in an animal hospital/or pet clinic.

Working Principle

This equipment can drive a pump to extrude the infusion set for accurately controlled infusion drops or infusion flow rate with the motor. It is capable of guaranteeing the infusion of drug fluids safely in the vein of animals with an even rate and accurate dosage.

Structure and Performance

Structure and Performance

The Covetrus® ProMAX IV Touch Digital Infusion Pump is composed of the main unit and built-in battery, which can be subdivided into shell assembly, main control module, power module, display module, operation module, drive module, monitoring module, and alarm module.

This equipment provides several infusion modes, such as rate mode, time mode, body weight mode, drug library mode, and sequence mode. Additionally, it also has functions such as history records, drug library, Anti-bolus, alarm, and so on.

Accessories

Power Cord and Pole Clamp.

Product Specification

Safety Classification	
Ingress Protection	IP34 (Prevent solid objects larger than 2.5 mm in diameter and water intrusion from splashing in all directions)
Working mode	Continuous
Classification	Portable equipment, non-portable infusion pump

Specification Parameters	
Infusion Set Specification	10~60 drops
System Accuracy	±5%
Drip Infusion Rate Accuracy	±10% or ±1 drops/minute
Infusion Rate	0.10-1500 ml/h
Drip mode range	1~500 drops/minute
Bolus Rate	0.1-1500 ml/h

Specification Parameters (continued)	
Bolus preset	0.1-60 ml
KVO Rate	0-5.00 ml/h
Micro Mode Setting Range	100-1500 ml/h
Minimum Flow Rate Increment	0.01 ml/h
VTBI	0-9999.99 ml, minimum step is 0.01 ml
Total Volume Infused	0.01-9999.99 ml, minimum step is 0.01 ml
Time Range	1 minute - 99 hours 59 minutes
Fuse Type	slow fuse 2A 250V
Dimensions	105(w) x 109(d) x 142(h) mm (Pole Clamp not included)
Weight	1.4 kg, 3.08 lbs

Power Supply	
AC Power Supply	100-240V 50/60Hz
Input Power	20VA
DC Power Supply	DC 12V
Battery Specifications	<p>Specification: 7.4V 2500mAh</p> <p>Charging time: single battery less than 2 hours, two batteries less than 4 hours (under OFF status)</p> <p>Working time: single battery over 4.5 hours, two batteries over 9 hours (after completely charging battery/batteries, when the environment temperature is 25°C or 77° F and flow rate is 25 ml/h, the constant working time)</p>

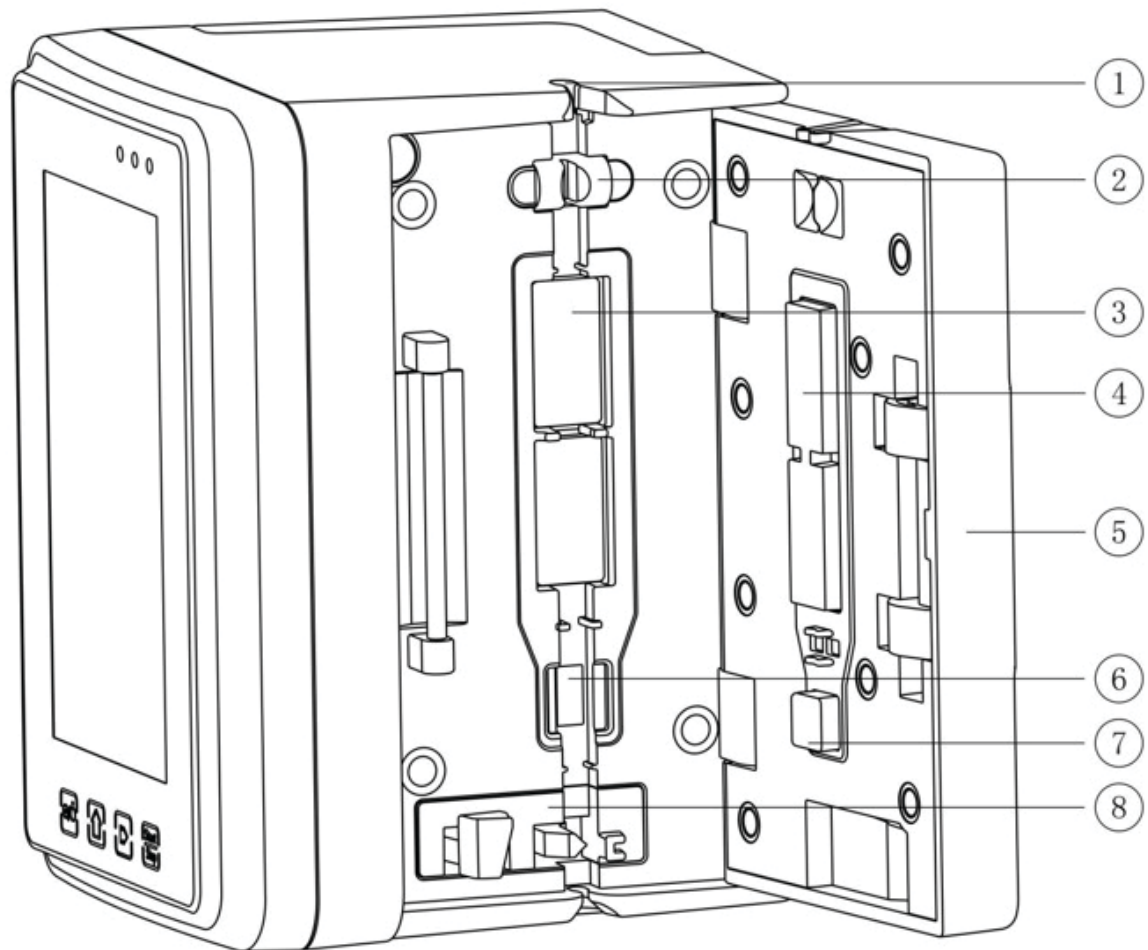
Alarm	
Alarm Signal Sound Pressure Level	<p>When the sound is set at lowest level, alarm signal sound pressure level $\geq 45\text{dB(A)}$</p> <p>When the sound is set at highest level, alarm signal sound pressure level $\leq 80\text{dB(A)}$</p>
Alarm Information	<p>VTBI near end, VTBI infused, Occlusion (Pressure high), Battery nearly empty, Battery empty, No battery inserted, No external power supply, Pump idle alarm, Standby time expired, KVO finished, Air bubble, Door Open</p>

Environment

Non-AP/APG type equipment	Do not use it in an environment with inflammable anesthetic gas mixed with air, and inflammable anesthetic gas mixed with oxygen or nitrous oxide
Operating	<ol style="list-style-type: none">1. Temperature: 5–40°C, 41–104°F2. Humidity: 20-90%, non-condensable3. Atmospheric Pressure: 57-106kPa
Transport and Storage	<ol style="list-style-type: none">1. Temperature: -20–55°C, -4–131°F2. Humidity: 10-95%, non-condensable3. Atmospheric Pressure: 50-106kPa

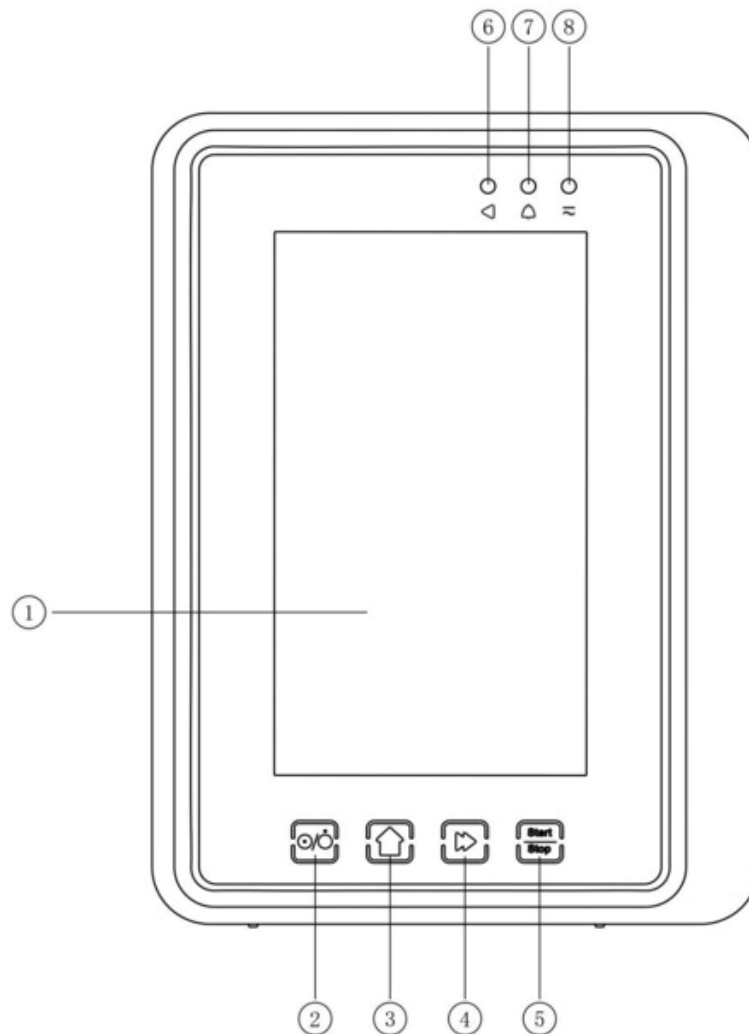
Appearance

Front View



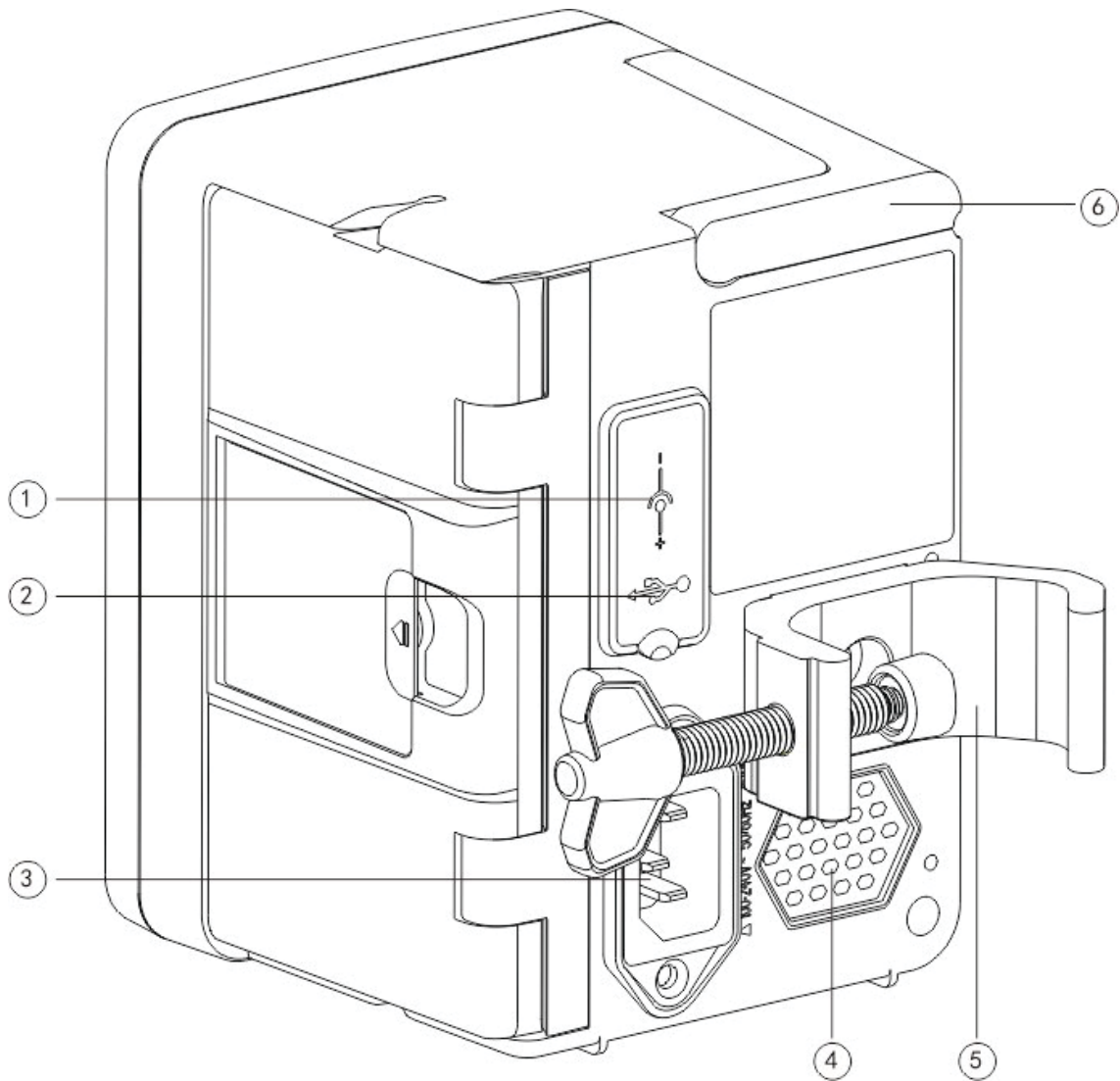
Part Number	Name
①	Tubing Guide
②	Pump Door Air Bubble Sensor (for air bubble detection in the infusion line)
③	Pump Tablets
④⑦	Pressure Plate
⑤	Pump Door
⑥	Pressure Sensor (for occlusion detection)
⑧	Anti-Free Flow Clamp

Operation Panel



Part Number	Name	
①	Touch Screen	
②	【Power】	Pump power switch, short pressing the power button to enter the shutdown setting interface, the user can set shutdown, standby (time), or cancel. Long pressing the power button until the screen turns off.
③	【Home】	Enter system home page.
④	【Bolus/Purge】	
⑤	【Start/Stop】	
⑥	Running Indicate Light	
⑦	Alarm Indicator Light	While pump alarms, the indicator light flashes with different frequencies and colors to show different alarm levels. For more information, please refer to page 21.
⑧	AC Indicate Light	When connected to the AC power supply, the AC indicator light is on.

Rear View



Part Number	Name
①	DC Input Port, external 12V DC power supply
②	Multi-function USB Port
③	A/C Adapter Port, external 100-240V 50/60Hz AC power supply
④	Loudspeaker
⑤	Pole Clamp, used for fixing the equipment on the infusion stand
⑥	Handle

Installation

Unpacking and Checking

- Please check the appearance before unpacking; if broken, please contact Covetrus®.
- Please carefully open the package to avoid damaging the equipment and relevant accessories.
- After unpacking, please check the objects according to the packaging list; if there are insufficient or damaged accessories, please contact Covetrus.
- Please keep relevant accessories, warranty card, and User Manual.
- Please keep the packing case and packing materials for future transportation or storage.



Please put the packing materials out of reach of children. Please obey local laws and regulations when disposing of items.

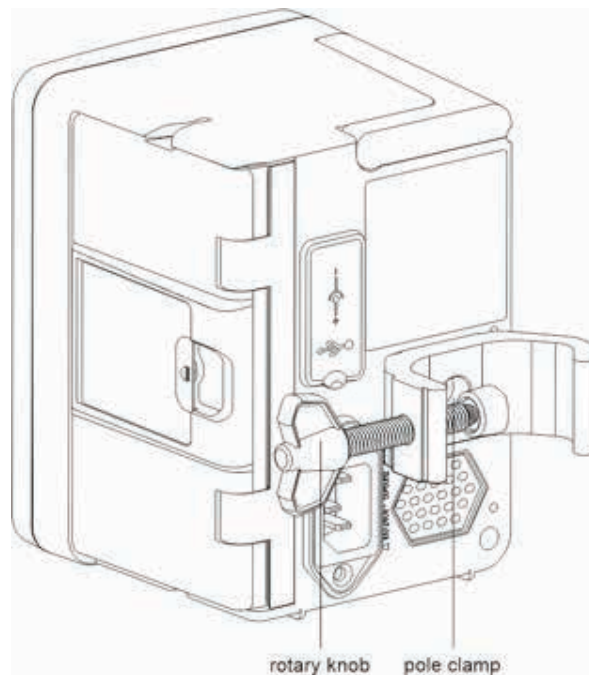
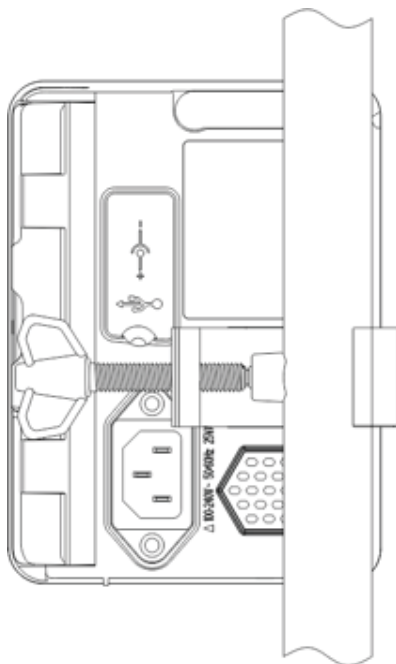
Installation



- This equipment shall be installed per instructions of this manual
- When connecting this equipment with other electric devices to form a combination with special function, if the combination can't be confirmed dangerous or not, please contact Covetrus or an electrical expert of the hospital to ensure the necessary safety of all devices in the combination won't be destroyed
- This equipment must be used and stored in an environment that satisfies the guidelines from this manual

Install the Covetrus® ProMAX IV Touch Digital Infusion Pump

- Rotate the Pole Clamp screw (knob) and unscrew it to leave space
- Lock the Pole Clamp on the infusion stand, adjust the position of the ProMAX IV Touch Digital Infusion Pump, and tighten the Pole Clamp to fix the ProMAX IV on the infusion stand (as shown in the drawing).
- Hold the ProMAX IV when tightening the fixing clamp; carefully let go of it after tightening to avoid it from falling
- The Pole Clamp supports the vertical pole at the default state. To adjust the Pole Clamp direction, please remove the bolt from the Pole Clamp, take out the Pole Clamp and, adjust the direction, then tighten the bolt



Use Preparation & Cautions

Use Preparation

If the equipment is new, reusing after storing for an extended period, or reusing after repair, please check it to ensure before use:

- The equipment's appearance is clean and in good condition without cracks and leakage
- The moving components are smooth and effective; the buttons are effective
- The touch screen can be operated smoothly and effectively
- The power cord is installed tightly and won't be easily damaged when pulling
- Set and check the system time to ensure the history records will be correctly recorded
- If only the built-in battery is adopted for supplying power, please charge it fully before using, and check the battery state frequently
- Carefully read the Warnings, Cautions, and Operation Steps in this User Manual



Operation Cautions



- Avoid direct sunlight, high temperature, and high humidity
- The parameters can only be set or changed by trained and professional personnel
- Infusion accuracy or abnormal work of the equipment may be compromised if the working environment temperature exceeds the designated range
- The viscosity and specific gravity of infusion fluid will influence infusion accuracy

Basic Operation

Operation Flow


- Mount the Covetrus® ProMAX IV Touch Digital Infusion Pump on the IV stand: refer to page 11
- Power on: press  button to power on, and the machine completes a self-inspection; refer to below
- Install Infusion set: refer to below and page 14
- Confirm Infusion set brand name: Select infusion set brand
- Remove air bubble from the line: refer to page 14
- Select infusion mode: Select infusion modes according to requirement
- Set infusion parameters: set infusion parameters according to requirement
- Connect the infusion set with the animal
- Start infusion: press , start infusion
- Finish infusion: refer to page 15
- Remove the Infusion set: refer to page 16
- Power off or Standby: refer to page 16

Infusion Operation

Equipment Installation

Mount the device on the infusion stand according to page 11, connect with AC power supply, and check the AC indicator lights. The battery will start to charge once AC power is connected.

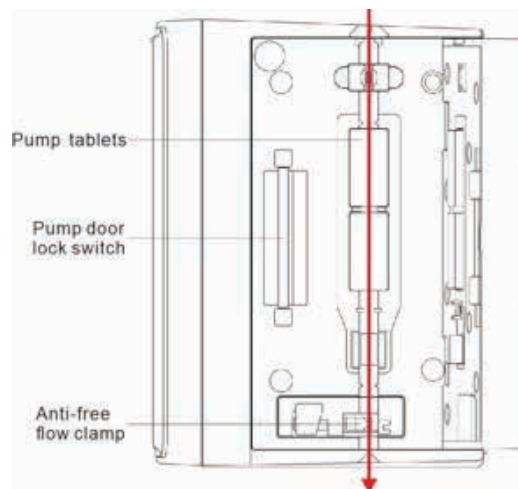
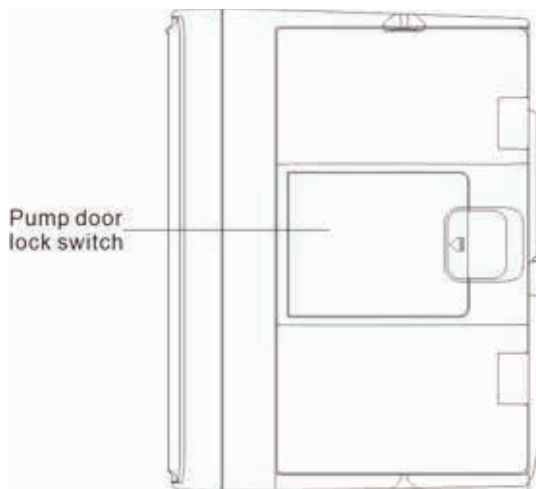
Starting and Self-test

- Press  button to power on the equipment
- After power is on, the system will automatically check the motor, sensor, battery, memorizer, CPU communication, and alarm indicator
- After passing the self-test, the pump enters into rate mode interface



If the self-test fails, the pump cannot be operated properly or is damaged, it cannot be used for animal infusion; please contact Covetrus®.

Infusion Set Installation



Infusion set Installation (continued)



- Connect the IV set with the infusion bottle
- Extrude the drip chamber
- When the fluid has reached the 1/2 position of the drip chamber, open the adjuster
- Fill fluid/drug to the injection needle to remove air, then close the adjuster
- Pull the lock switch in the middle of the Pump Door from the lower side, then open the door
- Push the Anti-Free Flow Clamp up to open it
- Install the infusion set in the slot according to the direction indicator shown in the above drawing, and press the infusion set in the pump inwards to make it attach to the peristaltic pump
- Manually push the Pump Door, which will make a "click" sound after it is correctly closed
- Click 『Settings』 → 『Commonly used tube brand』 , and select infusion set brand



- It is suggested to use the infusion set brand defaulted in the pump
- Please confirm that the infusion set brand and specification displayed on the display screen is accordant with the actual one in use
- Contact Triumph Medical if you are unsure if you are selecting the correct infusion set brand—selecting the wrong infusion set brand could compromise the accuracy and possibly cause injury to the patient

Purge Air

There are two ways to set parameters for purging air: manual purge and automatic purge. Users can choose the method according to their needs, and the total purge volume is not calculated in the Total Volume Infused.

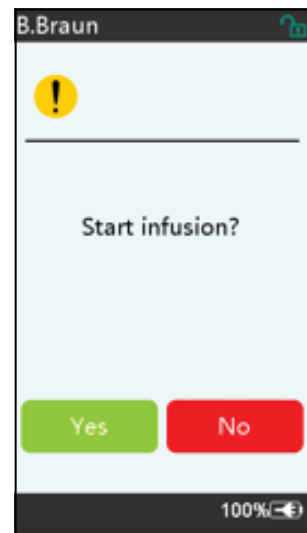
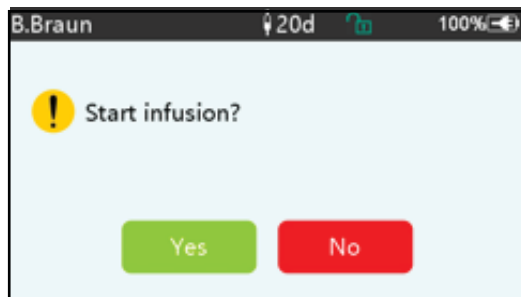
- Manual purge: Long pressing [Bolus] button  , the device will purge air according to the default flow rate of the system, release it and return to the setting parameter interface
- Automatic purge: Under the parameters setting interface, Press 【Bolus】  button on the display and select "Yes" in the pop-up prompt box until the air bubbles in the infusion line are eliminated and click "Stop"



- Before purging air, double-check to confirm the infusion set is **not connected** with the animal
- Purge rate is the max rate. The purge will automatically stop when the volume is ≥ 5 ml

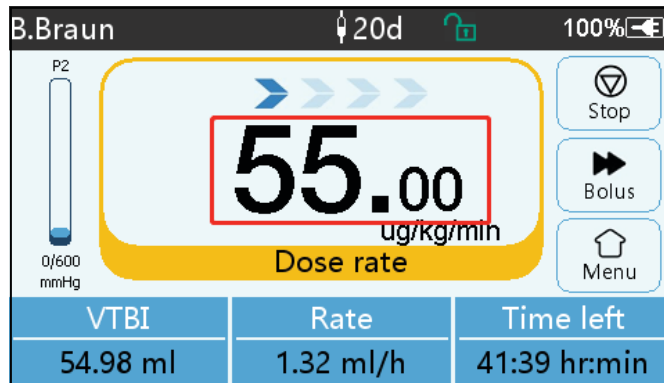
Start Infusion

Connect Infusion set to animal, confirm infusion parameters, Press 【Start】 button  , click 『 Yes 』 in the pop-up prompt interface, start infusion.



Changing the Rate During Infusion

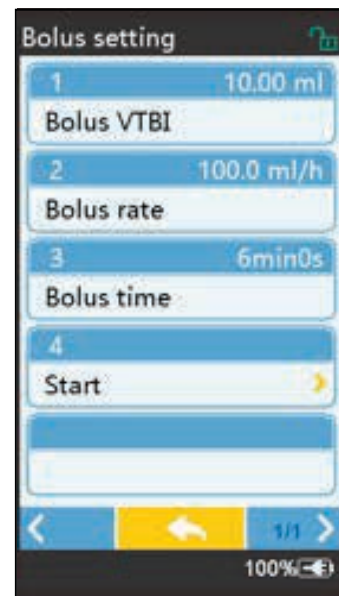
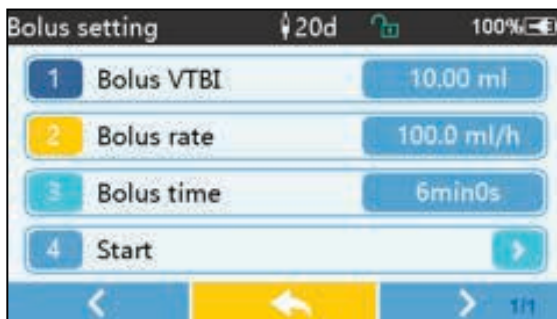
During the infusion process, the flow rate/dose rate/drop rate can be changed without stopping in any infusion modes.



Bolus Application

During operation, the bolus functions have two operation modes: Manual bolus and Automatic bolus.

- **Manual bolus:** Long pressing the [Bolus] ►► button on the product panel, pump will work at the max flow rate (refer to 2.5). Once the button is released, the pump will return to the previous infusion rate
- **Automatic bolus:** Under the running interface, click the [Bolus] ►► button on the touch screen, set two parameters among bolus infusion volume, rate, and time, and click [Start]. It will beep at every 1ml infused. After the bolus infusion is finished, it will return to the previous infusion rate



Infusion Completion


When the remaining infusion time is near the preset volume to be infused completion time, the pump will alarm. If the alarm is ignored, the system will keep alarming until it completes the VTBI infusion. For more information, please refer to page 19

After VTBI is completed, it activates VTBI infused alarm. If the KVO function is ON, the equipment automatically starts the KVO function click [OK] in the alarm interface to stop KVO and eliminate the alarm.

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

Please refer to page 18 to set the KVO rate.

Stop Infusion

During infusion, click  infusion stop. It will return to the parameter setting interface and display Total Volume Infused and adjustable parameters.

Remove the Infusion Set

Disconnect the infusion set from the animal, and open the Pump Door manually, the liquid can still be stopped normally with the Anti-Free Flow Clamp, and the infusion set can be removed after the Anti-Free Flow Clamp is opened.

Replace Infusion set; please follow the steps on [page 14](#).

Power OFF or Standby

Method 1: Hold the  【Power】 Button till the screen is OFF, the equipment is OFF.

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

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

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

Replace Infusion Set/Infusion Container

Please replace the infusion set assembly according to the following steps:

- Close the flow rate adjuster of the infusion set assembly, open the ProMAX IV Touch Digital Infusion Pump Door, and then remove the infusion set assembly
- According to [page 14](#), prefill and install the new infusion set 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 set assembly
- Remove the fluid/drug container from the infusion set assembly
- Connect the infusion set with the new fluid/drug container
- Restart infusion according to the above steps of replacing infusion set assembly




The infusion set will distort if it works for an extended period and result in inaccuracies or flow rate error, it's suggested to replace the pump position or infusion set after working for 8 hours.

Set Infusion Parameters

Introduction to Infusion Parameters Setting

- The drug information can only be displayed in the infusion running interface when the drug library is active
Click 『Settings』 icon in the main interface to enter the sub-menu, find the 『Drug Library』 menu item, click to enter, then set the ON/OFF state of the drug library and select drug—please refer to this User Manual, page 18, for details
- For both the rate set in the infusion parameter and the rate calculated by the system, the range is the system default flow rate of the current working infusion set specification
- If VTBI (Volume to be infused) is set, the pump will infuse all the fluid/drug in the IV set/bag

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 a preset infusion mode.

Rate/Time Mode

Under Rate mode, the user can set two parameters: Rate and VTBI (Volume to be infused). Set these two parameters, and the system will automatically calculate the third parameter; if the VTBI is 0, the equipment works at the set rate until the pump is stopped with an alarm.

Under Time mode, it allows the user to set VTBI (Volume to be infused) and Time, and 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), Active agent (Drug amount), Conc. unit (concentration unit), Volume (fluid volume), Conc., Dose rate, Dose unit, and VTBI.

The system will automatically calculate the flow rate according to the related formula $\{\text{dose rate} \times \text{weight}\} / \{\text{active agent (drug amount)} / \text{Volume(fluid volume)}\}$, 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 the parameters. Drug Library Editable (see next page in System Settings)

Sequence Mode

Sequence mode is to infuse according to a set sequence after programming the rate and time of different sets of sequences. Up to 10 different sequence groups can be programmed.


System Setting

Settings

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

Infusion Set Admin Brands

After installing the infusion set, select the correct infusion set brand

	The infusion set of different brands may cause flow rate deviation. When using an IV set, please confirm if the displayed information in the interface corresponds with the actual infusion set.
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Cage Number

Not Applicable.

Drug Library

Click on the preset drug name, and the selected drug will be reflected in infusion mode parameters. To remove drug name from infusion mode parameters, select "none" in the 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, and after confirming, click 『OK』 .

Please refer to page 6 for the adjustable KVO range.


Bolus Rate

Set the default Bolus rate. Please refer to page 5 for the range of bolus rate.

Occlusion Pressure

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

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

	<ul style="list-style-type: none">• When adopting a fluid/drug of high viscosity and the occlusion pressure is set at a low level, it is possible that the system will report an 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 set, and raise the occlusion pressure if needed• When the occlusion pressure is set at a high level, it may cause the animal to be uncomfortable.• After raising the occlusion pressure, please carefully observe the condition of the animal and immediately take measure if there's any abnormality• Under an equipment fault state, the max pressure generated by the infusion set is 300 kPa• Under single fault state, the max infusion volume is 2 mL
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Applicable Model: Covetrus® ProMAX IV Touch Digital Infusion Pump Occlusion Pressure Level: 4 levels							
Level	Pressure Intensity (mmHg)	Level	Pressure Intensity (mmHg)	Level	Pressure Intensity (mmHg)	Level	Pressure Intensity (mmHg)
1	50	2	300	3	600	4	900

Pressure Unit

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

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

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

Bubbles Size

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

The air bubble detector has 8 levels. It is suggested to select a suitable level according to the actual requirement.

Note: Please select a suitable air bubble detector level for different vets and drugs.

Air Bubble detector level	Alarm Threshold Value
Level 1	10ul
Level 2	50ul
Level 3	100ul
Level 4	200ul
Level 5	300ul
Level 6	450ul
Level 7	600ul
Level 8	800ul

Pump Idle Alert

Click 『Pump Idle Alert』 to enter the time for the reminder alarm setting interface and click the preset time option to set the reminder alarm time.

Pump Idle Alert refers to the alarm that will be prompted if there is no key operation within the preset idle alert time when the device is in the non-infusion and non-alarm state. Pump Idle Alert time is settable to 2, 5, 10, 15, 20, and 30 minutes.

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 the pre-alarm setting interface, and click the preset time option, to set the finish pre-alarm time. Finish pre-alarm time is settable to 2, 5, 10, 15, 20, and 30 minutes.

Micro Mode

Click 『Micro mode』 to enter into the micro mode setting interface. ON/OFF is optional in this function. Optional. Under the ON mode, set the rate limit, then the infusion rate under any infusion mode is not allowed to exceed this limit. Micro mode setting: 100~1500 ml/h, minimum step is : 1 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.

Rotate Screen

Click 『Rotate Screen ON/OFF』. When selecting ON, the screen will rotate freely in landscape or vertical directions.

Date & Time

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

When setting the date and time, directly input the numerical value in the input method interface. For example, to preset the date "2023-04-17", input "20230417"; to preset the time "13: 34", input "1334".

The time is displayed in 24-hour or 12-hour format, and the date is displayed in British, American, or Chinese; please set according to the requirement.

Brightness

Click 『Brightness』 to enter into the display brightness setting interface. The brightness has 10 levels.

Sound

Click 『Sound』 to enter into the sound parameters setting interface; the volume has 10 levels. The lowest volume is ≥ 45 dB, and the highest volume is ≤ 80 dB. Move the long box to the preset value. After confirming, click 『OK』

Screen Lock

Click 『Screen lock』 to enter into the automatic lock screen setting interface, and select ON or OFF. Automatic lock screen time can be set at 15 seconds, 30 seconds, 1 minute, 2 minutes, 5 minutes, 10 minutes, 30 minutes, and so on, which means that the equipment will automatically lock the screen if it is not touched or the button is pressed within corresponding time after starting.

Unlock: directly 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.

System

Click 『System』 under the menu interface, enter the system information setting interface.

Language

This equipment supports simplified Chinese, English, etc.

Factory Default

Click 『Factory data reset』 to clear the User defined option, and this function is open to the user.

Version

Check the software version and serial number of the equipment in this interface.

Maintenance

This interface is used by Triumph Medical to maintain and calibrate the equipment.

Maintenance Period

This interface is used by Triumph Medical to maintain and calibrate the equipment.

Last Maintenance Date

This interface is used by Triumph Medical to maintain and calibrate the equipment.

Other Functions

History Entries

Click 『Records』 in the main interface to enter the submenu, and click the 『History entries』 menu item into the history records query interface. The equipment supports saving 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 the first in, first out principle.

Last Therapies

Click 『Last Therapies』 in the main interface to enter the therapy records query interface.

- This interface shows the last 20 therapies. Users can select one therapy record for the new infusion. After selecting, check the infusion parameters, confirm and start infusion.
- When it is full, the new records will cover the old records with the first in, first out principle.

Anti-bolus

When an occlusion alarm is triggered, the system will automatically process the anti-bolus feature. When this happens, the pump will withdraw the amount of blocking fluid and reduce the pressure to avoid a large impact dose to the animal after the occlusion is eliminated.

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 and 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	20s	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 the alarm is not eliminated, the alarm sound will be sent out 2min later.



Some alarm threshold values of this equipment can be set by the user, for example, occlusion pressure, air bubble alarm, pump idle, 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 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, and report the middle alarm after eliminating all alarms of the highest level
Several alarms of same level generate simultaneously	Alarms circularly by turns, the time interval is 1s

When alarming, the corresponding alarm information will display on the screen's title. Refer to Appendix A for more information

Alarm Treatment



When there's an alarm, please check the conditions of the animal, remove the reason for the alarm, and then continue working.

Please refer to Appendix A for the alarm solution.

Fault Analysis and Solution

When there's a fault, the Covetrus® ProMAX IV Touch Digital Infusion 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, and 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 cause unpredictable harm if it works with a fault.

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

- Under a single fault state, the max infusion volume is 2 ml.

Maintenance

Cleaning

- The daily maintenance is mainly to clean the shell and pump body. Fluid/drug may inevitably flow in the equipment during infusion. Some fluid drugs may corrode the pump and cause a working fault. After infusion, please timely clean the equipment; first wipe it with 75% alcohol, then clean with a soft damp cloth, and then dry it naturally.
- When cleaning the equipment interface, please wipe it with dry and soft fabric, and confirm the interface is dry before using.
- Please do not soak the equipment in water. Although this equipment has a certain waterproof function, when fluid splashes on the equipment, please check if it works normally and perform an insulation and electric leakage test if needed.

Periodical Maintenance

Notes:

- The user should set up a complete maintenance plan. Otherwise, it may possibly cause the equipment to malfunction or fault.
- To ensure the safe use and prolong the service life of the equipment, it is suggested to periodically maintain and check it once every 12 months. Some items shall be maintained by the user, and some items shall be maintained by Triumph Medical.
- Please contact Covetrus® if the equipment is found defective.

Appearance Check

- The appearance of equipment shall be clean and in good condition without cracks and water leakage.
- The buttons are flexible and effective without invalid phenomena; the touch screen's sensitivity is normal.
- The Covetrus® ProMAX IV Touch Digital Infusion Pump Door should be smoothly opened and closed. The Anti-Free Flow Clamp mechanism is in good condition.
- The power cord is in good condition and can be installed tightly.
- After connecting with the external power supply, check whether the AC indicator light is on.
- Adopt the accessories designated by Covetrus.
- The environment meets the requirements of this user manual.

Performance Check

- Self-test and infusion functions work
- Alarm function works well
- Battery performance

Maintenance Plan

The following check/maintenance items must be performed by a professional technician recognized by our company. If the following maintenance is necessary, please contact our company. Please clean and disinfect the equipment before testing or maintaining.

Maintenance Items	Cycle
Safety checks	Once every 2 years, please check after replacing the printed circuit board assembly or if the equipment is dropped or knocked
Preventive system maintenance items (pressure calibrate, sensor calibrate, pump)	Once every 1 year, when the occlusion alarm, air bubble alarm, or infusion accuracy is doubted to be abnormal
Infusion accuracy	Using the equipment for the first time, using a new infusion brand, and reusing the equipment after not being used for a long time

Calibration

Calibration is performed by Triumph Medical.

Repair

Normal Repair Process

Please contact Covetrus® to repair if there's any fault. Do not disassemble and repair the equipment.

Maintenance for Long Term Store

If the equipment won't be used for an extended period, please take out the battery, and pack it with the equipment. Store it in a cool and dry place without direct sunlight.

The following operations are necessary for using it again:

- Verify the flow rate accuracy to avoid nonconformity between the infusion set parameters in the equipment and the actual parameters after it hasn't been used for an extended period or caused by other reasons; otherwise, it may cause infusion error, influence the therapeutic effects and even cause medical negligence
- Perform air bubble and occlusion alarm tests
- Test the battery discharging and charging duration to confirm that the battery is also usable

Equipment Components/Accessories



Only the components and accessories designated by Covetrus or Triumph Medical shall be adopted. Otherwise, it may possibly damage the equipment or decrease its performance.

Variety	Name	Number
Accessories	Power Cord	TRI-RTPC-23
Accessories	Pole Clamp	TRI-UPC-23

Production Date


Please refer to the label of the product.

Recycling

The average service life of this equipment is 10 years and depends on the frequency of use and maintenance. The equipment must be rejected after reaching the service life. Please contact Covetrus® if you need assistance.

- The obsolete equipment may be returned to Covetrus
- The used lithium-ion polymer battery has the same treatment method or according to the local applicable laws and regulations for batteries
- Please follow your local medical equipment scrap process
- Recycling must comply with local laws and regulations

Battery

The Covetrus® ProMAX IV Touch Digital Infusion Pump is equipped with a charging lithium-ion polymer battery to ensure the standard infusion when the equipment is moved, or the external power supply is cut off. Connecting the external power supply can charge the battery whether the equipment is started or not. When charging, the equipment screen displays the battery charging indication icon . In case only the built-in battery is adopted for supplying power, and when the remaining battery is less than 20%, please connect the equipment to an external power supply to charge the battery.



Only use the battery designed by Triumph.

Check Battery Performance

The performance of the built-in battery may drop according to the duration of use; it is suggested to check the battery once a month.

- Disconnect the equipment from the animal, and stop all infusions
- Supply AC power to the equipment to charge the battery for at least 5 hours
- Supply power for the ProMAX IV Touch Digital Infusion Pump only with the battery, infusion at the rate of 25 ml/h, and test the time until the battery runs down and the equipment is turned off
 - If the infusion time exceeds 7 hours, the battery keeps a good state
 - If the infusion time exceeds 5 hours but less than 7 hours, the battery starts deteriorating, but it can be used temporarily
 - If the infusion time is less than 5 hours, the battery is reaching the service life; please replace the battery

Replace Battery

Contact Triumph Medical

After-Sale Service

This product has a two-year free warranty after purchase. The warranty period is from the purchase date. The damages to the equipment caused by the following do not qualify for warranty service.

- Fault caused by incorrect operation, unauthorized refitting, or repair
- Damages caused by incorrect operation during transportation process after purchase
- Fault and damages caused by fire, salt injury, toxic gas, earthquake, windstorm, flood, abnormal voltage, and other natural disasters

For the damages or faults mentioned above, Triumph Medical provides repair services that can be chargeable.

Appendix

Appendix A Alarm and Solution

NO.	Alarm Type	Alarm Level	Reason	Solution
1	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
2	VTBI Infused	High	The preset value infusion Completion	Press 【Stop】 button to stop alarm
3	Pressure High	High	Line occlusion during infusion	Manually remove the reason for occlusion, press 【Start】 button to continue infusion
			Fluid/drug in the actual infusion set has high viscosity, but the system occlusion level is set too low	Rise the alarm Level, Press 【Start】 button to continue infusion
			The Pressure Sensor is damaged	Please contact the dealer or manufacturer for repair
4	Battery Nearly Empty	Low	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
			Battery aging or the equipment charging circuit is fault	Please contact the dealer or manufacturer for repair
5	Battery Empty	High	When only the internal battery is used for power supply, and the battery power is close to exhaustion, the alarm duration is not less than 3 minutes	Immediately connect with the external power supply
			Battery aging or the equipment charging circuit is fault	Please contact the dealer or manufacturer for repair
6	No Battery Inserted	Low	Battery is removed	Keep connecting with the external power supply, reinstall the battery
7	No External Power Supply	Low	Under the ON state, the AC power supply is adopted, but the AC power cord is dropped during the process	The alarm automatically eliminates after connecting the external power supply
8	Battery and External Power Not in Use	High	The battery is not inserted, and the AC power cord is not connected at the same time	Install battery or connect external power supply
9	Pump Idle Alert	Low	After installing the infusion set under a non-working or alarm state, it is not operated within the specified time of the system	Click any button to stop
10	Standby Time Expired	Middle	During standby, after reaching the standby time	Press 【Stop】 button to stop alarm

NO.	Alarm Type	Alarm Level	Reason	Solution
11	KVO Finished	High	KVO working time reaches 30min, ProMAX IV Touch Digital Infusion Pump stops working	Press 【Stop】 button to stop alarm
12	Air Bubble	High	Air bubble in the infusion set	Press 【Stop】 button to stop the alarm, disconnect the line from the animal, exhaust air with air exhaust function, or open the
13	Door Open	High	During infusion, the ProMAX IV Touch Digital Infusion Pump Door is opened	Press the 【Stop】 button to eliminate this alarm
14	System Error	High	Internal failure or software exception	Turn off and Restart. If the alarm still exists, please contact the dealer or manufacturer for repair

Note: When the alarm rings, click the 『Mute』 icon on the screen to temporarily stop the sound alarm for 2 minutes.



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