



## Technical Data

|                                  |                                                                                                                                                                                                                                                                     |                                                                     |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>Applicable Syringe Size</b>   | 2ml, 5ml, 10ml, 20ml, 30ml, 50/60ml                                                                                                                                                                                                                                 |                                                                     |
| <b>Rate</b>                      | 2ml:0.01~60ml,<br>10ml:0.01~300ml,<br>30ml:0.01~900ml,                                                                                                                                                                                                              | 5ml:0.01~150ml<br>20ml:0.01~600ml<br>50/60ml:0.01~2200ml            |
| <b>Bolus Rate &amp; Volume</b>   | 2ml:0.01~48ml/h<br>5ml:0.01~120ml/h<br>10ml:0.01~240ml/h<br>20ml:0.01~480ml/h<br>30ml:0.01~720ml/h<br>50/60ml:0.01~1500ml/h                                                                                                                                         | 0.1~0.5ml<br>0.1~1ml<br>0.1~5ml<br>0.1~10ml<br>0.1~10ml<br>0.1~10ml |
| <b>FF Rate</b>                   | 2ml:0.01~60ml,<br>10ml:0.01~300ml,<br>30ml:0.01~900ml,                                                                                                                                                                                                              | 5ml:0.01~150ml<br>20ml:0.01~600ml<br>50/60ml:0.01~2200ml            |
| <b>KVO Rate &amp; Volume</b>     | Rate:<br>0.01 ~ 5.0ml/h<br>Volume:<br>2ml:0~0.2ml, 5ml:0~0.2ml<br>10ml:0~0.2ml, 20ml:0~0.5ml<br>30ml:0~0.5ml, 50/60ml:0~1ml                                                                                                                                         |                                                                     |
| <b>Rate Accuracy</b>             | Within $\pm 2\%$ (after calibration)                                                                                                                                                                                                                                |                                                                     |
| <b>Occlusion Pressure Levels</b> | 13 Levels are available                                                                                                                                                                                                                                             |                                                                     |
| <b>Alarms Information</b>        | Injection finish, soon finish, VTBI finished, system stand-by freedom, injection is blocked, syringe falls off, syringe improperly installed, forgotten operation, low battery, battery runs out, abnormal running state, equipment failure, system power down etc. |                                                                     |
| <b>Prompts</b>                   | Parameter overrun, injection begins, AC power has been pulled out, speed overrun.                                                                                                                                                                                   |                                                                     |
| <b>Power Source</b>              | Three options for power supply:<br>First: 100~240VAC, 50/60Hz;<br>Second: Inserted Li-battery 11.1V, capacity $\geq$ 2600mAh, 8 hours backup time at the rate of 5ml/h for a fully charged battery;<br>Third: External DC 15V power supply.                         |                                                                     |
| <b>Drug Library</b>              | Up to 1000 drugs are provided                                                                                                                                                                                                                                       |                                                                     |
| <b>Dimensions</b>                | 301mm ( L ) $\times$ 183mm ( W ) $\times$ 82mm ( H )                                                                                                                                                                                                                |                                                                     |



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# Sunfusion®

## Syringe Pump

Semi-1|Erch-3|Anim-5



Scan to know more

**BYOND 比扬**

Pioneer in Life Science

# Sunfusion<sup>®</sup> Syringe Pump



Semi-1



Erch-3



Anim-5

## Innovative design Better sensibility

### > UI Design



- Brand-new appearance, small and lightweight, design as portable;
- 3.5" colorful touchscreen to display various information on one page;
- Easier operations are provided by simple UI design.

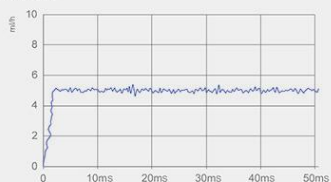
### > High-quality PBT Enclosure



- High-quality PBT enclosure, which makes medical disinfection and cleaning convenient;
- Multi - and Across - combination of syringe pump and infusion pump is enabled by Slide guide and lock catch design, which is safe and practical.

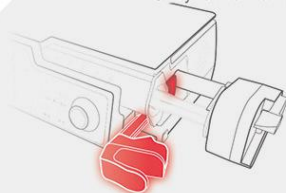
## Intelligent safety More care

### > Fast Start



- 8 injection modes are able to satisfy various clinical needs;
- Applicable to 2ml, 5ml, 10ml, 20ml, 30ml, 50ml /60mlsyringes;
- Rate are adjustable during running state.

### > Dynamic Alarm Instructions



- 10 levels for forgotten operation time are selectable;
- 30 levels for near finished alarm time are optional to make supervision reliable;
- Intuitively demonstrate operation instructions by the application of Smart Alarm System.

### > Multi-function interface



- DC 15V Power connector;
- Multi-function connector;
- Compatible with either recommended syringes by default with great accuracy or other syringes by correct calibration.  $\leq \pm 2\%$  accuracy is achieved.

$\leq \pm 2\%$

Precision

0.01ml/h  
2200ml/h

Rate

IP24

High IP Level

13 Levels

DPS

## Features



### Auto-Lock Screen

Up to 11 levels time setting;  
Prevention for operation errors.



### Night Mode

Design for nighttime safe operation.



### Dual CPU

Guarantee for safe work.



### System Self-test

System self-test is conducted every time turning on, including alarm indicator, volume, pressure, air bubbles, etc;  
Safeguard for every-time use.



### Human Voice Alarm

Exclusive technology;  
Combination of human voice, readable words and visual light alarm;  
8 volume levels are available.



### WLAN Function

Capable of communicating with information management system;  
Remotely monitor patient's condition in real time.



### History Record Cassette

Up to 2000pcs records, including operation, alarm and modification;  
Trackable treatments are ensured.



### Certification

Certified by TÜV Rheinland and EN ISO13485:2016





# **Syringe Pump**

## **Sunfusion Series**

### **Operator's Manual**

**Please read this manual carefully before use the device**

# 1 Overview

## 1.1 Introduction

### 1.1.1 Working Principle and Intended Use

Used together with the matching disposable syringe, the Sunfusion serial Syringe pumps (hereinafter referred to as syringe pump) implement its infusion function through a microprocessor which accurately controls the stepper motor to produce the translational thrust through the mechanical transmission devices to push the syringe plunger down into barrel. Equipped with various sensors, Sunfusion syringe pump is able to precisely control the infusion processes, like infusion rate, volume etc, as well as able to monitor the infusion process in real time. That makes Sunfusion pump a high precise intelligent syringe pump.

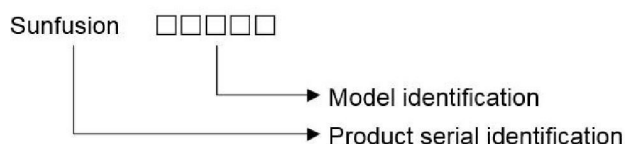
Not only can the syringe pump be compatible with 3 kinds of syringes specified in this manual (refer to Chapter 17), but compatible with any syringe brands after correct calibration. Various alarm functions are supplied with devices, prompt information is synchronously displayed with a TFT colorful touch screen, and safe and convenient operation is ensured by reasonable interface design.

Syringe pumps are intended for clinical treatments that require precise control of infusion rate (or volume) and monitoring of the infusion process, such as clinics, ICUs, operation rooms, emergency rooms, and general wards.

### 1.1.2 Contraindications

Nothing.

### 1.1.3 Model Coding



Different models are distinguished by different optional configurations.

### 1.1.4 Specifications

|                                             |                                                                                                                          |                                |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| Applicable syringe size                     | 2ml/3ml, 5ml, 10ml, 20ml, 30ml, 50/60ml                                                                                  |                                |
| Flow Rate                                   | 2ml/3ml:0.01~60ml,<br>5ml:0.01~150ml,<br>10ml:0.01~300ml,<br>20ml:0.01~600ml,<br>30ml:0.01~900ml,<br>50/60ml:0.01~2200ml |                                |
| Rate Step                                   | 0.01ml/h                                                                                                                 |                                |
| BOLUS Rate & VTBI<br>(Volume to be infused) | 2ml/3ml:0.01~ 60ml/h<br>5ml:0.01~ 150ml/h<br>10ml:0.01~300ml/h                                                           | 0.1~2ml<br>0.1~5ml<br>0.1~10ml |

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                            | 20ml:0.01~ 600ml/h      0.1~20ml<br>30ml:0.01~ 900ml/h      0.1~30ml<br>50/60ml:0.01~2200ml/h    0.1~50ml                                                                                                                                                                                                                                                                                                  |
| BOLUS Rate step                                            | 0.01ml/h                                                                                                                                                                                                                                                                                                                                                                                                   |
| FF (Fast Forward)                                          | 2ml/3ml:0.01~60ml,<br>5ml:0.01~150ml,<br>10ml:0.01~300ml,<br>20ml:0.01~600ml,<br>30ml:0.01~900ml,<br>50/60ml:0.01~2200ml                                                                                                                                                                                                                                                                                   |
| FF volume range                                            | 0 ~maximal volume of syringe                                                                                                                                                                                                                                                                                                                                                                               |
| Manual KVO Rate                                            | 0.01~5.0ml/h (0.01ml step)                                                                                                                                                                                                                                                                                                                                                                                 |
| Manual KVO Volume                                          | 2ml/3ml:0.01~0.2ml (0.01ml step),<br>5ml: 0.01~0.2ml (0.01ml step),<br>10ml: 0.01~0.2ml (0.01ml step),<br>20ml: 0.01~0.5ml (0.01ml step),<br>30ml: 0.01~0.5ml (0.01ml step),<br>50/60ml: 0.01~1ml (0.01ml step)                                                                                                                                                                                            |
| VTBI<br>(volume to be infused)                             | 0.01~9999.99ml, (0.01ml step)                                                                                                                                                                                                                                                                                                                                                                              |
| Cumulative infusion<br>volume                              | 0.01~9999.99ml, (0.01ml step)                                                                                                                                                                                                                                                                                                                                                                              |
| Rate accuracy                                              | Within $\pm 2\%$ (after calibration)                                                                                                                                                                                                                                                                                                                                                                       |
| Pressure units                                             | MPa, kPa, mmHg, inH <sub>2</sub> O, psi ,mbar                                                                                                                                                                                                                                                                                                                                                              |
| Occlusion pressure                                         | Level 1-13 (10、20、30、40、50、60、70、80、90、100、<br>110、120、130)kPa                                                                                                                                                                                                                                                                                                                                             |
| Alarms                                                     | Infusion finished, near infusion end, VTBI completed, near<br>VTBI end, extension tubing off(optional), pre-occlusion<br>alarm(optional), KVO completed, standby task completed,<br>infusion is blocked, syringe falls off, syringe is improperly<br>installed, forgotten operation, low battery, battery empty,<br>abnormal running state, equipment failure, power failure,<br>battery disconnected etc. |
| Prompts                                                    | Parameter overrun, infusion begins, AC power has been<br>pulled out, speed overrun, Uncalibrated accuracy.                                                                                                                                                                                                                                                                                                 |
| Maximum infusion<br>volume under single<br>fault condition | 1mL                                                                                                                                                                                                                                                                                                                                                                                                        |
| Power source                                               | 100~240VAC, 50/60Hz;<br>Standart: Internal rechargeable 11.1V Li battery with capacity<br>$\geq 2600$ mAh, 8 hours backup time at the rate of 5ml/h for a<br>fully charged battery; optionally available higher capacities<br>External DC power supply, input voltage 15V, input current<br>1.2-1A. (The DC power supply shall meet the requirements of<br>EN/IEC 60601-1)                                 |
| Power Consumption                                          | 25VA                                                                                                                                                                                                                                                                                                                                                                                                       |
| Fuse Specification                                         | T2A/250VAC                                                                                                                                                                                                                                                                                                                                                                                                 |
| Equipment<br>classification                                | Class I, Type CF, Continuous operation                                                                                                                                                                                                                                                                                                                                                                     |
| IP classification                                          | IP24                                                                                                                                                                                                                                                                                                                                                                                                       |
| Working conditions                                         | Temperature: +5℃~+40℃,<br>Relative humidity: 20~90%,<br>Atmospheric pressure: 86.0kPa~106.0kPa                                                                                                                                                                                                                                                                                                             |
| Transport & Storage<br>conditions                          | Temperature: -20℃~+55℃,<br>Relative humidity: $\leq 93\%$ ,<br>Atmospheric pressure: 50.0kPa~106.0kPa                                                                                                                                                                                                                                                                                                      |
| Dimensions                                                 | 301mm (L) ×183mm (W) ×82mm (H)                                                                                                                                                                                                                                                                                                                                                                             |

## **19 Manufacturer**

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