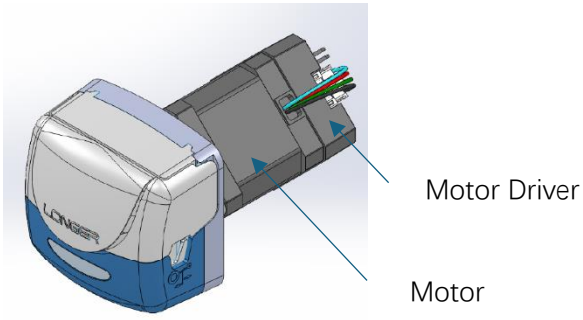
T100-SE01/T400-SE01

Operating Manual



1. Product Model:

Product Model	Product Code	Max Speed	Pump head
T100-SE01&BPH01	05.59.204	100rpm	BPH01(included)
T400-SE01&BPH01	05.62.100	400rpm	BPH01(included)
T100-SE01-02	05.59.206	100rpm	KZ15/KZ10
T400-SE01-02	05.62.102	400rpm	KZ15/KZ10
T100-SE01&WX10-14-H	05.59.200	100rpm	WX10-14-H(included)
T100-SE01&JY15-12-C	05.59.202	100rpm	JY15-12-C(included)

2. Product Type: Peristaltic Pump or Pump Drive

3. Product Features:

a) Compact size and structure, utilizing a NEMA 17 stepper motor with an integrated driver

b) Control the pump through digital signals, analog signals and pulse signals

i. Start/stop control and running direction control: controlled by switch signals (dry contact signals). The trigger mode can be configured via communication commands to either level trigger (momentary) or pulse trigger (maintained).

ii. Pump speed control: the pump speed can be set both by the DIP switch, and external input signals (4-20mA/0-5V/0-10V/0-10kHz)

iii. The pump speed is linearly proportional to the external speed signals: 4-20mA, 0-5V, 0-10V, 0-10kHz. The relationship between the signal range and

speed range can be configured through communication commands.

c) The pump is compatible with various peristaltic pump heads with a wide flow range

4. Technical Specifications

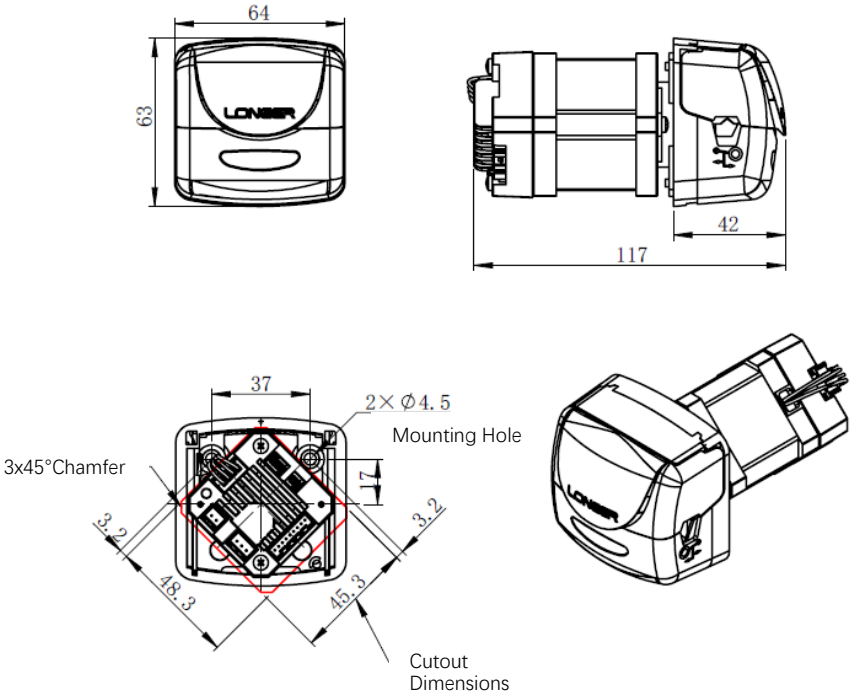
	T100-SE01&BPH01 T100-SE01&WX10-14-H T100-SE01&JY15-12-C T100-SE01-02	T400-SE01&BPH01 T400-SE01-02
Pump speed	0-100rpm	0-400rpm
Speed resolution	0.1rpm	1rpm
Running direction control	Pump running direction is controlled by a switch signal (dry contact signal). The trigger mode can be configured via communication commands to either level trigger or pulse trigger. Factory default setting: level trigger mode, contact open for clockwise, contact closed for counterclockwise.	
Start/stop control	Start/stop is controlled by a switch signal (dry contact signal). The trigger mode can be configured via communication commands to either level trigger or pulse trigger. Factory default setting: level trigger mode, contact open for start, contact closed for stop.	
DIP switch setting for pump speed	The DIP switch can set the pump speed to 0-100rpm, and each DIP position corresponds to a step of 5rpm.	The DIP switch can set the pump speed to 0-400rpm, and each DIP position corresponds to a step of 20rpm.
External signals for pump speed	The pump speed will be proportional to the external speed signal: 4-20mA, 0-5V, 0-10V, 0-10kHz. The relationship between the signal range and speed range can be configured through communication commands.	
Output	DC5V 10mA	
Power supply	DC24V/8W	DC24V/12W
Dimensions(L*W*H)	With BPH01 pump head：117x64x63mm With KZ10/KZ15 pump head：110x60x69mm With WX10-14 pump head：94x59x67.5mm With JY15-12 pump head： 116x60x61mm	
Mounting method	Panel mount	
Working condition	Temperature: 0℃-40℃, relative humidity＜80%	
Weight	With WX10-14 pump head: 0.47kg; With BPH01/JY15/KZ10/KZ15 pump head: 0.54kg	

5. Applicable Pump Heads and Flow Rates for Reference

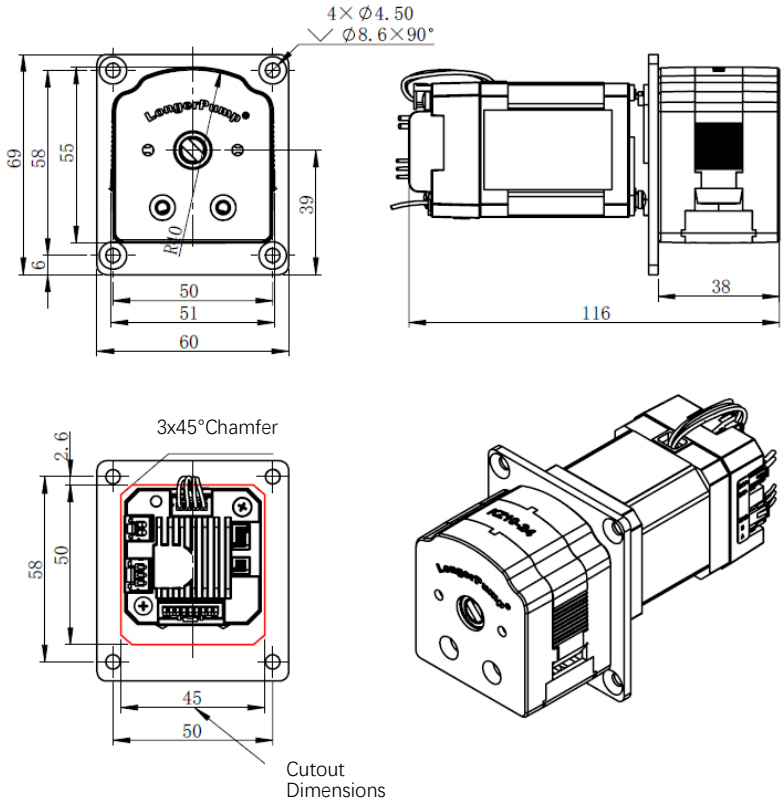
Pump	Max Speed	Pump Head	Tubings	Max Flow Rate for Reference (mL/min)
T100-SE01&BPH01	100rpm	BPH01 (Included)	Silicone tubing: 13#，14#，19#，16#，25# PharMed® tubing:13#，14#，19#，16#，25#	82
T400-SE01&BPH01	400rpm	BPH01 (Included)	Silicone tubing: 13#，14#，19#，16#，25# PharMed® tubing:13#，14#，19#，16#，25#	340
T100-SE01-02	100rpm	KZ10	Silicone tubing: ID≤3.17mm, W.T.: 0.86mm PharMed® tubing: ID≤3.17mm, W.T.: 0.86mm	23
		KZ15	Silicone tubing:13#，14#，19#，16# PharMed® tubing:13#，14#，19#，16#	42
T400-SE01-02	400rpm	KZ10	Silicone tubing: ID≤3.17mm, W.T.: 0.86mm PharMed® tubing: ID≤3.17mm, W.T.: 0.86mm	92
		KZ15	Silicone tubing:13#，14#，19#，16# Pharmed:13#，14#，19#，16#	168
T100-SE01&WX10-14-H	100rpm	WX10-14-H (Included)	Silicone tubing: ID≤3.17mm, W.T.: 0.8-1.0mm PharMed® tubing: ID≤3.17mm, W.T.: 0.86mm	40
T100-SE01&JY15-12-C	100rpm	JY15-12-C (Included)	Silicone tubing：25# 17# PharMed® tubing：25#	170

6. Installation Dimensions and Instructions

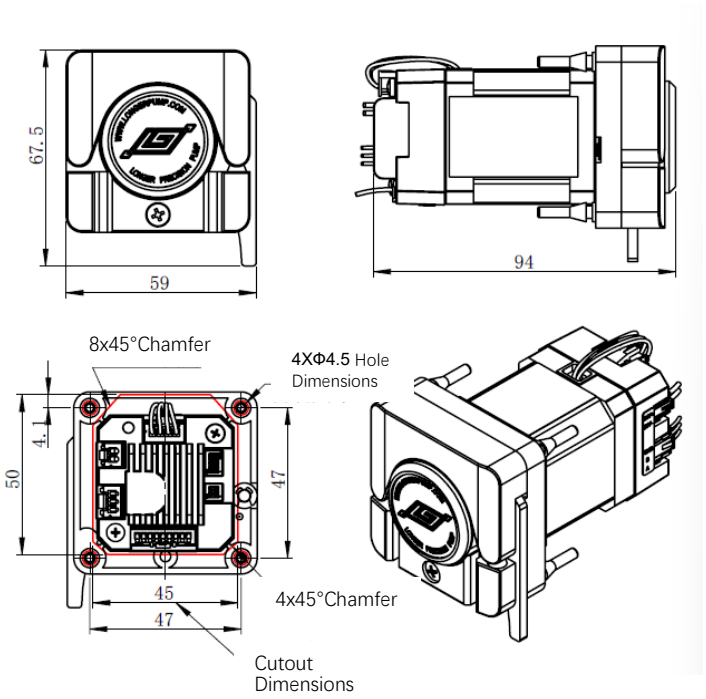
a. T100-SE01&BPH01 or T400-SE01&BPH01



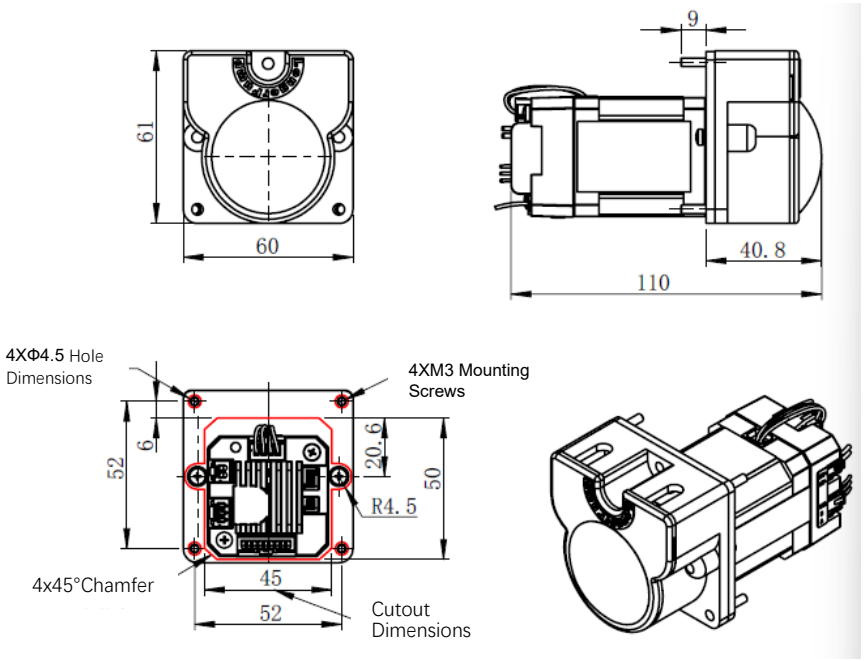
b. T100-SE01-02 or T400-SE01-02, mounted with KZ10 or KZ15 pump head



c. T100-SE01&WX10-14-H



d. T100-SE01&JY15-12-C

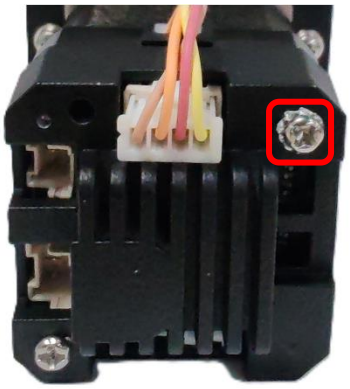


e. Instructions for the pump installation:

- The pump can be mounted through panel mounting or soleplate mounting.

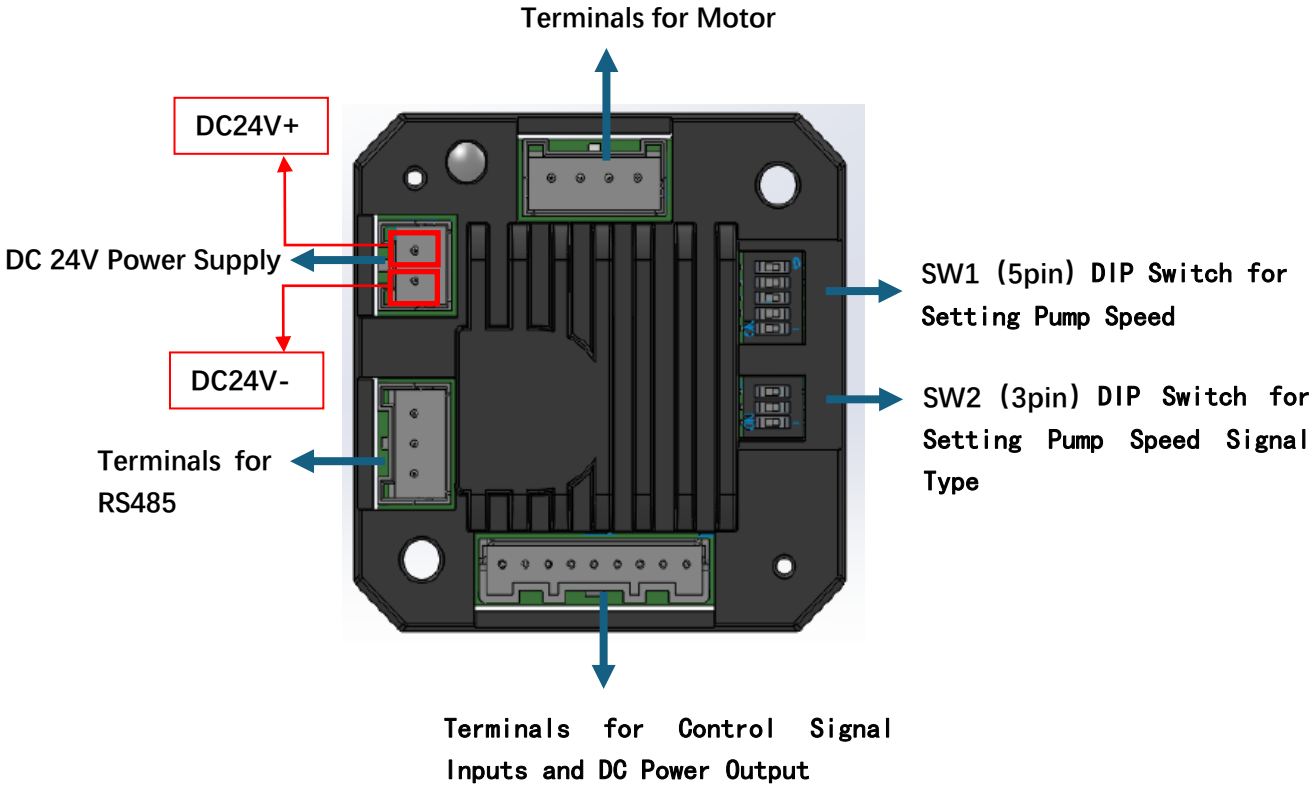
Refer to the dimension drawings.

- Connect the external control cable or communication cable first, then connect the pump to the power supply. (Refer to Chapter 7 for the interface specifications and wiring details.)
- Connect the protective earth (PE) at the serrated washer position of the pump. Refer to below picture. Connecting the PE improves the pump's resistance to electromagnetic interference. In environments with severe static electricity or electromagnetic radiation, grounding protection is mandatory.
-



Connector (with serrated washer) to PE

7. DIP Switch, Terminal Definitions and Wiring Instructions



a). Terminals for motor:

From the left to the right: A1,A2,B1,B2

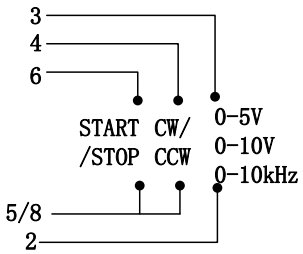
b). Terminals for power supply:

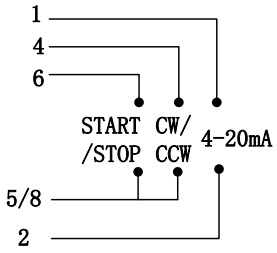
From the top to the bottom: DC24V+, DC24V-

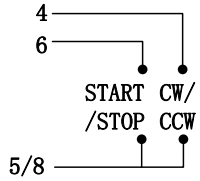
c). Terminals for RS485:

From the top to the bottom: GND, RS485-B, RS485-A

d). Terminals for Control Signal Inputs and DC Power Output: refer to below table for the pins definition (from the right to the left):

<table>
<tr><th>PIN</th><th>Function</th><th>Description</th><th>Wiring Instruction</th></tr>
<tr><td>1</td><td>mA</td><td>Speed signal 4-20mA input terminal: by default, the 4-20mA signal linearly corresponds to 0-100rpm or 0-400rpm. The relationship between the signal range and speed range can be configured through communication commands. Refer to Appendix 2 Modbus register definition.</td><td rowspan="7">(1) Wiring diagram when the speed signal is 0-5V/0-10V/0-10kHz.


(2) Wiring diagram when the speed signal is 4-20mA


(3) Start/stop and running direction wiring when the pump speed is set by DIP switch.

</td></tr>
<tr><td>2</td><td>A-GND</td><td>GND for the speed signal.</td></tr>
<tr><td>3</td><td>V/F</td><td>Speed signal 0-5V/0-10V/0-10kHz input terminal: by default, the 0-5V/0-10V/0-10kHz signal linearly corresponds to 0-100rpm or 0-400rpm. The relationship between the signal range and speed range can be configured through communication commands. Refer to Appendix 2 Modbus Register Definition for details.</td></tr>
<tr><td>4</td><td>DIR</td><td>Pump running direction control signal input. The default factory trigger logic is level trigger (momentary): DIR and GND contacts open for clockwise, contacts closed for counterclockwise. The trigger mode can be configured via communication commands to either level trigger (momentary) or pulse trigger (maintained). Refer to Appendix 2 Modbus Register Definition for details.</td></tr>
<tr><td>5</td><td>GND</td><td>GND</td></tr>
<tr><td>6</td><td>START</td><td>Pump start/stop control signal input. The default factory trigger logic is level trigger (momentary): START and GND contacts open for start, contacts closed for stop. The trigger mode can be configured via communication commands to either level trigger (momentary) or pulse trigger (maintained). Refer to Appendix 2 Modbus Register Definition for details.</td></tr>
</table>

7	NC	Revered	
8	GND	GND	
9	OUT	Output：DC5V voltage, max 10mA （GND is pin 8）	

Note: when setting the control parameters (trigger mode, the relationship between signal range and speed range) via communication commands, the communication control parameters are as below:

Address: 1

Baud rate: 115200bps

Parity: None

Stop bit:1

Data bits: 8

e). SW1 DIP Switch for Setting Pump Speed：

DIP MODE T100-SE01	SW1:5 Pin DIP				
Speed	1	2	3	4	5
0	OFF	OFF	OFF	OFF	OFF
5	OFF	OFF	OFF	OFF	ON
10	OFF	OFF	OFF	ON	OFF
15	OFF	OFF	OFF	ON	ON
20	OFF	OFF	ON	OFF	OFF
25	OFF	OFF	ON	OFF	ON
30	OFF	OFF	ON	ON	OFF
35	OFF	OFF	ON	ON	ON
40	OFF	ON	OFF	OFF	OFF
45	OFF	ON	OFF	OFF	ON
50	OFF	ON	OFF	ON	OFF
55	OFF	ON	OFF	ON	ON
60	OFF	ON	ON	OFF	OFF
65	OFF	ON	ON	OFF	ON
70	OFF	ON	ON	ON	OFF

75	OFF	ON	ON	ON	ON
80	ON	OFF	OFF	OFF	OFF
85	ON	OFF	OFF	OFF	ON
90	ON	OFF	OFF	ON	OFF
95	ON	OFF	OFF	ON	ON
100	ON	OFF	ON	OFF	OFF
0	others				

DIP MODE T400-SE01	SW1:5 Pin DIP				
Speed	1	2	3	4	5
0	OFF	OFF	OFF	OFF	OFF
20	OFF	OFF	OFF	OFF	ON
40	OFF	OFF	OFF	ON	OFF
60	OFF	OFF	OFF	ON	ON
80	OFF	OFF	ON	OFF	OFF
100	OFF	OFF	ON	OFF	ON
120	OFF	OFF	ON	ON	OFF
140	OFF	OFF	ON	ON	ON
160	OFF	ON	OFF	OFF	OFF
180	OFF	ON	OFF	OFF	ON
200	OFF	ON	OFF	ON	OFF
220	OFF	ON	OFF	ON	ON
240	OFF	ON	ON	OFF	OFF
260	OFF	ON	ON	OFF	ON
280	OFF	ON	ON	ON	OFF
300	OFF	ON	ON	ON	ON
320	ON	OFF	OFF	OFF	OFF
340	ON	OFF	OFF	OFF	ON
360	ON	OFF	OFF	ON	OFF
380	ON	OFF	OFF	ON	ON
400	ON	OFF	ON	OFF	OFF
0	others				

f). SW2 DIP Switch for Setting Pump Speed Signal Type:

T100-SE01 T400-SE01	SW2:3 Pin DIP		
	1	2	3
DIP MODE	OFF	OFF	OFF
0-5V	ON	OFF	OFF

0-10V	ON	OFF	ON
4-20mA	ON	ON	OFF
0-1kHz	ON	ON	ON

Note: If the speed control signal type is changed, the pump must be powered off and on again for the change to take effect.

8. Pump Operating

8.1 Set the pump speed by DIP switch

1. Set the SW2 DIP switch to OFF OFF OFF for DIP mode. Refer to Chapter 7 for the SW2 setting.
2. Set the SW1 DIP switch to the position corresponding to the target pump speed. Refer to Chapter 7 for the SW1 setting. Speed 0 means stop status.
3. Start/stop control: Start/stop is controlled by a switch signal (dry contact signal). The trigger mode can be configured via communication commands to either level trigger (momentary) or pulse trigger (maintained). Factory default setting: level trigger mode, contact open for start, contact closed for stop. Refer to Appendix 2 Modbus Register Definition to change the trigger mode. The communication control parameters are: address 1, baud rate 115200bps, no parity, 1 stop bit, 8 data bits.
4. Running direction control: Pump running direction is controlled by a switch signal (dry contact signal). The trigger mode can be configured via communication commands to either level trigger (momentary) or pulse trigger (maintained). Factory default setting: level trigger mode, contact open for clockwise, contact closed for counterclockwise. Refer to Appendix 2 Modbus Register Definition to change the trigger mode. The communication control parameters are: address 1, baud rate 115200bps, no parity, 1 stop bit, 8 data bits.

8.2 Control the pump speed by external control signal

1. Set the SW2 DIP switch for the pump speed signal type: 4-20mA, 0-5V, 0-10V, or 0-10kHz. Refer to Chapter 7 for the SW2 setting.
2. Speed control: input the speed signal to the corresponding terminals. The pump speed will be linearly proportional to the input speed signal. Refer to the table below for the default linear relationship between signal range and pump speed range:

Item	Speed Signal	Pump Speed Range	
		T100-SE01	T400-SE01
1	4-20mA	0-100rpm	0-400rpm

2	0-5V	0-100rpm	0-400rpm
3	0-10v	0-100rpm	0-400rpm
4	0-10kHz	0-100rpm	0-400rpm

The linear relationship between the signal range and pump speed range can be set via communication commands. Refer to Appendix 2 Modbus Register Definition for details. The communication control parameters are: address 1, baud rate 115200bps, no parity, 1 stop bit, 8 data bits.

3. Start/stop control: Start/stop is controlled by a switch signal (dry contact signal). The trigger mode can be configured via communication commands to either level trigger (momentary) or pulse trigger (maintained). Factory default setting: level trigger mode, contact open for start, contact closed for stop. Refer to Appendix 2 Modbus Register Definition to change the trigger mode. The communication control parameters are: address 1, baud rate 115200bps, no parity, 1 stop bit, 8 data bits.
4. Running direction control: Pump running direction is controlled by a switch signal (dry contact signal). The trigger mode can be configured via communication commands to either level trigger (momentary) or pulse trigger (maintained). Factory default setting: level trigger mode, contact open for clockwise, contact closed for counterclockwise. Refer to Appendix 2 Modbus Register Definition to change the trigger mode. The communication control parameters are: address 1, baud rate 115200bps, no parity, 1 stop bit, 8 data bits.

9. Contacts

Baoding Longer Precision Pump Co., Ltd.

Address: Floor 3-4, Block B, Building 6, University Science Park, No. 5699 North Second Ring Road, National High-tech Industrial Development Zone, Baoding City, Hebei Province, China

Telephone: +86-312-3110087

Website: www.longerpump.com

Appendix 1: Factory Default Settings

Parameters	T100-SE01	T400-SE01
Control mode	DIP mode	
Pump speed set by the DIP switch	0rpm	
Max speed corresponding to max external speed signal	100rpm	400rpm
Min speed corresponding to min external speed signal	0rpm	
Start/stop control trigger mode	Level trigger mode. The pump run/stop status when powered up depends on the start/stop signal. When the START and GND contacts are open, the pump runs (speed≠0rpm); when the contacts are closed, the pump stops.	
Running direction control trigger mode	Level trigger mode. DIR and GND contacts are open for clockwise, contacts are closed for counterclockwise.	
0-5V/0-10V speed control, min speed signal	0V	
0-5V/0-10 speed control, max speed signal	5V/10V	
4-20mA speed control, min speed signal	4mA	
4-20mA speed control, max speed signal	20mA	
0-10kHz speed control, min speed signal	0Hz	
0-10kHz speed control, max speed signal	10kHz	
Acceleration	1875rpm/s	
Deceleration	1875rpm/s	
Startup speed	30rpm	
Cutoff speed	30rpm	

Appendix 2: Modbus Register Definition.

Note: the pump must be stopped before modifying the following parameters via communication commands.

Function	Parameter Variable	Register Address	Data Type	Read/ Write	Parameter Stored?	Default	Description
External signal control setting	Start/stop trigger mode	0x0031	uint_16	R/W	Y	0X200	bit 1, bit 0 00: level trigger. Contact open pump runs; contact closed, pump stops 01: level trigger. Contact closed, pump runs; contact open, pump stops. 10: pulse trigger. Run/stop will switch on the falling edge signal. 11: pulse trigger. Run/stop will switch on the rising edge signal. bit 8： 0：When in external control mode, the start/stop signal is active, and a start/stop signal must be input to control the pump's start/ stop status. 1：When in external control mode, the start/stop signal is inactive, and the pump's start/ stop status is only controlled by the speed signal. Speed = 0, the pump stops; speed ≠ 0, the pump runs. bit 9: 0：when the trigger mode is set to level trigger, the pump remains stopped upon initial power-up. The start/stop signal must change from stop to start to make the pump start running. 1：when the trigger mode is set to level trigger, the pump's initial

							power-up status depends on whether the input signal is a start or stop signal. Note: 1. When the trigger mode is set to level trigger, the pump's powered up status depends on the settings of bit 8 and bit 9, as well as the start/stop input signal. 2. When the trigger mode is set to pulse trigger and bit 8 is 0, the pump will be in a stopped status upon power-up.
External signal control setting	Running direction trigger mode	0x0032	uint_16	R/W	Y	0	bit1: bit0 00: level trigger. Contact open for clockwise; contact closed for counterclockwise. 01: level trigger. Contact closed for clockwise; contact open for counterclockwise. 10: pulse trigger. Clockwise/ counterclockwise will switch on the falling edge signal. 11: pulse trigger. Clockwise/ counterclockwise will switch on the rising edge signal.
External signal control setting	Max speed corresponding to the max speed signal	0x0034	uint_16	R/W	Y	T100:10000 T400:40000	(min speed set in 0x0035 +1rpm) to the max speed of the pump. Data unit: 0.01rpm Max speed of the pump: T100: 100rpm T400: 400rpm
External signal control setting	Min speed corresponding to the min speed signal	0x0035	uint_16	R/W	Y	0	0rpm to (max speed set in 0x0034 -1rpm) Data unit: 0.01rpm
External signal control setting	0-5V speed control, min signal	0x0036	uint_16	R/W	Y	0	0V to (max input set in 0x0037 -1V) Data unit: 0.01V

External signal control setting	0-5V speed control, max signal	0x0037	uint_16	R/W	Y	500	(min input set in 0x0036 +1V) to 5V Data unit: 0.01V
External signal control setting	0-10V speed control, min signal	0x0038	uint_16	R/W	Y	0	0V to (max input set in 0x0039 - 1V) Data unit: 0.01V
External signal control setting	0-10V speed control, max signal	0x0039	uint_16	R/W	Y	1000	(min input set in 0x0038 +1V) to 10V Data unit: 0.01V
External signal control setting	4-20mA speed control, min signal	0x003A	uint_16	R/W	Y	400	4mA to (max input set in 0x003B - 1.6mA) Data unit: 0.01mA
External signal control setting	4-20mA speed control, max signal	0x003B	uint_16	R/W	Y	2000	(min input set in 0x003A +1.6mA) to 20mA Data unit: 0.01mA
External signal control setting	0-10kHz speed control, min signal	0x003C	uint_16	R/W	Y	0	0 to (max input set in 0x003D-1kHz) Data unit: 1Hz
External signal control setting	0-10kHz speed control, max signal	0x003D	uint_16	R/W	Y	10000	(min input set in 0x003C +1kHz) to 10kHz Data unit: 1Hz
System	Acceleration	0x0040	uint_16	R/W	Y	1875	Setting range: 100 - 7500rpm/s, data unit: 1rpm/s
System	Deceleration	0x0041	uint_16	R/W	Y	1875	Setting range: 100 - 7500rpm/s, data unit: 1rpm/s
System	Startup speed	0x0042	uint_16	R/W	Y	30	Setting range for T100: 10-100rpm, data unit: 1rpm Setting range for T400: 10-150rpm, data unit: 1rpm
System	Cutoff speed	0x0043	uint_16	R/W	Y	30	Setting range for T100: 10-100rpm, data unit: 1rpm Setting range for T400: 10-400rpm, data unit: 1rpm