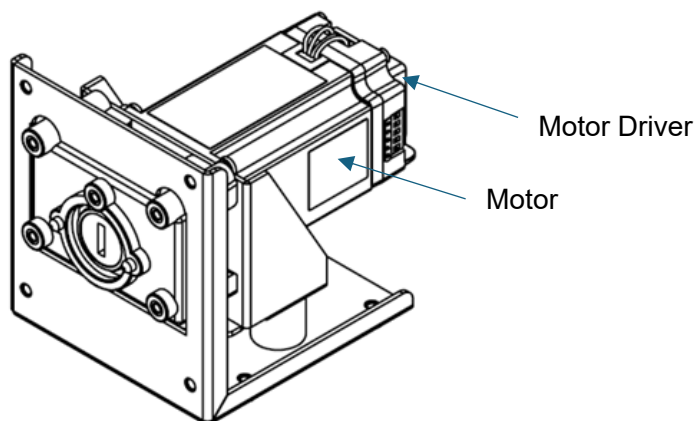


T100-SC02-01/T300-SC02-01/T600-SC02-01

Operating Manual



1. Product Model

Product Model	Product Code	Max Speed
T100-SC02-01	05.60.601	100rpm
T300-SC02-01	05.61.601	300rpm
T600-SC02-01	05.63.601	600rpm

2. Product Type: Peristaltic Pump Drive

3. Product Features:

- a) Compact size and structure, utilizing a NEMA 23 stepper motor with an integrated driver
- b) Communication control of the pump via the RS485 interface (Modbus RTU and Longer OEM protocol).
- c) The pump is compatible with various peristaltic pump heads with a wide flow range

4. Technical Specifications

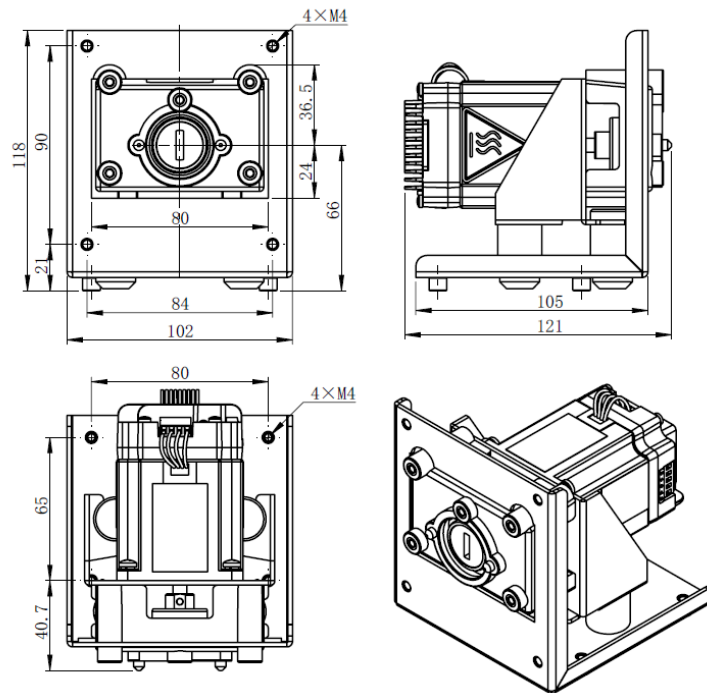
	T100-SC02-01	T300-SC02-01	T600-SC02-01
Pump speed	0-100rpm	0-300rpm	0-600rpm
Speed resolution	Modbus protocol: 0.01rpm Longer OEM protocol: 0.1rpm	Modbus protocol: 0.01rpm Longer OEM protocol: 1rpm	
Control function	RS485 interface, supporting both Modbus RTU protocol and Longer Pump OEM protocol. Control the pump speed, start/stop, running direction, and prime status (full speed) via communication commands. And the pump status when power up can be configured.		
Communication parameters	Baud rate: 1200bps, 9600bps, 19200bps, 115200bps Parity: None or Even Pump address: 1-32 Stop bit: 1 bit		
Output	DC5V 100mA		
Power supply	DC24V/15W	DC24V/45W	DC24V/55W
Dimensions(L*W*H)	121*102*118mm	143*102*118mm	
Mounting method	Panel mount or soleplate mount		
Working condition	Temperature: 0°C-40°C, relative humidity<80%		
Weight(without pump head)	1.29kg	1.61kg	

5. Applicable Pump Heads and Flow Rates for Reference

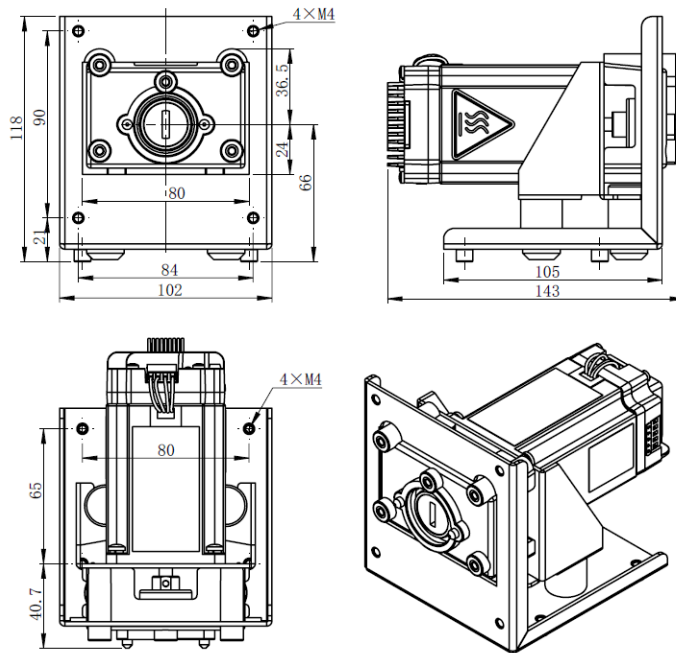
Pump Head	Tubings		Max Flow Rate for Reference (mL/min) T100-SC02	Max Flow Rate for Reference (mL/min) T300-SC02	Max Flow Rate for Reference (mL/min) T600-SC02
	Silicone Tubing	PharMed® Tubing			
YZ1515X, YZ1115 (3 rollers)	13#, 14#, 19#, 16#, 25#, 17#, 18#		380	1100	2200
YZ2515X	15#, 24#	Not Recommended	270	800	1600
YZ1125	15#, 24#, 35#, 36#	Not Recommended	500	1500	3000
FG15-13	13#, 14#, 19#, 16#, 25#, 17#, 18#	13#, 14#, 19#, 16#	430	1200	2400
FG25-13	15#, 24#	Not Recommended	320	1100	2200
DMD15-13-B	2x13#, 2x14#, 2x19#	2x13#, 2x14#	375	1035	2070
DMD15-13-D	2x16#, 2x25#	2x19#, 2x16#			
BZ15-13-A	14#		22	75	150
BZ15-13-B	16#		80	230	460
BZ15-14-C	25#		150	480	960
BZ15-14-D	17#		270	800	1600

BZ25-13-B	24#	Not Recommended	250	800	1600
DG15-24	16#, 25#, 17#	Not Recommended	300 (single channel)	900 (single channel)	1800 (single channel)
DG15-28	13#, 14#, ID≤3.17mm, Wall Thickness: 1mm	Not Recommended	75 (single channel)	Not Recommended	Not Recommended
DG-1,DG-2 6 rollers	ID≤3.17mm, Wall Thickness 0.8-1mm		48 (single channel)	Not Recommended	Not Recommended
DG-4, DG-6, DG-8 6 rollers	ID≤3.17mm, Wall Thickness 0.8-1mm	Not Recommended	48 (single channel)	Not Recommended	Not Recommended
DG-1,DG-2 10 rollers	ID≤3.17mm, Wall Thickness 0.8-1mm		32 (single channel)	Not Recommended	Not Recommended
DG-4 10 rollers	ID≤3.17mm, Wall Thickness 0.8-1mm	Not Recommended	32 (single channel)	Not Recommended	Not Recommended
BPH01	13#, 14#, 19#, 16#, 25#		82	260	530

6. Installation Dimensions and Instructions



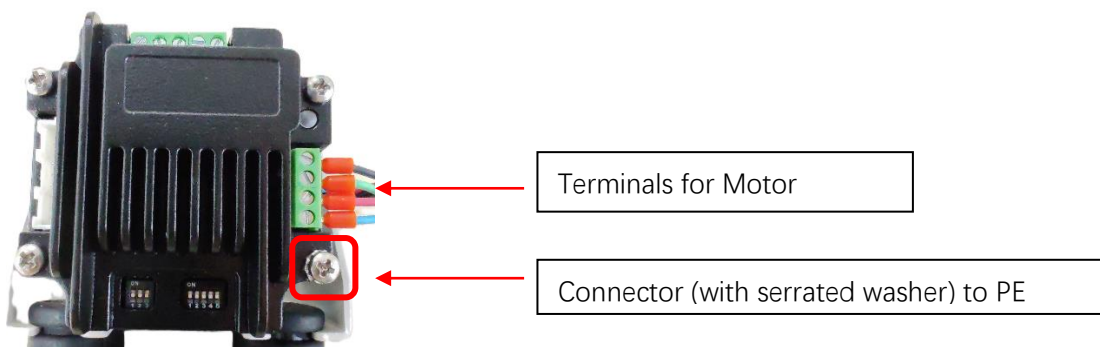
T100-SC02-01



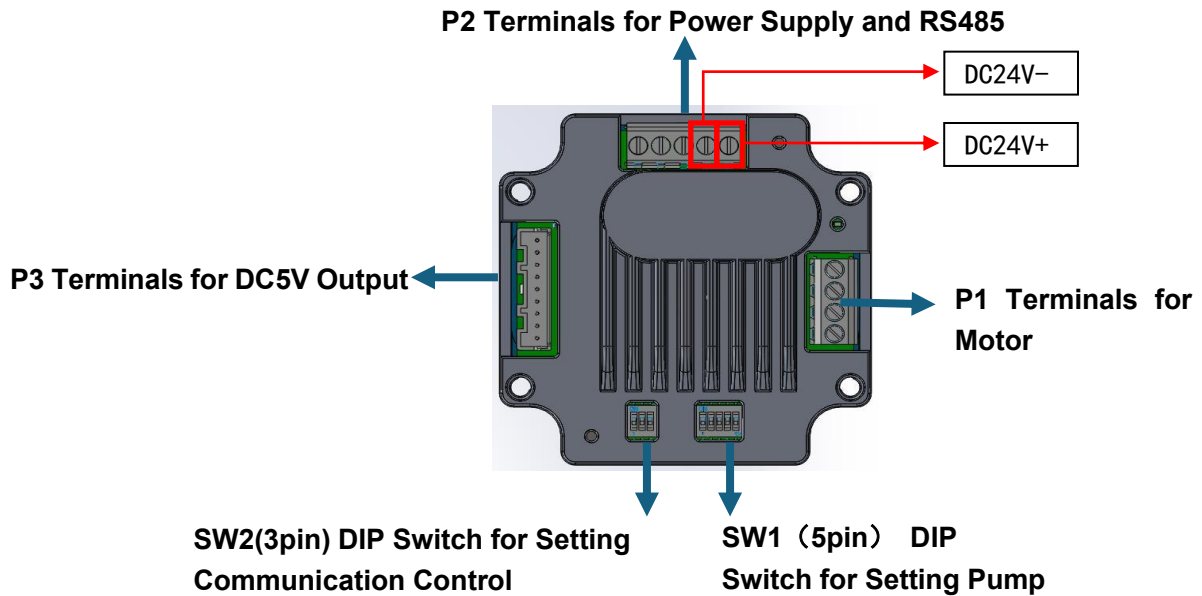
T300-SC02-01, T600-SC02-01

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.



7. DIP Switch, Terminal Definitions and Wiring Instructions



a). P1 terminals for Motor:

From the top to the bottom: A1,A2,B1,B2

b). P2 terminals for Power Supply and RS485:

From the left to the right: RS485-B, RS485-A, GND, DC24V-, DC24V+

c). P3 terminals for DC5V Output.

From the bottom to the top: Pin 8: GND, Pin 9: DC5V, other pins are reserved.

A 9P control cable is needed for the DC5V output connection.

e). SW1 DIP Switch setting for the pump address:

Note:

Pump address range for Modbus RTU protocol is 0-32, and 0 is broadcast address.

Pump address range for Longer OEM protocol is 1-31, and 31 is the broadcast address.

Pump address factory default setting is 1.

T100-SC02 T300-SC02 T600-SC02	SW1:5 Pin DIP				
Adress	1	2	3	4	5
1	OFF	OFF	OFF	OFF	OFF
2	OFF	OFF	OFF	OFF	ON
3	OFF	OFF	OFF	ON	OFF
4	OFF	OFF	OFF	ON	ON
5	OFF	OFF	ON	OFF	OFF
6	OFF	OFF	ON	OFF	ON
7	OFF	OFF	ON	ON	OFF
8	OFF	OFF	ON	ON	ON
9	OFF	ON	OFF	OFF	OFF
10	OFF	ON	OFF	OFF	ON
11	OFF	ON	OFF	ON	OFF
12	OFF	ON	OFF	ON	ON
13	OFF	ON	ON	OFF	OFF
14	OFF	ON	ON	OFF	ON
15	OFF	ON	ON	ON	OFF
16	OFF	ON	ON	ON	ON
17	ON	OFF	OFF	OFF	OFF
18	ON	OFF	OFF	OFF	ON
19	ON	OFF	OFF	ON	OFF
20	ON	OFF	OFF	ON	ON
21	ON	OFF	ON	OFF	OFF
22	ON	OFF	ON	OFF	ON
23	ON	OFF	ON	ON	OFF
24	ON	OFF	ON	ON	ON
25	ON	ON	OFF	OFF	OFF
26	ON	ON	OFF	OFF	ON
27	ON	ON	OFF	ON	OFF
28	ON	ON	OFF	ON	ON
29	ON	ON	ON	OFF	OFF
30	ON	ON	ON	OFF	ON
31	ON	ON	ON	ON	OFF
32	ON	ON	ON	ON	ON

f). SW2 DIP Switch setting for the communication control parameters:

T100-SC02 T300-SC02 T600-SC02	SW2:3 Pin DIP		
Settings	1	2	3
None Parity	OFF	/	/
Even Parity	ON	/	/
1200 bps	/	OFF	OFF
9600 bps	/	OFF	ON
19200 bps	/	ON	OFF
115200 bps	/	ON	ON

Factory default setting: none parity, 115200bps.

8. Pump Operating

Control the pumps T100-SC01, T300-SC01 and T600-SC1 through communication commands. The interface is RS485, and protocol can be Modbus RTU or Longer OEM protocol. Control the pump as following:

1. Set the communication control parameters: Set the pump address through SW1 DIP switch. Set other parameters through SW2 DIP switch. Refer to Chapter 7 for details.

Pump address range for Modbus RTU protocol is 1-32, and 0 is the broadcast address. Pump address range for Longer OEM protocol is 1-30, and 31 is the broadcast address. Pump address factory default setting is 1.

Parity: none (factory default setting) or even

Baud rate: 1200bps, 9600bps, 19200bps, 115200bps. Factory default setting is 115200bps.

Stop bit: 1

2. Connect the pump to the host controller (such as a PLC) via an RS485 cable. Configure the communication control parameters on the controller to match the DIP switch settings of the pump. Then establish the communication link between the controller and the pump.
3. Control the pump via communication commands: start/stop the pump, change running direction, adjust pump speed, and enable full-speed operation. For details, refer to Appendix 2 - Modbus Register Definition and Appendix 3 - Longer OEM Protocol.

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-SC02	T300-SC02	T600-SC02
Communication parameters	115200 bps baud rate, none parity, 1 stop bit		
Pump speed	100rpm	300rpm	600rpm
Start/stop status	Stop		
Running direction	Clockwise		
Pump status when power on	Stop		
Acceleration	1875rpm/s		
Deceleration	1875rpm/s		
Startup speed	30rpm		
Cutoff speed	30rpm		

Appendix 2: Modbus Register Definition

Pump address range: 1-32, and 0 is the broadcast address. Communication parameters default settings: 115200bps baud rate, none parity, 1 stop bit. The communication parameters can be set by SW2 DIP switch.

Function	Parameter Variable	Register Address	Data Type	Read/Write	Parameter Stored?	Default	Description
Running Control	Pump speed	0x0000	uint_16	R/W	Y	T100: 10000 T300: 30000 T600: 60000	T100: 0-10000, data unit: 0.01rpm T300: 0-30000, data unit: 0.01rpm T600: 0-60000, data unit: 0.01rpm
Running Control	Full-speed operation	0x0001	uint_16	R/W	N	0	0: disable the full-speed operation and return to the previous operating status. 1: enable the full-speed operation
Running Control	Start/stop control	0x0002	uint_16	R/W	Y	0	0: stop 1: start
Running Control	Running direction control	0x0003	uint_16	R/W	Y	1	0: counterclockwise 1: clockwise
System	Pump status when power up	0x0020	uint_16	R/W	Y	0	0: stop 1: return to the status before power-off
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 T300: 10-150rpm, data unit: 1rpm Setting range for T600: 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 T300: 10-300rpm, data unit: 1rpm Setting range for T600: 10-450rpm, data unit: 1rpm

Note: The system parameters must be set when the pump is stopped.

Appendix 3: Longer OEM Communication Protocol

1. Frame format (Character format): 1start + 8data + parity + 1stop

1 Start bit

8 data bits

1 parity bit (none, odd or even)

1 stop bit

Baud rate: 1200bps, 9600bps, 19200bps, 115200bps

2. Message format: flag+ addr + len + pdu + fcs

flag: E9H, the message head. When sending the message, the data E8H after message head will be replaced with E8H 00H, and E9H after message head will be replaced with E8H 01H. When receiving the message, the data E8H 00H after message head will be reverted to E8H, and E8H 01H after message head will be reverted to E9H. (Note: if E8 00 replaced E8 or E8 01 replaced E9, E8 00 or E8 01 will be regarded as one byte, no influence on the length of **pdu**.)

addr: one byte, pump address, 1-30. 31 is broadcast address.

len: one byte, length of **pdu**.

fcs: one byte, XOR of **addr, len , pdu**.

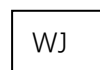
3. **pdu** format: application layer code format

3.1 Set the pump running parameters

Send to the pump:



Pump responds:



Note: When setting the running parameter, the **addr** in message can be pump address (1-30) or broadcast address 31. All pumps will operate according to the same command without response when using broadcast address.

3.2 Read the pump running status

Send to the pump:



Pump responds:



Note: When reading the running state, the **addr** in the message only can be pump address (1-30).

3.3 Read pump address

PC calls

RID

Pump responds:

RID

Note: When reading the running state, the **addr** in the message only can be pump address (1-30).

Supplementary notes

1. W, R, J, I, D, use ASCII code: 57H, 52H, 4AH, 49H, 44H
2. Pump speed data uses hexadecimal number, most significant byte first.
T100 max speed is 100.0rpm, data unit is 0.1rpm. For example: 03E8H means 100rpm.
T300 max speed is 300rpm, data unit is 1rpm. For example: 012CH means 300rpm.
T600 max speed is 600rpm, data unit is 1rpm. For example: 0258H means 600rpm.
3. Full speed and start/stop:
Bit0:
1: pump runs, 0: pump stops.
Bit1:
1: full speed, 0: normal speed.
4. Direction:
Bit0:
1: CW, 0: CCW.
5. For example:
 - a. T100 series pump: set the pump (addr: 01) to run at 100rpm, with a clockwise direction. The command is:
E9 01 06 57 4A 03 E8 00 01 01 F1
 - b. T300 series pump: set the pump (addr: 01) to run at 300rpm, with a clockwise direction. The command is:
E9 01 06 57 4A 01 2C 01 01 37
 - c. T600 series pump: set the pump (addr: 01) to run at 600rpm, with a clockwise direction. The command is:
E9 01 06 57 4A 02 58 01 01 40