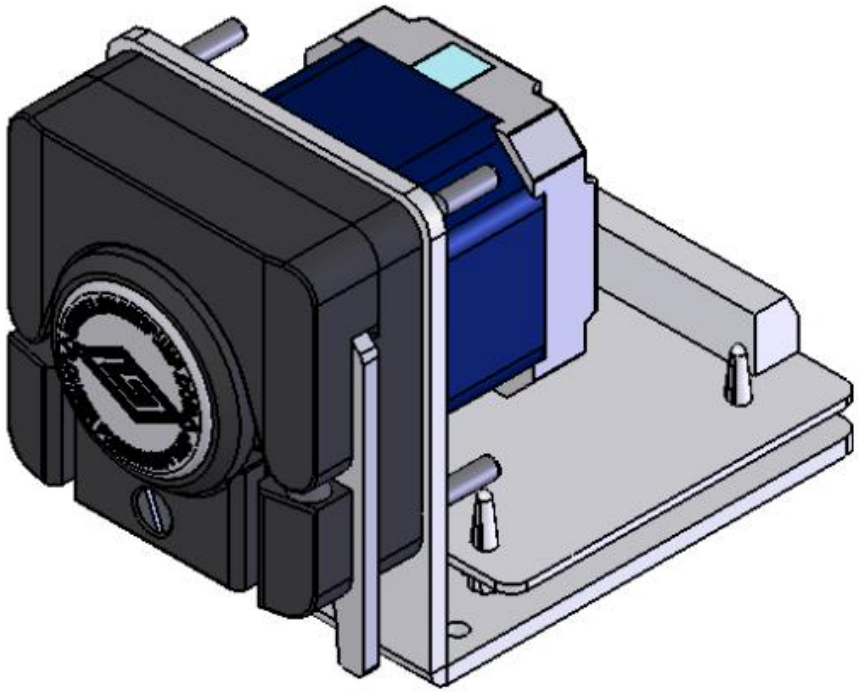
T60&WX10 Series Variable Speed Peristaltic Pump

Operating Manual



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Please read this operating manual carefully before using the product.

The contents of this publication are presented for informational purposes only, and while every effort has been made to ensure their accuracy. Longer accepts no liability for errors or omissions.

Longer reserves the right to modify or improve the designs or specifications of such products at any time without notice. Please contact with Longer or certified distributor for up-to-date manuals.

1 General Information

1.1 Precaution

- If tubing leaks or bursts, fluid may spray from the tubing and pump head. Take reasonable practicable measures to ensure the operators' safety.
- Make sure fluid in the tubing has been drained out, no pressure in the pipeline and disconnect pump from mains power, while removing or replacing the tubing.
- Disconnect pump from the mains power before connecting the control signal wire.
- Do not touch the rotor while pump is running.
- Some section of surfaces of the pump may get warm during operation. Do not take hold of the pump while it is running.
- Release the track when pump stop running for a long time to avoid tubing deformation caused by squeezing.
- Keep the rotor clean and dry to avoid tubing excessive wear and premature failure of pump head or driver.
- Please do not put lubricating oil by yourself, any improper operation could corrode the pump head housing or dislocate the tubing
- The entire unit can't resist organic solvent and corrosive liquid. Isolate the unit (except tubing) from these fluids.
- The control signal should not exceed the Max value when the pump is running under external control mode to avoid PCB damage.

1.2 Warranty and Service

1.2.1 Warranty Service

(1) Longer, obligation under this warranty is limited to a period of three (3) years from the date of original purchase. Within the 3 years of warranty period, Longer will replace or repair any defective parts free of charge. This warranty doesn't cover consumable part (tubing).

(2) Warranty does not cover:

- The repair or exchange of the entire unit after the warranty period.
- Any damage or failure caused by improper installation, storage, maintenance or usage, not in compliance with operating manual.
- Beyond or violate the conditions listed in contract or technical agreement.
- Any damage or failure caused by attempts by personnel other than authorized Longer representatives to install, repair, modify or remove the product.
- Any damage or failure caused by non-Longer parts, or user-replaceable parts purchased from unauthorized distributors.

- Any damage or failure caused by accidents or human errors (including wrong power supply voltage, corrosion, fall-off, etc.)
- Any damage or failure caused by natural disaster or other irresistible force (earthquake, fire, etc.).
- Other product damage or failure not caused by defects in design, material and workmanship.

1.2.2 Maintenance Service

- Customer will be charged for the repair or replacement of the parts or accessories after warranty period.
- Parts can be replaced within 3 working days. Longer will inform customer of the date in advance if out of 3 working days.

1.2.3 Service Commitment

- Longer commits to provide customer solutions to any quality complaint within 2 working days.
- Longer commits to reply to customer's requirement of on-site technical supports or training within 2 working days.

1.2.4 Dispute Settlement

Dispute over product quality or service will be handled according to contract or agreement. If there is no related contract or agreement, it shall be resolved by the disputing parties through consultation. Otherwise, it will be resolved according to relevant national laws and regulations.

1.3 Repair Notes

Please contact Longer or its distributor, and provide the product serial number before returning the product. Products which has been contaminated with, or exposed to, toxic chemicals or any other substance hazardous to health must be decontaminated before returning to Longer or its distributor. You must ship the product in its original packaging or better, to insure it against possible damage or loss during the transport.

1.4 Contacts Information

Baoding Longer Precision Pump Co., Ltd
3rd/4th Floor, Building 6B, University Science Park Baoding National,
High - Tech Industrial Development Zone
Baoding, Hebei, China 071051
Email: longer@longerpump.com
Tel: 86-312-3110087
Fax: 86-312-3168553
www.longerpump.com

2 Pump Introduction

2.1 Main Feature

T60&WX10 series variable speed peristaltic pumps, including pump drive and WX10 pump head, are mainly designed for ODM applications. The speed can be controlled by BCD dial switch or external control signal, with 60 rpm as max. The pump offers flow rate from 0.1 to 24mL/min and can be mounted to customer equipment through soleplate.

Please refer to Appendix A for product model.

2.2 Main Function

2.2.1 T60-S1/S2/S3/S4&WX10 Main Function

1) Pump head options: WX10-14 series pump head with 4 rollers, WX10-18 series pump head with 8 rollers and smaller pulse.

2）Pump speed can be controlled through internal control mode or external control mode. The internal control mode uses BCD dial switch. The external control mode uses current, voltage or pulse signal.

3) Start/stop can be controlled by external switch signal: pump runs when switch is open, pump stops when switch is closed.

4) Direction can be controlled by external switch signal: CW when switch is open, CCW when switch is closed.

2.2.2 T60-S50&WX10 Main Function

1) Pump head options: WX10-14 series pump head with 4 rollers, WX10-18 series pump head with 8 rollers and smaller pulse.

2）The pump’s start/stop, operation direction and speed are controlled through serial communication with RS485 port.

3) Prime function also can be carried out through RS485 signals, to run pump at full speed to fill or clear lines.

4) Power-off memory function: storing the running parameters automatically.

2.3 Specification

2.3.1 T60-S1/S2/S3/S4&WX10 Specification

Speed range under internal control mode: 1-60rpm，BCD dial switch is used to control the speed. Refer to Table 2 for corresponding relation between BCD dial switch position and speed.

Speed range under external control mode: 0-60 rpm. Being the linear function, the speed will increase with the increasing signal (T60-S1&WX10 will operate at 0 rpm when signal is smaller than 4mA, and 0.1 rpm when 4mA is received)

Speed resolution: 0.1rpm

Tubing options: ID≤3.17mm, wall thickness: 0.8-1.0mm

Please refer to up-to-date product catalog for the flow rate of each tubing.

Power Supply：DC 11.4-25.2V

Power consumption：≤10W

Working condition：temperature: 0-40℃， relative humidity: <80%，no condensation

Outline dimension：(L×W×H) 106×60×78(mm)

Weight：0.43kg

2.3.2 T60-S50&WX10 Specification

Speed: 0-60rpm

Speed resolution: 0.1rpm

Tubing options: ID≤3.17mm, wall thickness: 0.8-1.0mm

Please refer to up-to-date product catalog for the flow rate of each tubing.

Baud rate (bit rate): 1200 or 9600 baud (1200 or 9600 bps). Refer to table 4 for data transmission speed setting.

Communication address: 1-30, 31 is broadcast address. Refer to Table 5 for communication address setting.

Power supply: DC 11.4-25.2V

Power consumption: ≤10W

Working condition: temperature 0-40℃, relative humidity <80%, no condensation

Outline dimension: (L×W×H) 106×60×78（mm）

Weight: 0.42kg

2.4 Installation Drawing

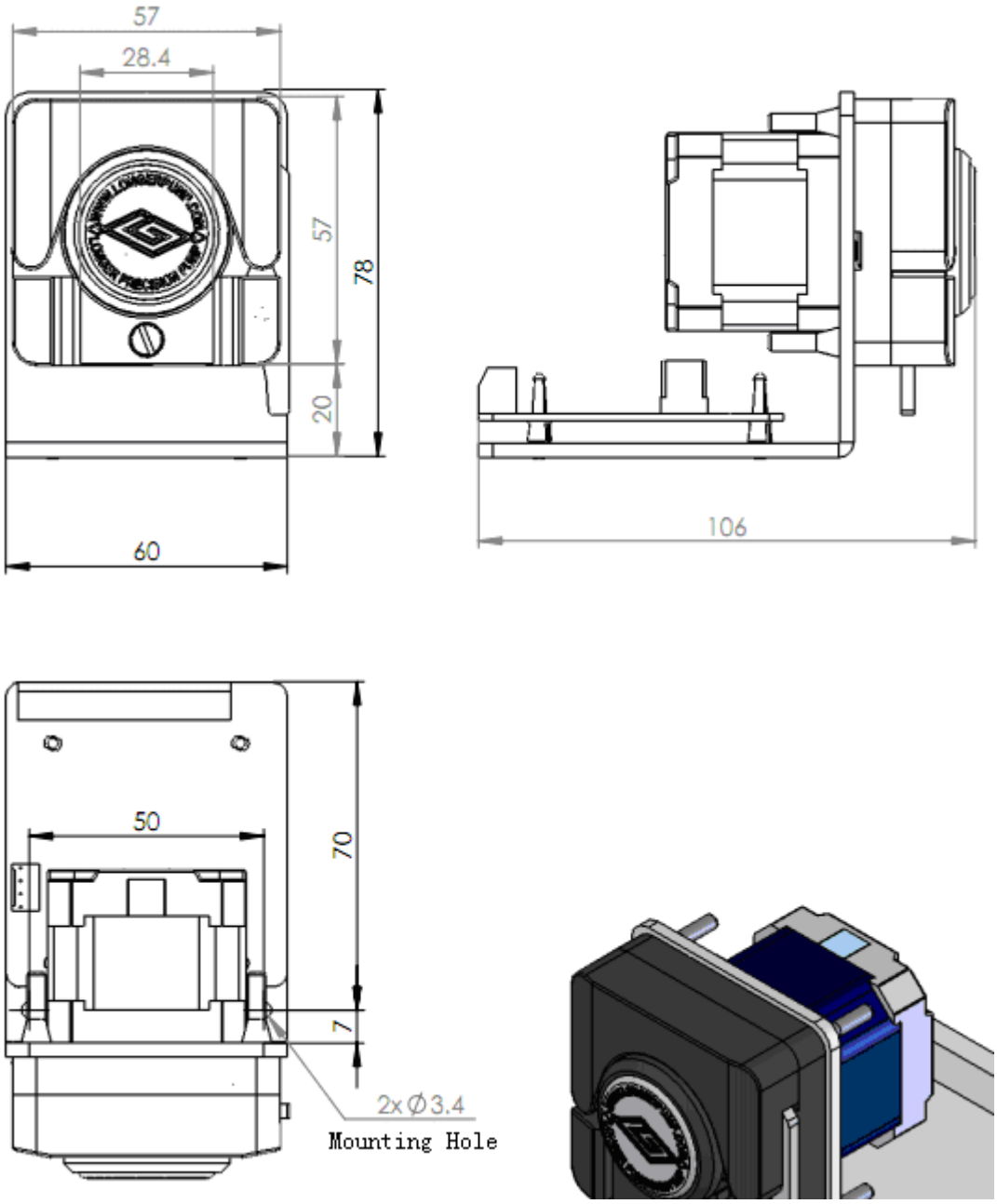


Figure 1

3 Operating Instruction

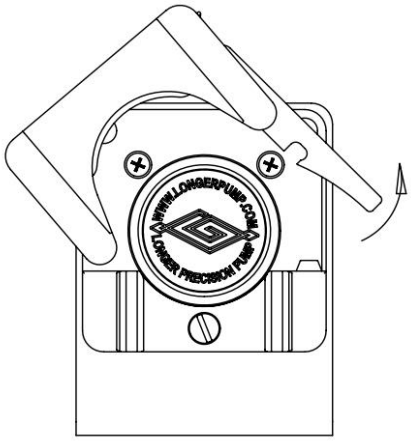
3.1 Pump Head Mounting

WX10 series pump head rotor drive shaft is the motor output shaft. The rotor needs re-aligning when mount the pump head on the pump drive. We don't recommend that you replace JY15-12 pump head by yourself. If you need to replace the pump head, please send the pump back to Longer or the authorized distributors.

3.2 Tube Loading

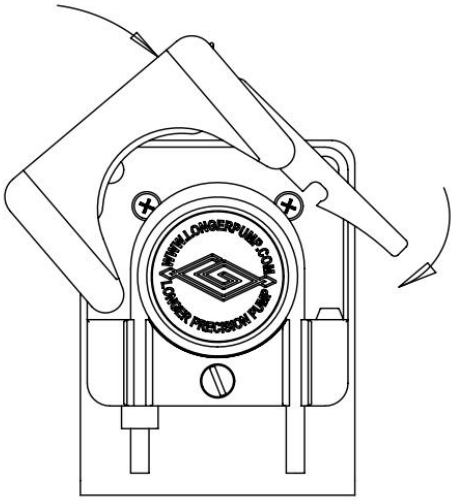
Note: Please disconnect pump from the mains power before loading the tube.

1）Release the trigger and open the compression block.

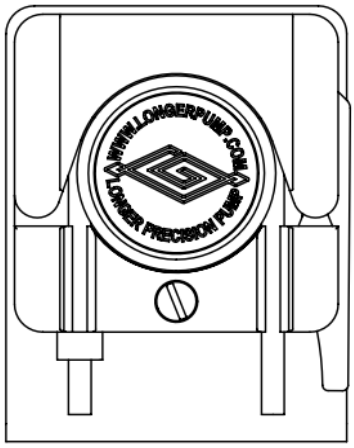


2）Tube loading

a) For one rotate direction application, only the inlet of the tubing needs one stop collar. For two rotate direction application, the outlet of the tubing also needs one stop collar. The tubing length between two stop collars is 93mm.
b) Fit the inlet of the tubing into the slot. Place the stop collar outside the slot.
c) Lightly stretch the tubing across rollers.
d) Fit the outlet of the tubing into the other slot. (The other stop collar will be placed outside the slot for the two rotate direction application.)



3）Close the compression block and fasten the trigger.



3.3 Pump Mounting

T60&WX10 series variable speed peristaltic pump can be mounted on customer equipment through soleplate. Refer to Figure 1 “Mounting Hole” for the mounting position.

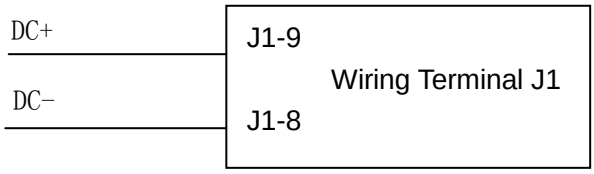
3.4 Hardware Setting

3.4.1 Power Supply

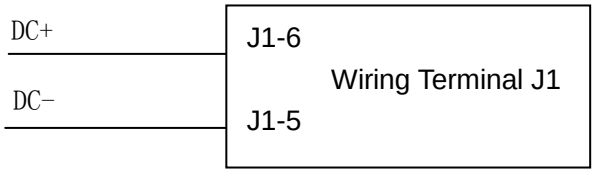
The power supply requirement is DC 11.4V-25.2V and power ≥10W. For the power supply terminal position, please refer to Figure 2 and Table 1 for T60-S1&WX10，T60-S2&WX10，T60-S3&WX10，T60-S4&WX10, Figure 3 and Table 3 for T60-S50&WX10.

Wiring Diagram shown as below:

T60-S1&WX10，T60-S2&WX10，T60-S3&WX10，T60-S4&WX10:



T60-S50&WX10：

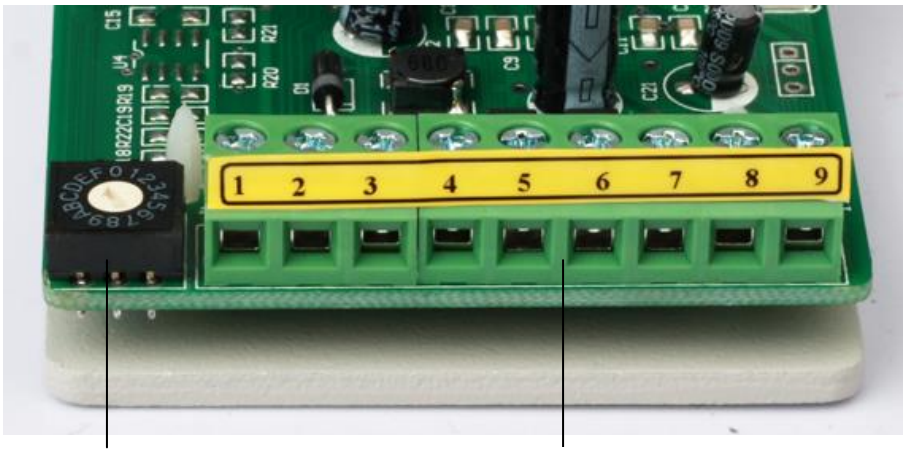


3.4.2 T60-S1/2/3/4&WX10 BCD Dial Switch and Wiring Terminal Instruction

T60-S1/2/3/4&WX10 speed is controlled through internal control mode or external control mode. The internal control mode uses BCD dial switch, and the speed is divided into 15 grades. Please refer to Table 2 for the corresponding relation between BCD dial switch position and speed. The external control mode uses current signal (4-20mA), voltage signal (0-5V or 0-10V) or pulse signal (0-10 kHz). Being the linear function, the speed will increase with the increasing signal. Switch signal is applied across terminals J1-5 and J1-7 to start/stop pump. Another

switch signal is applied across terminals J1-6 and J1-7 to control operation direction as CW or CCW.

Figure 2 shows BCD dial switch and wiring terminal on control circuit board. Refer to Table 1 for the terminal definition.



BCD Dial Switch Wiring Terminal J1

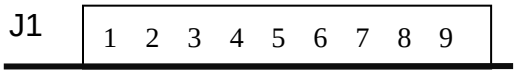


Figure 2

Table 1：Wiring Terminal Instruction

Terminal No.	Definition	Terminal No.	Definition
1	Current or Voltage Signal +	6	CW/CCW Signal
2	Current or Voltage Signal -	7	CW/CCW, Start/Stop Common Grounding
3	Pulse Signal +	8	DC Power Supply -
4	Pulse Signal -	9	DC Power Supply +
5	Start/Stop Signal		

Note:

Terminals J1-1 and J1-2 are only applicable to T60-S1/S2/S3&WX10 series products

Terminals J1-3 and J1-4 are only applicable to T60-S4&WX10 series products

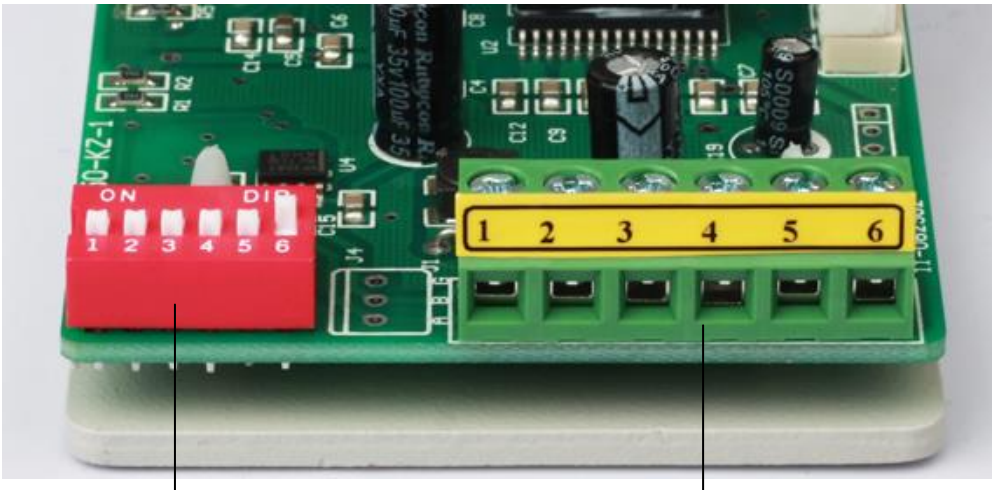
Table 2： BCD Dial Switch Position vs. Speed

Control Mode	BCD Dial Switch Position	Speed（RPM）
External Control	0	
Internal Control	1	1
	2	3

	3	5
	4	8
	5	10
	6	15
	7	20
	8	25
	9	30
	A	35
	B	40
	C	45
	D	50
	E	55
	F	60

3.4.3 T60-S50&WX10 Communication Address Setting, Wiring Terminal and Communication Wire Connection Instruction

T60-S50&WX10 receives RS485 communication signal to control start/stop, speed, direction and prime function. It also has the function of power-off memory. The data transmission speed and communication address are set through DIP switch. Figure 3 shows DIP switch and wiring terminal on control circuit board. Please refer to Table 4 and Table 5 for DIP switch setting, refer to Table 3 for wiring terminal definition, and refer to Appendix B for communication protocol.



DIP Switch Wiring Terminal J1

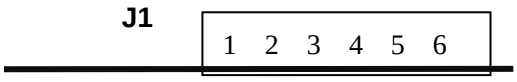
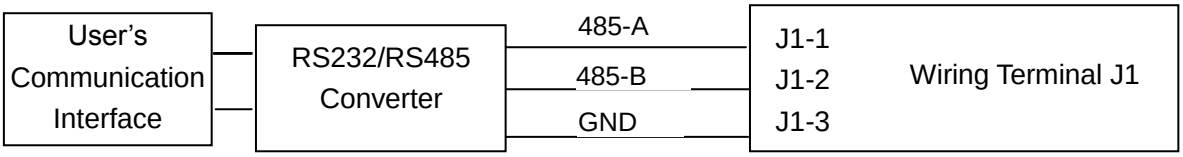


Figure 3

Communication wire connection instruction:

1) User's communication interface is RS485, please refer to below wiring diagram:

2) User's communication interface is RS232, please refer to below wiring diagram:



3) User's communication interface is USB, please refer to below wiring diagram:

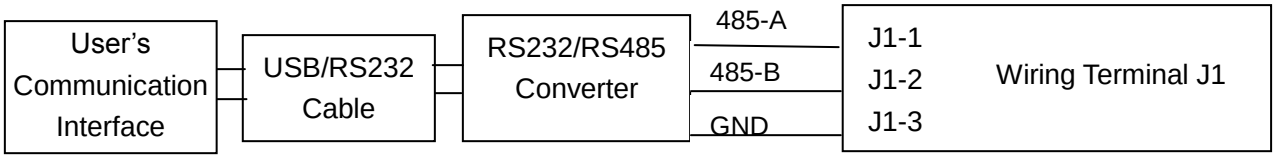


Table 3：Wiring Terminal Instruction

Wiring Terminal	Definition	Wiring Terminal	Definition
1	RS485-A	4	Common Grounding
2	RS485-B	5	DC Power Supply -
3	Common Grounding	6	DC Power Supply +

Table 4：DIP Switch vs. Data Transmission Speed

DIP1 Position	Baud Rate (Bit Rate)
ON	9600 baud (9600 bps)
OFF	1200 baud (1200 bps)

Table 5：DIP Switch vs. Communication Address

DIP2	DIP3	DIP4	DIP5	DIP6	Communication Address
OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	ON	OFF	2
OFF	OFF	OFF	ON	ON	3
OFF	OFF	ON	OFF	OFF	4
OFF	OFF	ON	OFF	ON	5
OFF	OFF	ON	ON	OFF	6
OFF	OFF	ON	ON	ON	7
OFF	ON	OFF	OFF	OFF	8
OFF	ON	OFF	OFF	ON	9
OFF	ON	OFF	ON	OFF	10
OFF	ON	OFF	ON	ON	11
OFF	ON	ON	OFF	OFF	12

OFF	0N	ON	OFF	ON	13
OFF	ON	ON	ON	OFF	14
OFF	ON	ON	ON	ON	15
ON	OFF	OFF	OFF	OFF	16
ON	OFF	OFF	OFF	ON	17
ON	OFF	OFF	ON	OFF	18
ON	OFF	OFF	ON	ON	19
ON	OFF	ON	OFF	OFF	20
ON	OFF	ON	OFF	ON	21
ON	OFF	ON	ON	OFF	22
ON	OFF	ON	ON	ON	23
ON	ON	OFF	OFF	OFF	24
ON	ON	OFF	OFF	ON	25
ON	ON	OFF	ON	OFF	26
ON	ON	OFF	ON	ON	27
ON	ON	ON	OFF	OFF	28
ON	ON	ON	OFF	ON	29
ON	ON	ON	ON	OFF	30

3.5 Operation

3.5.1 T60-S1/2/3/4&WX10 Operating Procedures

1) Ensure the power supply is DC 11.4V-25.2V and power≥10W.

2) Connect the power supply and necessary control signal wire according to Figure 2 and Table 1.

Control the pump start/stop with switch signal connected to J1-5 and J1-7 terminals.

Control the pump direction with switch signal connected to J1-6 and J1-7 terminals.

Control the pump speed with external control signal connected to J1-1 (ground to J1-2) for T60-S1/S2/S3&WX10, connected to J1-3 (ground to J1-4) for T60-S4&WX10.

3) Power on the pump and control the speed

Speed control under internal control mode:

Set the BCD dial switch at the position required, then power on the pump, pump will operate clockwise (start/stop and direction contacts are open by default). Pump will operate counter-clockwise when close direction switch. Change BCD position to control the pump speed. Pump will be at 0 rpm but still in running state, when BCD is set at “0” position. Pump will stop when close start/stop switch. We recommend external control mode where a high number of speed changes is required.

Speed control under external control mode:

Set BCD dial switch at “0” position, then power on the pump. Input the external current

signal, voltage signal or pulse signal, the pump will operate clockwise (start/stop and direction contacts are open by default). Pump will operate counter-clockwise when close direction switch. Control the speed of pump with external control signal. Being the linear function, the speed will increase with the increasing external control signal. Pump will stop when close start/stop switch.

3.5.2 T60-S50&WX10 Operating Procedures

1) Ensure the power supply is DC 11.4V-25.2V and power≥10W.

2) Connect the power supply and communication wire according to Figure 3 and Table 3.

3) Power on the pump, input RS485 signal according to Appendix B “communication protocol” to control the pump.

Appendix A: Product Model Table

Item	Model	Description	Product Code
1	T60-S1&WX10-14-A	BCD dial switch or 4-20mA signal. Black pump head with POM rollers and movable compression block	055701A
2	T60-S1&WX10-14-B	BCD dial switch or 4-20mA signal. White pump head with POM rollers and movable compression block.	055701B
3	T60-S1&WX10-14-C	BCD dial switch or 4-20mA signal. Black pump head with PVDF rollers and movable compression block.	055701C
4	T60-S1&WX10-14-D	BCD dial switch or 4-20mA signal. White pump head with PVDF rollers and movable compression block.	055701D
5	T60-S1&WX10-18-A	BCD dial switch or 4-20mA signal. Black pump head with POM rollers and movable compression block	055702A
6	T60-S1&WX10-18-B	BCD dial switch or 4-20mA signal. White pump head with POM rollers and movable compression block.	055702B
7	T60-S1&WX10-18-C	BCD dial switch or 4-20mA signal. Black pump head with PVDF rollers and movable compression block.	055702C
8	T60-S1&WX10-18-D	BCD dial switch or 4-20mA signal. White pump head with PVDF rollers and movable compression block.	055702D
9	T60-S2&WX10-14-A	BCD dial switch or 0-5V signal. Black pump head with POM rollers and movable compression block.	055711A
10	T60-S2&WX10-14-B	BCD dial switch or 0-5V signal. White pump head with POM rollers and movable compression block.	055711B
11	T60-S2&WX10-14-C	BCD dial switch or 0-5V signal. Black pump head with PVDF rollers and compression block.	055711C
12	T60-S2&WX10-14-D	BCD dial switch or 0-5V signal. White pump head with PVDF rollers and movable compression block.	055711D
13	T60-S2&WX10-18-A	BCD dial switch or 0-5V signal. Black pump head with POM rollers and movable compression block.	055712A
14	T60-S2&WX10-18-B	BCD dial switch or 0-5V signal. White pump head with POM rollers and movable compression block.	055712B
15	T60-S2&WX10-18-C	BCD dial switch or 0-5V signal. Black pump head with PVDF rollers and movable compression block.	055712C
16	T60-S2&WX10-18-D	BCD dial switch or 0-5V signal. White pump head with PVDF rollers and movable compression block.	055712D
17	T60-S3&WX10-14-A	BCD dial switch or 0-10V signal. Black pump head with POM rollers and movable compression block.	055721A
18	T60-S3&WX10-14-B	BCD dial switch or 0-10V signal. White pump head with POM rollers and movable compression block.	055721B
19	T60-S3&WX10-14-C	BCD dial switch or 0-10V signal. Black pump head with PVDF rollers and movable compression block.	055721C
20	T60-S3&WX10-14-D	BCD dial switch or 0-10V signal. White pump head	055721D

		with PVDF rollers and movable compression block.	
21	T60-S3&WX10-18-A	BCD dial switch or 0-10V signal. Black pump head with POM rollers and movable compression block.	055722A
22	T60-S3&WX10-18-B	BCD dial switch or 0-10V signal. White pump head with POM rollers and movable compression block.	055722B
23	T60-S3&WX10-18-C	BCD dial switch or 0-10V signal. Black pump head with PVDF rollers and movable compression block.	055722C
24	T60-S3&WX10-18-D	BCD dial switch or 0-10V signal. White pump head with PVDF rollers and movable compression block.	055722D
25	T60-S4&WX10-14-A	BCD dial switch or 0-10kHz signal. Black pump head with POM rollers and movable compression block.	055731A
26	T60-S4&WX10-14-B	BCD dial switch or 0-10kHz signal. White pump head with POM rollers and movable compression block.	055731B
27	T60-S4&WX10-14-C	BCD dial switch or 0-10kHz signal. Black pump head with PVDF rollers and movable compression block.	055731C
28	T60-S4&WX10-14-D	BCD dial switch or 0-10kHz signal. White pump head with PVDF rollers and movable compression block.	055731D
29	T60-S4&WX10-18-A	BCD dial switch or 0-10kHz signal. Black pump head with POM rollers and movable compression block.	055732A
30	T60-S4&WX10-18-B	BCD dial switch or 0-10kHz signal. White pump head with POM rollers and movable compression block.	055732B
31	T60-S4&WX10-18-C	BCD dial switch or 0-10kHz signal. Black pump head with PVDF rollers and movable compression block.	055732C
32	T60-S4&WX10-18-D	BCD dial switch or 0-10kHz signal. White pump head with PVDF rollers and movable compression block.	055732D
33	T60-S50&WX10-14-A	RS485 communication. Black pump head with POM rollers and movable compression block.	055741A
34	T60-S50&WX10-14-B	RS485 communication. White pump head with POM rollers and movable compression block.	055741B
35	T60-S50&WX10-14-C	RS485 communication. Black pump head with PVDF rollers and movable compression block.	055741C
36	T60-S50&WX10-14-D	RS485 communication. White pump head with PVDF rollers and movable compression block.	055741D
37	T60-S50&WX10-18-A	RS485 communication. Black pump head with POM rollers and movable compression block.	055742A
38	T60-S50&WX10-18-B	RS485 communication. White pump head with POM rollers and movable compression block.	055742B
39	T60-S50&WX10-18-C	RS485 communication. Black pump head with PVDF rollers and movable compression block.	055742C
40	T60-S50&WX10-18-D	RS485 communication. White pump head with PVDF rollers and movable compression block.	055742D

Appendix B: T60-S50&WX10 Communication Protocol

1. Frame format: 1start + 8data + 1even parity + 1stop, 1200bps or 9600bps

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 PC sets pump's running parameter

PC sends command:

WJ	Speed (2 bytes)	Full speed and start/stop (1 byte)	Direction (1 byte)

Pump responds:

WJ

- WJ: 2 bytes, using ASCII code, to indicate that this command is used to set pump's running parameter. ASCII code of W is 57H, ASCII code of J is 4AH.
- Speed: 2 bytes, hexadecimal number, most significant byte first. resolution is 0.1rpm, Example: 0258H means 60rpm
- Full speed and start/stop:
  Bit0: 1 means pump runs, 0 means pump stops.
  Bit1: 1 means full speed, 0 means normal speed.
- Direction:
  Bit0: 1 means CW, 0 means CCW.

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

3.2 PC reads pump's running state

PC calls

RJ

Pump responds:

RJ	Speed (2 bytes)	Full speed and start/stop (1 byte)	Direction (1 byte)

- RJ: 2 bytes, using ASCII code, to indicate that this call is used to read pump's running state. ASCII code of R is 52H, ASCII code of J is 4AH.
- Refer to para. 3.1 for instructions of speed, full speed, start/stop, direction

Note: When read 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

- RID: 3 bytes, using ASCII code, to indicate that this call is used to read pump address. ASCII code of R is 52H, ASCII code of I is 49H, and ASCII code of D is 44H.

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

4. Example:

To set a pump (addr: 01) to run CW at speed of 50rpm. The message should be:

E9 01 06 57 4A 01 F4 01 01 EF