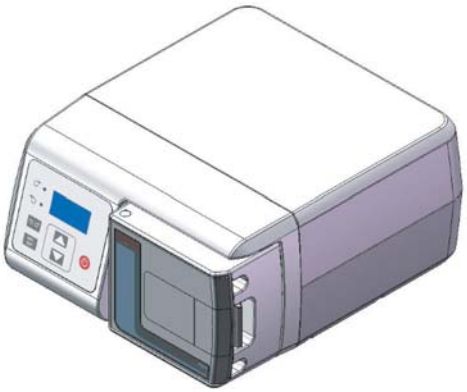
FH100 PERISTALTIC VARIABLE PUMP SYSTEM

Operating Manual
Model Number
72-320-000
72-320-100
A-1299-7091 Edition 03



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A-1299-7091

REV	ECR/ECN	DATE	DESCRIPTION	By
03	16900	100503	Revised Footswitch part number.	RW
02	16722	091222	Revised and added warnings and regulatory compliance statements.	JK
01	16681	091120	First Edition	JK

SAFETY PRECAUTIONS

DANGER: Remove power from the pump before any cleaning operation is started.

WARNING: Remove power from the pump before attempting any maintenance.

WARNINGS: Tubing breakage may result in fluid being sprayed from pump. Use appropriate measures to protect operator and equipment.

Turn Pump System off before removing or installing tubing. Fingers or loose clothing could get caught in drive mechanism.

CAUTIONS: When changing flow direction, allow the pump to come to a complete stop before starting again. Failure to do so could cause permanent damage to the motor.

Replace the fuse only with one of the same type and rating. The fuse rating and type are stated on the rear panel.

CAUTION: To avoid electrical shock, the power cord protective grounding conductor must be connected to ground. Not for operation in wet locations as defined by EN61010-1.

If the product is not used in a manner specified in the instructions, the protection provided by the equipment may be impaired.

Explanation of Symbols

CAUTION: Risk of Danger. Consult Operator's manual for nature of hazard and corrective actions.

CAUTION: Risk of crushing. Keep fingers away from rotor while pump is in operation. Stop pump before loading or unloading tubing.

CAUTION: Hot Surface. Do not touch.

CAUTION: Risk of electric shock. Consult Operator's manual for nature of hazard and corrective actions.

WARNING: Product Use Limitation

This product is not designed for, nor intended for use in patient connected applications; including, but not limited to, medical and dental use, and accordingly has not been submitted for FDA approval.

This product is not designed for, nor intended for use in hazardous duty areas as defined by ATEX or the NEC (National Electrical Code); including, but not limited to use with flammable liquids. Consult the factory for products suitable for these types of applications.

Safety

1. Read instructions before operating the unit.

2. Observe safety precautions at all times, especially when pumping dangerous liquids. Always have the clear plastic cover properly mounted on the Pump Head and, in general, protect the pump area from accidental spillage of liquid.

3. If the pump runs unusually noisily or if bunching of the tubing in the pump can be observed, make sure the tubing is clamped down tightly and/or replace it with a new piece of tubing.

4. The FH100 Pump System must be well-grounded at all times.

5. The FH100 Pump System is equipped with a current-limiting circuit that will slow the motor down if any of the following conditions exist:

   a. Tubing that is too hard is loaded in the pump.

   b. Incorrect tubing size or wall thickness is loaded in the pump.

   c. Tubing is improperly loaded into the Pump Head.

6. The unit is fused and grounded to protect the operator in the event of short circuits that could be caused by liquid entering the case.

   ⚠ ***CAUTION: Replace the fuse only with one of the same type and rating. The fuse rating and type are stated on the rear panel.***

7. The Pump System should not be used in outdoor or hazardous locations.

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Section 1 Introduction

General Description

The FH100 Peristaltic Variable Pump System provides continuous pumping of fluids while power is supplied.

These Pump Systems are ETL and CE certified. The pump speed range for both models is 4-400 rpm.

Controls, Indicators and Connectors

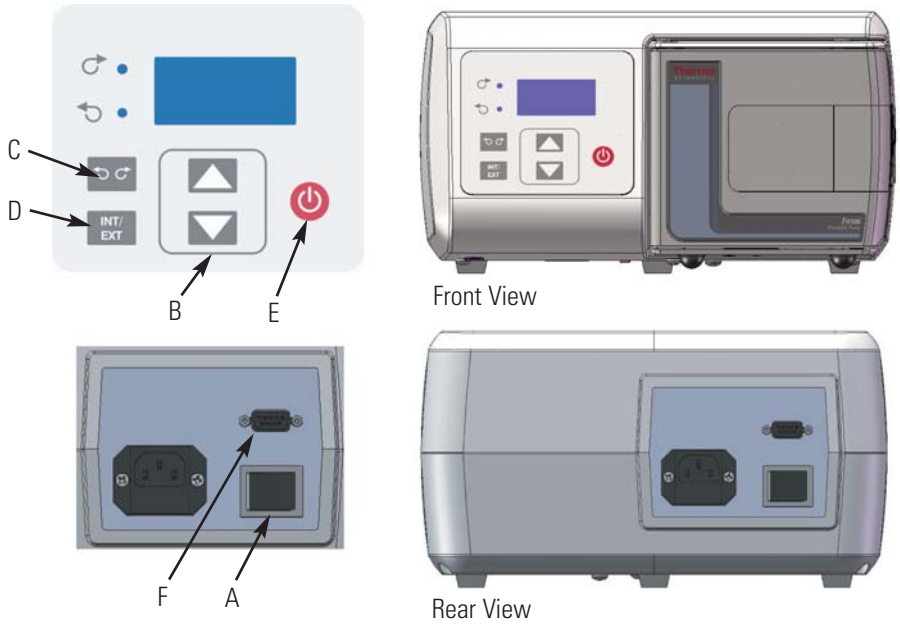

Figure 1-1. Controls, Indicators and Connectors

A. POWER (ON/OFF) SWITCH: Turns the unit ON or OFF.

B. SPEED KEYS: Sets the speed of the pump. The higher the number, the faster the speed of the pump. When setting the displayed values, units change first, then tens, etc. at an increasing rate.

C. FLOW DIRECTION KEY: Sets the direction of the rotation of the pump Clockwise/Counterclockwise. An LED annunciator shows the active direction. The motor is brought to a controlled stop before reversing direction.

D. INTERNAL/EXTERNAL KEY: This key changes the mode of operation for the drive. Internal (Local) operation throught the front panel keypad is designated by “INT” while external (Remote) operation is designated by “EXT”. In INT mode, START/STOP, FLOW DIRECTION, and SPEED keys on the front panel determine operating state. Pressing and releasing this key will toggle between the two operating states.

E. START/STOP KEY: When depressed, this key toggles the motor on and off when in INT mode. This key will not normally start the drive if in EXT mode. If pressed while running in EXT mode (stop desired), the button will always stop the drive and a toggle of the EXT Start/Stop is required to restart the drive.

F. EXTERNAL/REMOTE CONNECTOR: Used to connect wiring for remote control operation using a DB9 connector.

Section 2 Installation and Setup

Unpack the pump and retain all packing material until proper product operation has been verified. Select the tubing according to the flow desired, while considering chemical compatibility and tubing life.

Tubing Size Selection

Flow rate is determined by the size of the tubing in the Pump Head. When tubing links are used, best performance will be achieved when input and output tubing connected to the link are the same ID as the link.

72-320-000 Pump Systems accept tubing ID sizes of 1/32 in to 5/16 in (0.8 mm to 8.0 mm) by 1/16 in (1.6 mm) wall.

72-320-100 Pump Systems accept tubing ID sizes of 3/16 in to 3/8 in (4.8 mm to 9.5 mm) by 3/32 in (2.4 mm) wall.

For best results, select a tubing size with a mid-range at the desired flow rate to be pumped.

Section 3 Operation

Inserting Tubing

WARNINGS: Tubing breakage may result in fluid being sprayed from pump. Use appropriate measures to protect operator and equipment.

Turn Pump System off before removing or installing tubing. Fingers or loose clothing could be caught in the pump mechanism.

CAUTION: To avoid electrical shock, the power cord protective grounding conductor must be connected to ground. Not for operation in wet locations as defined by EN61010-1.

If the product is not used in a manner specified in the instructions, the protection provided by the equipment may be impaired.

The Pump Head has two tubing retainers, which hold tubing in place.

The occlusion bed retracts when you open the pump door and moves forward when the door is closed.

To load tubing into the Pump Head do the following:

1. Make sure that the power switch is turned OFF.
2. Open the Pump Head door using the side latch.
3. Install any tube fittings, inserts or clamps before loading the tubing.
4. Open the top tubing retainer by using just one finger to open the retainer, install tubing and release the retainer.

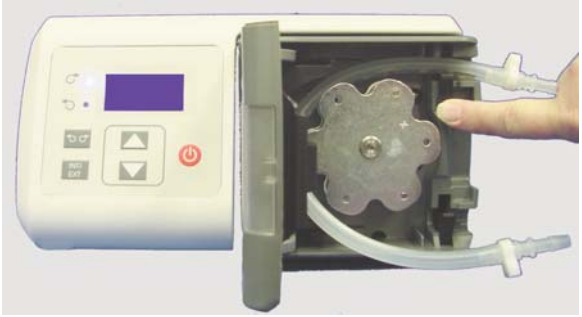

Figure 3-1. Tube Loading Upper Retainer

Inserting Tubing (continued)

5. Install the tubing around the rotor, going with the natural curve or lay of the tubing and center the tubing on the rollers.
6. Open the lower retainer by using just one finger to open the retainer and insert the tube and release the retainer.

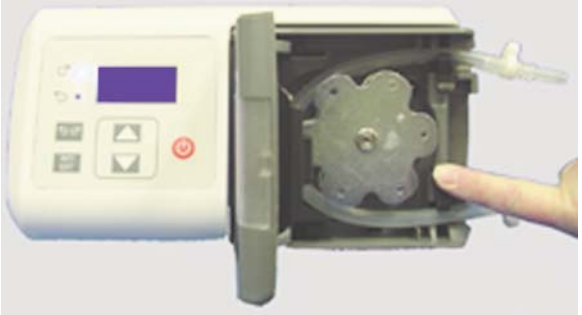

Figure 3-2. Tube Loading Lower Retainer

7. The tubing should be snug against the rotor, but not tight.
8. Close the Pump Head door. Verify that the door is securely shut or the pump will not spin.

Tubing Inspection and Replacement

Tubing should be inspected periodically and checked for tears, cracks, cut marks, abrasions, inability to hold pressure, bubbles in the flow stream and reduction or loss of flow.

Tubing life may be extended by periodically moving the worn tubing inside the occlusion bed of the pump to the outside of the occlusion bed to the suction side of the pump. This will avoid excessive tubing wear at any specific point.

Always move the worn tubing to the suction side of the pump.

Pump Controls

⚠ ***CAUTION: When changing flow direction, allow the pump to come to a complete stop before starting again. Failure to do so could cause permanent damage to the motor.***

1. Make sure the speed is set to the minimum setting.
2. Turn the power switch ON. Increase the speed to start the pump action. The higher the rpm, the faster the speed of the pump.
3. The Pump Systems are self-priming. To begin pumping, select a flow direction with the flow direction button, insert the intake and output tubing into a reservoir, and turn the unit ON. Prime the tubing for at least 5 minutes. If accurate flow control is important, allow the pump to prime for approximately 20 minutes for more stable flow conditions.

External Operation

Models are equipped with inputs that can be controlled by external signals connected at the rear panel 9-pin "D" shell connector. The External inputs permit control of the pump by remote equipment or accessories. Figure 3-3 shows the signal locations of the connector.

Pin No.	Description
1	Speed Control Voltage Input (0–10V) (+) input
2	Speed Control Current Input (4–20 mA) (+) input
3	Speed Control Input Reference Common
4	Local/Remote Speed Control
5	Local/Remote Speed Control Reference
6	Start/Stop and CW/CCW Reference
7	Start/Stop (+) Control
8	CW/CCW
9	Chassis (Earth) Ground

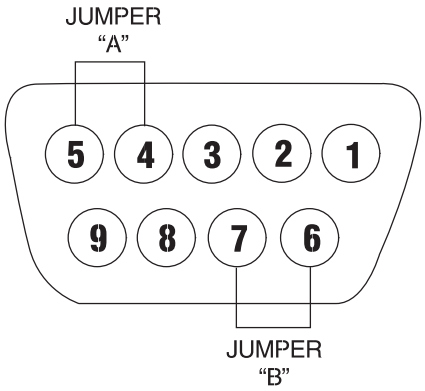

Figure 3-3. DB9 Pin Configuration with Wiring Scheme

External Inputs

The FRONT INT/EXT key enables external functions. Switching to INT on the display disables the external functions, allowing the front panel controls to operate the pump.

When the INT/EXT key is in the EXT position, starting and stopping the pump is controlled by an external contact closure between pins 6 and 7 (Jumper B), and the pump speed is determined by an externally supplied 0–10V or 4–20 mA source. Connection must be made between pins 6 and 7 and a control voltage greater than 0V or a control current greater than 4 mA must be applied for the pump to run.

If setting the speed from the front panel is desired with external Start/Stop contact operation, the INT/EXT key must again be in the EXT position. In addition, Jumper A should be in place. Jumper A connects pin 4 of the "D" shell connector (Local/Remote) to pin 5 (Local/Remote Reference). Start/Stop will then be controlled from the rear panel (Jumper B), and the pump speed will be controlled from the front panel. The accessory Footswitch (part no. 73-750-000) and Dispenser Wand (part no. 73-055-590) are connected internally in this way.

NOTE: The signal common for the speed control voltage and current inputs is referenced to earth ground.

The START/STOP (pin 7) input, CW/CCW (pin 8) and Local/Remote (pin 4) are digital inputs. They are internally pulled up to +5 V with respect to logic common (RETURNS). They can alternately be driven with open collector logic. For increased noise immunity, use of contact closures is recommended.

Section 4 Maintenance

WARNING: Remove power from the pump before attempting any maintenance.

The speed control circuit has solid-state components that do not require service. An excessive load on the system may, however, cause the fuse to blow. An indication of an excessive load is a switch that does not light with power applied to the pump and when the ON-OFF switch is in the ON position. If this condition occurs, remove power from the unit and remove the fuse from the fuse holder located on the rear of the pump. Replace the fuse with a fuse of the same type and rating. This information is printed on the rear of the unit.

CAUTION: Replace the fuse only with one of the same type and rating. The fuse rating and type are stated on the rear panel.

Cleaning

DANGER: Remove power from the pump before any cleaning operation is started.

Keep the pump enclosure clean by using a mild detergent solution. Never immerse nor use excessive fluid when cleaning the pump.

Section 5 Troubleshooting

Troubleshooting Chart

Symptom	Remedy
Unit will not turn on	Verify that the unit is plugged into a functioning outlet.
	Verify that the power cord is firmly attached to the unit.
	Verify that the fuse for the incoming voltage is not blown (located in the slot next to the power cord).
Unit will turn on but pump will not spin	Verify that the pump head door is securely shut.
	Check the tubing. Tubing should be snug, but not tight, against the rollers.
	Verify that the mode EXT/INT is set correctly.
Error XX is displayed on the screen	Err's 3 & 7, check pump for obstructions, all other Errs return unit for repair.
Unit will turn on but display would dim and pump will not spin	Verify that the incoming voltage meets the required minimum of 90Vrms.
Unit vibrates excessively when pump is running	Check that the tubing was loaded properly.

Section 6 Replacement Parts and Accessories

Replacement Parts

Description	Part Number	Qty.
Rubber Foot (pkg. of 6)	A-1390-0004-CR	1
Fuse (T3.15A, 250V, 5 x 20 mm)	77500-25	1
Pump Replacement (for model 72-320-000)	109716-CR	1
Pump Replacement (for model 72-320-100)	110219-CR	1
Ferrite, Line Cord Snap-on, (CE Required)	B-3689-CR	1
Line Cord, Australia	50001-60	1
Line Cord, Denmark	50001-62	1
Line Cord, India	50001-64	1
Line Cord (115V), United States	50001-68	1
Line Cord, Israel	50001-69	1
Line Cord, Europe	50001-70	1
Line Cord, England	50001-72	1
Line Cord, Switzerland	50001-74	1
Line Cord, Italy	50001-76	1
Line Cord (230V), United States	50001-78	1
Line Cord, China	50001-79	1

Accessories

Description	Part Number
Footswitch	73-750-000
Dispenser Wand	73-055-590
DB-9 External Control Connector	7595-45
PTFE Sinkers — keep intake tube at bottom of reservoir: Small: 1/16 in to 1/8 in (1.6 mm to 3.2 mm) ID tubing; Large: 3/16 in to 5/16 in (4.8 mm to 8.0 mm)	
Sinkers, (1 Small and 1 Large)	75-250-100
Small Sinkers 1/16 in – 1/8 in (1.6 mm – 3.2 mm)	75-250-102
Large Sinkers 3/16 in – 1/4 in (4.8 mm – 6.4 mm) each	75-250-104

Section 7 Specifications

Output:	
Speed:	4 - 400 rpm
Torque:	168 in-oz (12.1 kg•cm)
Input:	
Operating Voltage/Frequency:	90-260Vrms, 50/60 Hz, 1.6A @ 115Vrms, 1.9A @ 230 Vrms
External Inputs:	
START/STOP, CW/CCW, Remote/Local Speed Control	Contact closure
Voltage input	0–10V DC @ 10 kohm,
Accuracy:	±0.5% Full Scale
Current input	4–20 mA @ 250 ohm,
Accuracy:	±0.5% Full Scale
Environment:	
Operating Temperature:	32 to 104°F (0 to 40°C)
Storage Temperature:	-13 to 149°F (-25 to 65°C)
Humidity:	10% to 90% non-condensing
Altitude:	Less than 6562 ft (2000 m)
Pollution Degree:	Pollution degree 2 (indoor use–lab, office)
Construction:	
Dimensions (L × W × H):	12.5 in × 11 in × 6 in (31.8 cm × 27.9 cm × 15.2 cm)
Weight:	5.67 kgs (12.5lbs)
Color:	Light Grey (5% Black)
Material:	Aluminum, ABS plastic and vinyl
Enclosure Rating:	IP31 per IEC-60529
Compliance:	UL 61010-1, CAN/CSA-C22.2 No. 61010-1 This product has been tested to the requirements of CAN/CSA-C22.2 No. 61010-1, second edition, including Amendment 1, or a later version of the same standard incorporating the same level of testing requirements. (For CE Mark): EN61010-1: (EU Low Voltage Directive) and EN61326: (EU EMC Directive)

Section 8 Warranty, Product Return and Technical Assistance

Warranty

This product is warranted against defects in material or workmanship, and at the option of the manufacturer or distributor, any defective product will be repaired or replaced at no charge, or the purchase price will be refunded to the purchaser, provided that: (a) the warranty claim is made in writing within the period of time specified on the warranty card, (b) proof of purchase by bill of sale or receipted invoice is submitted concurrently with the claim and shows that the product is within the applicable warranty period, and (c) the purchaser complies with procedures for returns set forth in the general terms and conditions contained in the manufacturer's or distributor's most recent catalog.

This warranty shall not apply to: (a) defects or damage resulting from: (i) misuse of the product, (ii) use of the product in other than its normal and customary manner, (iii) accident or neglect, (iv) improper testing, operation, maintenance, service, repair, installation, or storage, (v) unauthorized alteration or modification, or (b) post-expiration dated materials.

THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER, AND THE MANUFACTURER AND DISTRIBUTOR DISCLAIM ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED, OR STATUTORY, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NO EMPLOYEE, AGENT, OR REPRESENTATIVE OF THE MANUFACTURER OR DISTRIBUTOR IS AUTHORIZED TO BIND THE MANUFACTURER OR DISTRIBUTOR TO ANY OTHER WARRANTY. IN NO EVENT SHALL THE MANUFACTURER OR DISTRIBUTOR BE LIABLE FOR INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES.

The warranty period for this product is one (1) year from date of purchase.

Product Return

To limit charges and delays, contact the seller or Manufacturer for authorization and shipping instructions before returning the product, either within or outside of the warranty period. When returning the product, please state the reason for the return. For your protection, pack the product carefully and insure it against possible damage or loss. Any damages resulting from improper packaging are your responsibility.

Technical Assistance

If you have any questions about the use of this product, contact the Manufacturer or authorized seller.

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