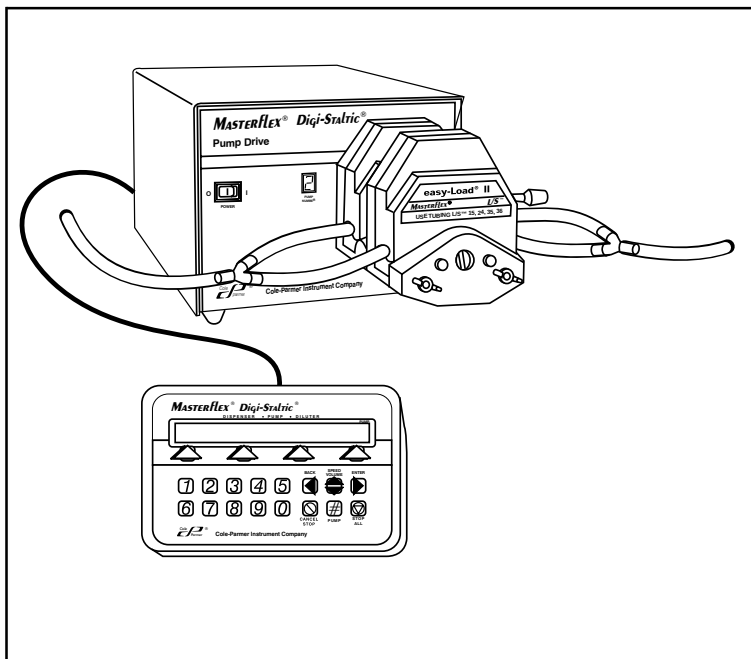




77310-00 DIGI-STAL TIC®

OPERATING MANUAL

MODULAR DISPENSING SYSTEM

NOTICE D'UTILISATION

SYSTÈME DE DISTRIBUTION MODULAIRE

BEDIENUNGSANLEITUNG

MODULARES DOSIERSYSTEM

MANUAL DE OPERACIÓN

SISTEMA DE DISTRIBUCIÓN MODULAR

MANUALE DI ISTRUZIONI

SISTEMA DISPENSATORE MODULARE

操作マニュアル

モジュラー ディスペンシング
システム

Model Nos.
Modèles n°
Modellnummern
Números de modelo
Modelli °
モデル番号

77310-00

77340-00

77310-50

77340-50

77310-02

A-1299-0780
Edition 03



Cole-Parmer Instrument Co. ■ 1-800-MASTERFLEX (627-8373) (U.S. and Canada only) ■
11 (847) 549-7600 (Outside U.S.) ■ (847) 549-7600 (Local) ■ www.masterflex.com

Barnant Company ■ 1-800-637-3739 (U.S. and Canada only) ■
11 (847) 381-7050 (Outside U.S.) ■ (847) 381-7050 (Local) ■ www.barnant.com



EU Declaration of Conformity

Name of Apparatus: MASTERFLEX® L/S® DIGI-STALTIC® Dispenser

Model Numbers: 77310-00, 77310-01, 77310-02, 77310-50
77340-00, 77340-50

Description of Apparatus: Programmable peristaltic pump dispenser system to pump measured amounts of fluids

77310-00 – Dispenser system w/thick wall pump,

77310-01 – Drive w/o pump,

77310-02 – Controller,

77310-50 – Drive w/thick wall pump,

77340-00 – Dispenser system w/thin wall pump,

77340-50 – Drive w/thin wall pump

Barnant Company declares that the above models are in conformity to the following harmonized standards and directives:

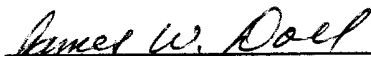
Applicable Directives	Applicable Specifications	Manufacturer's Report Number
73/23/EEC 93/68/EEC	EN61010-1/A2:1995	TR9868
89/336/EEC 92/31/EEC 93/68/EEC	EN61326-1/A1:1998	TR9869

The last two digits of the year in which the current configuration of the above models was assessed per the Low Voltage Directive is :00.

Manufacturer:

Barnant Company Division
Cole-Parmer Instrument Company
28W092 Commercial Avenue
Barrington, IL 60010-2392
USA
Tel.: 847-381-7050

Manufacturer's Signature:



James W. Doll
Vice President, Engineering

16 August, 2000

Date

TABLE OF CONTENTS

SAFETY	ii
Safety Precautions	ii
INTRODUCTION	1
General	1
Scope of the Manual	1
DESCRIPTION	2
Functional Description	2
Controls, Indicators, and Connectors	2
INSTALLATION	3
Site Requirements	3
Power Requirements	3
Interconnection	3
Power Connection	3
Balance Connection	4
Personal Computer Connection	4
Footswitch or DISPENSING WAND Connection	4
Relay Outputs	4
SETUP	5
Tubing Selection	5
Pump Mounting and Tubing Loading	5
Power On	5
Initial Operation	6
Adjusting the Display Contrast	7
Locking the Keypad	7
OPERATION	7
Description of Programming	7
General	8
Create or Edit a Pump Program	8
Create or Edit a Dispense Program	9
Create or Edit a Dilute Program	10
Saving a Program	11
Loading a Program	11
Operating Procedures	11
TROUBLESHOOTING	17
MAINTENANCE	17
Safety	17
Cleaning	17
Fuse Replacement	17
Belt Replacement	18
Brush Replacement	19
SPECIFICATIONS	20
USER-REPLACEABLE PARTS	20
ACCESSORIES	21
WARRANTY	21
PRODUCT RETURN	21
TECHNICAL ASSISTANCE	21
APPENDIX A — BALANCE CONNECTION	22
APPENDIX B — PC CONNECTION AND SOFTWARE INSTALLATION	22

NORPRENE and **PHARMED** are registered trademarks of Norton Co.

OHAUS and **VOYAGER** are registered trademarks of Ohaus Corp.

SARTORIUS is a registered trademark of Sartorius AG.

WINDOWS and **WINDOWS NT** are registered trademarks of Microsoft Corp.

Trademarks bearing the ® symbol in this publication are registered in the U.S. and in other countries.

SAFETY

Safety Precautions

This equipment uses AC and DC power to operate. AC and DC power can cause serious injury and even death. All of the maintenance and repair procedures in this manual must be performed with the equipment disconnected from the power source. Allow ten minutes for energy-storing components to discharge fully before removing the cover for service.

DANGER: *Never remove the cover from the pump drive when power is present. AC and DC power in the pump drive can cause serious injury or death. Ensure that the pump drive is disconnected from the power source before removing the cover for maintenance. Allow ten minutes for the capacitors in the power supply to discharge before proceeding.*



WARNINGS: *Disconnect the dispenser from the AC source before cleaning. A shock hazard exists when using water on powered equipment.*



The dispensing system must be plugged into a grounded power source only. An ungrounded power source presents a serious shock hazard.

WARNINGS: *Observe safety precautions at all times. Pay special attention when pumping dangerous liquids. Protect yourself, the work area, and the dispensing system from accidental spillage of the liquid.*



Turn off the system before removing or installing tubing. Disconnect the pump drive from the AC source to prevent accidental starting of the drive mechanism. Fingers or loose clothing can be caught in the pump mechanism, causing serious injury.

Tubing breakage can result in fluid being sprayed from the pump. Take appropriate measures to protect operator and equipment.

Be careful when working near the fan end of the motor. The fan blades are sharp.

CAUTIONS: *To avoid damaging your pump drive, ensure that the voltage selection switch is set to match the AC power source at your location.*



Always replace the fuse with the same type and rating as the blown fuse. Using a fuse of a different type or with a different rating can cause damage to the pump drive.

Ensure that the 115/230 voltage switch on the back of each pump drive is set to the appropriate voltage before connecting the pumps to the source voltage. Selecting the incorrect voltage can cause damage to the dispenser.

Excessive commutator wear or “bridging” between commutator segments can cause excessive current through the controller circuit and damage to the dispenser.



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.

INTRODUCTION

GENERAL

The MASTERFLEX® L/S® DIGI-STALTIC® Dispensing System, as shown in Figure 1, consists of a control console and up to four pump drives. Each pump drive can operate two EASY-LOAD® II Pump Heads. Table 1 lists catalog numbers and approximate physical size for the Dispensing Systems and component parts. Each pump drive is identified by the control console with a unique number from 1 to 4, depending to which port on the console the pump drive is connected. Pump drives are available for use with precision tubing or high-performance precision tubing.

Table 1. L/S DIGI-STALTIC Pump Drives

Component for Use with...	Precision Tubing	High-Performance Precision Tubing	Size (W × D × H) in inches (cm)	Approximate Weight in lbs. (kg)
L/S DIGI-STALTIC Pump System	77340-00*	77310-00†	—	—
Control Console (included with system)	77310-02	77310-02	8.9 × 6.5 × 2.7 (22.6 × 16.5 × 6.9)	3 (1.4)
Pump Drive (included with system)	77340-50*	77310-50†	9 × 12.6 × 7.4 (22.8 × 32 × 18.8)	20 (9)
Pump Drive with no pump heads	77310-01	77310-01	—	—
EASY-LOAD II Pump Head	77200-60	77200-62	—	—

* Includes two 77200-60 EASY-LOAD II Pump Heads

† Includes two 77200-62 EASY-LOAD II Pump Heads

Units are protected against vertically falling water and incidental splashes.

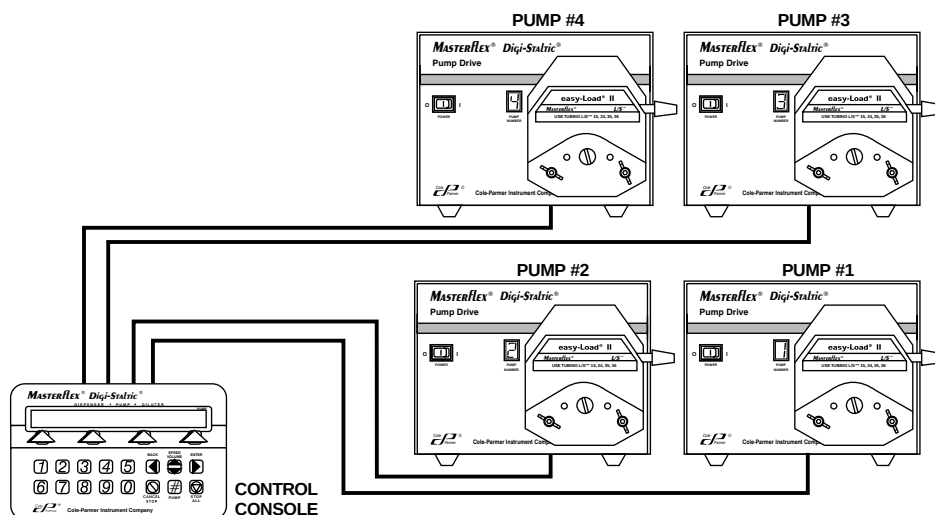


Figure 1. L/S DIGI-STALTIC Modular Dispensing System

The L/S DIGI-STALTIC Dispensing System is a microprocessor-controlled, programmable peristaltic pump system designed to meet liquid-handling needs. The system can be programmed to operate as a dispenser, diluter/dispenser, and an all-purpose pump. The operator designs programs that contain operational parameters. The programs can be run manually with the controller, a dispensing wand, or by using the optional footswitch, semiautomatically in cycle, or automatically by specifying the exact number of cycles to be completed.

The control console can control each pump independently, or pumps can be linked and controlled simultaneously.

Operation can be varied to suit specific applications by dispensing cumulative volume, flow in mL/min, and/or by cycle count. The dispenser can communicate with a variety of balances in order to dispense liquid by weight. A built-in RS-232 interface allows the dispenser to be controlled by a personal computer.

SCOPE OF THE MANUAL

This manual contains instructions for installing, setting up, programming, operating, and maintaining the dispensing system. It is intended for use by technicians and operators as well as maintenance personnel. **TROUBLESHOOTING** contains a list of possible problems, their probable causes, and actions to take to remedy each problem.

Instructions for replacing user-serviceable parts and a list of parts that can be ordered are included. **ACCESSORIES** lists all available accessories for the DIGI-STALTIC. **SPECIFICATIONS** lists pertinent characteristics of the DIGI-STALTIC. **APPENDIX A — BALANCE CONNECTION** provides pinout and signal information for connecting a balance to the dispenser. **APPENDIX B — PC CONNECTION AND SOFTWARE INSTALLATION** provides details to connect the DIGI-STALTIC to a personal computer.

DESCRIPTION

FUNCTIONAL DESCRIPTION

The DIGI-STALTIC control console provides the interface for the operator for programming and control of the dispensing system. The microprocessor in the control console scans the keypad, communicates to the display, and communicates with the attached pump drives through a serial interface. One of the pump drives supplies power to the control console.

Programmed information is stored in an EEPROM. Each program contains specific parameters for controlling the pump drives. Up to 30 programs in any combination of pump, dispense, and dilute can be stored at one time.

CONTROLS, INDICATORS, AND CONNECTORS

All the controls, connectors, and indicators on the control console are shown in Figure 2. All connectors are located on the back panel. Figure 3 illustrates a pump drive, showing the power switch and display on the front, and the connectors on the back.

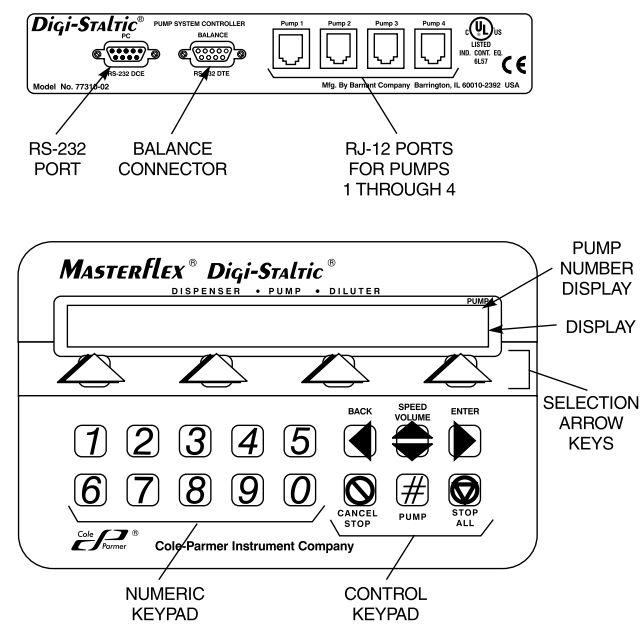


Figure 2. Control Console

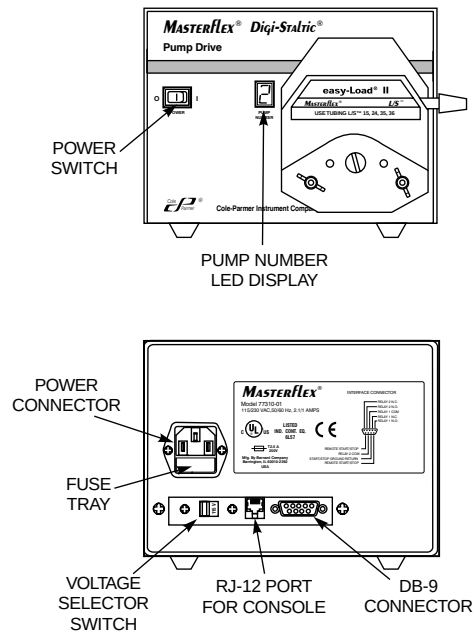


Figure 3. Pump Drive Controls, Connectors, and Indicators

Table 2. Operator Controls and Indicators

Control or Indicator	Description and Function
Display	80-character, two-line LCD that displays all menus needed for programming and operating the system.
Selection arrow keys	Use to select menu items shown on the second line of the display.
Numeric keypad	Use for numeric entry.
BACK	Takes user to previous menu line in menu structure. Acts as a backspace key during numeric input.
SPEED/VOLUME	Changes speed or volume of pump during operation.
ENTER	Use to confirm data entry or to continue during programming.
CANCEL/STOP	Use to stop currently selected pump immediately and to clear entry during programming.
STOP ALL	Immediately stops all pumps.
PUMP#	Changes the pump that is currently operated by the controller.

INSTALLATION

SITE REQUIREMENTS

The L/S DIGI-STALTIC Dispensing System is designed to operate in most workplace conditions. Ensure that the work area temperature range is 0°C to 40°C (32° to 104°F) and that the relative humidity remains between 10% and 90%. Locate the dispenser system so that it is not exposed to running water and is protected from dangerous chemicals and excessive or conductive dust.

POWER REQUIREMENTS

The L/S DIGI-STALTIC Dispensing System requires 115 (90–130) VAC or 230 (180–260) VAC, 50/60 Hz incoming power. Each pump drive draws 1.7 A at 115 V or 0.8 A at 230 V.

INTERCONNECTION

Each pump drive is connected to the control console with a 3-1/2 ft (1.1 m) RJ-12 cable (catalog number 77095-02). Longer cables are available as an option, but are not recommended for use in areas where interference may be high. Use as short a cable as is practical. Use only cables supplied by Cole-Parmer Instrument Co.

Refer to Figure 4, and connect the components of the dispensing system. Ensure that the plugs snap firmly into the connectors on the back of the control console and on the back of each pump drive.

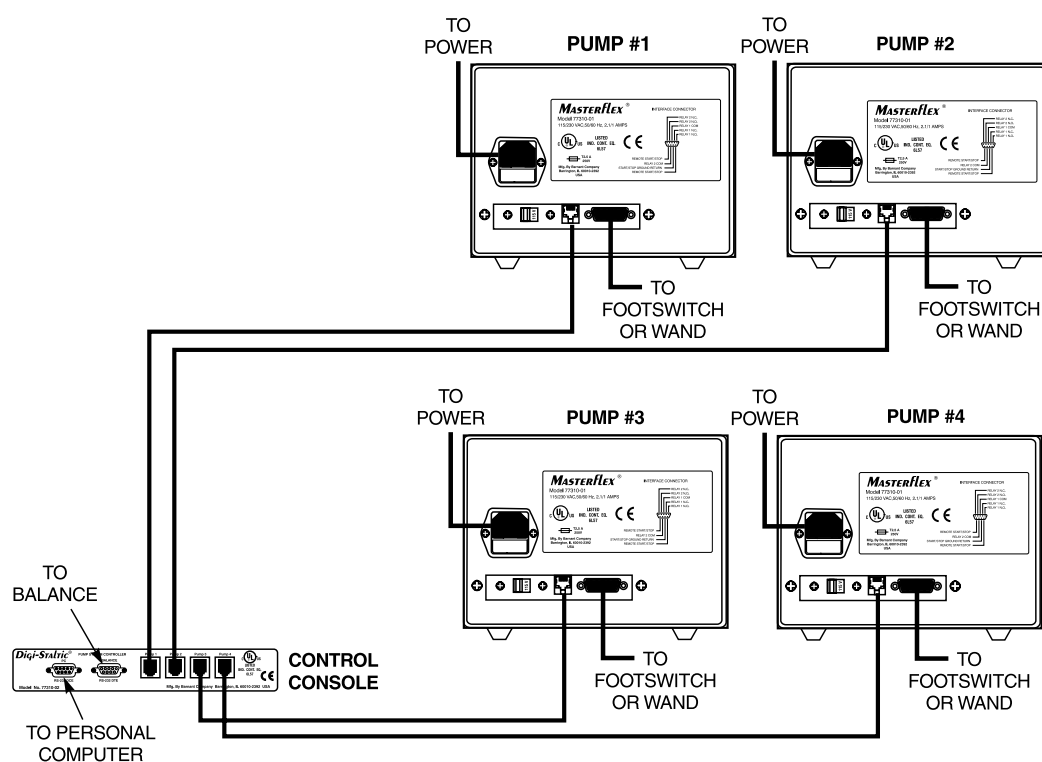


Figure 4. Interconnecting Components

POWER CONNECTION

Each pump drive requires AC power to operate. The power for the control console is supplied by one of the pump drives.

WARNING: The dispensing system must be plugged into a grounded power source only. An ungrounded power source presents a serious shock hazard.



CAUTION: Ensure that the 115/230 voltage switch on the back of each pump drive is set to the appropriate voltage before connecting the pumps to the source voltage. Selecting the incorrect voltage can cause damage to the dispenser.



If the voltage selection switch is set to the incorrect voltage, refer to Figure 5 and set the switch to match the voltage of your AC source. Slide the switch so the correct voltage is displayed.

Ensure that the AC outlet is grounded and meets all local and national codes. The use of ground-fault interrupted AC power is recommended because of liquid handling. Use the supplied power cord for each pump in the system. Refer to Figure 4, and attach the female plug to the connector on the back of the pump drive. Plug the male connector into a properly grounded AC outlet.

BALANCE CONNECTION

In order to operate the dispense program with a balance, a compatible balance must be connected to the control console. The DIGI-STALTIC provides communication to the balance through a nine-pin male RS-232 DTE port on the back of the control console. Refer to **APPENDIX A — BALANCE CONNECTION** for a list of compatible balances and a description of the RS-232 connections.

WARNING: Ensure that all pump drives and the balance are disconnected from the power source.



1. Make sure that all power is disconnected.
2. Ensure that the balance is compatible with the dispenser and that the cable is constructed so that pin connections are in accordance with Figure 16 in **APPENDIX A — BALANCE CONNECTION**.
3. Refer to Figure 4, and connect the balance to the connector labeled BALANCE on the back of the control console.
4. Tighten the two screws on the connector.

PERSONAL COMPUTER CONNECTION

The DIGI-STALTIC may be controlled by a personal computer using software shipped with the system. A serial port on the computer connects to the RS-232 DCE port on the back of the control console. Refer to Figure 17 in **APPENDIX B — PC CONNECTION AND SOFTWARE INSTALLATION** for pin connections and signals.

FOOTSWITCH OR DISPENSING WAND CONNECTION

In order to run a program with a footswitch or dispenser wand, the accessory must be connected.

WARNING: Ensure that the pump drive is disconnected from the power source.



1. Ensure that all power is disconnected.
2. Refer to Figure 4, and connect the DB-9 connector from the footswitch or dispenser wand to the nine-pin connector on the back of the pump drive.
3. Tighten the two screws on the connector.

RELAY OUTPUTS

Each DIGI-STALTIC pump drive provides control to external apparatus through two drive relays. Normally open contacts are open when the relay is off and closed when the relay turns on. Normally closed contacts are closed when the relay is off and open when the relay turns on. Table 3 provides the three possible states for the relays for each type of program. Connections are made to the relays at the DB-9 connector on the back of the pump drive.

Table 3. Relay Outputs

Pump Program	Dispense Program	Dilute Program	Relay 1	Relay 2
Not running	Not running or program complete	Not running or program complete	OFF	OFF
Pumping	Dispensing or dispensing paused	Pump running, hold delay, or paused	ON	ON
Pumping paused	Delay between cycles	Delay between cycles	OFF	ON
Calibrating, priming, purging	Calibrating, priming, purging	Calibrating, priming, purging	OFF	OFF

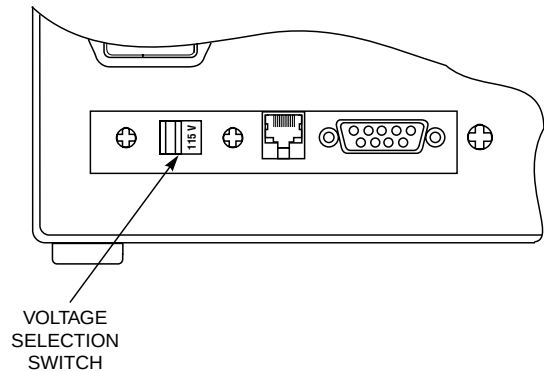


Figure 5. Voltage Selection Switch

SETUP

TUBING SELECTION

Flow rate is determined by the size of the tubing in the pump head. For best results, select a tubing size with a mid-range at the desired flow rate to be pumped. Table 4 provides an average of flow rates using silicone tubing measured with water at standard pressure at 20°C (68°F) for each pump type. No lift or discharge pressure is represented. Higher flow can be achieved by using PHARMED® or NORPRENE® tubings.

Table 4. Flow Rate Table

TUBING SIZE	VOLUME/ REV (mL/rev)	MINIMUM FLOW 6 rpm (mL/min)	MAXIMUM FLOW 600 rpm (mL/min)
One Pump Head			
L/S®13	0.06	0.36	36
L/S®14	0.21	1.30	130
L/S®16	0.80	4.80	480
L/S®25 or L/S®15*	1.66	10.00	1000
L/S®17 or L/S®24*	2.83	17.00	1700
L/S®18 or L/S®35*	3.83	23.00	2300
L/S®36	4.83	29.00	2900
Two Pump Heads			
L/S®13†	0.12	0.72	72
L/S®14	0.43	2.60	260
L/S®16	1.60	9.60	960
L/S®25 or L/S®15*	3.33	20.00	2000
L/S®17 or L/S®24*	5.67	34.00	3400
L/S®18 or L/S®35*	7.67	46.00	4600
L/S®36	9.67	58.00	5800

* L/S®15, L/S®24, and L/S®35 are the recommended tubings for these flow rates.

† L/S®13 tubing should be combined into L/S®14 or larger tubing due to pressure developed at these flow rates.

PUMP MOUNTING AND TUBING LOADING

Refer to the Operating Manual supplied with the EASY-LOAD II Pump Head and mount the pump heads to the pump drive. Load the correct tubing into the pump(s). Use appropriate “Y” connectors or double “Y” tubing sets to combine the inputs and outputs of a two-pump head configuration into single tubing.

NOTE: When using multiple pumps, best accuracy is achieved when all tubing lengths are the same for each pump setup. When using two pump heads, L/S®13 tubing should be combined into L/S®14 or larger tubing due to pressure developed at high flow rates.

POWER ON

After the control console and all the pump drives are properly connected and the drives are plugged into an AC source, the system may be powered up. Refer to Figure 2, and place the POWER switch on one of the pump drives in the On (I) position. The pump number appears on the LED display. The welcome screen appears on the control console.

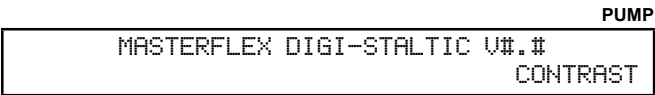
Place the POWER switch on the remaining pump drives in the On (I) position.

If the system does not power up, place the POWER switch in the Off (O) position. Check that all interconnection wiring is secure. Make sure that the voltage selection switch on the back of the pump drive(s) are set to the correct voltage. Ensure that the pump drive(s) are plugged into a live, grounded AC source.

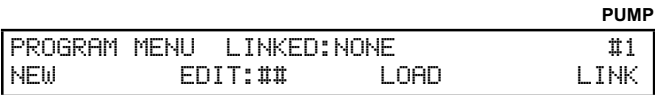
If the system powers up but the pump number displayed is 0 (zero), the pump drive is not properly connected to the control console. Place the POWER switch in the Off (O) position, check all the interconnections, and place the POWER switch in the On (I) position.

INITIAL OPERATION

When power is first applied from any of the attached pumps, the control console displays the welcome screen:



After three seconds, the Program Menu appears:



The number displayed in the upper right corner represents the pump number currently being controlled. The first time the dispenser is powered, #1 is displayed. Pressing PUMP# on the control keypad changes the pump number. When the dispenser is shut down, it remembers the pump number last displayed, and that pump number appears the next time the dispenser is powered. Figure 6 depicts the Main Menu and its functions.

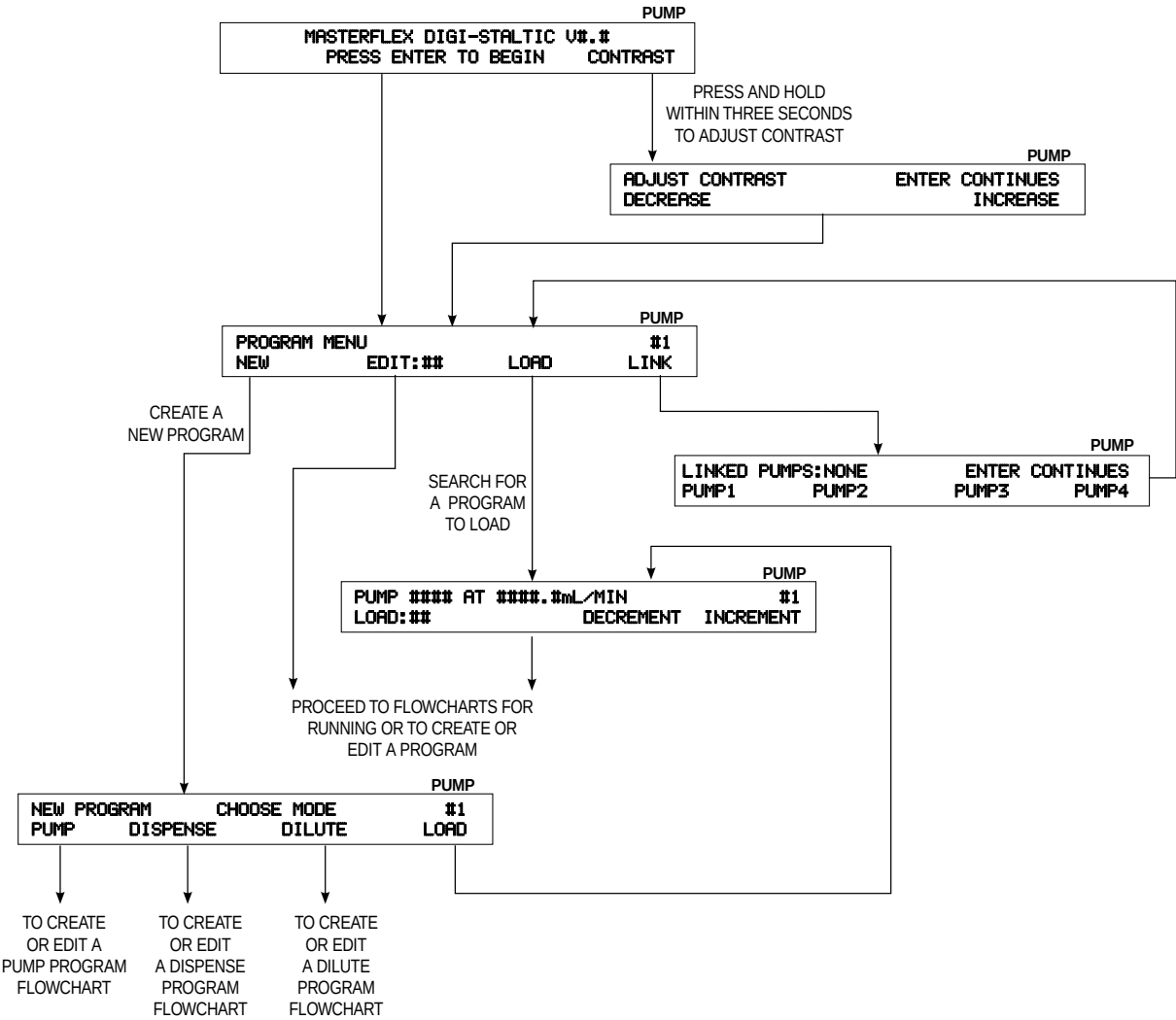


Figure 6. Main Menu Flowchart

From this menu, the user can create a new program, edit a program previously saved under a known number, load a program previously saved, or link pumps. The first time the system is started, there are no saved programs, and pressing any arrow key other than the one under NEW or LINK results in an error message. Refer to **OPERATION** for instructions to create new programs, load programs, save programs, and link pumps.

ADJUSTING THE DISPLAY CONTRAST

To adjust the contrast of the display, press and hold the arrow key under CONTRAST within three seconds after power is applied until the following display appears:

		PUMP
ADJUST CONTRAST	ENTER CONTINUES	
DECREASE	INCREASE	

To adjust the contrast of the display, repeatedly press the arrow key under DECREASE or INCREASE until the display is adjusted to your preference. Press ENTER to accept the adjustment.

LOCKING THE KEYPAD

The DIGI-STALTIC keypad may be locked to ensure that running programs are not inadvertently terminated or to restrict access to the system. To lock the keypad, perform the following procedure:

1. Ensure that the control console is not waiting for a numerical input such as tube size, volume, or flow rate.
2. Enter 727637 on the numeric keypad.
3. The following display appears for approximately three seconds. The display reappears anytime a non-numeric key is pressed.

		PUMP
KEYPAD IS LOCKED		

4. To unlock the keypad, enter the same code. The following display appears:

		PUMP
KEYPAD IS UNLOCKED		

OPERATION

This equipment should not be operated on a “learn as you go” basis. Be familiar with and practice all safety procedures presented in the **SAFETY** section before operating the dispensing system.

DESCRIPTION OF PROGRAMMING

The DIGI-STALTIC can save up to 30 programs of any combination of pump, dispense, and dilute. Table 5 lists all the required and optional parameters in each of the programs.

Table 5. Program Parameters

Type of Parameter	Program		
	Pump	Dispense	Dilute
Required	Number of heads	Number of heads	Number of heads
	Tube size	Tube size	Tube size
	Rate	Rate	Rate
	—	Volume	Sample
	—	Pump direction	Delivery
	—	—	Pump direction
Optional	Acceleration time	Acceleration time	Acceleration time
	Deceleration time	Deceleration time	Deceleration time
	No-drip	No-drip	No-drip
	Pump direction	Cycle	Hold
	—	Auto/Manual	Cycle
	—	Delay	Auto/Manual
	—	Beep	Delay
	—	Units	Beep
	—	Balance	—

GENERAL

Programs may be designed and saved, or may be run immediately without saving. After the program is run, the user can modify the program, try it again, and when satisfied, save it. A designed program that is not saved will be lost if power to the dispenser is removed. After the program is saved, it may be run, modified, and saved under the same or another number.

Settings for optional parameters such as acceleration ramping, deceleration ramping, and no-drip are usually determined through trial and error. Acceleration and deceleration are programmed separately. Acceleration is the amount of time in seconds it will take the pump to reach the programmed speed. A setting of 0.0 (zero) instructs the pump to reach the programmed speed as quickly as possible. Deceleration is the amount of time in seconds it will take the pump to slow to zero from the programmed speed. A setting of 0.0 (zero) instructs the pump to stop as quickly as possible. Use acceleration/deceleration to minimize splash of dangerous materials or to improve accuracy when dispensing viscous materials.

A no-drip value instructs the pump to reverse direction before stopping, preventing fluid in the tubing from dripping after the pump has stopped. The best no-drip setting is dependent on tube size, rate, physical setup, and viscosity of the fluid being pumped. No-drip can be set from 0 (zero) to 10, where 10 equals one pump revolution.

CREATE OR EDIT A PUMP PROGRAM

To create a new pump program, ensure that the console displays the PROGRAM MENU. If any other menu appears, press the BACK key until the PROGRAM MENU is displayed.

PUMP			
PROGRAM MENU	LINKED:NONE		#1
NEW	EDIT:##	LOAD	LINK

Press the arrow under NEW to create a new program or press the arrow under EDIT to select a program to revise. Follow the flowchart in Figure 7 to create or edit a pump program.

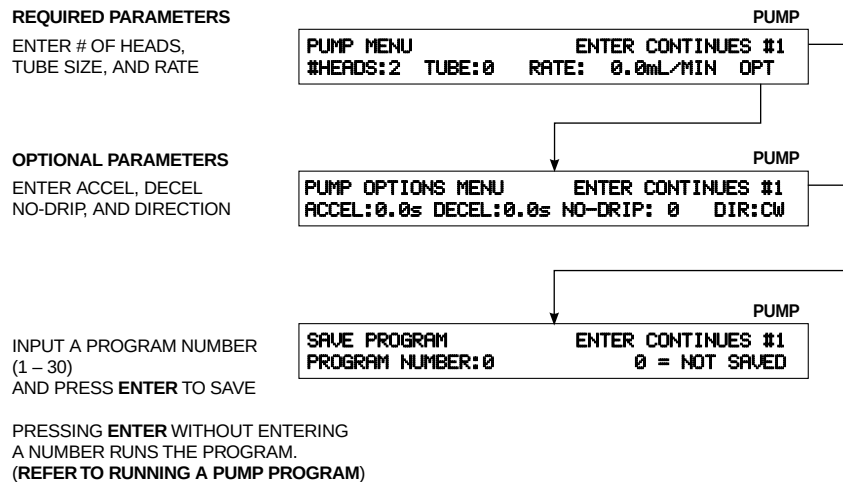
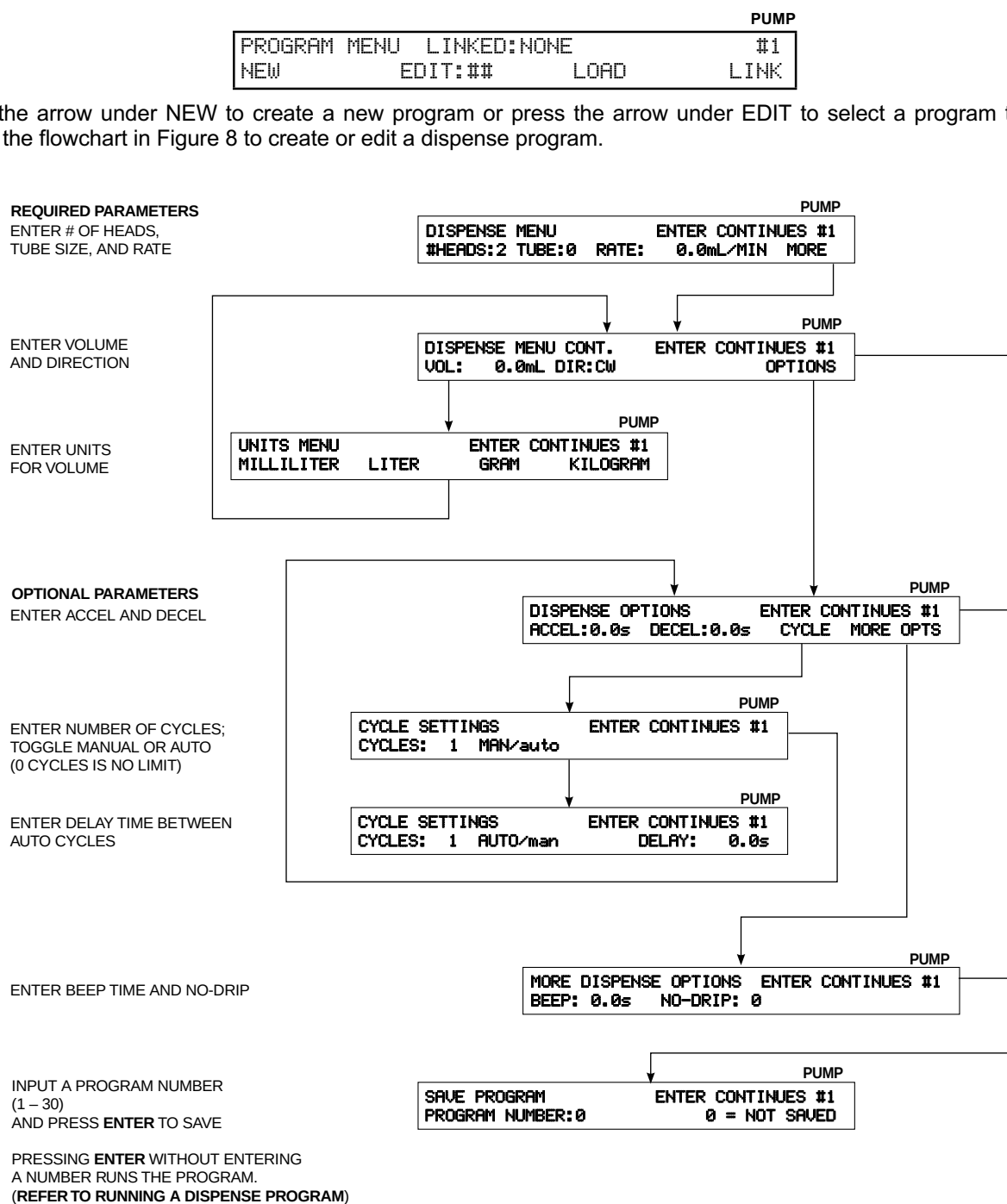


Figure 7. Pump Menus

To create a new dispense program, ensure that the console displays the PROGRAM MENU. If any other menu appears, press the BACK key until the PROGRAM MENU is displayed.



CREATE OR EDIT A DILUTE PROGRAM

For use as a diluter, the pump is first primed with the diluent. Then, a dilute cycle consists of two separate actions, sample and delivery. For the sample action, the outlet end of the tubing is placed in the container holding the sample. The pump runs opposite the programmed direction to draw the sample volume into the tube. For the delivery action, the outlet end of the tubing is moved to the receiving container, and after the hold time, the delivery volume is pumped out of the pump. The sample volume plus the diluent volume equals the delivery volume.

To create a new dilute program, ensure that the console displays the PROGRAM MENU. If any other menu appears, press the BACK key until the PROGRAM MENU is displayed.

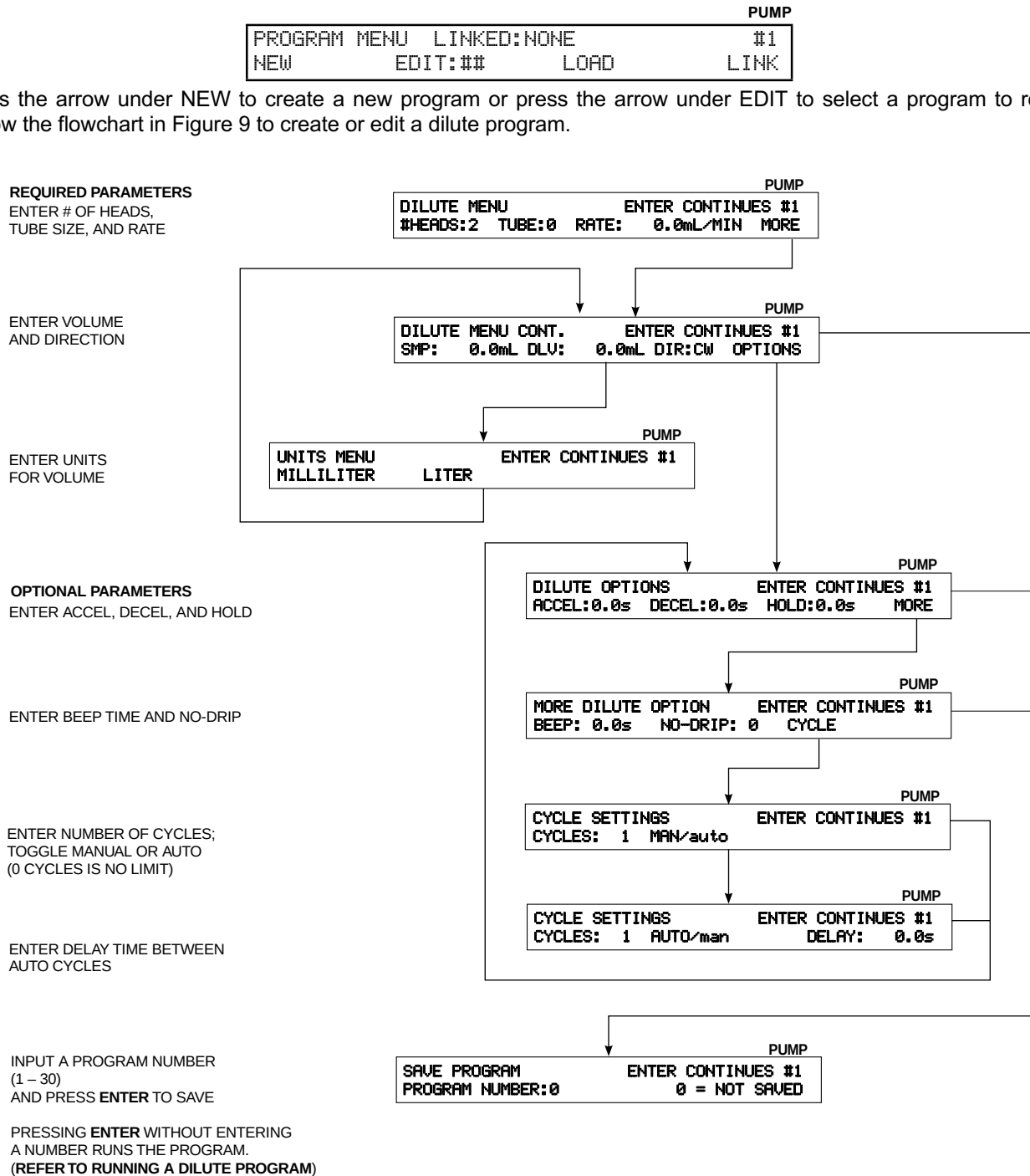


Figure 9. Dilute Menus

SAVING A PROGRAM

After all the required parameters are entered, you should save the program. Up to 30 programs in any combination of pump, dispense, and dilute can be stored at one time. If the SAVE MENU is not shown, go to the PROGRAM MENU, edit the program you want to save, and press ENTER until the following display appears:

PUMP	
SAVE PROGRAM	ENTER CONTINUES #1
PROGRAM NUMBER: 0	0 = NOT SAVED

1. Enter a number between 1 and 30 and press ENTER to save the program. If there is a program saved under the number entered, the following display appears:

PUMP	
PROGRAM ## IS IN USE. OVERWRITE?	
YES	NO

2. Press the arrow key under YES to overwrite the saved program with the current one, or press the arrow key under NO to go back to the SAVE MENU to give the program a different number.

LOADING A PROGRAM

To load an existing program, ensure that the console displays the PROGRAM MENU. If any other menu appears, press the BACK key and then the arrow key under PROGRAM so the PROGRAM MENU is displayed.

PUMP	
PROGRAM MENU LINKED: NONE	#1
NEW EDIT: ##	LOAD LINK

Ensure that the pump number shown in the upper right of the display is the pump that will run the loaded program. If it is not the correct pump, press PUMP# on the control keypad until the correct pump number is displayed.

NOTE: If you do not know the number of the program you want to load, press the arrow key under LOAD, and proceed to step 4. If you know the number of the program to load, continue with step 1.

1. Press the arrow key under LOAD, input the program number, and press ENTER. The program loads into memory. Refer to **OPERATING PROCEDURES** to run the program.
2. If there is no program saved under that number, the following display appears:

PUMP	
NO PROGRAM AT THIS LOCATION.	
ENTER CONTINUES.	

3. Press ENTER to return to the LOAD menu.
4. To scroll through the saved programs, press the arrow key under DECREMENT or INCREMENT until the desired program is located. Press ENTER to load the program. The program loads into memory. Refer to **OPERATING PROCEDURES** to run the program.

OPERATING PROCEDURES

Before performing any of the procedures in this section, be sure that the correct size tubing is properly loaded. Refer to **SETUP** to mount the pump heads and install the tubing.

You may run the same program to four pumps, or different programs for each pump.

A program designed for a pump drive with two heads will run on a pump drive with one head mounted, but the flow rate will be only half of the expected rate. A program designed for a pump drive with one head will run on a pump drive with two heads mounted, but the flow rate will be double the expected rate.

Linking Pumps

For pumping or dispensing operations, two or more pump drives may be linked so that they operate and are controlled simultaneously. All linked drives start with a single key press or by one external signal. All linked drives must be set up to run the same type of program.

NOTE: Dilute programs cannot be linked.

For pump programs, all linked pump drives begin when the RUN arrow key is pressed or the external start/stop contact closure is closed for any linked pump. The pumps continue running until the CANCEL/STOP or STOP ALL key is pressed or until the external start/stop contact closure is opened for any linked pump. All pumps pause simultaneously. All pumps start over or resume simultaneously when the appropriate arrow key is pressed. An external signal resumes all pumps.

For dispense programs, all linked pump drives begin when the RUN arrow key is pressed or the external start/stop contact is momentarily closed for any linked pump. The pumps continue running until the CANCEL/STOP or STOP ALL key is pressed or until the external start/stop contact signal is momentarily closed. All pumps pause simultaneously. All pumps start over or resume simultaneously when the appropriate arrow key is pressed. Momentarily closing the external start/stop contact also resumes all pumps. If not interrupted, each pump continues to run until the programmed volume is dispensed. For programs with multiple cycles, each pump must complete a cycle, then a new cycle simultaneously starts all linked pump drives.

Use the following procedure to link pump drives. Ensure that the PROGRAM MENU is displayed. If it is not, press BACK until the following display is shown:

PUMP			
PROGRAM MENU	LINKED:NONE	#1	
NEW	EDIT:##	LOAD	LINK

1. Press the arrow key under LINK. The following display appears:

PUMP			
LINKED PUMPS:NONE	ENTER CONTINUES		
PUMP1	PUMP2	PUMP3	PUMP4

2. Press the arrow key under the pump you wish to link. The selected pump number appears on the top line.
3. Select the additional pumps to be linked. Their numbers appear on the top line.

NOTE: To deselect a pump, press the arrow key under the pump, and its number is removed from the linked pumps.

4. Press ENTER to accept the linked pumps.

Running Programs

NOTE: Before continuing, be sure that the pump heads are mounted and that the correct size tubing is properly loaded and routed to the correct locations.

If the pump number shown in the upper right corner of the display is not the pump that is going to run the program, you will have to reload the program to run it on that pump. The program stays in memory, assigned to the active pump when loaded. Change the pump number by pressing PUMP# on the control keypad. When the correct pump number is displayed, refer to **LOADING A PROGRAM**, press the arrow key under PROGRAM, and load the desired program.

NOTE: Be sure that the number of pump heads mounted on the pump drive is the same as the number of heads the program is designed to run. If the number of heads do not agree, the program will not operate properly.

Refer to Figure 10, Figure 11, or Figure 12 to run a pump program, a dispense program, or a dilute program.

SELECT THE PUMP NUMBER BEFORE LOADING THE PROGRAM

PERFORM PRIME AND
CALIBRATE PROCEDURES
BEFORE RUNNING
THE PROGRAM

RUNNING THE PROGRAM

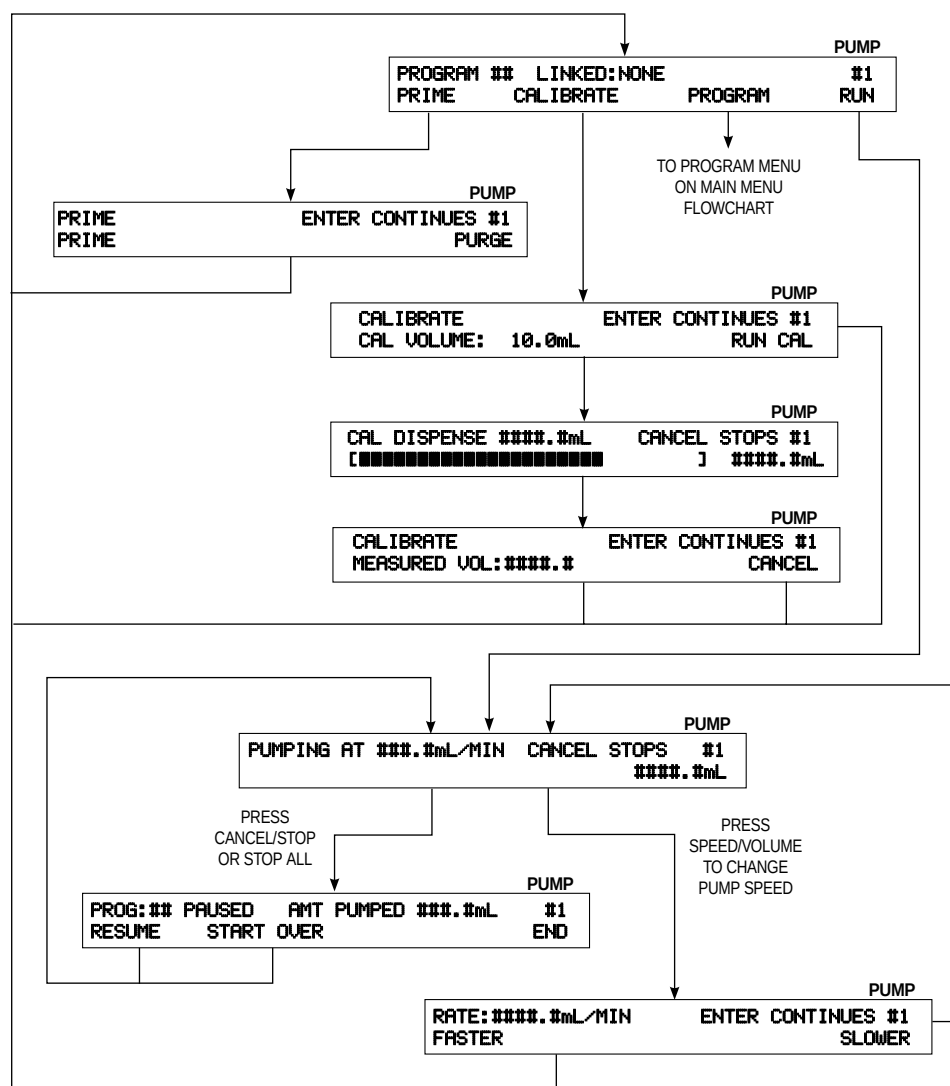
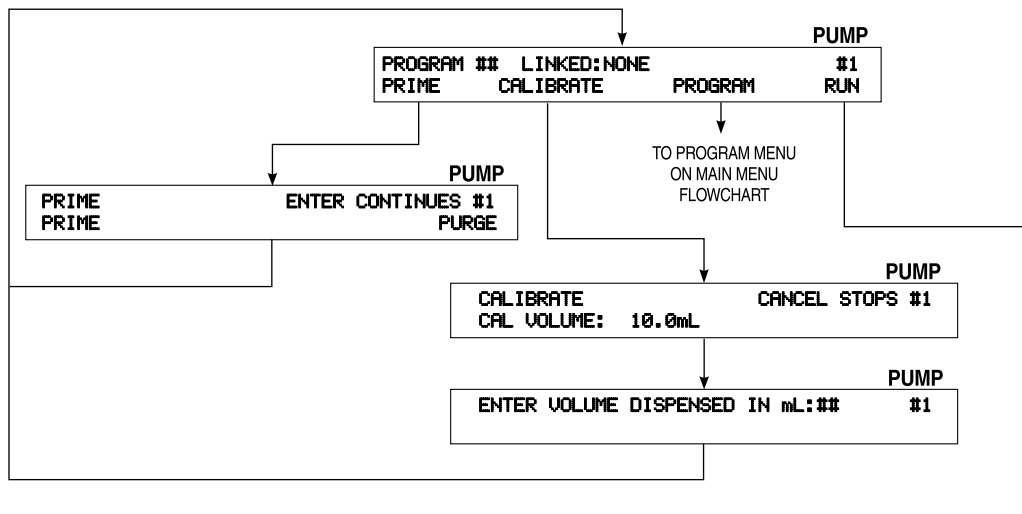


Figure 10. Run a Pump Program

**PERFORM PRIME AND
CALIBRATE PROCEDURES
BEFORE RUNNING
THE PROGRAM**



```

graph TD
    S(( )) --> S1[DISP AT ###.##mL ## OF ### CANCEL STOPS #1  
[#####] #####mL]
    S1 --> S2[DISP ####.##mL ### OF ### CANCEL STOPS #1  
TIME LEFT ####.# OF ####.# SECONDS]
    S1 -- MANUAL DELAY --> S3[DISP ###.##mL ### OF ### CANCEL STOPS #1  
RUN]
    S2 --> S3
    S2 -- PRESS SPEED/VOLUME TO CHANGE VOLUME --> S4[VOLUME: ####.##mL ENTER CONTINUES #1  
MORE LESS]
    S3 --> S4
    S3 -- PRESS SPEED/VOLUME TO CHANGE VOLUME --> S4
    S4 --> S5[DISP ###.##mL ### OF ### CANCEL STOPS #1  
RUN]
    S4 --> S6[DISP ####.##mL ### OF ### CANCEL STOPS #1  
TIME LEFT ####.# OF ####.# SECONDS]
    S5 --> S1
    S6 --> S2
    S5 -- PRESS SPEED/VOLUME TO CHANGE VOLUME --> S4
    S6 -- PRESS SPEED/VOLUME TO CHANGE VOLUME --> S4
    S5 -- PRESS RUN OR USE FOOTSWITCH OR WAND IN MANUAL MODE  
CYCLES REPEAT AUTOMATICALLY IN AUTO MODE --> S6
    S6 -- PRESS RUN OR USE FOOTSWITCH OR WAND IN MANUAL MODE  
CYCLES REPEAT AUTOMATICALLY IN AUTO MODE --> S5
    
```

The flowchart illustrates the control sequence for the PUMP system. It begins with a screen displaying 'DISP AT ###.##mL ## OF ### CANCEL STOPS #1' and a progress bar. From this screen, the system can proceed to the next screen ('DISP ####.##mL ### OF ### CANCEL STOPS #1 TIME LEFT ####.# OF ####.# SECONDS') or to a screen with 'RUN' ('DISP ###.##mL ### OF ### CANCEL STOPS #1 RUN') via a 'MANUAL DELAY'. The 'RUN' screen leads to the 'VOLUME' screen ('VOLUME: ####.##mL ENTER CONTINUES #1 MORE LESS') or back to the first screen. The 'VOLUME' screen leads to the second screen or back to the 'RUN' screen. The second screen leads to the 'RUN' screen or to the 'VOLUME' screen via a 'PRESS SPEED/VOLUME TO CHANGE VOLUME' action. The 'RUN' screen also has a 'PRESS SPEED/VOLUME TO CHANGE VOLUME' action leading to the 'VOLUME' screen. The 'VOLUME' screen has a 'PRESS RUN OR USE FOOTSWITCH OR WAND IN MANUAL MODE CYCLES REPEAT AUTOMATICALLY IN AUTO MODE' action leading to the 'RUN' screen. The 'RUN' screen has a 'PRESS RUN OR USE FOOTSWITCH OR WAND IN MANUAL MODE CYCLES REPEAT AUTOMATICALLY IN AUTO MODE' action leading to the second screen. The second screen has a 'PRESS RUN OR USE FOOTSWITCH OR WAND IN MANUAL MODE CYCLES REPEAT AUTOMATICALLY IN AUTO MODE' action leading to the 'RUN' screen. The 'RUN' screen has a 'PRESS RUN OR USE FOOTSWITCH OR WAND IN MANUAL MODE CYCLES REPEAT AUTOMATICALLY IN AUTO MODE' action leading to the second screen. The 'VOLUME' screen has a 'PRESS RUN OR USE FOOTSWITCH OR WAND IN MANUAL MODE CYCLES REPEAT AUTOMATICALLY IN AUTO MODE' action leading to the 'RUN' screen. The 'VOLUME' screen has a 'PRESS RUN OR USE FOOTSWITCH OR WAND IN MANUAL MODE CYCLES REPEAT AUTOMATICALLY IN AUTO MODE' action leading to the second screen.

NOTE:
TO SIMPLIFY FLOWCHART, CANCEL/STOP
FUNCTIONS ARE NOT SHOWN.

Figure 11. Run a Dispense Program

SELECT THE PUMP NUMBER BEFORE LOADING THE PROGRAM

PERFORM PRIME AND CALIBRATE PROCEDURES BEFORE RUNNING THE PROGRAM

RUNNING THE PROGRAM

NOTES:

1. PRESS SPEED/VOLUME DURING HOLD OR PAUSE TO CHANGE VOLUME OF SAMPLE.
2. PRESS SPEED/VOLUME DURING A DELAY OR PAUSE TO CHANGE VOLUME OF DELIVERY.

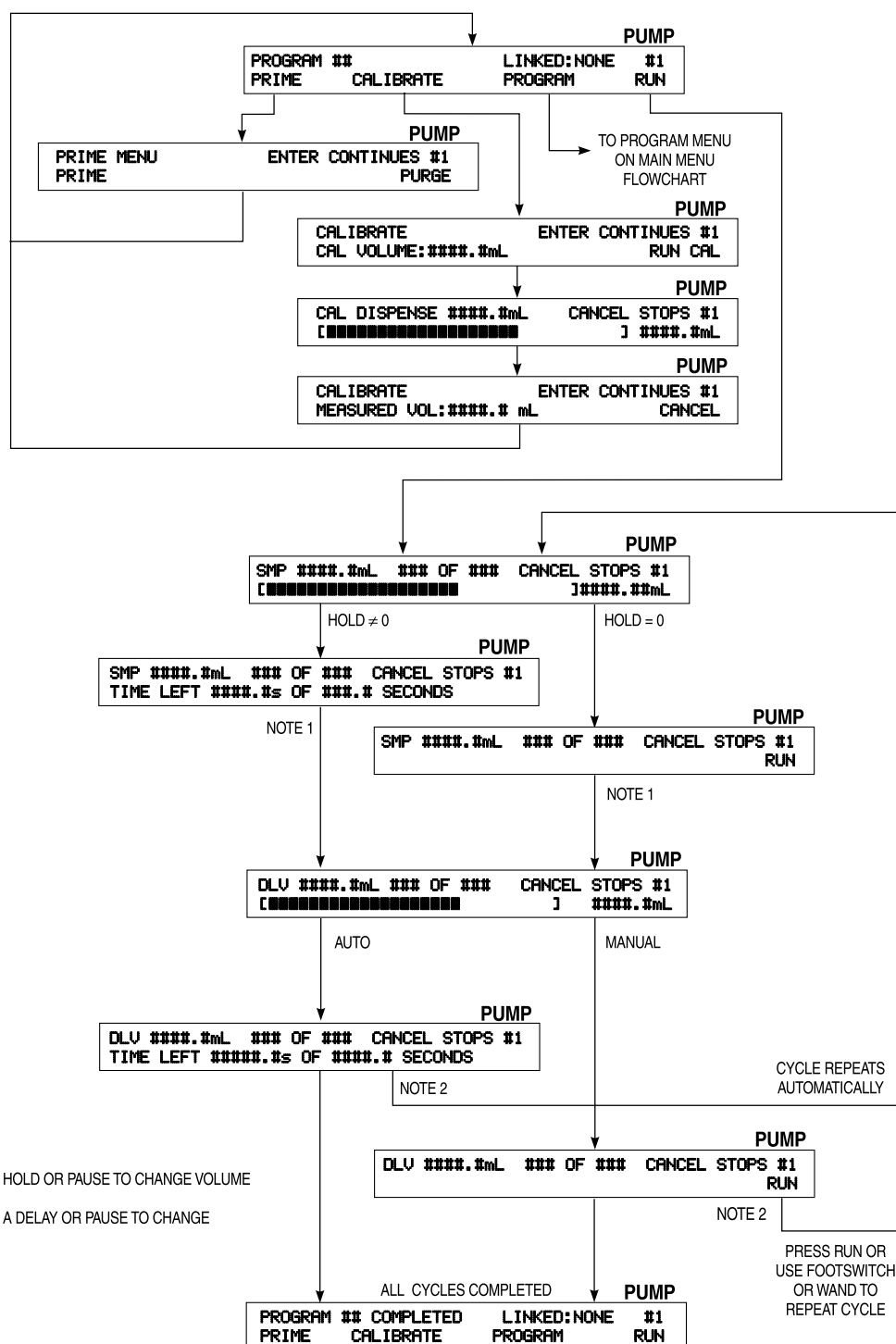


Figure 12. Run a Dilute Program

If there is not fluid all the way through the tubing or if it is the first dispense of the day, the pump should be primed. If there is unwanted fluid in the tubing, it can be removed by purging the pump. In order to prime or purge the pump, a program must be loaded or just saved. The following display appears when a program is loaded or just saved:

			PUMP
PROGRAM ##	LINKED:NONE		#1
PRIME	CALIBRATE	PROGRAM	RUN

1. Press the arrow key under PRIME and the following display appears:

		PUMP
PRIME		ENTER CONTINUES
PRIME		PURGE

2. To prime the pump, press the arrow key under PRIME. The pump runs in the direction (clockwise or counterclockwise) of the program. The display updates to show the progress of the pump action. Press CANCEL/STOP when the tubing is primed with fluid.
3. To purge the pump, press the arrow key under PURGE. The pump runs in the opposite direction (clockwise or counterclockwise) of the program. Press CANCEL/STOP when the tubing is purged of fluid.
4. Press ENTER to continue.

Performing a Calibration

You must prime the pump to purge the air from the tubing before calibrating, dispensing, or diluting. Air in the tubing will also cause an inaccurate volume display while a pump program is run.

NOTES: If the pump has never been calibrated, the default range for the selected tubing size is displayed. If the pump has been calibrated, the valid range for the tubing size is calculated based on the results of the calibration. The dispensing system stores the calibration for each tubing size in each pump number (1–4).

Before continuing, ensure that the tubing is properly loaded and the pump is primed.

The DIGI-STALTIC can be calibrated anytime a program is loaded. After creating a new program or loading a previously created program, the following display appears:

			PUMP
PROGRAM ##	LINKED:NONE		#1
PRIME	CALIBRATE	PROGRAM	RUN

1. Press the arrow key under CALIBRATE. The following display appears:

		PUMP
CALIBRATE	ENTER CONTINUES #1	
CAL VOLUME: #####.mL	CLEAR CAL	RUN CAL

NOTE: CLEAR CAL appears only if the tube was previously calibrated. Press the arrow key under CLEAR CAL to delete a calibration and restore the factory calibration.

2. Press the arrow key under **VOLUME**, and enter the amount you want the pump to dispense for calibration. Press the arrow key under **RUN CAL** to start pumping action. The following display shows the dispense interactively:

			PUMP
CAL DISPENSE	##.##mL	CANCEL STOPS	#1
[#####]		##.##	mL

3. When the pump stops, the following display appears:

		PUMP
CALIBRATE	ENTER CONTINUES #1	
MEASURED VOL: ####.##mL	CANCEL	

4. Measure the actual volume that the pump dispensed. If the actual volume and displayed volume are the same, press CANCEL. If the amounts are different, press the arrow key under VOL and enter the actual volume. Press ENTER to continue.

After performing step 4, you may want to run the entire procedure again to confirm the calibration.

After the calibration is completed, the actual flow rates for the selected tubing size for the pump are calculated. The calculated rates are displayed when creating or modifying a program.

TROUBLESHOOTING

Use the Troubleshooting Chart as a guide to determine the cause of an observed problem. If a particular problem is not listed in the chart, or if the listed remedies do not solve the problem, contact Cole-Parmer Instrument Co. for assistance in determining the cause of the malfunction.

Table 6. Troubleshooting Chart

Problem	Cause	Remedy
Display reads "PUMP DRIVE TURNED OFF OR NOT CONNECTED".	Pump drive not turned on	Place POWER switch in the On (I) position.
	Pump drive not plugged in	Plug pump into a live AC source.
	Pump drive not connected to control console	Connect pump drive to control console.
	Defective cable	Reconnect pump to control console with new cable.
Display reads "COMMUNICATION ERROR #".	Defective drive or controller	Return to dealer for service.
Pump drive number displayed is 0 (zero).	Pump drive not connected to control console	Connect pump drive to control console.
	Defective cable	Reconnect pump to control console with new cable.
	Defective drive or controller	Return to dealer for service.
Everything appears to work properly, but pump does not turn.	Broken belt	Refer to BELT REPLACEMENT , and replace the belt.

MAINTENANCE

SAFETY

The procedures in this section must be performed with power removed from the dispensing system. Attempting to perform the procedure without power removed can result in serious injury or death. If you are unsure of the status of electrical power, DO NOT perform the procedure. The capacitors in the power supply section of the pump drive maintain high voltage for up to ten minutes after power is removed. Allow sufficient time for the capacitors to discharge before removing the cover for servicing.

Refer to **USER-REPLACEABLE PARTS** for the part numbers of all the user replacement parts.

CLEANING

WARNING: *Disconnect the dispenser from the AC source before cleaning. A shock hazard exists when using water on powered equipment.*



Keep the dispenser enclosures clean by using a mild detergent and water solution. Never immerse the unit in water or use excessive fluid when cleaning the dispenser. Dry the dispenser before restoring power.

FUSE REPLACEMENT

If you suspect that the fuse has blown, use the following procedure to remove, check, and replace the fuse.

CAUTION: *Always replace the fuse with the same type and rating as the blown fuse. Using a fuse of a different type or with a different rating can cause damage to the pump drive.*



1. Unplug the power cord from the AC source.
2. Ensure that the power switch is in the Off (O) position, and remove the power cord from the back of the pump drive.
3. Refer to Figure 13, and use a small screwdriver to pull out the fuse tray.
4. Slide the defective fuse out of the fuseholder.

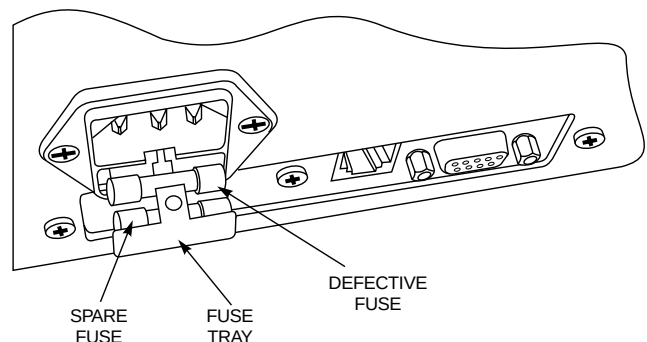


Figure 13. Fuse Replacement

5. Remove the spare fuse and slide it into the fuseholder in place of the defective fuse.

NOTE: Replace the spare fuse as soon as is practical.

6. Push the fuse tray in until it snaps into place.

7. Make sure that the voltage selection switch matches the AC power source.

8. Reconnect the power cord to the connector on the back of the pump drive.

9. Plug the power cord into the AC source.

10. Place the power switch in the On (I) position.

NOTE: If the fuse blows repeatedly, there is a problem with the pump drive. Contact your distributor or Cole-Parmer Instrument Co. Technical Support for help.

BELT REPLACEMENT

If the dispenser powers up properly and appears to be operating correctly at the control console, but the pump does not turn, it is possible that the belt has broken. Use the following procedure to inspect and, if necessary, replace the belt.

DANGER: *Never remove the cover from the pump drive when power is present. AC and DC power in the pump drive can cause serious injury or death. Ensure that the pump drive is disconnected from the power source before removing the cover for maintenance. Allow ten minutes for the capacitors in the power supply to discharge before proceeding.*



1. Remove and retain the four screws from each side of the pump drive cover.

2. Remove the cover by sliding it straight up.

NOTE: Inspect the belt to see if it is broken or has missing teeth. If it is broken or worn, it needs to be replaced.

3. Refer to Figure 14 and loosen, but do not remove, the two nuts that secure the motor to the top of the motor mounting brackets.

WARNING: *Be careful when working near the fan end of the motor. The fan blades are sharp.*



NOTE: It may be necessary to loosen the lower two nuts that secure the motor to the mounting brackets in order to perform the following step.

4. Pivot the motor toward the pump, and remove the belt from around the motor pulley.

5. Remove the belt from around the pump pulley.

6. Install the replacement belt around the pump pulley and around the motor pulley.

7. Pivot the motor so the belt is taut, and secure the motor in position by tightening the nuts loosened in step 3 just enough to hold the motor.

8. Test belt tension by pressing on the belt midway between the pulley. The belt should flex approximately 1/8 in (3 mm).

9. If belt tension is correct, tighten the nuts securely. If tension is not correct, loosen the nuts and repeat step 7 and step 8.

10. Reinstall cover and secure with eight screws.

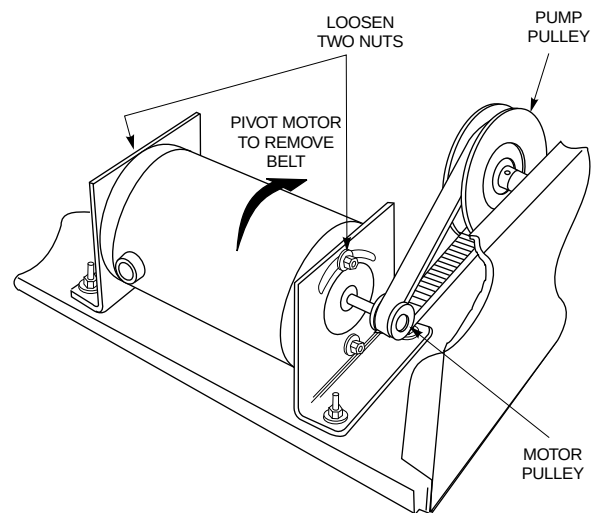


Figure 14. Replacing the Belt

BRUSH REPLACEMENT

Exact motor brush and commutator life will depend on duty cycle and motor operating speed. Inspect the brushes every six months or after 2000 hours of operation, whichever occurs first. Replace brushes if they are less than 0.3 in (7.6 mm) long. Inspect the commutator when the brushes are replaced, and clean if necessary.

DANGER: *Never remove the cover from the pump drive when power is present. AC and DC power in the pump drive can cause serious injury or death. Ensure that the pump drive is disconnected from the power source before removing the cover for maintenance. Allow ten minutes for the capacitors in the power supply to discharge before proceeding.*



1. Refer to **BELT REPLACEMENT**, remove the cover, and remove the belt from the pulley on the drive motor.
2. Pivot the motor away from the pump to gain access to the brush on the pump side of the motor.
3. Refer to Figure 15, and remove the brush caps.

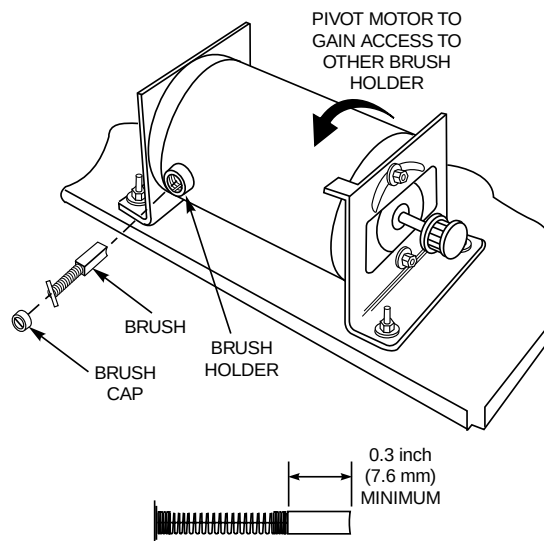


Figure 15. Inspecting and Replacing Brushes

4. Rotate each brush retainer so it lines up with the groove in the brush holder. Remove the brushes.
5. Measure the length of the brushes. If either brush is less than 0.3 in (7.6 mm) long, they both need to be replaced. Always replace them in pairs.

CAUTION: *Excessive commutator wear or “bridging” between commutator segments can cause excessive current through the controller circuit and damage to the dispenser.*



6. Inspect the commutator for wear and dirt. If the commutator segments are worn, replace the motor. If there are dark tracks where the brushes contact the commutator, clean with isopropyl alcohol.
7. Install the brushes into the brush holders and rotate the retainer to secure the brushes. Reinstall the brush caps.
8. When the motor has been reassembled, refer to step 7 of **BELT REPLACEMENT** to reassemble the pump drive.

SPECIFICATIONS

Output:

Speed:	6 to 600 rpm
Maximum torque output:	12.9 kg•cm (180 oz-in)
Speed regulation (all conditions):	±0.3% of full speed
Remote contact closures:	28 VDC, 1 A 28 VAC, 1 A
Dispense volume:	0.1 mL to 8000 L
Dilute volume:	Sample: 0.1 mL to 100.0 mL Delivery: 0.1 mL to 8000 L

Input:

Supply voltage limits:	90 VAC to 130 VAC, 48 Hz to 63 Hz
115 VAC	180 VAC to 260 VAC, 48 Hz to 63 Hz
230 VAC	1.7 A (115 VAC), 0.8 A (230 VAC)
Nominal current:	Category II per IEC 664 (local level — appliances, portable equipment, etc.)
Installation category:	START/STOP +5 VDC, 5 mA
Remote input:	

Display: 40-character x 2-line backlit LCD

Construction:

Control console dimensions:	22.6 cm (8.9 in) wide, 16.5 cm (6.5 in) deep, 2.3 cm (0.9 in) front, 6.9 cm (2.7 in) back in height
Control console weight:	1.4 kg (3.0 lbs)
Pump drive dimensions:	23.4 cm (9.2 in) wide, 32.3 cm (12.7 in) deep, 18.8 cm (7.4 in) high
Pump drive weight:	9.1 kg (20 lbs)
Two EASY-LOAD® II pump heads:	14.6 cm (5.75 in) deep

Environment:

Operating temperature:	0° to 40°C (32° to 104°F)
Storage temperature:	–25° to 65°C (–13° to 149°F)
Humidity (non-condensing):	10% to 90%
Altitude:	Less than 2000 m (6500 ft)
Pollution degree:	Pollution degree 2 per IEC 664 (Indoor use — lab, office)
Chemical resistance:	All materials withstand standard cleaning solvents. Materials used in the construction are: a polyester label, a combined aluminum motor and paint-loc steel controller enclosure, and an epoxy-based, non-chip paint finish.
Environmental protection:	Withstands general spills and light sprays (IEC-529 IP22).

Compliance:

UL 508, CSA C22.2, No. 14-M91
230 V (For CE Mark):
EN61010-1/A2: 1995 (EU Low Voltage Directive) and
EN61326-1/A1: 1998 (EU EMC Directive)

USER-REPLACEABLE PARTS

Description	Part Number
Line cord	
115V	B-3115
230V	B-2938
PC interface cable	22050-54
3-1/2 ft (1.1 m) RJ-12 cable	77095-02
Motor brushes (2)	B-1238-0056
Fuse (T2.5 A, 250 V, 5×20 mm)	B-1115-0043
Rubber foot (1)	A-1390-0004
Belt	A-1341-0006
Brush Cap (1)	A-3190-CR

ACCESSORIES

Description	Part Number
10 ft (3 m) RJ-12 cable	77095-03
15 ft (4.6 m) RJ-12 cable	77095-04
Balance cable kit	77310-06
CD-ROM software and PC interface cable	77310-10
Footswitch	07595-40
Dispensing wand	77310-05
PTFE tubing weights:	
Set of two: one for L/S®14 and L/S®16 tubing; and one for L/S®25, L/S®17, L/S®18, L/S®15, L/S®24, and L/S®35 tubing	77310-03
Set of two for L/S®14 and L/S®16 tubing	78226-81
Set of two for L/S®25, L/S®17, L/S®18, L/S®15, L/S®24, and L/S®35 tubing	78226-82
Glass dispensing tip with Luer lock for 3/16 in. and 1/4 in. ID tubing	77310-04
EASY-LOAD II pump head for high-performance precision tubing	77200-62
EASY-LOAD II pump head for precision tubing	77200-60
Mounting hardware (2) pump heads	77200-02
Silicone Double-Y tubing sets:	
L/S®13 96500-13	L/S®18 96500-18
L/S®14 96500-14	L/S®24 96500-24
L/S®15 96500-15	L/S®25 96500-25
L/S®16 96500-16	L/S®35 96500-35
L/S®17 96500-17	L/S®36 96500-36
Stands	
Frame rods (small)	08024-22
Frame rods (large)	08024-23
Equipment clamp (small)	08024-40
Equipment clamp (large)	08024-41
Frame clamp	08024-28
V-Base (small)	08024-55
V-Base (large)	08024-56

WARRANTY

Use only MASTERFLEX precision tubing with MASTERFLEX pumps to ensure optimum performance. Use of other tubing may void applicable warranties.

The Manufacturer warrants this product to be free from significant deviations from published specifications. If repair or adjustment is necessary within the warranty period, the problem will be corrected at no charge if it is not due to misuse or abuse on your part, as determined by the Manufacturer. Repair costs outside the warranty period, or those resulting from product misuse or abuse, may be invoiced to you.

The warranty period for this product is noted on the Warranty Card.

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.

We reserve the right to make improvements in design, construction, and appearance of our products without notice.

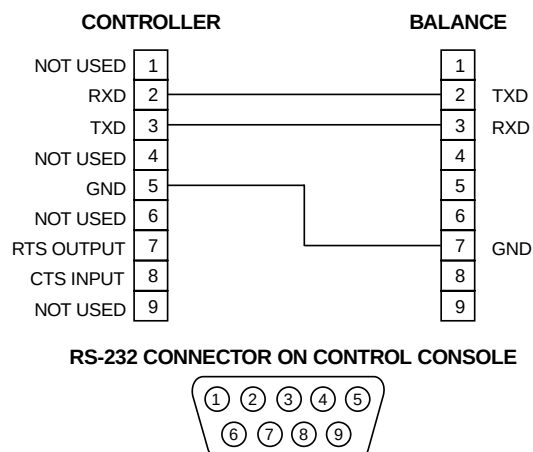
APPENDIX A — BALANCE CONNECTION

The following balances have been confirmed as compatible with the DIGI-STALTIC. Other balances may work with the dispenser, but have not been tested by Cole-Parmer Instrument Co.

OHAUS® VOYAGER® Model V1D120 (part number 11014-10)
SARTORIUS® Master^{pro} Model LP4200 (part number 11212-20)

The DIGI-STALTIC provides communication to the balance through a nine-pin male RS-232 DTE port on the back of the control console. The DIGI-STALTIC communicates at 9600 baud, 7 databits, 2 stop bits, odd parity. The balance must be set up to communicate at that protocol and must be set up to measure in grams. Figure 16 shows pin connections and signals necessary for the dispenser to communicate with the compatible balances.

NOTE: If a balance is being used for dispensing, the actual weight of the finished dispense is communicated to the controller. The controller displays the weight and, if necessary, adjusts the calibration for the following dispense.



NOTES:

1. 9-PIN BALANCE CONNECTOR IS SHOWN. PIN NUMBERS ARE THE SAME FOR THE 25-PIN CONNECTOR ON THE SARTORIUS BALANCE.
2. FOR OHAUS VOYAGER BALANCE, MODEL V1D120, PINS 5 AND 6 ON BALANCE CONNECTOR MUST BE JUMPED.

Figure 16. RS-232 Pin Assignments for the Balance Connection

APPENDIX B — PC CONNECTION AND SOFTWARE INSTALLATION

The DIGI-STALTIC provides communication to a personal computer through a nine-pin female RS-232 DCE port on the back of the control console. The DIGI-STALTIC communicates with software provided with the system to provide an alternative user interface to access all the capabilities of the system. Figure 17 shows pin connections and signals necessary for the dispenser to communicate with the computer.

A complete description of the serial communication protocol can be found on the enclosed CD-ROM (kit part number 77310-10).

The DIGI-STALTIC Control Software can be used to program or operate the dispensing system from a PC using the WINDOWS® 95/98 or WINDOWS NT® operating system.

Use the following procedure to install the DIGI-STALTIC Control Software:

1. Insert the DIGI-STALTIC Control Software CD in the CD-ROM drive.
2. Run the installation program, setup.exe in the root directory.
3. Follow the instructions on the screen during the setup procedure.

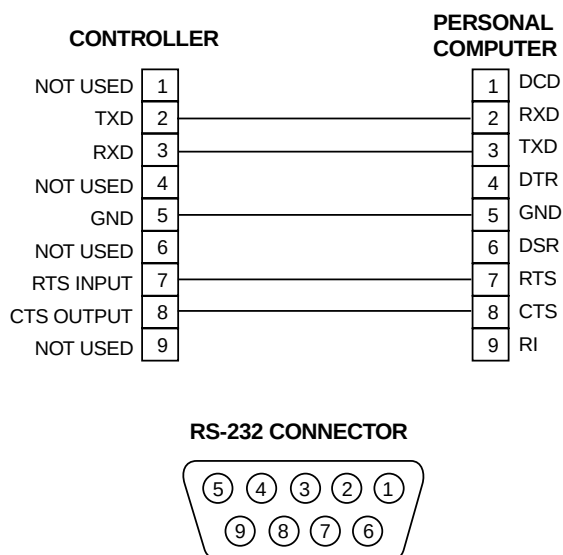


Figure 17. RS-232 Pin Assignments for PC Connection