



07571-02 Portable Sampling Drive

OPERATING MANUAL:

PORTABLE SAMPLING DRIVES

Model Nos.

07571-02



Preface

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PUMP FOR LIQUIDS ORIGINAL INSTRUCTIONS

C-FLEX, NORPRENE, PHARMED, TYGON—Reg TM Saint-Gobain Performance Plastics Corp.

VITON—Reg TM E.I. duPont DeNemours & Co.

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SAFETY PRECAUTIONS



DANGERS: NEVER apply AC voltages directly to the EXTERNAL POWER INPUT receptacle on the front panel. The application of AC voltages can result in injury and death of the operator and destruction of the unit. Use only the AC/DC Power Supply/Converter supplied with the unit to power unit from an AC source.

NEVER short or connect the terminals of the battery terminals together. Shorting of the battery terminals causes rapid internal heating of the battery resulting in the explosion of the battery and severe injury to or the death of the operator.

The AC/DC Power Supply/Converter is rated for INDOOR USE ONLY. **DO NOT** use the AC/DC Power Supply/Converter in an outdoor environment to either charge the battery or power the drive. Electrical shock, severe injury and/or death is possible if this warning is ignored.

DO NOT BURN OR INCINERATE THE BATTERY. THE BATTERY MAY EXPLODE CAUSING SEVERE INJURY OR DEATH OF THE PERSONNEL IN THE AREA. (Dispose of the old battery by recycling.)



CAUTIONS: Do not reverse the connections to the battery. If the battery connections are reversed, damage to the unit will occur.

Fully charge the unit before using for the first time. Damage to the internal battery can result if the battery is in a fully discharged state and operation of the unit is attempted.

Immersion or submersion of the unit will result in improper operation and possible damage to the unit.

Use of pump heads, tubing sizes and formulations other than those specified in this manual, or the mounting and use of two or more pump heads concurrently will result in improper operation and possible damage to the unit.



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

Turn drive off, remove all the power to the unit, including the AC/DC Power Supply/Converter, Automotive Power Adapter or other external power source if present before removing or installing pump head or tubing. Place the Mode of Operation Switch (RUN/CHARGE) in the "CHARGE" position and all other switches in the off position. This will help prevent accidental activation of the drive mechanism so fingers or loose clothing will not get caught in the pump drive mechanism.

Explanation of Symbols



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



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

WARNING: Production 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.

Table of Contents

Section 1	INTRODUCTION	1-1
	General Description	1-1
	Suction Lift	1-1
Section 2	SETUP	2-1
Section 3	OPERATION	3-1
	Controls and Functions	3-1
	Drive Operation	3-3
Section 4	MAINTENANCE	4-1
	Replacement Parts	4-5
Section 5	TROUBLESHOOTING	5-1
Section 6	ACCESSORIES	6-1
Section 7	SPECIFICATIONS	7-1
Section 8	WARRANTY, PRODUCT RETURN, and TECHNICAL ASSISTANCE ..	8-1

Figures

	Page
Control Panel	3-1
Battery Replacement	4-3
Motor Brush Replacement	4-4
Pump Head Sealing Gasket	4-4

Section 1 Introduction

The MASTERFLEX® L/S® Portable Sampler Pump Drive provides pump speeds from 70 to 400 rpm in a clockwise or counterclockwise direction for purging the tubing and for the sampling of liquids.

The Drive and charging system are current limited, protected from reverse power supply polarity and transient voltages.

You may operate the Drive on the internal battery, an external 12V DC source or 115 V AC or 230V AC when used with the AC/DC Power Supply/Converter supplied with the unit.

The Drive has a built-in spill-proof battery and recharging system allowing the unit to be recharged from an AC power source using the supplied AC/DC Power Supply/Converter or from an automotive 12V DC electrical system if used with the Automotive Power Adapter accessory.

It is designed to accept and power one MASTERFLEX® L/S® Standard, QUICK LOAD®, EASY-LOAD® or PTFE Tubing Pump Head for fluid transfer and sampling in the field.

The unit is housed in a high visibility, protective housing. The control panel and the drive controls are protection rated to IP54 only when a Pump Head is mounted on the drive.

When closed, the drive will float for a minimum of 30 minutes if dropped into a lake or stream to allow recovery of the unit.

Suction Lift

The combination of the MASTERFLEX® L/S® drive and a single MASTERFLEX Pump Head is capable of lifting a sample of water up to twenty-six (26) feet vertically. This capability is called suction lift and is measured from the surface of the liquid to the Pump Head.

If the liquid to be sampled has a viscosity or density greater than that of water, this lifting capability is reduced or diminished.

Section 2 Setup

1. Care has been taken in the packaging of the drive to protect it in transit from the factory to its final destination. After opening the carton, save the packing material until proper product operation has been verified.

The drive consists of the following items:

- (1) Drive Unit
- (1) AC/DC Power Supply/Converter
- (1) Operating Manual
- (1) Warranty Card
- (1) Pouch for Accessories



CAUTION: *Use of pump heads, tubing sizes and formulations other than those specified in this manual, or the mounting and use of two or more pump heads concurrently will result in improper operation and possible damage to the unit.*



WARNING: *Turn drive off, remove all the power to the unit, including the AC/DC Power Supply/Converter, Automotive Power Adapter or other external power source if present before removing or installing pump head or tubing. Place the Mode of Operation Switch (RUN/CHARGE) in the "CHARGE" position and all other switches in the off position. This will help prevent accidental activation of the drive mechanism so fingers or loose clothing will not get caught in the pump drive mechanism.*

2. The drive does not include a Pump Head or tubing. The drive is capable of running one (1) of the following Pump Heads: MASTERFLEX® L/S® Standard, L/S QUICK LOAD, L/S EASY-LOAD or L/S PTFE Tubing Pump Head.

See Appendix A for Pump Head and tubing catalog numbers recommended.

See Appendix B for flow rates and lift.

Select one of the recommended Pump Heads and MASTERFLEX tubing formulations and mount it to the drive per the instructions in the Pump Head manual.

Setup (Continued)

NOTE: OPTIMUM STARTING PERFORMANCE

The greatest load seen by the drive is starting a new piece of tubing. For optimum performance in starting new tubing, turn on the drive mechanism and activate the “MAX” switch for 30 seconds. After starting the tubing, release the MAX switch and adjust the speed of the pump using the speed control knob.

For optimum performance and ease of use, the EASY-LOAD or PTFE Tubing Pump Head is recommended.



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

Section 3 Operation

Controls and Functions

The controls are divided into two sections.

The controls on the left side of the control panel are power and mode of operation controls for the selection of either running the drive or charging the internal battery.

The controls on the right side of the control panel are for control of the drive mechanism, such as drive direction and speed.

The drive controls will only function once the appropriate choices have been made in the power control section on the left.

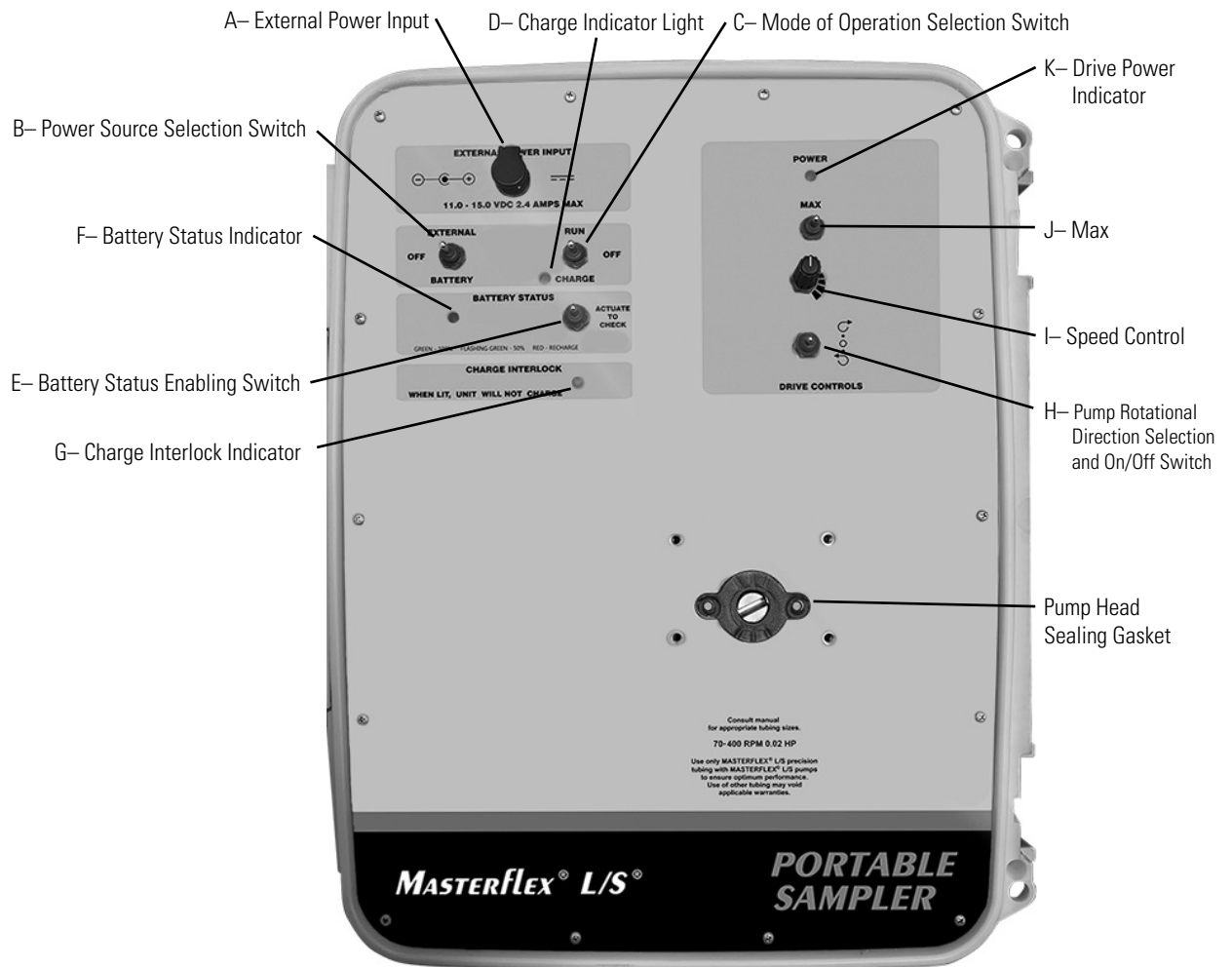


Figure 1- Control Panel

Controls and Functions (Continue)

A. EXTERNAL POWER INPUT

2.5 mm coaxial receptacle for supplying DC power to the drive for charging of the internal battery or running the drive from a power source other than the internal battery. The center pin is positive (+), the sleeve is negative (-).

B. POWER SOURCE SELECTION SWITCH

Selects whether the operator will use the internal **BATTERY** or an **EXTERNAL** power source to power the drive mechanism.

C. MODE OF OPERATION SELECTION SWITCH

Selects whether the operator will **RUN** the pump or **CHARGE** the battery.

Note: The battery cannot be charged while the pump is running. You can select either but not both. When placed in the **CHARGE** position, all other functions are disabled.

D. CHARGE INDICATOR LIGHT

A green LED which will illuminate when external power has been applied and the unit has been placed in the battery charging mode of operation.

E. BATTERY STATUS ENABLING SWITCH

Activates the Battery Status Indicator by toggling up or down and holding.

F. BATTERY STATUS INDICATOR

Illuminates in three different modes to indicate battery potential.

Continuous green = battery is fully charged

Pulsing green = battery is partially discharged, 50% or less capacity remaining

Red = battery is fully discharged, recharge immediately

G. CHARGE INTERLOCK INDICATOR

Illuminates when the ambient temperature within the housing is too high to charge the battery safely. When illuminated, the charging circuit has been disabled. The system can be run but cannot be charged.

H. PUMP ROTATIONAL DIRECTION SELECTION AND ON/OFF SWITCH

This switch turns the pump ON and OFF and allows user to select pump rotational direction: CW or CCW. The center position is off.

I. SPEED CONTROL

The one (1) turn potentiometer controls the pump speed. CW increases the speed, CCW decreases it.

J. MAX

A switch which bypasses the speed control circuitry to make the pump run at its maximum rated speed. Can be used to prime or purge tubing depending on the position of the Rotational Direction Selection Switch (H).

K. DRIVE POWER INDICATOR

A green LED which illuminates when the Rotational Direction Selection (ON/OFF) Switch is in a position other than off. This indicates that the drive mechanism is powered.

Drive Operation

1. Select Mode of Operation

The unit can be operated in three different modes:

- A. Charge the internal battery, this disables all other functions.
- B. Operate the drive on the internal battery power source.
- C. Operate the drive on an external power source.

2. Operation Directions

To Charge the Internal Battery with AC/DC Power Supply/Converter or other External Power Source:



CAUTION: Fully charge the unit before using for the first time. Damage to the internal battery can result if the battery is in a fully discharge state and operation of the unit is attempted.

- A. Connect the supplied AC/DC Power Supply/Converter to drive by lifting EXTERNAL POWER INPUT (A) receptacle cover and inserting the 2.5 mm coaxial power jack into the receptacle. (See Figure 1.)



DANGER: Never apply AC voltages directly to the EXTERNAL POWER INPUT receptacle on the front panel. The application of AC voltages can result in injury and death of the operator and destruction of the unit. Use only the AC/DC Power Supply/Converter supplied with the unit to power unit from an AC source.

- B. Connect AC/DC Power Supply/Converter to an AC power source. Place the Power Source Selection Switch (B), (EXTERNAL/BATTERY) in the "BATTERY" position.
- C. Place the Mode of Operation Selection Switch (C), (RUN/CHARGE) to the "CHARGE" position.
- D. The CHARGE indicator will illuminate.
- E. Charge the battery for 8–12 hours.

To Operate Pump With Internal Battery



DANGER: The AC/DC Power Supply/Converter is rated for INDOOR USE ONLY. DO NOT use the AC/DC Power Supply/Converter in an outdoor environment to either charge the battery or power the drive. Electrical shock, severe injury and/or death is possible if this warning is ignored.



CAUTION: Fully charge the unit before using for the first time. Damage to the internal battery can result if the battery is in a fully discharged state and operation of the unit is attempted.

- A. Place the Power Source Selection Switch (B), (EXTERNAL/BATTERY) to the "BATTERY" position.
- B. Place the Mode of Operation Selection Switch (C), (RUN/CHARGE) to the "RUN" position.

Drive Operation (Continue)

- C. **Select Pump Rotational Direction Selection On/Off Switch (H)**, CW or CCW. (See Figure 1.) (When changing directions, turn off the power first, which is the center or OFF position of the Rotational Direction Switch.)
- D. **Adjust pump flow rate** with the 1-turn **Speed Control (I)**, by turning the knob CW to increase flow rate or CCW to decrease flow rate.
- E. To **“Prime the Tubing”**, toggle the **“MAX” Switch (J)**, up or down to make the pump run at maximum speed.

To Check the Available Battery Potential

NOTE: Check the internal battery with the pump running for best accuracy.

- A. **Place the Power Source Selection Switch (B), (EXTERNAL/BATTERY)** to the **“BATTERY”** position.
- B. **Place the Mode of Operation Selection Switch (C), (RUN/CHARGE)** to the **“RUN”** position.
- C. **Select Pump Rotational Direction Selection On/Off Switch (H)**, CW or CCW. (See Figure 1.) (When changing directions, turn off the power first, which is the center or OFF position of the Rotational Direction Switch.)
- D. Toggle the Battery Status Switch up or down and hold. The status indicator will illuminate.

Continuous green = battery is fully charged

Pulsing green = battery is partially discharged, 50% or less capacity remaining

Red = battery is fully discharged, recharge immediately

To Operate Pump With an External 12V Battery, the Automotive Power Adapter, or other DC Power Source



DANGER: The AC/DC Power Supply/Converter is rated for INDOOR USE ONLY. DO NOT use the AC/DC Power Supply/Converter in an outdoor environment to either charge the battery or power the drive. Electrical shock, severe injury and/or death is possible if this warning is ignored.



CAUTION: Fully charge the unit before using for the first time. Damage to the internal battery can result if the battery is in a fully discharged state and operation of the unit is attempted.

- A. **Place the Power Source Selection Switch (B), (EXTERNAL/BATTERY)** to the **“EXTERNAL”** position.
- B. **Place the Mode of Operation Selection Switch (C), (RUN/CHARGE)** to the **“RUN”** position.
- C. **Select Pump Rotational Direction Selection On/Off Switch (H)**, CW or CCW. (See Figure 1.) (When changing directions, turn off the power first, which is the center or OFF position of the Rotational Direction Switch.)

Drive Operation (Continue)

- D. **Adjust pump flow rate** with the 1-turn **Speed Control (I)**, by turning the knob CW to increase flow rate or CCW to decrease flow rate.
- E. To **“Prime the Tubing”**, toggle the **“MAX” Switch (J)**, up or down to make the pump run at maximum speed.

To Operate Pump With an AC Power Source



DANGER: NEVER apply AC voltages directly to the EXTERNAL POWER INPUT receptacle on the front panel. The application of AC voltages can result in injury and death of the operator and destruction of the unit. Use only the AC/DC Power Supply/Converter supplied with the unit to power unit from an AC source.



DANGER: The AC/DC Power Supply/Converter is rated for INDOOR USE ONLY. DO NOT use the AC/DC Power Supply/Converter in an outdoor environment to either charge the battery or power the drive. Electrical shock, severe injury and/or death is possible if this warning is ignored.

- A. **Connect the supplied AC/DC Power Supply/Converter to drive** by lifting the **EXTERNAL POWER INPUT (A)**, receptacle cover and inserting the 2.5 mm coaxial power jack into the receptacle. (See Figure 1.)
- B. **Connect AC/DC Power Supply/Converter to an AC power source. Place the Power Source Selection Switch (B), (EXTERNAL/BATTERY) to the “EXTERNAL” position.**
- C. **Place the Mode of Operation Selection Switch (C) (CHARGE/RUN) to the “RUN” position.**
- D. **Select Pump Rotational Direction Selection On/Off Switch (H), CW or CCW.** (See Figure 1.) (When changing directions, turn off the power first, which is the center or OFF position of the Rotational Direction Switch.)
- E. **Adjust pump flow rate** with the 1-turn **Speed Control (I)**, by turning the knob CW to increase flow rate or CCW to decrease flow rate.
- F. To **“Prime the Tubing”**, toggle the **“MAX” Switch (J)**, up or down and hold to make the pump run at maximum speed.

Section 4 Maintenance

Cleaning

Clean exterior and interior surfaces of the housing and control panel using a dry or damp cloth with mild detergent. Never immerse nor use excess fluid.



CAUTION: Immersion or submersion of the unit will result in improper operation and possible damage to the unit.

Internal Battery

The internal battery is spill-proof and sealed, has no serviceable internal parts or components and is constructed for years of useful service when maintained properly.



CAUTION: Fully charge the unit before using for the first time. Damage to the internal battery can result if the battery is in a fully discharged state and operation of the unit is attempted.

- A. Fully charge the unit before first use.
- B. Store unit at room temperature if possible.
- C. Always store the unit in a fully charged condition.
- D. The battery will partially self-discharge over time. The rate of self-discharge increases with temperature. It is recommended that the unit be run for at least 2 hours every six months and then recharged overnight. This will preserve the potential life of the internal battery to its fullest extent.
- E. Do not leave the unit on charge for more than 24 hours. Unnecessary extended charging will cause internal heating and potential premature failure of the battery. The battery will fully charge in 8–12 hours from a fully discharged state. Once the battery has reached full charge, the internal battery charger/regulator circuit will place the battery in the trickle charge mode to prevent overcharging.

To Charge the Internal Battery From an AC Source

- A. **Connect the supplied AC/DC Power Supply/Converter** by lifting the **EXTERNAL POWER INPUT (A)**, receptacle cover and inserting the 2.5 mm coaxial power jack into the receptacle. (See Figure 1.)
- B. Connect AC/DC Power Supply/Converter to an AC power source.
- C. **Place the Mode of Operation Selection Switch (C) (CHARGE/RUN)** to the **“CHARGE”** position.
- D. The charge indicator will illuminate when charging circuit is powered.
- E. The battery will fully charge in 8–12 hours from a fully discharged state.

Maintenance (Continue)



DANGER: NEVER apply AC voltages directly to the EXTERNAL POWER INPUT receptacle on the front panel. The application of AC voltages can result in injury and death of the operator and destruction of the unit. Use only the AC/DC Power Supply/Converter supplied with the unit to power unit from an AC source.

To Charge the Internal Battery With an External 12V Battery, the 07571-50 Automotive Power Adapter, or other DC Power Source

- A. **Connect the** external power source by lifting the **EXTERNAL POWER INPUT (A)**, receptacle cover and inserting the 2.5 mm coaxial power jack into the receptacle. (See Figure 1.)
- B. Connect the 07571-50 Automotive Power Adapter accessory to the cigarette lighter in the vehicle.
- C. **Place the Mode of Operation Selection Switch (C), (CHARGE/RUN)** to the “CHARGE” position.
- D. The charge indicator will illuminate when charging circuit is powered.
- E. The battery will fully charge in 8–12 hours from a fully discharged state.

Replacing the Internal Battery (See Figure 2)

- A. Place all control panel switches in the off position and disconnect the AC/DC Power Supply/Converter or other external power source if present.
- B. Remove the fourteen (14) screws holding the control panel assembly to the housing using a phillips screwdriver.
- C. Gently remove the control panel from the housing and disconnect the wires from the battery.
- D. Remove the quick-disconnect terminals supplied with the replacement battery and place them over the terminals of the old battery.
- E. Using a 5/16 in nut driver, loosen and remove the four (4) nuts and bracket holding the battery restraining bar in place.
- F. Remove the battery.

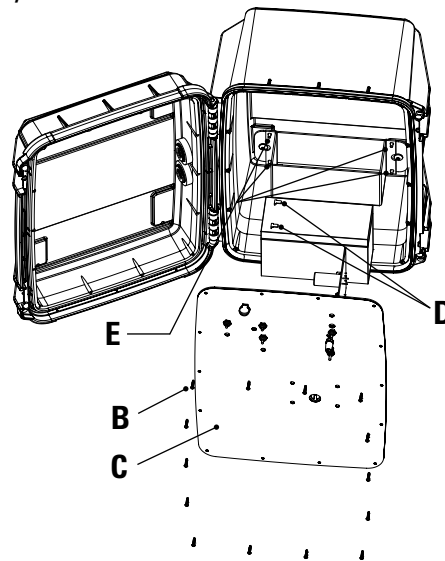


Figure 2. Battery Replacement

Maintenance (Continue)



DANGER: NEVER short or connect the terminals of the battery terminals together. Shorting of the battery terminals causes rapid internal heating of the battery resulting in the explosion of the battery and severe injury or the death of the operator.



CAUTION: Do not reverse the connections to the battery. If the battery connections are reversed, damage to the unit will occur.

- G. Reverse the service process to install the battery. **Connect the RED wire to the battery terminal marked + (positive). Connect the BLACK wire to the battery terminal marked – (negative).**



CAUTION: Fully charge the unit before using for the first time. Damage to the internal battery can result if the battery is in a fully discharged state and operation of the unit is attempted.

- H. Fully charge the battery after replacement. See CHARGING THE BATTERY.



DANGER: DO NOT BURN OR INCINERATE THE BATTERY. THE BATTERY MAY EXPLODE CAUSING SEVERE INJURY OR DEATH OF THE PERSONNEL IN THE AREA. (Dispose of the old battery by recycling.)

Motor Brush Check/Replacement (See Figure 3)



WARNING: Turn drive off, remove all the power to the unit, including the AC/DC Power Supply/Converter, Automotive Power Adapter or other external power source if present before servicing the motor brushes. Place the Mode of Operation Switch (RUN/CHARGE) in the "CHARGE" position and all other switches in the off position. This will help prevent accidental activation of the drive mechanism so fingers or loose clothing will not get caught in the drive mechanism.

NOTE: The brushes should be checked every 2000 operating hours or every 6 months or if erratic operation occurs.

- A. Place all control panel switches in the off position and disconnect the AC/DC Power Supply/Converter if present.
- B. Remove the fourteen (14) screws holding the control panel assembly to the housing using a Phillips screwdriver.
- C. Gently remove the control panel from the housing and disconnect the wires from the battery.
- D. Remove the brushes using a screwdriver and rotate the brush holder 90° CCW. The brush should pop out.
- E. Vacuum any brush dust from the brush holder openings.

Maintenance (Continue)

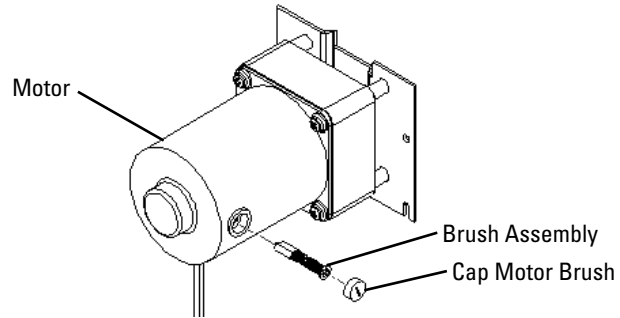


Figure 3. Motor Brush Replacement

- F. Inspect the brushes. If they are 0.160 in (4 mm) or less in length, replace the brushes.
- G. Repeat step D to remove the other brush.
- H. Reverse the process to reinstall the brushes, reconnect the battery and install the control panel. Connect the **RED** wire to the battery terminal marked + (positive). Connect the **BLACK** wire to the battery terminal marked – (negative).

Replacing the Pump Head Sealing Gasket (See Figure 4)

A gasket to seal the Pump Head is supplied with each unit and is located on the control panel around the drive output shaft. The gasket will deteriorate with time and frequent pump head changes. To maintain the integrity of the IP protection of the unit, the gasket should be changed if deterioration is noted, a leak develops, or after one to two years of use, whichever comes first.

To replace the gasket, peel the gasket and its adhesive backing from the control panel. Make sure to remove all gasket residue. An outline of the gasket is shown on the control panel. Remove the release liner from the adhesive backing of the new gasket and position the new gasket within the gasket outline shown on the control panel.

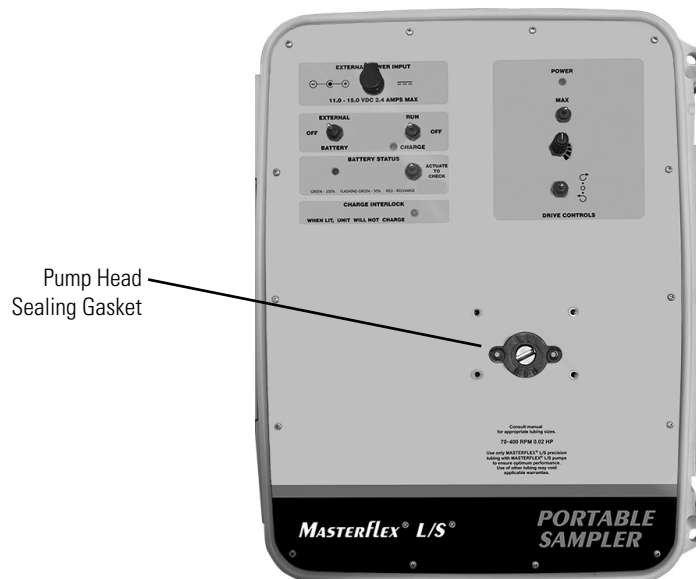


Figure 4. Pump Head Sealing Gasket

Replacement Parts

Part No.	Description
77500-03	Fuse Replacement for Automotive Power Adapter or Auxiliary Power Pack
07571-55	Battery 12V 7.2AH
07571-56	Gasket, Pump Head (pkg of 6)
07571-57	Sealing Boots, Switches and Speed Control (pkg. of 6)
07571-58	Knob and Cap, Speed Control
07571-59	Motor Brush Replacement Kit, set of two
07571-60	O-Ring, Case Seal 46" Length

Section 5 Troubleshooting

1. The Drive will not operate on the internal battery power source.

- A. Verify that the **Power Source Selection Switch (B)**, is in the **BATTERY** position.
- B. Verify that the **Mode of Operation Selection Switch (C)**, is in the **RUN** position.
- C. Verify that the pump head, tubing size and formulation are correct and recommended for this drive.
- D. If using a PTFE pump head, install and start the tubing per the instructions in the pump head manual. Excessive tightening of the occlusion bed can jam the drive mechanism. Tighten the occlusion bed gradually as indicated in the pump head manual.
- E. Verify that the **Pump Rotational Selection On/Off Switch (H)**, is either in the **CW** or **CCW** position for the desired rotation. The **Power** indicator in the Drive Controls section will be illuminated.
- F. Toggle or activate the **Battery Status Indicator (F)**. If the indicator is RED, recharge the battery immediately. You have drained or exhausted the available power of the internal battery.
- G. If the **Battery Status Indicator (F)** does not illuminate, remove the control panel and check for loose connections to the battery.
- H. Use a digital multi-meter (DMM) set to DC volts to check the battery potential. If below 9 volts DC, replace battery.
- I. If none of the above solutions work, contact your authorized dealer for service.

2. The Drive will not run using external power supplied by the AC/DC Power Supply/Converter.

- A. Verify that the **Power Source Selection Switch (B)**, is in the **EXTERNAL** position.
- B. Verify that the **Mode of Operation Selection Switch (C)**, is in the **RUN** position.
- C. Verify that the pump head, tubing size and formulation are correct and recommended for this drive.
- D. If using a PTFE pump head, install and start the tubing per the instructions in the pump head manual. Excessive tightening of the occlusion bed can jam the drive mechanism. Tighten the occlusion bed gradually as indicated in the pump head manual.

Troubleshooting (Continue)

- E. Verify that the **Pump Rotational Selection On/Off Switch (H)**, is either in the **CW** or **CCW** position for the desired rotation. The **Power** indicator in the Drive Controls section will be illuminated.
- F. Verify that the coaxial plug is fully inserted in the External Power Input of the unit.
- G. Verify that AC voltage is present in the AC outlet to which the AC/DC Power Supply/Converter is connected.
- H. Verify the DC voltage at the 2.5 mm coaxial connector. Must be at least 13 volts DC. **AC/DC Power Supply/Converter is not a serviceable unit and contains no user serviceable parts.**
- I. If none of the above solutions work, contact your authorized dealer for service.

3. The Drive will not operate using the Automotive Power Adapter Accessory.

- A. Verify that the **Power Source Selection Switch (B)**, is in the **EXTERNAL** position.
- B. Verify that the **Mode of Operation Selection Switch (C)**, is in the **RUN** position.
- C. Verify that the pump head, tubing size and formulation are correct and recommended for this drive.
- D. If using a PTFE pump head, install and start the tubing per the instructions in the pump head manual. Excessive tightening of the occlusion bed can jam the drive mechanism. Tighten the occlusion bed gradually as indicated in the pump head manual.
- E. Verify that the **Pump Rotational Selection On/Off Switch (H)**, is either in the **CW** or **CCW** position for the desired rotation. The **Power** indicator in the Drive Controls section will be illuminated.
- F. Verify that the coaxial plug of the Automotive Power Adapter is fully inserted in the External Power Input of the drive.
- G. Verify that the Automotive Power Adapter is fully inserted into the cigarette lighter on the vehicle.
- H. Verify that the fuse for the cigarette lighter is not open or blown.
- I. Verify the DC voltage at the 2.5 mm coaxial connector. It must be at least 12 volts DC.
- J. Verify the polarity of the DC voltage at the 2.5 mm connector. The sleeve is negative, the center is positive. **The drive is protected against polarity reversal and will not operate if the polarities are reversed.**
- K. If none of the above solutions work, contact your authorized dealer for service.

Troubleshooting (Continue)

4. The internal battery charge indicator is not illuminated or the battery will not charge using the AC/DC Power Supply/Converter.

- A. Verify that the **Mode of Operation Selection Switch (C), (CHARGE/RUN)** is in the **CHARGE** position.
- B. Verify that the coaxial plug of the AC/DC Power Supply/Converter is fully inserted in the External Power Input of the unit.
- C. Verify that AC voltage is present in the AC outlet to which the AC/DC Power Supply/Converter is connected. Verify the DC voltage at the 2.5 mm coaxial connector. It must be 13 volts DC minimum.
- D. If none of the above solutions work, contact your authorized dealer for service.

5. The internal battery charge indicator is not illuminated or the battery will not charge using the Automotive Power Adapter Accessory.

- A. Verify that the **Power Source Selection Switch (B), (EXTERNAL/BATTERY)** is in the **EXTERNAL** position.
- B. Verify that the **Mode of Operation Selection Switch (C), (CHARGE/RUN)** is in the **RUN** position.
- C. Verify that the coaxial plug of the Automotive Power Adapter is fully inserted in the External Power Input of the drive.
- D. Verify that the Automotive Power Adapter is fully inserted into the cigarette lighter on the vehicle.
- E. Verify that the fuse for the cigarette lighter is not open or blown.
- F. Verify the DC voltage at the 2.5 mm coaxial connector. It must be 13 volts DC minimum. Verify the polarity of the DC voltage at the connector.
- G. The drive is protected against polarity reversal and will not operate if the polarities are reversed. The sleeve is negative, the center is positive.
- H. If none of the above solutions work, contact your authorized dealer for service.

Section 6 Accessories

Part No.	Description
07570-04	Tubing weight, flow-through fits L/S® size 15, 24 or 25 tubing
07571-50	Automotive Power Adapter, Current Limited
07571-52	Auxiliary Power Pack w/Charger 115V AC
07571-54	Auxiliary Power Pack w/Charger 230V AC

Section 7 Specifications

Operating Speed	70 to 400 rpm
Operating Voltage/Frequency:	
Model 07571-02	115V AC nominal 50/60 Hz (100–130) V AC @ 120mA AC 230V AC nominal 50/60 Hz (200–260) V AC @ 60mA AC 12V DC nominal (11–16)V DC @2.4A DC
Number of Pump Heads:	1
Torque Load:	50 oz-in (0.35 N•m), maximum
Direction of Rotation:	Clockwise and Counterclockwise
Operating Temperature:	32°F to 122°F (0° to 50°C)
Storage Temperature:	–4°F to 149°F (–20°C to 65°C)
Humidity (Non-condensing):	10% to 90%
Altitude	6600 ft. (2000 m)
Dimensions (L x W x H):	17.9 in x 12.1 in x 9.6 in (38 cm x 31 x 24 cm)
Weight:	17.8 pounds (8.07 kg)
Chemical Resistance:	High-density polyethylene, clear anodized aluminum, stainless steel and polyester. All materials withstand standard solvents.
Enclosure Rating:	IP54 per IEC529
Pollution Degree:	Degree 2 per IEC664
Installation Category:	Category II per IEC664 (local level—appliances, portable equipment, etc.)
Compliance:	
07571-02	115V AC Power Supply AC/DC Converter is UL listed and CSA approved. Regulatory agency specifications not applicable to the balance of the unit due to low voltage. CE Mark: EN809 (EU Machinery Directive) EU EMC Directive (EN61326-1)

Section 8 Warranty, Product Return, and Technical Assistance

Warranty

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

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 two (2) years 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.

APPENDIX A

RECOMMENDED PUMP HEADS, TUBING SIZES, FORMULATIONS AND MODEL NUMBERS										
			TUBING MODEL NUMBERS							
L/S® TYPE PUMP HEAD	PUMP MODEL NO.	TUBING SIZE	SILICONE	C-FLEX®	TYGON® LAB	TYGON® LFL	PHARMED® BPT	NORPRENE®	VITON® Fluoroelastomer	PTFE
Standard	07013-20 07013-21 07013-52	13	96400-13 96410-13	06424-13	06409-13	06429-13	06508-13	06404-13	96412-13	
	07014-20 07014-21 07014-52	14	96400-14 96410-14	06424-14	06409-14	06429-14	06508-14	06404-14	96412-14	
	07015-20 07015-21 07015-52	15	96400-15 96410-15	06424-15	06409-15					
	07016-20 07016-21 07016-52	16	96400-16 96410-16	06424-16	06409-16	06429-16	06508-16	06404-16		
	07024-20 07024-21 07024-52	24	96400-24 96410-24	06424-24						
QUICK LOAD®	07021-22 07021-26	15	96400-15 96410-15	06424-15	06409-15					
		24	96400-24 96410-24	06424-24						
	07021-20 07021-24	13	96400-13 96410-13	06424-13	06409-13	06429-13	06508-13	06404-13	96412-13	
		14	96400-14 96410-14	06424-14	06409-14	06429-14	06508-14	06404-14	96412-14	
		16	96400-16 96410-16	06424-16	06409-16	06429-16	06508-16	06404-16		
	25	96400-25 96410-25	06424-25	06409-25	06429-25					
EASY-LOAD®	07518-02 07518-12 07518-62	15	96400-15 96410-15	06424-15	06409-15					
		24	96400-24 96410-24	06424-24	06409-24	06429-24				
	07518-00 07518-10 07518-60	13	96400-13 96410-13	06424-13	06409-13	06429-13	06508-13	06404-13	96412-13	
		14	96400-14 96410-14	06424-14	06409-14	06429-14	06508-14	06404-14	96412-14	
		16	96400-16 96410-16	06424-16	06409-16	06429-16	06508-16	06404-16		
	25	96400-25 96410-25	06424-25	06409-25	06429-25	06508-25	06404-25			
PTFE	77390-00	4mm								77390-50
PTFE	77390-00	6mm								77390-60

Note: 96400 prefix indicates Peroxide Cured Silicone Tubing,
96410 prefix indicates Platinum Cured Silicone Tubing.

APPENDIX B

LIFT VERSUS TUBING SIZE, FORMULATION & FLOW						
ALL FLOWS SHOWN ARE ML/MIN @70°F (21.1°C)						
LIFT FEET	TUBING SIZE	SILICONE C-FLEX	TYGON® LAB	TYGON® LFL	NORPRENE® PHARMED® BPT	PTFE
0	15	675	740	740		
12		635	690	710		
25		290	210	570		
0	24	1085	1060	1040		
12		730	955	1030		
25		15' Max LIFT	560	670		
0	25	750	825	785	740	
12		260	625	680	690	
25		15' Max LIFT	130	365	345	
0	4 mm					30
12						29
25						20
0	6 mm					84
12						31
25						19

- Notes:**
1. The flows shown above were generated on an EASY-LOAD pump.
 2. Average barometric pressure is 740 mm Hg.
 3. Flows shown are nominal or averaged.
 4. PTFE Tubing Pump is being run @ 400 rpm, which is above its recommended rpm range; this is for intermittent use (10–15 minutes) only and will result in shorter tubing life. For continuous use, do not exceed 300 rpm. Reduce flows by 33% for use at 300 rpm.

US & Canada only

Toll Free 1-800-MASTERFLEX | 1-800-637-3739

Outside US & Canada

1-847-549-7600 | 1-847-381-7050

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