Stryker Air™ Pump

REF 2861

stryker®

Service Manual

For Parts or Technical Assistance:
USA: 1-800-327-0770

Table of Contents

Symbols and Definitions

SYMBOLS

	Warning/Caution - Consult accompanying documentation
	Caution
	Refer to Instruction Manual
	Electrical Safety Mark
	Consult Instructions for Use
	Type BF Applied Part; Applied Part is the Support Surface
	Protective Earth Terminal
IPX4	Protection from Powerful Jets of Water Rating
	Equipment Emits Electromagnetic Energy
	Manufacturer
	Model Number
	Serial Number
	Power (ON/STANDBY)
	Lock
	Alarm Indicator
	Operating Mode ($IsoFlex_{LAL}$ or SPR_{Plus})
	SPR_{Plus} Pressure Adjustment (Millimeters of Mercury = mmHg)
	Warning: dangerous voltage

WARNING / CAUTION

The words **WARNING and CAUTION** carry special meanings and should be carefully reviewed.

WARNING

Alerts the reader about a situation which, if not avoided, could result in death or serious injury. It may also describe potential serious adverse reactions and safety hazards.

CAUTION

Alerts the reader of a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to the user or patient or damage to the equipment or other property. This includes special care necessary for the safe and effective use of the device and the care necessary to avoid damage to a device that may occur as a result of use or misuse.

Introduction

This manual is designed to assist with the operation and maintenance of the Stryker Air™ Pump ("Pump") that is used to power both the Stryker SPR_{Plus}™ Single Patient Use Low Air Loss Overlay System ("SPR_{Plus}") and $IsoFlex_{LAL}$™ Support Surface. ⚠ The SPR_{Plus} is only for use in the United States.

Carefully read this entire manual before using or beginning maintenance on the Pump. To ensure safe operation of this equipment, it is recommended that methods and procedures are established for educating and training staff on the safe operation of the Pump.

INTENDED USE OF THE PRODUCT

The Pump is an accessory used with the SPR_{Plus} and $IsoFlex_{LAL}$ Support Surface to assist in the prevention and treatment of pressure ulcers. This therapy is recommended to be used in combination with clinical evaluation of risk factors and skin assessments made by a health care professional. Patients may be excluded due to some medical conditions such as unstabilized spinal cord injuries or other conditions as determined by the facilities professional staff.

This Pump is intended to be used:

- With the Stryker SPR_{Plus} or $IsoFlex_{LAL}$ Support Surface only.
- With the hosing and connector assembly provided (Part Number 2861-001-001).
- In acute care, general hospital care, or other locations as prescribed by a physician.

This product is not intended to be used in a home health care environment.

PRODUCT DESCRIPTION

The Pump provides *Low Air Loss Therapy* and when used in conjunction with SPR_{Plus} or $IsoFlex_{LAL}$ Support Surface assists in the prevention and treatment of pressure ulcers and includes the following features:

- The Pump is a versatile accessory that may be used with either the SPR_{Plus} or the $IsoFlex_{LAL}$ Support Surface.
- Easily attaches to the Footboard of the Bed Frame.
- Incorporates an alarm for detection of hose disconnection from the Pump
- Designed with a "User-Friendly" Control Panel.

OPERATING PRINCIPLE

The Stryker Air Pump is designed to work with either the $IsoFlex_{LAL}$ (Low Air Loss) mattress or the SPR_{Plus} mattress overlay. When used with the $IsoFlex_{LAL}$ mattress, the Pump provides a continuous flow of air to the mattress for the Low Air Loss feature of the mattress. Air flows inside the mattress to the underside of the cover to remove moisture. The mattress, by itself, provides all the necessary support for the patient. The Pump does not provide support of the patient.

When the Pump is used with the SPR_{Plus} mattress overlay, the Pump provides air for patient support and Low Air Loss. The patient is supported by air pressure in the mattress overlay. The Pump adjusts its air output to obtain the pressure value selected by the user. Small pin holes in the top side of the mattress overlay "leak" air to achieve the Low Air Loss therapy.

SPECIFICATIONS

Pump	
Dimensions	Height: 8.5 in / 25.6 cm Width: 8 in / 20.3 cm Depth: 5 in/ 12.7 cm
Weight	5.5 lbs/ 2.5kgs
Input Voltage AC	110 - 127 Volts
Input Frequency	50 - 60 Hz
Current Consumption	0.25 Amps
Power Consumption	< 60 VA
Circuit Protection	Dual Circuit Breakers, 240V, 1.0A
Mode of Operation	Continuous
Protection Against Electrical Shock	Class I, Type BF Applied Part 
Air Output	– 12.5 Liters / Minute @ 30 mmHg – 25 Liters / Minute @ 20 mmHg
Pressure Settings (mmHg)	18 to 30 mmHg in 3 mmHg Increments
Power Cord	3 ft/ 0.91m (For Bed Frame Outlet) 15 ft / 4.6m; (For Wall Outlet)
Air Hose	56 in / 142 cm
Air Hose Connection	3/8 Inch Flow Quick Coupling
Packaging	1 Piece per Box
Latex Content	User accessible parts of the Pump are not made with natural rubber latex.
Alarms:	
Sound Pressure Level	63.1 dB(A)
Hose Disconnection Alarm (Low Priority Alarm)	– Indicated after 15 minutes for hose disconnection from Pump (SPR_{Plus} Mode)
Hose Disconnection / High Pressure Alarm (Medium Priority Alarm)	– Indicated after 30 minutes for hose disconnection from Pump (SPR_{Plus} Mode) – Indicated after 30 seconds for excessive Pump pressure
System Alarm (Medium Priority Alarm)	– If system error is detected – Stuck Button
Operating Conditions:	
Ambient Temperature	40 to 90 ^{o}F / 5 to 32 ^{o}C
Relative Humidity	30 to 75 % Non-Condensing
Atmospheric Pressure	700 to 1060 hPa
Storage and Shipping Conditions:	
Ambient Temperature	-40 to 158 ^{o}F / -40 to 70 ^{o}C
Relative Humidity	10 to 95 %, Non-Condensing
Atmospheric Pressure	500 to 1060 hPa
Protection Against Harmful Ingress of Liquids:	
Liquid Ingress Protection	IPX4
Product Compliance:	
Medical Equipment	IEC 60601-1 (3rd Edition) UL 60601-1 CAN/CSA C22.2 NO. 601.1 (3rd Edition)
Collateral Standards	Electromagnetic Compatibility IEC 60601-1-2 (See **Pages 53-55**) Usability IEC 60601-1-6

Stryker reserves the right to change specifications without notice.

CONTACT INFORMATION

Contact Stryker Customer Service or Technical Support at: **(800) 327-0770** or **(269) 324-6500**.

Stryker Medical
3800 E. Centre Avenue
Portage, MI 49002
USA

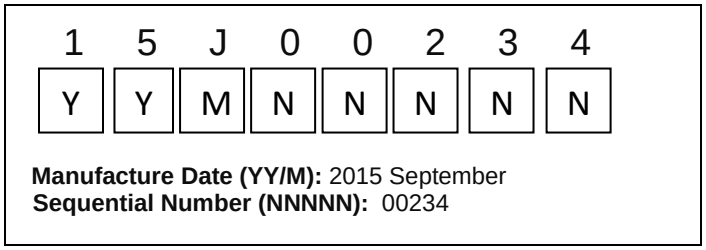
Please have the serial number of your Stryker product available when calling Stryker Customer Service or Technical Support. Include the serial number in all written communication.

SERIAL NUMBER LOCATION

The serial number is located on the back of the Pump, on the rear label.

SERIAL NUMBER FORMAT (8 DIGITS):

Serial Number Example: 15J00234



Year Legend (YY)	
2015	15
2016	16
2017	17
2018	18
2019	19

Month Legend (M)	
January	A
February	B
March	C
April	D
May	E
June	F
July	G
August	H
September	J
October	K
November	L
December	M

Sequential # Legend (NNNNN)
00001 - 99999

Cleaning Instructions

CLEANING / DISINFECTION

The exterior of the Pump and hosing assembly should be wiped down between patient uses with a cloth dampened with disinfectant.

WARNING

- DO NOT spray disinfectant directly on the electrical Pump, or immerse the Pump in any type of liquid. This could result in a severe electrical hazard.
- All disinfection should be done using a “hospital-grade” disinfectant registered with the Environmental Protection Agency (EPA).
- When disinfecting is required, check manufacturer’s instructions before use, and use disinfectant in accordance with the manufacturer’s instructions.

Suggested Disinfectants

1. Quaternary Cleaners
2. Phenolic Cleaners
3. Chlorinated Bleach Solution (5.25% bleach diluted 1 part bleach to 10 parts water)
4. 70% Isopropyl Alcohol
5. Accelerated Hydrogen Peroxide (AHP)

CAUTION

- Disinfect the Pump, Power Cord, and Hosing Assembly between patient installations and when servicing, utilizing standard hospital protocol and disinfectants. Failure to disinfect may risk cross-contamination and infection.
- DO NOT autoclave the Pump OR the Hosing Assembly.
- Unplug Pump from its source prior to cleaning.
- Do not use harsh cleansers, solvents, or detergents on the Pump. Equipment damage could occur.

Quick Reference Replacement Parts List

Part Number	Item Description
2861-001-009	COVER, FRONT
2861-001-013	FEMALE COUPLING, 3/8” QUICK DISCONNECT
2861-001-004	HANGING BRACKET
2861-001-006	HANGING BRACKET, PIN
2861-001-005	HANGING BRACKET, RING
2861-001-012	KIT, BUMPER
2861-001-014	KIT, CABLE ASSEMBLY
2861-001-011	KIT, CIRCUIT BREAKER
2861-001-015	KIT, CONTROL BOARD
2861-001-038	KIT, CONTROL MEMBRANE
2861-001-019	KIT, HANGING BRACKET REPLACEMENT
2861-001-018	KIT, INTERNAL PUMP ASSEMBLY
2861-001-008	KIT, POWER INLET
2861-001-016	KRYTOX GPL 205 SEALANT
2861-001-020	MODIFIED NUTDRIVER
2861-001-024	POWER CORDS, PLUG TYPE B – 3 FEET (1M) AND 15 FEET (4.5M)
2861-001-001	STRYKER AIR HOSE ASSEMBLY
2861-001-039	STRYKER AIR MANUAL
2861-001-037	STRYKER AIR SERVICE MANUAL

Membrane Replacement

Tools Required:

- Membrane Kit (2861-001-038)
- Small Slotted Screwdriver
- #2 Phillips Screwdriver
- Acetone
- ESD System (Static Strap)

Removal:

1. Unplug the power cord from the power inlet and remove the air hose from the controller, if attached, and set aside.
2. Set the controller on a work surface.
3. With the controller sitting upright and facing away from you, use a #2 Phillips screwdriver to remove the six screws and O-rings securing the front cover to the back cover, see **Figure 1**.

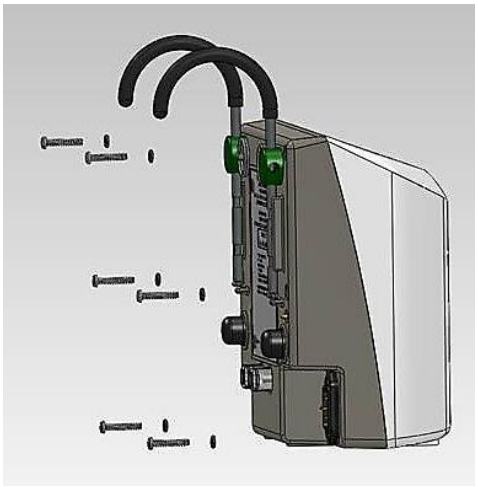


Figure 1

4. Hold the front and back cases together and tip the controller backwards to remove the screws and O-rings and set them aside.
5. With the controller upright and facing away from you, turn it counterclockwise 90^{o} and slightly separate the front and back cases. See **Figure 2**.

Figure 2

6. Once separated, use a small slotted screwdriver to unlock both sides of the membrane ribbon cable connector at J10 and remove the ribbon cable from the connector. See **Figure 3**.

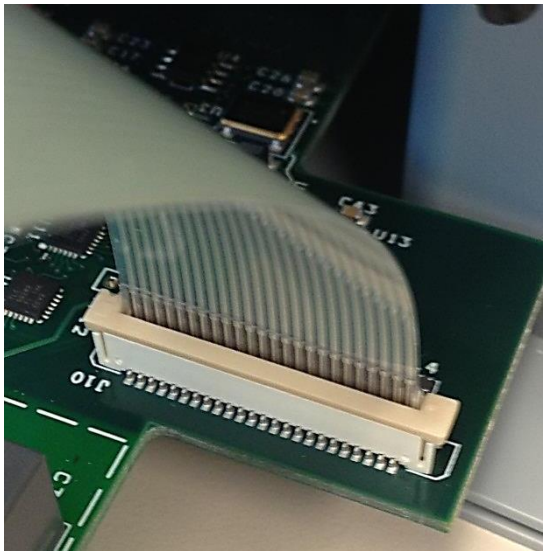


Figure 3

7. Carefully peel the membrane ribbon cable up and away from the tape on the inside of the front cover.
8. With the front case facing toward you, use a small slotted screwdriver to pry up the membrane from the left side and peel off the membrane. See **Figure 4**.

Figure 4

9. Pull the membrane ribbon cable through the slot in the front cover.
10. Remove the two pieces of tape from the inside of the front case.

Installation:

1. Using acetone, clean and wipe down the recessed membrane area of the front case.
2. Slide the membrane ribbon cable through the slot in the front cover.
3. Remove the paper backing from the membrane and align it with the recessed area on the front cover.
4. Apply the membrane to the recessed area and press down to seal.
5. Make a small loop at the top of the membrane ribbon cable and line up the membrane ribbon cable with the adhesive tape and press down to seal.
   See **Figure 5**.

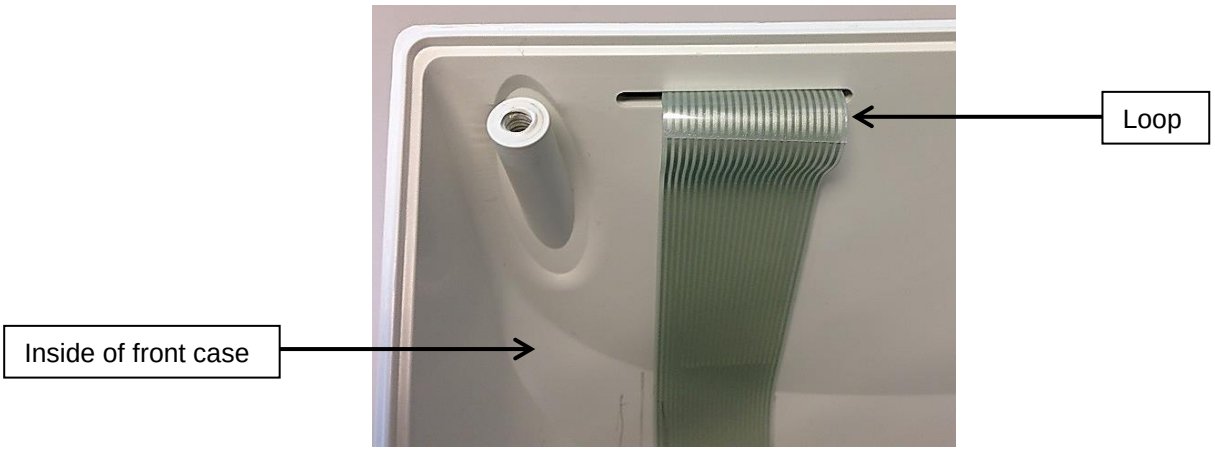


Figure 5

6. Peel the plastic backing off of the 3M VHB tape that is adhered to the membrane tail.
7. Apply the adhesive membrane tail to the inside of the front case.

Krytox® Application:

Refer to page 48 for Krytox® application instructions.

Case Closure:

Refer to page 49 for case closure instructions.

Functionality Test:

Refer to page 50 for functionality test procedures.

Pump Replacement

Tools Required:

- Pump Replacement Kit (2861-001-018)
- Small Slotted Screwdriver
- #2 Phillips Screwdriver
- Needle Nose Pliers
- Wire Cutters
- ESD System (Static Strap)

Removal:

1. Unplug the power cord from the power inlet and remove the air hose from the controller, if attached, and set aside.
2. Set the controller on a work surface.
3. With the controller sitting upright and facing away from you, use a #2 Phillips screwdriver to remove the six screws and O-rings securing the front cover to the back cover. See **Figure 6**.

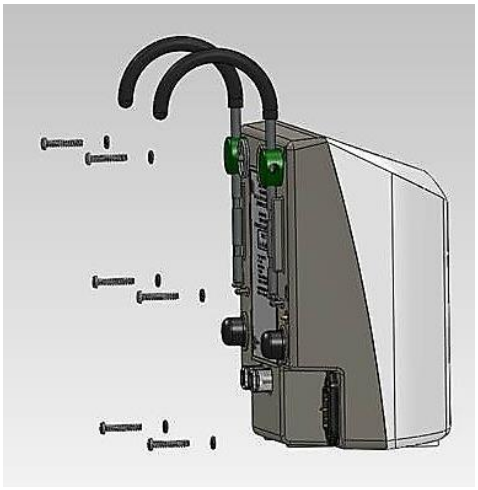


Figure 6

4. Hold the front and back cases together and tip the controller backwards to remove the screws and O-rings and set them aside.
5. With the controller upright and facing away from you, turn it counterclockwise 90^{o} and slightly separate the front and back cases. See **Figure 7**.

Figure 7

6. Once separated, use a small slotted screwdriver to unlock both sides of the membrane ribbon cable connector at J10 and remove the ribbon cable from the connector. See **Figure 8**.

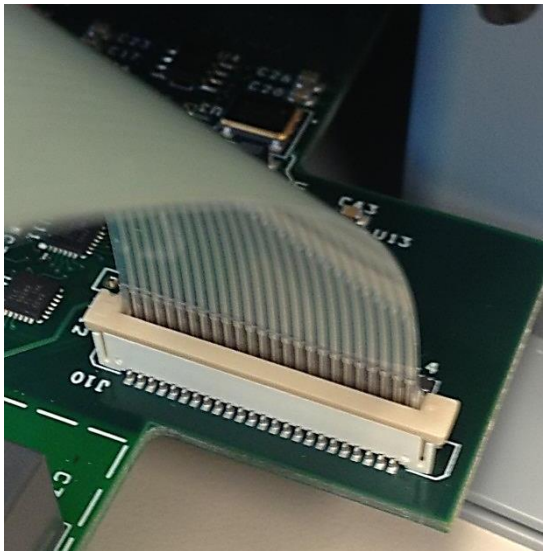


Figure 8

7. Using wire cutters, carefully clip the four (4) zip ties that hold the wires together.
8. Unplug the two (2) connectors from the control board connector at J8 and J9.
9. Disconnect the large and small silicone hoses from the muffler. Keep the hoses attached to the board and air outlet fitting. See **Figure 9**.

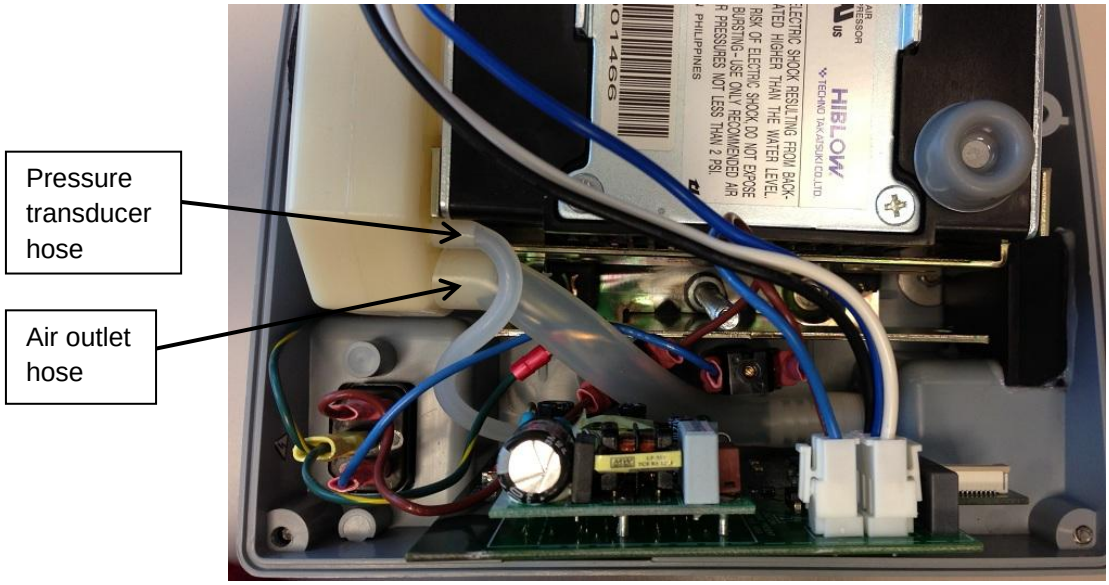


Figure 9

10. Slide the PCB out of the key in the back case and put aside.
11. Lay the back case down, face up, on a work surface.
12. Using needle nose pliers unhook and remove the two (2) pump isolators from the bottom pump bracket.
13. Slide the two (2) pump isolators out of the black hooks on the top of the pump. See **Figure 10**.

Figure 10

14. Lift the pump assembly up and remove it from the back case.

Installation:

1. Place the back case on a work surface, facing up.
2. Put the pump assembly onto the back metal bracket.
3. Using needle nose pliers, pull the bottom two (2) pump isolators through the holes in the bottom pump bracket. See **Figure 11**.

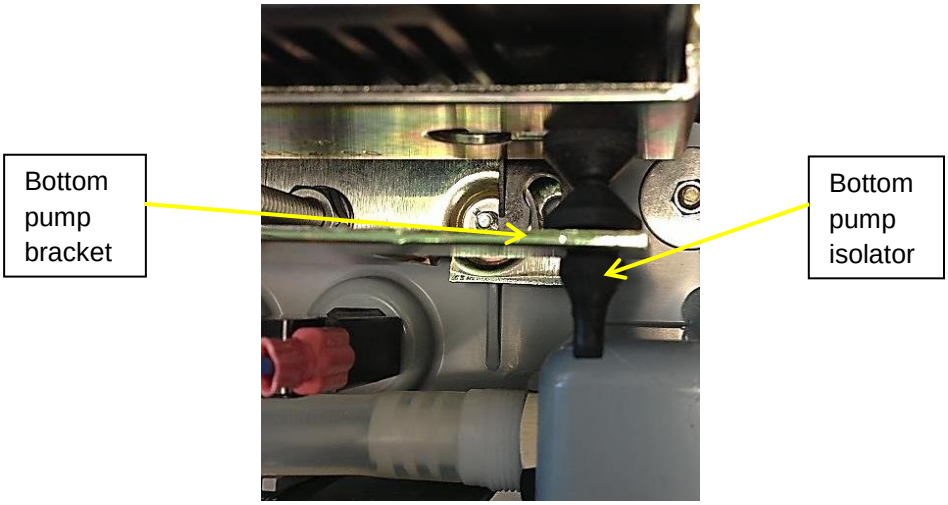


Figure 11

4. Attach the top two (2) pump isolators to the black hooks on the top of the pump.
5. Attach the large and small silicone hoses to the muffler. See **Figure 9** for correct hose orientation.
6. Reinsert the PCB into the key in the back case.
7. Insert the two (2) connectors to the control board connector at J8 and J9.
8. Zip tie the wires. See **Figure 12** for placement reference.

Pump Replacement

Important! Wires must be constrained in accordance with the placement specified below for safety reasons.

A) Pump wires: blue, white and black

B) AC inlet module wires: blue, brown and green/yellow

C) Pump and circuit breaker wires: blue, white and black (pump) with blue (right circuit breaker) and brown (left circuit breaker)

D) Circuit breaker wires: blue (left and right) with brown (right side of left circuit breaker)

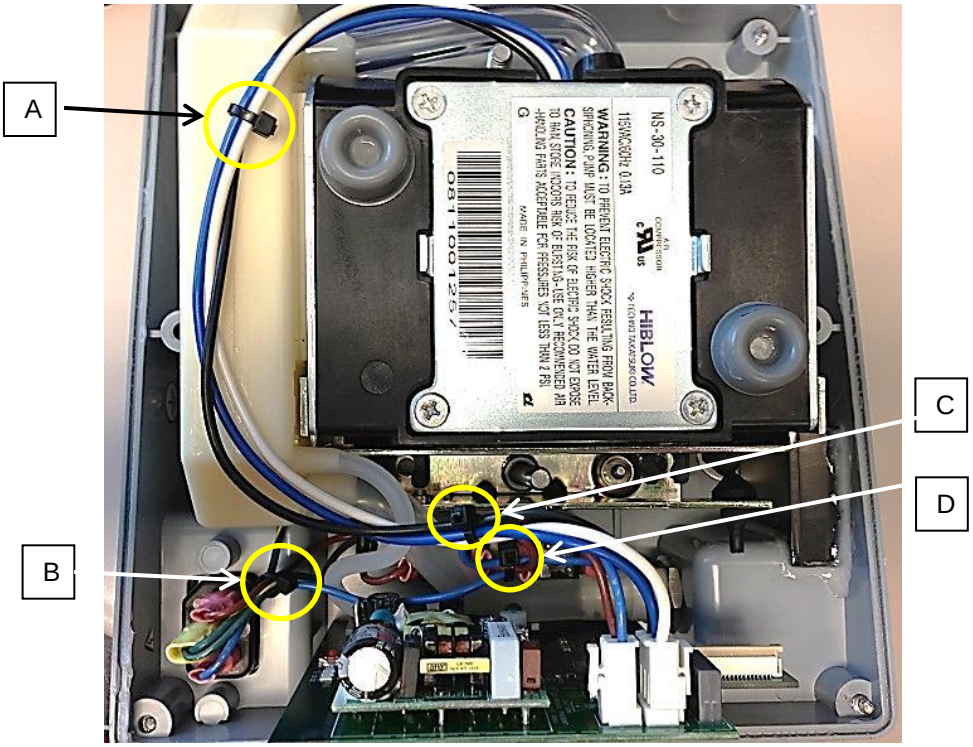


Figure 12

Krytox® Application:

Refer to page 48 for Krytox® application instructions.

Case Closure:

Refer to page 49 for case closure instructions.

Functionality Test:

Refer to page 50 for functionality test procedures.

Front Cover Replacement

Tools Required:

- Front Cover Replacement Kit (2861-001-009)
- Small Slotted Screwdriver
- #2 Phillips Screwdriver
- ESD System (Static Strap)

Removal:

1. Unplug the power cord from the power inlet and remove the air hose from the controller, if attached, and set aside.
2. Set the controller on a work surface.
3. With the controller sitting upright and facing away from you, use a #2 Phillips screwdriver to remove the six screws and O-rings securing the front cover to the back cover. See **Figure 13**.

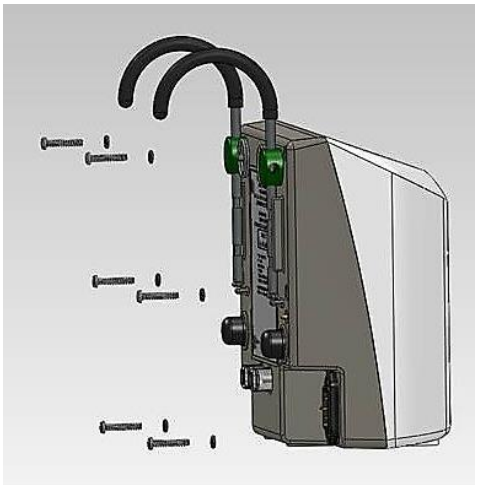


Figure 13

4. Hold the front and back cases together and tip the controller backwards to remove the screws and O-rings and set them aside.
5. With the controller upright and facing away from you, turn it counterclockwise 90^{o} and slightly separate the front and back cases. See **Figure 14**.

Figure 14

6. Once separated, use a small slotted screwdriver to unlock both sides of the membrane ribbon cable connector at J10 and remove the ribbon cable from the connector. See **Figure 15**.

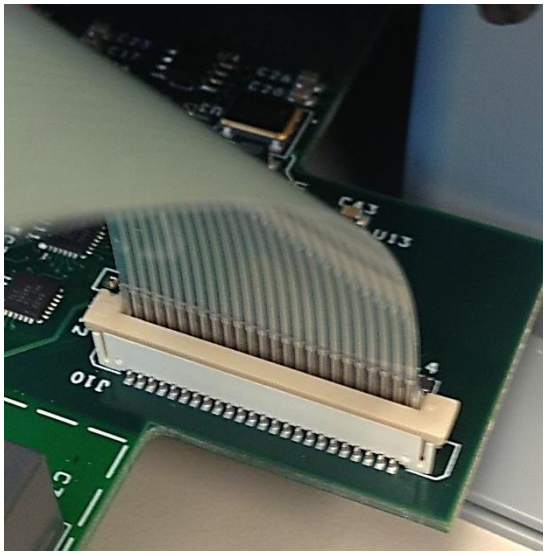


Figure 15

7. Discard the entire front cover.

Installation:

1. With the front case upright, line up the grooves with those of the back case.
2. With the controller upright and facing away from you, turn it counterclockwise 90°.
3. Insert the membrane ribbon cable at J10 and push down the sides of the connector to lock it in place. See **Figure 16**.

Figure 16

Krytox® Application:

Refer to page 48 for Krytox® application instructions.

Case Closure:

Refer to page 49 for case closure instructions.

Functionality Test:

Refer to page 50 for functionality test procedures.

Control Board Replacement

Tools Required:

- PCB (2861-001-015)
- Small Slotted Screwdriver
- #2 Phillips Screwdriver
- Needle Nose Pliers
- ESD System (Static Strap)

Removal:

1. Unplug the power cord from the power inlet and remove the air hose from the controller, if attached, and set aside.
2. Set the controller on a work surface.
3. With the controller sitting upright and facing away from you, use a #2 Phillips screwdriver to remove the six screws and O-rings securing the front cover to the back cover. See **Figure 17**.

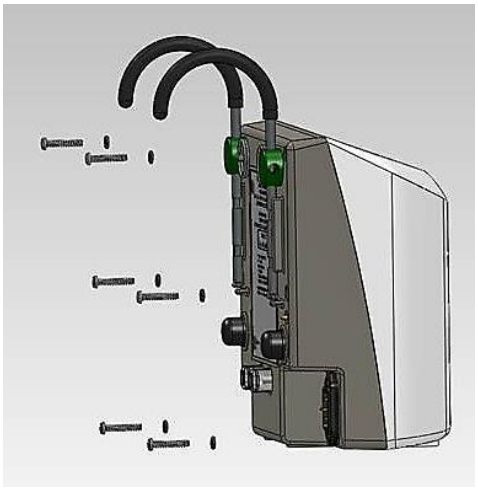


Figure 17

4. Hold the front and back cases together and tip the controller backwards to remove the screws and O-rings and set them aside.
5. With the controller upright and facing away from you, turn it counterclockwise 90^{o} and slightly separate the front and back cases. See **Figure 18**.

Figure 18

6. Once separated, use a small slotted screwdriver to unlock both sides of the membrane ribbon cable connector at J10 and remove the ribbon cable from the connector. See **Figure 19**.

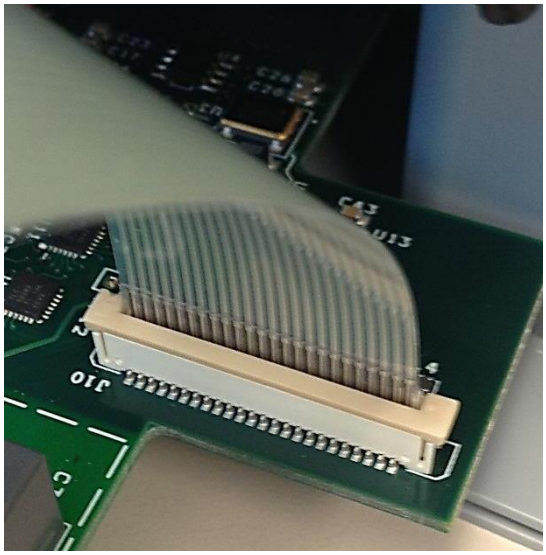


Figure 19

7. Unplug the two (2) connectors from the control board connector at J8 and J9.
8. Partially remove the PCB from the key in the back case.
9. Remove the small silicone hose from the pressure transducer on the board at PT1. See **Figure 20** for reference.

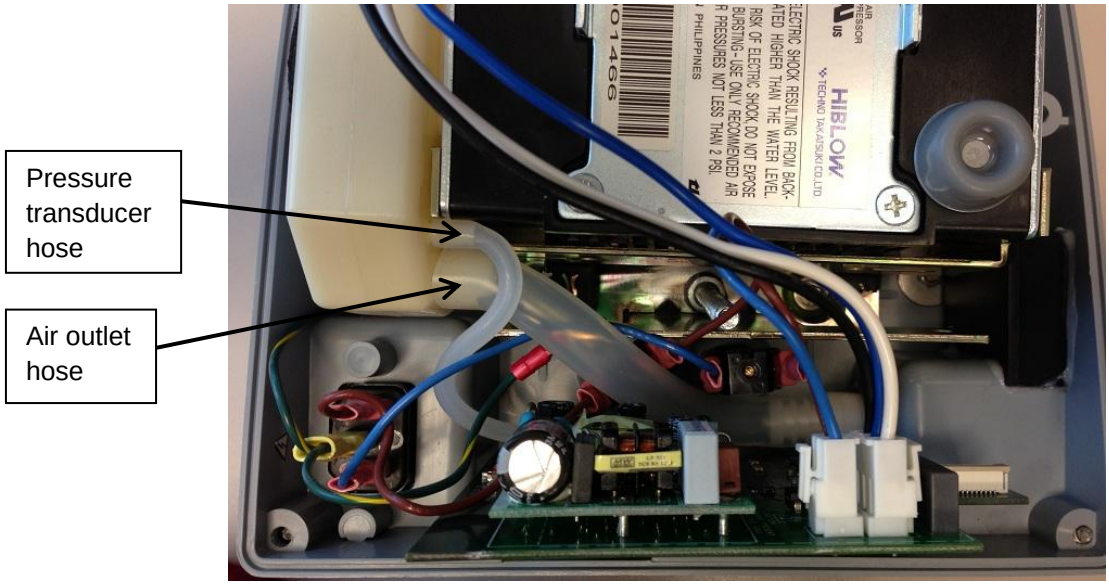


Figure 20

10. Slide the PCB completely out of the key in the back case and dispose of according to applicable local and federal regulations.

Installation:

1. Remove the sticker from the speaker on the bottom of the PCB.
2. Place the back case on a work surface, facing up.
3. Attach the small silicone tube from the muffler to PT1 on the board.
4. Insert the PCB into the key in the back case.
5. Insert the two (2) connectors to the control board connector at J8 and J9.

Krytox® Application:

Refer to page 48 for Krytox® application instructions.

Case Closure:

Refer to page 49 for case closure instructions.

Functionality Test:

Refer to page 50 for functionality test procedures.

Circuit Breaker Replacement

Tools Required:

- Circuit Breaker (2861-001-011)
- Small Slotted Screwdriver
- #2 Phillips Screwdriver
- Wire Cutters
- Needle Nose Pliers
- ESD System (Static Strap)

Removal:

1. Unplug the power cord from the power inlet and remove the air hose from the controller, if attached, and set aside.
2. Set the controller on a work surface.
3. With the controller sitting upright and facing away from you, use a #2 Phillips screwdriver to remove the six screws and O-rings securing the front cover to the back cover. See **Figure 21**.

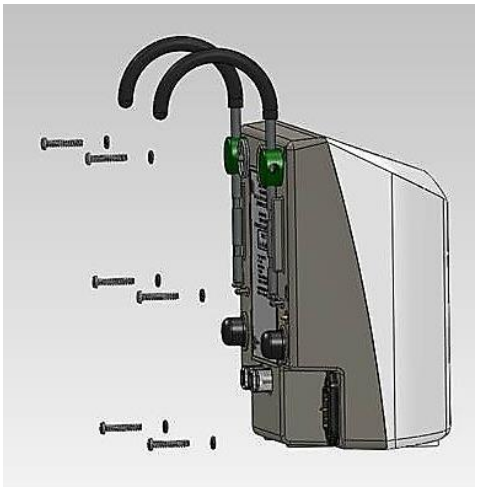


Figure 21

4. Hold the front and back cases together and tip the controller backwards to remove the screws and O-rings and set them aside.
5. With the controller upright and facing away from you, turn it counterclockwise 90^{o} and slightly separate the front and back cases. See **Figure 22**.

Figure 22

6. Once separated, use a small slotted screwdriver to unlock both sides of the membrane ribbon cable connector at J10 and remove the ribbon cable from the connector. See **Figure 23**.

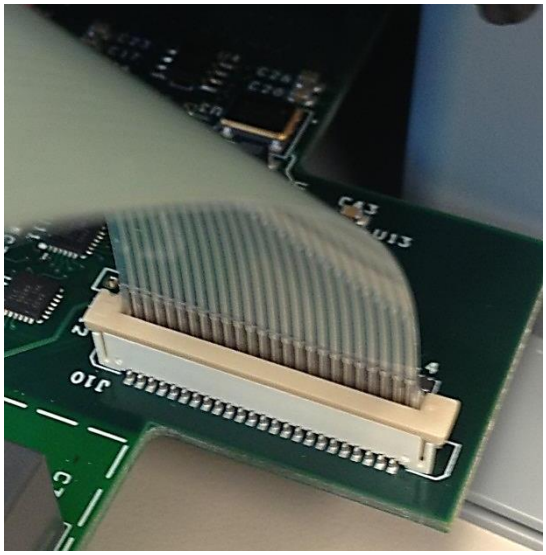


Figure 23

7. Using wire cutters, carefully clip the four (4) zip ties that hold the wires together.
8. Unplug the two (2) connectors from the control board connector at J8 and J9.
9. Partially remove the PCB from the key in the back case.
10. Remove the small silicone hose from the pressure transducer on the board at PT1.
11. Remove the large silicone hose from the muffler. See **Figure 24** for reference.

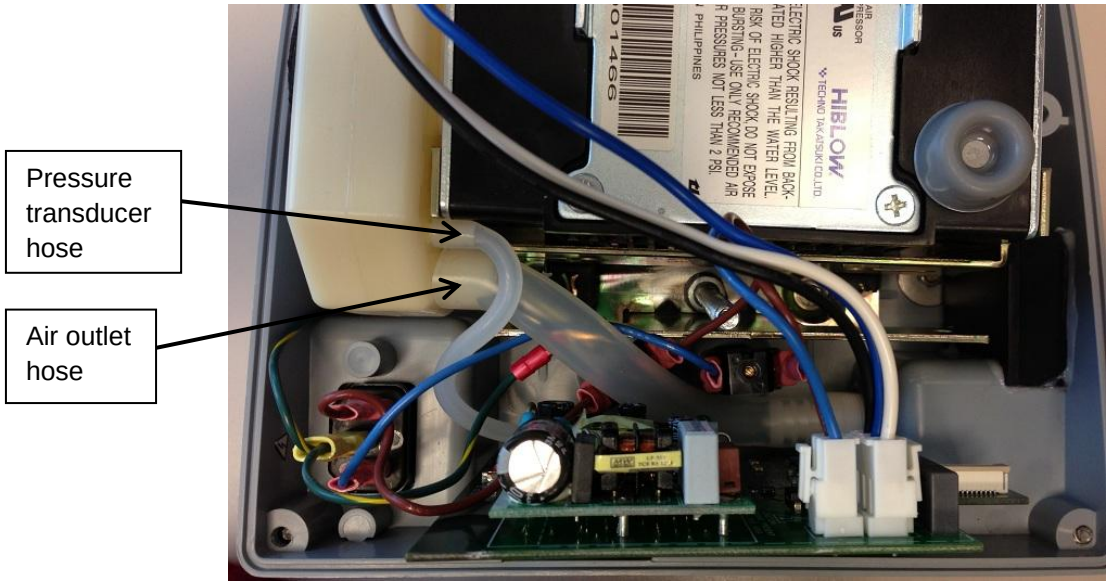


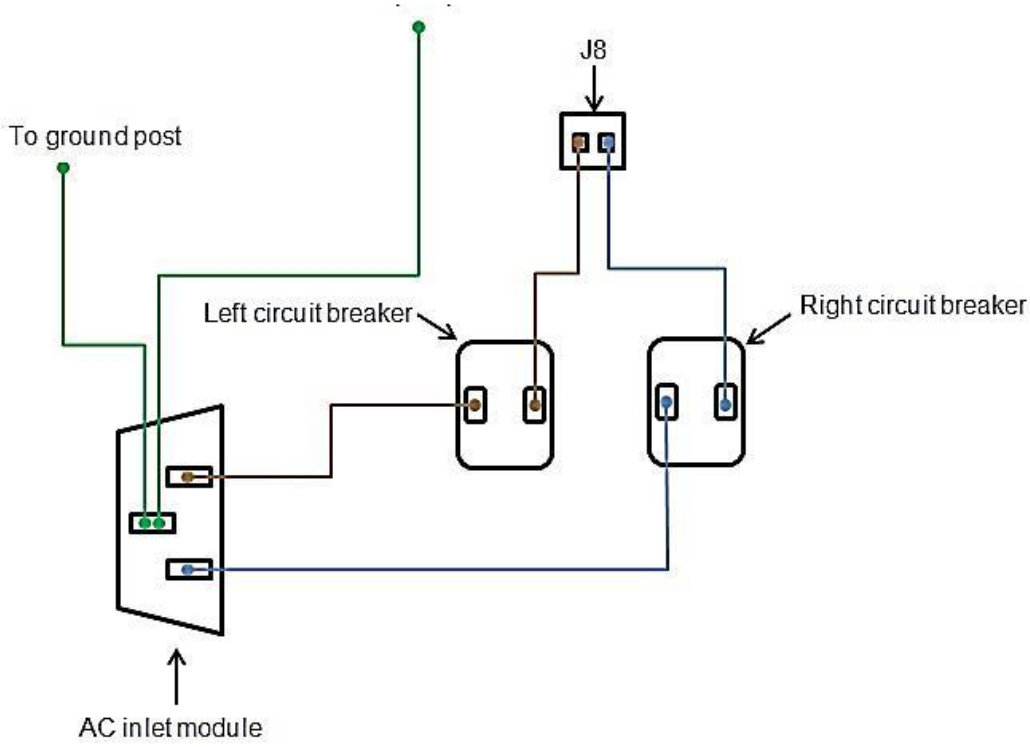
Figure 24

12. Slide the PCB completely out of the key in the back case and set aside.
13. Using needle nose pliers, pull straight up on the fastons connected to the circuit breaker.
14. Turn the back case on its side.
15. Holding the circuit breaker from the inside, unscrew the circuit breaker cover on the outside of the back case.
16. Remove the circuit breaker and dispose of according to local and federal regulations.
17. Put the circuit breaker cover aside.

Installation:

1. Remove the nut from the circuit breaker and discard.
2. With the back case still on its side, insert the new circuit breaker.
3. Holding the circuit breaker from the inside, reinstall the circuit breaker cover to the back of the case.
4. Place the back case on a work surface, facing up.
5. Using needle nose pliers, reconnect the fastons to the circuit breaker. See **Schematic 1** below for placement.

View: looking down into the back case



Schematic 1

6. Insert the PCB into the key in the back case.
7. Attach the large silicone tube from the air outlet to the muffler.
8. Attach the small silicone tube from the muffler to PT1 on the board.
9. Insert the two (2) connectors to the control board connector at J8 and J9.
10. Zip tie the wires. See **Figure 25** for placement reference.

Important! Wires must be constrained in accordance with the placement specified below for safety reasons.

A) Pump wires: blue, white and black
B) AC inlet module wires: blue, brown and green/yellow
C) Pump and circuit breaker wires: blue, white and black (pump) with blue (right circuit breaker) and brown (left circuit breaker)
D) Circuit breaker wires: blue (left and right) with brown (right side of left circuit breaker)

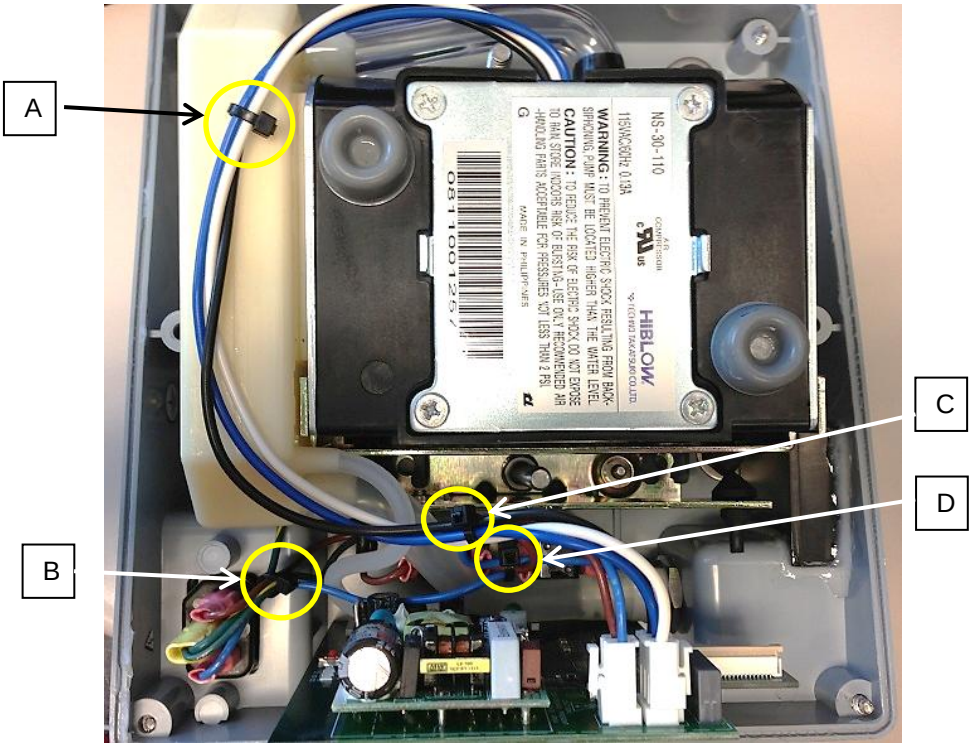


Figure 25

Krytox® Application:

Refer to page 48 for Krytox® application instructions.

Case Closure:

Refer to page 49 for case closure instructions.

Functionality Test:

Refer to page 50 for functionality test procedures.

Power Inlet Replacement

Tools Required:

- Power Inlet (2861-001-008)
- #2 Phillips Screwdriver
- Torx Screwdriver T10
- Torque Screwdriver
- Wire Cutters
- Needle Nose Pliers
- ESD System (Static Strap)

Removal:

1. Unplug the power cord from the power inlet and remove the air hose from the controller, if attached, and set aside.
2. Set the controller on a work surface.
3. With the controller sitting upright and facing away from you, use a #2 Phillips screwdriver to remove the six screws and O-rings securing the front cover to the back cover. See **Figure 26**.

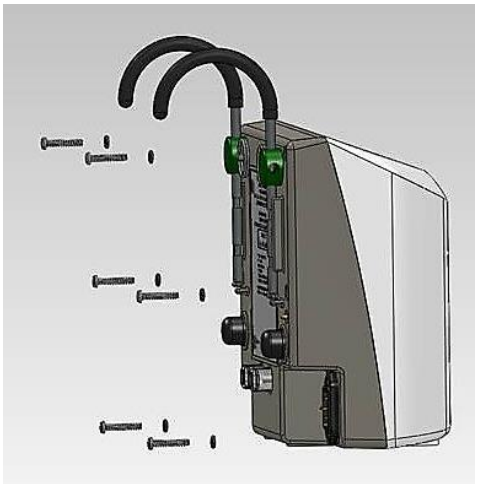


Figure 26

4. Hold the front and back cases together and tip the controller backwards to remove the screws and O-rings and set them aside.
5. With the controller upright and facing away from you, turn it counterclockwise 90^{o} and slightly separate the front and back cases. See **Figure 27**.

Figure 27

6. Once separated, use a small slotted screwdriver to unlock both sides of the membrane ribbon cable connector at J10 and remove the ribbon cable from the connector. See **Figure 28**.

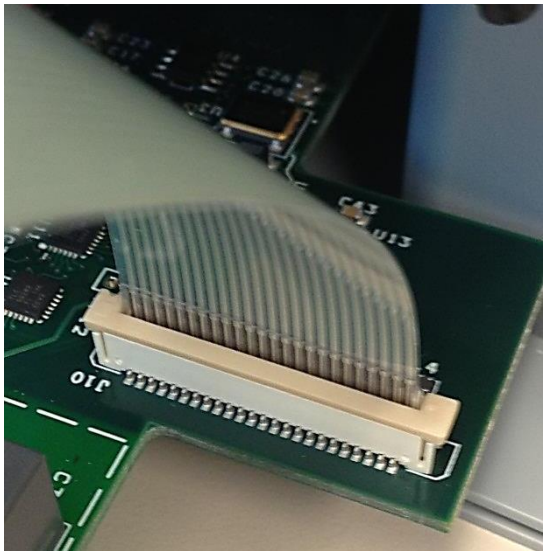


Figure 28

7. Using wire cutters, carefully clip the four (4) zip ties that hold the wires together.
8. Unplug the two (2) connectors from the control board connector at J8 and J9.
9. Partially remove the PCB from the key in the back case.
10. Remove the small silicone hose from the pressure transducer on the board at PT1.
11. Slide the PCB completely out of the key in the back case and set aside.
12. Using needle nose pliers, pull straight up on the three (3) fastons connected to the power inlet.

13. Lay the back case with the back facing up toward you.
14. With a Torx T10 screwdriver, remove the two (2) screws holding the power inlet in place and set the screws aside.
15. Remove the power inlet and discard.
16. Remove the two (2) rubber gaskets and discard.

Installation:

1. Insert the two (2) new rubber gaskets over the new power inlet.
2. With the back case still lying flat, insert the power inlet with gaskets into the appropriate slot in the back case.

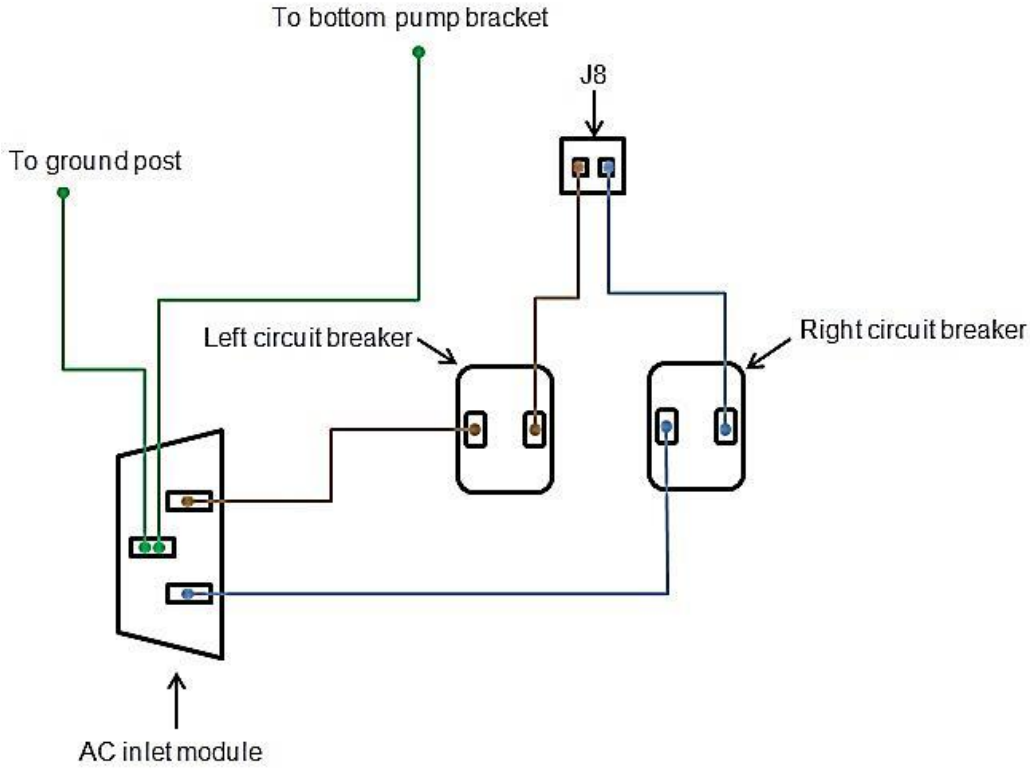
Important! Ensure the power inlet is inserted in the correct orientation as shown in **Figure 29** below.

Figure 29

3. Using a torque screwdriver, use the previously removed two (2) screws and torque them down to 4 in-lbf being careful not to over torque them.
4. Place the back case on a work surface, facing up.

5. Using needle nose pliers, reconnect the fastons to the circuit breaker. See **Schematic 2** below for placement.

View: looking down into the back case



Schematic 2

6. Insert the PCB into the key in the back case.
7. Attach the small silicone tube from the muffler to PT1 on the board.
8. Insert the two (2) connectors to the control board connector at J8 and J9.
9. Zip tie the wires. See **Figure 30** for placement reference.

Important! Wires must be constrained in accordance with the placement specified below for safety reasons.

A) Pump wires: blue, white and black

B) AC inlet module wires: blue, brown and green/yellow

C) Pump and circuit breaker wires: blue, white and black (pump) with blue (right circuit breaker) and brown (left circuit breaker)

D) Circuit breaker wires: blue (left and right) with brown (right side of left circuit breaker)

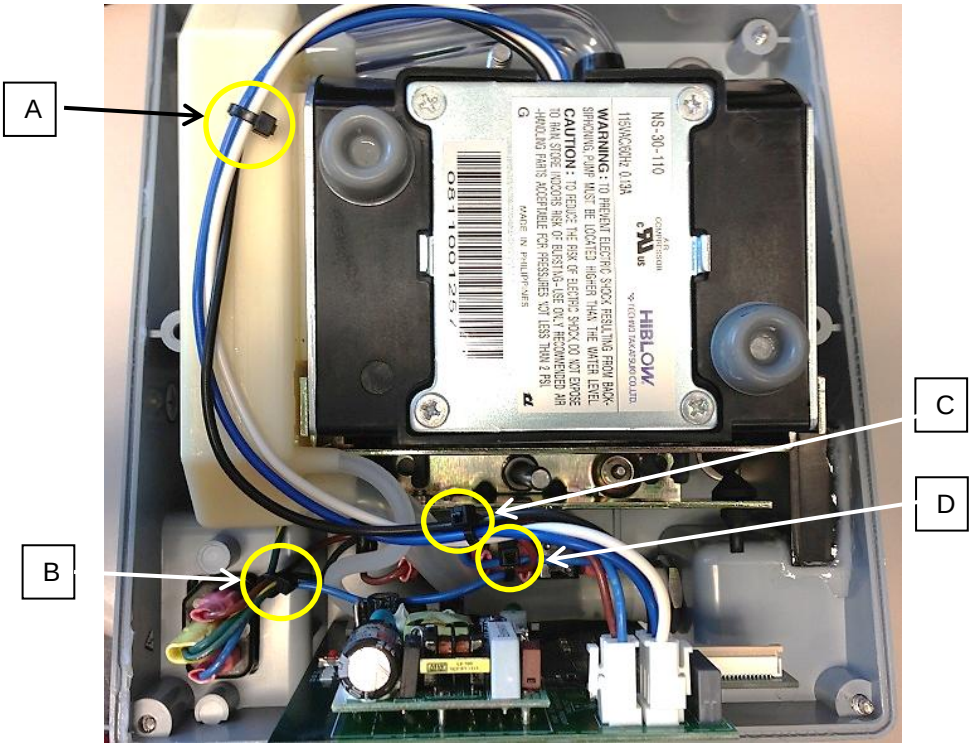


Figure 30

Krytox® Application:

Refer to page 48 for Krytox® application instructions.

Case Closure:

Refer to page 49 for case closure instructions.

Functionality Test:

Refer to page 50 for functionality test procedures.

Bumper Replacement

Tools Required:

- Bumper (2861-001-012)
- #2 Phillips Screwdriver
- Wire Cutters
- Modified nutdriver bit (2861-001-020)
- Torque Screwdriver
- Loctite 242 thread locker
- ESD System (Static Strap)

Removal:

1. Unplug the power cord from the power inlet and remove the air hose from the controller, if attached, and set aside.
2. Set the controller on a work surface.
3. With the controller sitting upright and facing away from you, use a #2 Phillips screwdriver to remove the six screws and O-rings securing the front cover to the back cover. See **Figure 31**.

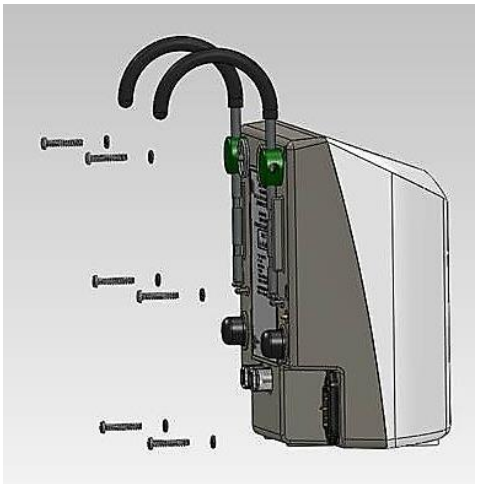


Figure 31

4. Hold the front and back cases together and tip the controller backwards to remove the screws and O-rings and set them aside.
5. With the controller upright and facing away from you, turn it counterclockwise 90^{o} and slightly separate the front and back cases. See **Figure 32**.

Figure 32

6. Once separated, use a small slotted screwdriver to unlock both sides of the membrane ribbon cable connector at J10 and remove the ribbon cable from the connector. See **Figure 33**.

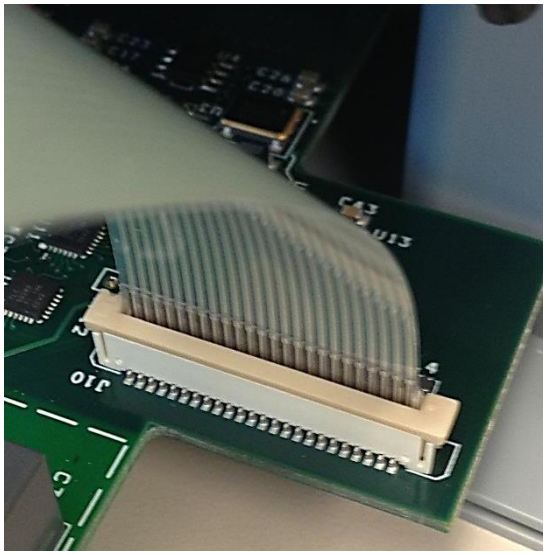


Figure 33

7. Using wire cutters, carefully clip the four (4) zip ties that hold the wires together.
8. Unplug the two (2) connectors from the control board connector at J8 and J9.
9. Partially remove the PCB from the key in the back case.
10. Remove the small silicone hose from the pressure transducer on the board at PT1.
11. Slide the PCB completely out of the key in the back case and set aside.
12. Using the torque screwdriver and modified nutdriver bit remove the nut from the inside of the back case and set aside.

See **Figure 34** for reference.

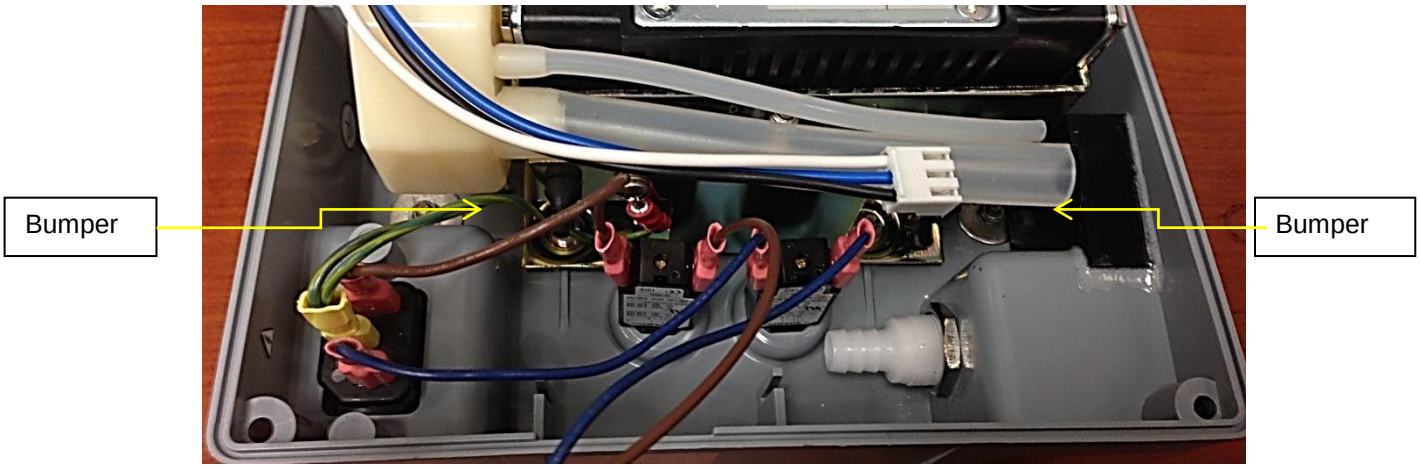


Figure 34

13. Remove the fender washer and set aside.
14. From the other side of the back case, unscrew the bumper, remove the bumper and neoprene washer and discard.

Installation:

1. Apply Loctite 242 thread locker to the new bumper screw threads.
2. Insert the neoprene washer and bumper into the hole in the back case.
3. From the inside of the back case, install fender washer and nut over the threads of the bumper and torque to 8.5 in-lbf being careful not to over torque.
4. Place the back case on a work surface, facing up.
5. Insert the PCB into the key in the back case.
6. Attach the small silicone tube from the muffler to PT1 on the board.
7. Insert the two (2) connectors to the control board connector at J8 and J9.
8. Zip tie the wires. See **Figure 35** for placement reference.

Important! Wires must be constrained in accordance with the placement specified below for safety reasons.

A) Pump wires: blue, white and black
B) AC inlet module wires: blue, brown and green/yellow
C) Pump and circuit breaker wires: blue, white and black (pump) with blue (right circuit breaker) and brown (left circuit breaker)
D) Circuit breaker wires: blue (left and right) with brown (right side of left circuit breaker)

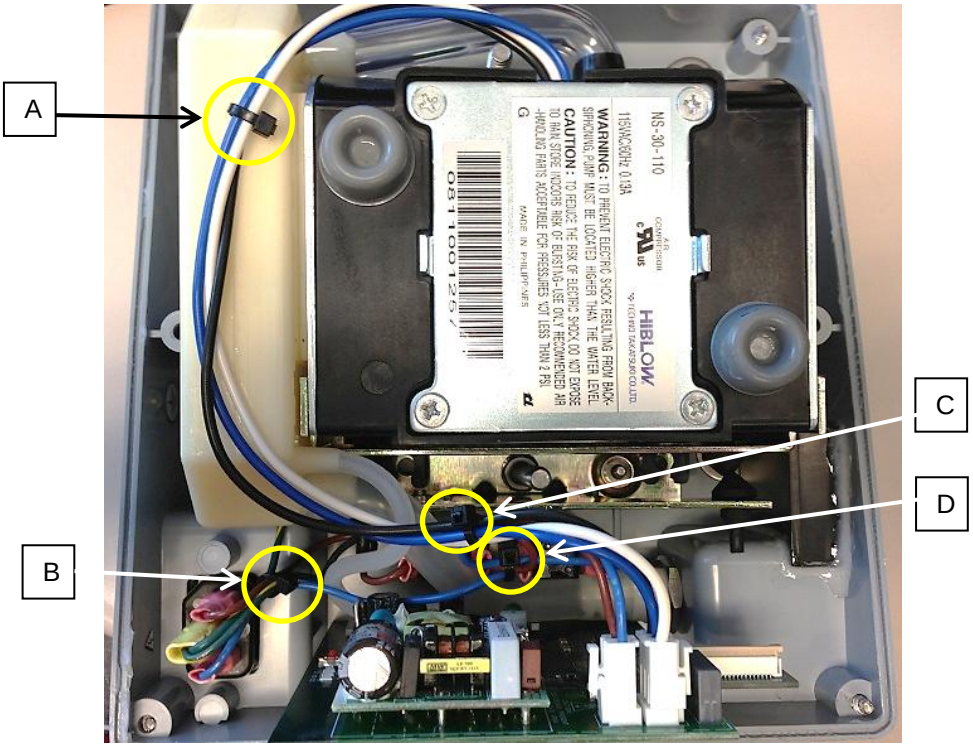


Figure 35

Krytox® Application:

Refer to page 48 for Krytox® application instructions.

Case Closure:

Refer to page 49 for case closure instructions.

Functionality Test:

Refer to page 50 for functionality test procedures.

Quick Disconnect Replacement

Tools Required:

- Quick Disconnect Kit (2861-001-013)
- #2 Phillips Screwdriver
- Wrench, 21 mm.
- Small Slotted Screwdriver
- Torque Screwdriver
- ESD System (Static Strap)

Removal:

1. Unplug the power cord from the power inlet and remove the air hose from the controller, if attached, and set aside.
2. Set the controller on a work surface.
3. With the controller sitting upright and facing away from you, use a #2 Phillips screwdriver to remove the six screws and O-rings securing the front cover to the back cover. See **Figure 36**.

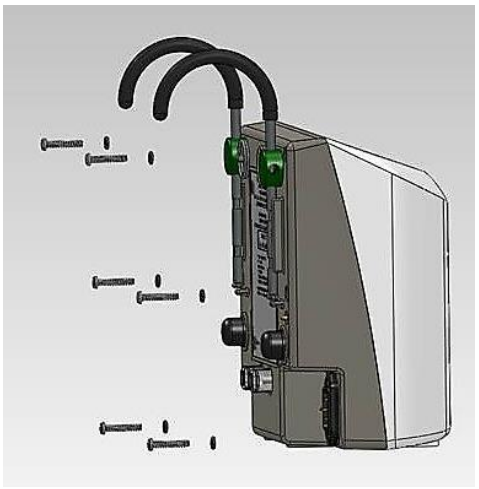


Figure 36

4. Hold the front and back cases together and tip the controller backwards to remove the screws and O-rings and set them aside.
5. With the controller upright and facing away from you, turn it counterclockwise 90^{o} and slightly separate the front and back cases. See **Figure 37**.

Figure 37

6. Once separated, use a small slotted screwdriver to unlock both sides of the membrane ribbon cable connector at J10 and remove the ribbon cable from the connector. See **Figure 38**.

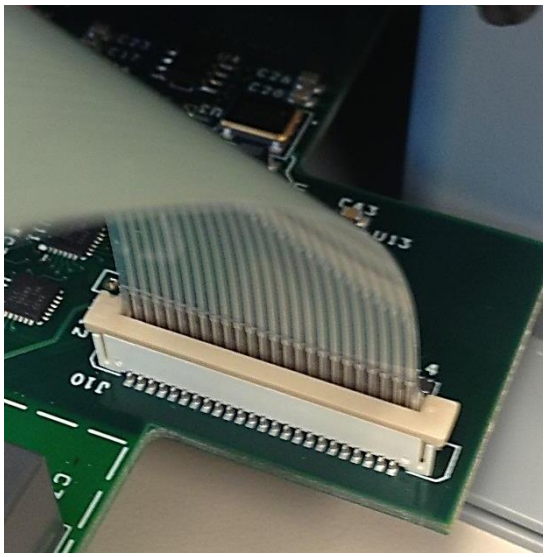


Figure 38

7. Disconnect hose from the back of the Quick-Disconnect. See **Figure 39**.
8. Remove Retaining Washer using 21 mm Wrench.
9. Remove Quick-Disconnect.

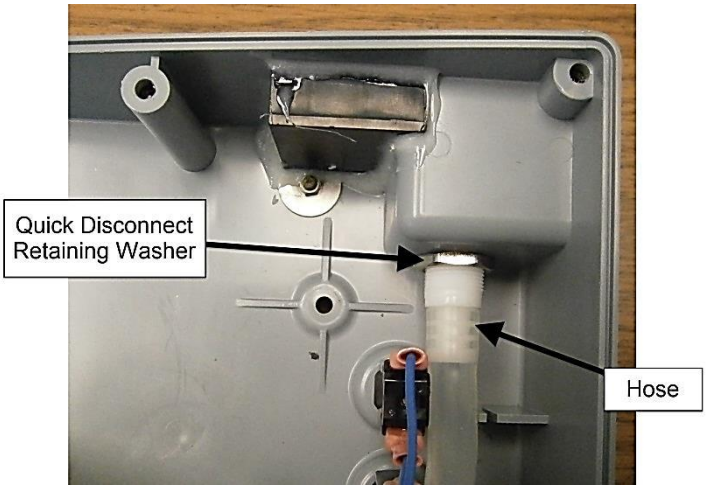


Figure 39

Installation:

1. Insert replacement Quick-Disconnect as shown in **Figure 40**.

Figure 40

2. Ensure that Quick-Disconnect release tab is oriented as shown in **Figure 41**.

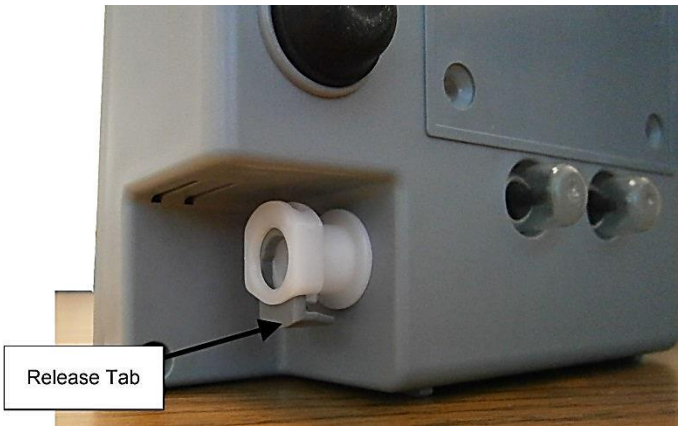


Figure 41

3. Replace washer and tighten securely while holding the external end of the Quick-Disconnect to keep release tab in the correct orientation.
4. Re-connect hose to the back of Quick-Disconnect.

Krytox® Application:

Refer to page 48 for Krytox® application instructions.

Case Closure:

Refer to page 49 for case closure instructions.

Functionality Test:

Refer to page 50 for functionality test procedures.

Cable Replacement

Tools Required:

- Cable Kit (2861-001-014)
- #2 Phillips Screwdriver
- Wire Cutters
- Needle Nose Pliers
- Nut Driver (11/32”)
- Torque Screwdriver
- ESD System (Static Strap)

Removal:

1. Unplug the power cord from the power inlet and remove the air hose from the controller, if attached, and set aside.
2. Set the controller on a work surface.
3. With the controller sitting upright and facing away from you, use a #2 Phillips screwdriver to remove the six screws and O-rings securing the front cover to the back cover. See **Figure 36**.

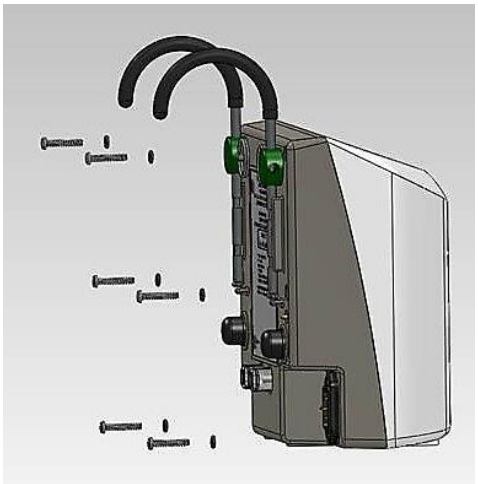


Figure 42

4. Hold the front and back cases together and tip the controller backwards to remove the screws and O-rings and set them aside.
5. With the controller upright and facing away from you, turn it counterclockwise 90^{o} and slightly separate the front and back cases. See **Figure 37**.

Figure 43

6. Once separated, use a small slotted screwdriver to unlock both sides of the membrane ribbon cable connector at J10 and remove the ribbon cable from the connector. See **Figure 38**.

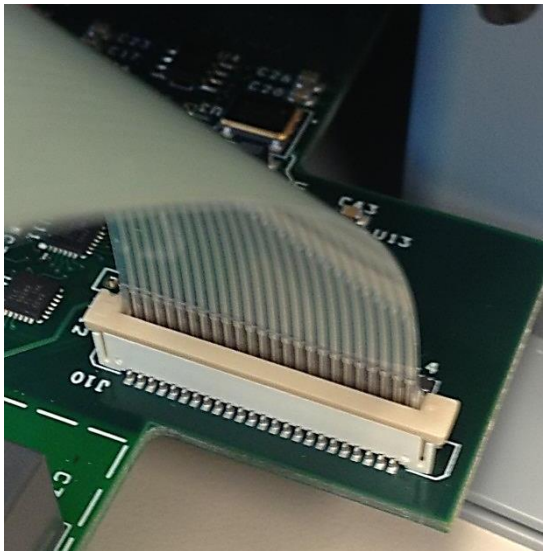


Figure 44

7. Using wire cutters, carefully clip the four (4) zip ties that hold the wires together.
8. Unplug the two (2) connectors from the control board connector at J8 and J9.
9. Partially remove the PCB from the key in the back case.
10. Remove the small silicone hose from the pressure transducer on the board at PT1.
11. Slide the PCB completely out of the key in the back case and set aside.
12. Using needle nose pliers, pull straight up on the fastons connected to the circuit breakers (brown and blue wires) and dispose of wires.

13. Using needle nose pliers, pull straight up on the fastons connected to the power inlet (brown, blue and green/yellow) and dispose of wires.
14. Using a #2 Phillips screwdriver, remove the screw in the pump shelf and put aside. Remove the green/yellow wire. See **Figure 39** below for reference.

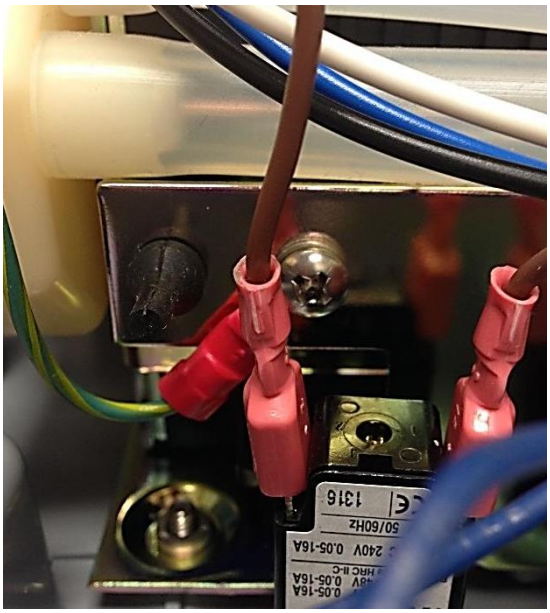


Figure 45

15. Using a 11/32” nutdriver, remove the nut on the ground lug and put aside. Remove the green/yellow wire and dispose of the wire. See **Figure 40** below for reference.

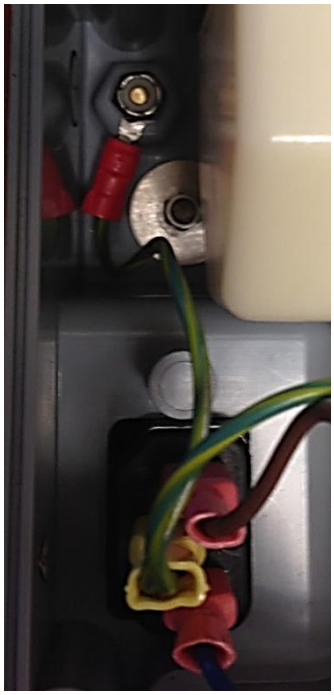
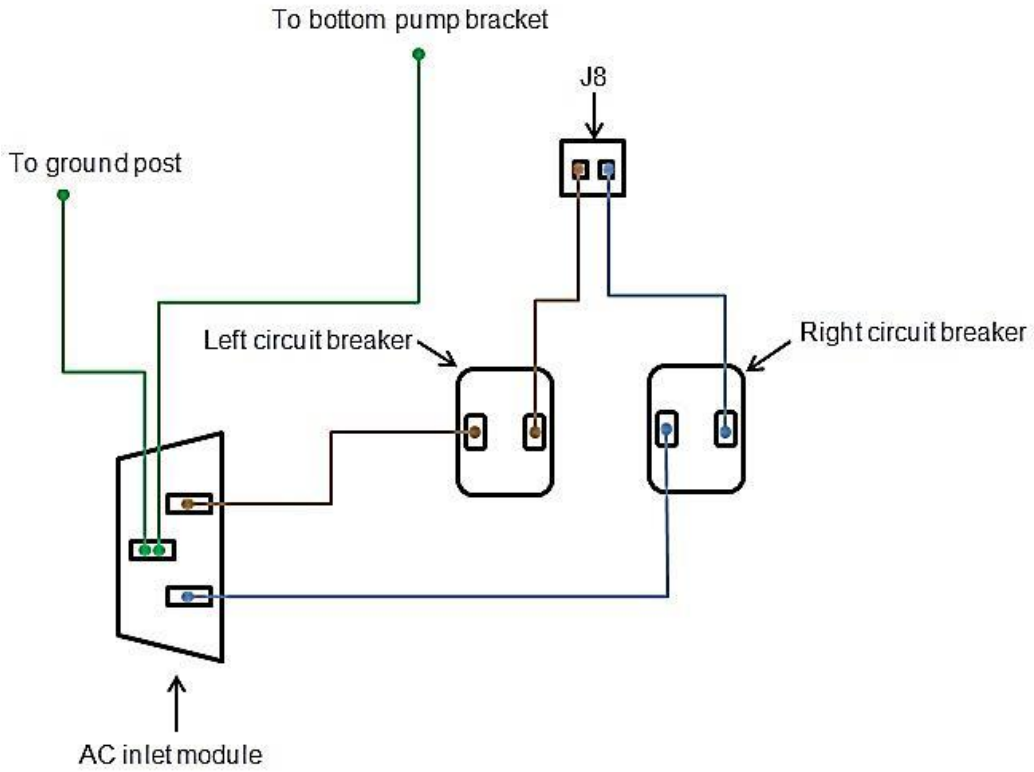


Figure 46

Installation:

1. Place the back case on a work surface, facing up.
2. Using the previously removed screw, install the green/yellow wire to the pump shelf.
3. Using the previously removed nut, install the green/yellow wire to the ground lug and torque to 18 in-lbf being careful not to over torque.
4. Attach the green/yellow wire faston to the middle tab of the power inlet.
5. Attach the brown and blue wires to the circuit breakers and power inlet according to **Schematic 3** below.



Schematic 3

6. Insert the PCB into the key in the back case.
7. Attach the small silicone tube from the muffler to PT1 on the board.
8. Insert the two (2) connectors to the control board connector at J8 and J9.
9. Zip tie the wires. See **Figure 41** for placement reference.

Cable Replacement

Important! Wires must be constrained in accordance with the placement specified below for safety reasons.

A) Pump wires: blue, white and black

B) AC inlet module wires: blue, brown and green/yellow

C) Pump and circuit breaker wires: blue, white and black (pump) with blue (right circuit breaker) and brown (left circuit breaker)

D) Circuit breaker wires: blue (left and right) with brown (right side of left circuit breaker)

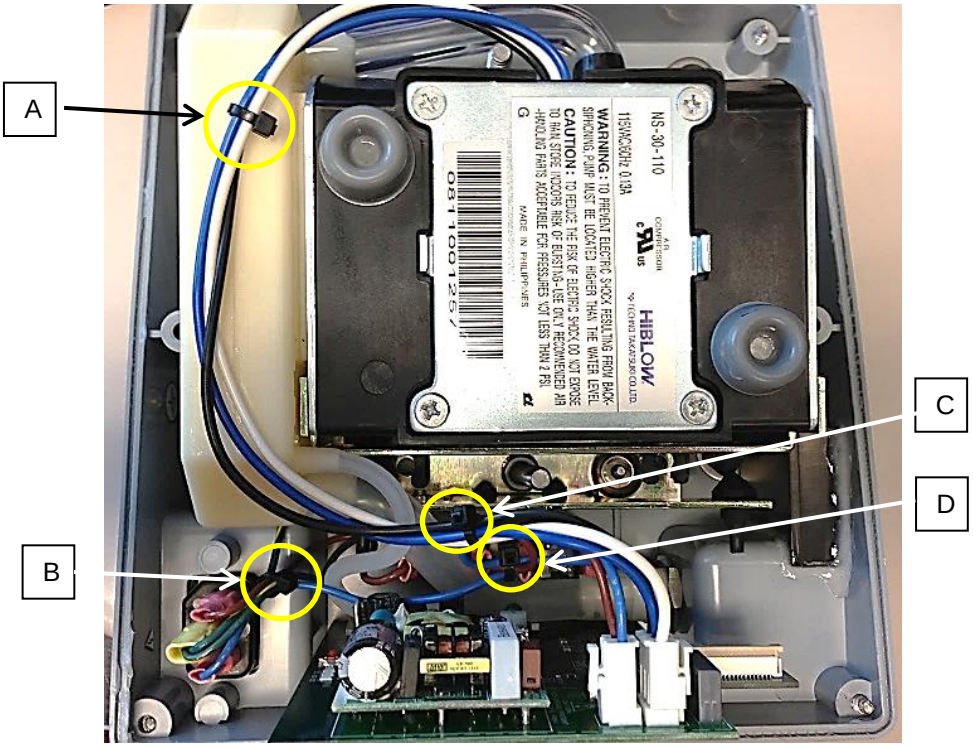


Figure 47

Krytox® Application:

Refer to page 48 for Krytox® application instructions.

Case Closure:

Refer to page 49 for case closure instructions.

Functionality Test:

Refer to page 50 for functionality test procedures.

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Krytox® Application

Tools Required:

- DuPont™ Krytox® Grease (2861-001-016)
- Gloves

1. Apply Krytox® to the groove of the back case ensuring that there are no spaces. See **Figure 42** and **Figure 43** for reference.
2. Remove any excess Krytox® from the inside of the back case.

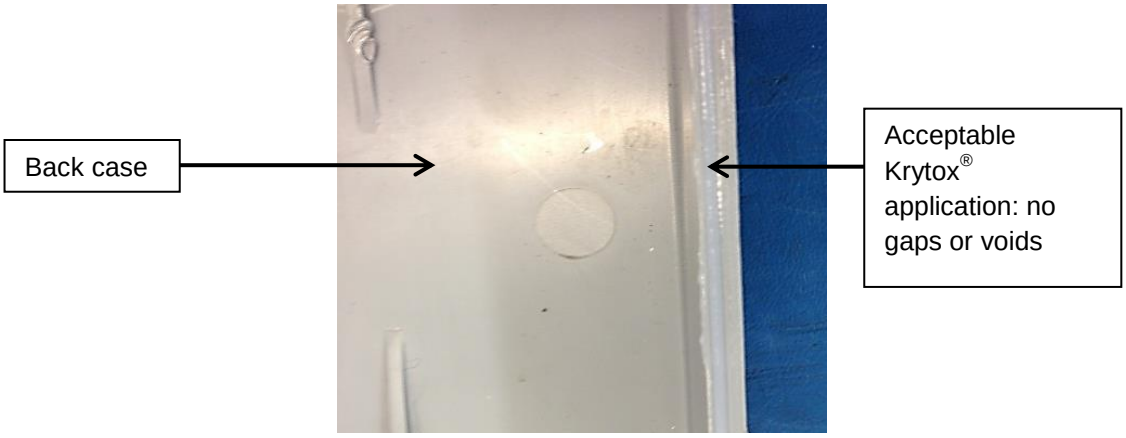

Figure 48

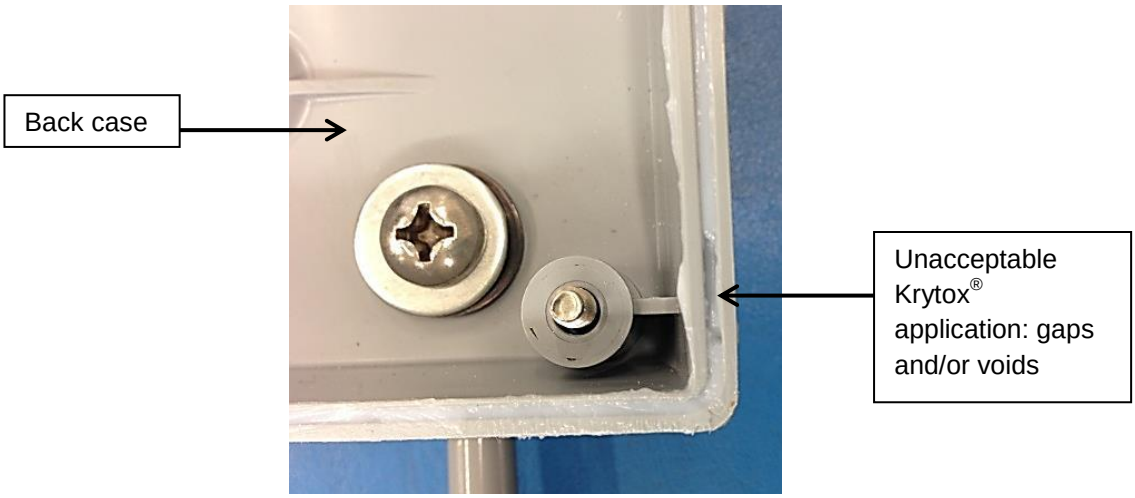

Figure 49

Case Closure

Tools Required:

- #2 Phillips Screwdriver
- Torque Screwdriver with #2 Phillips bit
- Simple Green® or comparable degreaser

1. Line up the front and back cases with the controller facing toward you.
2. With the right side slightly ajar, insert the membrane ribbon cable into the connector on the PCB board at J10.
3. Press down both sides of the connector to lock the membrane ribbon cable in place.
4. Slide the PCB into the key of the front cover and press the front and back case together.
5. Place the controller face down with the back case facing up toward you.
6. Reinstall the 6 screws with O-rings, using a #2 Phillips screwdriver, previously removed to secure the front case to the back case. DO NOT TIGHTEN.
7. Using a torque screwdriver, torque down the 6 screws to 8.5 in-lbf being careful not to over torque them.
8. Wipe down the seam of the controller with Simple Green®, or comparable degreaser, to remove any excess Krytox®.

Functionality Test

Follow final test procedure to verify proper functionality prior to returning it to service.

Equipment List

- Pressure Meter (Extech HD700 Differential Pressure Manometer or equivalent)
- Stopwatch
- Power Strip with Switch
- SPR Mattress
- IsoFlex Mattress
- 3/8 x 3/8 x 1/8 'T' Fitting
- 6"of PVC tubing (5/16" ID x 1/2" OD) x 2
- 1' of PVC tubing (1/8" ID x 1/4" OD)

Test Procedure

Step 1 Hanger Inspection

- Inspect hangers to ensure each can be locked in all three height adjustment positions.
- Acceptance Criteria: Locking pin engages on all three positions of both hangers.

Step 2 System Initialization

- Connect power strip to appropriate voltage AC source for controller being tested.
- Switch power strip off.
- Connect unit to power strip
- Switch power strip on.
- Acceptance Criteria: All LEDs illuminate for 1 second and unit powers up (unit will power up in previous operating mode).

Step 3 Calibration

- **Acceptance Criteria:** Alarm does not sound after unit power-up.

Step 4 ON/OFF Switch

- Press the Power Button.
- Acceptance Criteria: Blue LED is illuminated (under power button).
- Press the Power Button.
- Acceptance Criteria: The button is tactile and the white LED is illuminated (under power button).

Step 5 Button Test

- Press the Mode button repeatedly.
- **Acceptance Criteria:** Button is tactile and toggles between IsoFlex and SPR mode.
- Press the Lock button twice.
- **Acceptance Criteria:** Button is tactile and Lock toggles ON and OFF
- Set to SPR mode.
- Press the mmHg button, and note that pressure indicator on the membrane panel switches to the next value with each repeated press (18, 21, 24, 27, 30).
- Acceptance Criteria: Button is tactile and increases pressure setting to the maximum then sequences to the lowest value.

Step 6 SPR+ Pressure Test

- Connect the 'T' fitting to the three PVC hoses, the pressure meter, controller air output and CPR hose as seen in **Figure 44** below.

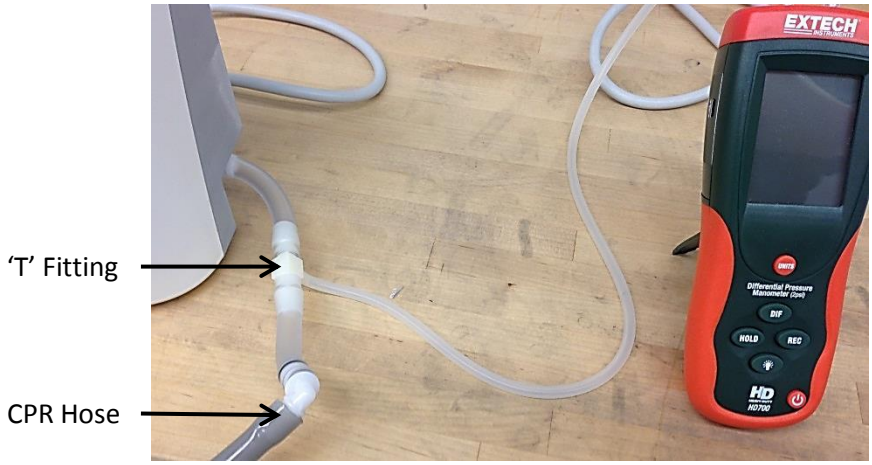

Figure 50

- Connect the CPR hose to the SPR mattress.
- Set controller pressure level to 30 mmHg.
- Measure pressure.
- **Acceptance Criteria:** Pressure reading is in the range of 28 to 32 mmHg.

Step 7 IsoFlex Flow Test

- Connect the 'T' fitting to the three PVC hoses, the pressure meter, controller air output and CPR hose as seen in **Figure 28** above.
- Connect the CPR hose to the IsoFlex mattress.
- Toggle mode to IsoFlex.
- Measure pressure.
- **Acceptance Criteria:** Pressure reading is greater than 20 mmHg.

Step 8 High Pressure Regulation Test

- Manually block air outlet to simulate a kinked hose (High Pressure)
- Measure pressure after it stabilizes.
- **Acceptance Criteria:** Pressure regulates to 48 to 52 mmHg.

Step 9 High Pressure Alarm Test

- Wait for alarm (approximately 30 seconds).
- **Acceptance Criteria:** System alarms.
- Allow air to flow normally.
- **Acceptance Criteria:** Alarm is disabled (approximately 5 seconds).

Step 10 Power Failure Test

- Set unit to SPR mode, with 30 mmHg selected.
- Cycle power on power strip to simulate a power failure.
- **Acceptance Criteria:** Systems recalls mode and firmness setting after power returns.

Step 11 Electrical Safety Testing

- Electrical safety test unit according to the table below:

TEST	ACCEPTANCE CRITERIA
GROUND IMPEDENCE	≤ 0.10 Ω
CURRENT LEAKAGE	≤ 0.50 mA
INSULATION WITHSTAND	≥ 1.488kVac
FUNCTIONAL	0.05A - 0.40A

Product Compliance Declarations

GUIDANCE AND MANUFACTURER'S DECLARATION – ELECTROMAGNETIC EMISSIONS

Guidance and Manufacturer's Declaration – Electromagnetic Emissions		
The Pump is intended for use in the electromagnetic environment specified below. The customer or the user of the Pump should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment – guidance**
RF emissions CISPR 11	Group 1	The Pump uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The Pump is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Complies	

GUIDANCE AND MANUFACTURER'S DECLARATION – ELECTROMAGNETIC IMMUNITY

Guidance and Manufacturer's Declaration – Electromagnetic Immunity			
The Pump is intended for use in the electromagnetic environment specified below. The customer or the user of the Pump should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment – guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines Not Applicable	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±1 kV line(s) to line(s) ±2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % *UT* (>95 % dip in *UT*) for 0,5 cycle 40 % *UT* (60 % dip in *UT*) for 5 cycles 70 % *UT* (30 % dip in *UT*) for 25 cycles <5 % *UT* (>95 % dip in *UT*) for 5 sec	<5 % *UT* (>95 % dip in *UT*) for 0,5 cycle 40 % *UT* (60 % dip in *UT*) for 5 cycles 70 % *UT* (30 % dip in *UT*) for 25 cycles <5 % *UT* (>95 % dip in *UT*) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Pump requires continued operation during power mains interruptions, it is recommended that the Pump be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A / m	3 A / m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE! *UT* is the a.c. mains voltage prior to application of the test level.			

GUIDANCE AND MANUFACTURER'S DECLARATION – ELECTROMAGNETIC IMMUNITY - NON LIFE SUPPORTING

Guidance and Manufacturer's Declaration – Electromagnetic Immunity			
The Pump is intended for use in the electromagnetic environment specified below. The customer or the user of the Pump should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment – guidance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the Stryker Pump , including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m	**Recommended separation distance** $d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ 800 MHz to 2,5 GHz Where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range. [b] Interference may occur in the vicinity of equipment marked with the following symbol: 
NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Pump is used exceeds the applicable RF compliance level above, the Pump should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Pump. [b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

GUIDANCE AND MANUFACTURER'S DECLARATION – RECOMMENDED SEPARATION DISTANCES

Recommended Separation Distances Between Portable And Mobile RF Communications Equipment And The Pump

The Pump is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Pump can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Pump as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	**Separation distance according to frequency of transmitter** M		
	150 kHz to 80 MHz	**80 MHz to 800 MHz**	**800 MHz to 2,5 GHz**
	$d = 1.2\sqrt{P}$	$d = 1.2\sqrt{P}$	$d = 2.3\sqrt{P}$
0,01	0.12	0.12	0.23
0,1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Warranty

LIMITED WARRANTY

The Stryker Air™ Pump has a warranty of THREE (3) YEARS under normal use, conditions, and with appropriate periodic maintenance as described in this manual. The Stryker Air™ Pump has an expected service life of FIVE (5) YEARS.

This statement constitutes Stryker's entire warranty with respect to the aforesaid equipment. Stryker makes no other warranty or representation, either expressed or implied, except as set forth herein. There is no warranty of merchantability and there are no warranties of fitness for any particular purpose. In no event shall Stryker be liable here under for incidental or consequential damages arising from or in any manner related to sales or use of any such equipment.

CONDITIONS AND LIMITATIONS

This statement constitutes Stryker's entire warranty with respect to the aforesaid equipment. Stryker makes no other warranty or representation, either expressed or implied, except as set forth herein. There is no warranty of merchantability and there are no warranties of fitness for any particular purpose. This warranty does not extend to, nor cover:

- Normal wear and tear; or
- Damage or product failure due to causes beyond Stryker's control such as, but not limited to abuse, theft, fire, flood, wind, lightning, freezing, clogging of support surface pores due to tobacco smoke, unusual atmosphere conditions, material degradation due to exposure to moisture; or
- Damage to support surface or support surface handles through the use of the support surface for patient transfer or transport.

Normal use is defined as normal hospital or facility usage. Damages arising from abnormal use such as those caused by needle punctures, burns, chemicals, negligent use or improper care or improper cleaning or staining resulting from it are exempt from warranty coverage.

TO OBTAIN PARTS AND SERVICE

Stryker products are supported by a nationwide network of dedicated Stryker Field Service Representatives. These representatives are factory trained, available locally, and carry a substantial spare parts inventory to minimize repair time. Simply call your local representative or call Stryker Customer Service USA at (800) 327-0770 or (269) 324-6500.

RETURN AUTHORIZATION

Merchandise cannot be returned without approval from the Stryker Customer Service Department. An authorization number will be provided which must be printed on the returned merchandise. Stryker reserves the right to charge shipping and restocking fees on returned items. Special, modified, or discontinued items not subject to return.

DAMAGED MERCHANDISE

ICC Regulations require that claims for damaged merchandise must be made with the carrier within fifteen (15) days of receipt of merchandise. Do not accept damaged shipments unless such damage is noted on the delivery receipt at the time of receipt. Upon prompt notification, Stryker will file a freight claim with the appropriate carrier for damages incurred. Claim will be limited in amount to the actual replacement cost. In the event that this information is not received by Stryker within the fifteen (15) day period following the delivery of the merchandise, or the damage was not noted on the delivery receipt at the time of receipt, the customer will be responsible for payment of the original invoice in full. Claims for any short shipment must be made within thirty (30) days of invoice.

Notes

Distributed By:
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