LECTRA/SAN® MC™

Installation and Maintenance Instructions

THE FOLLOWING ARE CAUTIONARY STATEMENTS THAT MUST BE READ AND FOLLOWED DURING BOTH INSTALLATION AND OPERATION

WARNING: *Raritan Engineering Company, Inc. recommends that a qualified person or electrician install this product. Equipment damage, injury to personnel or death could result from improper installation. Raritan Engineering Company, Inc. accepts no responsibility or liability for damage to equipment, or injury or death to personnel that may result from improper installation or operation of this product.*

WARNING: HAZARD OF SHOCK AND FIRE - Always use recommended fuse/circuit breaker and wire size.

WARNING: HAZARD OF FLOODING - Always shut off seacocks before leaving boat unattended. Double clamp all hose fittings below the waterline, check hose clamps frequently for integrity.

WARNING: *The Lectra/San MC operates on an Electrochemical principle. Introduction of any substance other than salt water, human waste, Raritan concentrate or toilet tissue may cause heat build up and extensive damage. If any other substance is introduced by accident, the Lectra/SanMC must not be turned on until entire system is flushed out with water.*

INTRODUCTION

The Lectra/San® MC (LST/MC™) is a U. S. Coast Guard Certified Type I Marine Sanitation Device for inspected and uninspected vessels less than 65 feet in length. The LST/MC is designed and approved to treat waste for overboard discharge in areas that are not declared a No Discharge Zone by the U.S. Environmental Protection Agency (EPA). LST/MC accommodates most marine toilets including the VacuFlush® marine toilet manufactured by Sealand Technology, Inc., (See Application note L286) and can be used with one or in some cases two toilets. The Lectra/San MC is available in 12, 24 or 32 V DC. The total system is made up of two basic parts, the Control Indicator Panel and the Treatment Tank. A salt feed system (optional) must be utilized if operating in fresh or brackish water.

The Control Indicator Panel - Begins the treatment cycle and can also be connected to flush an electric toilet at the same time.

Dimensions: 4 1/2" (11.4 cm) Height x 2 3/4" (7 cm) Width x 1" (2.5 cm) Depth.

The Treatment Tank - Consists of two chambers and an electrode pack that temporarily converts salt water into a powerful bactericide for the duration of the treatment cycle. The top of the tank contains the control module and its protective cover.

Dimensions: 13 1/2" (34.3 cm) Height x 16" (40.6 cm) Width x 9 3/4" (24.8 cm) Depth.

Additional parts included: 1 1/2" hose adapters (2), 1 1/2" NPT Intake Plug, 90° 1 1/2" slip PVC fitting, control indicator panel cable, Owners manual, warranty information, Operation Instruction Wall Placard, template for Control Panel and U.S.C.G. Type I Equipped label.

Salt Feed Systems - A salt feed system is not required for ocean water use as the salinity of the ocean water is sufficient to operate the system as designed. A salt feed system must be utilized if operating in fresh water, pressurized fresh water or brackish water. Low salt is indicated by the control panel and requires addition of salt using one of the following methods:

Two Gallon (7.6 liters) Salt Feed Tank (optional - Part #31-3001) - A salt solution is mixed and placed in the salt feed tank. Every time the toilet is used a portion of the salt solution is mixed with incoming water to provide seawater salinity. This system can be used with all Lectra/San models. One system is needed per toilet.

Four Gallon (15.2 liters) Salt Feed Tank (optional Part #31-3002) - The four gallon (15.2 liters) salt feed tank must be connected to pressurized fresh water. Simply add solar salt to the tank and the water

level is maintained automatically. Every time the toilet is used a portion of the salt solution is mixed with the incoming water to provide ocean water salinity. This system can be used with all Lectra/San models. One system is needed per toilet.

Four Gallon (15.2 liters) Salt Feed Tank with Pump (optional - Part #32-3003 12Volt and #33-3003 24 Volt - for 32V applications contact Raritan

Two Gallon Salt Feed Dimensions
9" (22.9cm) square
7 1/2" (19.1cm) High

Four Gallon Salt Feed Dimensions
9 7/8" (25 cm) square
1 1/2" (3.8cm)
Overflow Fitting
13 1/2" (34.3 cm) high
Pressure Water Connection
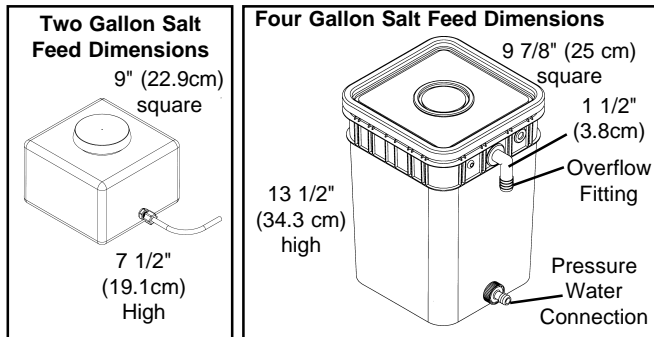
Technical Support) - The four gallon (15.2 liters) salt feed tank must be connected to pressurized fresh water. Simply add solar salt to the tank and the water level is maintained automatically. A salt feed pump is used to pump salt water directly into the LST/MC when needed. The pump is controlled by the MC Circuit Board which monitors the electrode current in the LST/MC Treatment Tank and automatically turns on the pump when salt is low. This system can only be used with the LST/MC. One system is needed per Lectra/San.

Manual Salt Addition - Every time the toilet is used dry table salt can be added through the toilet bowl. The amount of salt can be adjusted until the control panel does not show any extended treatment light blinking (one blink per second) on the Control Panel of the LST/MC. This method can be used with all Lectra/San models. For brackish water add one to two ounces (28 - 56 grams) of salt. For fresh water you will have to add four ounces (112 grams) of salt per gallon (3.8 liters) of water flushed. If toilet uses a half gallon (1.9 liters) of water per flush, add two ounces (56 grams) of salt every time toilet is flushed.

OPERATION

Integral Activation (touch pad activates toilet and treatment cycle): Press the "PUSH TO FLUSH" touch pad as often as necessary until the Normal Treatment light begins to blink. The control prevents the toilet from flushing after treatment cycle begins.

Independent Activation (manual or electric toilet on independent circuit): Activate LST by pressing "PUSH TO FLUSH", then flush the toilet as necessary until Normal Treatment light begins to blink.

NOTE: Total flush volume of the toilet should not exceed 1.5 gallons (5.7 liters) per flush per treatment.

TREATMENT CYCLE
(How it Works and What it Does)

Flushing action of the marine toilet discharges treated waste overboard and waste water into the first chamber of the Treatment Tank. Waste is macerated and treated. Proprietary electrode plates are electrically energized to temporarily convert salt water into a strong bactericide (hypochlorous acid) on both sides of the Treatment Tank. This solution treats waste, **destroying bacteria and viruses** and then reverts back to the original state of salt and water.

A mixer is located in the second chamber to prevent sludge from accumulating and to ensure uniform treatment of its contents.

When the discharge enters the water it is completely treated and no harmful elements are added to the environment.

If the unit senses a low amp draw due to low salt or low voltage it will automatically extend the treatment cycle for a total time of up to four minutes to allow for the same high treatment standard.

MAINTENANCE

Periodically inspect for leaks and check for loose plumbing and electrical connections.

TREATMENT TANK/ELECTRODE CLEANING

Completely read all instructions before beginning the procedure.

1. Activate the LST/MC and flush toilet (repeat this several times to flush out the treatment tank). Allow a few minutes between cycles to avoid overheating the motors.

NOTE: If your toilet is designed to flush without bringing additional water in, skip step #2 (refer to toilet manufacturers instructions).

2. Shut off water supply. Disconnect or remove inlet pump to prevent impeller from running dry.

3. Flush toilet as dry as possible.

4. Turn off power and disconnect wires to LST/MC.

WARNING: Lectra/San must not be activated while the muriatic acid solution is in the system. Before using acid, observe safe handling instructions on container.

5. Using a plastic bucket combine one pint (.5 liter) of muriatic acid with two gallons (7.6 liters) of fresh water. It will take about three gallons (11.4 liters) of this solution to fill the treatment unit.

6. Pour solution into the toilet and flush the toilet so solution is forced into the treatment unit.

7. Pour an additional gallon (3.8 liters) of fresh water into the toilet bowl to dilute the remaining acid. Let stand for 45 minutes before flushing toilet.

8. Connect inlet pump if needed see Step #2. Turn on water supply. Allow a few minutes between flushes to avoid overheating toilet motors. Flush toilet at least 15 times (minimum of ten gallons [37.9 liters] rinse water) to effectively dilute and discharge muriatic acid solution.

NOTE: If using brackish or fresh water for flushing, add two to four ounces (56 to 112 grams) of salt to each of the last four flushes.

9. Reconnect power wires to LST/MC and then restore the power to LST/MC.

STORAGE

Short Term Storage - If boat is not going to be used for up to one week, activate treatment unit and flush toilet for the complete flush cycle before leaving the boat. Repeat this several times to flush out sediment from the treatment tank. Allow a few minutes between cycles to avoid overheating the motors.

Long Term Storage - If boat is not going to be used for over a week, follow short term storage instructions and purge toilet discharge hoses and LST/MC with fresh water. See Recommissioning and Start up.

WINTERIZATION

WARNING: DO NOT use antifreeze in the Lectra/San MC.

1. Flush toilet and activate LST/MC. Repeat several times to flush out Treatment Tank. Allow a few minutes between cycles to avoid overheating motors.

2. Disconnect power and ensure that it remains off for winter lay-up.

3. Close seacocks.

4. Disconnect and drain hoses.

5. Using a pump, remove water from the Treatment Tank (through quick cap - see exploded parts view on page 10, item 20).

RECOMMISSIONING & START UP

WARNING: Make sure all hoses are connected. LST/MC must not be activated unless filled with salt water.

1. Open seacocks.

NOTE: If using brackish or fresh water for flushing add two to four ounces (56 to 112 grams) of salt to each of the last four flushes.

2. If **toilet is NOT activated by Lectra/San MC:** Flush toilet four or five times, allowing approximately three to four gallons (11.4 to 15.2 liters) of salt water to enter Treatment Tank.

If toilet is activated by Lectra/San MC: Flush toilet four or five times by holding down the "R" touch pad and then press "PUSH TO FLUSH" simultaneously. The center Amber indicator

light will be on and not blinking indicating that only the toilet is being flushed.

If toilet activates Lectra/San MC: Disconnect power to the LST/MC and flush toilet four times. Reconnect the power.

3. System is ready for use.

INSTALLATION

NOTE: Below waterline installations must include a vented loop. Top of loop must be four to six inches (10.2 to 15.2 cm) above the waterline at maximum heel to prevent siphoning. See toilet or vented loop manufacturers instructions for maximum allowable height of loops.

Figures #2 and #3 show some installation options.

MOUNTING

Treatment Tank Location

The Treatment Tank should be within six feet (1.5 m) of the toilet, with the top of the tank located at the same level or lower than the toilet's discharge. If the tank is at the same level, or slightly above the toilet, a vented loop must be installed between the toilet and the Treatment Tank (see Fig. #2). If the Treatment Tank must be mounted more than a few inches higher than the toilet, contact Raritan Customer Service.

WARNING: DO NOT locate in an area where ambient temperature exceeds 120º F (49º C).
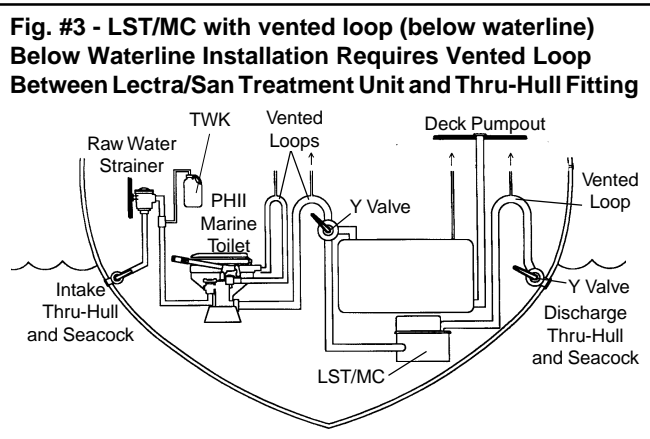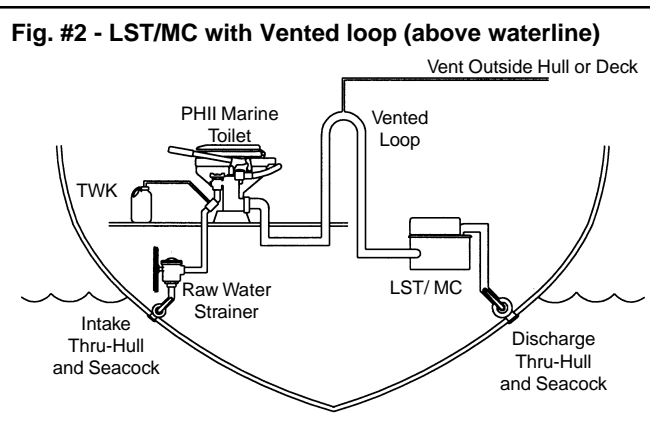
Securing Treatment Tank

Additional supplies needed (not included): 1" (2.54 cm) x 1" (2.54 cm) wood (approximately 5 ' [1.5 m]), 8 - 1 1/2" screws, 3/4" (1.9 cm) strapping (approximately 5' [1.5 m]) and suitable fasteners to fasten frame to floor.

1. Make mounting frame (Fig. #4).
2. Secure mounting frame using suitable fasteners.
3. Use 3/4" (1.9 cm) mounting straps to secure tank to frame (see Fig. #4). A 3/8" (.9 cm) rubber pad under the tank helps reduce vibration and noise.

PLUMBING

Additional supplies needed (not included): teflon tape or nonpermanent thread sealing compound, PVC cement, 1 1/2" (3.8 cm) I.D. Sanitation Hose (available from Raritan by the foot [#SH]) and 1 1/2" (3.8 cm) hose clamps.

Use only high quality, smooth interior 1 1/2" (3.8 cm) I.D. sanitation hose to help prevent odor problems. DO NOT USE metal pipe or wire rreinforced hose.

Fig. #2 - LST/MC with Vented loop (above waterline)

Fig. #3 - LST/MC with vented loop (below waterline) Below Waterline Installation Requires Vented Loop Between Lectra/San Treatment Unit and Thru-Hull Fitting
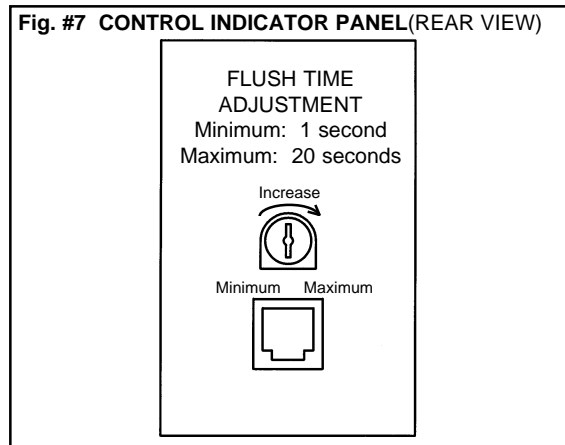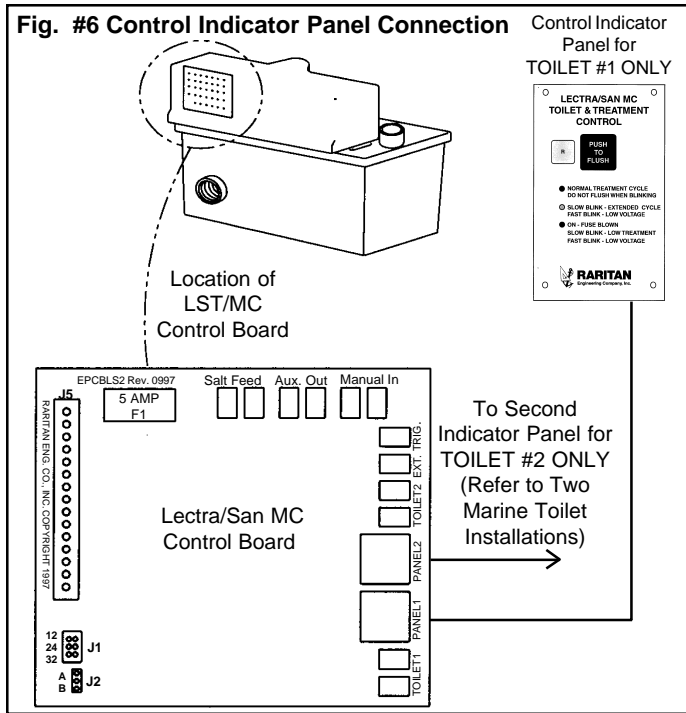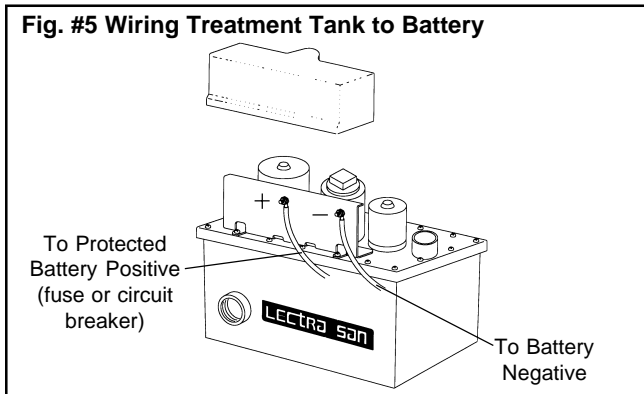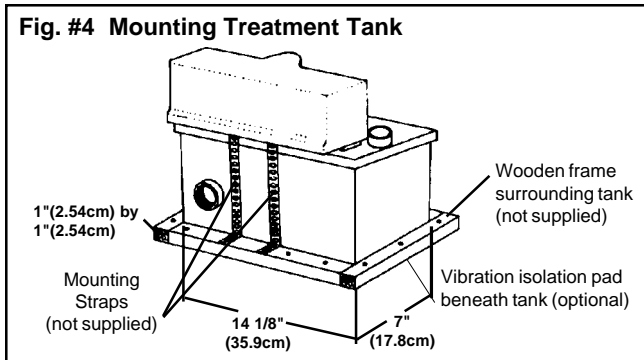
1. Use teflon tape or nonpermanent thread sealing compound on threaded PVC fittings and connections.

2. Connect discharge from toilet to one of the two lower ports on the sides of the Treatment Tank. Avoid dips or low areas in the hose that would allow untreated waste to collect.

3. Determine orientation of the discharge elbow provided before gluing with PVC Cement.

4. Connect hose from top of tank to holding tank or thru hull fitting.

5. Double clamp all hose fittings below the waterline.

NOTE: Discharge of raw, untreated sewage is restricted in all U. S. waters inside the three-mile limit. "Y" valves, if installed, must direct toilet discharge to a U.S.C.G. approved treatment system or holding tank and must be secured in that position while inside the three-mile limit.

ELECTRIC WIRING

WARNING: Danger of electric shock. Be sure to disconnect power.

WARNING: Improper wiring can damage the Circuit Board. See "ELECTRIC TOILET" section of the manual.

Fig. #4 Mounting Treatment Tank

Wooden frame surrounding tank (not supplied)

1"(2.54cm) by 1"(2.54cm)

Mounting Straps (not supplied)

Vibration isolation pad beneath tank (optional)

14 1/8" (35.9cm)   7" (17.8cm)

Fig. #5 Wiring Treatment Tank to Battery

To Protected Battery Positive (fuse or circuit breaker)

To Battery Negative

LectRa san

Fig. #6 Control Indicator Panel Connection

Control Indicator Panel for TOILET #1 ONLY

LECTRA/SAN MC TOILET & TREATMENT CONTROL

PUSH TO FLUSH

● NORMAL TREATMENT CYCLE DO NOT FLUSH WHEN BLINKING
☼ SLOW BLINK - EXTENDED CYCLE FAST BLINK - LOW VOLTAGE
● ON - FUSE BLOWN SLOW BLINK - LOW TREATMENT FAST BLINK - LOW VOLTAGE

RARITAN Engineering Company, Inc.

Location of LST/MC Control Board

EPCBLS2 Rev. 0997   5 AMP F1   Salt Feed   Aux. Out   Manual In

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J5

To Second Indicator Panel for TOILET #2 ONLY (Refer to Two Marine Toilet Installations)

Lectra/San MC Control Board

TOILET2 EXT. TRIG.   PANEL2   TOILET1 PANEL1

12 24 32   J1
A B   J2

Fig. #7 CONTROL INDICATOR PANEL (REAR VIEW)

FLUSH TIME ADJUSTMENT
Minimum: 1 second
Maximum: 20 seconds

Increase

Minimum   Maximum

Additional supplies needed for electric wiring (not provided): Red and black supply wire and yellow 18 gauge wire (Atlantes lever flush option) or purple 18 gauge wire (Atlantes touch pad operation option).

Treatment Unit

1. Run supply wire to Positive and Negative terminals on Treatment Tank to power source (Fig. #5). Use Lectra/San MC Specification table (page 12) to determine proper wire size and fuse/breaker size.

2. Connect wires to Positive and Negative terminals on Treatment Tank (Fig. #5). Positive wire from battery is connected to "POS" terminal and Negative wire is connected to "NEG" terminal.

3. Connect cable, (#31-604) from Control Indicator Panel to Circuit Board (Fig. #6) panel 1 jack. Secure strain relief.

Check polarity at Treatment Tank before turning on power. Burnt control board components or foils are a result of improper wiring during installation. Board replacement in these cases are not covered by Raritan's Limited Warranty.
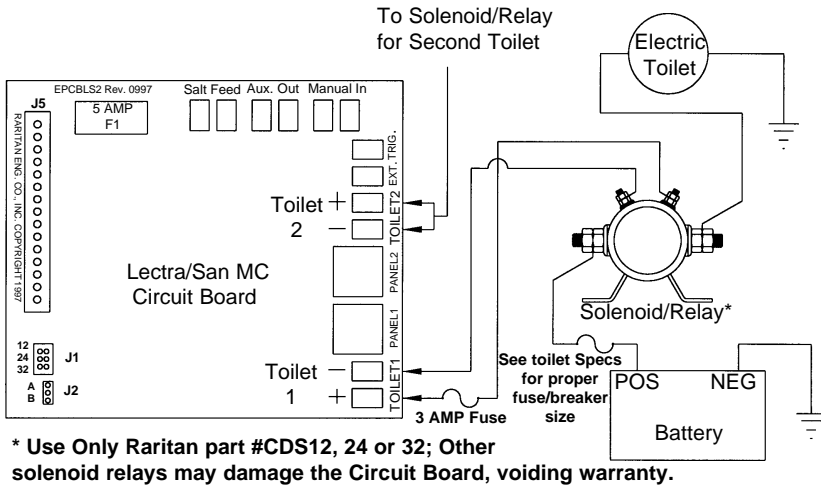
Control Indicator Panel

1. Locate in head compartment where indicator lights will be visible.

2. Using template provided, mark the cutout for the panel. Cut out only hatched area.

3. Route cable (#31-604) between Control Indicator Panel and LST/MC Treatment Unit. A 14 foot (4.25 m) cable is provided (25 foot [7.62 m] cable is available if needed). Secure cable every 18 inches (45.7 cm). Do not damage insulation. Plug cable into Control Indicator Panel (Fig #6).

4. Conduct Start-Up Procedure in Recommissioning and Start-Up" on page 3 and 4.

NOTE: If toilet is flushed by pressing "PUSH TO FLUSH" touch pad, length of flush is factory adjusted to 10 seconds (see Operation Options section). Flush time can be adjusted to 1 to 20 seconds. This adjustment is made at the rear of the Control Indicator Panel (Fig. #7). If LST/MC will be activated by Atlantes flush lever or wall switch (A6 models) flush time adjustment must be set to the minimum position (1 second).

Fig. #8 Flushing Toilet By Pressing "PUSH TO FLUSH" Touch Pad

To Solenoid/Relay for Second Toilet

Electric Toilet

EPCBLS2 Rev. 0997   5 AMP F1   Salt Feed   Aux. Out   Manual In   J5

Lectra/San MC Circuit Board

Toilet 2 + −

Solenoid/Relay*

Toilet 1 − +

See toilet Specs for proper fuse/breaker size

3 AMP Fuse

POS   NEG

Battery

12 24 32   J1
A B   J2

* Use Only Raritan part #CDS12, 24 or 32; Other solenoid relays may damage the Circuit Board, voiding warranty.

Fig. #8A Activation of LST/MC from Toilet Flush Switch

Electric Toilet

To PBS of Second Toilet

EPCBLS2 Rev. 0997   5 AMP F1   Salt Feed   Aux. Out   Manual In   J5

PBS

3 AMP Fuse

Lectra/San MC Circuit Board

See toilet Specifications for proper Fuse/ Breaker size

Solenoid/Relay*

POS   NEG

Battery

12 24 32   J1
A B   J2

* Use Only Raritan part #CDS12, 24 or 32; Other solenoid relays may damage the Circuit Board, voiding
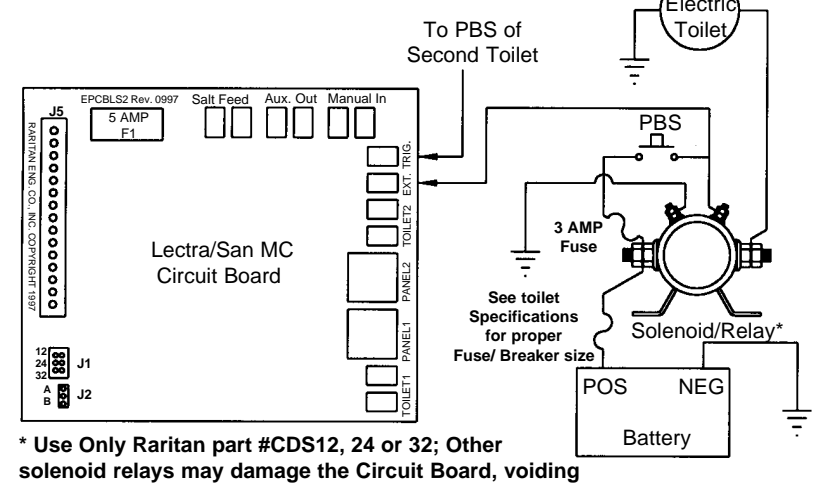
Fig. #9 Flushing the Atlantes Toilet by Pressing the "PUSH TO FLUSH" Touch Pad

Location of Atlantes Control Board

To 2nd Atlantes Toilet (purple wire)

Purple

Atlantes Control Board

EPCBLS2 Rev. 0997   5 AMP F1   Salt Feed   Aux. Out   Manual In   J5

U10
U11

Lectra/San MC Circuit Board

U9
U8

12 24 32   J1
A B   J2

5. Secure Control Indicator Panel into position using four screws (provided). If located in shower/head compartment, apply a bead of nonpermanent sealant around rear edges of the Control Indicator Panel before securing.

OPERATION OPTIONS

NOTE: Choose only one option per toilet. LST/MC Control Indicator Panel must be installed.

The LST/MC offers several operating options in conjunction with your toilet.

ELECTRIC TOILETS

NOTE: Raritan recommends that any installation made with an electric toilet be installed for single touch operation.

INTEGRAL ACTIVATION

WARNING: Improper wiring of toilet outputs can damage the circuit board.

- **Remove diode installed across the solenoid/relay coil terminals if present.**
- **Connect only the solenoid/relay coil to toilet 1 or toilet 2 outputs on the circuit board.**
- **Do not connect toilet negative or positive directly to toilet 1 or toilet 2 outputs on the circuit board.**
- **Do not connect switches or any other components to toilet 1 or toilet 2 outputs on the circuit board.**
- **Use only a solenoid/relay with an isolated coil (such as #CDS*).**

Touch Pad Operation: To activate toilet and start treatment cycle with touch pad, wire as per Fig. #8 for most electric toilets. Toilets that are flushed by pressing "PUSH TO FLUSH" touch pad of the LST/MC have a factory preset flush of ten seconds. Depending upon your installation requirement you may increase or decrease the length of flush 1-20 seconds (Fig. #7). Use Fig. #9 when connecting to an Atlantes and adjust flush time to minimum setting.

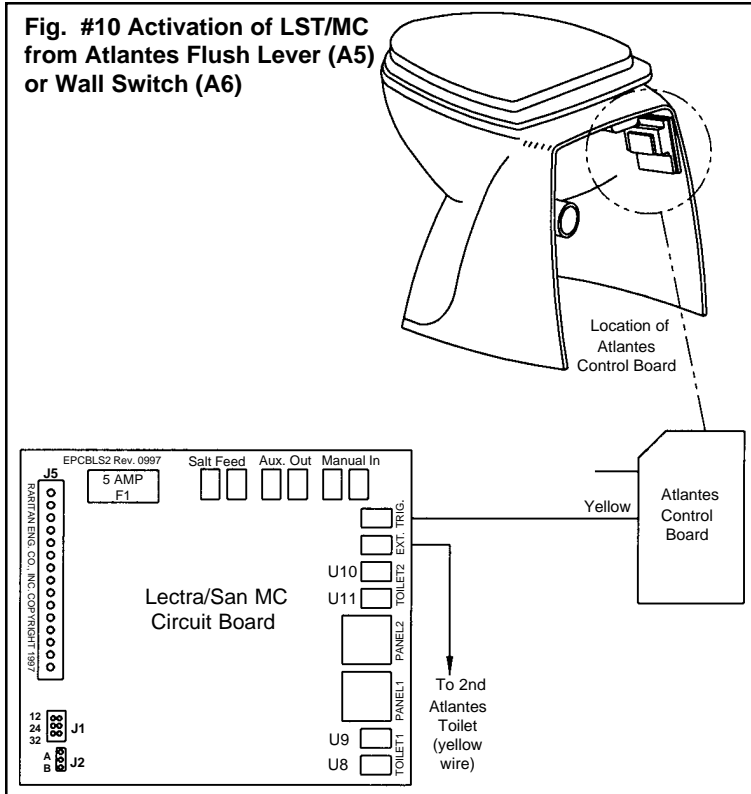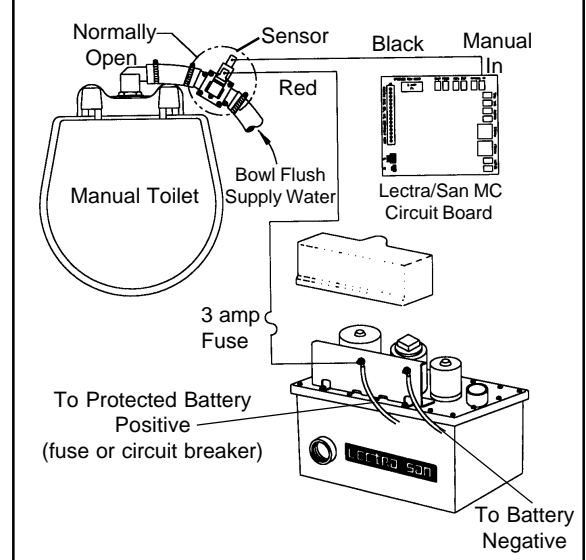Fig. #10 Activation of LST/MC from Atlantes Flush Lever (A5) or Wall Switch (A6)

Fig. #11 Manual Toilet Wiring Diagram

MANUAL TOILETS

Raritan offers a sensor kit (#31-605 for 3/4" [19 mm] hose and #31-615 for 1" [25 mm] hose) which will activate the LST/MC automatically when a manual toilet is flushed. When the toilet has been pumped for approximately three to five strokes, within a ten second time period, the LST/MC will be activated.

Refer to instructions included with sensor kit for installing manual sensor (Fig. #11).

Push Button Operation: To flush toilet and activate treatment cycle a seperate with push button switch, wire as per Fig. #8A.

Atlantes Lever Operation: To flush toilet and activate treatment cycle with lever or "Atlantes A6 Model Wall Switch", wire as per Fig. #10.

USING TWO MARINE TOILETS WITH THE LECTRA/SAN MC SYSTEM

The LST/MC Type I MSD can be connected to two marine toilets if the toilets are in close proximity to:

1. Reduce the pressure requirement to move waste through the connecting hose.

2. To decrease the possibility of untreated sewage remaining in the lines.

The LST/MC Treatment Tank should be located midway between the two toilets. **The maximum distance from either toilet to the treatment tank should not exceed six feet (1.8 m).**

Lectra/San MC Dual Control Kit (#LSTMDC) is available for conversion to dual toilet operation. This kit includes the Control Indicator Panel with cable, additional fitting and Wall placard with Installation Instructions.

INSTALLATION

1. **Mounting** - Each toilet should be installed within six feet (1.8 m) of LST/MC.

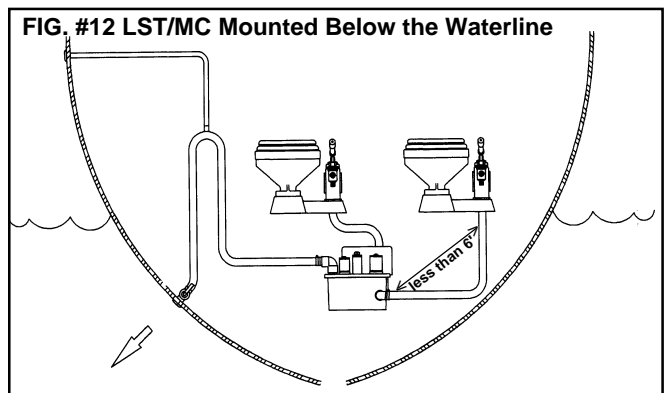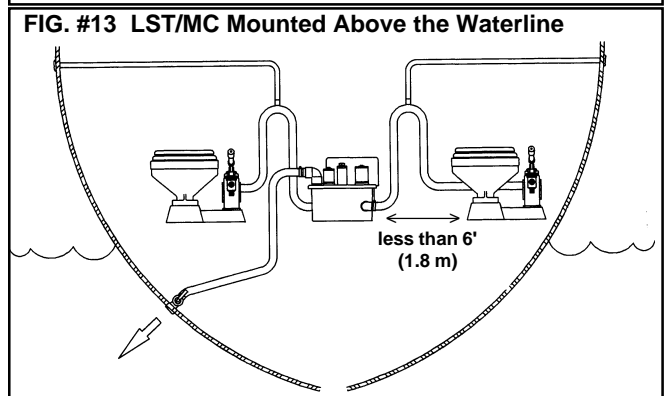FIG. #12 LST/MC Mounted Below the Waterline

FIG. #13 LST/MC Mounted Above the Waterline

2. **Plumbing** - Install Lectra/San and first toilet per manual, then add second toilet by connecting discharge line to the opposite side of the tank. Remove the plug (#31-122) to allow connections (Figs. #12 and #13).

3. **Control Indicator Panel** - The Dual Control Indicator Panel attaches directly to the LST/MC circuit board via cable. Connect to jack marked "PANEL 2" (Fig. #6).

4. **Wiring the second toilet** - The Lectra/San MC's circuit board has been designed to operate a second toilet. With every option outlined under "TOILET WIRING" there is a duplicate terminal for wiring a second toilet. Refer to Figs. #8 through #11. Any two options can be selected if the second toilet needs to be controlled differently from the first.

One of our three optional Salt Feed Tanks needs to be installed if operating in fresh or brackish water. See salt feed options on page 1 and 2.

OPERATION

Indicator/LED lights will indicate operation on both panels when either toilet is in use. DO NOT attempt to activate LST/MC while another toilet is in use. Wait until treatment cycle has ended and indicator lights are off before flushing toilet.(see fig.1)

USE OF LECTRA/SAN MC ON INSPECTED VESSELS

Installation of the Lectra/San MC is approved for an inspected vessel if plumbing and electrical installation of the vessel is in compliance with 46 CFR subchapter F and J. Copies of these regulations pertaining to inspected vessels (46 CFR) can be obtained from the internet at address:

http://www.access.gpo.gov/nara/cfr/index.html

Applicable requirements for a MSD from Title 46 CFR are section 50 to 63 and section 110 to 113.

### INSTALLATION OF THE LECTRA/SAN MC ON AN INSPECTED VESSEL

In addition to the installation requirements stated on pages four and five, some of the following requirements are specific to the MSD installation in 46 CFR subchapter F and J. There may be additional requirements, not listed below, which must be met before a vessel is inspected and approved.

PLUMBING (INSPECTED VESSELS)

1. Piping, tubing, pipe joining fittings and pipe system components shall meet material and standard requirements of 46 CFR subpart 56.60 and shall meet certification requirement of part 50 of the subchapter as per 46 CFR 56.10-1.

NOTE: As per 46 CFR 56-60-25 (3) nonmetallic flexible hose may be used for plastic pipe in non vital fresh and salt water systems and non-vital pneumatic system subject to the limitation of paragraph (a) (1) through (6) of section 56-60. Unreinforced hoses are limited to a maximum service pressure of 50 PSI, reinforced hoses are limited to a maximum service pressure of 150 PSI.

2. Periodically inspect for leaks and check for loose plumbing and electric connections as per 46 CFR 61.01-1 and Installation and Maintenance Instruction stated on pages 3, 4 and 5 in this manual.

3. Follow Recommission and Start up instructions found on pages 3 and 4 to periodically test piping system as per 46 CFR 61.15-1.

Fig. #14

Fig. #15
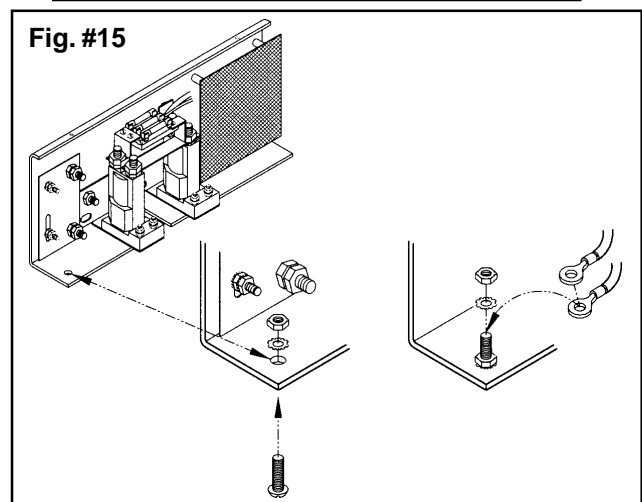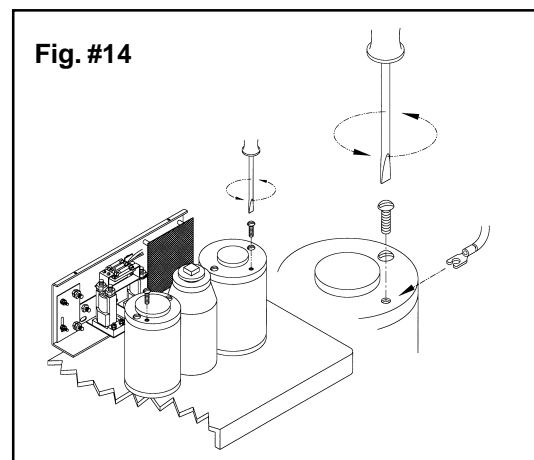
ELECTRICAL (INSPECTED VESSELS)

1. In addition to meeting wire size and fuse/breaker ratings as per specification table on page 12, all electrical wiring, overcurrent protection and grounding should comply with section 110 to 113 of 46 CFR subchapter J.

2. **Grounding:** Exposed electrical motors on Lectra/San should be grounded to comply with 46 CFR 111.05-3. Install ground wires to mixer and macerator motors. Secure wires with 10-32 x 1/4" screws (not included) as shown in Fig. #14. Install a 10-32 x 1/4" screw (not included) in control module mounting plate as shown in Fig. #15. Attach ground wires from motors to screw. Ground the mounting plate to the boat's grounding system.

3. Plans of electrical wiring and schematic specific to the vessel as per 46 CFR 110.25-1 should be submitted to Coast Guard review in accordance with 46 CFR sec. 110.25-3.

For more information on Inspected vessels requirements please contact your local coast guard inspector or: Commandant G-MSE-3, United States Coast Guard, System Engineering Division, 2100 Second Street, S.W., Washington, DC 20593-001.

TROUBLESHOOTING		
PROBLEM	**POSSIBLE CAUSE**	**CORRECTION**
A. When "PUSH TO FLUSH" Touch Pad is pushed, nothing happens; system inoperative.	A1. No power to unit. A2. Open or loose connection. A3. Control board fuse. A4. Damage to Circuit Board. A5. Inoperative Control Indicator Panel. A6. Damage to Control Indicator Panel Cable.	A1. Check circuit breaker or main fuse to unit. Check wiring to unit. A2. Check and clean wiring connections. A3. Check Circuit Board fuse. A4. Replace Circuit Board. A5. Replace Control Panel Indicator assembly. A6. Replace Control Indicator Panel Cable.
B. Red Light on, not blinking.	B1. Fuse blown. B2. Damage to Circuit Board. B3. Inoperative solenoid. B4. Defective control module wire harness B5. Bad fuse block.	B1. Check fuse A, B or C on Treatment Unit. B2. Replace Circuit Board. B3. Replace solenoid. B4. Replace wire harness. B5. Replace fuse block.
C. Amber or Red Light on, slow blink (one blink per second). Low salt indicator is lit when the electronics in the LST/MC control board determines that not enough current is flowing through the electrode pack.	C1. Low salt. C2. Dirty electrode pack. C3. Water too cold. C4. Any combination of above. C5. Nonfunctioning electrode pack	C1. Add salt to system. A salt feed system needs to be utilized if operating in fresh or brackish water. C2. Clean electrode pack (see maintenance). C3. Increase salt tank flow. Contact Technical Support. C4. Address C1-C4 as needed. C5. Replace electrode pack.
D. Amber or Red Light on, fast blink (two blinks per second).	D1. Low voltage. D2. Drop in line voltage D3. Other equipment operating on same electric circuit as LST/MC. D4. Open or loose connections.	D1. Discharged or bad battery. D2. Check voltage at Treatment Unit and battery during Treatment Cycle. See Specification Table for minimum voltage and wire size. D3. Isolate circuit. D4. Check and clean wire connections
E. Sewage odor.	E1. Odor permeating through discharge hose or plumbing connections. E2. Treatment Unit has leak. E3. Electrode not functioning properly. E4. LST/MC not being activated at each flush. E5. Treatment unit not being stored properly.	E1. Rub cloth on outside of hose. If odor transfers to cloth; all discharge hose must be replaced with high quality discharge hose (Raritan #SH). E2. Check for liquid leaks (not gas). Follow discharge hose from toilet to Treatment Tank until leak is located and corrected. E3. Check operation of amber or red light as each unit is activated. Increase salt level, clean treatment tank or replace electrode. E4. See Operation on page 2. E5. See Storage on page 3.

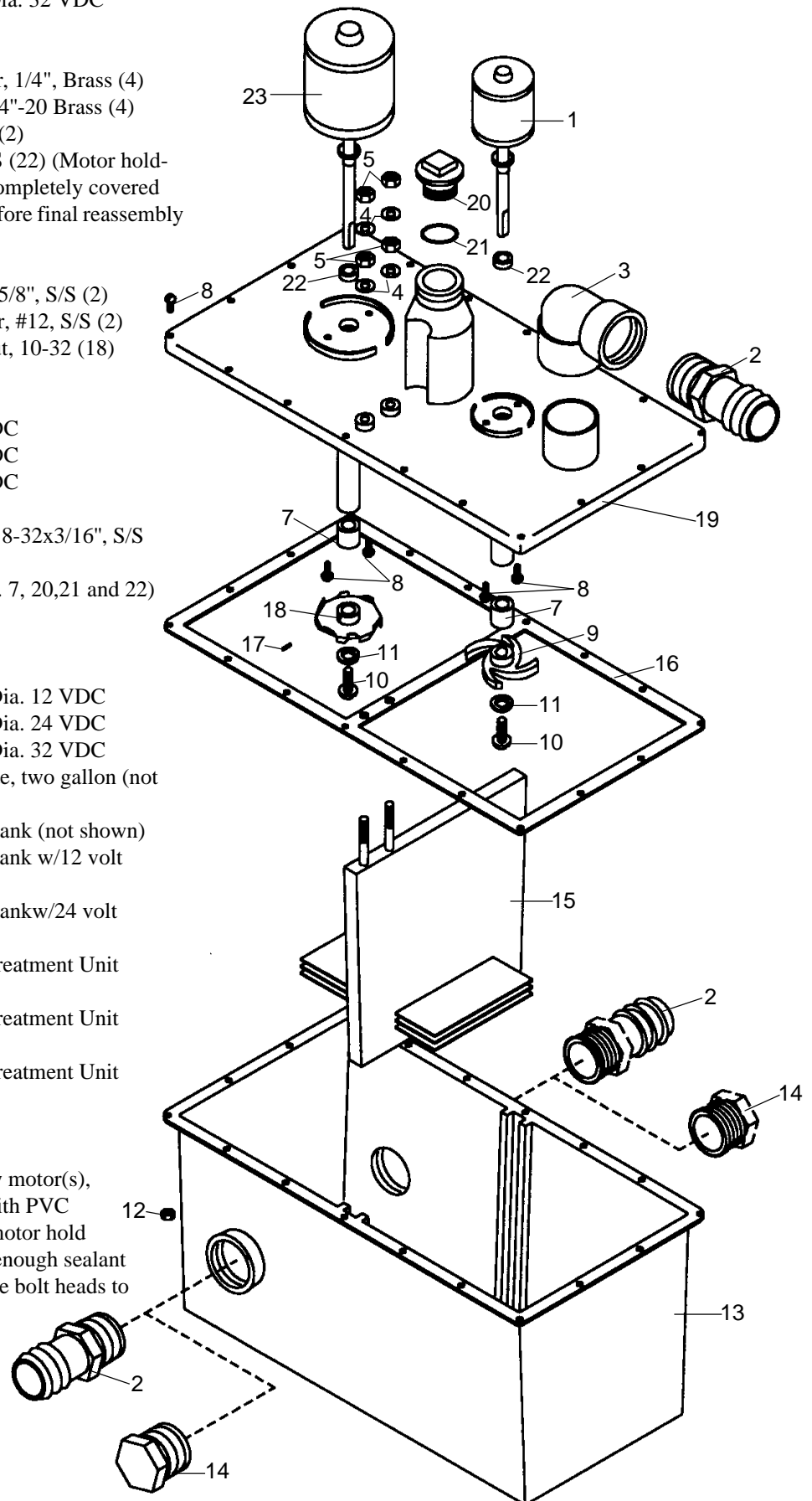If above troubleshooting does not solve the problem, contact your dealer or Technical Support at Raritan.

NOTE: Press "R" Touch Pad to reset Circuit Board. System will not operate when RED light is on or blinking. A blinking Amber light is a caution - system will continue to operate. Follow steps C and or D above to resolve the problem.

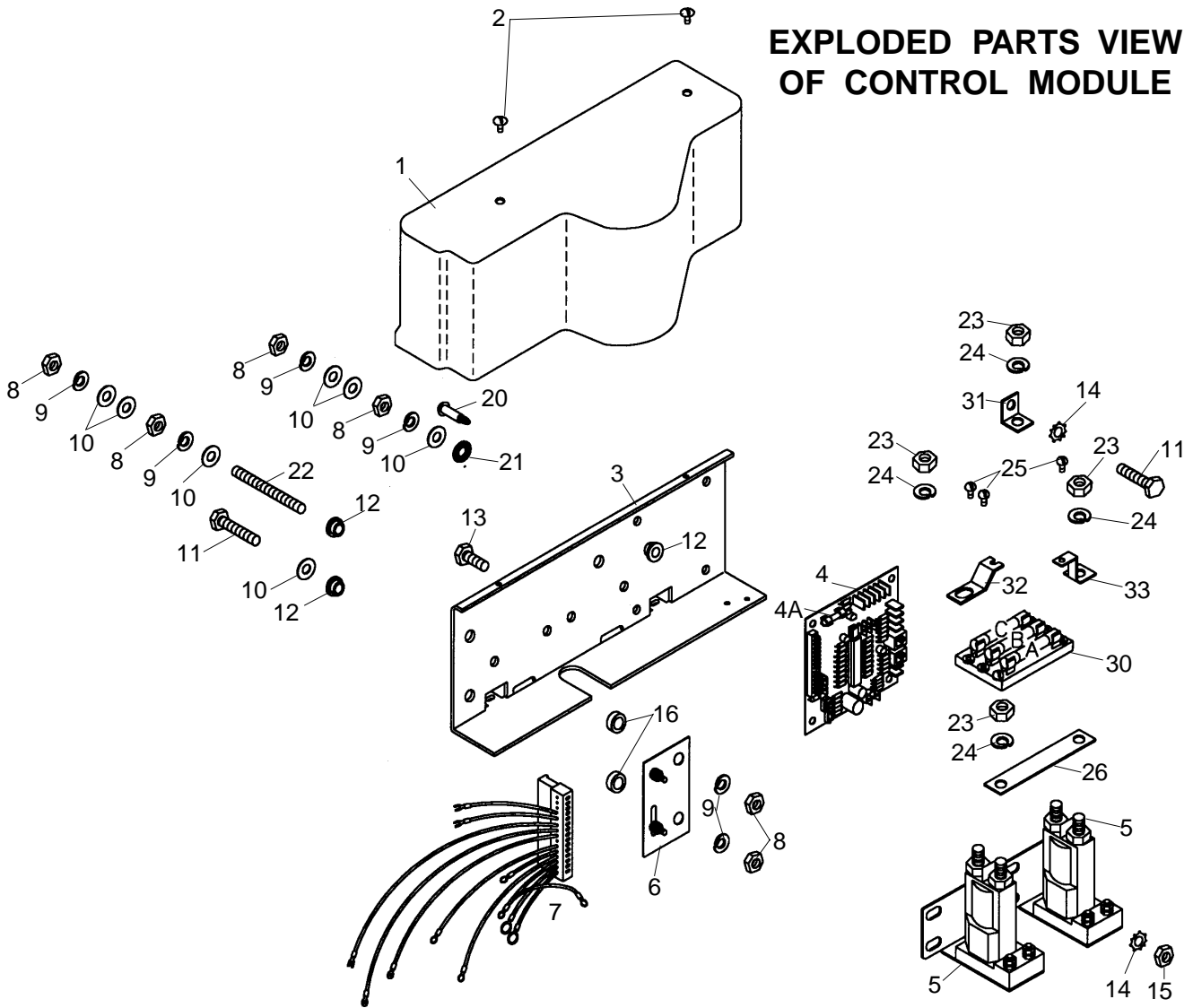| Item	Part No.	Description
1	32-102A**	Mixer Motor 2 1/2" Dia. 12 VDC
1	33-102A**	Mixer Motor 2 1/2" Dia. 24 VDC
1	34-102A**	Mixer Motor 2 1/2" Dia. 32 VDC
2	31-121	Hose Fitting (2)
3	31-120	Discharge Elbow 90°
4	M30	Electrode Flat Washer, 1/4", Brass (4)
5	M31	Electrode Lug Nut, 1/4"-20 Brass (4)
7	31-103	Motor Shaft Bushing (2)
8	31-106	10-32x7/8"RHMS,S/S (22) (Motor hold-down bolts must be completely covered with silicone caulk before final reassembly to prevent leaking.)
9	31-109	Mixer Impeller
10	31-110-1	Impeller Bolt, 12-24x5/8", S/S (2)
11	31-110-2	Impeller Lock Washer, #12, S/S (2)
12	31-114	Cover Hold Down Nut, 10-32 (18)
13	31-115	Treatment Tank
14	31-122	Intake Plug
15	32-5000	Electrode Pack 12 VDC
15	33-5000	Electrode Pack 24 VDC
15	34-5000	Electrode Pack 32 VDC
16	31-112	Cover Gasket
17	31-108	Macerator Set Screw, 8-32x3/16", S/S
18	31-107	Macerator Impeller
19	31-101W	Treatment Cover (Inc. 7, 20,21 and 22)
20	31-104C	Crossover Plug
21	31-105	O-Ring
22	31-102	Motor Shaft Seal (2)
23	32-101AW**	Macerator Motor 3" Dia. 12 VDC
23	33-101AW**	Macerator Motor 3" Dia. 24 VDC
23	34-101AW**	Macerator Motor 3" Dia. 32 VDC
	31-3001	Salt tank unit complete, two gallon (not shown)
	31-3002	Four gallon salt feed tank (not shown)
	32-3003	Four gallon salt feed tank w/12 volt pump (not shown)
	33-3003	Four gallon salt feed tankw/24 volt pump (not shown)
	32-4000*	12 V DC Complete Treatment Unit (Items 1-22)
	33-4000*	24 V DC Complete Treatment Unit (Items 1-22)
	34-4000*	32 V DC Complete Treatment Unit (Items 1-22)

* Less Control Module

**NOTE: When replacing existing or new motor(s), clean area around motor mounting bolts with PVC cleaner before applying silicone caulk to motor hold down bolt heads (see Item #8). Dispense enough sealant to cover an area three times greater than the bolt heads to avoid leakage through bolt holes.

EXPLODED PARTS VIEW OF CONTROL MODULE

Item	Part No.	Description	Item	Part No.	Description
1	31-460	Control Cover	23		5/16 - 24 Nut (4)
2	CH26	8-32 x 7/16" Truss head screw (2)	24		5/16 Lockwasher (4)
3	31-462	Mounting Plate	25		#6-32 Screw
4	32-601	Circuit Board, 12V	26	31-464	Bracket
	33-601	Circuit Board, 24V	30	31-232	Fuse Block
	34-601	Circuit Board, 32V	30A	32-218	MDL 6 1/4 Fuse (12V)
4A	EF5FA	F1 - 5 Amp Fuse, fast acting	30B	32-219	MDL 35 Fuse (12V)
5	AM06012	Solenoid Relay (2) - 12V	30C	32-220	MDL 30 Fuse (12V)
	AM06024	Solenoid Relay (2) - 24V	31	31-466	Bracket
	AM06032	Solenoid Relay (2) - 32V	32	31-469	Copper Bracket
6	RBS501	Shunt 50 mv 50 amp LST/MC		31-468	Bracket (not shown)
7	31-402A	Wiring Harness Assy.	33	31-470	Cond. Bracket
8	M30	1/4 - 20 Brass Nut (8)		32-602	12V Assy. (incl. all above parts except 1 and 2)
9	HLWQB	1/4" Lockwasher (6)			
10	M31	#14 Brass Flat Washer (7)		33-602	24V Assy. (incl. all above parts except 1 and 2)
11	HSB1	1/4 - 20 Brass Cap Screw (2)			
12	RNI	Nylon Shoulder Washer (3)		34-602	32V Assy. (incl. all above parts except 1 and 2)
13	1119A	1/4 - 20 x 1/2" S/S Hex Head Machine Screw (4)			
				31-603	Control Indicator Panel (not shown)
14	1118	1/4" External Tooth Washer (5)		31-604	Control Indicator Panel Cable (not shown)
15	1226B	1/4 - 20 S/S Hex Head Nut (4)			
16	31-476	Nylon Spacer Washer (2)		31-605	Activator Assembly for Manual Toilets (not shown)
20	F31-480	Nylon Stand Offs: PCB Supports (4)			
21	F069	Gray Fiber Flat Washer		31-606	Pressure Switch for the Activator (not shown)
22	F31-478	Threaded Rod 1/4 - 20 x 2" Brass	( ) Indicates Total pieces required		

Lectra/San MC SPECIFICATION TABLE

ELECTRICAL:

Voltage Nominal	12VDC	24VDC	32VDC
Voltage Minimal	11.5V	23.0V	30.5V
Power	1.7 amp hr	1.5 amp hr.	1.2 amp hr.
Current	50 A	42 A	35 A
Fuse/Breaker	**60 A**	**50 A**	**50 A**

Distance from source to unit and back to source [feet (m)] (See Note 1)						
UNIT'S VOLTAGE	10' (3.1)	15' (4.6)	20' (6.1)	25' (7.2)	30' (9.2)	40' (12.2)	50' (15.2)
	Minimum recommended conductor wire AWG (mm²) for 3% voltage drop						
12	6 (16.0)	6 (16.0)	4 (25.0)	4 (25.0)	2 (35.0)	2 (35.0)	1 (50.0)
24	10 (6.0)	8 (10.0)	6 (16.0)	6 (16.0)	6 (16.0)	4 (25.0)	4 (25.0)
32	12 (4.0)	10 (6.0)	10 (6.0)	8 (10.0)	8 (10.0)	6 (16.0)	6 (16.0)

NOTE: Recommend conductor sizes based on 105°C rated Insulation. Refer to ABYC Standards for other insulation ratings.

☛**NOTES:**

1. **Wire distance is determined by measuring from the battery to the Lectra/San MC and back again.**

2. **Minimal Voltage is read across the electrode pack while the system is operating in the treatment (2nd) cycle.**
3. **Requires ocean grade salinity for proper conductivity.**

Max Amperage:	12VDC	24VDC	32VDC
Mixer Motor amp	5	4	4
"A" Fuse Type MDL	6 1/4	6 1/4	5
Electrode Pack amp	25	22	22
"B" Fuse Type MDL	35	30	30
Macerator Motor amp	20	16	9
"C" Fuse Type MDL	30	25	20

Gallons of Waste Treatable/Day: 576
Maximum Roll/Pitch Angle: 30°
Maximum Temperature Exposure: 120° F (49° C)
Maximum Total Flush Volume: 1.5 Gallons/Flush
U.S.C.G. Type I MSD Certification #159.015/0107/1

LIMITED WARRANTY

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