

SANX[®] OPERATION INSTALLATION GUIDE



Sealand
TECHNOLOGY, INC.

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USCG Certified Type I MSD

The SeaLand SanX® Model SX12T is the new and improved version of our highly reliable and successful TDX-S flow-through MSD.

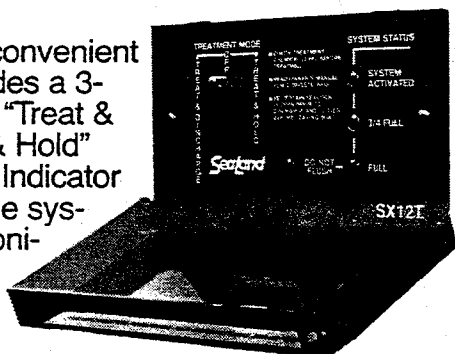
Like the TDX-S, the SanX® Model SX12T is a complete system that provides automatic onboard treatment and legal discharge of treated waste within the three mile limit. It is the ideal sanitation system for boats used primarily within waters where discharge of treated waste is legal.

System Components

The Model SX12T is available only as a complete system, and includes the following components:

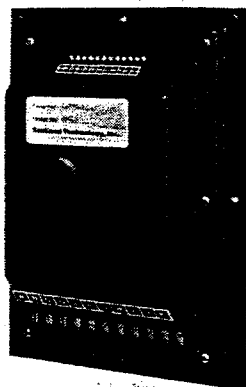
Control Panel.

The attractive and convenient control center includes a 3-position switch with "Treat & Discharge," "Treat & Hold" and "Off" positions. Indicator lights show when the system is activated, monitor level of tank contents and when the toilet should not be flushed.



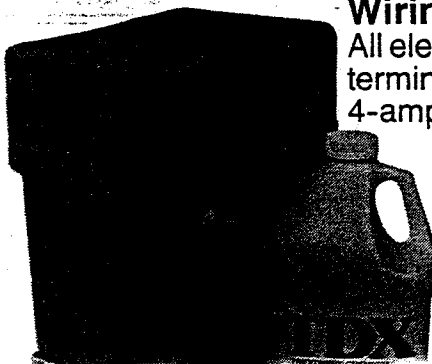
Electronic Control

Module. The Model SX12T electronic control module is a brand new, highly reliable integrated circuit design. It has been engineered specifically for marine use. New features include a built-in 2-second delay on tank level indicators to eliminate false signals in rough sea conditions and auxiliary "Tank Full" outputs for additional remote indicators.



Deodorant Injection Unit.

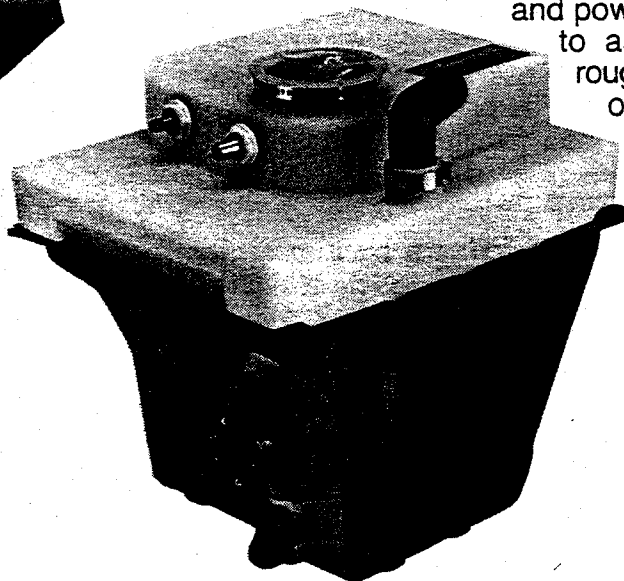
The new deodorant injection unit is completely contained in a molded, spill-proof housing that accommodates a full gallon of treatment deodorant, the injection pump, and an inline fuse.



Level Indicator Sensor have been completely re-designed for improved accuracy and reliability. This new design eliminates false readings from fouled probes and has no electrical components in direct contact with waste. Field tested for over three years, they have proven to be maintenance free.



Treatment Tank is specially shaped to provide optimum treatment and complete discharge. Includes corrosion free agitator and powerful motor to assure thorough treatment of entire contents, and convenient molded cradle for secure mounting.



Wiring & Overcurrent Protection.

All electrical connections are made at molded terminal blocks on each of the components. A 4-amp fuse is provided in the deodorant injection unit, and the system must be protected by a 15 amp circuit breaker or a 15 amp fuse in the boat's distribution panel. Wiring should be of 12 to 18 gauge stranded copper, depending upon length of harness.

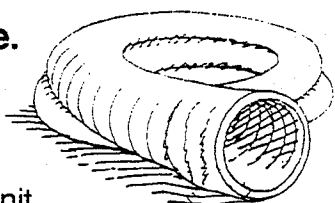
Other Required Components

Components not supplied with the SanX® system, but required for installation are:

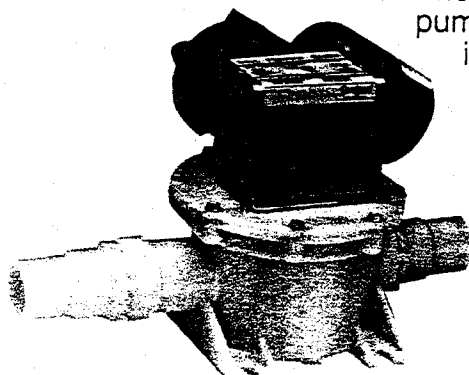
Marine Head. The Model SX12T can be used with almost any manual or electric head. The extremely low water usage of SeaLand VacuFlush® toilets make them ideal for SanX® installations.

Sanitation & Vent Hose.

1-1/2" ID sanitation hose is required from the head to the treatment unit, and 1" ID hose from the treatment unit to the discharge pump. 5/8" ID vent hose is required from the treatment tank to an external vent. Odor resistant SeaLand Heavy Duty Sanitation Hose and Vent Hose are recommended. The only sanitation hose with a Three Year Limited Warranty.*

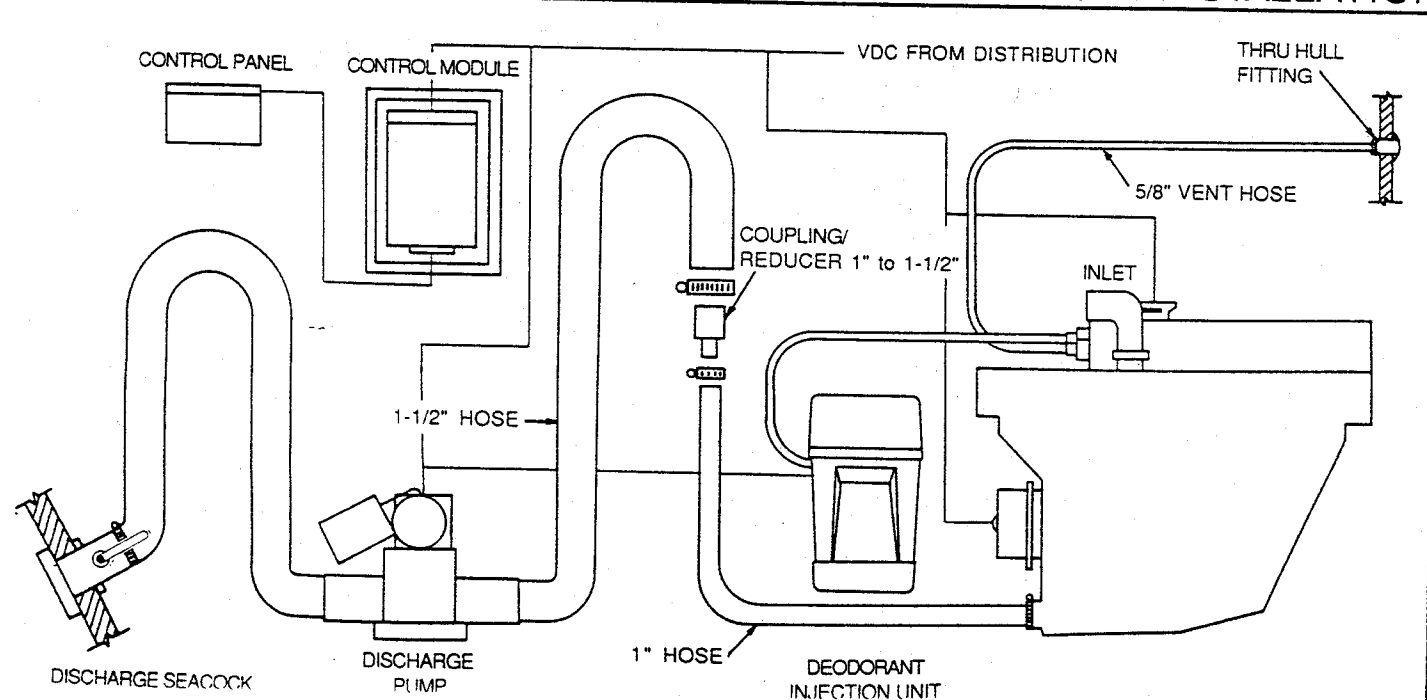


Discharge Pump. An efficient discharge pump suitable for handling waste must be provided. The system may also be used with a manual discharge. The SeaLand model T12 pump is designed specifically for this application. A typical rotary macerator pump may NOT be used on the SanX®.

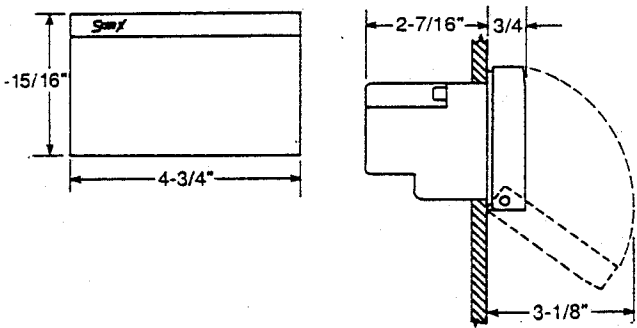


Miscellaneous Fittings, such as through-hulls, vents, valves, and a variety of rigid plastic plumbing fittings are available from SeaLand.

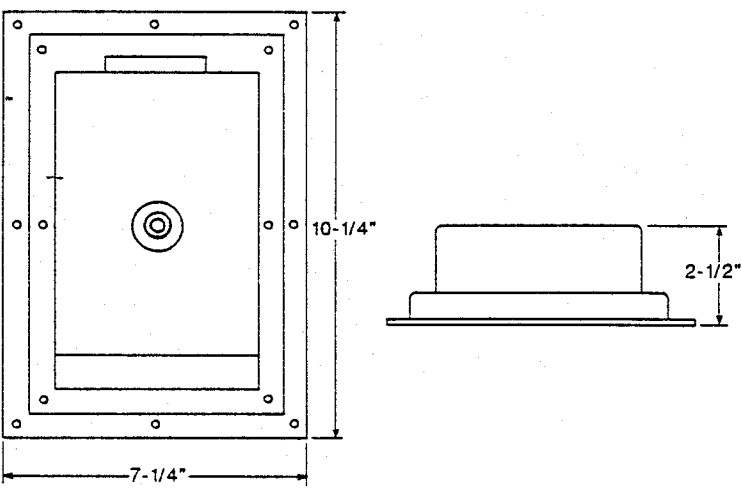
TYPICAL INSTALLATION



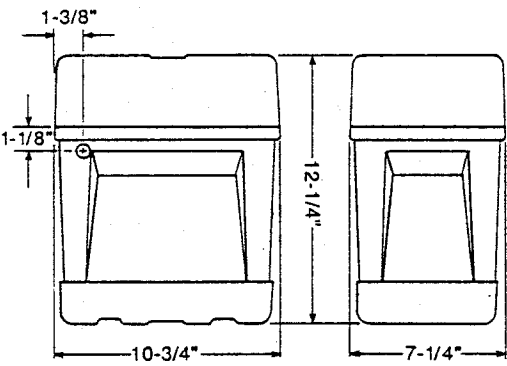
Control Panel



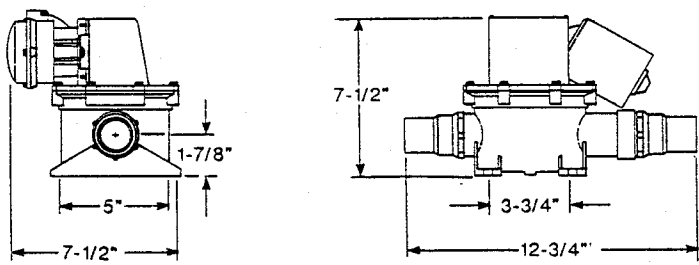
Electronic Control Module



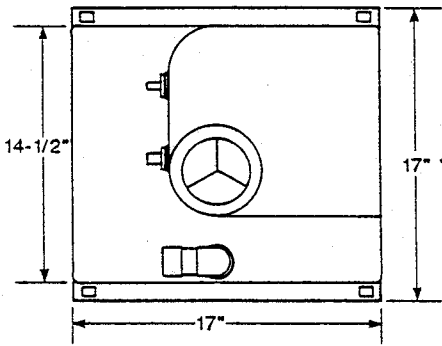
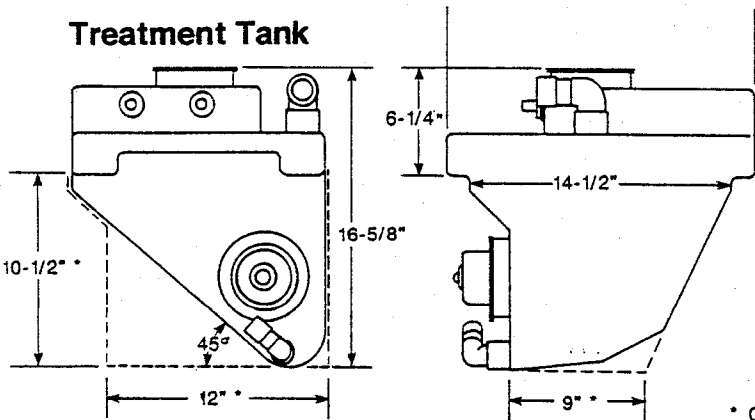
Deodorant Injection Unit



T-Series Discharge Pump (Optional)



Treatment Tank



* CRADLE

PRINCIPLE OF OPERATION

The SanX is a flow-through system designed to cope with space and power limitations of the small boat. It is a U.S. Coast Guard Certified Type 1 Marine Sanitation Device for use on uninspected and inspected subchapter T vessels not over 65 feet in length.

The SanX is not a holding tank. It chemically treats the waste the second it enters the tank. Waste is collected in the treatment tank until it is nearly full. A remotely installed control panel signals the contents level of the treatment tank. A single control switch activates the automatic treatment cycle. Power is required for treatment only when the tank is full--not after every flush.

The SanX draws only 8 amps at 12 volts for every tank full of waste.

When the SanX is activated, treatment chemical is pumped into the treatment tank. The solid waste and bacteria are treated in 20 minutes. In waters where treated discharge is permitted, "Treat & Discharge" provides full flow-through service. The "Treat & Hold" option, a standard feature of the SanX allows contents to be treated and then held for later discharge in non-restricted waters or at a dockside facility.

After the contents are discharged, a bacteria controlling chemical is injected into the treatment tank to prepare it for future use.

The SanX is designed to be trouble free and corrosion resistant. If the impeller becomes entangled, the macerator motor can easily be removed and cleaned without reaching into the tank.

The SanX can be adapted to any standard manually or electrically operated marine toilet. It features a unique collection capability which allows it to be connected to two or more toilets. Any vessel, 65 feet and under with a 12VDC electrical source, properly installed thru-hull fittings of 1½" discharge and 5/8" vent lines will accept the SanX.

The main components in the SanX system are a treatment tank, chemical injection unit, discharge pump, control module and control panel.

With a treatment tank contoured to the inside of the hull, the SanX can be installed on sailboats under the aft end of the vee-berth, port or starboard. The mounting cradle supplied with each SanX provides a convenient means of mounting the tank to flat surfaces available in power boats.

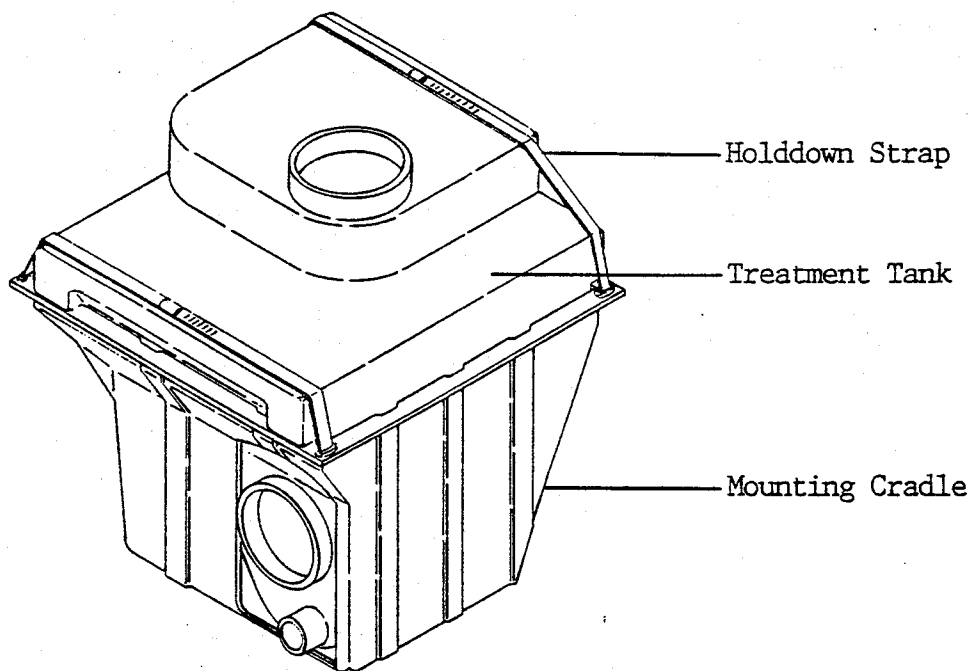
You can go boating in waters where treated discharge is permitted, in unrestricted discharge waters beyond the three mile limit or in zero discharge areas using the SanX as a treatment and holding system for later dockside discharge. No matter where you operate your boat, the SanX lets you do it legally.

INSTALLATION INSTRUCTIONS

A. Treatment Tank

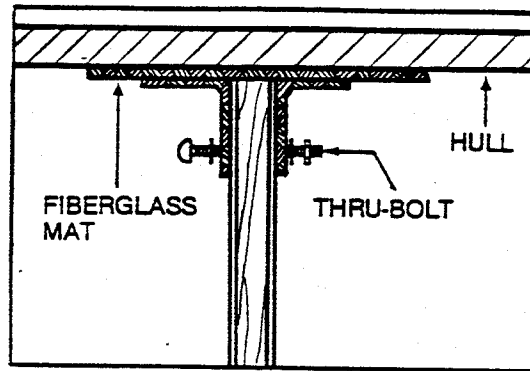
Note: In view of the variety of hull configurations and cabin layouts, it is impossible to provide specific instructions for mounting the tank. It is important the mounting structure is capable of holding 80 pounds, and it must be mounted in a space protected from submersion in water and exposure to excessive heat.

- To mount SanX treatment tank using the cradle supplied:
 1. Mount cradle on flat surface using large flat washers and screws that are best suited for your vessel.
 2. Slip treatment tank into cradle and secure with stainless steel straps provided.

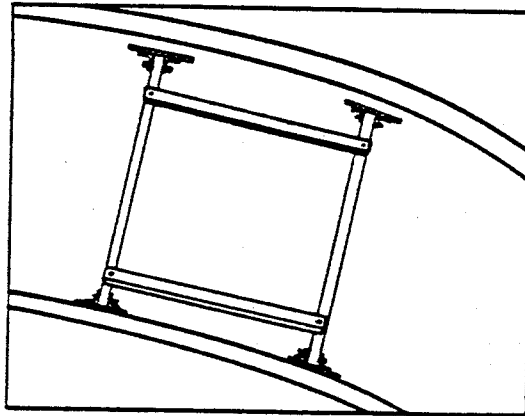


- To mount SanX treatment tank without using the mounting cradle:
 1. On some boats a hatch is available, if not, cut a hole large enough to be able to work around the tank.
 2. Determine the best position for the SanX treatment tank. The ideal position is one where the tank is as low in the hull as possible. The tank should be at least 9½" from the bulkhead so the macerator can be removed for service.
 3. Using 1" x 3" wood stringers or equivalent materials, construct a frame that will hold the tank from the fore and aft ends (under the ledges of the tank).

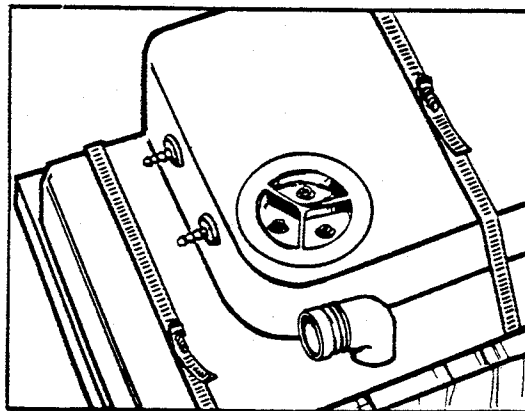
REMEMBER: The frame must be capable of holding 80 pounds and be mounted in a space protected from submersion in water or exposure to excessive heat.



4. The outboard ends of stringers may necessitate the use of fiberglass reinforcement. If so, sand interior of hull and apply materials as specified.
5. After tank frame has been completed, it is necessary to place an additional support on the outboard side of tank to keep it in place.

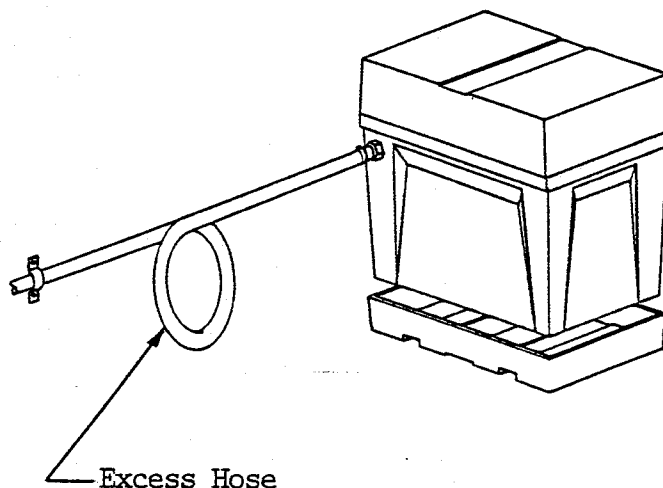
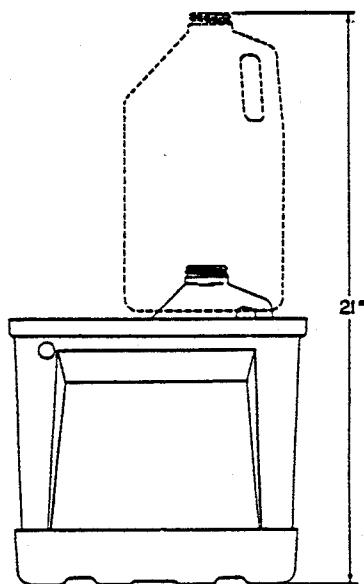


6. After framing is completed, fasten metal or equivalent straps across the top of tank as shown, and secure.



B. Chemical Injection Unit

- Select location less than six feet from treatment tank protected from submersion in water and exposure to excessive heat.
- The chemical injection unit must not be mounted above the top of the treatment tank because siphoning of the chemical may result.
- Provide clearance above injection unit to replace chemical bottle as shown below:



C. To Install T12 Electric Discharge Pump

Note: The typical SanX uses the T12 electric pump (supplied in separate carton). However, the SanX can use a manual pump for discharge (contact factory for details).

- Select location between treatment tank outlet and 1½" overboard discharge seacock. The pump can be mounted above or below the treatment tank. Important - end marked suction is connected to treatment tank outlet.

D. Discharge Hose

- Determine lengths and routing of 1½" hose from the toilet to the treatment tank inlet.
- Determine lengths and routing of 1½" hose from the discharge pump outlet to the overboard discharge seacock. Provide a loop of hose above the waterline when the pump is mounted at or below the waterline. (See system installation diagram on page 4.)

- A special 1" I.D. x 3 ft. long hose supplied with the SanX must be used on the treatment tank outlet to meet USCG MSD requirements. Connect one end of this hose to the treatment tank outlet and the other end to the 1" x 1½" adapter supplied.

- Route the 1" hose above the top of the treatment tank as shown in the system installation diagram on page 4.

Note: If pump is located above treatment tank, loop is not necessary.

- Determine length and routing of 1½" hose between the discharge pump inlet (suction) and the 1" x 1½" adapter. Secure all hose connections with stainless hose clamps (not supplied).

E. Chemical Injection Hose

- Route the 3/8" I.D. x 6 ft. long hose between the chemical injection unit and the treatment tank.

REMEMBER: If bottle replacement requires the container to be moved for access, allow excess hose near the container (see page 9). Secure hose to connections with clamps provided.

F. Vent Hose

- Route 5/8" I.D. hose between the treatment tank vent fitting and the thru-hull vent fitting. Secure with hose clamps.

G. Control Panel Installation

- Select a mounting location away from direct contact with water and oil. Dry locations in the head, salon or galley are most desirable.
- Confirm clearances for the panel behind walls and bulkheads.
- Allow clearance for cover to fully open.
- Cut out mounting hole for control panel. (See template on page 20.)
- Do not mount control panel at this time. Wiring between the control panel and control module must be routed and secured.

H. Control Module

- Select a mounting location away from direct contact with water and oil. Do not mount the control module in engine rooms that get hotter than 150°F even if for only a short

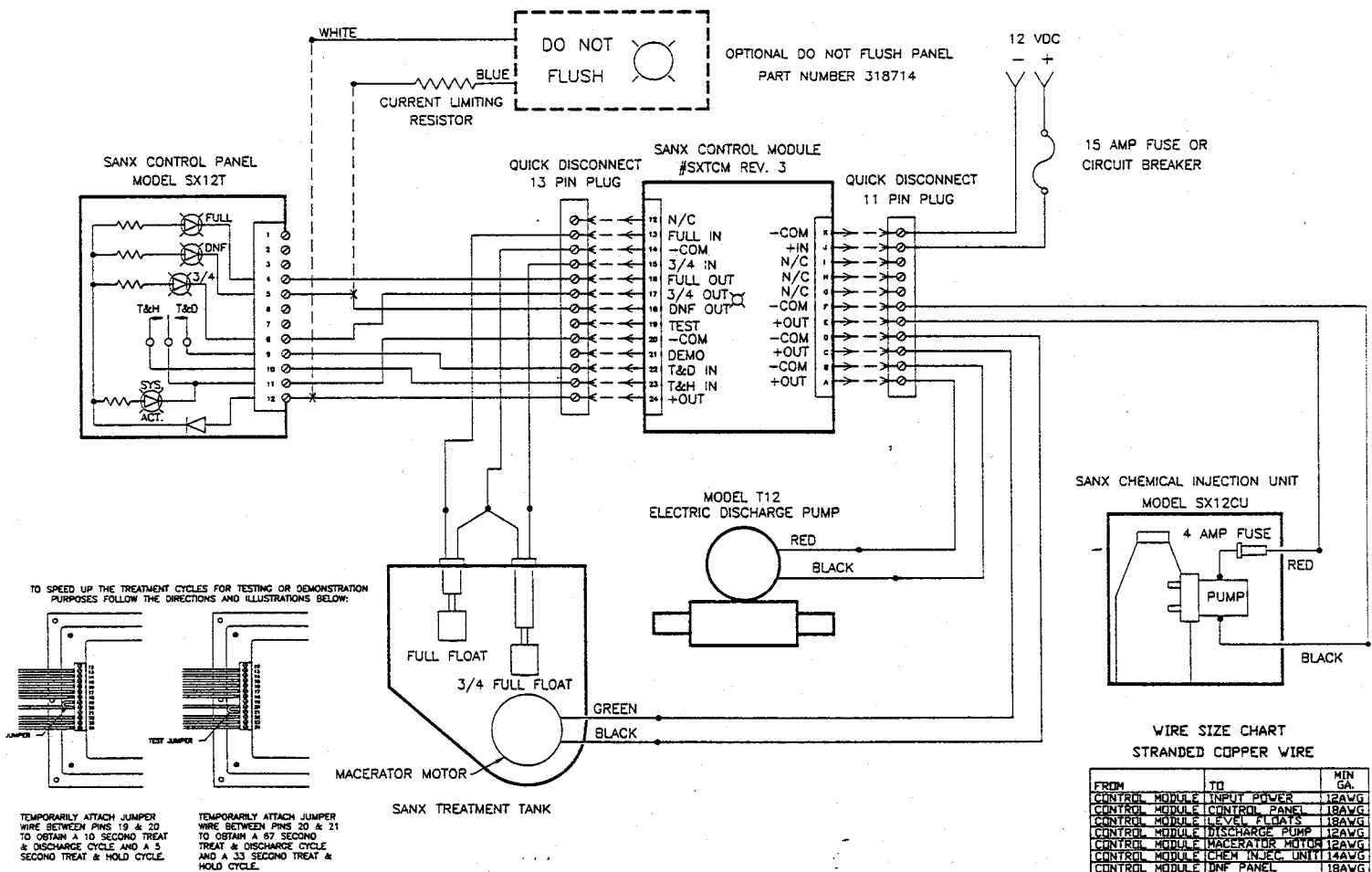
time. The selected mounting area must also prevent accidental contact with combustible materials such as paper, cloth, etc.

- Mount the control module with #6, #8 or #10 screws, best suited for the mounting surface you select.

I. Wiring the SanX System (Refer to wiring diagram)

- Provide 15 amp circuit breaker or fuse in D.C. distribution panel or at any accessible location.
- Provide sufficient wire size as noted on wiring diagram.
- Allow excess wire at all components to facilitate ease of maintenance and repair..
- Secure the control panel with black #6 screws provided.

TYPICAL WIRING DIAGRAM



SANX SYSTEM START-UP

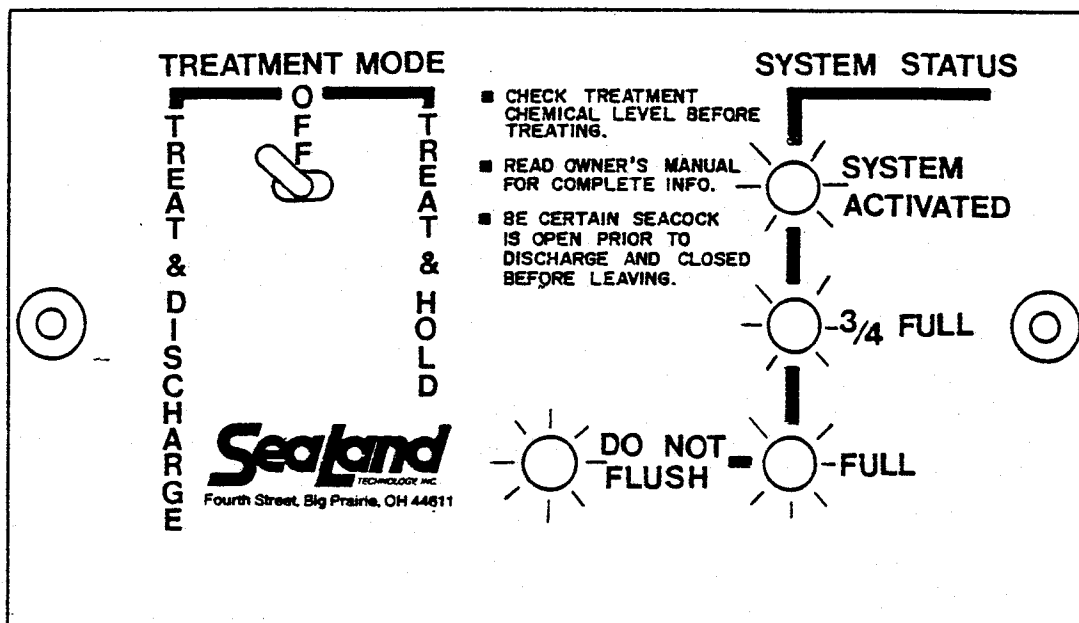
If the SanX System has never been operated or is being commissioned for summer use after being winterized, the following instructions should be followed.

1. Install "fresh" gallon of TDX/SanX chemical into chemical injection unit.
2. Open the seacock for overboard discharge.
3. Turn on electrical power to system.
4. Verify that the "System Activated" (power on) light is on.
5. Check the treatment tank level lights by removing the tank cap and carefully pushing the floats up. Wait two seconds and verify that the "3/4 Full", "Full" and "Do Not Flush" lights are on. Clean off any debris that may have accumulated during the past boating season.
6. Check the chemical injection function by flipping the switch between off and either treatment mode every nine seconds until chemical begins to enter the treatment tank. Check for leaks in the chemical injection system and supply hose to the treatment tank.
7. Partially fill the treatment tank with water and flip the switch to the "Treat & Discharge" position. Verify that the macerator motor comes on and there are no leaks in the treatment tank.
8. After 20 minutes the discharge pump will come on and run for five minutes discharging the treatment tank contents overboard. Check for leaks around the discharge pump and the overboard discharge seacock. Verify the pump has emptied the treatment tank.
9. After the discharge pump shuts off, the chemical injection pump will again come on for another nine seconds.
10. The only light remaining on will be the "System Activated" light.

OPERATING INSTRUCTIONS

The SanX treatment cycle is a five step process. Here is how it works: --

1. With each flush of the toilet, waste is pumped into the treatment tank. After approximately 15 flushes, the "3/4 Full" light comes on. After a few more flushes, the "Full" light and the "Do Not Flush" light comes on. At that point, do not use the toilet. If you continue to use the toilet, waste may be forced out the vent or damage to the system may result.



2. Move the switch from the "Off" position to the "Treat & Discharge" position. The chemical injection pump comes on for nine seconds and delivers one pint of chemical to the treatment tank.
3. The chemical injection pump shuts off and the macerator motor begins its 20 minute mixing cycle. This reduces the size of the solids while allowing the chemical sufficient time to kill the bacteria per USCG requirements.
4. After the mixing cycle is completed, the discharge pump comes on for five minutes, emptying the treatment tank.
5. The discharge pump shuts off and the chemical injection pump comes on for another nine seconds injecting another pint of chemical. (A gallon of chemical will provide four treatment cycles.)

The SanX System is again ready for use.

Note: The treatment switch does not have to be returned to the "Off" position after a treatment cycle. However, to initiate a new treatment cycle, the switch must be returned to the "Off" position (reset).

The "Treat & Hold" mode is used when treatment only is desired. Instances where a boat is left unattended for a few days with waste in the treatment tank warrants the use of this treatment mode. It will liquify the waste and control odors.

A small amount of D.C. current is used by the "System Activated" light, tank level circuitry and the D.C. filter circuitry. When leaving your boat for extended periods of time, turn off the circuit breaker or remove the fuse from the SanX power source.

WINTERIZING

1. Treat and discharge waste in SanX.
2. Replace bottle of chemical with bottle of 50/50 mixture of non-alcohol based antifreeze and water.
3. Put approximately three gallons of 50/50 antifreeze mixture in treatment tank. This is normally done through the toilet or by removing the inspection port on top of the treatment tank.
4. Treat and discharge one complete cycle.
5. If the boat is left in the water, close the seacock on the discharge line and disconnect the discharge line at the seacock and drain into a three gallon container.
6. If boat is hauled, open seacock and empty tank overboard.
7. Turn off electric supply to the SanX.

Recommissioning - See Start-Up Instructions on Page 12.

SERVICE AND REPAIR

Note: Before attempting to service treatment tank or discharge pump, flush soapy water into the treatment tank and discharge overboard.

- A. "System Activated" (Power On) Light Is Not On And Unit Will Not Cycle
 1. Macerator motor blade obstruction
 2. Blown fuse or tripped breaker
 3. No power to system
 4. Loose wires
- B. System Cycles In Both Treatment Modes But Macerator Motor Does Not Run
 1. Loose or defective wiring
 2. Defective macerator motor
 3. Loose or defective relay R₂ inside control module
 4. Defective control module (See Note - Page 15)
- C. Macerator Motor Will Not Shut Off
 1. Defective relay R₂ inside control module
 2. Defective control module (See Note - Page 15)
- D. Unit Will Not Cycle In "Treat & Discharge" But Cycles In "Treat & Hold"
 1. Loose or defective wiring between control panel and control module.
 2. Defective treatment selector switch
 3. Defective control module (See Note - Page 15)
- E. Unit Will Not Cycle In "Treat & Hold" But Cycles In "Treat & Discharge"

Same as D

F. Chemical Pump Runs But Chemical Will Not Enter Treatment Tank

1. Pump needs cleaned out
2. Pump needs primed
3. Replace pump

G. Chemical Pump Will Not Run In Either Treatment Mode

1. Loose wires
2. Blown chemical pump fuse
3. Pump needs cleaned out
4. Defective pump
5. Defective relay R₃ inside control module
6. Defective control module (See Note Below)

H. Chemical Pump Will Not Shut Off

1. Defective relay R₃ inside control module
2. Defective control module (See Note Below)

I. Discharge Pump Will Not Come On In "Treat & Discharge" Mode

1. Loose or defective wiring
2. Defective pump motor
3. Defective relay R₁ inside control module
4. Defective control module (See Note Below)

J. Discharge Pump Will Not Shut Off

1. Defective relay R₁ inside control module
2. Defective control module (See Note Below)

K. "3/4 Full" Or "Tank Full" Light Will Not Come On

1. Loose or defective wiring between control module and treatment tank, or between control panel and control module
2. Defective or fouled level float switch
3. Defective control module (See Note Below)
4. Defective control panel

L. "3/4 Full" Or "Tank Full" Light Will Not Go Out

1. Defective or fouled tank level float switch
2. Defective control module (See Note Below)

M. "Do Not Flush" Light Will Not Come On

1. Loose or defective wiring between control module and control panel
2. Defective control panel
3. Defective control module (See Note Below)

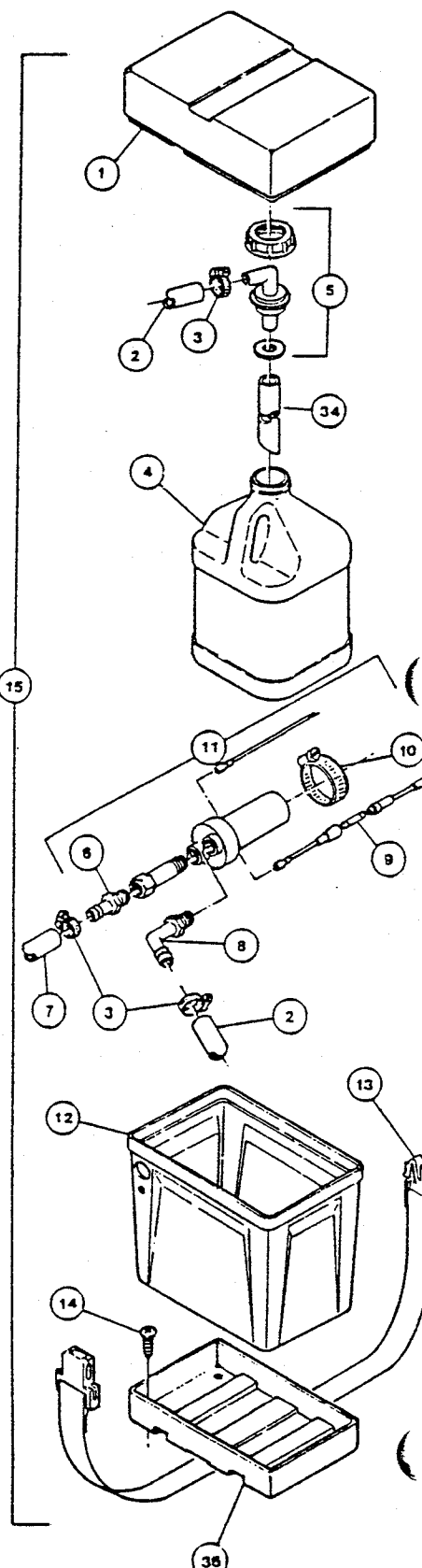
N. LED On Control Module Is Not Flashing, But Module Is Operating Normally

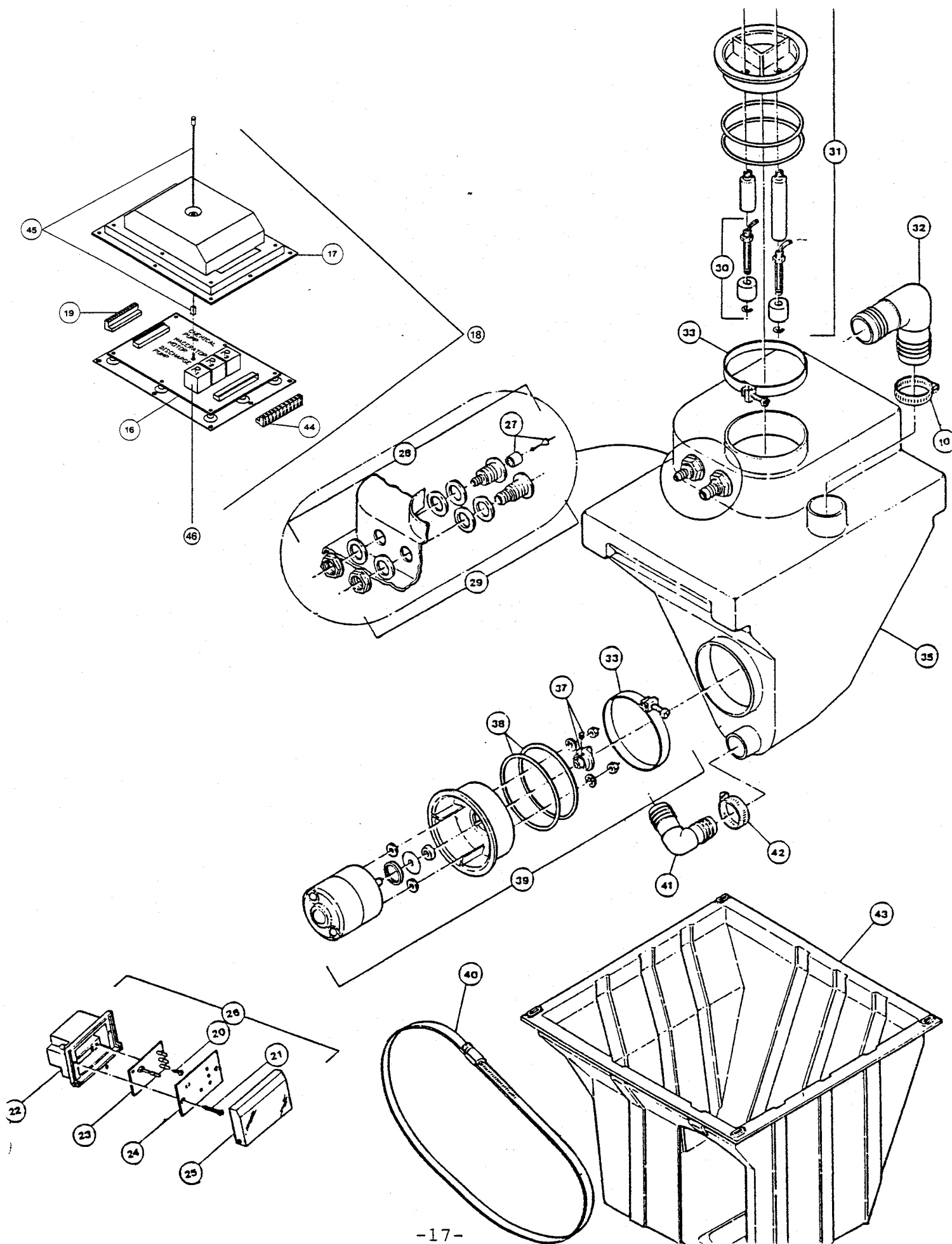
1. Check connection of LED to module
2. Replace LED assembly

Note: The indicator light located in the center of the control module cover is used as a troubleshooting aid, as follows:

- A. Light Blinking - Control module is operating normally.
- B. Light Continually On Or Off - Control module needs to be reset by temporarily turning off power supply and turning back on. If light still does not blink, see N above, or the control module is defective.

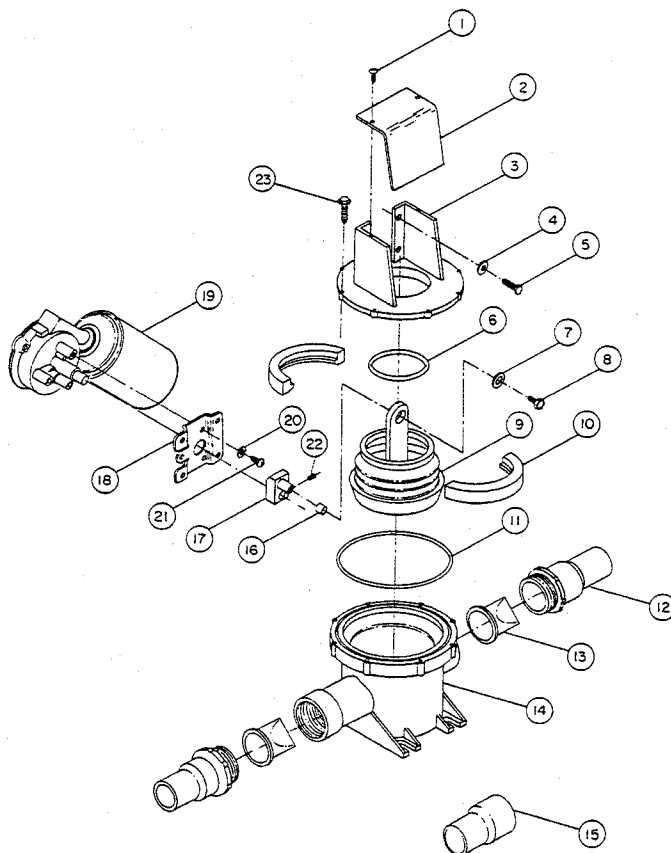
| ITEM | PART NUMBER | DESCRIPTION |
|----------------|----------------|---|
| 1 | 340421 | Chemical Container Cover |
| 2 | 340502 | Pump to Bottle Hose-24" |
| 3 | 345932 | Hose Clamp .875 |
| 4 | 348666 | Sanx/TDX Chemical-One Gallon |
| 5 | 310011 | Bottle Cap and Insert Kit |
| 6 | 348581 | Straight Adapter |
| 7 | 341251 | Tank to Pump hose-6' |
| 8 | 348595 | Hose Adapter Elbow |
| 9 | 340413 | Fuse |
| 10 | 347940 | Hose Clamp-2.250" |
| 11 | 230296 | Chemical Pump Assembly |
| 12 | 340420 | Chemical Container |
| 13 | 340464 | Holddown Strap |
| 14 | 230267 | Chemical Container Mounting Kit |
| 15 | 230297 | Chemical Container Assembly-Complete |
| 16 | 640133 | Control Module-Revision 3 |
| 17 | 230683 | Control Module Cover Assembly |
| 18 | 230679 | Control Module Assembly (Includes 16, 17, 19, 44, 45 and 46) |
| 19 | 230680 | 13 Pin Terminal Plug and Label |
| 20 | 340488 | Sheet Metal Screw, #6 x 3/8" SS |
| 21 | 340471 | Black Mounting Screw, #6 x 1" SS |
| 22 | 340432 | Control Panel Housing |
| 23 | 340553 | Control Panel |
| 24 | 340543 | Face Plate |
| 25 | 340433 | Control Panel Cover |
| 26 | 230299 | Control Panel Assembly-Complete |
| 27 | 230044 | Check Valve Assembly |
| 28 | 310010 | Chemical Inlet Fitting and Mounting Hardware |
| 29 | 310009 | Vent Fitting and Mounting Hardware |
| 30 | 230268 | Stem and Float Assembly |
| 31 | 230300 | Level Indicator Cap Assembly |
| 32 | 640055 | Inlet Elbow |
| 33 | 341064 | Clamp-4.5" |
| 34 | 341362 | Dip Tube |
| 35 | 640006 | Holding Tank |
| 36 | 340422 | Chemical Container Cradle |
| 37 | 310008 | Macerator Blade and Screw Kit |
| 38 | 341222 | Macerator Adapter O'Ring |
| 39 | 310007 | Replacement Macerator Kit |
| 40 | 341066 | Clamp-12" |
| 41 | 341094 | Discharge Elbow |
| 42 | 345692 | Clamp-1.75" |
| 43 | 341141 | Mounting Cradle |
| 44 | 230681 | 11 Pin Terminal Plug and Label |
| 45 | 310167 | LED Assembly Kit |
| R ₁ | 341292 | Discharge Pump Relay |
| R ₂ | 341292 | Macerator Motor Relay |
| R ₃ | 341292 | Chemical Injection Relay |
| | 640041 | Outlet Hose-1" x 3' (Not Shown) |



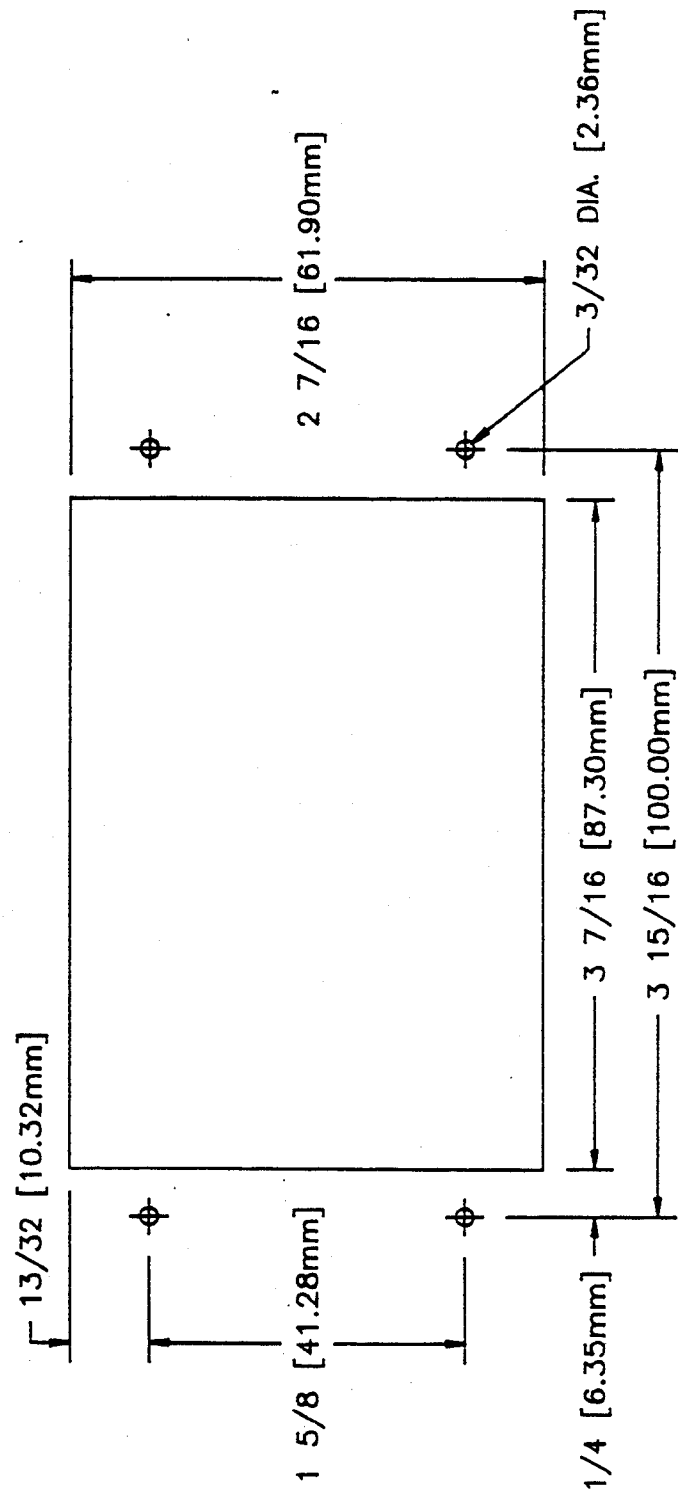


T PUMP PARTS LIST

| ITEM | PART NUMBER | DESCRIPTION |
|------|----------------|---|
| 1 | 340237 | Cover Screw, #4 x 3/8" Pan Head |
| 2 | 340236 | Pump Cover |
| 3 | 341502 | Top Closure |
| 4 | 344087 | Washer, #10.x 5/8" O.D. SS |
| 5 | 340156 | Hex Head Screw, #10-32 x 3/4" SS |
| 6,11 | 310151 | O'Ring Replacement Kit |
| 7,16 | 340664 | Bushing Kit |
| 8 | 347785 | Hex Head Screw, #10-32 x 3/8" SS |
| 9 | 340671 | Bellows Assembly |
| 10 | 347807 | Bellows Clamp |
| 12 | 340669 | Valve Nipple |
| 13 | 347802 | 1 1/2" Duckbill Valve |
| 14 | 341489 | Pump Body |
| 15 | 341113 | Coupling |
| 17 | 340018 | Eccentric |
| 18 | 340008 | Motor Mounting Bracket |
| 19 | 310245 | Motor, 12VDC |
| | 310246 | Motor, 24VDC |
| | 310247 | Motor, 32VDC |
| 20 | 346615 | External Tooth Lockwasher 1/4" |
| 21 | 340017 | Screw, #1/4-28 x 1/2" Phil Head SS |
| 22 | 347788 | Set Screw, #1/4-28 x 5/16" |
| 23 | 341503 | Screw, #10-10 x 3/4" Hex Washer Head |
| 24 | 310250 | Pump Assembly Less Motor (Includes Items 3, 6, 9, 10, 11, 12, 13, 14, 16, 23) |



CONTROL PANEL MOUNTING TEMPLATE:



Parts Distributors

AER Supply, Inc.
2301 Nasa Road 1
Seabrook, TX 77586
In Texas (800) 392-4113
(713) 474-3276
Fax: (713) 474-2714

Ardemco Marine Specialties
1835 Whittier Ave., Unit 8-6
Costa Mesa, CA 92627
(714) 722-7672
Fax: (714) 642-9582

Baylor Marine Supply, Inc.
921 S.E. 20th Street
Fort Lauderdale, FL 33316
(305) 522-2656

Carolina Marine Services
80 41st Avenue
Isle of Palms, SC 29451
(803) 886-4213

Deimarine, Inc.
232 S. Ketcham Avenue
Amityville, NY 11701
(516) 598-2946
Fax: (516) 598-3524

Marine Sanitation Specialists
1900 N. Northlake Way
Suite 121
Seattle, WA 98103
(206) 633-1110
Fax: (206) 633-0317

Midwest Marine Supply Co.
24300 Jefferson Avenue
St. Clair Shores, MI 48080
(313) 778-8950
Fax: (313) 778-6108

Sea Farer Marine Supply
12270 Ulmerton Rd.
Largo, FL 33544
(813) 595-8813

Sea Power Marine
333 Kennedy Street
Oakland, CA 94606
(415) 533-9291
Fax: (415) 534-0908

Australia
SeaLand-Australia
Unit 11
16 Loyalty Road
North Rocks, NSW 2151
02-683-4848
Fax: 02-683-4747

Canada
Clearwater Marine
P.O. Box 254, Station S
Toronto, Ontario,
Canada M5M 4L7
(416) 881-3215
Fax: (416) 889-4399

Finland
Oy Laumar AB
PL 23
SF 00211 Helsinki
Finland
358-0-675617
Fax: 358-0-6821510

Greece and Turkey
Aegean Yachts
Leof. Syngrou 29
Athens, Greece 15126
30-1-842-3625

Italy
Ecosan SRL
Via della Liberazione 67/7
20089 Peschiera Borromeo
Italy
39-2-5470005
Fax: 39-2-55300397

Svama
Via Domodossola 19
20145 Milano
Italy
39-2-314141
Fax: 39-2-315553

Japan
Tominaga Co. Ltd.
6-8, 2-Chome
Nishi-Tenma, Kita-Ku
Osaka 530 Japan
(06) 365-5010
Fax: (06) 365-6294

New Zealand
Lusty & Blundell Ltd.
121 Wairau Rd.
Takapuna Auckland
9 New Zealand
64-9-444-3675
Fax: 64-9-444-3798

Sweden
Promar AB
Pentavagen 5G
S-183 30 TABY
Sweden
46-8-792-2990
Fax: 46-8-792-3075

Taiwan
Mar-Tech Eng. Corp.
41, Ping Ho West Road
Hsiao Kang
Kaohsiung
Taiwan ROC
(07) 822-6482
Fax: (07) 822-6485

The Netherlands
Heinen & Hopman Eng.
Zuidwenk 45 PO Box 9
3750 GA Spakenburg
31-3499-83014
Fax: 31-3499-87078

United Kingdom
Wyn Ltd.
Plas Paradwys, Bodorgan
Gwynedd LL62 5PE
Wales (UK)
44-407-840199
Fax: 44-407-840183

West Germany
Triton-Belco AG
Postfach 761120
Alter Teichweg
2000 Hamburg 76
West Germany
49-4-0291870
Fax: 49-4-029187104

Warranty

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If this SeaLand Technology product is placed in commercial or business use, it will be warranted, to the original purchaser only, to be free of defects in material and workmanship for a period of ninety (90) days from the date of purchase.

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