

# SCALEBLASTER®

## WATER CONDITIONER

*Salt-Free Solution to Hard Water Problems*

Manufactured by



## **SB-1200, SB-2000, SB-2800, SB-3600 & SB-4000 Installation & Operation Manual**



**Industrial Electronic Descaler**  
**120/240 VAC (Auto Selected)**

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**ScaleBlaster.com**

**Product Information**

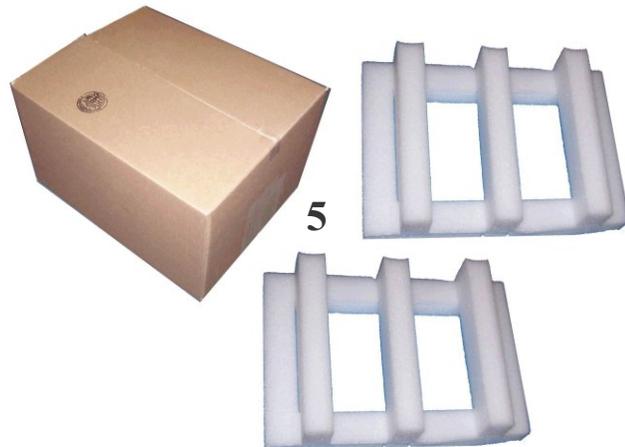
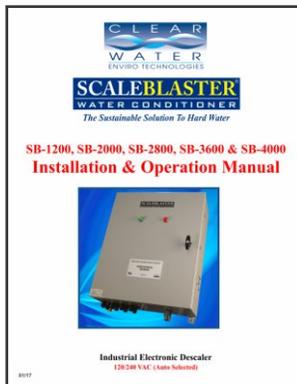


# A.) Identifying the ScaleBlaster Components

This ScaleBlaster unit includes the following components:

- 1) One ScaleBlaster control box.
- 2) One roll of 8 awg signal wire per number of channels. The total length of the cable will depend on the diameter and composition of the pipe to which it will attach.
- 3) Several long nylon cable ties, depending on number of channels. These ties aid in securing the cable to the pipe.
- 4) Warranty card (along with this Installation & Operations Manual)
- 5) Shipping Box. Please save the foam inserts and shipping box, it is made to protect the descaler during transport and is reusable in case the unit ever needs servicing at the factory.

SB-1200, SB-2000, SB-2800, SB-3600 or SB-4000



## B.) Installing the ScaleBlaster Control Box

### Selecting the Installation Location and Mounting the ScaleBlaster Unit

**PLEASE READ THE ENTIRE MANUAL BEFORE BEGINNING INSTALLATION. THE LOCATION OF THE SIGNAL CABLE AND THE CONTROL BOX ARE CRITICAL WITH RESPECT TO PRODUCT PERFORMANCE.**

- 1.) The unit should be installed by a licensed electrician, and the installation should meet all local and national codes.
- 2.) The best place to install the unit is on the main water line entering the facility, or on the line serving the relevant portion of the facility. First determine where the signal coils will be wrapped. This should be on a straight section of pipe (no elbows, tees, valves or couplings) that is at least four (4) feet long. Also, very important, the signal coils should be at least three (3) feet from any major source of electrical interference. The unit is splash-proof and can be installed outside if necessary. However, in this case a cover should be installed above the unit, and the unit should be kept out of direct sunlight.
- 3.) Mount the control box as close as possible to where the signal wire will wrap on the pipe, so that the cable is as short as possible.
- 4.) The control box, which has a 15-ft. power cord, should be mounted on a wall or other solid surface in a location near an electrical outlet or other power source. The unit is heavy and a sturdy installation is required. We recommend that you use a 3/8" lag and washer for each of the four mounting feet. (See photos below.)
- 5.) Upon being plugged in, the unit will work automatically on either 120 VAC or 240 VAC.

NOTE: If you have any questions about installation, contact your dealer or **Clearwater Enviro Technologies, Inc.** for assistance.



Photo 1 - recommended 3/8" mounting lag with washer.



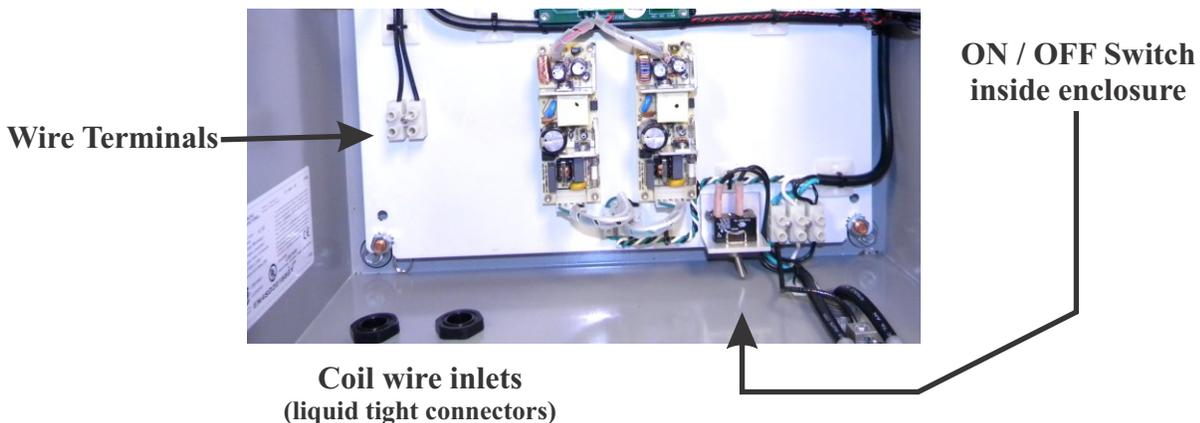
Photo 2 - one of the four control box mounting feet.

## C.) Wrapping the Signal Wire

### Wrapping the Signal Wire Around the Pipe

Included with the unit is one roll of 8 awg coil wire whose length is based on the size and composition of the pipe selected for installation.

- 1.) Carefully strip off 2" (51mm) of the outer rubber shield from the end of the signal wire.
- 2.) Insert one end of the coil wire into the coil wire inlet and attach to wire terminals (see below and also page 9). Turn liquid tight connectors to seal in wire.



- 3.) Route the signal wire from the control box to the inlet pipe. Hold the cable parallel and against the pipe and then secure the wire to the pipe with one of the nylon cables ties. Make sure that the tie is pulled tightly so that the wire is well-attached to the pipe. Remove excess cable tie with scissors.
- 4.) Using finger pressure to keep the signal wire and tie from moving, begin wrapping the signal wire securely around the pipe in any direction. The correct number of wraps depends on pipe size and composition. For proper product performance, it is imperative to wrap the correct number of times. To determine the number of wraps for ferrous pipe, consult **pages 6-8**. For non-ferrous pipe, please call **Clearwater Enviro Technologies, Inc.** to get this information.
- 5.) **MAKE SURE THAT THE WRAPS ARE FLUSH AGAINST ONE ANOTHER—NEVER OVERLAPPING (see Photo 4a & 4b, page 9).**

NOTE: As previously indicated, make sure that the control box is mounted as close as possible to where the signal wire is wrapped on the pipe.

- 6.) Once the wrapping is complete, secure the signal wire to the pipe using another cable tie. Remove the excess cable tie with scissors.
- 7.) Route the loose end of the signal wire back to the control box. Trim the wire to length.

# C.) Wrapping the Signal Wire

(continued)

## Industrial Models

<b>SB-1200</b>									
<b>PVC/PEX</b>									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
8"	8.625	39	Single	8	10.5	108.1		G	
10"	10.750	30	Single	8	8.0	104.4		G	
12"	12.750	24	Single	8	6.4	100.1		F	
<b>Ferrous (Re-circulating)</b>									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
4"	4.500	61	Single	8	16.3	91.9		F	
4 1/2"	5.000	57	Single	8	15.3	94.6		F	
5"	5.563	54	Single	8	14.5	98.6		F	
6"	6.625	51	Single	8	13.7	108.5		G	
<b>Ferrous (One-Shot)</b>									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
2 1/2"	2.875	30	Double	8	8.0	67.6		F	
3"	3.500	27	Double	8	7.2	71.7		F	

\* Expected Wire usage includes the wire used on the coil and both leads (10ft ea) connecting the unit to the coil.

<b>SB-2000</b>									
<b>PVC/PEX</b>									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
18"	18.000	17	Single	8	4.6	100.1		F	
20"	20.000	15	Single	8	4.0	98.5		F	
<b>Ferrous (Re-circulating)</b>									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
12"	12.750	34	Single	8	9.1	133.5		G	
14"	14.000	31	Single	8	8.3	133.6		G	
<b>Ferrous (One-Shot)</b>									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
6"	6.625	51	Single	8	13.7	108.5		G	
7"	7.625	49	Single	8	13.1	117.8		G	
8"	8.625	46	Single	8	12.3	123.9		G	

\* Expected Wire usage includes the wire used on the coil and both leads (10ft ea) connecting the unit to the coil.

# C.) Wrapping the Signal Wire

(continued)

## Industrial Models

<b>SB-2800</b>									
<b>PVC/PEX</b>									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
20"	20.000	15	Single	8	4.0	98.5		F	
24"	24.000	12	Single	8	3.2	95.4		F	
30"	30.000	11	Single	8	2.9	106.4		G	
<b>Ferrous (Re-circulating)</b>									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
14"	14.000	31	Single	8	8.3	133.6		G	
16"	16.000	24	Single	8	6.4	120.5		G	
18"	18.000	22	Single	8	5.9	123.7		G	
20"	20.000	21	Single	8	5.6	130.0		G	
<b>Ferrous (One-Shot)</b>									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
8"	8.625	46	Single	8	12.3	123.9		G	
9"	9.625	43	Single	8	11.5	128.3		G	
10"	10.750	41	Single	8	11.0	135.4		G	

\* Expected Wire usage includes the wire used on the coil and both leads (10ft ea) connecting the unit to the coil.

<b>SB-3600</b>									
<b>PVC/PEX</b>									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
30"	30.000	11	Single	8	2.9	106.4		G	
36"	36.000	9	Single	8	2.4	104.8		G	
<b>Ferrous (Re-circulating)</b>									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
20"	20.000	21	Single	8	5.6	130.0		G	
22"	22.000	19	Single	8	5.1	129.4		G	
24"	24.000	17	Single	8	4.6	126.8		G	
<b>Ferrous (One-Shot)</b>									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
10"	10.750	41	Single	8	11.0	135.4		G	
12"	12.750	34	Single	8	9.1	133.5		G	

\* Expected Wire usage includes the wire used on the coil and both leads (10ft ea) connecting the unit to the coil.

# C.) Wrapping the Signal Wire

(continued)

## Industrial Models

SB-4000									
PVC/PEX									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
36"	36.000	9	Single	8	2.4	104.8		G	
42"	42.000	7	Single	8	1.9	97.0		F	
Ferrous (Re-circulating)									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
24"	24.000	17	Single	8	4.6	126.8		G	
30"	30.000	13	Single	8	3.5	122.1		G	
Ferrous (One-Shot)									
Pipe Size	Pipe OD (in)	Number of Wraps	Type of Coil	Wire Gauge (AWG)	Length of Coil (in)	Expected Wire Usage (ft)*		Wire Pack Code	
12"	12.750	34	Single	8	9.1	133.5		G	
14"	14.000	31	Single	8	8.3	133.6		G	
16"	16.000	24	Single	8	6.4	120.5		G	

\* Expected Wire usage includes the wire used on the coil and both leads (10ft ea) connecting the unit to the coil.



### - Important Notice -

If you are sizing a commercial and/or industrial model, we strongly recommend you contact the engineers at ScaleBlaster for the proper sizing and location of the installation. While the pipe size is a critical criteria for the sizing of a ScaleBlaster unit, other factors such as water hardness, the actual application, type of pipe, flow rates, direction and length of pipe can affect the proper decision on what model to use.

## C.) Wrapping the Signal Wire

(continued)

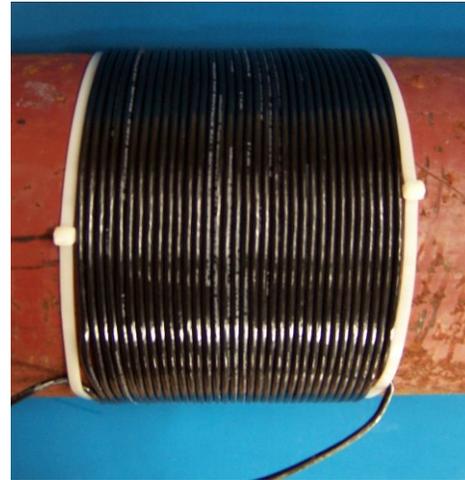


Photo 4a & 4b - Examples of tightly wrapped signal wire

### Channel One Coil Wire Inlets:

Connect first signal wire thru these coil wire inlets and attach the wire to the wire terminals inside.

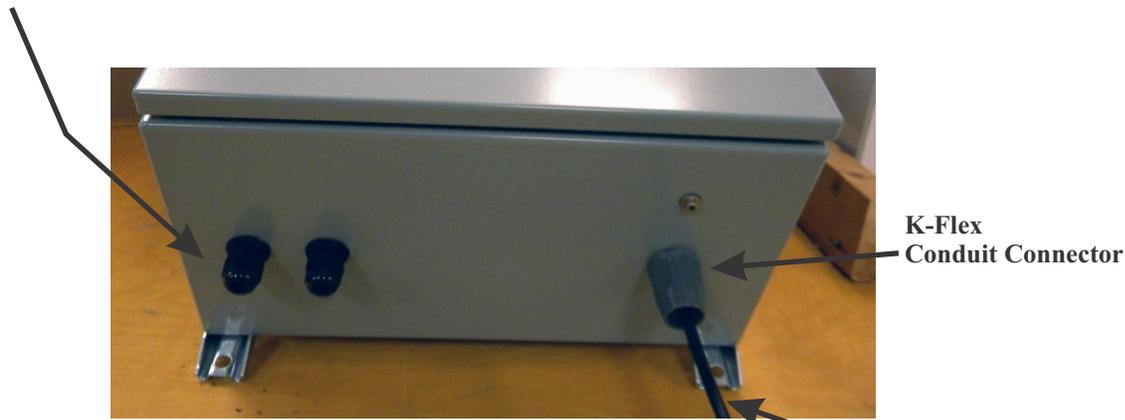


Photo 5 - bottom of unit

Main Input Cable:  
90-264 VAC, 47-63Hz

## D.) Powering up the Control Box / Computer

### Power Requirements and Considerations for the ScaleBlaster Control Box

**Please Note: YOU MUST FOLLOW ALL LOCAL, STATE, NATIONAL OR INTERNATIONAL CODES WHEN INSTALLING. A CERTIFIED ELECTRICIAN WILL BE REQUIRED.**

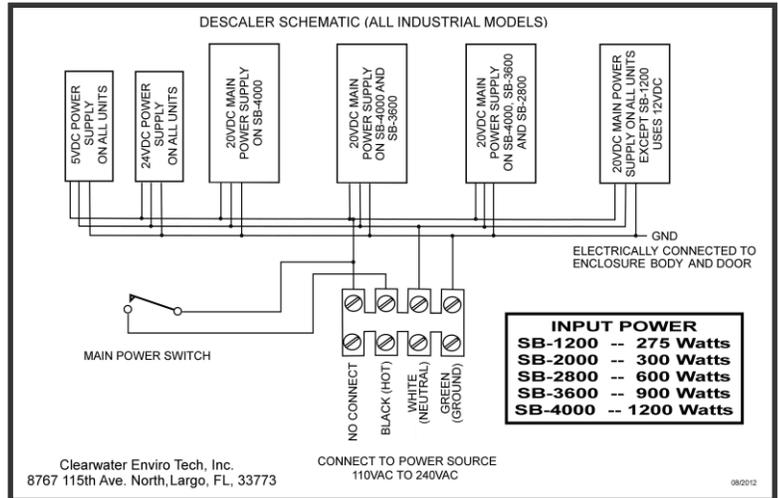
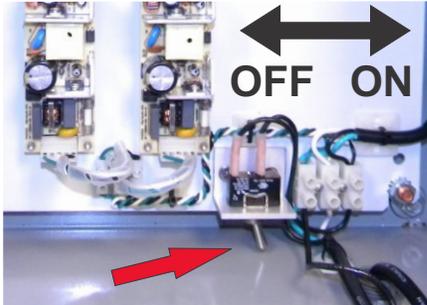
The control box auto switches between 115VAC and 230VAC, there is no need to make any internal adjustments.

1.) The control box must be connected to the power source by a wire conduit. The control box ships from the factory with a 1/2" K-Flex conduit connector on it. However, the installer can change the conduit connector to another style if needed. The new connector should also be a water tight conduit connector. The existing hole in the enclosure for the conduit connector is 7/8". Again this installation should be done by a licensed electrician.

## D.) Powering up the Control Box / Computer (continued)

2.) Wire the control box to the power source as shown in the diagram to the right.

3.) When ready to operate unit, turn the power switch to the on position.



## E.) LCD Indicator Screen

This ScaleBlaster unit has an LCD screen on the front of the control box that provides information on operation on the descalers operational condition.

### Start-up Screen

The start-up screen is displayed for approximately 10 seconds while the unit initializes.

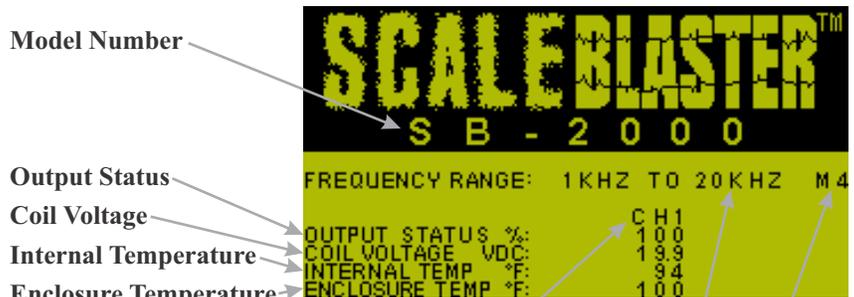


Firmware Revision Level

Total Hours of Operation

### Main Screen

The main screen shows most of the operation condition of the ScaleBlaster control box.



Model Number

Output Status

Coil Voltage

Internal Temperature

Enclosure Temperature

Channel Number

Frequency Sweep Range

Frequency Sweep Range Mode Number

### Descriptions of some of the screen indicators:

**Model Number:** ScaleBlaster Industrial Models include the SB-1200, SB-2000, SB-2800, SB-3600, and SB-4000.

**Output Status:** Output status of the coil current. The value of "100" indicates that the unit is functioning at 100%.

**Coil Voltage:** This is the voltage applied to the induction coil (i.e., the coiled wraps on the pipe). These values should always be between 19.5 and 20.5 volts direct current.

**Internal Temp:** This value indicates the internal temperature in degrees Fahrenheit.

**Enclosure Temp:** Displays the temperature, in degrees Fahrenheit, of each channel's heatsink.

**Frequency Sweep Range:** Frequency range the descalers output will sweep between.

**Mode Number:** This number identifies a particular frequency sweep range, as set by the DIP switch. The unit is designed to permit selecting from among several pre-set sweep ranges via the DIP switch. (See "Additional Options: Frequency Sweep Mode", p. 17.)

## F.) Error Screen and Codes

This ScaleBlaster unit constantly scans for any malfunctions in the operation status of the unit. If an error is detected it is logged reported via the *Unit Error Screen*. This screen will display the channel and error that has occurred. A brief description of these errors are described below.

**Error List:** Displays channel number and type of error that has occurred. List holds up to four errors.



```
UNIT ERROR
CH-1 COIL CURRENT
SB-2000
FREQUENCY RANGE: 1KHZ TO 20KHZ M4
OUTPUT STATUS %: CH1 000
COIL VOLTAGE VDC: 19.9
INTERNAL TEMP °F: 94
ENCLOSURE TEMP °F: 100
```

**Error:** In this example, the reading of "000" for the output status indicates a problem with the current at the coil for Channel 1.

Sample Error Screen

### INTERNAL TEMP Error

Displayed as: CH-1 INTERNAL TEMP

The internal temperature sensor has recorded a temperature that is too high (above 150° F , 65.6° C) and has shut down that channel. One possible cause for this error is that the unit was installed in a location exposed to direct sunlight, which may make the unit overheat. Another possible reason for this is a failure of internal circuitry causing excess heat buildup. In this case, contact your dealer or ClearWater Enviro Technologies, Inc.

### ENCLOSURE TEMP Error

Displayed as: CH-1 ENCLOSURE TEMP

Enclosure and slave board heatsink temperature sensor has recorded a temperature that is too high (above 150° F , 65.6° C) and has shut down that channel. Possible cause for this error: internal circuitry failure. Contact your dealer or ClearWater Enviro Technologies, Inc.

### SMPS VOLTAGE Error

Displayed as: CH-1 SMPS VOLTAGE

The value shown at "Coil Voltage" is the main output in volts from the Switch Mode Power Supply located inside the control box. If this error occurs, check the output binding posts for that channel to make sure that they are not directly shorted together. If not, then there must be a failure of internal circuitry. Contact your dealer or ClearWater Enviro Technologies, Inc.

### COIL CURRENT Error

Displayed as: CH-1 COIL CURRENT

This indicates a failure in the main output current for that channel. Possible cause: the cable wire has been cut or disconnected from the output binding post.

# G.) Calibrating the Signal Coil

## Calibrating the Industrial unit to match Coil / Pipe Variations

The unit has been factory calibrated to the pipe similar to that of the actual installed pipe. However there may be differences in the pipe material, pipe wall thickness, and coil wrapping techniques which may require the unit to be re-calibrated. The following will instruct the installer how to accomplish this task. Tools required, a large regular screw driver, and a small jewelers screw driver. **Note that even though the instructions are using different models to show the calibration process, the process is virtually identical for each model.**

**Step 1)** Make sure unit is at room temperature, **DO NOT** calibrate unit while the unit is warm. Please wait till the unit has returned to room temperature. Then, open the door on the unit using the large regular screw driver.



Control unit with door closed



Control unit with door opened showing electronics inside

**Step 2)** Use the small jewelers screwdriver to move the bottom four dip switches to the positions shown in the picture below.

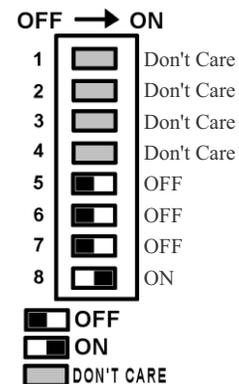
**Note: DO NOT move any of the top four dip switches.**



View of the master board showing location of the Dip Switch



Close up view of the Dip Switch set for calibration mode



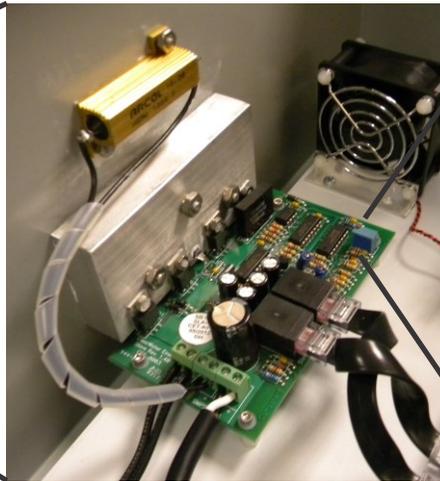
# G.) Calibrating the Signal Coil

(continued)

**Step 3)** Locate the slave board, and the small blue potentiometer located at the upper right side of that board.



View showing all boards



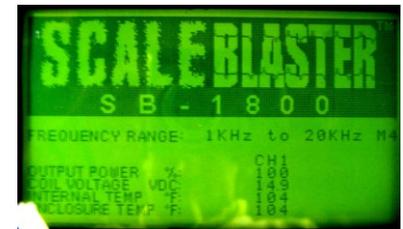
Close up view of slave board



Close up view of potentiometer on slave board

**Step 4)** With the coil attached, power up unit and notice that it now comes up in calibration mode (M9).

**Step 5)** Now the unit is in calibration mode, the output power reading is changed in this mode to display the under/over current error trip point. This reading should be between 40 and 60. If output power is lower then 040, then using the small jewelers screwdriver, turn the small screw on the blue potentiometer, (the blue square thing) clock wise, this will increase the output power reading. Likewise if the output power reading is more then say 060, adjust the potentiometer counter clockwise till it is between 40-60. Please note that the exact reading is not critical, and where from 40 to 60 will allow the unit to operate with in the normal operating parameters.



View of the units screen in normal mode (M4).

Note if the unit is not responding to the above calibration then, turn the potentiometer 20 full turns counter-clockwise. This will reset the unit to its default minimum value. Then repeat step 5.



View of the units screen in calibration mode (M9).

Note this will not increase the output power. This adjustment is for the internal microcontroller reference for sensing over and under current conditions.

**Step 6)** Once the adjustment has been made, power down unit and reset the bottom four dip switches back to the normal operating mode, 1KHz to 20KHz (M4).



View of the Dip Switch set for normal mode.

OFF → ON

- |   |                                     |            |
|---|-------------------------------------|------------|
| 1 | <input type="checkbox"/>            | Don't Care |
| 2 | <input type="checkbox"/>            | Don't Care |
| 3 | <input type="checkbox"/>            | Don't Care |
| 4 | <input type="checkbox"/>            | Don't Care |
| 5 | <input checked="" type="checkbox"/> | ON         |
| 6 | <input checked="" type="checkbox"/> | ON         |
| 7 | <input type="checkbox"/>            | OFF        |
| 8 | <input type="checkbox"/>            | OFF        |

- OFF
- ON
- DON'T CARE

## H.) Adjusting the LCD Contrast

Depending of light conditions of the control boxes installation site, it might be necessary to adjust the LCD's contrast. To adjust the contrast of the LCD, first locate the Contrast Adjustment Control. Using a small, flathead screwdriver, rotate the control until the desired contrast is achieved.



Inside the unit showing the LCD screen

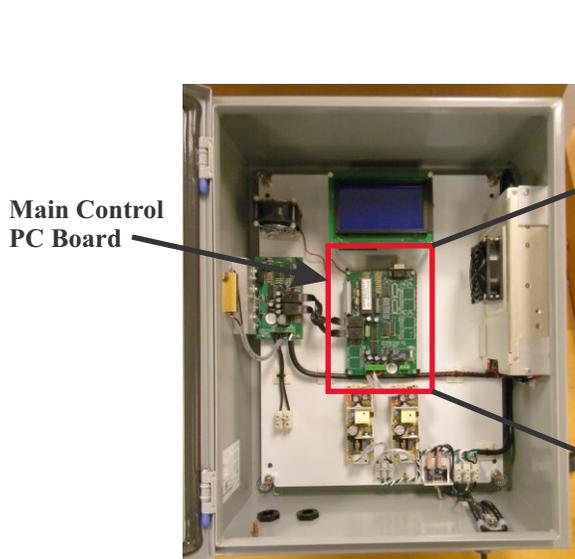
LCD Contrast Control



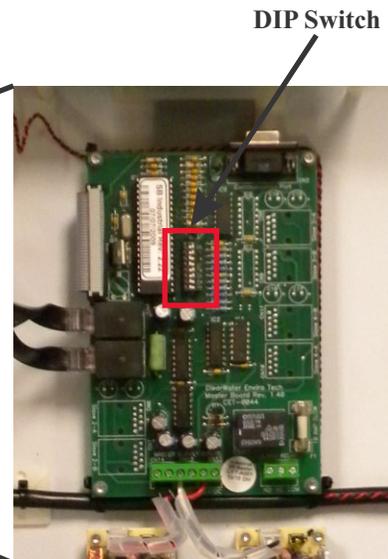
Back side of the LCD screen showing the Contrast Control

## I.) Changing the Frequency Sweep Mode

This unit has a patent-pending feature that allows you to adjust the frequency sweep range via the DIP switch (below). The range has been factory set, and we recommend that you do not change this without first consulting **Clearwater's** engineers.



View of main Control PC Board

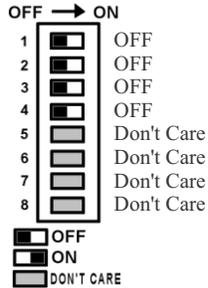


Close-up view showing DIP Switch

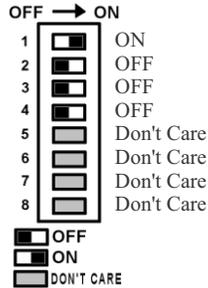
# Appendix 1) Model Number Dip Switch Settings

This is factory set and should not be adjusted by the end user. These switches will not increase the power to the unit, that can only be done at the factory. These settings are only for reference in the case that they were altered by mistake.

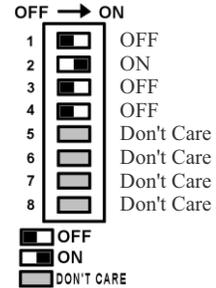
## SB-1200 Mode



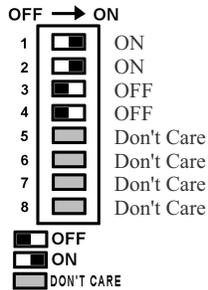
## SB-1400 Mode Discontinued



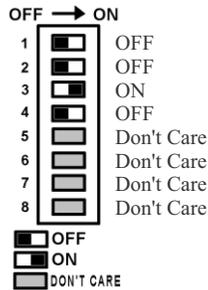
## SB-1800 Mode Discontinued



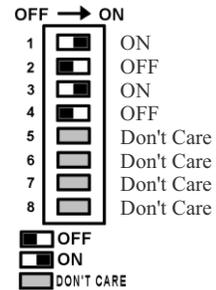
## SB-2000 Mode



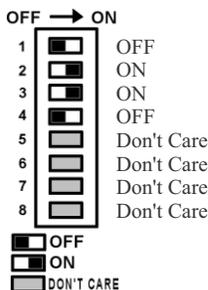
## SB-2800 Mode



## SB-3600 Mode



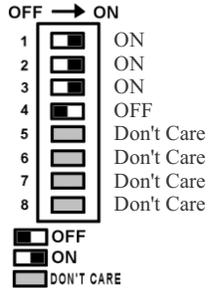
## SB-4000 Mode



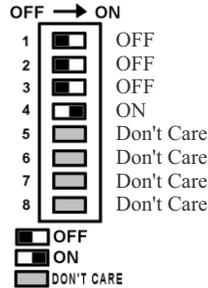
# Appendix 1) Model Number Dip Switch Settings (continued)

This is factory set and should not be adjusted by the end user. These switches will not increase the power to the unit, that can only be done at the factory. These settings are only for reference in the case that they were altered by mistake.

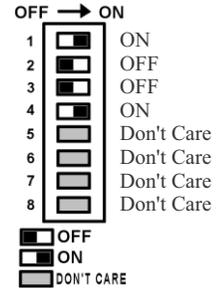
## SB-2800 Single Mode



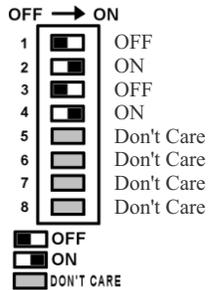
## SB-3600 Single Mode



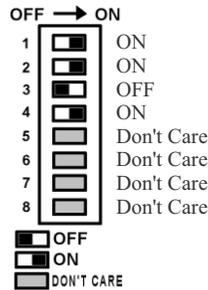
## SB-4000 Single Mode



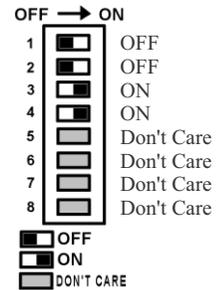
## SB-5400 Single Mode



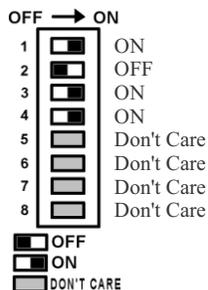
## SB-6400 Single Mode



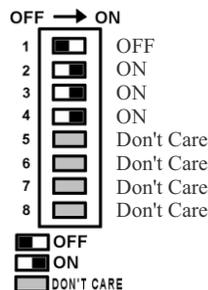
## SB-7400 Single Mode



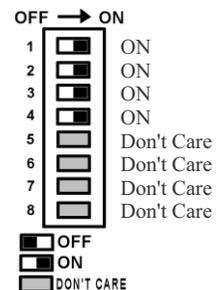
## SB-8400 Single Mode



## SB-9400 Single Mode



## Future Use



# Appendix 2) Frequency Sweep DIP Switch Settings

This is factory set and should not be adjusted by the end user. These switches will not increase the power to the unit, that can only be done at the factory. These settings are only for reference in the case that they were altered by mistake.

**Mode 1 - 1KHz to 5KHz**  
Sets the frequency sweep range of the unit to sweep from 1,000 hertz to 5,000 hertz.

OFF → ON

1	<input type="checkbox"/>	Don't Care
2	<input type="checkbox"/>	Don't Care
3	<input type="checkbox"/>	Don't Care
4	<input type="checkbox"/>	Don't Care
5	<input checked="" type="checkbox"/>	OFF
6	<input checked="" type="checkbox"/>	OFF
7	<input checked="" type="checkbox"/>	OFF
8	<input checked="" type="checkbox"/>	OFF

OFF  
 ON  
 DON'T CARE

**Mode 2 - 1KHz to 10KHz**  
Sets the frequency sweep range of the unit to sweep from 1,000 hertz to 10,000 hertz.

OFF → ON

1	<input type="checkbox"/>	Don't Care
2	<input type="checkbox"/>	Don't Care
3	<input type="checkbox"/>	Don't Care
4	<input type="checkbox"/>	Don't Care
5	<input checked="" type="checkbox"/>	ON
6	<input checked="" type="checkbox"/>	OFF
7	<input checked="" type="checkbox"/>	OFF
8	<input checked="" type="checkbox"/>	OFF

OFF  
 ON  
 DON'T CARE

**Mode 3 - 1KHz to 15KHz**  
Sets the frequency sweep range of the unit to sweep from 1,000 hertz to 15,000 hertz.

OFF → ON

1	<input type="checkbox"/>	Don't Care
2	<input type="checkbox"/>	Don't Care
3	<input type="checkbox"/>	Don't Care
4	<input type="checkbox"/>	Don't Care
5	<input checked="" type="checkbox"/>	OFF
6	<input checked="" type="checkbox"/>	ON
7	<input checked="" type="checkbox"/>	OFF
8	<input checked="" type="checkbox"/>	OFF

OFF  
 ON  
 DON'T CARE

**Mode 4 - 1KHz to 20KHz**  
Sets the frequency sweep range of the unit to sweep from 1,000 hertz to 20,000 hertz.

OFF → ON

1	<input type="checkbox"/>	Don't Care
2	<input type="checkbox"/>	Don't Care
3	<input type="checkbox"/>	Don't Care
4	<input type="checkbox"/>	Don't Care
5	<input checked="" type="checkbox"/>	ON
6	<input checked="" type="checkbox"/>	ON
7	<input checked="" type="checkbox"/>	OFF
8	<input checked="" type="checkbox"/>	OFF

OFF  
 ON  
 DON'T CARE

**Mode 5 - 1KHz to 2KHz**  
Sets the frequency sweep range of the unit to sweep from 1,000 hertz to 2,000 hertz.

OFF → ON

1	<input type="checkbox"/>	Don't Care
2	<input type="checkbox"/>	Don't Care
3	<input type="checkbox"/>	Don't Care
4	<input type="checkbox"/>	Don't Care
5	<input checked="" type="checkbox"/>	OFF
6	<input checked="" type="checkbox"/>	OFF
7	<input checked="" type="checkbox"/>	ON
8	<input checked="" type="checkbox"/>	OFF

OFF  
 ON  
 DON'T CARE

**Mode 1 - 2KHz to 4KHz**  
Sets the frequency sweep range of the unit to sweep from 2,000 hertz to 4,000 hertz.

OFF → ON

1	<input type="checkbox"/>	Don't Care
2	<input type="checkbox"/>	Don't Care
3	<input type="checkbox"/>	Don't Care
4	<input type="checkbox"/>	Don't Care
5	<input checked="" type="checkbox"/>	ON
6	<input checked="" type="checkbox"/>	OFF
7	<input checked="" type="checkbox"/>	ON
8	<input checked="" type="checkbox"/>	OFF

OFF  
 ON  
 DON'T CARE

**Mode 7 - Cal. Auto Tune**  
Future Use

OFF → ON

1	<input type="checkbox"/>	Don't Care
2	<input type="checkbox"/>	Don't Care
3	<input type="checkbox"/>	Don't Care
4	<input type="checkbox"/>	Don't Care
5	<input checked="" type="checkbox"/>	OFF
6	<input checked="" type="checkbox"/>	ON
7	<input checked="" type="checkbox"/>	ON
8	<input checked="" type="checkbox"/>	OFF

OFF  
 ON  
 DON'T CARE

**Mode 8 - Use Auto Tune**  
Future Use

OFF → ON

1	<input type="checkbox"/>	Don't Care
2	<input type="checkbox"/>	Don't Care
3	<input type="checkbox"/>	Don't Care
4	<input type="checkbox"/>	Don't Care
5	<input checked="" type="checkbox"/>	ON
6	<input checked="" type="checkbox"/>	ON
7	<input checked="" type="checkbox"/>	ON
8	<input checked="" type="checkbox"/>	OFF

OFF  
 ON  
 DON'T CARE

**Mode 9 - Calibrate Coil**  
Used to calibrate the signal coil to the ScaleBlaster unit.

OFF → ON

1	<input type="checkbox"/>	Don't Care
2	<input type="checkbox"/>	Don't Care
3	<input type="checkbox"/>	Don't Care
4	<input type="checkbox"/>	Don't Care
5	<input checked="" type="checkbox"/>	OFF
6	<input checked="" type="checkbox"/>	OFF
7	<input checked="" type="checkbox"/>	OFF
8	<input checked="" type="checkbox"/>	ON

OFF  
 ON  
 DON'T CARE

## Appendix 3) Specifications

**Industrial Descalers Specification Sheet for: SB-1200, SB-2000, SB-2800, SB-3600 and SB-4000**

**Input Wattage:** SB-1200 - 275 Watts, SB-2000 - 300 Watts, SB-2800 - 600 Watts,  
SB-3600 - 900 Watts, SB-4000 - 1200 Watts

**Input Current:** 2A rush @ 115 VAC, 1A rush @ 230 VAC

**Number of Output Channels:**

SB-1200: One  
SB-2000: One  
SB-2800: Two  
SB-3600: Three  
SB-4000: Four

**Output Voltage:** 20 VDC (All units except SB-1200)

**Output Voltage:** 12 VDC (SB-1200 only)

Output Current: 10 Amps Peak Min. @1KHz\* (All units except SB-1200) per channel

\* Maximum coil inductance: 200uH.

Output Current: 6 Amps Peak Min. @1KHz\* (SB-1200 only)

\* Maximum coil inductance: 200uH.

**Type of Descaler:** Alternating Magnetic Field

**Transducer type:** Solenoid Coil, using copper wire

**Output Signal:** AC Square wave, Frequency user selectable:

Factory set to: 1KHz to 20KHz

Available Frequencies: 1KHz to 5KHz, 1KHz to 10KHz, 1KHz to 15KHz, 1KHz to 2KHz, 2KHz to 4KHz

**Circuit Protection:**

- Thermal overload protection on Switch-Mode Power Supply (SMPS)
- Over voltage protection on SMPS
- Over current protection on SMPS
- Micro-controller monitoring of enclosure/heatsink over temperature shutdown
- Micro-controller monitoring of internal over temperature shutdown
- Output sensing circuit for over current immediate shutdown protection
- Main input noise filtering

## Appendix 3) Specifications

### Operational Status Indicators:

- Internal – using LCD display for full status on all channels
- External – using two LED lamps for a go / no go status.
  - Green for Functioning, and Red for Not Functioning

**Enclosure:** Wall mount, grey powder-coated, 16-gauge steel. Nema 4 and 12 rated.

**Operating Temperature:** 10° F to 130° F (12° C to 54° C)

**Storage Temperature:** 2° F to 150° F (17° C to 66° C)

### Physical Properties:

SB-1200 Unit Dimensions: 16"x12"x6"

SB-1200 Unit Weight: 17 LBS

SB-1200 Shipping Crate Dimensions: 21"x17"x12"

SB-1200 Shipping Weight: 33 LBS, Includes 1 set of Coil Wire and Packaging

SB-2000 Unit Dimensions: 20"x16"x8"

SB-2000 Unit Weight: 30 LBS

SB-2000 Shipping Crate Dimensions: 26"x21"x14.5"

SB-2000 Shipping Weight: 46 LBS, Includes 1 set of Coil Wire and Packaging

SB-2800 Unit Dimensions: 24"x20"x8"

SB-2800 Unit Weight: 49 LBS

SB-2800 Shipping Crate Dimensions: 36"x24"x15"

SB-2800 Shipping Weight: 77 LBS, Includes 2 sets of Coil Wire and Packaging

SB-3600 Unit Dimensions: 24"x20"x8"

SB-3600 Unit Weight: 54 LBS

SB-3600 Shipping Crate Dimensions: 36"x24"x15"

SB-3600 Shipping Weight: 93 LBS, Includes 3 sets of Coil Wire and Packaging

SB-4000 Unit Dimensions: 30"x24"x8"

SB-4000 Unit Weight: 84 LBS

SB-4000 Shipping Crate Dimensions: 38"x32"x16"

SB-4000 Shipping Weight: 136 LBS, Includes 4 sets of Coil Wire and Packaging

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