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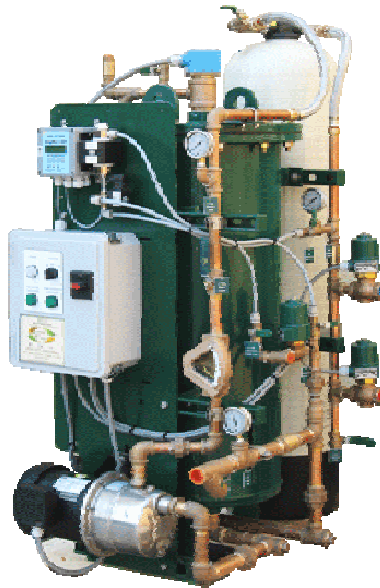
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## BOSS 107 SEPARATOR SYSTEM INSTALLATION & APPLICATION MANUAL



BOSS 2.2T/107



BOSS 5T/107



BOSS 11T/107



BOSS 25T/107



BOSS 45T/107

# INSTALLATION MANUAL

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# 1 Unpacking & Inspection

## 1.1 Delivery Inspection & Reporting

Prior to delivery the system is tested in the manufacturers shop to verify that the system is watertight and that all the pumps, valves, instrumentation and controls are operational. When the system arrives at it final destination it should be carefully checked for damage that may have been sustained during shipping. All damage should be noted and reported to the shipping company and to the manufacturer. If replacement parts or components are needed the manufacturer should be informed immediately.

# 2 Installation

The BOSS Oil Water Separator is a self-contained system that is fully tested and operated under normal operating conditions without oil at the factory. Each function of the system is tested and verified. Within the system no piping or wiring will be necessary unless the separator and polisher are to be mounted separate from each other.

Installation normally involves the following:

1. Move separator into place and mount the separator to the deck.
2. Make the necessary piping connections to your application. All piping connections to the system are listed in the table in appendix 2.

**BOSS 2, 5, and 11 Units:** The BOSS 2, 5 and 11 systems are piped complete.

**BOSS 25 & 45 Units:** The BOSS 25 and BOSS 45 and larger units are shipped with the polishing unit separate from the separator unless the skid option is ordered. These polishing units can be installed in a separate location from the separator if needed or desired. These units require the installer to install piping to connect the separator and the polisher together. The inlet and outlet on these units are clearly marked. The polisher can only be piped up one way, as marked on the unit.

**All Units:** It is critical that the connecting pipe runs are sized to permit unrestricted operation of the unit. Piping that is undersized can impair the operation of the system. To facilitate service and testing procedures it is recommended that the customer install isolation valves at all piping connections to the separator unit.

3. The unit has been set up for the proper voltage requirements at the factory as specified by your purchasing department. Please insure that the voltage you are supplying matches the voltage that the unit is designed to operate on. This voltage is shown on the electrical drawing. This schematic is found inside the control panel, as well as within the attachment section of the operating manual. The power connections to the main power disconnect (see figure 1) are shown on the electrical schematics attached as Attachment 5.

## 3 Startup & Commissioning

### 3.1. Factory Startup and Acceptance Test Procedures

Every system receives an acceptance test at the factory prior to shipping. A factory authorized technician is available to come on site for a field startup, commissioning and acceptance test if desired. This is not required for the system, however, it is a good idea and one that we highly recommend. The following procedures are those that a factory authorized technician will perform. If the customer does their own startup they will need to follow these same procedures. If the customer initially elects to do their own startup and then changes their mind the factory startup can be done at any time. Contact your representative or the factory for the associated costs. The factory startup can also be performed by your distributor if they have a factory trained technician. Check with your distributor to determine if they have a factory trained technician. The fee charged by the distributor's technician will be determined by the distributor.

The general steps for startup are listed here. More details are provided in the text.

1. Verify that the installation of the system before applying power.
2. Turn main power on and initial clean water fill and remove air from polishing filter.
3. Introduce process water and set design flow rate using manual control flow valve.
4. Verify suction & repair air leaks.
5. Verify proper operation of the TPH monitor.
6. Operate the system at design conditions for the required test period.
7. Simulate alarm and warning conditions to verify that they function properly.
8. Make any adjustments that are appropriate.

### 3.2. Before applying Power

Before applying power to the unit, be sure all isolation valves to and from the system are closed with the exception of the oil out valve after CV-102.

Verify that the power is at the voltage and frequency indicated on the electrical drawing and connected as shown on the electrical drawing. There are 2 copies in the electrical enclosure. One copy should be kept there.

If your system is wired for 115 or 240 VAC SINGLE PHASE operation the following procedure is NOT required. Follow this procedure ONLY if your system is wired for **3 PHASE** operation. Connect power to the L1, L2 and L3 terminals on the combination motor starter as shown on the electrical drawings. Do not remove the other wires on these terminals.

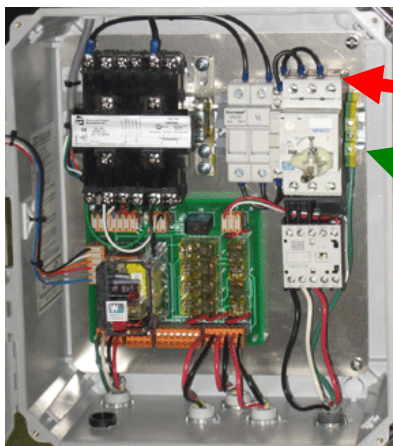
## Power Test:

After the installation of power and **BEFORE ANY WATER IS PUT IN THE SYSTEM** the pump should be checked for proper direction of rotation. If pump rotation is checked after the system is filled, starting the pump in the incorrect direction can cause the pump impeller to rotate off the motor shaft. If this should occur remove the pump head and re-attach the impeller to the shaft.

## WARNING!!

**An experienced and trained electrician or controls technician should do this procedure, as potentially lethal voltages are present in the control panel.**

Check rotation by manually energizing the pump. Open the control enclosure and turn the power on by turning the disconnect shaft counterclockwise 90 degrees. Momentarily push the contactor button with a pencil or other non-metallic item. At the same time, watch the direction of the fan on the rear of the pump. It should rotate in a clockwise direction as viewed from the back end of the motor (see figure 2). After testing rotation turn the disconnect off and close the enclosure door.



**Figure 1**

Power Connections

Ground



**Figure 2**

Watch the direction of the fan on the rear of the pump. It should rotate in a clockwise direction as viewed from the back end of the motor.

The unit is now ready to run by turning the disconnect to the On position and turning the ON-OFF-REM selector switch to the desired position.

The “REM” position of the BOSS selector switch is for remote on/off control. This would be for a remote controller or for a remote level switch in the bilge sump. The unit comes from the factory with a jumper on the REM position so that the system will operate the same at the “ON” or “REM” positions. For any remote operation, the customer will need to connect to the terminals provided. When the power disconnect on the BOSS unit is turned on, the power light should come on. The TPH monitor on the 107 unit should power up and perform its self test mode

### **3.3. Power ON & Initial Water Filling:**

Before the initial filling and testing, isolate the supply of oily water. It is important that the system is tested **BEFORE** any oily water is admitted into the separator. Verify that the clean water source has been turned on. It is recommended that the pressure of the clean water should not exceed 15 psig (the vessel design pressure). Turn the system switch to ON. The separator will automatically start to fill and the Fill & Oil Discharge light should be on. Open the separator vent valve (V001) at the top of the separator. When the separator is full the fill valve and oil discharge valve (MOV-101) will close (if your unit has the MOV option) and the pump will come on. The separator is now full.

During the initial fill of the system with water, the air in the polisher has no way of venting itself. Since a vacuum is formed in the separator the vent valve on top of the separator will need to be opened to allow water back into the pump. With the pump running, close the discharge and recycle isolation valves to allow the pressure to build up. When the pressure builds up, turn off the pump and open the polisher vent. This will release air and water. To avoid spraying of water connect the vent to a hose. When there is no more release of air and water shut the valve and turn the pump on and repeat the process as many times as necessary. When the system pressurizes quickly that is an indication that the air is gone. Once the air is evacuated open the isolation valves.

**IMPORTANT:** If the polisher is not completely filled the TPH monitor will have problems due to air in the polisher interfering with the oil ppm reading.

### **3.4. Introduce Process Water & Set Flow Rate:**

Turn the system on. Establish proper flow by adjusting the flow control valve until the flow indicator shows the proper system flow rate. Observe the pressure gauge located on the pump outlet. It is normally not necessary to adjust the flow rate during operations once it has been set.

### **3.5. Verify Suction:**

Check the suction by reading the suction gauge on the inlet pipe. If the suction pressure reads 0 there are most likely leaks in the piping. If the suction pressure is > 10 inches Hg there are either restrictions in the suction piping or the suction lift is too high. If you have removed all restrictions and the vacuum gauge still reads > 10 inches Hg the system could have difficulty achieving the design flow rate. In most cases the pump is oversized and the system will accommodate a somewhat higher than normal suction head. If there is no foot valve in the sump the system will drain every time it is shut off and will have a hard time priming. Verify that there is a foot valve in the sump.

### **3.6. TPH Test:**

While the system is running on clean water the TPH needs to read zero. If the TPH is not reading zero this may be caused by air in the sample lines or turbidity in the water. After a few minutes of running with clean water the air will work itself out of the system and any turbidity from the system should be eliminated. It is possible you may need to clean the cell with the brush. When the unit returns with a display of “0” PPM the unit is ready for operation.

If the monitor continues to read > 0 it may need to be reset. For further explanation of the TPH see the vendor O&M manual.

### **3.7. Polisher Startup Notes**

The system will not operate properly until all the air is purged from the polisher. There is a vent valve located on the inlet of the polisher or on the polisher cover. Open the vent valve to release all the air from the polisher. You may need to run the pump one or more times to get all the air out of the system.

### **3.8. Simulate Alarm Conditions for inspector or verification of valve operation**

The 107(49) monitors are factory calibrated by law and so no calibration is needed on startup.

When the inspectors come to verify the operation of the oil water separator, they will want to see that the monitor will open the discharge valve when less than 15ppm and that the recycle valve will activate when over the limit.

There is no reason to put oil in the system to verify its operation. If you were to introduce oil, it would only be absorbed by the filter and would not demonstrate anything, but would instead use up some of the capacity of the filter without showing any results.

The proper operation of the monitor can be demonstrated by simulating the alarm conditions. This is accomplished on the Brannstrom by holding the back arrow key for 4 seconds. This will simulate what happens when the unit is above 15 ppm. The discharge valve will close and the recycle valve will open.

This can be demonstrated on the Deckma Monitor by turning the cleaning water valve to the right while the unit is running and the discharge and recycle valves can be checked.

You can check that the valves are actuating by shutting off the isolation valves (customer supplied) and observing the pressure gauges on the separator.  
for example if the discharge is isolated and the recycle is not, you will have pressure when it is trying to discharge and no pressure when it is recycling.  
The monitor can be forced into alarm by emptying the cell by using the brush to push all the water out. Then when you turn the separator on the monitor will go above 15 ppm for a short period. This will show that above 15 ppm reading that the alarm works.

## **Checklist and Commissioning Report**





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## BOSS Oil Water Separator Commissioning Report

<b>Distributor:</b>	<b>Technician:</b>	<b>Date:</b>
<b>Customer:</b>	<b>Location:</b>	<b>Vessel:</b>
<b>Model No:</b>	<b>Serial No:</b>	

<b>BEFORE APPLYING POWER TO THE SYSTEM FOR THE FIRST TIME</b>		<b>O.K.</b>	<b>Remarks</b>
1	Verify the installation connections to the right locations and proper sizing per installation drawing		
2	Make sure isolation valves are installed before and after the unit and a foot valve in the sump/bilge.		
3	Verify power connection is correct including voltage per electrical drawing.		
4	Before applying power to the unit, be sure all isolation valves to and from the system are closed with the exception of the oil out valve after CV-102.		
5	For 3 Phase power systems, check pump rotation as outlined in 3.2 of the installation manual.		

<b>STARTING AND TESTING THE SYSTEM</b>		<b>O.K.</b>	<b>Remarks</b>
6	Turn the system power switch to the ON position		
7	The system will automatically fill with clean water. Make sure no oily water is allowed into the system.		
8	Open the separator vent valve (V001)		
9	Close the discharge and recycle isolation valves so the system will pressurize. This is to help evacuate the air from the system.		
10	Evacuate all air from the system. This may require running the pump one or more times.		
11	Open the isolation valves.		
12	Set the design flow rate as described in 3.4 of the installation manual.		
13	Verify proper vacuum as described in 3.5 of the installation manual. Fix any piping leaks or remove any obstructions.		
14	Open the valves to the TPH and verify proper operation of the TPH as outlined in 3.6 of the installation manual.		
15	The system is now ready for full operation and the oily water isolation valve can be opened and normal operations can commence. Turn 3 position switch to ON or REM (if using a remote on/off switch)		
16	Operate the system at design conditions for the required test period.		
17	Observe several cycles of the system. You can shorten the cycle time by opening the separator vent valve. This will pull air into the oil chamber and cause the system to go into the fill mode.		
18	Simulate alarm and warning conditions to verify that they function properly as outlined in 3.8 of the installation manual.		
19	Make any adjustments that are appropriate.		

**Installation Manual**  
**ATTACHMENT 1 - PIPING CONNECTIONS**

**BOSS 25T/107**

<b>Connection</b>	<b>2.2T/107</b>	<b>5T/107</b>	<b>11T/107</b>	<b>25T/107</b>	<b>45T/107</b>
<b>Oily Water Inlet</b>	3/4"	1"	1"	1 1/2"	2"
<b>Fresh Water In</b>	1/2"	1/2"	1/2"	3/4"	3/4"
<b>Oil Out Discharge</b>	1/2"	1/2"	3/4"	3/4"	3/4"
<b>Water Out Discharge</b>	1/2"	3/4"	1"	1 1/2"	1 1/2"
<b>Water Recycle</b>	1/2"	3/4"	1"	1 1/2"	1 1/2"
<b>Separator Center Drain<sup>1</sup></b>	3/4"	1"	1"	1 1/2"	1 1/2"
<b>Separator Outer Drain<sup>1</sup></b>	3/4"	1"	1"	1 1/2"	1 1/2"

<sup>1</sup> Not used during normal operation

**Installation Manual**  
ATTACHMENT 2 – INSTALLATION DRAWINGS