



Installation Guide

Version 2.2*

Model # MS-SCK-001

*Requires SapCheck v7.99B software or above

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LIMITED WARRANTY

You should first read all the instructions in this Installation Guide before attempting to use this product.

The SapCheck Controller and sensors are warranted against defective material or workmanship from the date of purchase. The warranty period is one (1) year.

This limited warranty applies to repair or replacement of product found to be defective in material or workmanship. This warranty does not apply to damage resulting from commercial, abusive, unreasonable use or supplemental damage. Defects that are the result of normal wear and tear will not be considered manufacturing defects under this warranty. **THE BOSWORTH COMPANY IS NOT LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE. ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON THIS PRODUCT IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY.** Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you also may have other rights which vary from jurisdiction to jurisdiction. This warranty applies only to the original purchaser of this product from the original date of purchase.

At its option, The Bosworth Company will repair or replace this product if it is found to be defective in material or workmanship.

This warranty does not cover damage resulting from any unauthorized attempts to repair or from any use not in accordance with the instruction manual.

NOTE: IF YOU EXPERIENCE A PROBLEM, PLEASE FIRST CONTACT SUPPORT@THEBOSWORTHCO.COM OR CALL US TOLL-FREE AT 1-888-438-1110. PLEASE HAVE AVAILABLE THE SAPCHECK MODEL NUMBER PRINTED ON THE BOTTOM OF THE CONTROLLER BOX. DO NOT RETURN THE PRODUCT TO THE ORIGINAL PLACE OF PURCHASE WITHOUT A RETURN MERCHANDISE AUTHORIZATION. DO NOT ATTEMPT TO OPEN THE SAPCHECK CONTROLLER BOX YOURSELF. DOING SO MAY VOID YOUR WARRANTY AND MAY CAUSE PERSONAL INJURY OR DAMAGE TO THE PRODUCT.

IMPORTANT! READ THIS FIRST !

SAVE THE PACKAGING!

Should you need to return SapCheck for any reason, you will need to send it back in its original carton in order to reduce the risk of possible damage during shipping. Shipping damage may not be covered under the product warranty if SapCheck has not been properly packaged in its original container prior to shipment.

BEFORE YOU BEGIN—CHECK FOR COMMUNICATIONS

Before you begin your installation, check to be sure that there is sufficient cell phone signal strength at your sugarbush for SapCheck to operate.

Note: If you purchased your SapCheck unit from a dealer, you will need to first contact The Bosworth Company to purchase a SapCheck Support Plan for your unit. (*See page 20 for details.*) Purchasing a plan will allow your SapCheck device to be assigned a SapCheck phone number to communicate on a cellular network. If you purchased your SapCheck directly from The Bosworth Company, then a phone number has already been assigned to your SapCheck, and your unit is ready to send and receive text messages.

Remove the SapCheck Controller from the packaging and attach the antenna to the box as shown in the figures below.



Figure 1a. Screw the antenna into the antenna port on the side of the SapCheck Controller.



Figure 1b. Flip the antenna up. Optionally, rotate the antenna so that the flat side faces forward.



Figure 1c. Antenna installed in optional rotated orientation.

CHECK FOR COMMUNICATIONS (CONT'D)

Bring the SapCheck Controller and power cord to your sugarbush. Be sure to have with you the cell phone that is going to function as a SapCheck Command Number.

While at your sugarbush, connect the SapCheck Controller to power. (

Note: For this initial communications test, you do not need to connect any of the SapCheck sensors to the Controller.

If there is sufficient cell phone connectivity at the sugarbush, then within approximately two minutes after powering on, SapCheck will send a text message to your cell phone, indicating the software version that is running, e.g.,

SapCheck version 7.96

example of start-up text message sent to your phone

You can text the command “**get signal**” to SapCheck and it will return a percent indicator of cell phone signal strength.

If you do not receive this text message, or if the percent signal strength is below 10%, then there may be insufficient cell phone signal strength at your sugarbush for SapCheck to operate.

INTRODUCTION

SapCheck is used to remotely monitor and control vacuum pump operation at maple syrup sugarbushes. It consists of a Controller together with three (3) sensors and associated connecting wires to monitor vacuum and temperature conditions at the sugarbush. SapCheck also sends an alert when the sap in the collection tank has reached a user-specified target level.

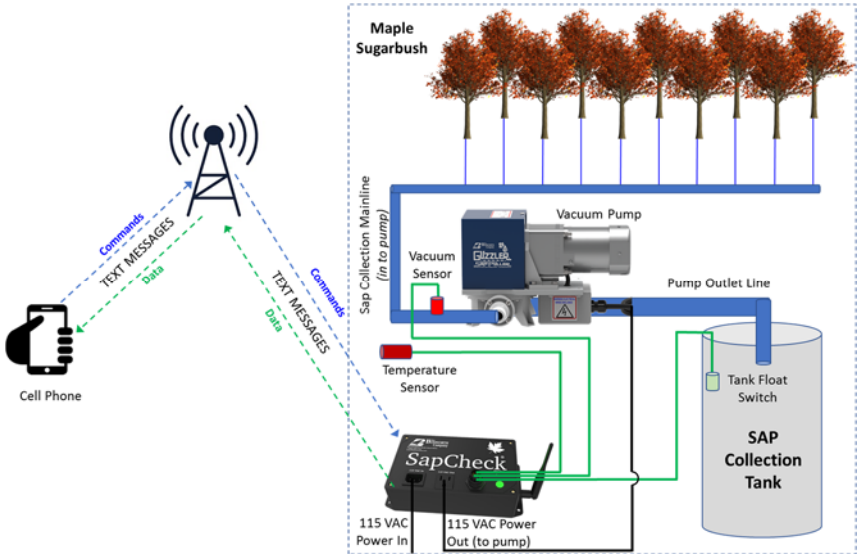


Figure 2

SapCheck requires 120 VAC power to the controller, and it can control vacuum pumps that operate on 120 VAC. Vacuum pumps up to 1/2 Hp can be directly controlled with SapCheck. Larger horsepower vacuum pumps can be controlled with the optional PowerToggle available for SapCheck.

However, SapCheck is not limited to controlling pumps that plug directly into the SapCheck Controller. SapCheck can be used to control power to any electrical device that is powered by 120 VAC and does not draw more than 370 watts of power. This includes the possibility of controlling 120 VAC relays that control larger pump equipment.

SapCheck operates by sending and receiving text messages over a cellular network. To operate properly, cell phone communications must be available at the sugarbush, but only to the extent of being able to send and receive text messages.

Each SapCheck unit has an associated phone number that is used for sending text messages to it. If you purchased your SapCheck unit directly from The Bosworth Company, that phone number has already been assigned to your device and your unit is ready to send and receive text messages.

If you purchased your unit through a dealer, you must call The Bosworth Company (1-888-438-1110) or visit the company website at <https://thebosworthco.com/activate> to purchase a support plan that will provide the cell phone communications necessary for SapCheck to operate. When you purchase a support plan, your SapCheck unit will be activated and you will receive your SapCheck's phone number.

To purchase a support plan you will need to provide the SapCheck ID # printed on the bottom of the SapCheck Controller. (Figure 3 shows an example of a SapCheck with ID # "D0000XT003".)



Figure 3

Example of SapCheck ID # printed on bottom of SapCheck controller:.

SAFETY

SapCheck should not be used to power any device that requires more than 370 watts of power. Using SapCheck with such a device could pose a risk of fire or electrical shock.

The SapCheck Controller requires protection from the elements. The unit should be deployed in a dry environment and should not be operated in temperatures below 20° F (-6° C) or above 90° F (32° C)

Under no circumstances should the SapCheck Controller be opened or disassembled. Tampering with the SapCheck equipment will void the warranty.

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DEFINITIONS

SapCheck Controller	That portion of the SapCheck product that contains the active electronics of the product. The product ID # is printed on the bottom of the Controller unit.
Command Number	SapCheck will only receive text commands from cell phone numbers that it recognizes. Each of these numbers is referred to as a Command Number. The “ set user ” text command can be used to add or delete cell phone numbers from this list.
SapCheck Phone Number	This is the phone # to which you will send text messages to your SapCheck device. You can add this phone # to your “Contacts” on your cell phone under the name “SapCheck”. (Note: if you have more than one SapCheck device, you may want to list each in your Contacts giving it a unique name, such as “SapCheck—Marshfield Rd”.)
Service mode	When service mode is turned on, SapCheck will only respond to text commands sent from The Bosworth Company’s service support line. This mode is only activated upon a user’s request and allows Bosworth to send and receive diagnostic text messages to the unit for troubleshooting purposes.
Activated	A SapCheck unit is “Activated” when its wireless communications components have been configured to send/receive text messages on a cell phone network. To be activated, a SapCheck unit must be covered by a Support Plan. An activated SapCheck has an assigned SapCheck phone #.
Inactive	A SapCheck unit is “Inactive” if its wireless communications components have not been configured to send/receive text messages. An inactive SapCheck unit has not been assigned a SapCheck phone #.
Deactivated	Unless a customer purchases additional support plan coverage, a SapCheck unit with an assigned phone # is Deactivated once the term of the Support Plan ends. When a SapCheck unit is deactivated, it can no longer send/receive text messages and it no longer retains its originally assigned SapCheck phone #. If a new Support Plan is purchased, a new phone # is assigned to the unit and communications are restored for the length of the new Support Plan.

SAPCHECK COMPONENTS



Figure 4

- ◆ SapCheck Controller (A)
- ◆ Tank float switch (B)
- ◆ 12' insulated float switch cable (C)
- ◆ Wire assembly consisting of Male Sensor Connector Plug (D) with temperature sensor (E) and male vacuum sensor connector (F) and 2 terminated Float Switch wires (G)
- ◆ Vacuum Sensor transducer with female connector (H)
- ◆ Controller Power Cord (J)
- ◆ "Power In" Receptacle on Controller (L)
- ◆ "Power Out" Receptacle on Controller (M)
- ◆ Multi-sensor connector (N)
- ◆ Float Switch By-pass wire (P)
- ◆ Antenna (Q)

INSTALLATION**TOOLS YOU WILL NEED**

Drill bits	Other
9/32" - Pump enclosure hole for temperature sensor	1/8" NPT tap
21/64" - Starter hole for vacuum transducer (to be tapped 3/8" NPT)	Electrical tape
3/8" - Pump enclosure hole for float switch cables	Teflon tape
13/32" - Float switch hole in sap collection tank (Drill 2-34" above alert level.)	Adjustable wrench (for installing tank float switch and vacuum transducer)

BEFORE YOU BEGIN

The SapCheck Controller unit must be co-located near your pump. It should be installed in a dry, ventilated enclosure that protects it from the elements. These instructions assume that SapCheck will be installed in the same enclosure that contains your vacuum pump.

Your SapCheck unit has been pre-configured to send text messages to the cell phone number (a "Command Number") you provided. You can send text messages to your SapCheck unit at the SapCheck phone number listed with this installation note. We suggest you add this phone number to your "Contacts" on your cell phone, giving it the name "SapCheck" or, if you have more than one SapCheck unit, a name referencing the sugarbush location where the unit is deployed. That way, you will be receiving and sending text messages either from/to "SapCheck" or from/to the sugarbush location where SapCheck is operating.

INSTALLATION: SAPCHECK CONTROLLER

Note: While you can add on any length to the cable connecting the Controller to the tank float switch, there is only 30" of cable connecting the SapCheck Controller to the vacuum sensor. Be sure to choose a Controller location that allows you to locate the vacuum sensor where you want it. (See page 13.)

1. Locate the SapCheck controller (**A**) within your pump enclosure. (Make sure that you have previously installed the antenna (**Q**) onto the controller. (See page 3 for details.)
2. Attach the Male Sensor Connection Plug (**D**) to the Female Connector (**N**) on the top of the SapCheck box.

INSTALLATION STEPS (CONT'D)

Figure 5a View from above



Figure 5b View from inside tank

Figure 5a pictures tank wall from above, showing the installed float switch with exterior nut holding switch in place. The nylon washer fits between the inside nut (non-rotating) and inside tank wall to ensure secure fit with no leakage.

Figure 5b shows installed float switch, with bottom of switch roughly 3-1/2 in from top of tank. Center of hole drilled to accommodate float switch (13/32 in diameter) was located 5/8 in from top of tank.

INSTALLATION: TANK FLOAT SWITCH

The tank float switch (**B**) is to be installed in your sap collection tank. The maximum tank wall thickness that the float switch can accommodate is 3/8 in. The switching end of the float switch must be installed pointing down.

Note: If you do not wish to install the Tank Float Switch provided, simply connect the two Float Switch (**G**) wires coming from the Male Sensor Connector Plug (**D**) to the Float Switch By-pass wire (**P**).

1. Determine the desired sap level height in your collection tank at which you want the SapCheck unit to send you a Sap Alert Level message. Using the 13/32" drill bit, drill a hole 2-3/4" above this height in your tank to mount the float switch. Remove the nut from the Float Switch (**G**) and pass the float switch wires through this hole from inside the tank wall out. (Ensure that the nylon washer sits between the inside tank wall and the interior float switch nut.) Pass the nut over the wires on the outside and secure the nut onto the exposed threads of the tank float switch using an adjustable wrench.



Figure 6a

Figure 6b

Figure 6c

Figure 6d

(6a) Remove red nut from one of the Posi-tab terminals on the 12' float switch cable and insert one of the bared end float switch wires through the red nut. (6b) Insert the bared end wire into the other end of the Posi-tab terminals. Screw the red nut from (6a) onto the Posi-tab terminal in (6b) into which the float switch wire has been inserted. When the red nut is completely screwed onto the Posi-tab terminal, pull on the float switch wire (6d) to test that a solid connection has been made. Repeat to connect the other float switch wire to the remaining float

TANK FLOAT SWITCH (CONT'D)

2. Drill a 3/8" hole in the pump enclosure near where the SapCheck Controller is to be located. Pass the end of the 12' float switch cable (C) through this hole and connect the cable to the SapCheck Float Switch wires (G) using the red Posi-Tap connectors. (See Figure 6.) Wrap the connections with waterproof electrical tape. (Note: If your sap collection tank is further than 12 feet from the SapCheck Controller, you can splice additional wires onto the existing Float Switch wires without affecting the operation of the Float Switch.)

TEMPERATURE SENSOR

1. Drill a 9/32" hole in the pump enclosure box near where the SapCheck Controller is located and pass the temperature sensor (E) from inside the enclosure to the outside. (See Figure 7.) Ensure that the end of the temperature sensor probe is exposed to the outside temperature.



Figure 7a



Figure 7b



Figure 7c

(7a) shows temperature probe being inserted through 9/32" diameter hole in floor of pump enclosure box. (7b) shows temperature sensor installed through a hole in the floor of the pump enclosure box. (7c) shows the metal end of the temperature probe located outside and below the pump enclosure box. The metal end tip of temperature sensor must be exposed to the outside air to correctly register outside temperature. The probe tip should be located at least 12 inches away from the pump enclosure box so that it does not register heat being radiated in the area immediately near the box by the equipment operating within.

VACUUM SENSOR

SapCheck's vacuum sensor is normally installed in the mainline near the pump inlet. However, it can be installed wherever you want to measure vacuum in your system. Note, though, that there is a little less than 3-1/2' of cable connecting the vacuum sensor to the SapCheck Controller. Determining the mounting location of one will impact the mounting location of the other.

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For best results, the vacuum sensor should be installed so that it avoids coming in contact with sap. In particular, the sensitive transducer head of the sensor can be damaged if it is exposed to a forceful sap spray created as a result of rapid pressurization of the sap lines (caused, for example, by opening a valve to admit air pressure to the line.) We recommend creating a “baffle” of the kind shown in the image below which both lofts the sensor away from sap flow in the mainline and helps protect the sensor from the impact of sap spray in the event of rapid pressurization of the line. (See Figure 8a.)



Figure 8a

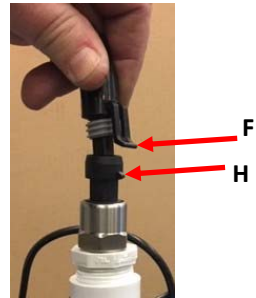


Figure 8b

1. Tap a 1/8" NPT hole in the tubing plug. (First drill a 21/64" hole and then use a tapping tool to create a 1/8" NPT tap inside the hole.)
 Note: Locate this tapped hole so that it can connect to the Sap-Check Controller using the approximately 30" long wire coming from the Controller and terminating in the male vacuum sensor connector (F).
2. Use a wrench to install the vacuum sensor transducer (H) into the tapped hole, first applying Teflon tape for a leak-proof connection.
3. Connect the male vacuum sensor plug (F) into the female receptacle on the vacuum sensor transducer (H), being careful to align the clip of F to snap over the tab of H. (See Figure 8.)

Controller & Pump Power Connections

4. Connect your vacuum pump to 120 VAC Out power receptacle (M) on the SapCheck Controller. If your vacuum pump has an ON/OFF switch, set it to the ON position.
5. Connect the female end of the Controller power cord (J) into the male 120 VAC In power plug (L) on the Controller and plug the other end of this cord into 120 VAC power. The green light on the SapCheck Controller will illuminate. Within 2 minutes, you will receive a “text indicating SapCheck and the SapCheck software version that is running. (*Ensure that your cell phone is powered on and has reception.*)

SapCheck is now ready to receive and respond to text message commands from your cell phone to monitor and control your vacuum pump operation.

Controller & Pump Connections with PowerToggle Accessory

4. Note: If you are installing SapCheck with the PowerToggle accessory, plug your vacuum pump into the “Power-out-to-pump” receptacle on the PowerToggle. (See Figure 9.)
5. Plug the SapCheck power cord into the “Power-out-to-Sapcheck” receptacle on the PowerToggle.
6. Plug the 3-plug end of the PowerToggle control wire (terminated with small green connection on the other end) into the outlet power jack on SapCheck. Plug the other end of this cable with the green connection into the control receptacle on the side of the PowerToggle.
7. Optionally, plug any electrical device (e.g., heat lamp) whose on/off state you want to “toggle” with your pump (i.e., pump on/device off OR pump off/device ON) into the “Power-out-to-heat-source” receptacle on the PowerToggle.
8. Plug the PowerToggle power cord into the AC power in receptacle on the PowerToggle and plug the other end into 120 VAC power.

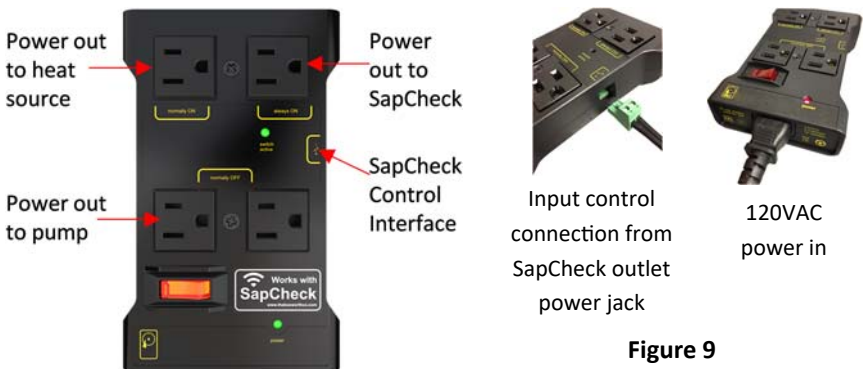


Figure 9



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US Patent Protected

Canada Patent Pending

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