



CHEMICAL CORPORATION

SmartBox[®] System



**Parts and Operator's
Manual**

 **AMVAC**
CHEMICAL CORPORATION
SmartBox® System Operator's Manual

Introduction

CONGRATULATIONS! By purchasing the SmartBox® system, you have obtained the world's first variable-rate, speed-compensated, and totally enclosed system for the application of low-rate granular insecticides. The SmartBox® system was created to allow granular insecticides to be applied accurately, efficiently, and safely to your crops.

The information presented in this Parts & Operator's Manual will introduce you to the components of the SmartBox® system, provide step-by-step instructions on how to install the system on your planter, and lead you through the programming and operating steps required to obtain the most accurate application and record keeping possible. Please read all of the information in Section A before proceeding to Sections B, C, & D. Section A will tell you the tools needed for installation and operation, as well as give you helpful hints to make installing the system as effortless as possible.

From all of the employees at AMVAC Chemical Corporation who have worked to offer you the SmartBox® system, we are confident that you will enjoy the many benefits of our product. Should you have any questions or comments, please feel free to contact your local AMVAC sales representative or call our Customer Service Center at 1-888-SMARTBOX (1-888-762-7826). Or, you may write to us at the following address:

AMVAC Chemical Corporation
Attn: SmartBox® Customer Services
2110 Davie Avenue
Commerce, CA 90040
www.amvac-chemical.com or www.smartboxsystem.com

SmartBox® is a registered trademark of AMVAC Chemical Corp.

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NOTICE — SAFETY PRECAUTIONS

Persons using a SmartBox® system to apply granular insecticides are responsible for obtaining, reading, and following all safety recommendations as stated on the manufacturer's product label. Read and follow all use directions and precautions specified on the product label(s), including, but not limited to, the following sections:

- Emergency Response Telephone Numbers
- Personal Protective Equipment (PPE)
- User Safety Requirements
- User Safety Recommendations
- Environmental Hazards
- Directions for Use
- Agricultural Use Requirements
- Storage and Disposal

In addition, all SmartBox® system maintenance must be performed in compliance with product safety precautions as stated on the product label. If you have questions regarding any of the use directions and precautions specified on the product label, or require additional information, contact your local AMVAC sales representative or call 1-888-462-6822. You may also visit the AMVAC Chemical Corporation website at www.amvac-chemical.com for access to product labels and other information.

NOTICE — WARRANTY

All parts and assemblies supplied with the SmartBox® application system are intended for use only with this system and only with the insecticide products licensed for application using this system. Any usage of the SmartBox® system which is inconsistent with the intended usage will result in the following actions:

- The entire warranty for the SmartBox® system will be voided immediately.
- User will be in violation of U.S. Patent laws and will be prosecuted to the fullest extent of the law.

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System Overview

System Description:

The AMVAC SmartBox® system is a closed transfer application system which uses electronically controlled metering technology to accurately apply low-rate granular insecticides. The system features a controller which can store and record the necessary information required by the Environmental Protection Agency (EPA) for record keeping.

The controller can easily download the stored information to a personal computer at the user's convenience. This transfer of information is performed by connecting the controller to the personal computer. Windows-based record-keeping software is also included with the system.

An added feature of the SmartBox® system is the ability to program controller functions by entering information into the personal computer. That information can then be transferred from the personal computer to the controller.

An additional option is GPS capability. The SmartBox system can connect to an external GPS controller for mapping and/or variable rate application.

The SmartBox® system provides the operator with on-the-go flexibility to monitor and change various operating parameters or set the system and allow it to run automatically. The controller, which mounts inside the tractor cab, enables the user to quickly change the chemical application rate or shut off flow to one, all, or any combination of planter rows.

Input from a lift switch mounted on the planter will shut the system off when the planter is raised. Audio and visual alarms on the controller alert the user of a possible plugged row tube, non-flowing meter, or empty chemical box by row.

The accuracy of the SmartBox® system is optimized if true ground speed is measured using radar or another true wheel speed measurement device. With accurate speed input and proper calibration, the meters will automatically compensate for variations in planter speed to keep the chemical application rate steady. If true ground speed is not available, a fixed planting speed can be entered but application accuracy will depend on how closely actual ground speed matches fixed speed entered in controller.

What's Included:

The AMVAC SmartBox® system consists of the components listed below. All components will be received in the quantities required for your planter according to the manufacturer, row count, and fold type of the planter.

Controller: The controller is the central control of the SmartBox® system. It is installed in the tractor cab and connects to the 12-volt electrical system of the tractor. All mounting hardware is included.

SmartBox® System Manager: The software is Windows-based. Information such as Grower ID and Applicator License Number can be added for record-keeping.

Meter: The meter is attached to the base container and includes both the metering device and a flow sensor. Once the meters are configured, the controller is able to identify the exact meter and row number if a problem occurs. A 24" discharge tube (a 30" braided nylon tube may be purchased if needed), and tube clamp are included with each meter.

Wiring Cables: These cables include the hitch cable, hitch extension cable (if required), 8-row and / or 4-row wiring harnesses, and meter extension cables (if required) used to make the electrical connection between the controller and the meters. Also included as needed are the battery extension cable and lift switch extension cable.

Lift Switch: The mechanical lift switch with cable is used to signal the controller that the planter is either in the raised or lowered position. This input tells the controller when to start and stop the meters to avoid discharge of chemical on row turns. The lift switch is connected to the system through the 4-row or 8-row wire harness.

Base Container: The base container will hold a range of 8 to 15 pounds of chemical. Each base container comes with a rain cover for use when a transfer container is not installed.

Universal Mounting Cradle: The universal mounting cradle is designed to fit onto most of the major planter row configurations to hold the base container and meter securely on the row frame. Mounting hardware (with clips and brackets for various planter manufacturers and series) is included.

Transfer Container: The transfer containers are available only through a Chemical Dealer. The boxes will be delivered with product loaded and ready for use. With a transfer container locked in place on the base container and with valves opened, product will flow to fill the base container for discharge through the meter and discharge tube. A loaded transfer container can be dispersed into many base containers, so a new transfer container may not be needed every time a base container empties. This feature is handy when finishing a field or at the end of the planting season.

The controller, lift switch, battery cable, hitch cable, and software are part of the Controller System. The transfer container, base container, cradle, and meter with discharge tubing make up the SmartBox® Row Unit. These will be discussed in greater detail later in the manual.

What's Not Included:

The following items are not included with the AMVAC SmartBox[®] system. If any of these items are required for installation and operation of the SmartBox[®] system on your planter, please contact your chosen Equipment Dealer or the appropriate source shown below to purchase the item(s) separately. These items will not be part of the SmartBox[®] system shipped to you from AMVAC.

Radar or true wheel speed sensor: Input to the controller from radar or a true wheel sensor is required to get the most accurate chemical application rate. The system is operable in a fixed speed mode, but automatic speed compensation will not be available in this mode.

The SmartBox[®] controller has a 4-pin radar connector compatible with the connector of many leading radar brands. Other radar and true-wheel sensors (some true wheel speed sensors are not compatible) may be used; if your sensor has a different connector arrangement, an adapter will be required and must be purchased separately. Radar signals routed through tractor wiring must match the pin assignments of the controller; some systems have been found to feed voltage to the controller through a signal pin resulting in a “buzzing” of the controller when the controller is shut off. While this arrangement does not damage the controller, the radar signal may not be read correctly. There is a cable available to filter the voltage feed. Contact your local AMVAC representative for further information.

Radar or true wheel speed sensor Y-cable or signal booster: When using radar to more than one monitor (planter monitor and SmartBox[®]), a Y-cable will be required. If the sensor's signal will be split for several monitors, then a signal booster may be required. For help with the requirements of your setup, including compatibility of specific true wheel sensors and radar wiring arrangements, we can suggest these sources:

AG-EXPRESS Electronics Des Moines, IA 515-289-2746
Sulphur Springs, IN 765-533-4809
Grand Island, NE 308-381-2905

White planter series 6000 & 8000 seal lid kits or seed hopper extension rings: When installing the SmartBox® system on a White series 6000 planter, seal lid kits or seed hopper extension rings may be required. These planters use seed boxes with lids designed to slide backward over the insecticide hopper for filling. The SmartBox® transfer containers will extend approximately two inches above the seed box lids, preventing the lids from sliding backward. If liquid fertilizer tanks are installed in front of the seed boxes, the tanks may prevent the seed box lids from sliding forward. In this situation, either the seed box lids may be replaced with hinged lids (White's seal lid kit), or the seed boxes must be lifted with spacer rings. Contact your local White Equipment Dealer or your AMVAC sales representative for recommendations.

In-furrow kits and discharge tubes: Recommendations on product application (in-furrow vs. T-band) must come from your Chemical Dealer or AMVAC. Discharge tubes currently are supplied in 30" lengths and should be cut to fit the specific planter. L-brackets should be used on John Deere, Kinze, White, and Buffalo planters to position the discharge tube. Attention should be given to planters using seed firmers to verify the discharge tubes are not hitting the firmers while the planter is in the down position. In-furrow kits and different diameter or length tubing must be obtained from a source other than AMVAC.

Case IH row unit brackets: When installing the SmartBox® system on a Case IH planter which has not previously used insecticide boxes, any additional row unit frames or brackets may be purchased through an Equipment Dealer. Rear mount brackets for the Case 1200 Series planters may be purchased through Redball, LLC. Contact Redball, LLC at 1-877-332-2551 for pricing and bracket options.

John Deere 1770NT, 1790, and DB model planters: Brackets have been developed to mount the SmartBox® on these model planters. Contact Redball, LLC at 1-877-332-2551 for pricing and bracket options.

In addition, as new planter designs and folds are introduced to the market, some modifications may be required. If you have any questions concerning compatibility of the SmartBox® system with your particular planter configuration, you may contact your AMVAC Sales Representative (1-888-SMARTBOX) for answers to your questions.

How To Get Started

Tools Required:

The following tools will be required to install your SmartBox® system:

cordless drill	drill bits
7/16" wrenches	3/8" socket bit
7/16" sockets	nut driver
pliers	3/8" wrench

Additional tools may be required for lift switch and controller mounting.

Time Required:

The amount of time required to install your system will depend on your planter design, fold type, and number of rows. Also, the amount of information you enter into the controller will have an affect on installation time. The following chart presents estimated time requirements.

number of planter rows	hours required
4	4-6
8	6-8
12	8 - 10
16	10 - 12
24	12 - 14

Installation

This section will include instructions on installation of the SmartBox® controller system, row units, and wiring cables. Suggested cable routings and lift switch mounting locations will be shown at the end of this section (Appendix A). The order in which you install your system components may vary from the order shown in this manual. These instructions are grouped by system. One recommended installation sequence is as follows:

1. Remove existing insecticide boxes and chains. (If necessary)
2. Install cradles.
3. Install meters onto base containers.
4. Install base containers in cradles.
5. Loosely route all wiring and harnesses. Do not use cable ties at this point.
6. Adjust wiring and use ties to secure.
7. Install controller in tractor.
8. Install battery cable.
9. Install lift switch.

Due to the vast number of existing planter configurations and continuous introduction of new ones, your planter may differ slightly from the figures shown here. If you have questions concerning fit of the SmartBox® system on your planter, please contact your AMVAC sales representative or call 1-888-SMARTBOX.

Controller System:

The front and back of the SmartBox® **controller** are shown in Figures 1 and 2 below. The controller should be installed inside the tractor cab (or mounted on the tractor if there is no cab) in a position where the user can easily see the screen during operation and where there is no possibility of the controller being damaged. When a 2-way FM radio is installed in the tractor cab, care should be taken to position the controller to avoid potential interference. Also, sufficient room must be provided behind the controller to connect the necessary cables (see Figure 2).

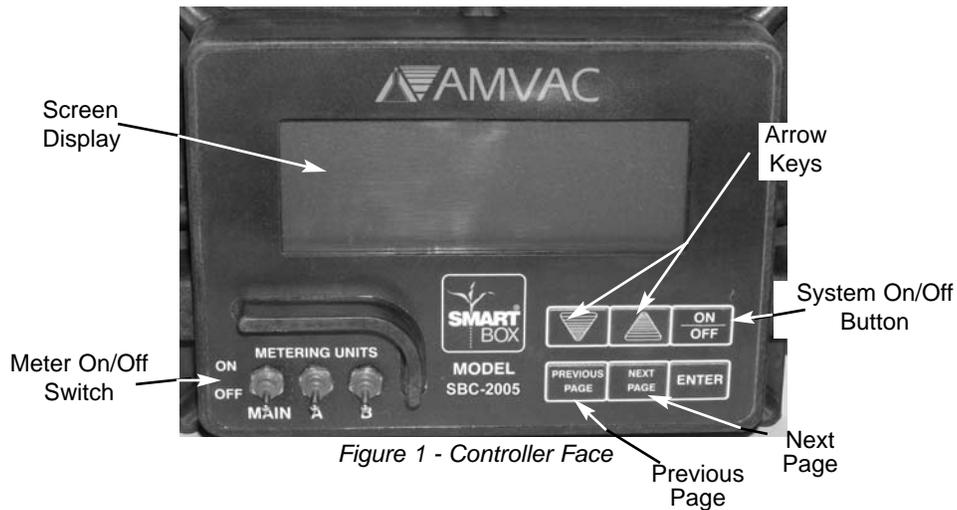


Figure 1 - Controller Face

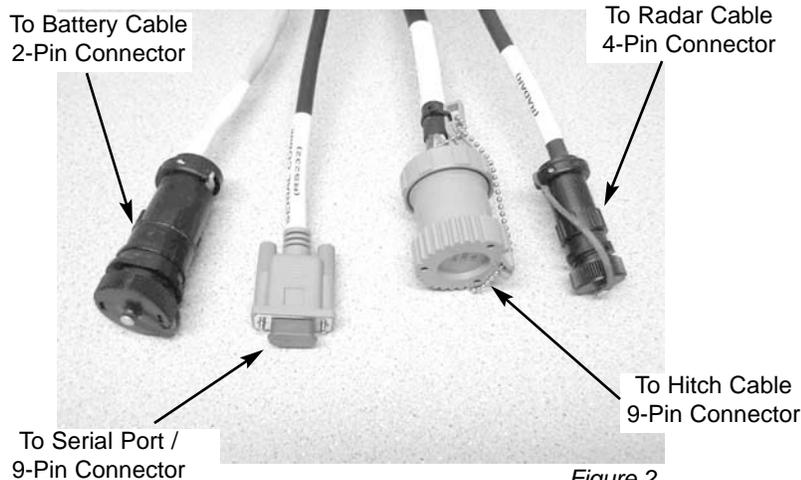
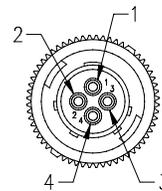


Figure 2



Radars Pin Assignments

- 1 - Ground
- 2 - Signal
- 3 - +12 Volt
- 4 - Empty

Controller System (continued)

WARNING!

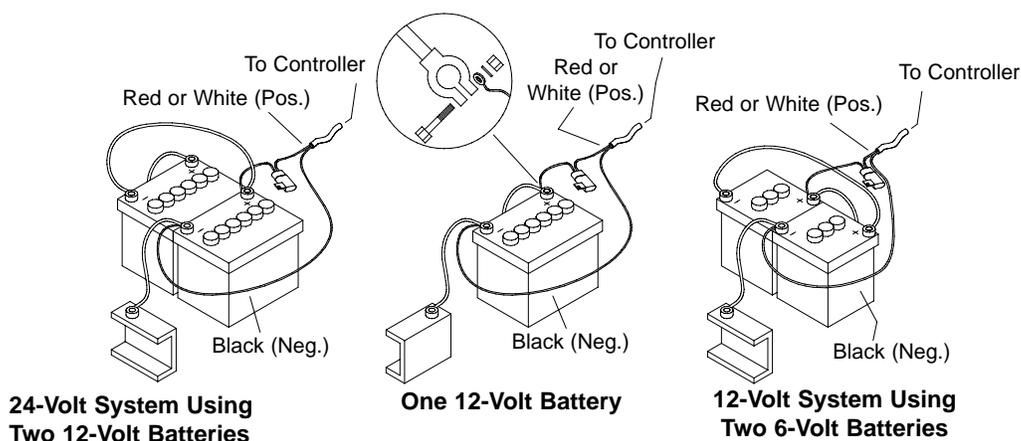
- Only connect the SmartBox® Controller to the 12-volt battery of the tractor
- Secure machinery from sudden or unwanted movement when working on or near it. Remove key from the tractor ignition to prevent unwanted starting.

Suggestion: Before mounting the controller, estimate the length of cable required to run between the controller and the connecting wiring harness. Each SmartBox® system includes one 12' hitch cable plus enough 12' or 20' extension cables for the planter indicated on the order. Locate the controller in a position which will not require additional extension cables.

1. Secure the controller mounting bracket to the tractor using the three screws provided.
2. Use the two controller knobs to secure the controller to the mounting bracket.
3. Connect the controller's power socket to the 12' battery cable provided. An additional 12' battery cable extension is available if needed.

Connect the battery cable terminals directly to the 12-volt battery with red wire to positive and black wire to negative.

If the tractor is powered by two 6-volt batteries instead of one 12-volt battery, then the terminals must be connected at a location where a 12-volt supply is available. The controller will not operate if sufficient power is not supplied.



Controller System (continued)

Do not use a fuse greater than 30 amps in the supply; use of a larger amperage fuse may result in controller damage.

Do not remove the fuse when attaching power port adapter. Be sure to check polarity with positive to fuse.

Once the cables are routed and a speed sensor (if used) has been installed, connect the hitch cable and speed sensor cable to the controller. If the speed sensor's connector is not compatible with the controller's 4-pin radar connector, then an adapter must be obtained by the user.

The 9-pin parallel port extending from the controller will not be used during planting. This port is provided for transfer of data from the controller to a personal computer.

Row Units:

The SmartBox® row unit is made up of the **cradle, base container with rain cover, meter with discharge tube**, and **transfer container**. The transfer container is shipped from the insecticide supplier and is not part of the system shipped. Installation of each of these items is shown below.

Cradle installation will differ according to the make and model of the planter. Existing insecticide hoppers and drive chains should be removed prior to installation of the SmartBox® cradles.

Instructions for cradle installation on each of the major planter groups are shown beside Figures 3 through 8. General precautions for all planter types are as follows:

1. Use hardened steel for mounting pins.
2. Do not over-tighten. Doing so will cause the cradle sides to bend inward.
3. Check for clearance between hoppers on vertical fold planters. Insecticide transfer containers may need to be removed for transport on vertical fold planters.

Installation: Cradle - John Deere Planter Series 7000 and 7100

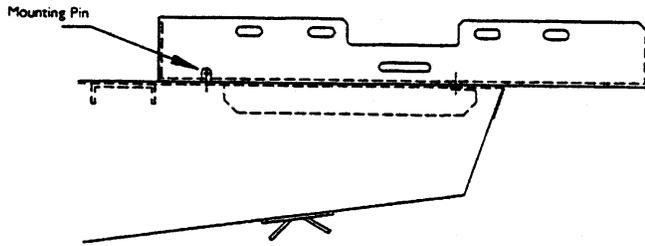


Figure 3

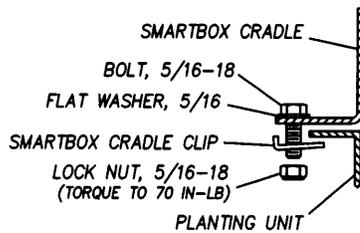


Figure 3a

1. Remove existing insecticide hoppers and drive mechanisms.
2. Orient SmartBox® cradle as shown in Figure 3.
3. Position cradle so that legs of cradle slide back into rear cross brace of row unit frame.
4. Position cradle so that vertical posts on row unit frame come through slots in cradle.
5. Place existing cotter pins through hole in frame posts to lock cradle in place.
6. If cotter pins do not hold cradle securely in place, use SmartBox® cradle clips as a spacer between the frame and pins; or secure the cradle to the frame using the SmartBox® cradle clips and fasteners as shown in Figure 3a.

Installation: Cradle - John Deere Planter Series 1700, 7200 and 7300

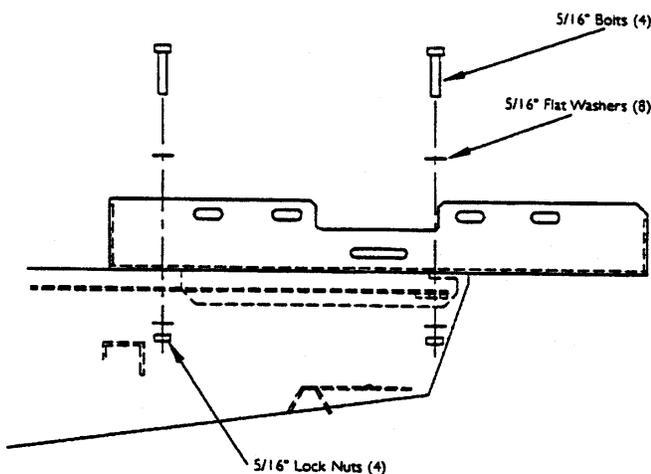


Figure 4

1. Remove existing insecticide hoppers and drive mechanisms.
2. Orient SmartBox® cradle as shown in Figure 4.
3. Place the 5/16" x 1-1/2" bolt with washer through the rear hole in the cradle in line with the rear hole in the row unit frame (as shown), lightly secure with washer and lock nut.
4. Place the 5/16" x 1-1/2" bolt with washer through the cross frame (as shown) and lightly secure with washer and lock nut.
5. Center cradle in relation to planter frame and tighten all bolts securely.

Installation: Cradle - Kinze and Buffalo Planters

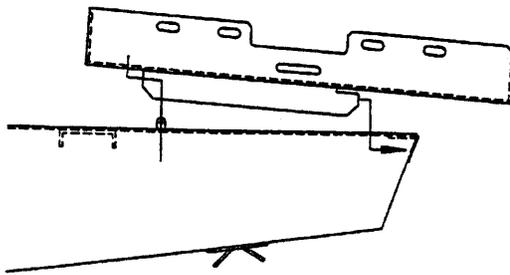


Figure 5

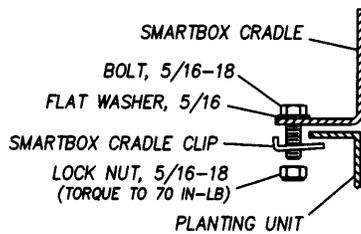


Figure 5a

1. Remove existing insecticide hoppers and drive mechanisms.
2. Orient SmartBox® cradle as shown in Figure 5.
3. Position cradle so that legs of cradle slide back into rear cross brace of row unit frame.
4. Position cradle so that vertical posts on row unit frame come through slots in cradle.
5. Place existing cotter pins through hole in frame posts to lock cradle in place.
6. If cotter pins do not hold cradle securely in place, use SmartBox® cradle clips as a spacer between the frame and pins; or secure the cradle to the frame using the SmartBox® cradle clips and fasteners as shown in Figure 5a.

Installation: Cradle - Great Plains Planter

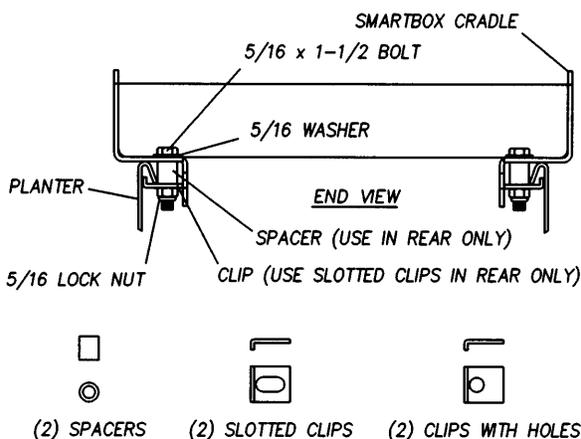


Figure 6

1. Remove existing insecticide hoppers and drive mechanisms.
2. Orient SmartBox® cradle as shown in Figure 6.
3. Place 5/16" x 1-1/2" bolt with washer through rear hole of the cradle down through spacer and slotted mounting clip (oriented as shown to catch underside of planter frame) and secure with lock nut.
4. Place 5/16" x 1-1/2" bolt with washer through slotted hole of the cradle down through SmartBox® cradle mounting clip (oriented as shown to catch underside of planter frame) and secure with lock nut.

Installation: Cradle - Case IH Planter Models 800 - 950 and White Series 5000

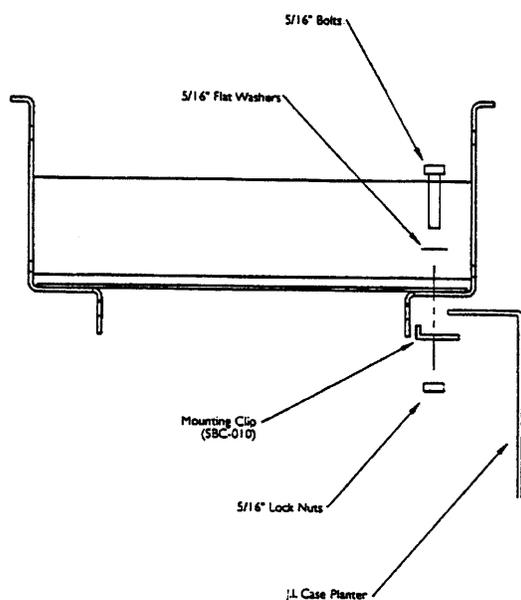


Figure 7

1. Remove existing insecticide hoppers and drive mechanisms.
2. Orient SmartBox® cradle as shown in Figure 7.
3. Place 5/16" x 3/4" bolt with washer through cross slot in cradle, through hole in row unit frame and secure with lock nut.
4. Using SmartBox® cradle mounting clips to secure rear of cradle, orient clips underneath planter row unit frame so short bend is facing toward center and upward (as shown).
5. Place 5/16" x 3/4" bolt with washer through rear hole of cradle down through planter row unit frame and SmartBox® cradle mounting clip and secure with lock nut.

Installation: Cradle - Case IH Planter Model 1200

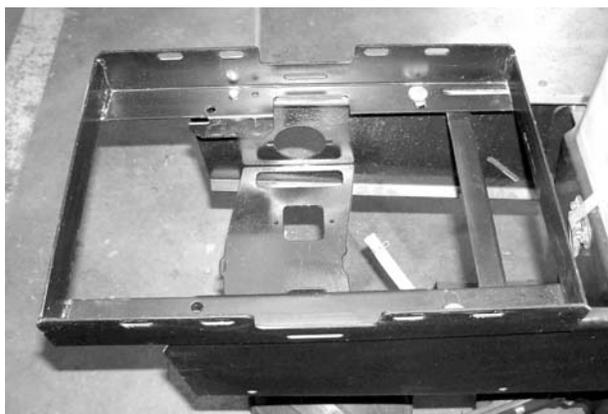


Figure 7A

1. Remove existing insecticide hoppers and drive mechanisms.
2. Orient SmartBox® cradle as shown in Figure 7A.
3. Place 5/16" x 3/4" bolt with washer through cross slot in cradle, through hole in row unit frame and secure with lock nut.
4. Using SmartBox® cradle mounting clips to secure rear of cradle, orient clips underneath planter row unit frame so short bend is facing toward center and upward (as shown).
5. Place 5/16" x 3/4" bolt with washer through rear hole of cradle down through planter row unit frame and SmartBox® cradle mounting clip and secure with lock nut.

Installation: Cradle - White Planter Series 6000

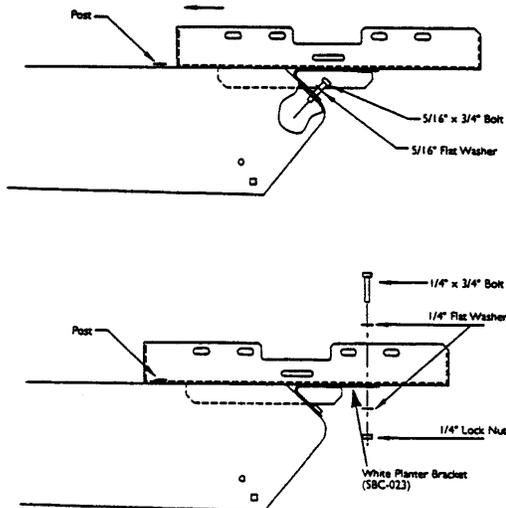


Figure 8

1. Position seed hoppers so that lids slide toward front of planter (SmartBox® transfer containers will interfere with lids sliding toward rear of planter)
2. Remove existing insecticide hoppers and drive mechanisms.
3. Orient SmartBox® cradle as shown in Figure 8.
4. Attach White planter brackets to rear of row unit frame (as shown) using 5/16" x 3/4" bolt with washer.
5. Position cradle so that open-ended slot of cradle slides forward underneath head of row unit frame post.
6. Secure cradle to White planter bracket using double holes on both sides at rear of cradle using 1/4" x 3/4" bolt and washer with lock nuts.

Installation: Cradle - White Planter Series 6000 Vertical Fold Planter and Planter with Liquid Fertilizer Tanks Mounted in Front of Planter Seed boxes - Using White Seal Lid Kits

1. Replace sliding lids on seed hoppers with lids purchased separately in White seal lid kits.
2. Repeat steps 2 through 6 above.

Installation: Cradle - White Planter Series 6000 Vertical Fold Planter and Planter with Liquid Fertilizer Tanks Mounted in Front of Planter Seed boxes - Using White Seal Lid Kits

1. Remove seed hoppers.
2. Place hopper ring into position and secure.
3. Insert seed hopper into the ring and secure.
4. Repeat steps 2 through 6 on the previous page.

For easier installation, mount the meter to the base container before installing the base container in the cradle. Install the meter discharge tube onto the meter after the base container is installed in the cradle. **Note: These instructions are for initial meter installation. For meter replacement, see instructions in Section D of the manual. Always use a new meter gasket when installing or replacing a SmartBox® meter.**

Installation: Cradle - Meter to Base Container

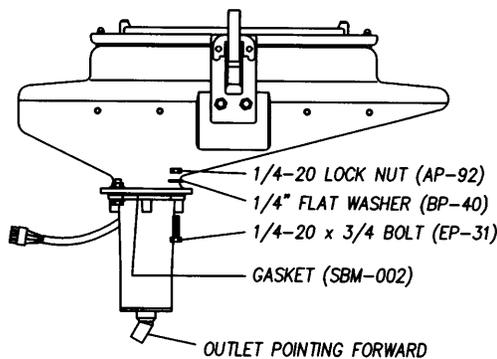


Figure 9

1. Position the meter with the 45° meter discharge opening facing forward (pointing toward the short side of the base container and pointing toward the planter tool bar).
2. Ensure the gasket and meter screen are properly installed on the meter. **NOTE: Always use a new gasket when replacing or re-installing a meter.** Place a thin layer of silicone caulk around edge of gasket to seal.
3. Place the 1/4" x 1" bolts up through the meter, base container flange, and washer. Lightly secure with the lock nuts (see Figure 9).
4. Examine meter gasket to make sure it is centered to provide a good seal.
5. Tighten all bolts securely. Torque all bolts to 25 – 30 in-lbs. **NOTE: Do not over-tighten or under-tighten bolts; meter-to-base gasket must be compressed 60%-75% for proper sealing. Over-tightening can cause the meter-to-base gasket to tear.**

Installation: Base Container to Cradle

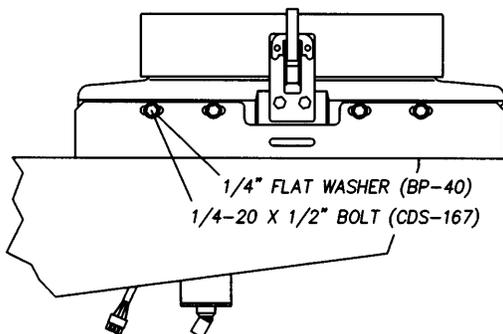


Figure 10

1. Orient the base container into the cradle with the shorter sloped end of the container toward the planter tool bar.
2. Loosely secure the base container to the cradle using the 1/4" x 1/2" bolts with washers. Tighten all bolts securely.

Installation: Transfer Container

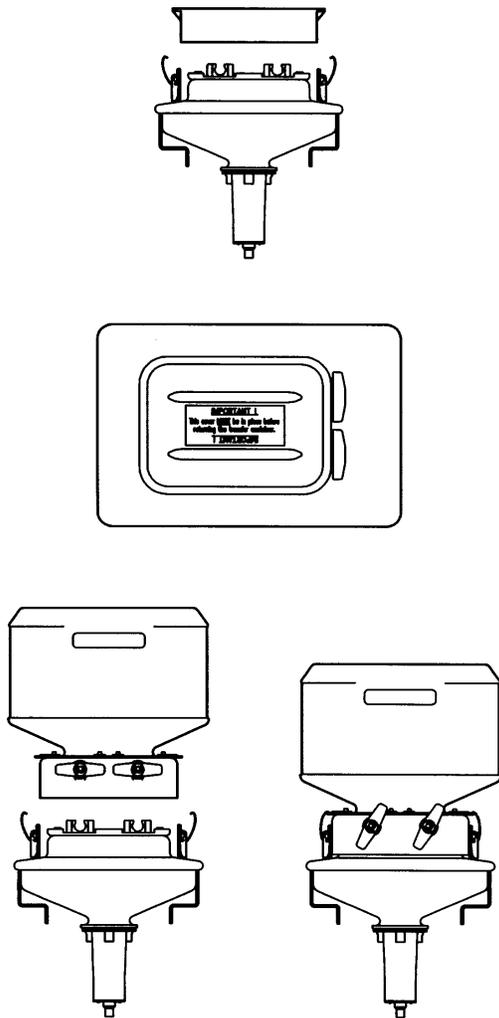


Figure 12

1. Remove rain cover from base container (see Figure 12). Store rain cover for use whenever transfer container is not installed on base container.
2. **Apply a light dusting of baby powder/ talc on the base container seal prior to seating transfer container. This step is necessary to avoid damage to the seals during removal of transfer container. Do not use a petroleum based silicon spray to lubricate the seals. Do not use graphite.**
3. Remove the transfer container valve cover. Store cover for return of used container to Chemical Dealer.
4. Orient the transfer container so that the valve handles face away from the planter seed hopper.
5. Lower the transfer container so each valve is fully inserted into the mating base container valve. If valves are not fully seated, they will not open to release product to the base container.
6. Clamp transfer container to base container. **Rock each transfer container from side to side to make sure that clamps are secure.** If the transfer container is not clamped securely, the clamps may be made more secure by increasing the bend in the clamp arm which hooks onto the transfer container. If your base containers are supplied with locking pins, insert the pins through the clamps to further secure the transfer containers.
7. Turn valves counter-clockwise 60° to open. If valve does not open smoothly, then the valve is not seated properly; unclasp container and repeat steps 4 through 6 above. Both valves must be closed before the transfer container can be removed.

Wiring Cables:

Cable routings and extension requirements vary according to the planter manufacturer, fold style, and number of planter rows. All cables must be routed and secured to the planter in such a way to eliminate damage during folding or planting. Damage resulting from improper installation will not be covered by the AMVAC Chemical Corporation warranty.

The SmartBox® system includes the following cables (quantities supplied depend on the planter design):

battery cable	4-row wiring harness
battery extension cable (optional)	8-row wiring harness
12' hitch cable	15' meter extension cable
20' hitch extension cable (optional)	lift switch extension cable (optional)

Wiring harness connections are as shown in Figure 13 for a 4-row wiring harness. Suggested routings are shown in the specific planter arrangement drawings which follow in "Installation: Wiring Harness, Planter Wiring Instructions".

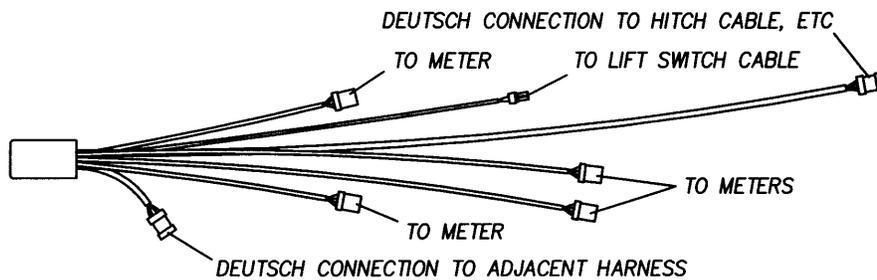


Figure 13 - 4-Row Wiring Harness

The battery cable and hitch cable are supplied in the Controller System discussed earlier. Installation instructions are included in "Installation: Wiring Harness, Tractor Wiring Instructions".

Use of existing planter seed monitor wiring paths (if equipped) will help to avoid pinch points or obstructions. Slack should be left in the cables when wiring around hinge points.

Installation: Wiring Harness

Planter Wiring Instructions

Note: See Appendix A for detailed wiring diagrams on different planters.

1. Position the 1st wiring harness in the center of the rows the harness will service.
2. Run the 20' 9-pin connection cable on the harness to the tractor-hitch point.
3. If more than one wiring harness is needed, wire the 9-pin connection cable of one harness to the 9-pin pigtail connector of the other (Do not connect).
4. Run the individual 4-pin cables from the wiring harness to the meters. The row numbers on the 4-pin cable are for manufacturing purposes only and do not reference to row routing. **Do not connect at this time.** Meters and wiring harnesses will be connected during meter configuration.
5. Reposition or add cable extensions (if needed) for proper length.
6. Carefully fold the planter (if not already folded) and check for correct cable lengths and pinch points.
7. Install and connect the lift switch to the 2-pin connector of the wiring harness.
8. Secure the wiring using the cable ties included starting at each meter. Loop excess wire and tie to the tool bar.

Installation: Wiring Harness

Tractor Wiring Instructions

1. Connect the 12' hitch cable to the 9-pin round Deutsch connector in the back of the controller and run the other end of the hitch cable to the tractor-planter hitch point.
2. If not previously connected, connect the radar unit (if used) to the round 4-pin connector (see Figure 3).
3. If not previously connected, connect the 12' power cable from the 2-prong connector of the controller to the 12-volt battery of the tractor. See instructions for Controller System earlier in this Section for details. See warnings listed above.
4. Connect the hitch cable to the wiring harness at the tractor-planter hitch point.

Installation Suggestions:

1. Place the planter in the planting position.
2. Layout the wiring harness without tying down the cables.
3. Locate ideal places for wire tying the harness to the planter frame. Do not tie down the cables at pinch points; this allows the cable to flex during folding. Ideal locations are to follow existing electrical and hydraulic lines.
4. When attaching the meter cables to the planter, remember that it may be more advantageous to connect a longer cable to a closer row and a shorter cable to a meter extension cable and then to the further row.
5. If more than one wiring harness is used, it is usually more convenient to connect the harness on the left side (from the back of the planter) to the hitch extension cable. This is due to the massive number of hydraulic and electrical cables threaded through the right side of the tongue.
6. Secure the harness(es) to the planter by connecting the wire ties.
7. Attach the hitch extension cable to the hitch cable and place the cable along the tongue.
8. Fold the planter to the transport position and then check all of the pinch points to be sure that the wires stay in place and the connections remain intact.
9. Unfold the planter to the planting position and check all of the pinch points to be sure that the wires stay in place and the connections remain intact.

Lift Switch (Whisker) Installation: Locate a protected location on the implement that will allow the lift switch to contact the implement when the implement is in the lower position. Mount the lift switch in the “neutral” position when the implement is in the raised position. As the implement is lowered, the lift switch contact arm should be pushed to the side, turning “on” the SmartBox® System.

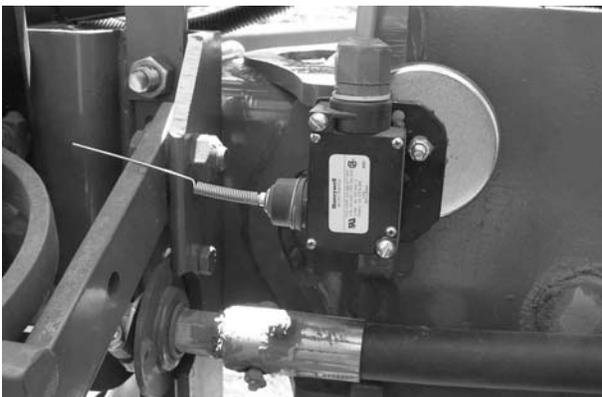
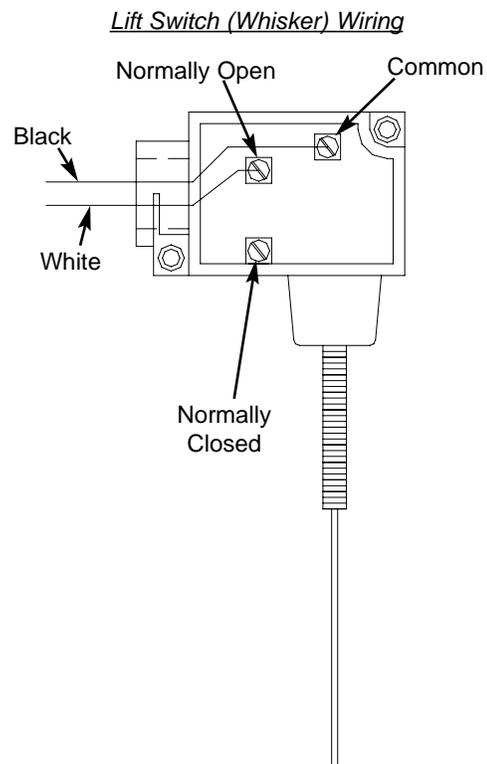
A magnetic mounting bracket is provided, but you may need to fabricate a special bracket, based on your particular mounting location and configuration. The lift switch mounting should allow for adjustment of the lift switch to allow for switch activation at different implement heights.

To obtain maximum magnetic holding force, it is very important that the mounting surface be smooth and free of dirt, weld splatter, paint runs, etc. It is also important that any debris be removed from the magnet before mount is made.

Connect the lift switch cable to the 2-pin connector on one of the 4-row or 8-row wiring harness. On systems using more than one wiring harness, only one lift switch is required and may be connected to the 2-pin connector on any of the harnesses used. The 2-pin connector on any other harnesses used will remain empty.



Lift Switch (Whisker)



Mounted Lift Switch

Appendix A

Suggested Wiring Configurations by Planter Type:

The following figures show suggested routings for the SmartBox® hitch cable, hitch cable extensions, row harnesses, and meter extension cables for various planters. Please use the tables included to locate the drawings pertaining to your planter manufacturer, number of planter rows, and fold type. These arrangements are presented as suggestions only. Routing of cables and lift switch placement are left to the discretion of the user. Due to the large number of planter arrangements available, some planters will not be included in this section. For further information concerning planters not included in this section, please contact your local AMVAC Representative.

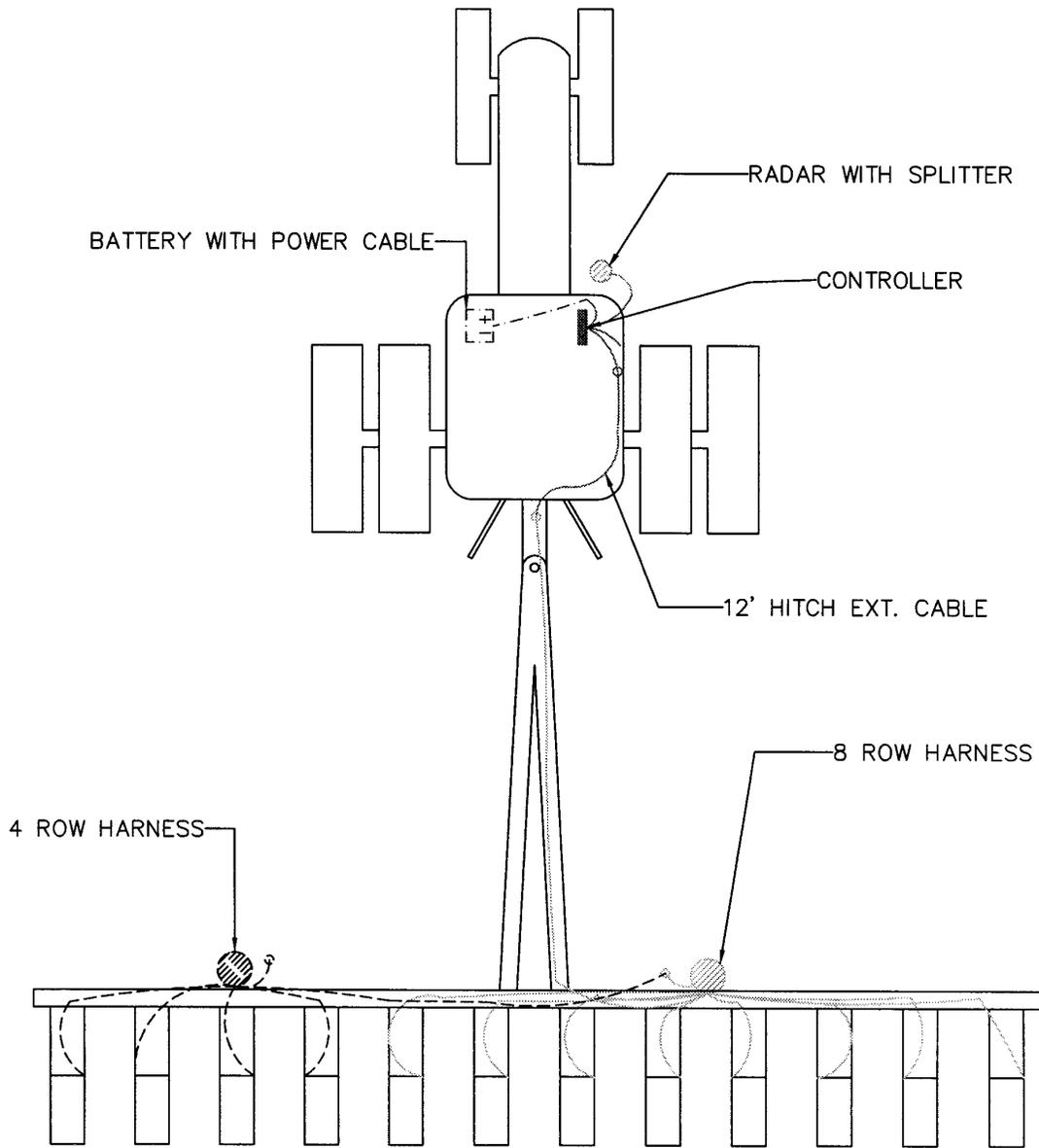
<u>Manufacturer</u>	<u>Series</u>	<u>Rows</u>	<u>Folds</u>	<u>Planter Drawing Number</u>
Case IH	950	12	front, narrow row	3, 4
Case IH	955	12	front, narrow row	3, 4
Case IH	950	16	front, narrow row	19, 20
Case IH	955	16	front, narrow row	19, 20
Case IH	950	24	front	32, 33
Case IH	950	24	narrow front row	34, 35
Case IH	955	24	front	32, 33
Case IH	955	24	narrow front row	34, 35
John Deere	1720	12	stack	9, 10
John Deere	1760	12	flex	1, 2
John Deere	1770	12	front, narrow row	3, 4
John Deere	1770NT	12	front, narrow row	5, 6
John Deere	1780	12	front, narrow row	3, 4
John Deere	1790	12	front, narrow row	7, 8
John Deere	7000	12	flex	1, 2
John Deere	7000	12	front, narrow row	3, 4
John Deere	7100	12	front, narrow row	3, 4
John Deere	7200	12	flex	1, 2
John Deere	7200	12	front, narrow row	3, 4
John Deere	7300	12	stack	9, 10
John Deere	1770	16	front, narrow row	19, 20
John Deere	1770NT	16	front, narrow row	23, 24
John Deere	1780	16	front, narrow row	19, 20
John Deere	1790	16	front, narrow row	21, 22
John Deere	7000	16	front, narrow row	19, 20
John Deere	7100	16	front, narrow row	19, 20
John Deere	7200	16	front, narrow row	19, 20
John Deere	1770	24	front	32, 33
John Deere	1770NT	24	front	36, 37
John Deere	1780	24	narrow row front	34, 35
John Deere	1790	24	front	38, 39
John Deere	7000	24	front	32, 33
John Deere	7000	24	narrow row front	34, 35
John Deere	7100	24	front	32, 33
John Deere	7100	24	narrow row front	34, 35
John Deere	7200	24	front	32, 33
John Deere	7200	24	narrow row front	34, 35
John Deere	DB66	36	front	44, 45
Kinze	2100	12	stack	9, 10
Kinze	2200	12	flex	1, 2
Kinze	2300	12	front	11, 12
Kinze	2600	12	twin line	13
Kinze	2100	16	stack	25, 26
Kinze	2300	16	front	27, 28
Kinze	2600	16	twin line	29
Kinze	2700	24	front parallel	40, 41
White	5100	12	standard, vertical fold	16
White	6102	12	standard, vertical fold	16
White	6122	12	standard, vertical fold	16
White	6180	12	front	17, 18
White	6200	12	flex	14, 15
White	6300	12	flex	14, 15
White	6702	12	standard, vertical fold	16
White	6722	12	standard, vertical fold	16
White	6762	12	standard, vertical fold	16
White	6180	16	front	30, 31
White	6500	24	front	42, 43

SYSTEM NUMBER: SBSS120

12 ROW FLEX FOLD WIRING
DIAGRAM. FOR FOLDED VIEW
SEE NEXT PAGE.

JOHN DEERE: 1760, 7000, 7200
KINZE: 2200

BATTERY CABLE -----
RADAR
4 ROW HARNESS -----
8 ROW HARNESS
CONTROLLER -----
LIFT SWITCH CABLE
12' HITCH CABLE -----



PLANTER DRAWING 1

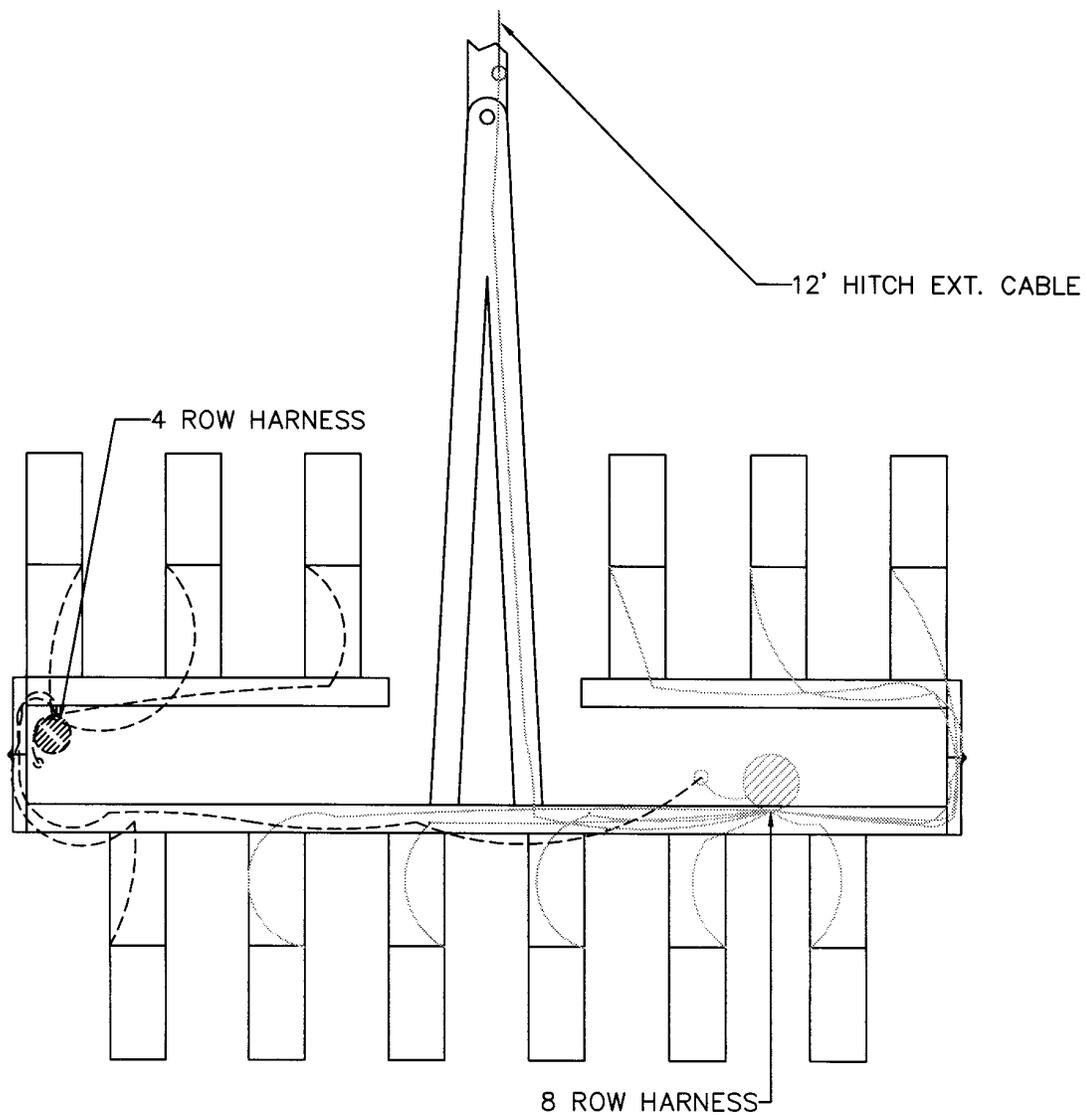
SYSTEM NUMBER: SBSS120

12 ROW FLEX FOLD FOLDED
VIEW WIRING DIAGRAM.

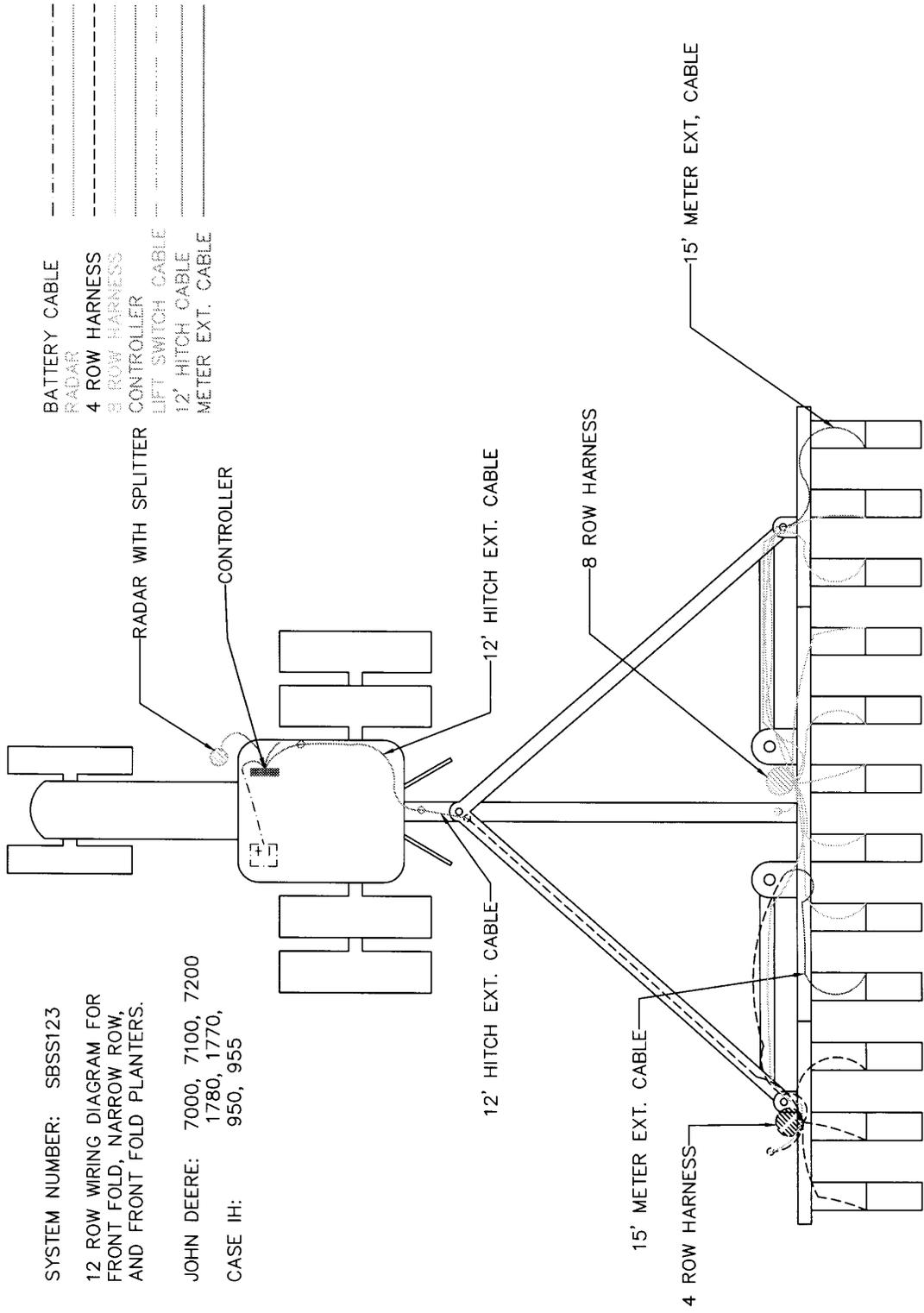
JOHN DEERE: 7000, 7200, 1760

KINZE: 2200

BATTERY CABLE	-----
RADAR	.....
4 ROW HARNESS	-----
8 ROW HARNESS	.....
CONTROLLER	-----
LIFT SWITCH CABLE	-----
METER EXT. CABLE	-----
HITCH EXT. CABLE	-----



PLANTER DRAWING 2



SYSTEM NUMBER: SBSS123
 12 ROW WIRING DIAGRAM FOR
 FRONT FOLD, NARROW ROW,
 AND FRONT FOLD PLANTERS.
 JOHN DEERE: 7000, 7100, 7200
 1780, 1770,
 CASE IH: 950, 955

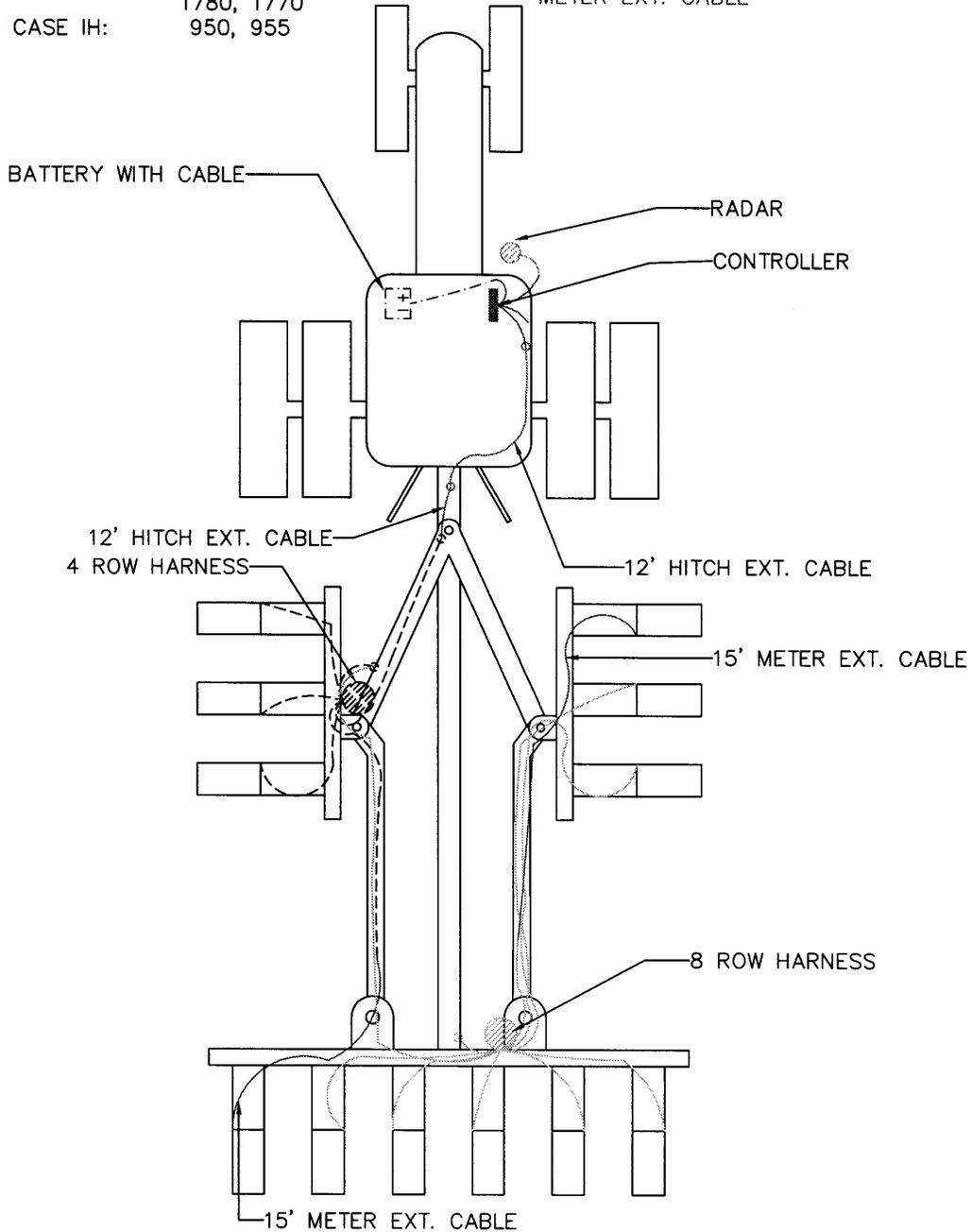
PLANTER DRAWING 3

SYSTEM NUMBER: SBSS123

12 ROW WIRING DIAGRAM FOR
FRONT FOLD, NARROW ROW,
AND FRONT FOLD PLANTERS

JOHN DEERE: 7000, 7100, 7200
1780, 1770
CASE IH: 950, 955

BATTERY CABLE -----
RADAR
4 ROW HARNESS -----
8 ROW HARNESS
CONTROLLER _____
LIFT SWITCH CABLE
20' HITCH CABLE -----
METER EXT. CABLE



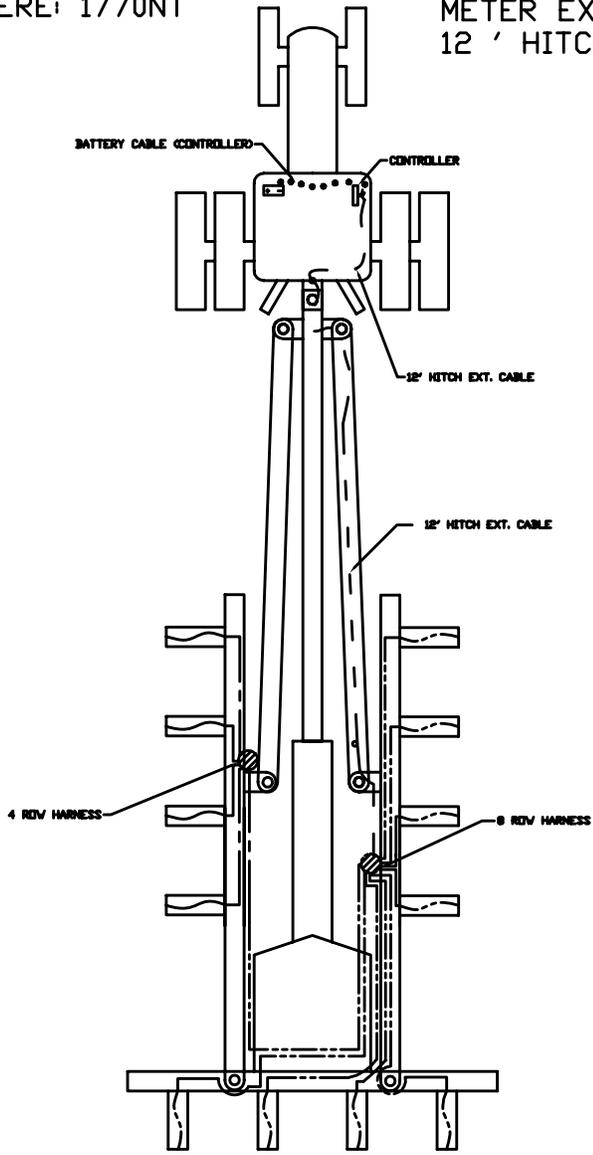
PLANTER DRAWING 4

SYSTEM NUMBER: SBSS123

12 ROW 30" FRONT
FOLD WIRING DIAGRAM.

JOHN DEERE: 1770NT

BATTERY (CONTROLLER)	.....
4 ROW HARNESS	-----
8 ROW HARNESS	-----
CONTROLLER	=====
20' HITCH CABLE	-----
METER EXT. CABLE	-----
12' HITCH CABLE	-----



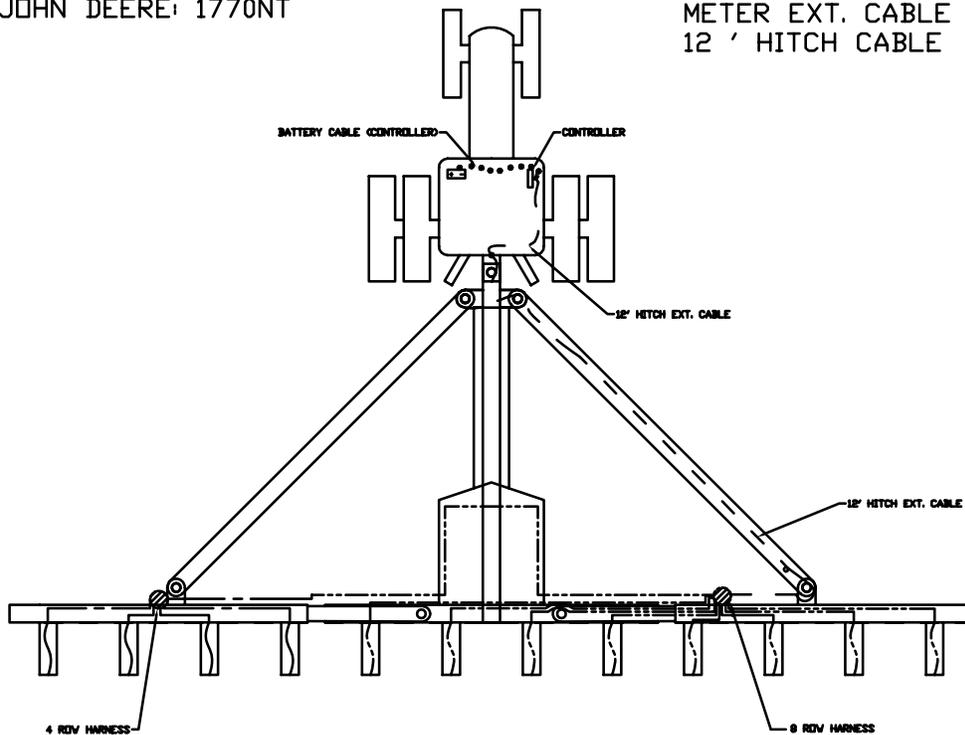
PLANTER DRAWING 5

SYSTEM NUMBER: SBSS123

12 ROW 30" FRONT
FOLD WIRING DIAGRAM.

JOHN DEERE: 1770NT

BATTERY (CONTROLLER)	.....
4 ROW HARNESS	-----
8 ROW HARNESS	-----
CONTROLLER	-----
20' HITCH CABLE	-----
METER EXT. CABLE	-----
12 ' HITCH CABLE	-----



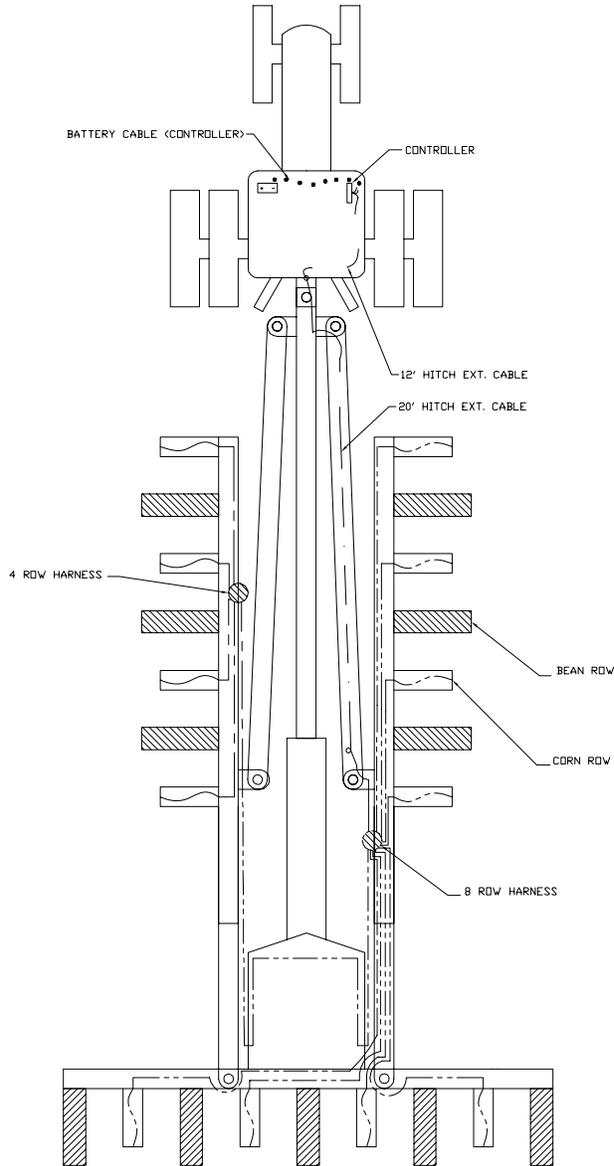
PLANTER DRAWING 6

SYSTEM NUMBER: SBSS123

12 ROW 30" FRONT
FOLD WIRING DIAGRAM.

JOHN DEERE: 1790

BATTERY (CONTROLLER)	.....
4 ROW HARNESS	-----
8 ROW HARNESS	-----
CONTROLLER	-----
20' HITCH CABLE	-----
METER EXT. CABLE	-----
12' HITCH CABLE	-----



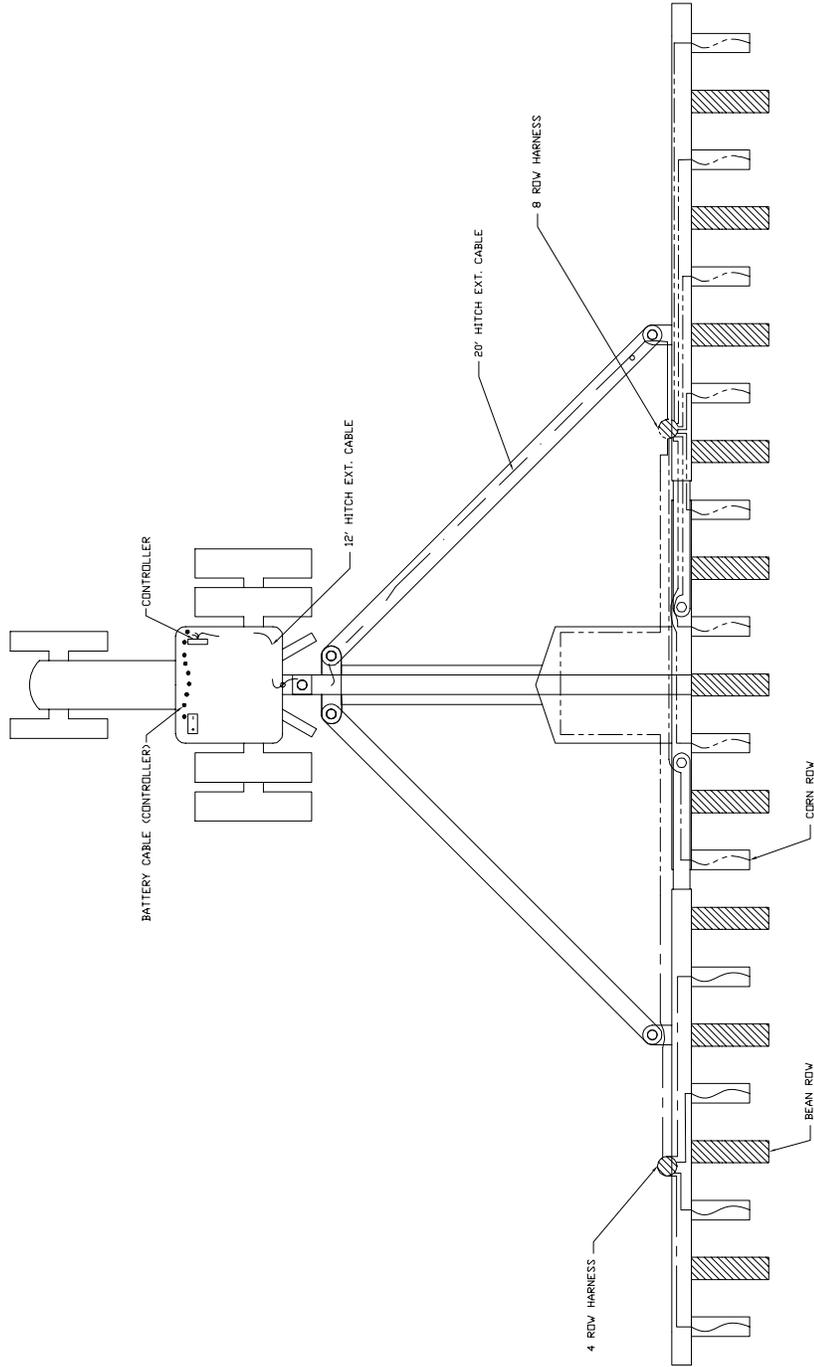
PLANTER DRAWING 7

SYSTEM NUMBER: SBSS123

12 ROW 30" FRONT
FOLD WIRING DIAGRAM.

JOHN DEERE: 1790

- BATTERY (CONTROLLER)
- 4 ROW HARNESS -----
- 8 ROW HARNESS -----
- CONTROLLER -----
- 20' HITCH CABLE -----
- METER EXT. CABLE -----
- 12' HITCH CABLE -----



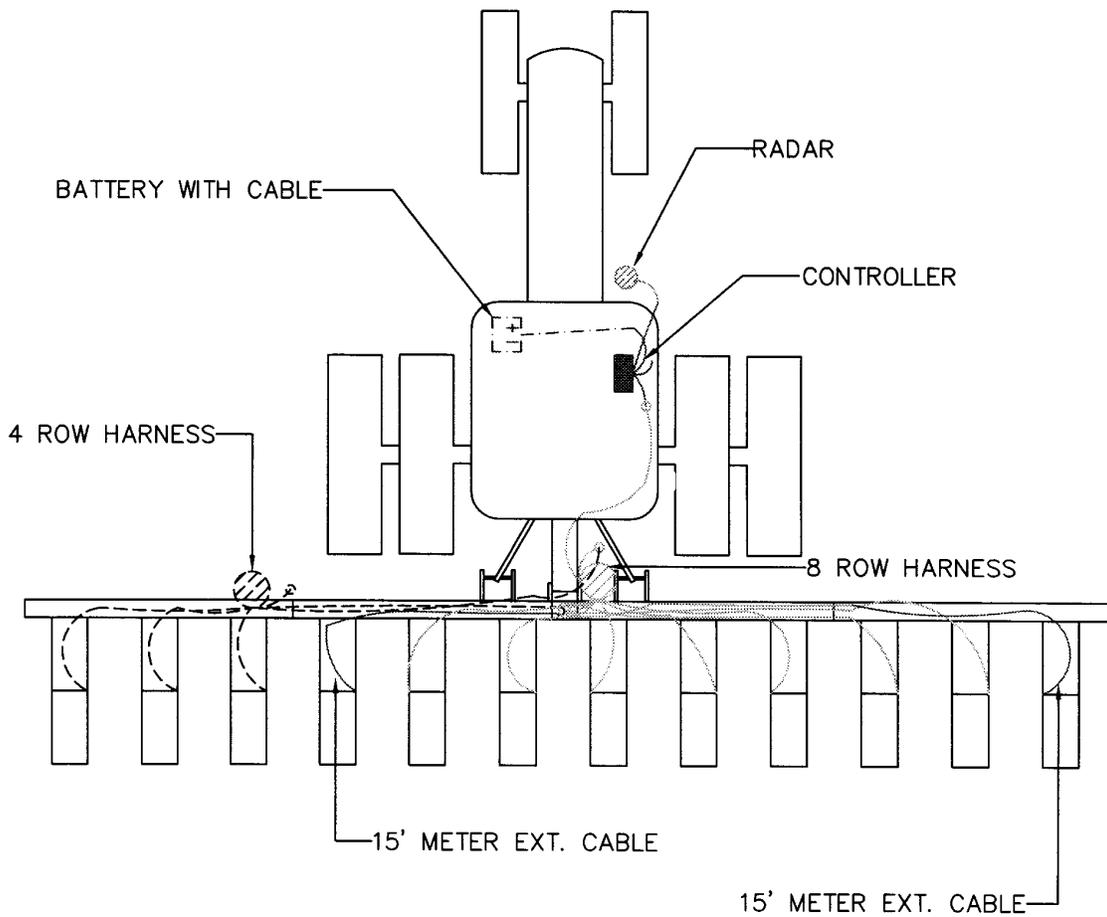
PLANTER DRAWING 8

SYSTEM NUMBER: SBSS124

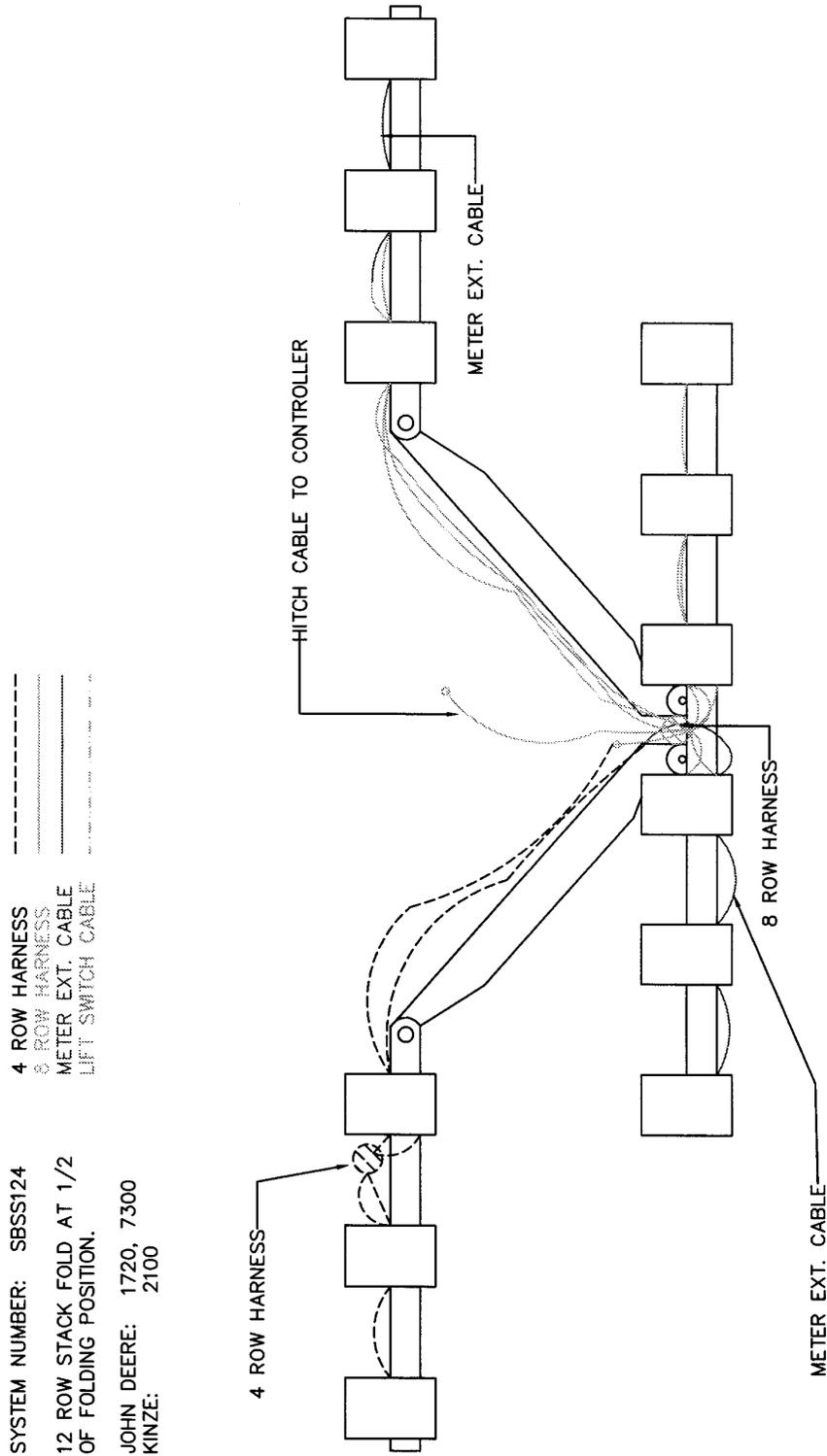
12 ROW STACK FOLD WIRING
DIAGRAM.

JOHN DEERE: 1720, 7300
KINZE: 2100

BATTERY CABLE -----
RADAR -----
4 ROW HARNESS -----
8 ROW HARNESS -----
CONTROLLER -----
LIFT SWITCH CABLE -----
METER EXT. CABLE -----



PLANTER DRAWING 9

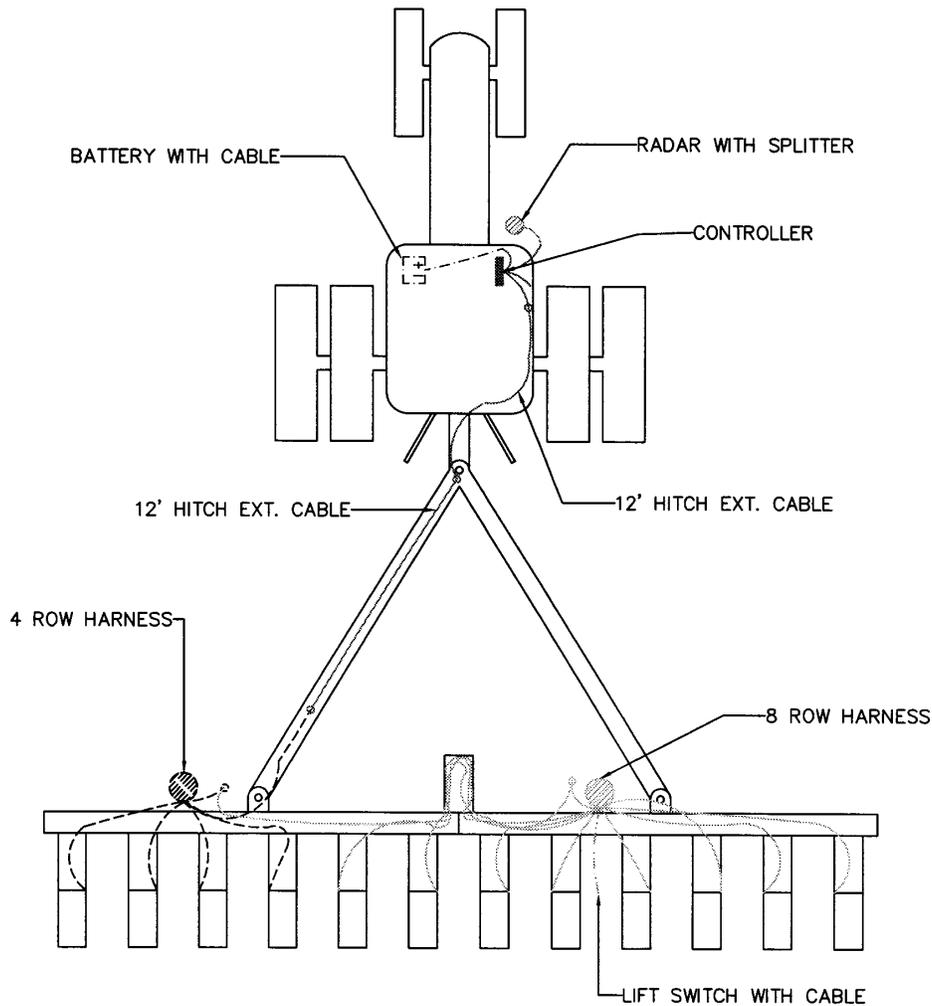


PLANTER DRAWING 10

SYSTEM NUMBER: SBSS125

KINZE MODEL 2300 12 ROW
FRONT FOLD WIRING DIAGRAM.
FOR FOLDED VIEW SEE NEXT
PAGE.

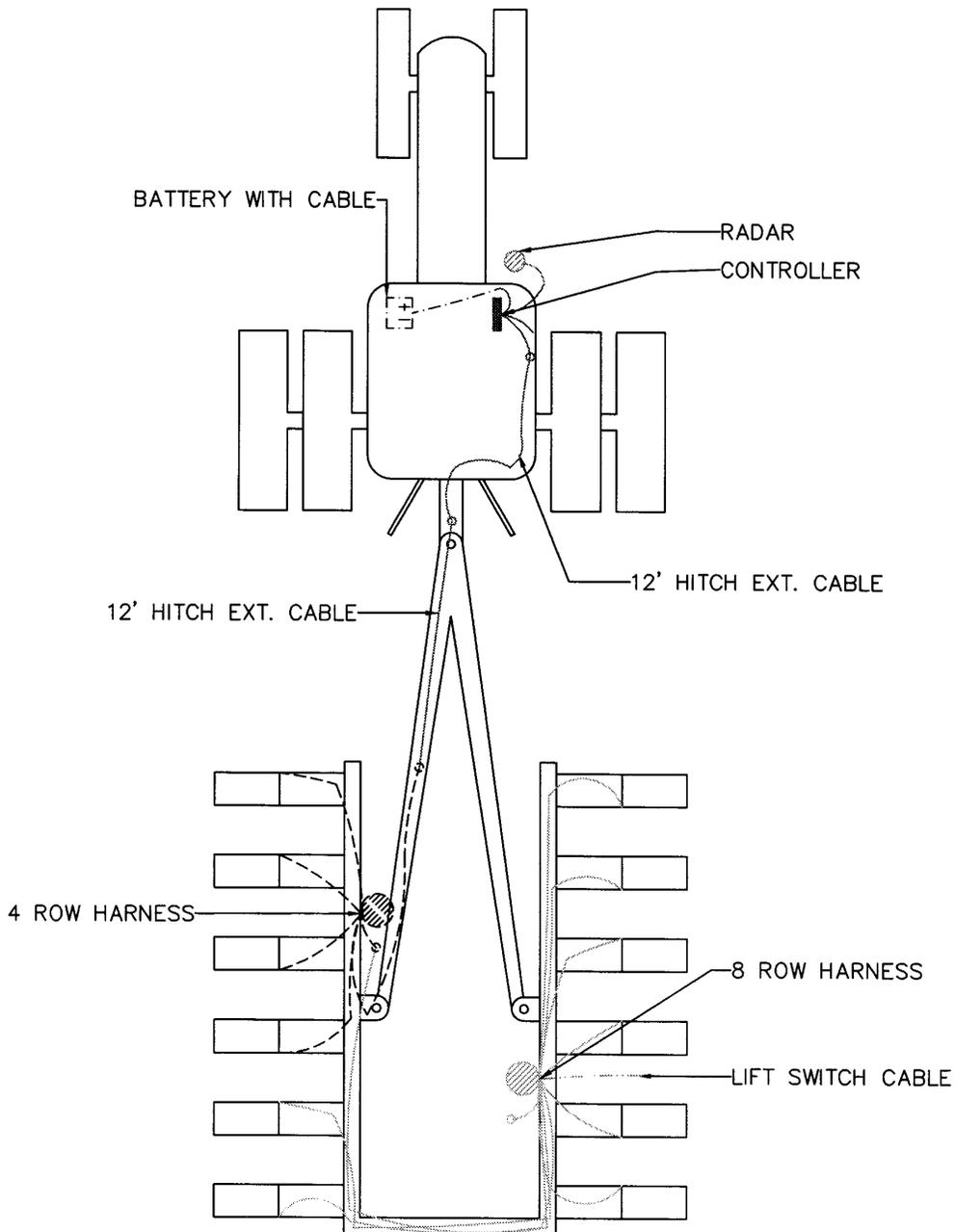
- BATTERY CABLE -----
- RADAR -----
- 4 ROW HARNESS -----
- 8 ROW HARNESS -----
- CONTROLLER -----
- LIFT SWITCH CABLE -----
- 20' HITCH CABLE -----
- METER EXT. CABLE -----



PLANTER DRAWING 11

SYSTEM NUMBER: SBSS125
 KINZE MODEL 2300 12 ROW
 FRONT FOLD WIRING DIAGRAM.

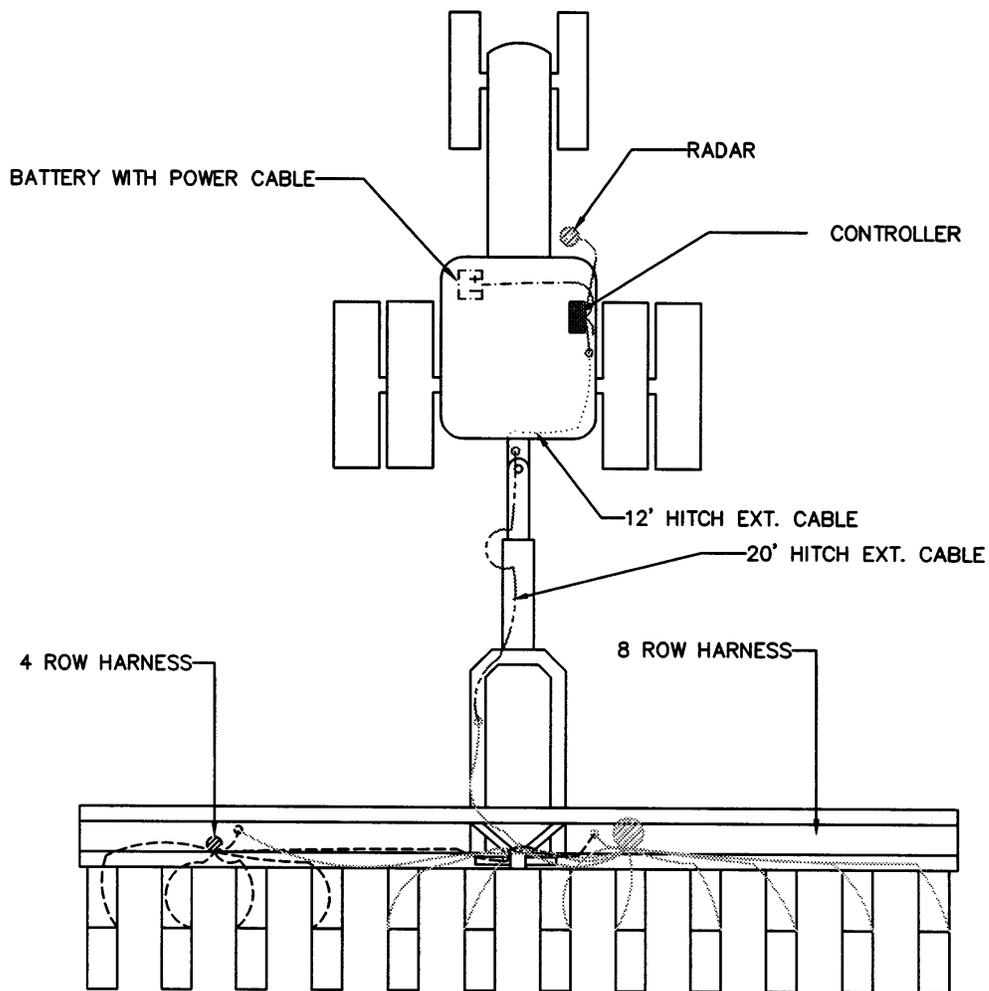
BATTERY CABLE -----
 RADAR
 4 ROW HARNESS -----
 8 ROW HARNESS -----
 CONTROLLER
 LIFT SWITCH CABLE -----
 20' HITCH CABLE -----
 METER EXT. CABLE -----



PLANTER DRAWING 12

SYSTEM NUMBER: SBSS125
 12 ROW KINZE TWIN LINE
 WIRING DIAGRAM FOR SERIES
 2600 PLANTERS.

RADAR	.....
BATTERY CABLE	-----
8 ROW HARNESS	.....
LIFT SWITCH CABLE	.....
CONTROLLER	.....
20' HITCH CABLE	-----
12' HITCH CABLE	.....



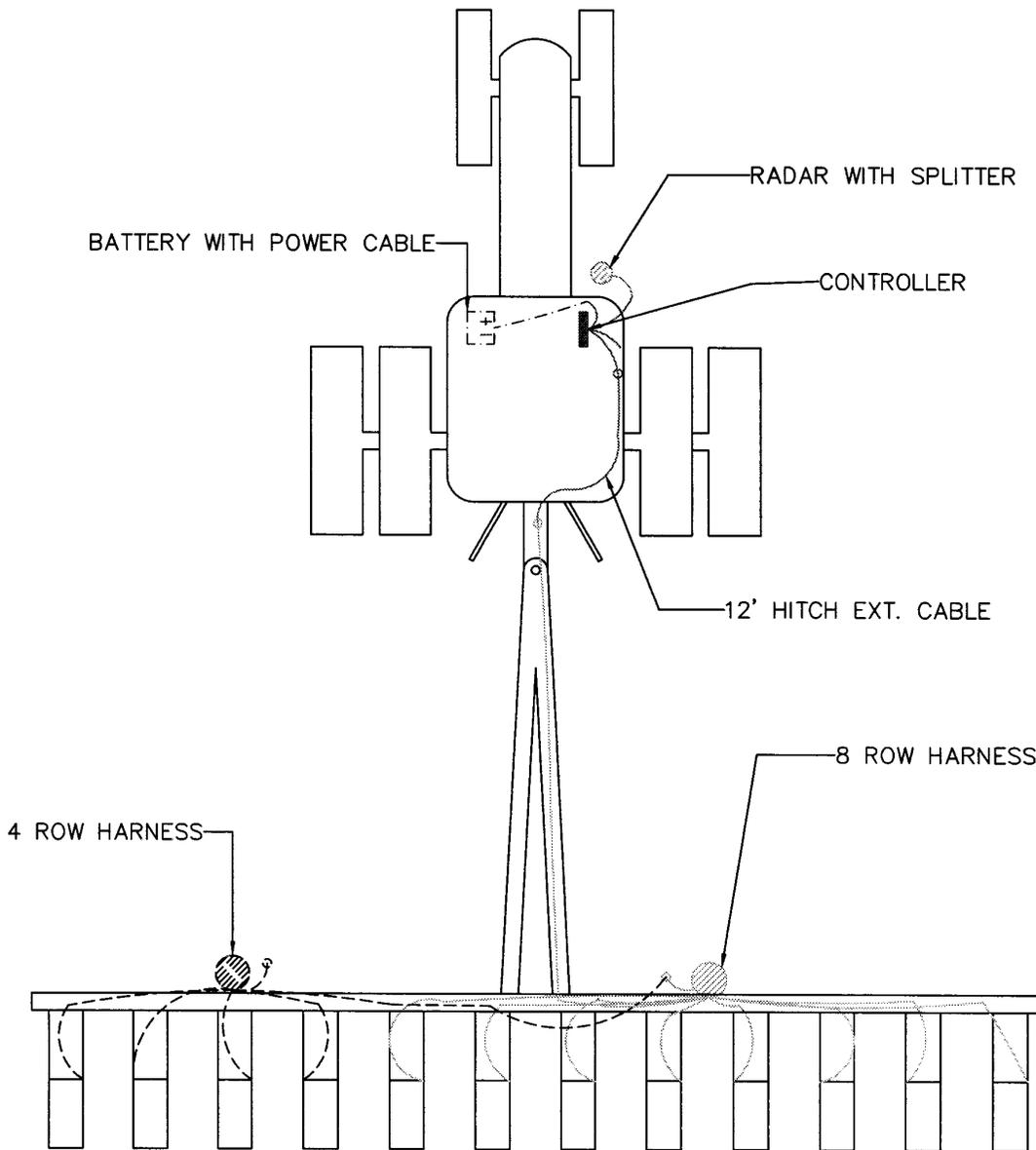
PLANTER DRAWING 13

SYSTEM NUMBER: SBSS127

12 ROW FLEX FOLD WIRING
DIAGRAM. FOR FOLDED VIEW
SEE NEXT PAGE.

WHITE: 6200, 6300

BATTERY CABLE -----
RADAR -----
4 ROW HARNESS -----
8 ROW HARNESS -----
CONTROLLER -----
LIFT SWITCH CABLE -----
12' HITCH CABLE -----
METER EXT. CABLE -----



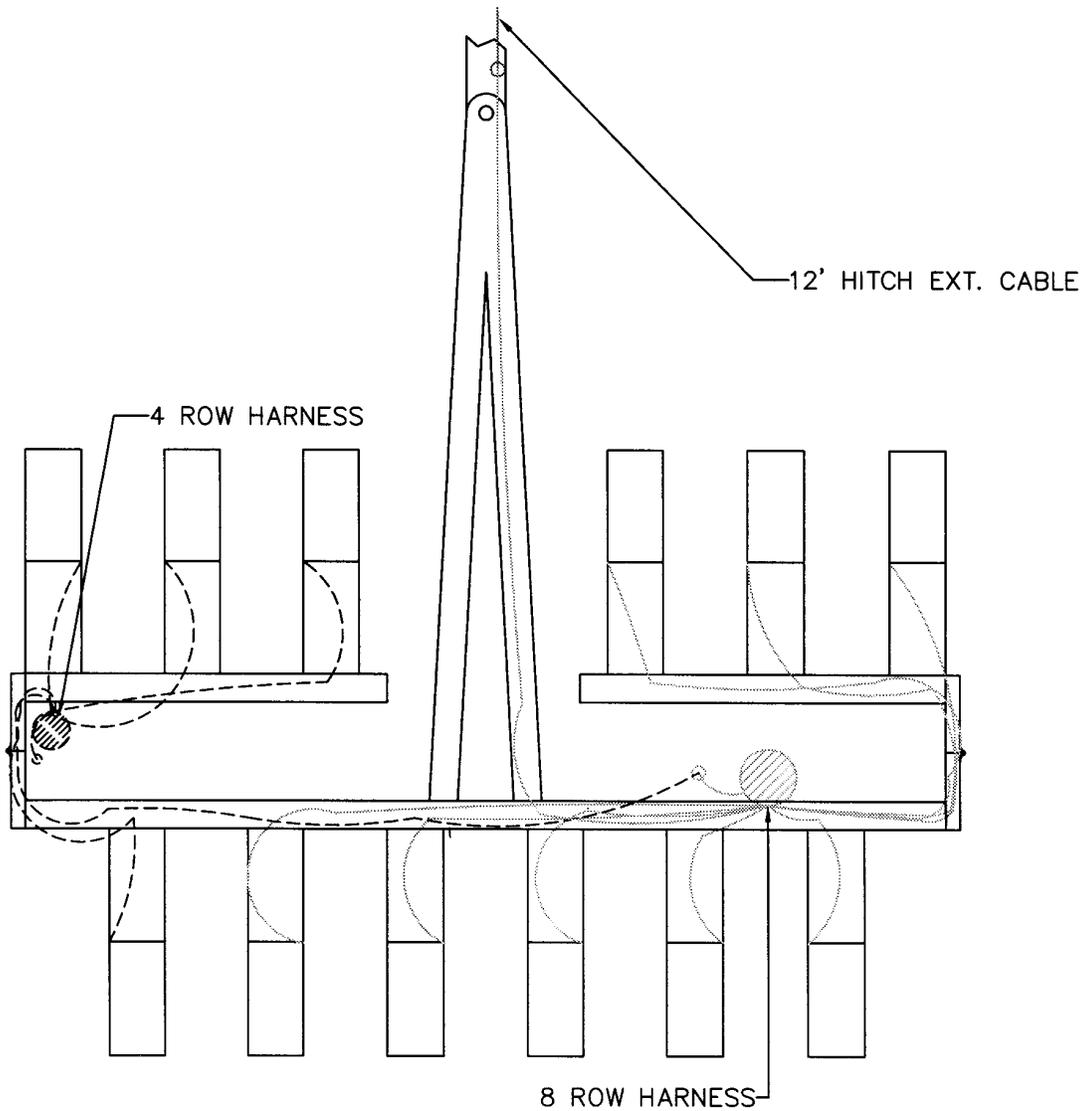
PLANTER DRAWING 14

SYSTEM NUMBER: SBSS127

12 ROW FLEX FOLD FOLDED
VIEW WIRING DIAGRAM.

WHITE: 6200, 6300

BATTERY CABLE	-----
RADAR	.....
4 ROW HARNESS	-----
8 ROW HARNESS	.....
CONTROLLER	-----
LIFT SWITCH CABLE	-----
METER EXT. CABLE	-----
HITCH EXT. CABLE	-----

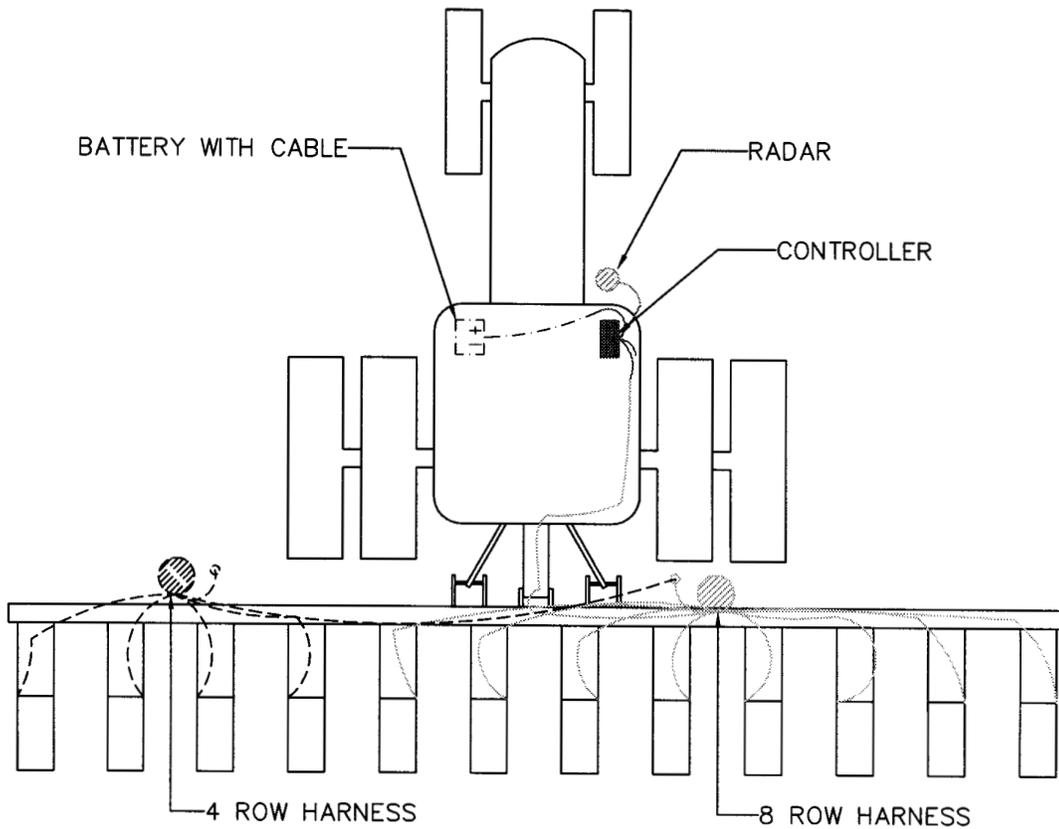


PLANTER DRAWING 15

SYSTEM NUMBER: SBSS127
12 ROW 3 POINT MOUNTED WIRING
DIAGRAM FOR STANDARD, VERTICAL
FOLD, AND NARROW ROW PLANTERS.

BATTERY CABLE -----
RADAR -----
8 ROW HARNESS -----
CONTROLLER -----
LIFT SWITCH CABLE -----

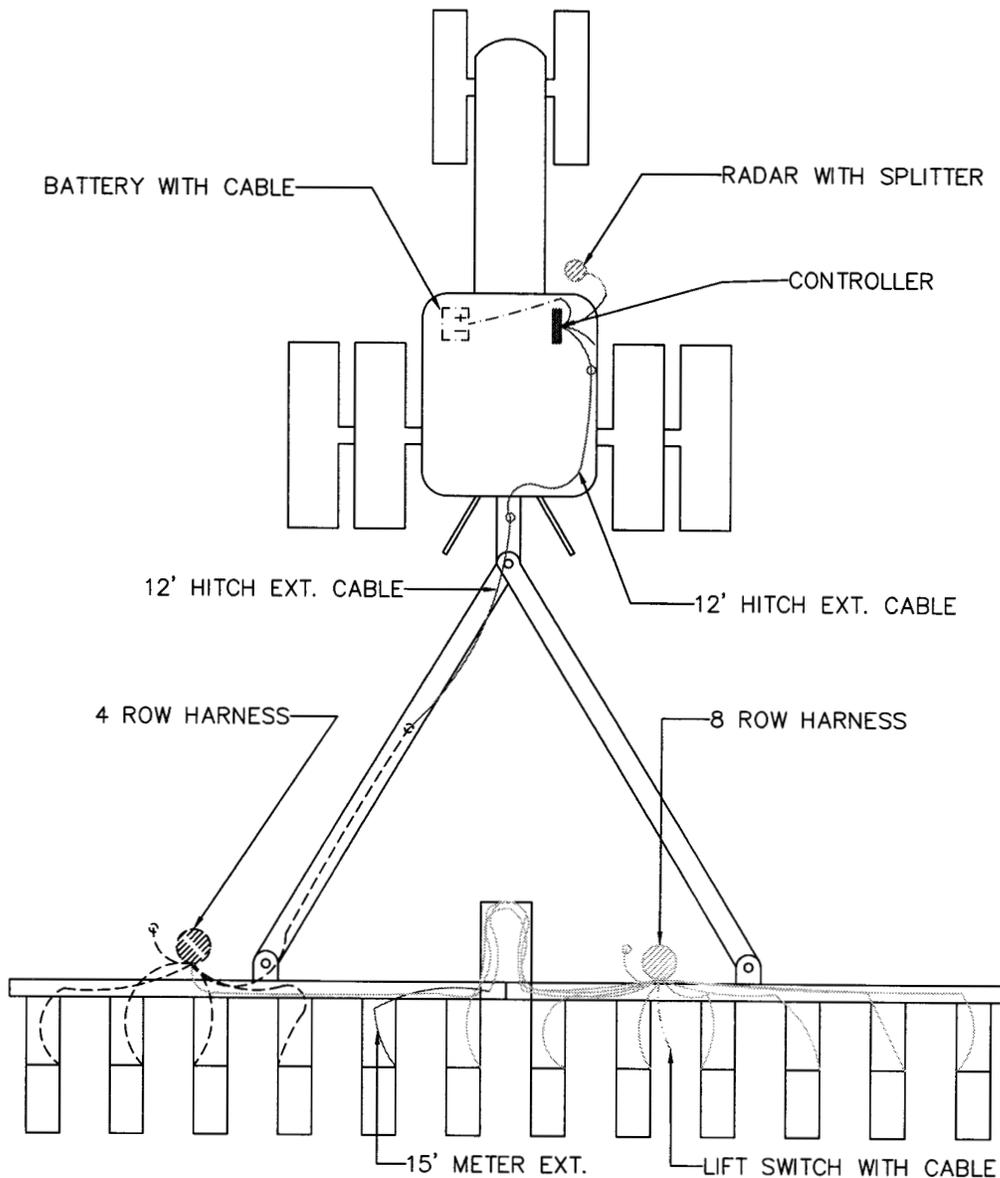
WHITE: 5100, 6102, 6702 6762
6122, 6722



PLANTER DRAWING 16

SYSTEM NUMBER: SBSS128
 WHITE MODEL 6180 12 ROW
 FRONT FOLD WIRING DIAGRAM.
 FOR FOLDED VIEW SEE NEXT PAGE.

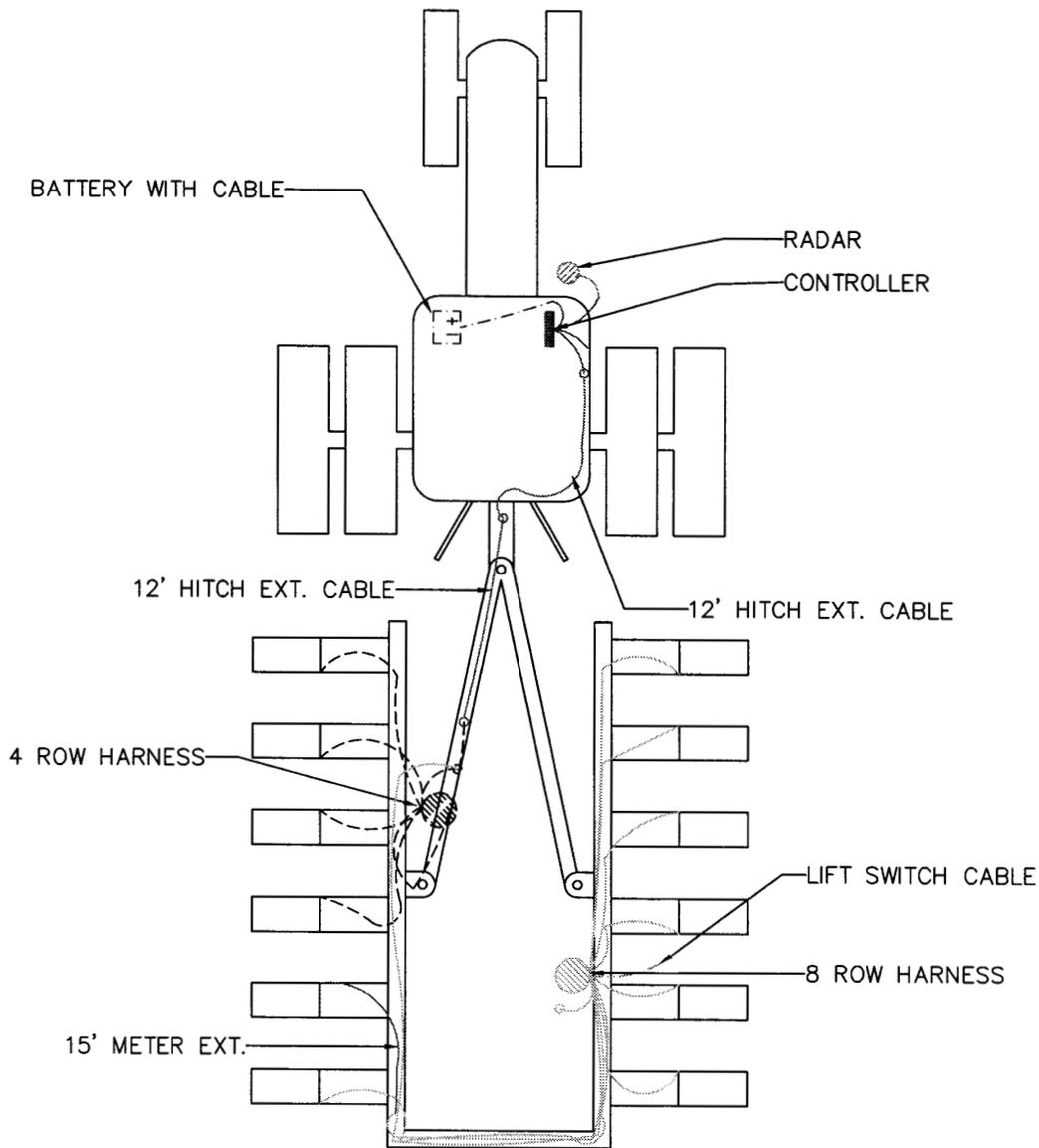
BATTERY CABLE -----
 RADAR
 4 ROW HARNESS -----
 8 ROW HARNESS
 CONTROLLER -----
 LIFT SWITCH CABLE
 20' HITCH CABLE -----
 METER EXT. CABLE



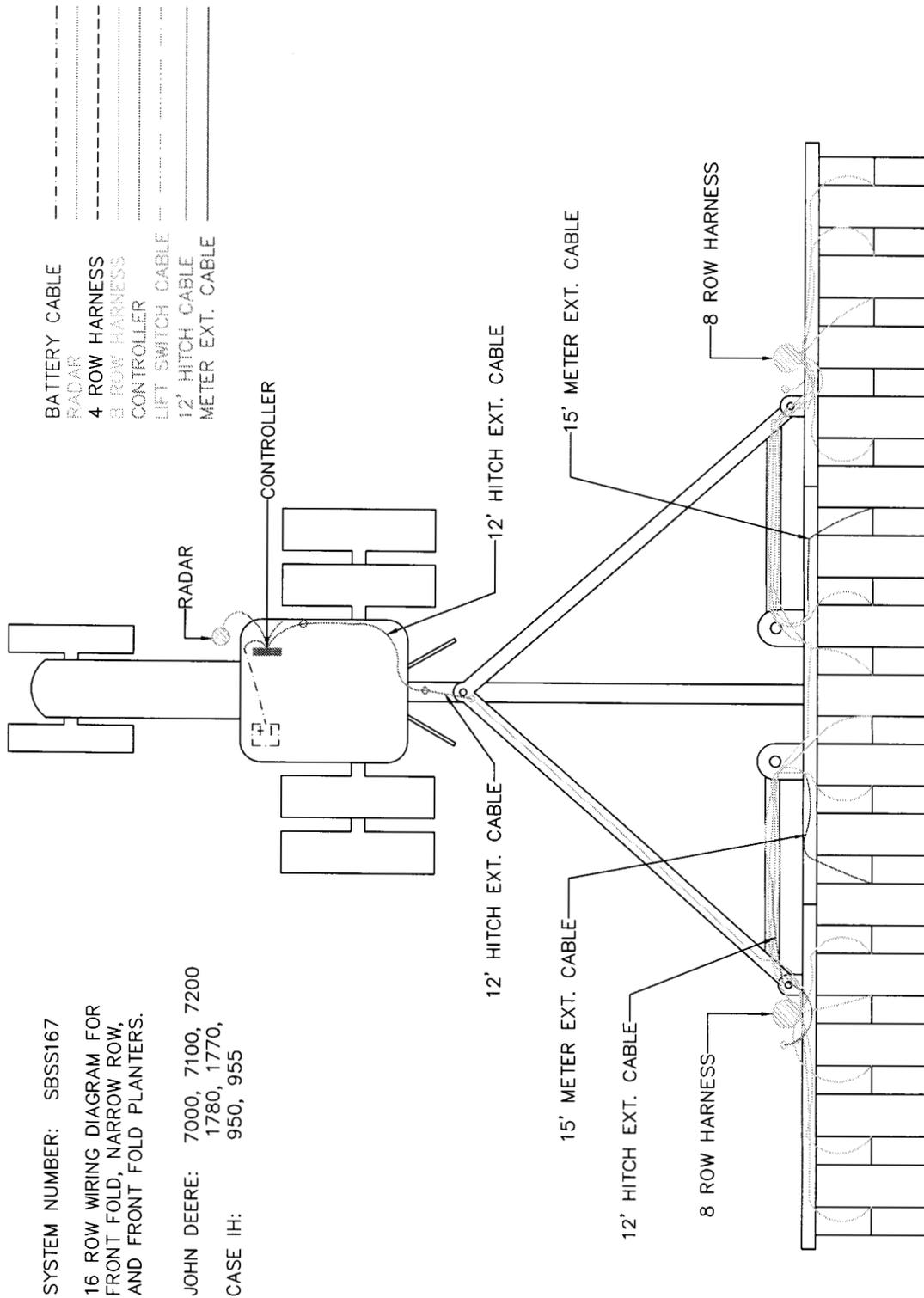
PLANTER DRAWING 17

SYSTEM NUMBER: SBSS128
 WHITE MODEL 6180 12 ROW
 FRONT FOLD WIRING DIAGRAM.

BATTERY CABLE -----
 RADAR
 4 ROW HARNESS -----
 8 ROW HARNESS
 CONTROLLER -----
 LIFT SWITCH CABLE -----
 20' HITCH CABLE -----
 METER EXT. CABLE -----



PLANTER DRAWING 18

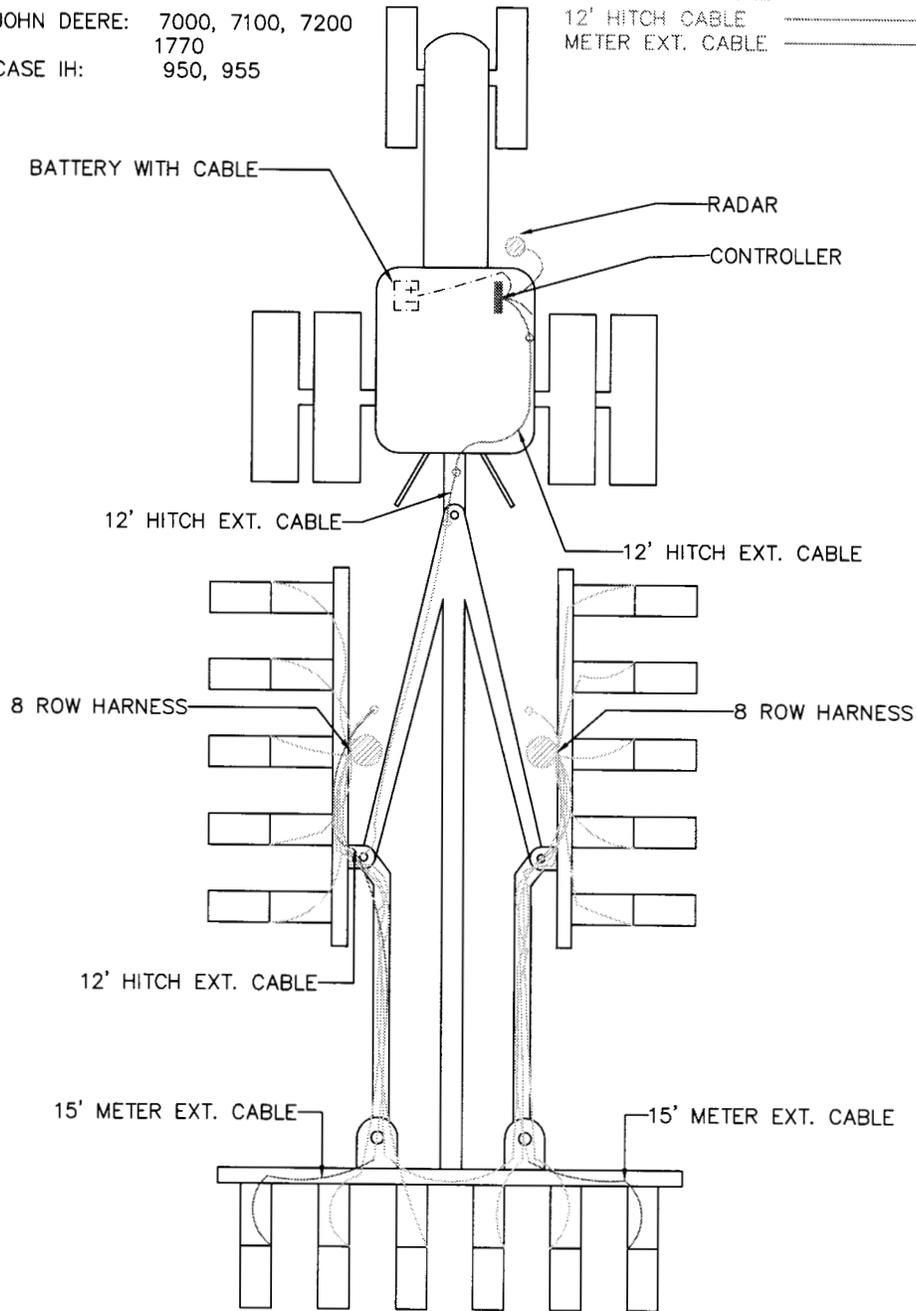


PLANTER DRAWING 19

SYSTEM NUMBER: SBSS167
 16 ROW WIRING DIAGRAM FOR
 FRONT FOLD PLANTERS

JOHN DEERE: 7000, 7100, 7200
 1770
 CASE IH: 950, 955

BATTERY CABLE -----
 RADAR
 4 ROW HARNESS -----
 8 ROW HARNESS
 CONTROLLER -----
 LIFT SWITCH CABLE
 12' HITCH CABLE -----
 METER EXT. CABLE -----



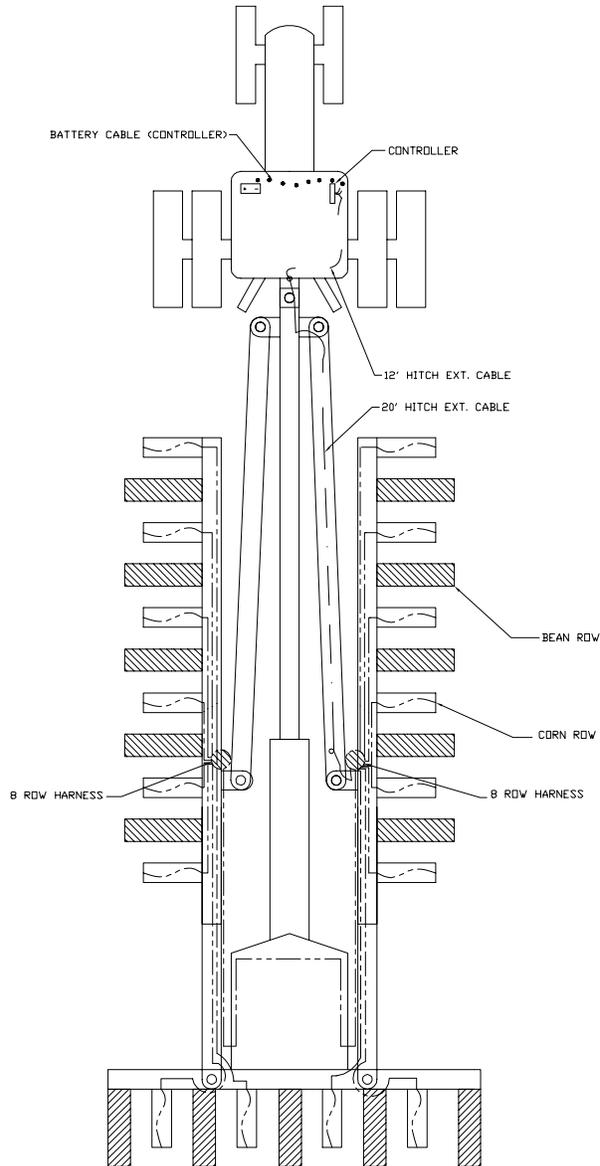
PLANTER DRAWING 20

SYSTEM NUMBER: SBSS167

16 ROW 30" FRONT
FOLD WIRING DIAGRAM.

JOHN DEERE: 1790

BATTERY (CONTROLLER)	.....
4 ROW HARNESS	-----
8 ROW HARNESS	-----
CONTROLLER	-----
20' HITCH CABLE	-----
METER EXT. CABLE	-----
12' HITCH CABLE	-----



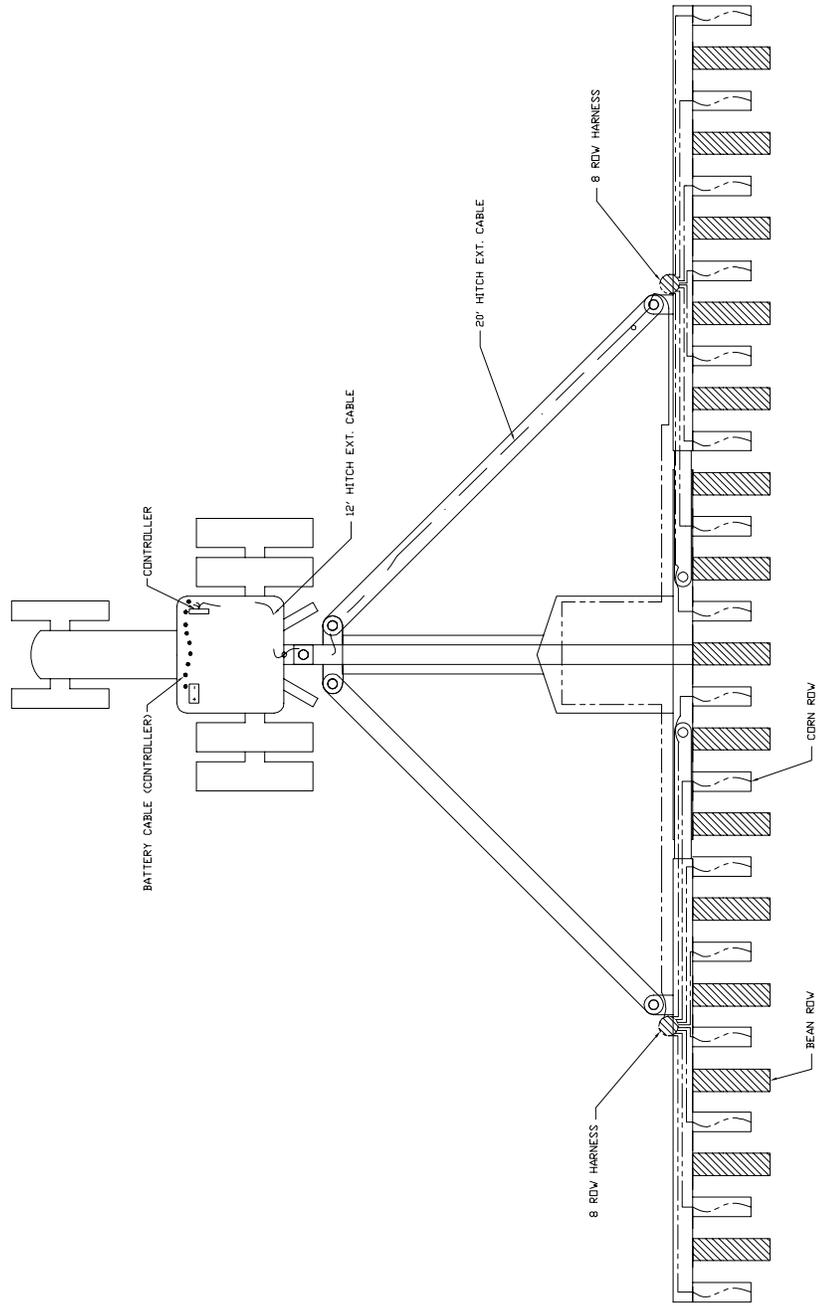
PLANTER DRAWING 21

SYSTEM NUMBER: SBSS167

16 ROW 30" FRONT
FOLD WIRING DIAGRAM.

JOHN DEERE: 1790

- BATTERY (CONTROLLER)
- 4 ROW HARNESS -----
- 8 ROW HARNESS -----
- CONTROLLER -----
- 20' HITCH CABLE -----
- METER EXT. CABLE -----
- 12' HITCH CABLE -----



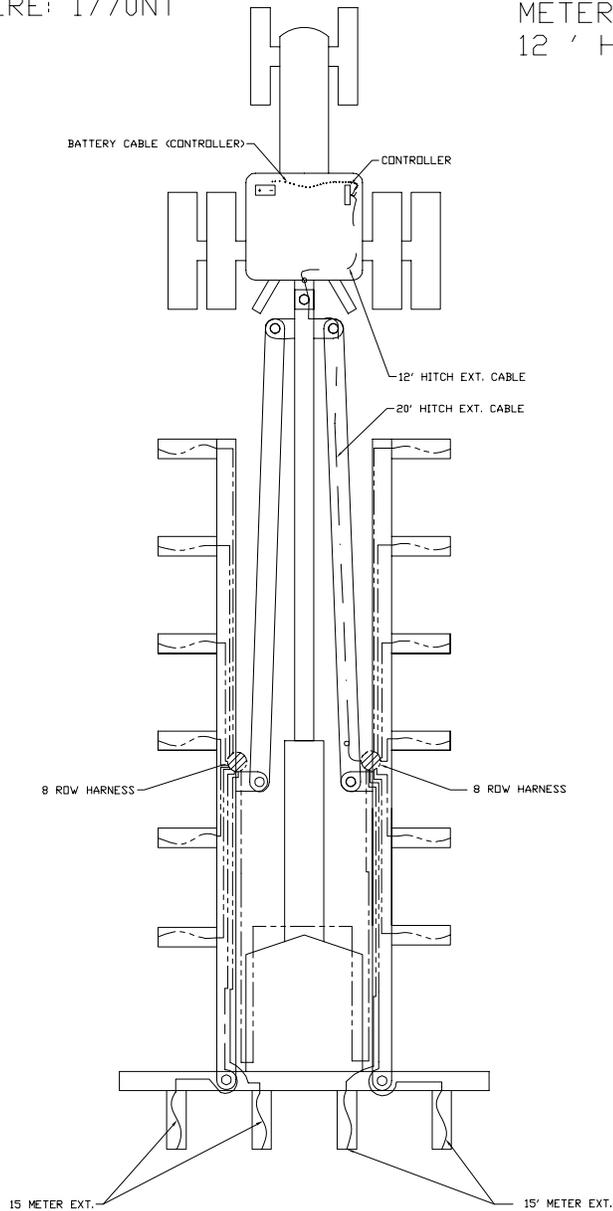
PLANTER DRAWING 22

SYSTEM NUMBER: SBSS167

16 ROW 30" FRONT
FOLD WIRING DIAGRAM.

JOHN DEERE: 1770NT

BATTERY (CONTROLLER)	_____
4 ROW HARNESS	_____
8 ROW HARNESS	_____
CONTROLLER	_____
20' HITCH CABLE	_____
METER EXT. CABLE	_____
12 ' HITCH CABLE	_____



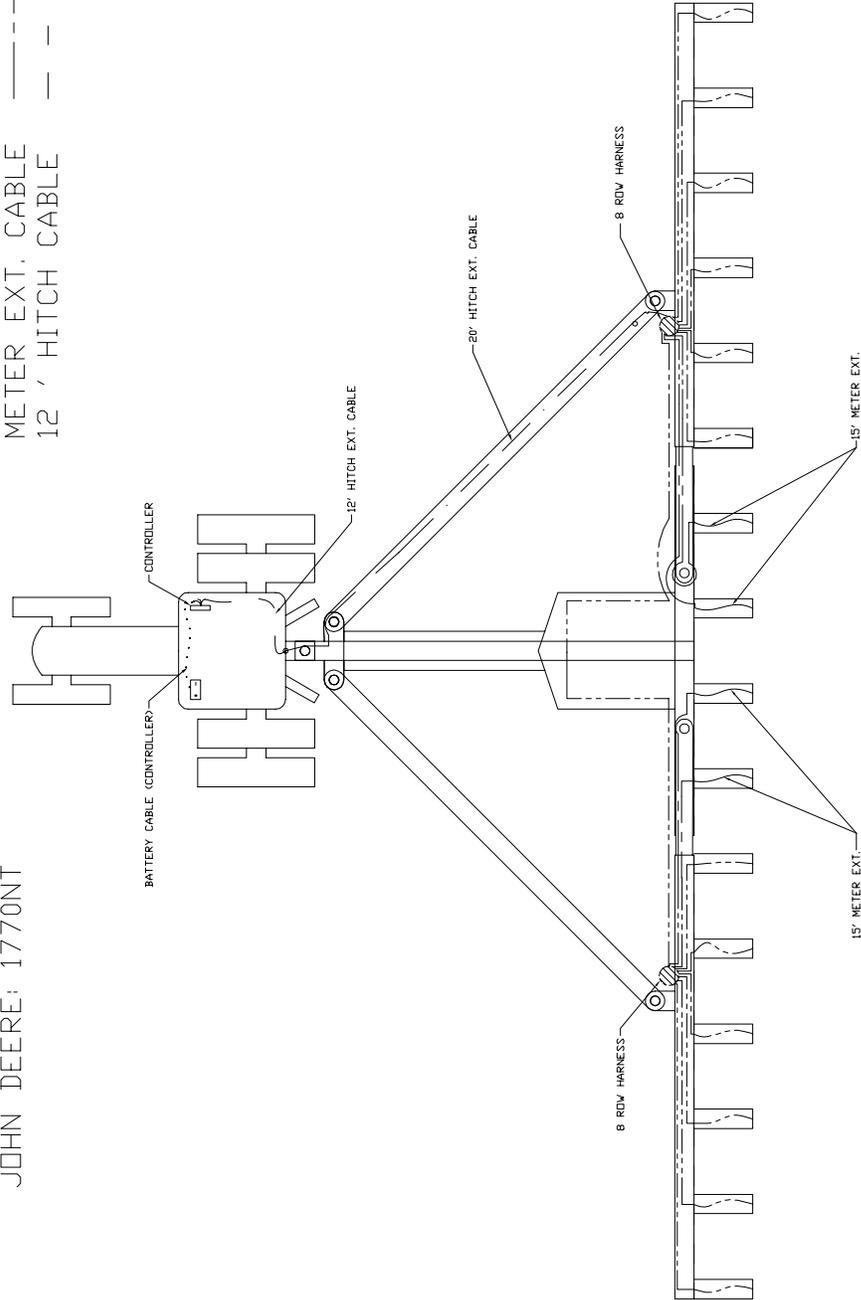
PLANTER DRAWING 23

SYSTEM NUMBER: SBSS167

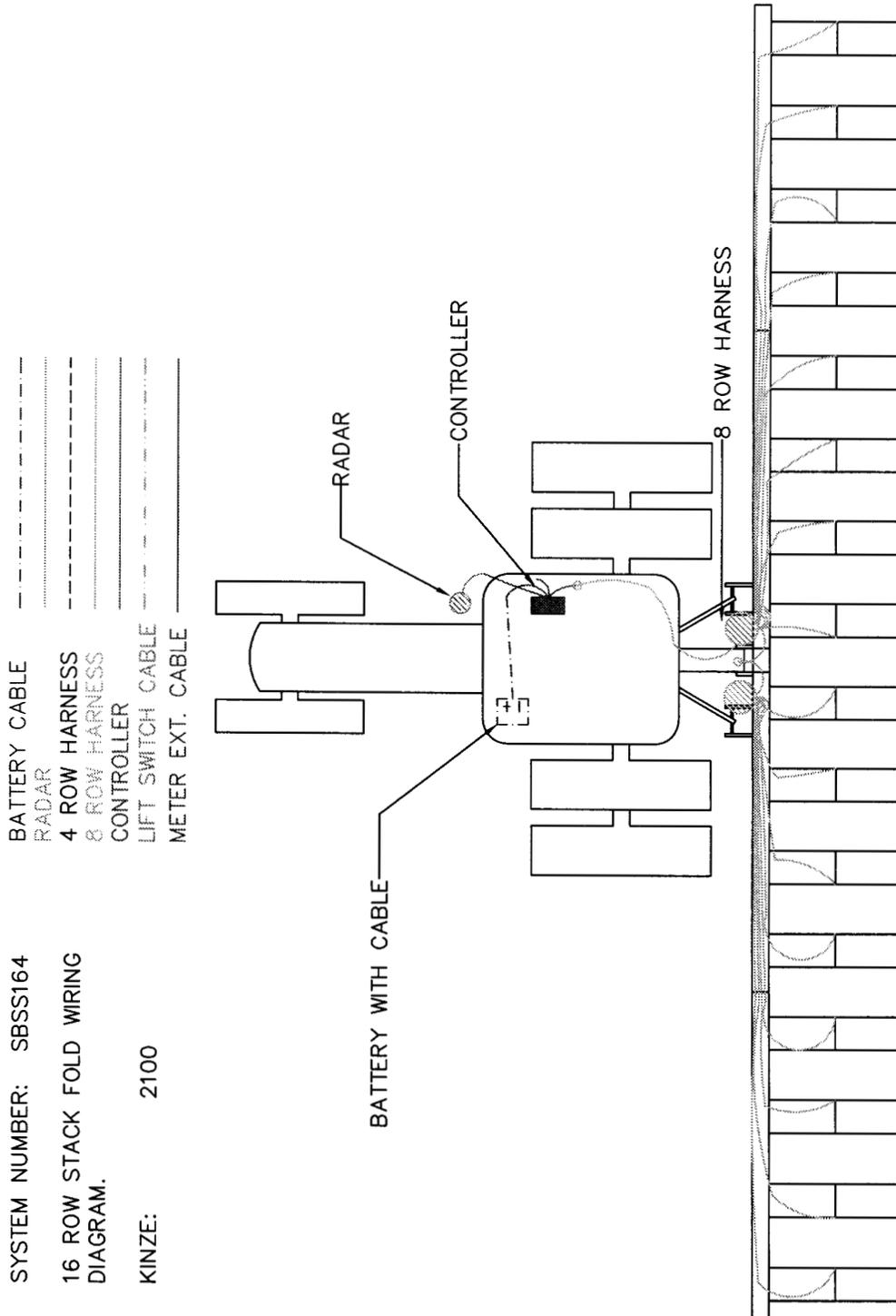
16 ROW 30" FRONT
FOLD WIRING DIAGRAM,

JOHN DEERE: 1770NT

BATTERY (CONTROLLER).....
 4 ROW HARNESS -----
 8 ROW HARNESS -----
 CONTROLLER -----
 20' HITCH CABLE -----
 METER EXT. CABLE -----
 12' HITCH CABLE -----



PLANTER DRAWING 24

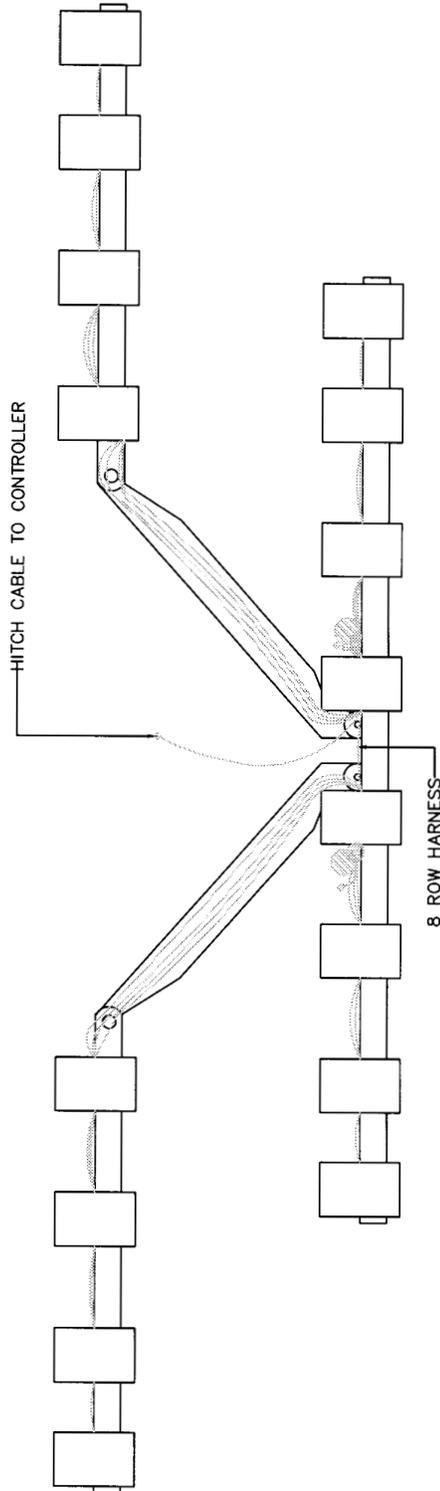


PLANTER DRAWING 25

SYSTEM NUMBER: SBSS164
 16 ROW STACK FOLD REAR VIEW
 AT 1/2 OF FOLDING POSITION.

KINZE: 2100

- - - - - 4 ROW HARNESS
 ········· 6 ROW HARNESS
 ········· METER EXT. CABLE
 ········· LIFT SWITCH CABLE

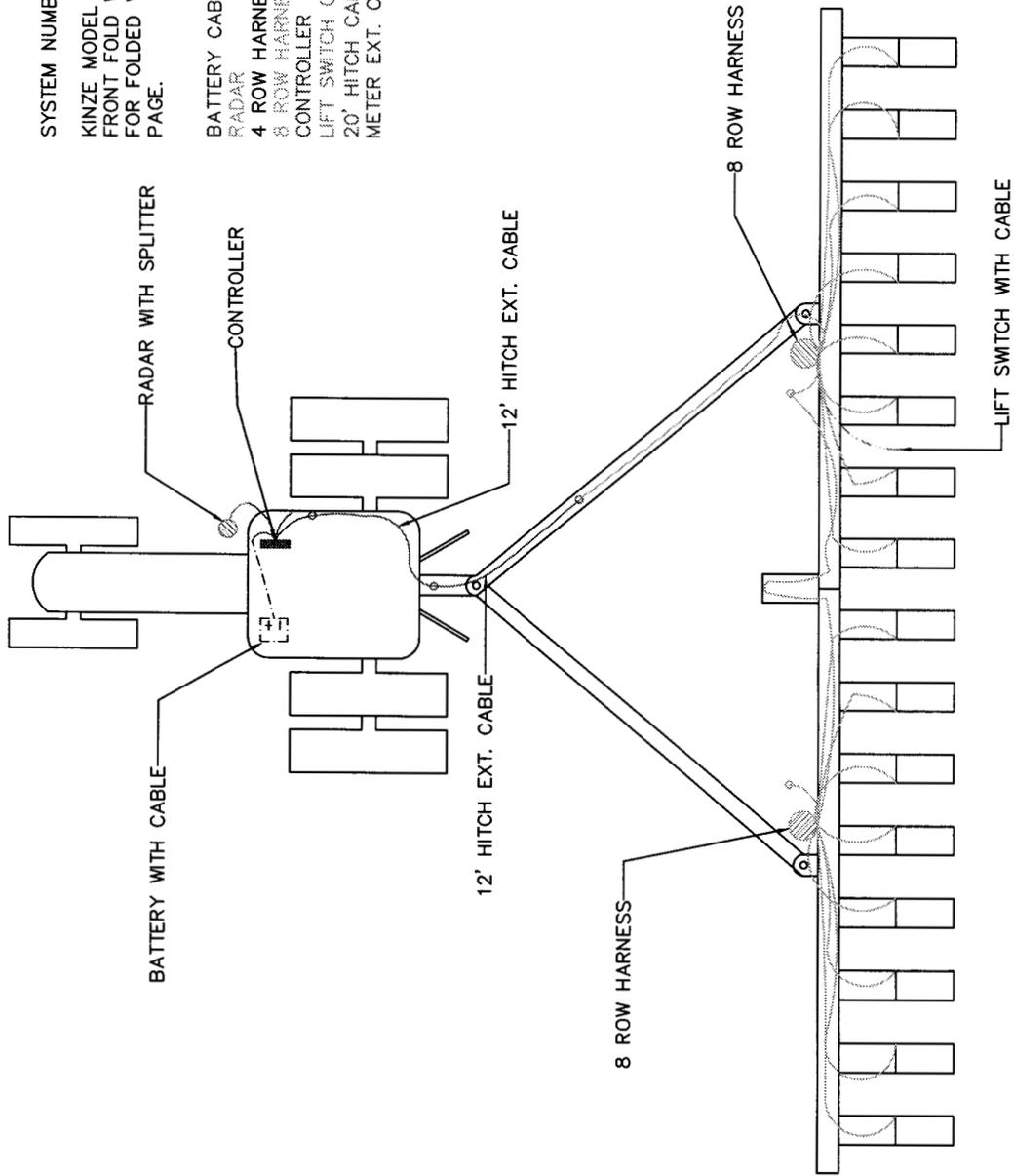


PLANTER DRAWING 26

SYSTEM NUMBER: SBSS162

KINZE MODEL 2300 16 ROW
FRONT FOLD WIRING DIAGRAM.
FOR FOLDED VIEW SEE NEXT
PAGE.

- BATTERY CABLE
- RADAR
- 4 ROW HARNESS
- 8 ROW HARNESS
- CONTROLLER
- LIFT SWITCH CABLE
- 20' HITCH CABLE
- METER EXT. CABLE

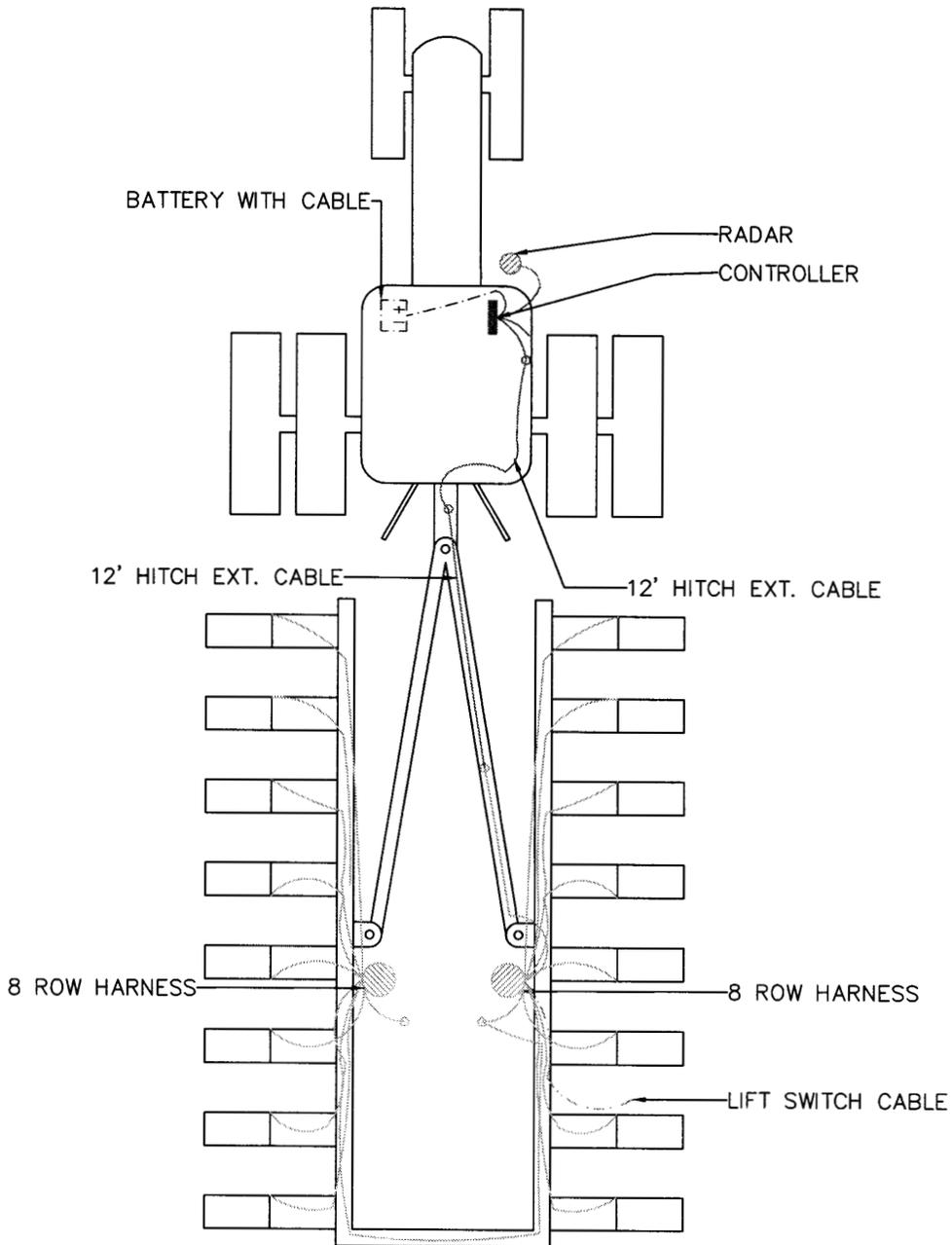


PLANTER DRAWING 27

SYSTEM NUMBER: SBSS162

KINZE MODEL 2300 16 ROW
FRONT FOLD WIRING DIAGRAM.

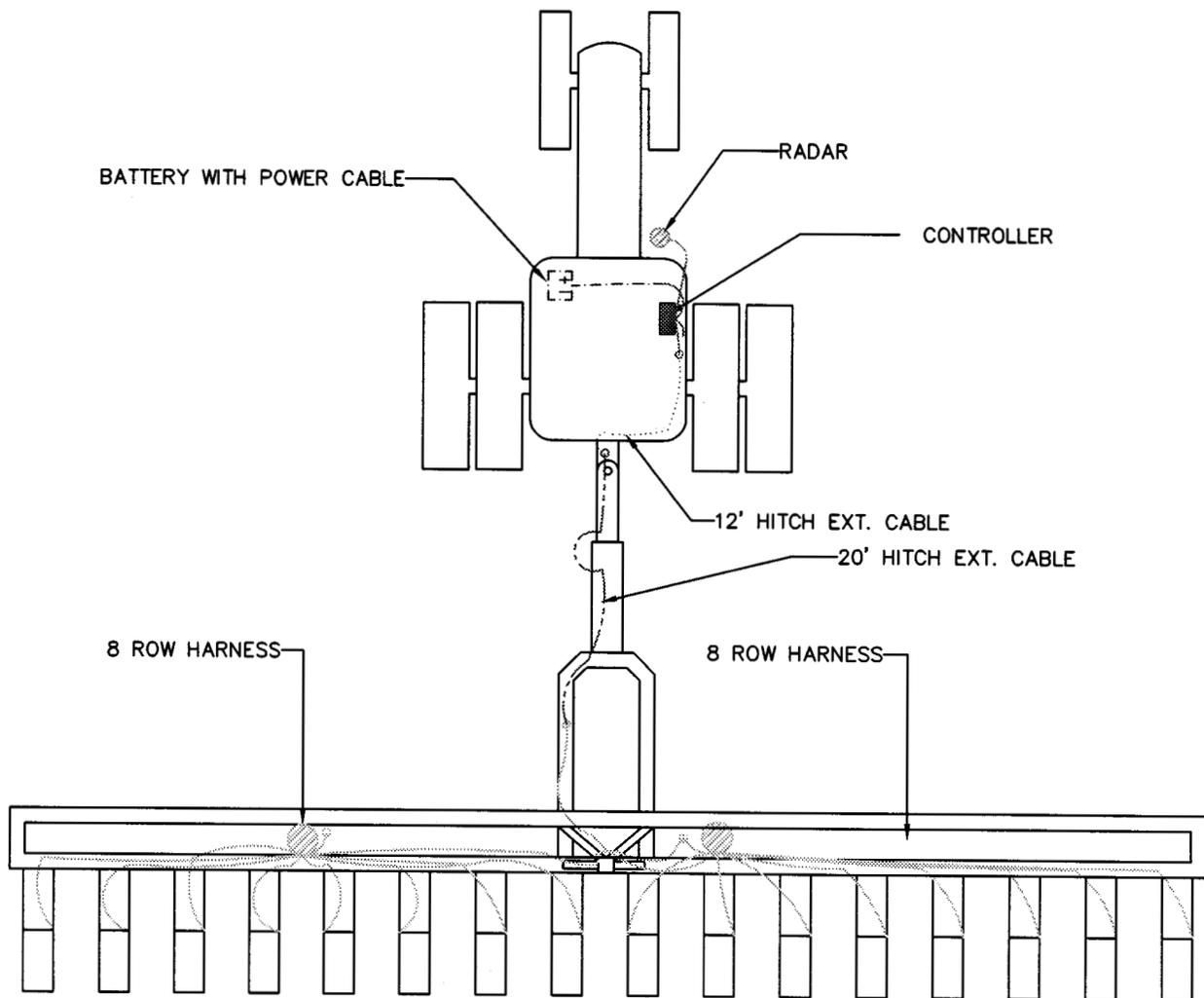
- BATTERY CABLE -----
- RADAR -----
- 4 ROW HARNESS -----
- 8 ROW HARNESS -----
- CONTROLLER -----
- LIFT SWITCH CABLE -----
- 20' HITCH CABLE -----
- METER EXT. CABLE -----



PLANTER DRAWING 28

SYSTEM NUMBER: SBSS163
 16 ROW KINZE TWIN LINE
 WIRING DIAGRAM FOR SERIES
 2600 PLANTERS.

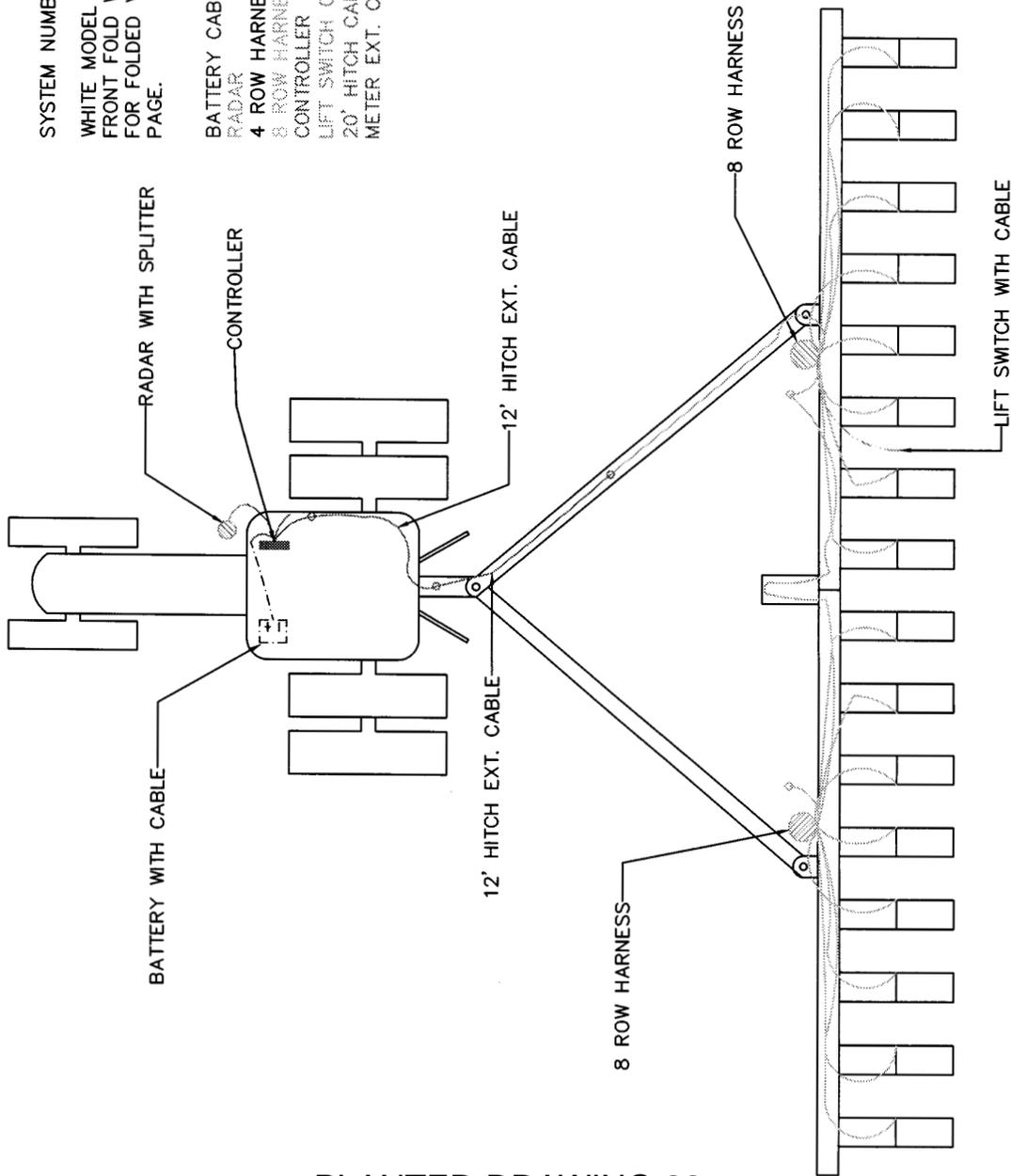
RADAR	.....
BATTERY CABLE	-----
8 ROW HARNESS	.....
LIFT SWITCH CABLE	.....
CONTROLLER	.....
20' HITCH CABLE	-----
12' HITCH CABLE	.....



PLANTER DRAWING 29

SYSTEM NUMBER: SBSS167
 WHITE MODEL 6180 16 ROW
 FRONT FOLD WIRING DIAGRAM.
 FOR FOLDED VIEW SEE NEXT
 PAGE.

- BATTERY CABLE
- RADAR
- 4 ROW HARNESS
- 8 ROW HARNESS
- CONTROLLER
- LIFT SWITCH CABLE
- 20' HITCH CABLE
- METER EXT. CABLE

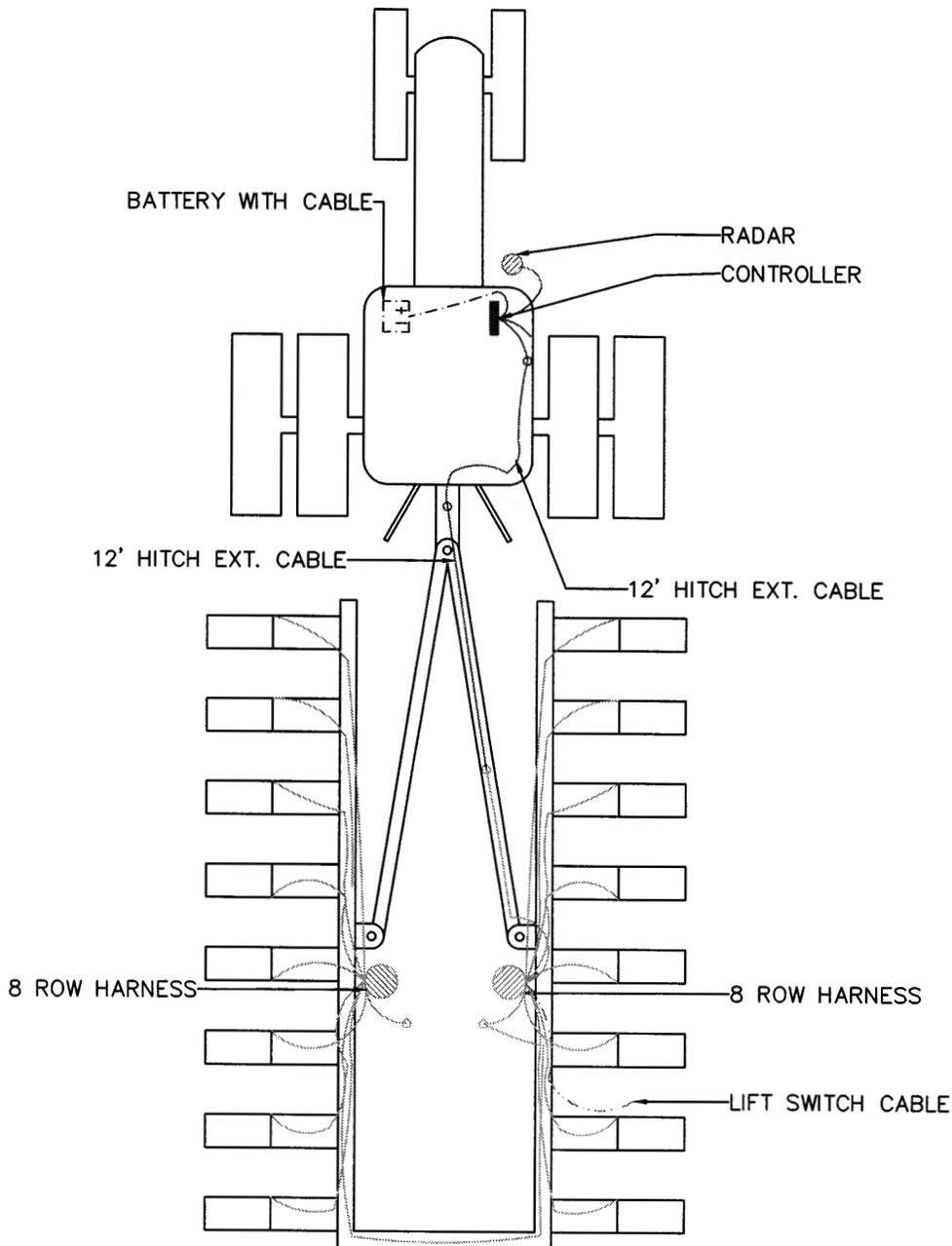


PLANTER DRAWING 30

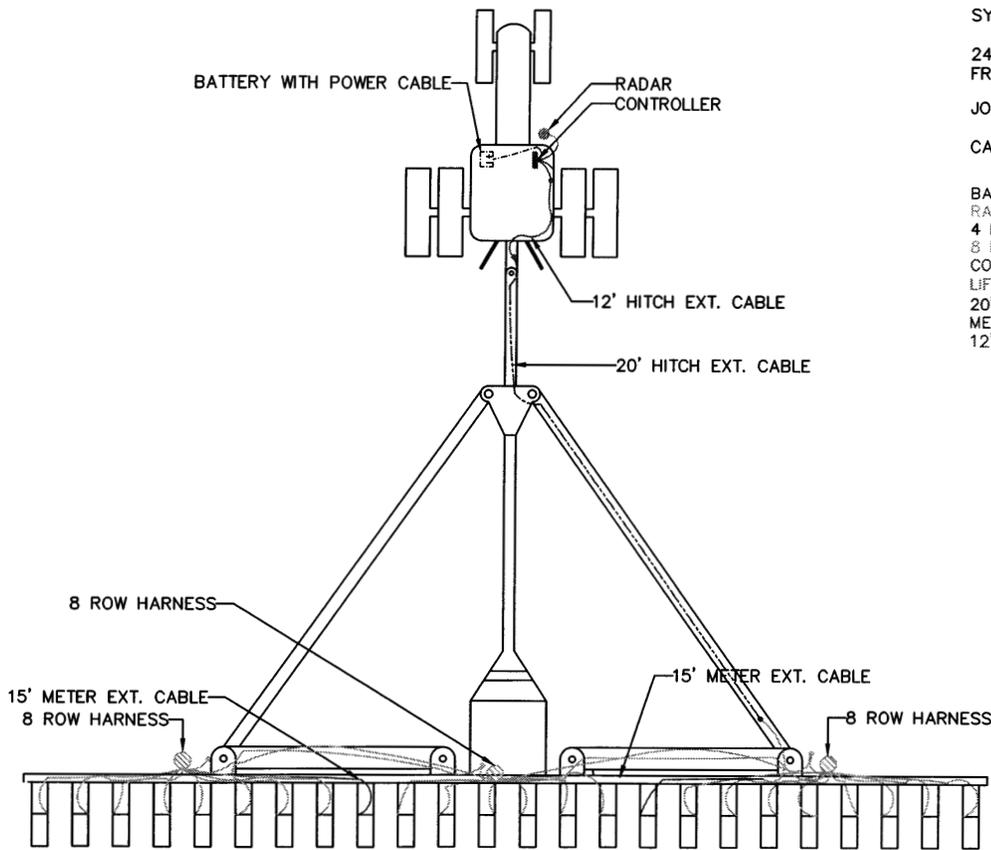
SYSTEM NUMBER: SBSS167

WHITE MODEL 6180 16 ROW
FRONT FOLD WIRING DIAGRAM.

BATTERY CABLE -----
 RADAR
 4 ROW HARNESS -----
 8 ROW HARNESS
 CONTROLLER -----
 LIFT SWITCH CABLE
 20' HITCH CABLE -----
 METER EXT. CABLE -----



PLANTER DRAWING 31



SYSTEM NUMBER: SBSS240

24 ROW WIRING DIAGRAM FOR FRONT FOLDS.

JOHN DEERE: 7000, 7100, 7200
1770

CASE IH: 950, 955

- BATTERY CABLE -----
- RADAR -----
- 4 ROW HARNESS -----
- 8 ROW HARNESS -----
- CONTROLLER -----
- LIFT SWITCH CABLE -----
- 20' HITCH CABLE -----
- METER EXT. CABLE -----
- 12' HITCH CABLE -----

PLANTER DRAWING 32

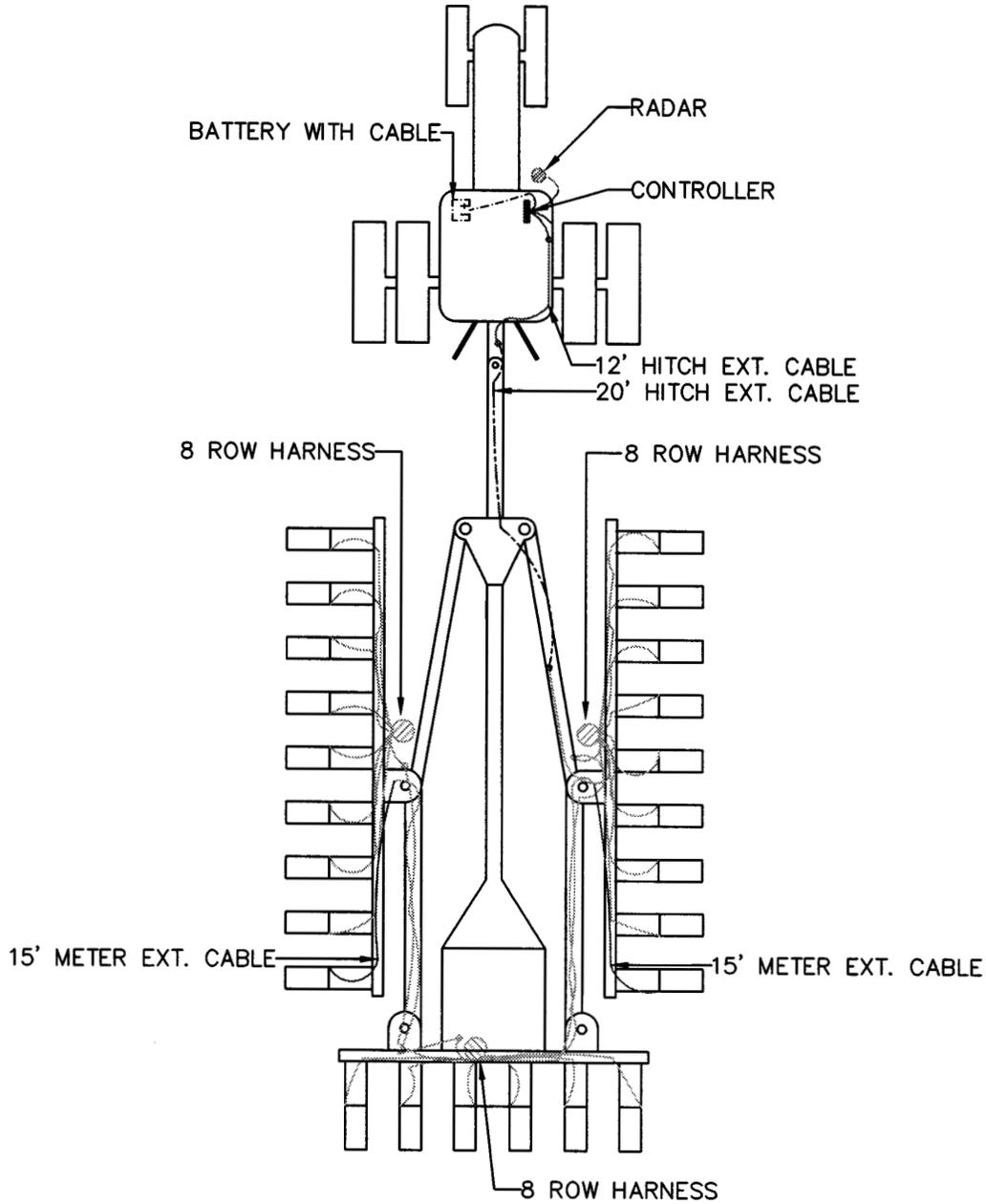
SYSTEM NUMBER: SBSS240

24 ROW FRONT FOLD WIRING
DIAGRAM.

JOHN DEERE: 7000, 7100, 7200,
1770

CASE IH: 950, 955

BATTERY CABLE	-----
RADAR	=====
4 ROW HARNESS	-----
8 ROW HARNESS	-----
CONTROLLER	=====
LIFT SWITCH CABLE	-----
20' HITCH CABLE	-----
METER EXT. CABLE	-----
12' HITCH CABLE	-----



PLANTER DRAWING 33

SYSTEM NUMBER: SBSS240
 24 ROW WIRING DIAGRAM FOR
 NARROW ROW FRONT FOLDS.
 JOHN DEERE: 7000, 7100, 7200
 1780
 CASE IH: 950, 955

 BATTERY CABLE

 RADAR

 4 ROW HARNESS

 8 ROW HARNESS

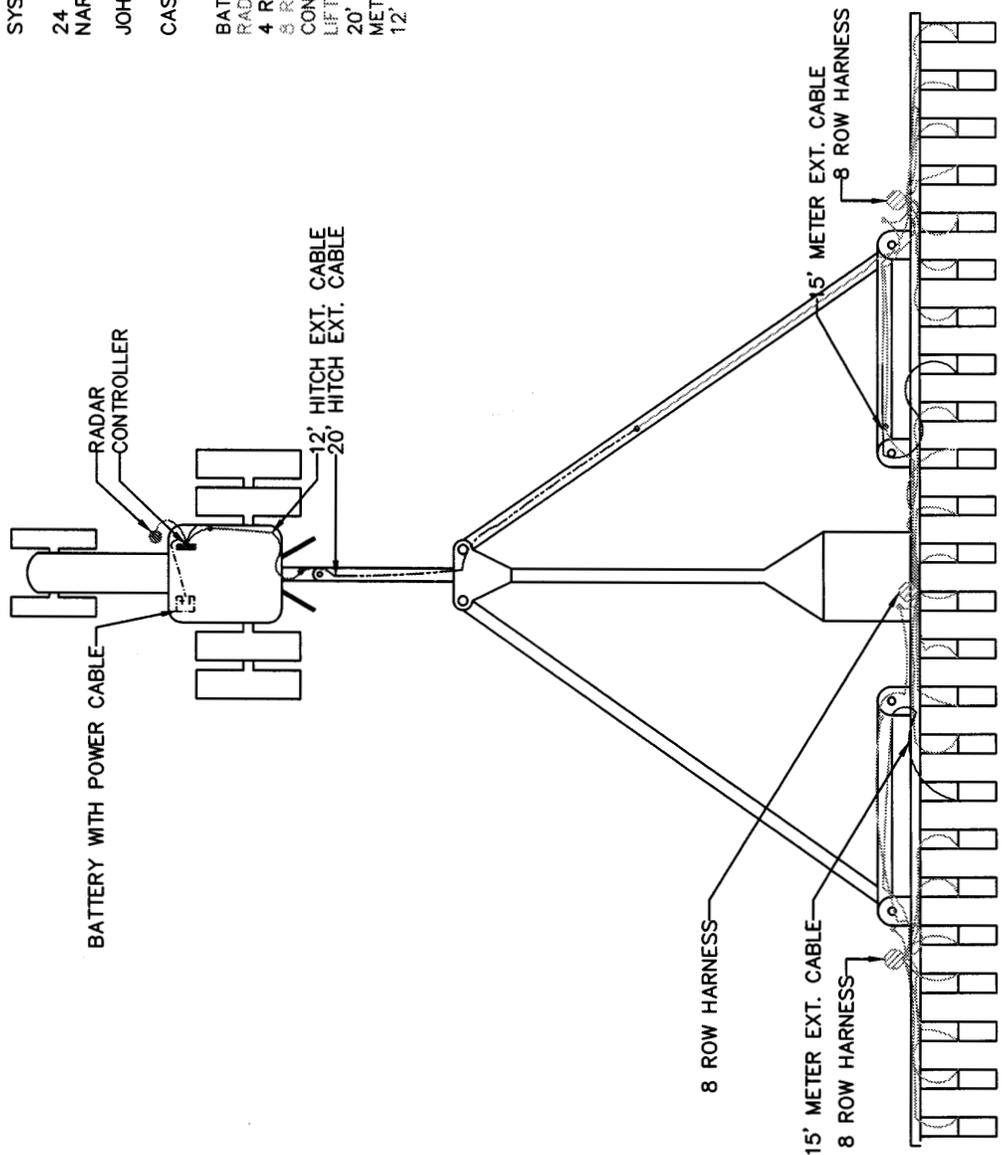
 CONTROLLER

 LEFT SWITCH CABLE

 20' HITCH CABLE

 METER EXT. CABLE

 12' HITCH CABLE



PLANTER DRAWING 34

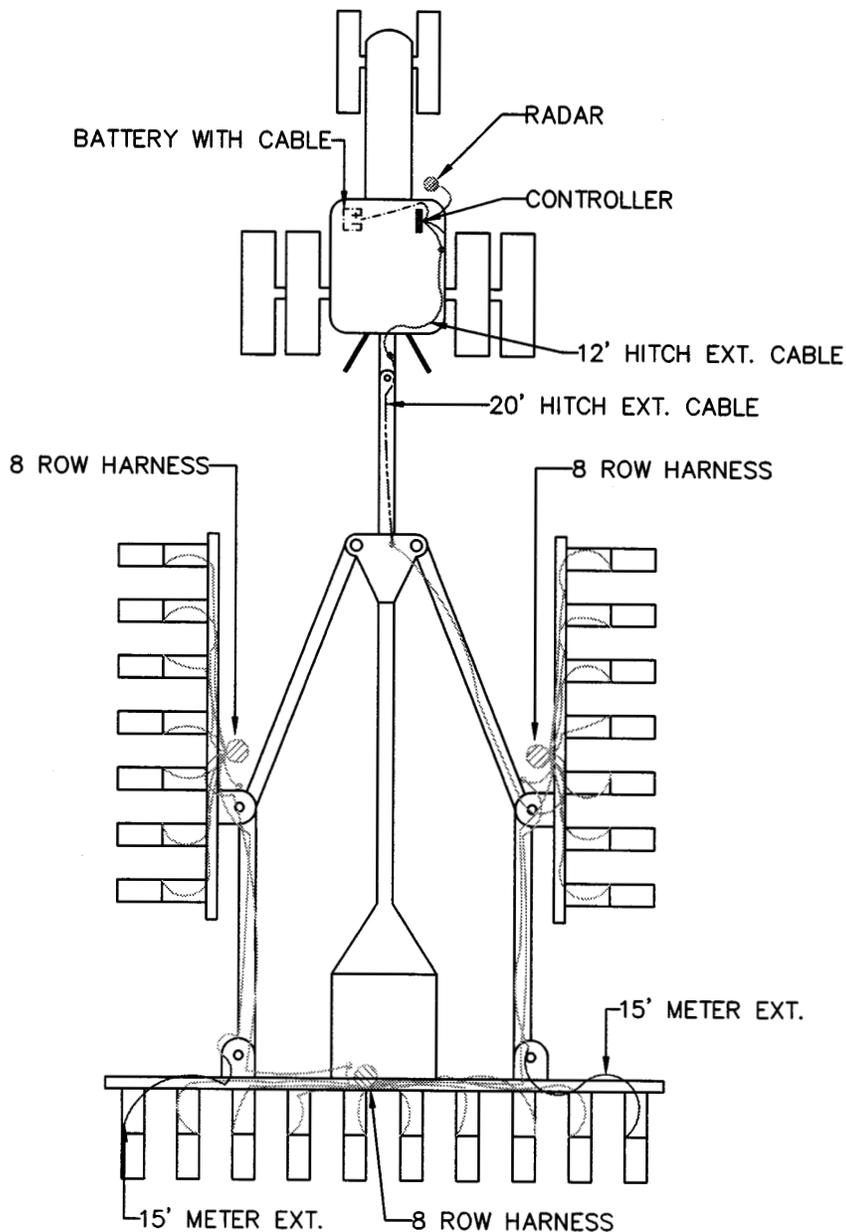
SYSTEM NUMBER: SBSS240

24 NARROW ROW FRONT
FOLD WIRING DIAGRAM.

JOHN DEERE: 7000, 7100, 7200,
1780

CASE IH: 950, 955

- BATTERY CABLE -----
- RADAR -----
- 4 ROW HARNESS -----
- 8 ROW HARNESS -----
- CONTROLLER -----
- LIFT SWITCH CABLE -----
- 20' HITCH CABLE -----
- METER EXT. CABLE -----
- 12' HITCH CABLE -----



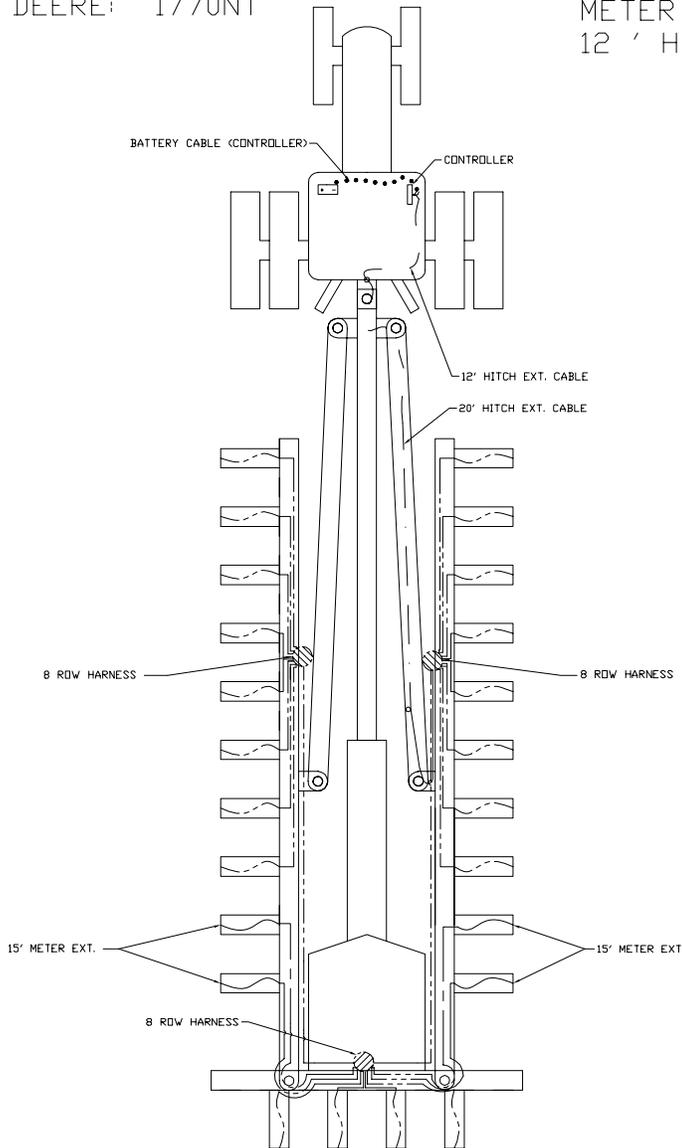
PLANTER DRAWING 35

SYSTEM NUMBER: SBSS240

24 ROW 30" FRONT
FOLD WIRING DIAGRAM.

JOHN DEERE: 1770NT

BATTERY (CONTROLLER).....
 4 ROW HARNESS -----
 8 ROW HARNESS -----
 CONTROLLER -----
 20' HITCH CABLE -----
 METER EXT. CABLE -----
 12 ' HITCH CABLE - - - - -



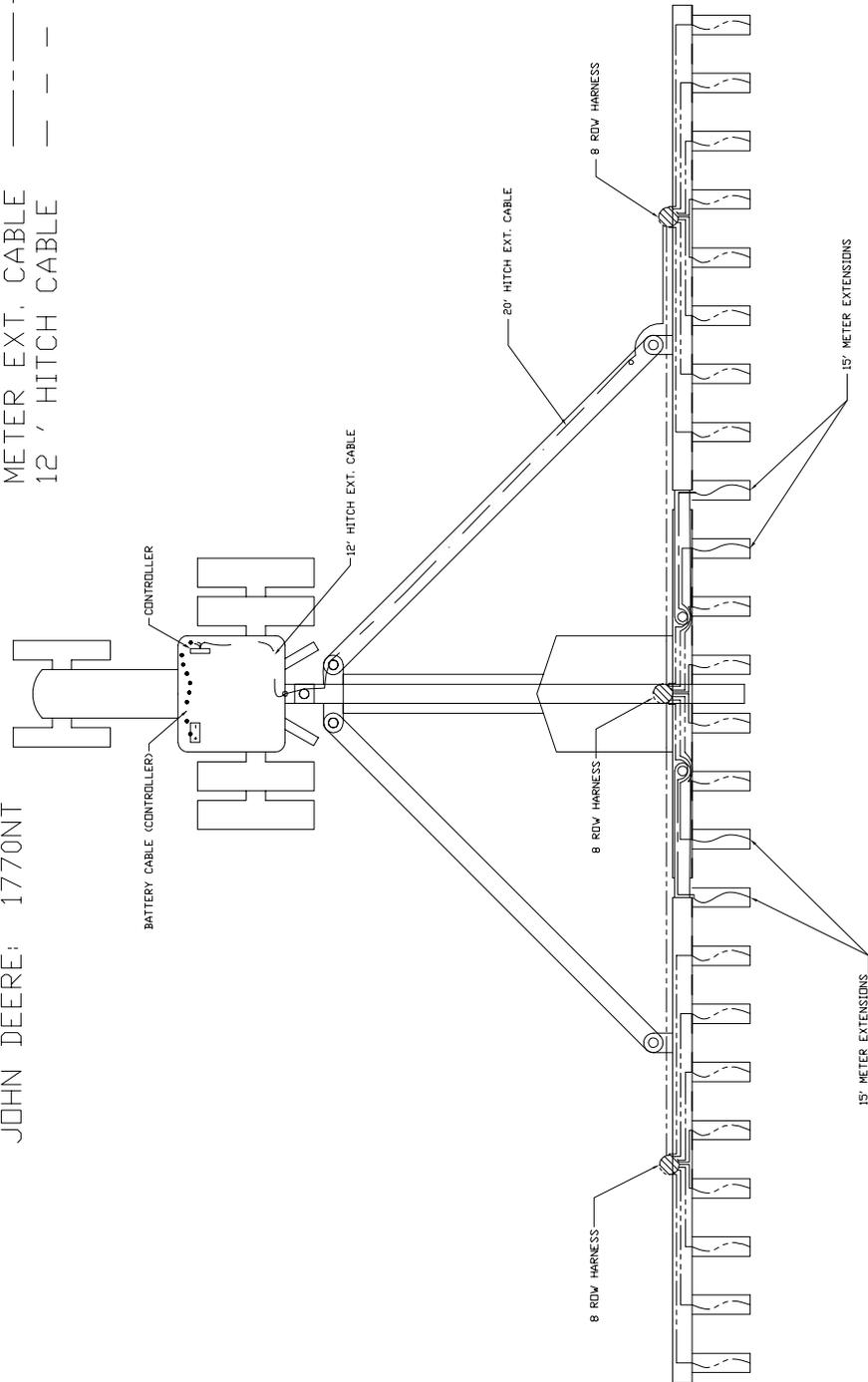
PLANTER DRAWING 36

SYSTEM NUMBER: SBSS240

24 ROW 30" FRONT
FOLD WIRING DIAGRAM.

JOHN DEERE: 1770NT

- BATTERY (CONTROLLER).....
- 4 ROW HARNESS -----
- 8 ROW HARNESS -----
- CONTROLLER -----
- 20' HITCH CABLE -----
- METER EXT. CABLE -----
- 12' HITCH CABLE -----



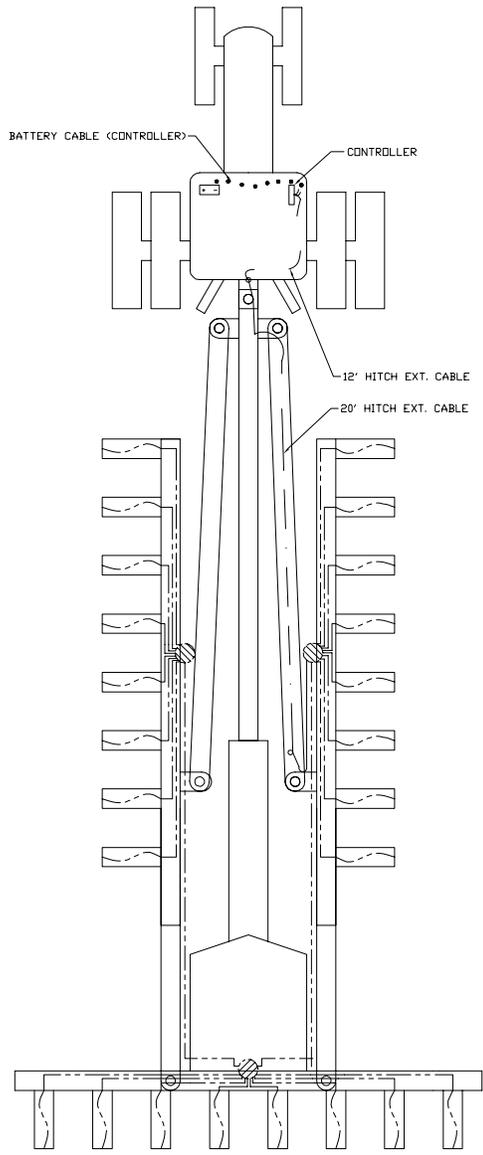
PLANTER DRAWING 37

SYSTEM NUMBER: SBSS240

24 ROW 20" FRONT
FOLD WIRING DIAGRAM.

JOHN DEERE: 1790

BATTERY (CONTROLLER)	_____
4 ROW HARNESS	_____
8 ROW HARNESS	_____
CONTROLLER	_____
20' HITCH CABLE	_____
METER EXT. CABLE	_____
12' HITCH CABLE	_____



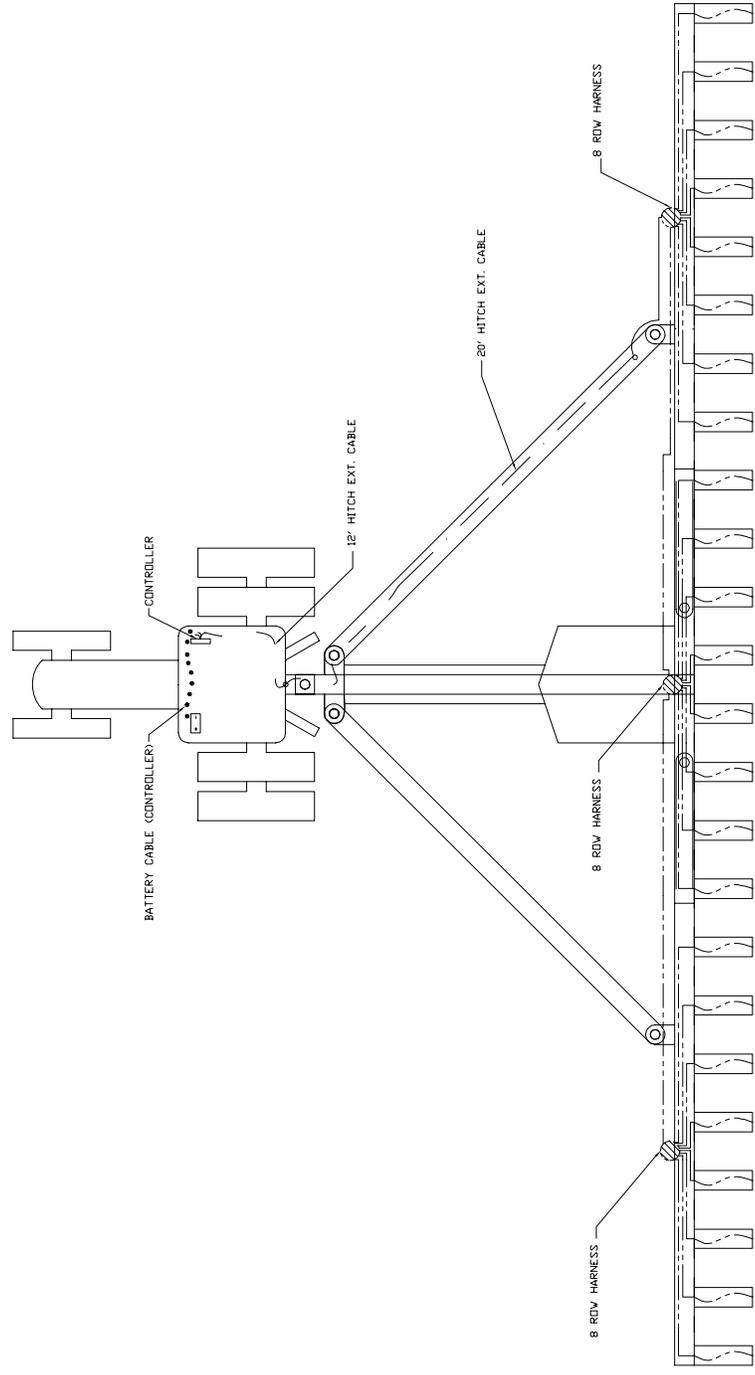
PLANTER DRAWING 38

SYSTEM NUMBER: SBSS240

24 ROW 20" FRONT
FOLD WIRING DIAGRAM.

JOHN DEERE: 1790

- BATTERY (CONTROLLER)
- 4 ROW HARNESS _____
- 8 ROW HARNESS _____
- CONTROLLER _____
- 20' HITCH CABLE _____
- METER EXT. CABLE _____
- 12' HITCH CABLE _____

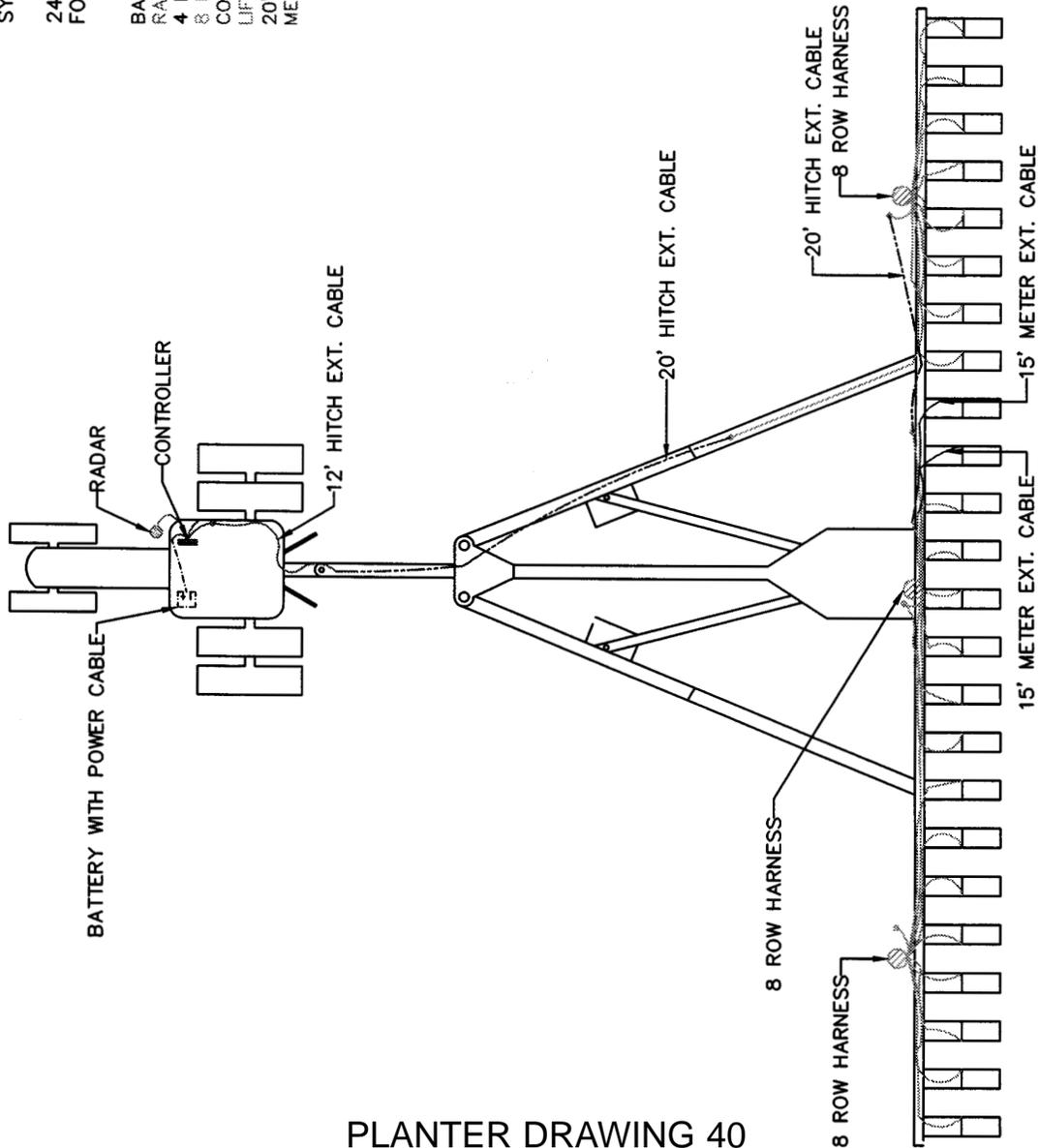


PLANTER DRAWING 39

SYSTEM NUMBER: SBSS243

24 ROW KINZE FRONT PARALLEL FOLDING 2700 SERIES PLANTER.

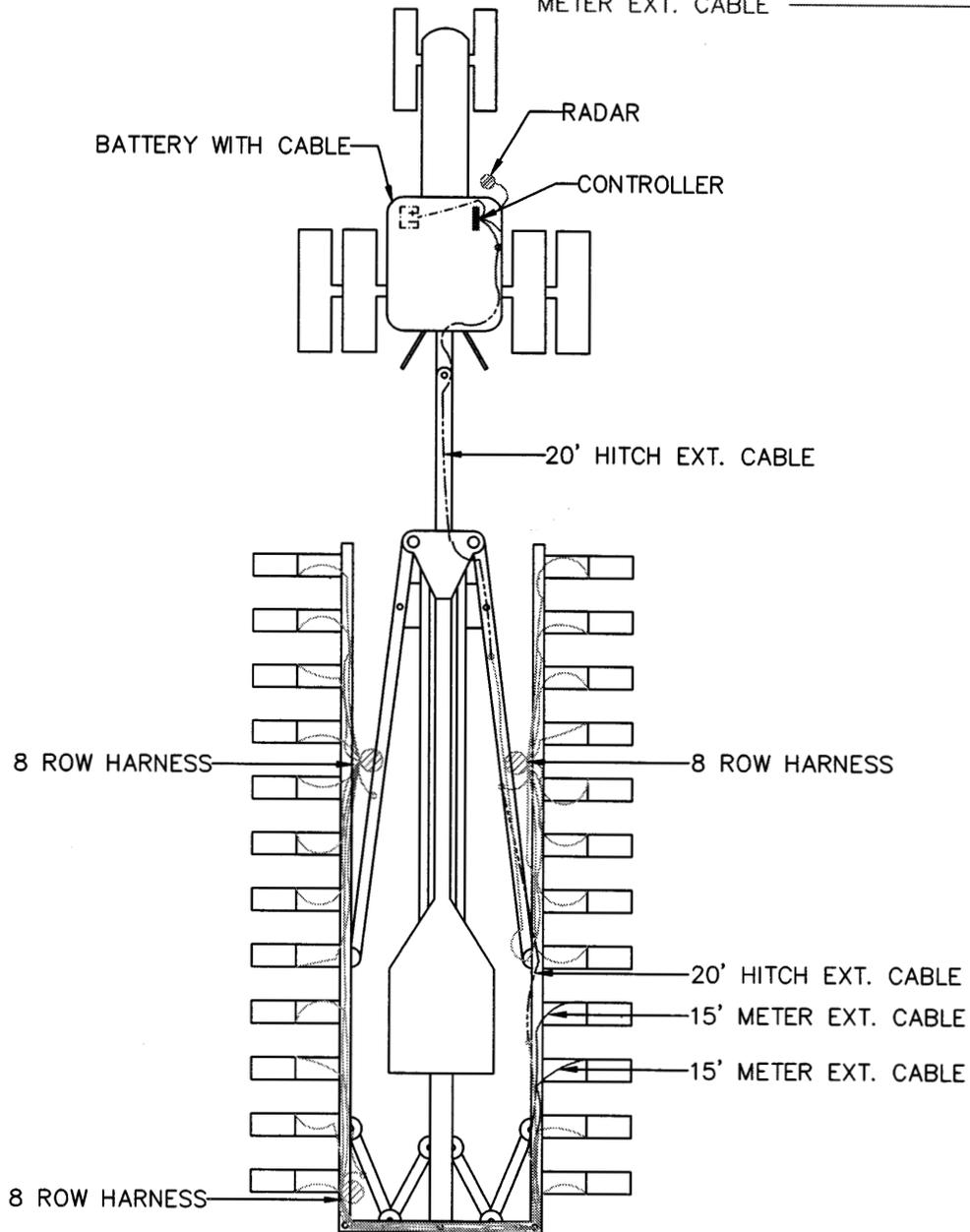
- BATTERY CABLE
- RADAR
- 4 ROW HARNESS
- 8 ROW HARNESS
- CONTROLLER
- LIFT SWITCH CABLE
- 20' HITCH CABLE
- METER EXT. CABLE



PLANTER DRAWING 40

SYSTEM NUMBER: SBSS243
 24 ROW KINZE 2700 WIRING
 DIAGRAM

BATTERY CABLE -----
 RADAR -----
 4 ROW HARNESS -----
 8 ROW HARNESS -----
 CONTROLLER -----
 LIFT SWITCH CABLE -----
 20' HITCH CABLE -----
 METER EXT. CABLE -----



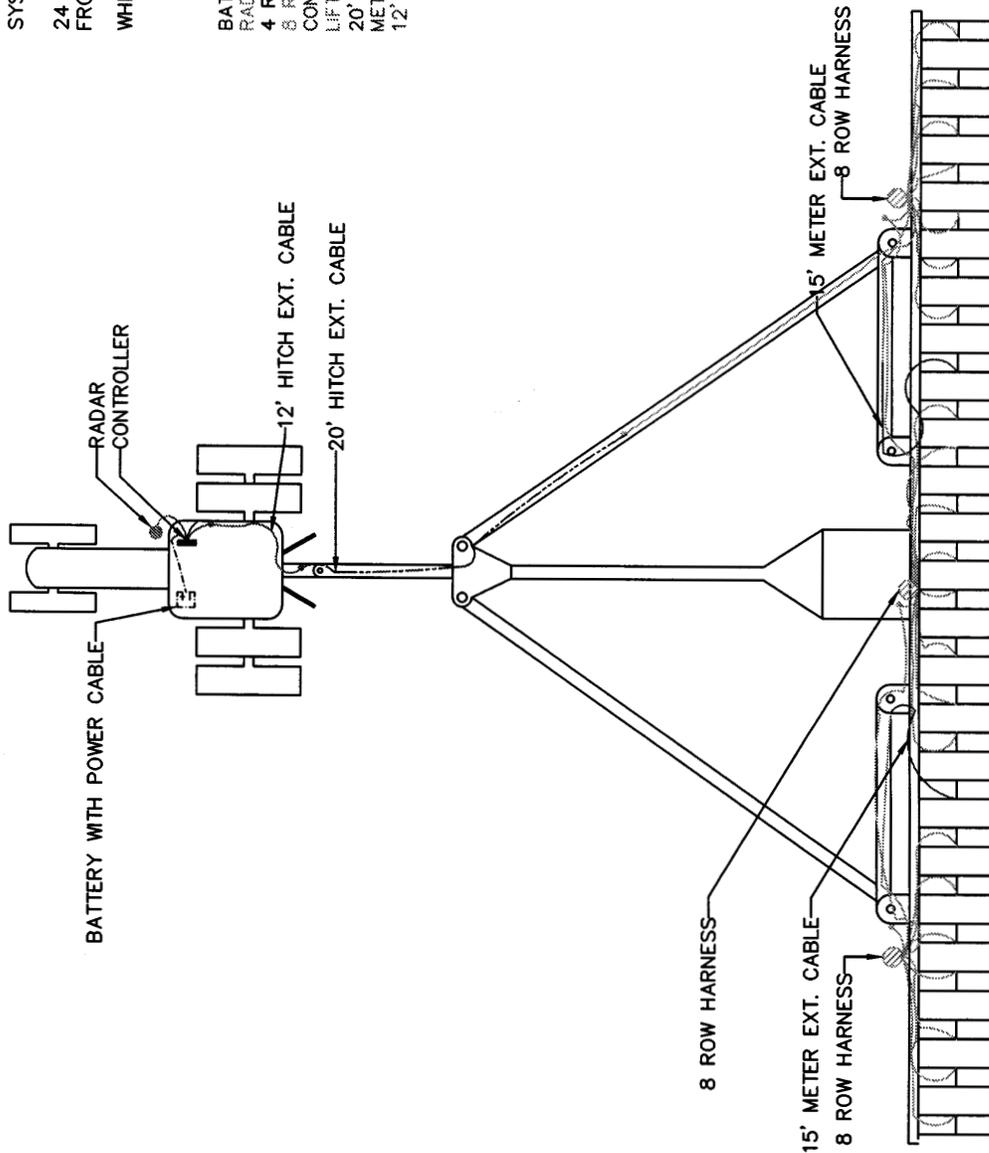
PLANTER DRAWING 41

SYSTEM NUMBER: SBSS244

24 ROW WIRING DIAGRAM FOR FRONT FOLDS.

WHITE: 6500

- BATTERY CABLE
- RADAR
- 4 ROW HARNESS
- 8 ROW HARNESS
- CONTROLLER
- LIFT SWITCH CABLE
- 20' HITCH CABLE
- METER EXT. CABLE
- 12' HITCH CABLE



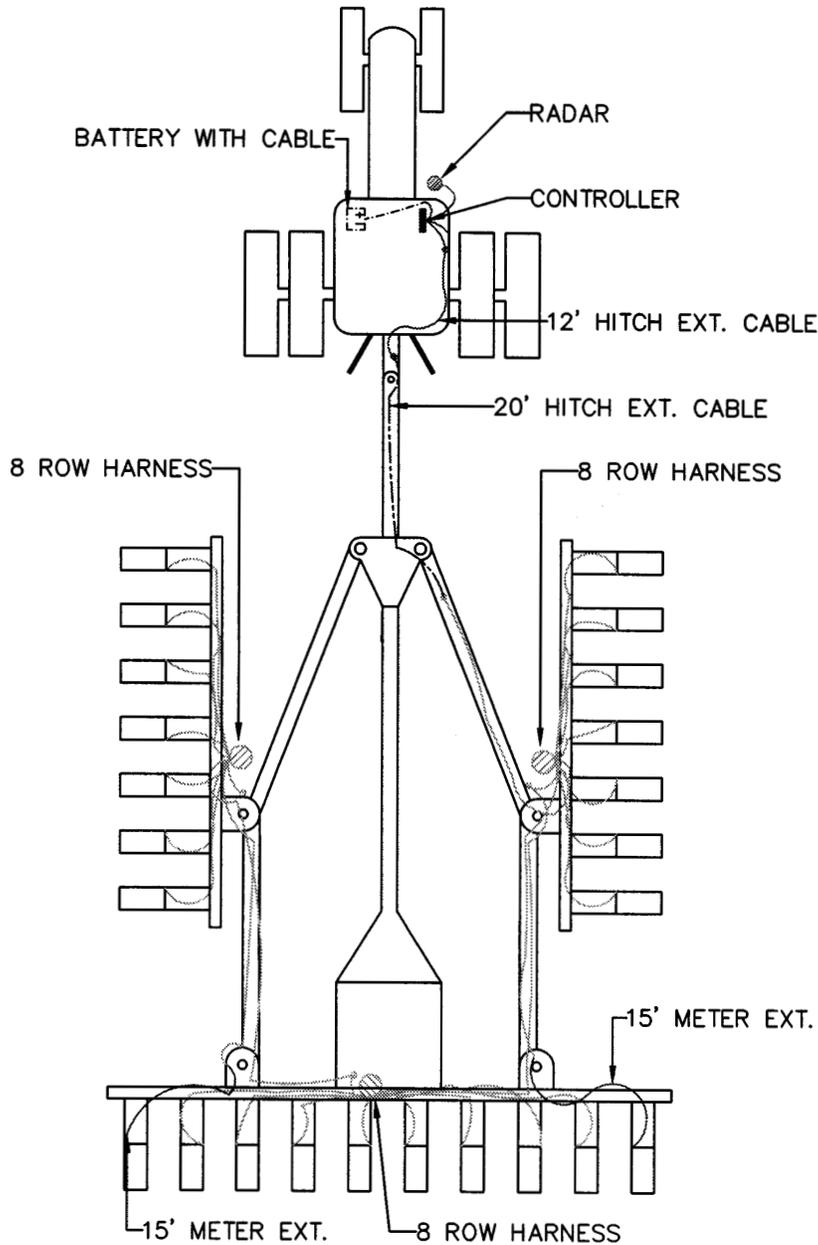
PLANTER DRAWING 42

SYSTEM NUMBER: SBSS244

24 ROW FRONT FOLD WIRING
DIAGRAM.

WHITE: 6500

BATTERY CABLE	-----
RADAR	=====
4 ROW HARNESS	-----
8 ROW HARNESS	=====
CONTROLLER	-----
LIFT SWITCH CABLE	-----
20' HITCH CABLE	-----
METER EXT. CABLE	=====
12' HITCH CABLE	-----



PLANTER DRAWING 43

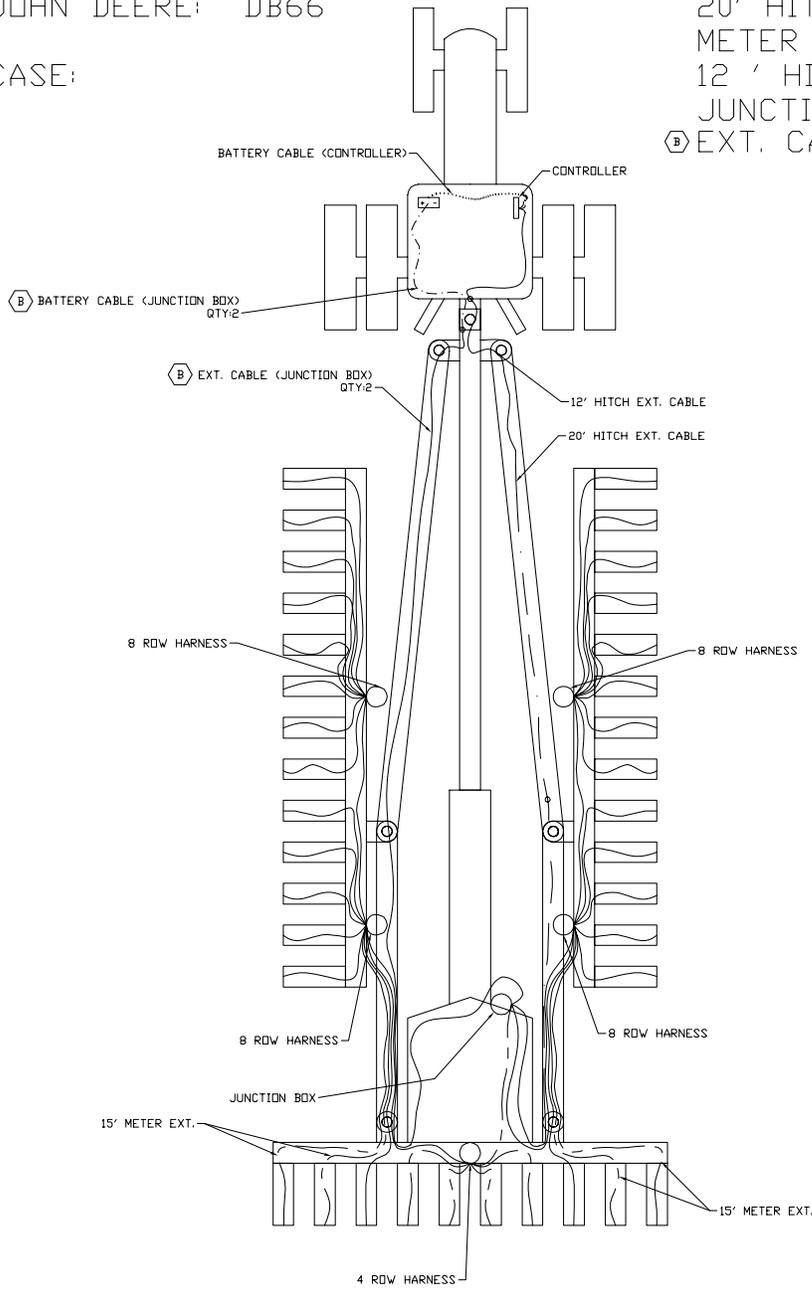
SYSTEM NUMBER: SBSS360

36 ROW 22" FRONT
FOLD WIRING DIAGRAM.

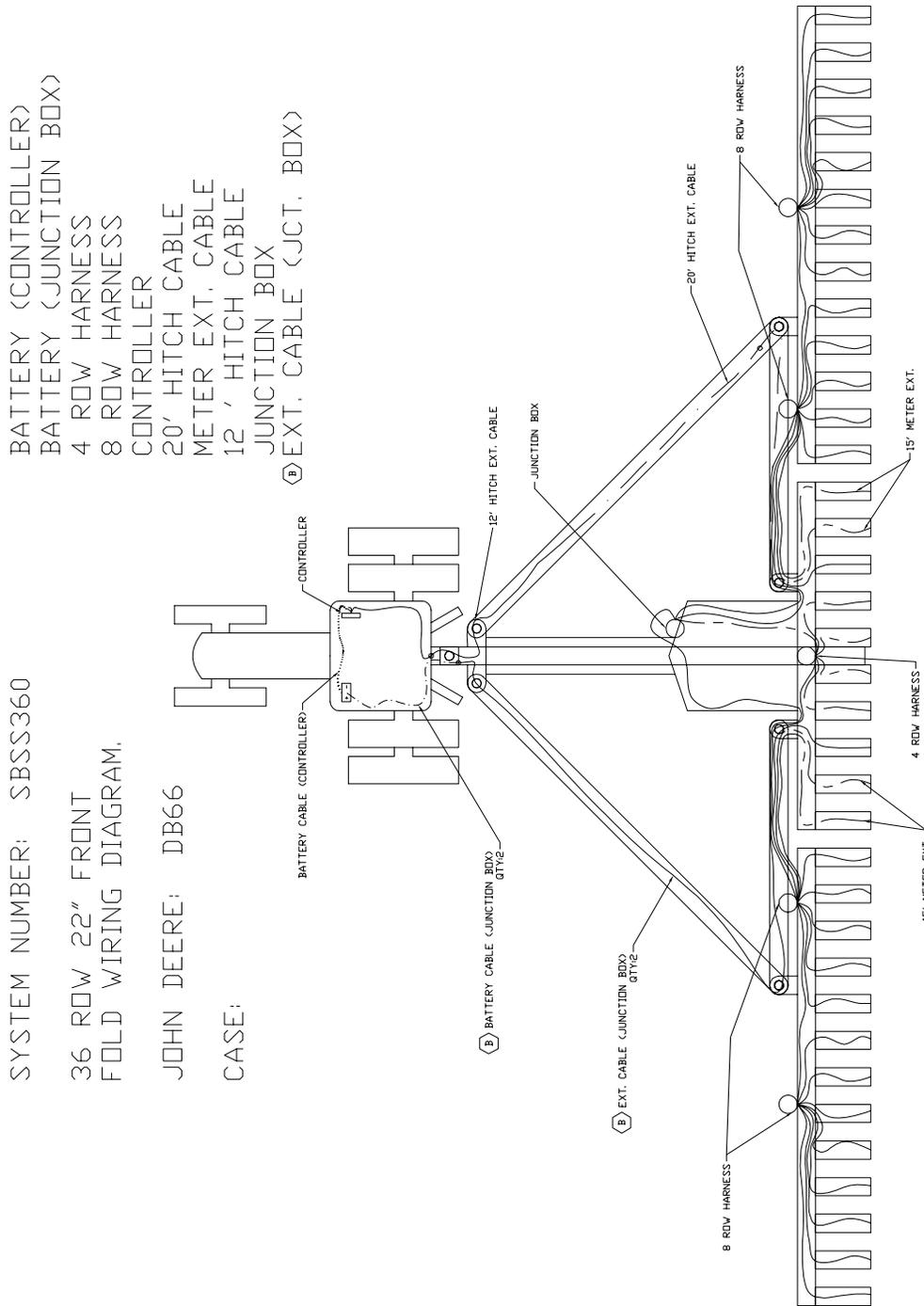
JOHN DEERE: DB66

CASE:

- BATTERY (CONTROLLER)
- BATTERY (JUNCTION BOX)
- 4 ROW HARNESS
- 8 ROW HARNESS
- CONTROLLER
- 20' HITCH CABLE
- METER EXT. CABLE
- 12' HITCH CABLE
- JUNCTION BOX
- ⓑ EXT. CABLE (JCT. BOX)



PLANTER DRAWING 44



- BATTERY (CONTROLLER)
- BATTERY (JUNCTION BOX)
- 4 ROW HARNESS
- 8 ROW HARNESS
- CONTROLLER
- 20' HITCH CABLE
- METER EXT. CABLE
- 12' HITCH CABLE
- JUNCTION BOX
- EXT. CABLE (JCT. BOX)

SYSTEM NUMBER: SBSS360
 36 ROW 22" FRONT
 FOLD WIRING DIAGRAM.
 JOHN DEERE: DB66
 CASE:

PLANTER DRAWING 45

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Controller Setup

The SmartBox® controller requires several setup steps to produce accurate chemical application. This section of the Operator's Manual will show those steps required as a minimum, as well as additional steps which may be followed to increase the benefits of the SmartBox® system.

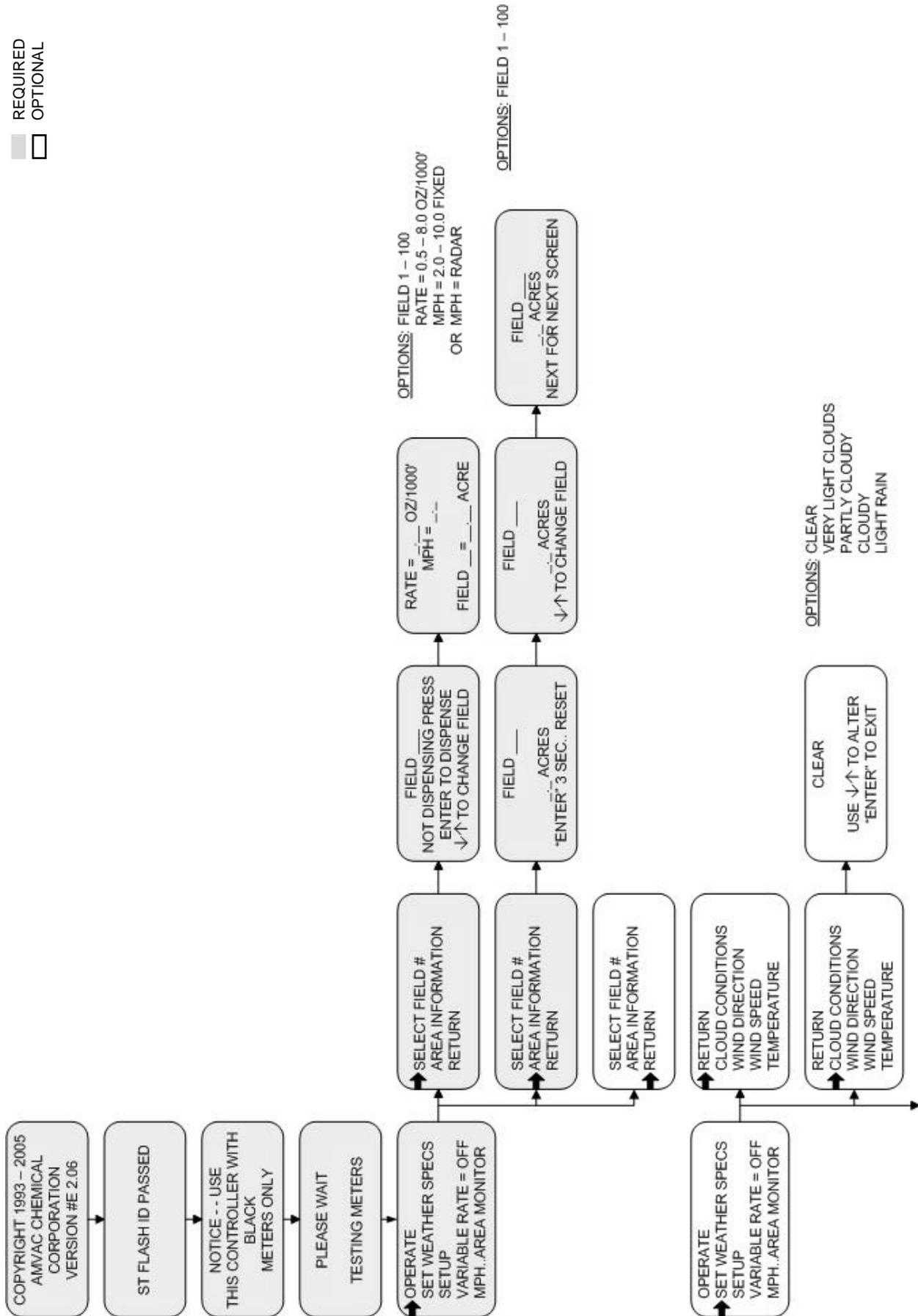
One added feature of the SmartBox® system is the ability to upload field and user information from a personal computer to the controller. Instructions for uploading information are given in Section C. Instructions provided in this section are for programming directly into the controller.

- The controller screen will show only four menu choices at a time. To view all of the selections available in a menu, press the down arrow button repeatedly to scroll through the selections.
- To make a selection from the menu, push the up or down arrow button repeatedly until the arrow on the menu screen points toward your selection. Then push the "ENTER" button to move into the next level of menu choices.
- The "RETURN" option is available in each menu. Selecting this option will return the controller to the previous menu.
- To return to the original menu during operation, press the "PREVIOUS PAGE" and "NEXT PAGE" buttons at the same time.

A "map" of controller menus is presented on the next pages. Those steps required for accurate insecticide application are shaded. Other steps are optional but will greatly enhance operation and record keeping of the system. Instructions for particular functions (such as inputting user information, programming A/B switches, and recording weather conditions) are shown following the controller function map. The instructions are given in an order of probable use, but programming sequence and use of optional functions are at the discretion of the user.

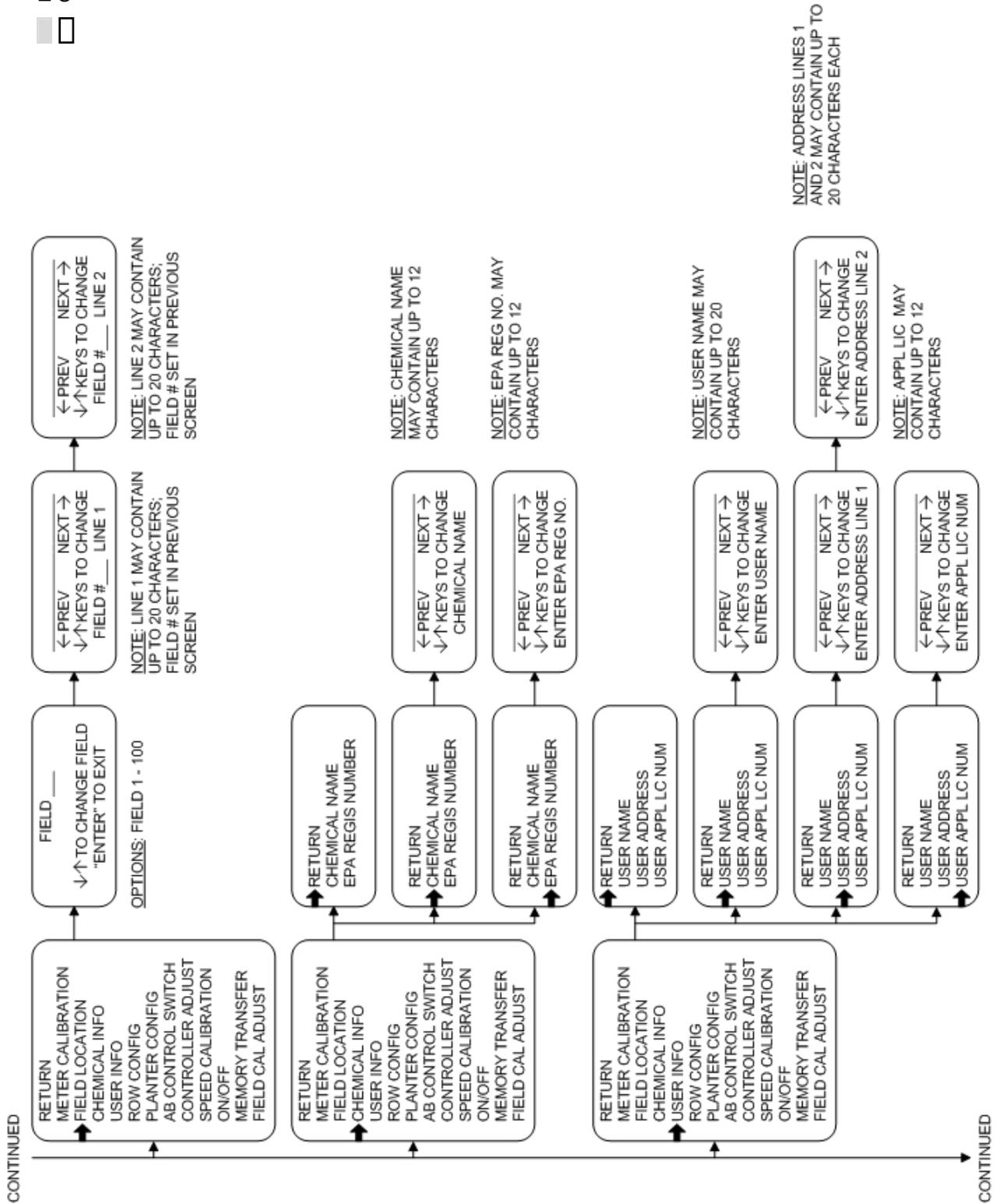


REQUIRED
 OPTIONAL

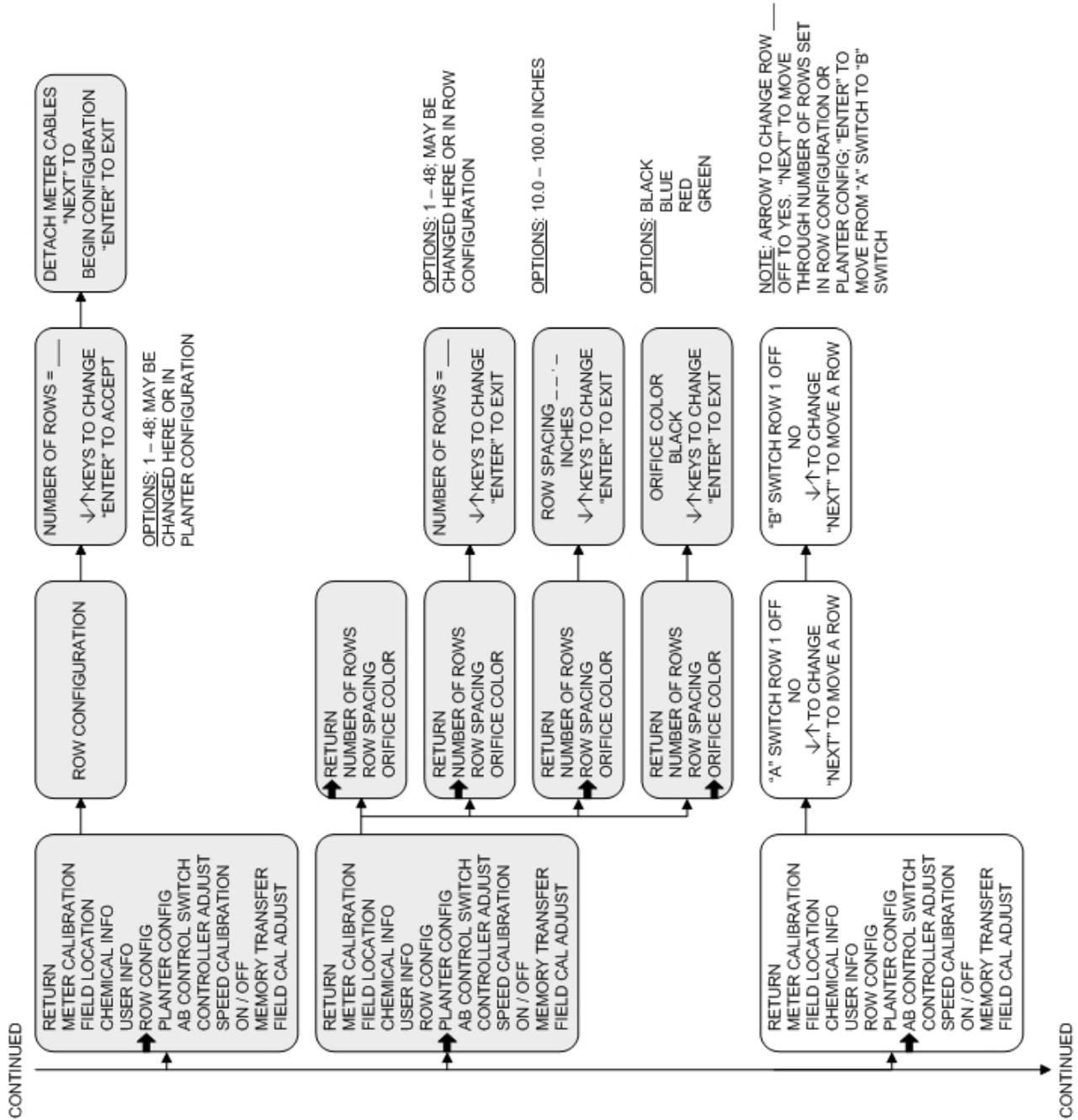


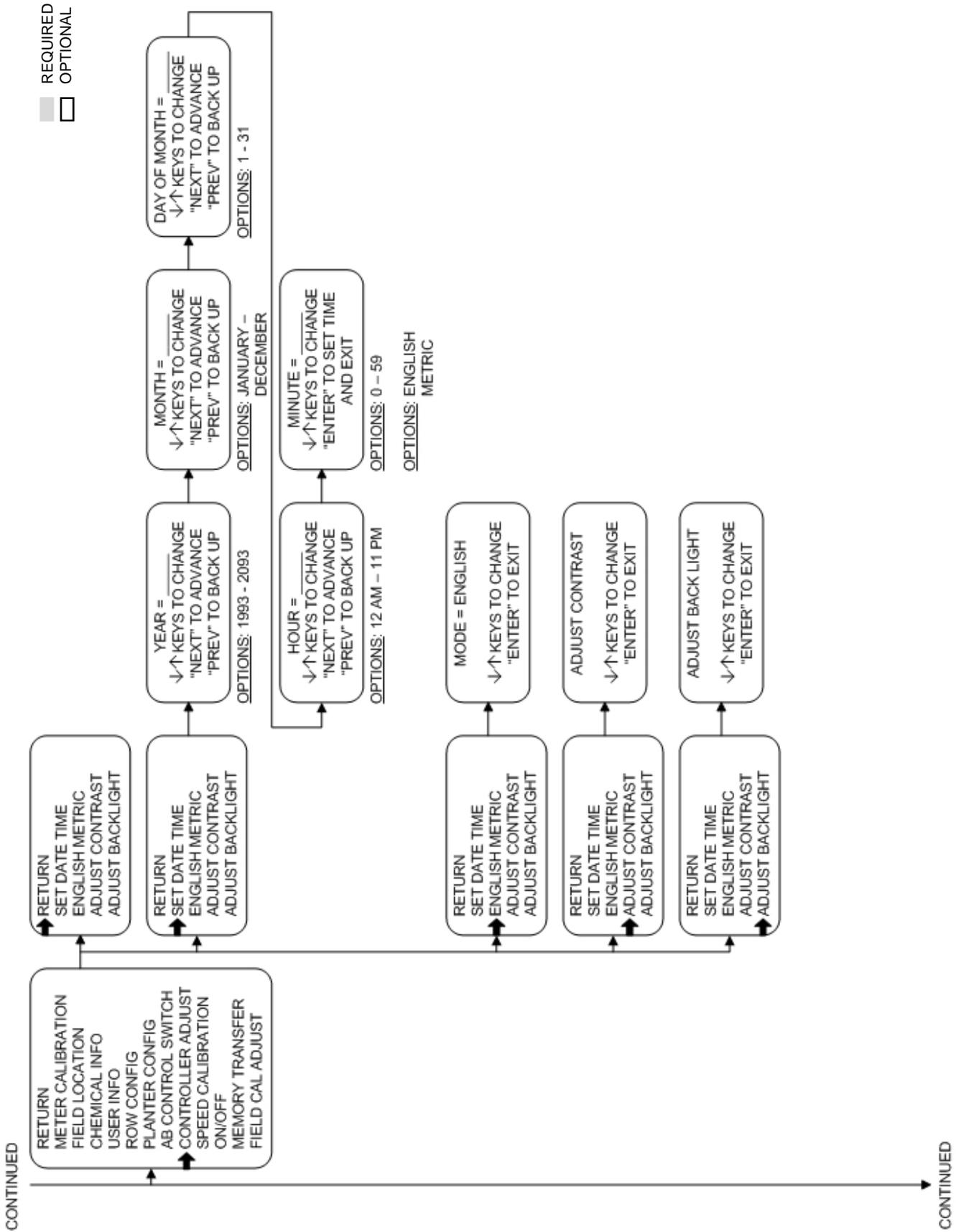
CONTINUED

REQUIRED
OPTIONAL

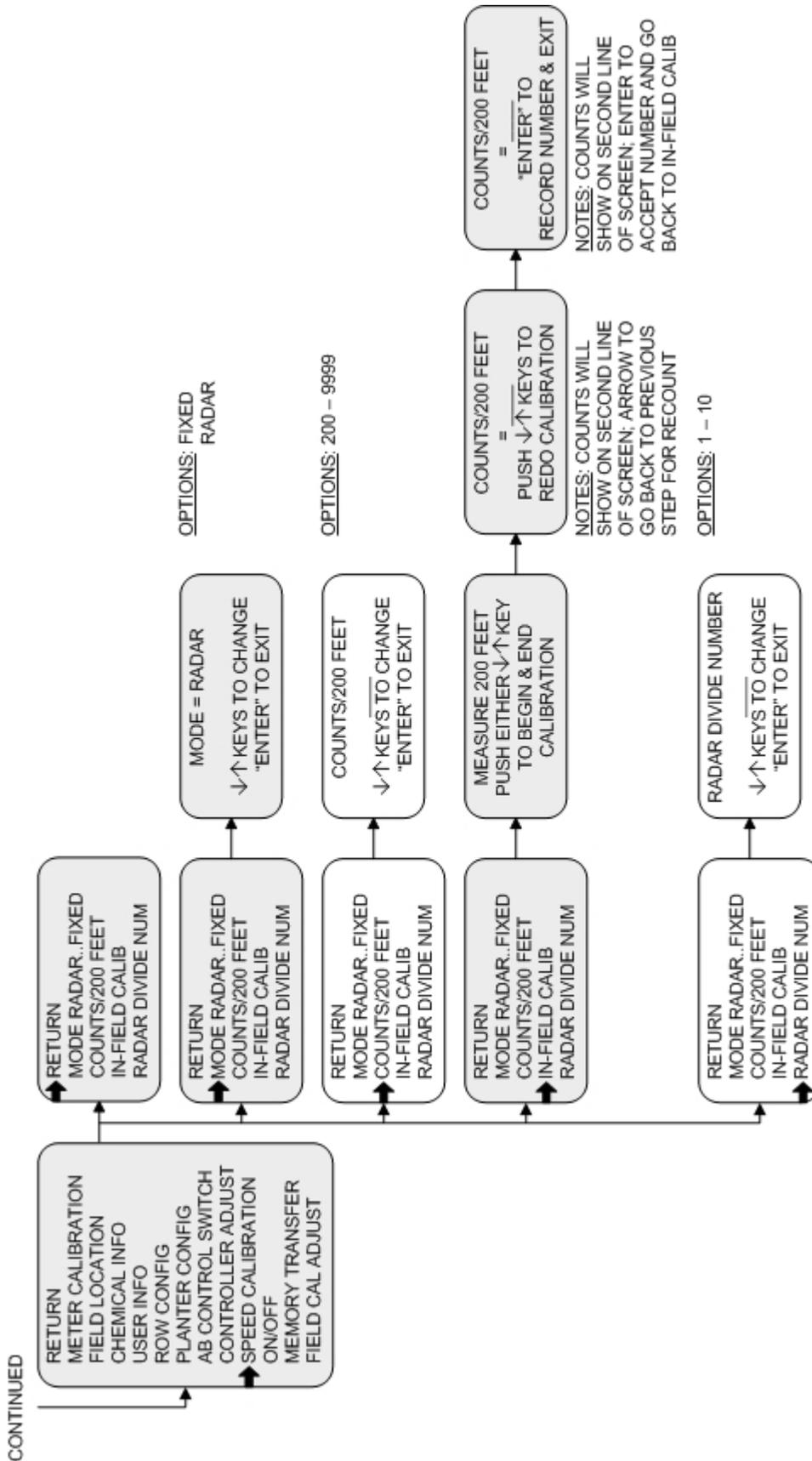


REQUIRED
OPTIONAL

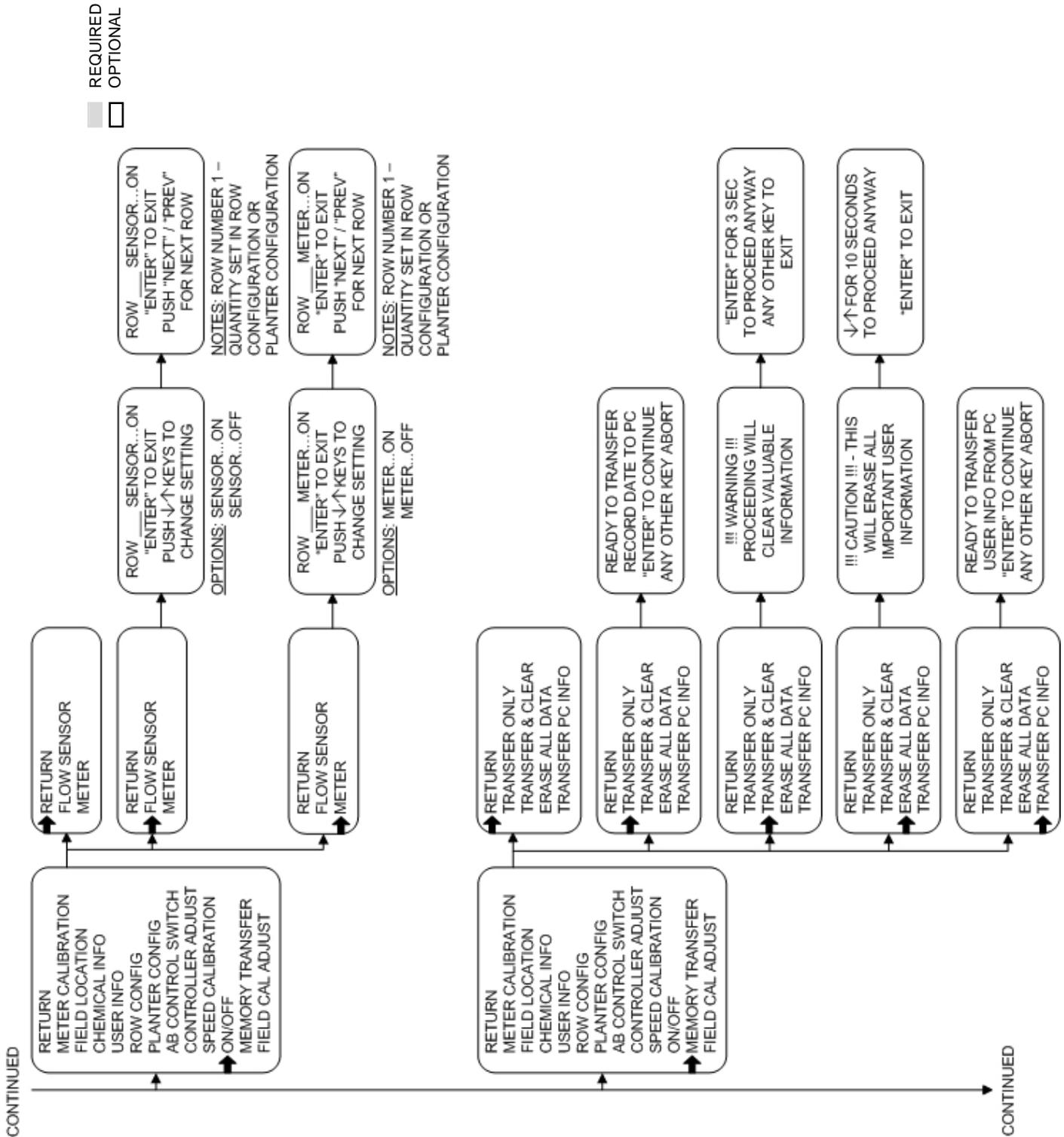




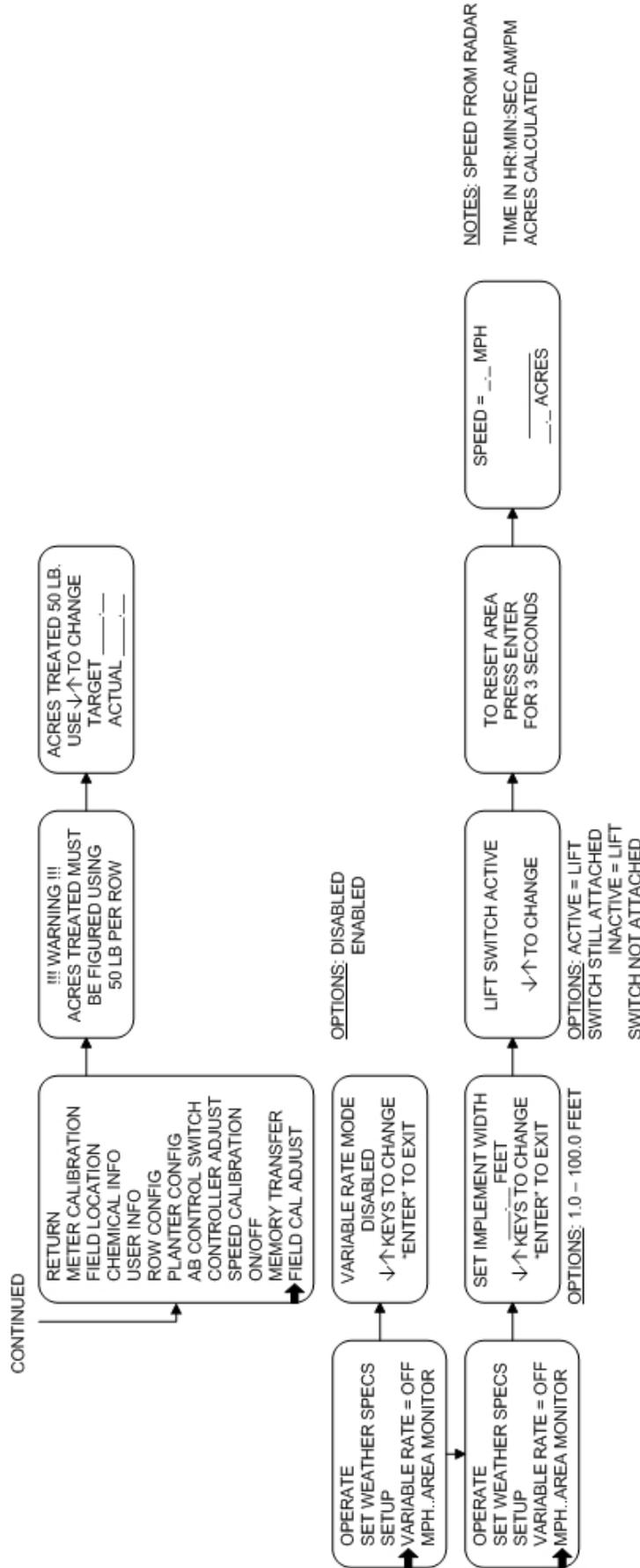
REQUIRED
OPTIONAL



REQUIRED
OPTIONAL



REQUIRED
OPTIONAL



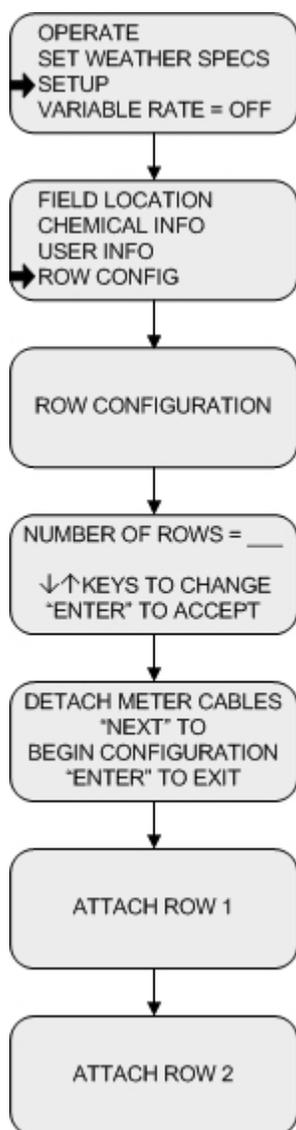
Controller Functions

Row Configuration

■ REQUIRED
□ OPTIONAL

The Row Configuration routine is used to assign row numbers to each of the meters. This routine is needed at initial system setup or whenever more than one new meter is attached.

Note: If you have previously configured all rows and are replacing only one meter, see applicable instructions in Section D.



Step 1

From Main Menu select **SETUP** and press **ENTER**.

Step 2

Using the arrow keys, scroll to **ROW CONFIG** and press **ENTER**.

Step 3

Using the arrow keys, select the number of rows and press **ENTER**.

Step 4

Disconnect the 4-pin connector from each meter. Press **NEXT PAGE** to begin configuration.

Step 5

Attach the 4-pin connector for the row which is to be designated as Row 1 and wait for three “beeps”. The screen will automatically sequence to the next row.

Step 6

Repeat Step 5 until all rows have been configured.

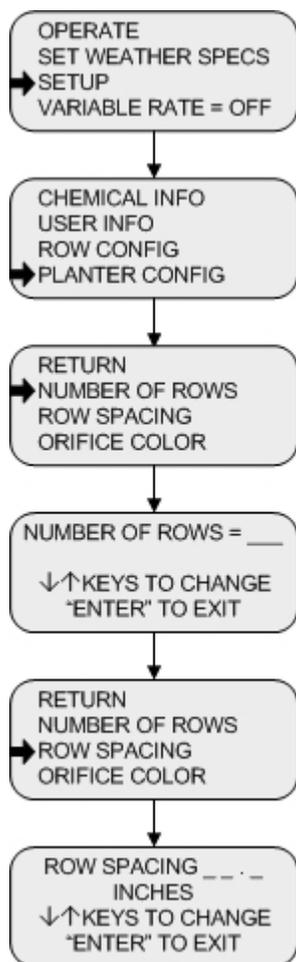
End

After all rows have been configured, the system will automatically advance to the **SETUP** menu.

Planter Configurations

■ REQUIRED
□ OPTIONAL

The planter Configuration routine is used to record or change the number of planter rows and row spacing. This information is required for calculation of acreage values.



Step 1

From Main Menu select **SETUP** and press **ENTER**.

Step 2

Using the arrow keys, scroll to **PLANTER CONFIG** and press **ENTER**.

Step 3

Using the arrow keys, select **NUMBER OF ROWS** and press **ENTER**.

Step 4

Use the arrow keys to increase or decrease the value shown until it equals the number of planter rows (1 to 48). Press **ENTER**.

Step 5

Using the arrow keys, select **ROW SPACING** and press **ENTER**.

Step 6

Use the arrow keys to increase or decrease the value shown until it equals the planter row spacing in inches (10.0 to 100.0). Press **ENTER**.

End

Using the arrow keys, select **RETURN** and press **ENTER** to return to the main menu.

Speed Calibration

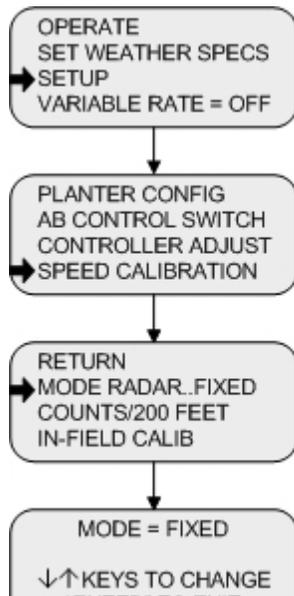
■ REQUIRED
□ OPTIONAL

The Speed Calibration routine is used to accomplish two objectives: to choose either true or fixed speed and to calibrate the true speed device if used. “True” speed here indicates use of either radar or a true wheel speed sensor; a wheel sensor is considered true speed, however no compensation is made for wheel slippage.

The SmartBox® system will work in either fixed or true speed mode. The meters will compensate for changes in planter speed only when the system is set in the true speed mode.

The in-field calibration described below is critical for accurate speed measurement and insecticide application. This calibration is separate from calibrations of the radar itself; you must calibrate the speed device with the SmartBox® controller by performing the 200’ in-field calibration steps stated below. Do not enter the radar calibration number used for other monitors. If speed calibration is not performed correctly, then the values recorded for planter speed will produce errors in calculations of acreage treated, pounds of chemical applied, and pounds of chemical applied per acre. Inaccuracies resulting from failure to properly calibrate are the responsibility of the user.

The in-field calibration routine should be used at the start of each new season or whenever a modification is made which could affect the output of the speed sensor. For greater accuracy, the 200’ in-field test should be run at the expected planting speed. Also, the test should be repeated two or three times and the average count value entered into the controller.



Step 1

From Main Menu select **SETUP** and press **ENTER**.

Step 2

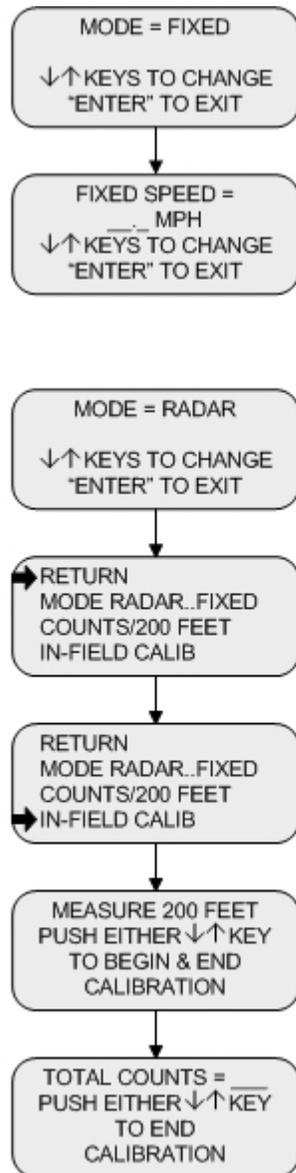
Using the arrow keys, scroll to **SPEED CALIBRATION** and press **ENTER**.

Step 3

To choose true speed or fixed speed input, select **MODE RADAR..FIXED** and press **ENTER**. The screen shown on the left does not indicate the mode in use; to see which mode is in use, move to next screen by pressing **ENTER**.

Speed Calibration (*continued*)

■ REQUIRED
□ OPTIONAL



Step 4

Use the arrow keys to choose **RADAR** (for either radar or true wheel speed monitor) or **FIXED** speed. Press **ENTER** to advance.

Step 5

If **FIXED** speed is chosen, use the arrow keys to change the speed. Press **ENTER** to return to the **SPEED CALIBRATION** menu.

Step 6

If **RADAR** is chosen, press **ENTER** to return to the **SPEED CALIBRATION** menu. If an in-field calibration has already been done, scroll to **RETURN** and press **ENTER** to return to the **SETUP** menu.

Step 7

If an in-field calibration has not been done, use the arrow keys to scroll to **IN-FIELD CALIB** and press **ENTER**.

Step 8

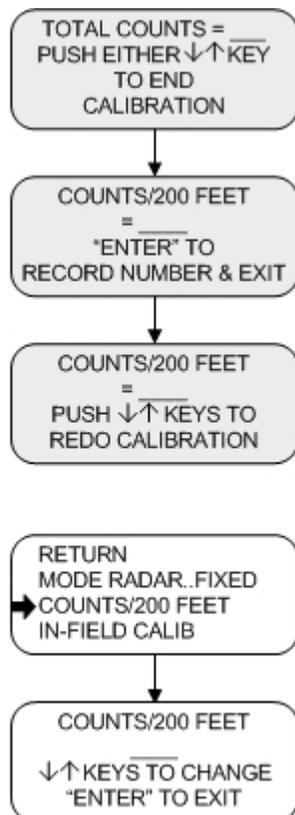
Measure and mark a linear course of 200 feet.

Step 9

Press either arrow key as you enter the course. The controller will then measure the counts of the radar. If your controller fails to count pulses as you move through the course, re-start controller and repeat above steps. If pulses still do not register, you may need a signal booster for the radar system. See recommended contacts in Section A.

Speed Calibration (*continued*)

■ REQUIRED
□ OPTIONAL



Step 10

Press the opposite arrow key as you exit the course. The controller will then calibrate according to the counts of the radar.

Step 11

Press **ENTER** to accept the calibration and return to the **SETUP** menu. Or, push either arrow to return to the **MEASURE 200 FEET** screen to redo the in-field calibration.

Step 12

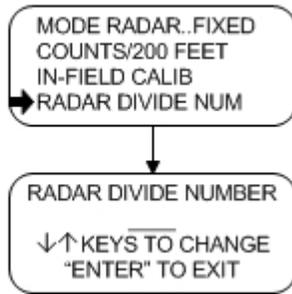
To change radar counts per 200 feet (6096 counts is preset), select **COUNTS / 200 FEET** and press **ENTER**.

Step 13

Use the arrow keys to change the radar count value. Press **ENTER** to the **SPEED CALIBRATION** menu. This step may be done to move the radar reading slightly to agree with a monitor already calibrated and correct. **Do not use the value provided in the radar system owner's manual or obtained from calibration with a different monitor without confirming calibration with an in-field test.**

Speed Calibration (*continued*)

REQUIRED
 OPTIONAL



Step 14

To reduce the count number for certain wheel sensors, select **RADAR DIVIDE NUM** and press **ENTER**.

Step 15

Using the arrow keys, select a number that will put the counts under 10,000. Press **ENTER** when complete.

End

Select **RETURN** to go to the **SETUP** menu.

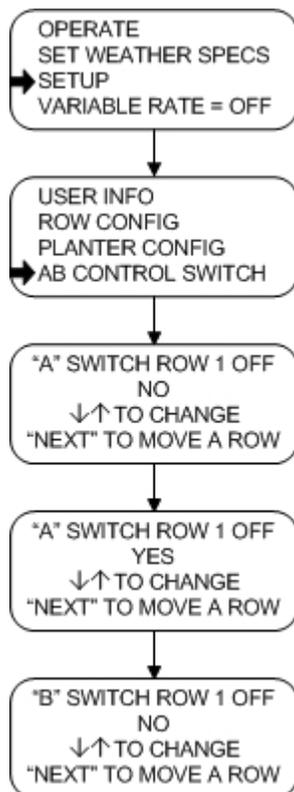
AB Control Switch

■ REQUIRED
□ OPTIONAL

The AB Control Switch routine is used to select certain meters to be controlled by the A or B switch. This function is beneficial when planting point rows or planting along the edge of a field. Those rows which are not needed can be shut off simply by pre-assigning those rows to the A or B switch, and then flipping the corresponding switch to the off, or down, position.

The simplest way to understand this function is to ask the following question while programming the controller: When the A (or B) switch is off (pushed to the down position), do I want row 1 (or other row) shut off? If the row is to be shut off, then the answer is “yes”. If the row is to be on, then the answer is “no”.

Use of this function is optional.



Step 1

From the Main Menu select **SETUP**.

Step 2

Using the arrow keys, scroll to **AB CONTROL SWITCH** and press **ENTER**.

Step 3

Using the arrow keys, select **YES** or **NO** for row 1 on the A switch. If **YES** is selected, then the meter on row 1 will shut off when the A switch is flipped to the down position. Press the “NEXT PAGE” button to advance to the next row. Press **ENTER** to move to the B switch.

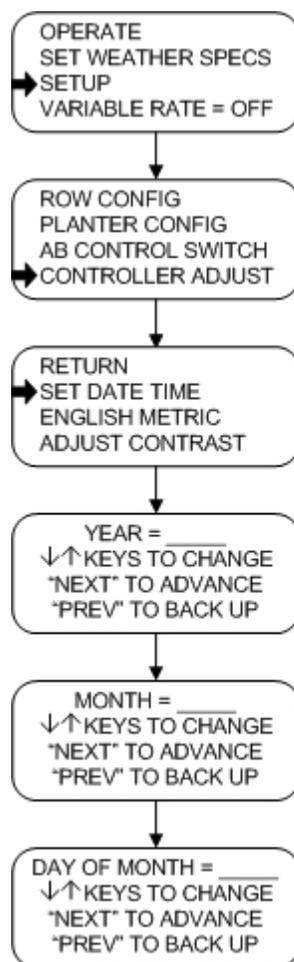
Step 4

Repeat Step 3 for B switch assignments. Press **ENTER** to return to the **SETUP** menu.

Controller Adjust

REQUIRED
 OPTIONAL

The Controller Adjust routine is used to set date and time, select English or metric units, and adjust the controller contrast and backlight. The SmartBox® systems are preset with standard Eastern time and English units.



Step 1

From the Main Menu select **SETUP**.

Step 2

Using the arrow keys, scroll to **CONTROLLER ADJUST** and press **ENTER**.

Step 3

Using the arrow keys, scroll to **SET DATE TIME** and press **ENTER**.

Step 4

Using the arrow keys, scroll to the correct year. Press the "NEXT PAGE" button to move to the next screen.

Step 5

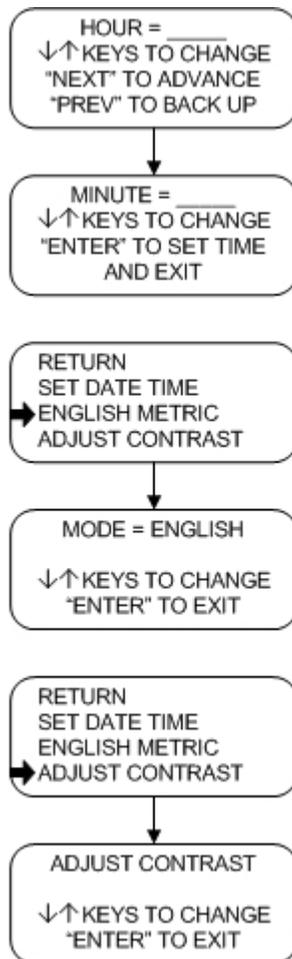
Using the arrow keys, scroll to the correct month. Press the "NEXT PAGE" button to move to the next screen.

Step 6

Using the arrow keys, scroll to the correct day of the month. Press the "NEXT PAGE" button to move to the next screen.

Controller Adjust (*continued*)

REQUIRED
 OPTIONAL



Step 7

Using the arrow keys, scroll to the correct hour. Press the "NEXT PAGE" button to move to the next screen.

Step 8

Using the arrow keys, scroll to the correct minute. Press **ENTER** to save settings and return to the **CONTROLLER ADJUST** menu.

Step 9

Using the arrow keys, scroll to **ENGLISH METRIC** and press **ENTER**.

Step 10

Using the arrow keys, scroll to select either English or metric units of measure. Press **ENTER** to return to the **CONTROLLER ADJUST** menu.

Step 11

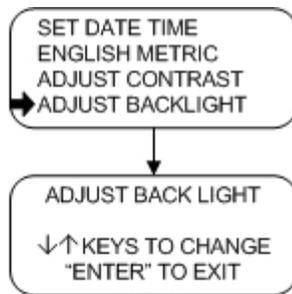
Using the arrow keys, select **ADJUST CONTRAST**.

Step 12

Using the arrow keys, scroll to increase or decrease controller contrast. Press **ENTER** to return to the **CONTROLLER ADJUST** menu.

Controller Adjust (*continued*)

REQUIRED
 OPTIONAL



Step 13

Using the arrow keys, select **ADJUST BACKLIGHT**.

Step 14

Using the arrow keys, scroll to increase or decrease controller backlight. Press **ENTER** to return to the **CONTROLLER ADJUST** menu.

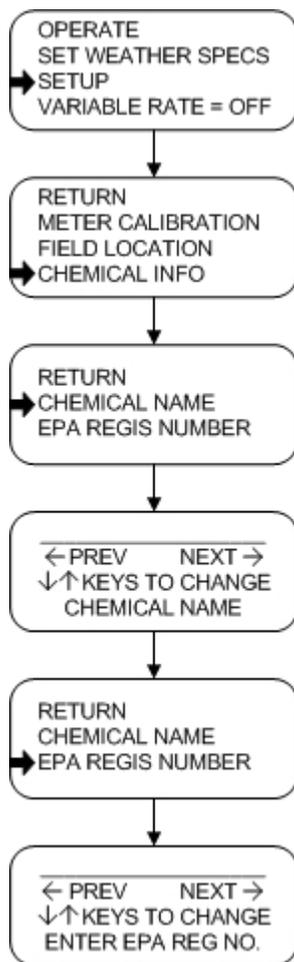
End

Select **RETURN** to go to the **SETUP** menu.

Chemical Information

■ REQUIRED
□ OPTIONAL

The Chemical Information routine is used to input a chemical name and EPA registration number. The information input in this location will be displayed and recorded for all of the fields as one description. If different chemicals are to be used and identified on separate fields, then the chemical name must be input and stored in the FIELD LOCATION lines.



Step 1
From the Main Menu select **SETUP**.

Step 2
Using the arrow keys, scroll to **CHEMICAL INFO** and press **ENTER**.

Step 3
Using the arrow keys, select **CHEMICAL NAME** and press **ENTER**.

Step 4
Use the arrow keys to scroll through the characters available for each space. ONce located, enter and move to the following space by pushing the “**PREVIOUS PAGE**” or “**NEXT PAGE**” buttons. Press **ENTER** to return to the **CHEMICAL INFO** screen.

Step 5
Repeat Steps 3 and 4 above for **EPA REGIS NUMBER**.

End
Select **RETURN** to go to the **SETUP** menu.

INSTALLATION OF SMARTBOX® SYSTEM MANAGER

SmartBox® System Manager Setup:

The following steps describe proper installation of the SmartBox® System Manager software on Windows '98 or newer systems.

If installing a new version of SmartBox® System Manager software on a computer with an older version currently active, first remove the older version.

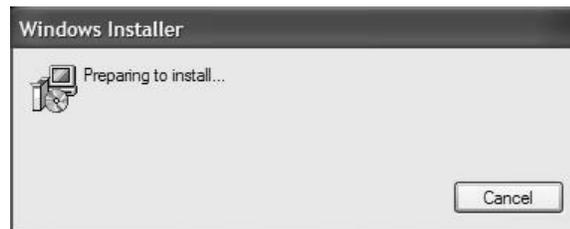
Before installing the SmartBox® System Manager software, close all programs. Always backup system files before installing new software. It is recommended to create a restoration point prior to installing new software.

Step 1

Insert the CD labeled **SmartBox® System Manager** into the CD drive.

Step 2

If the autorun starts, the following screens will appear:



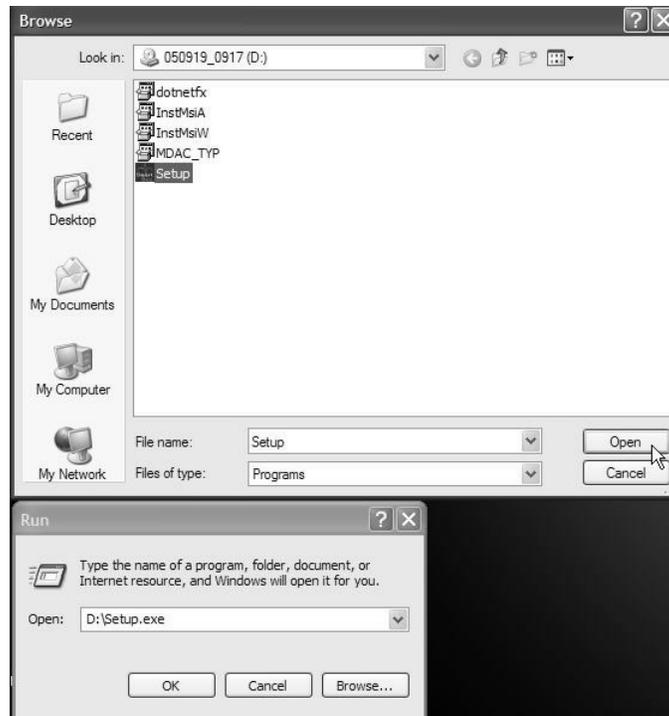
SmartBox® System Manager Setup (continued):

Step 2 (continued)

If the autorun does not start, click on **Start** then select **Run**.



When the run window opens, click the **Browse...** button. Select the CD drive the SmartBox System Manager CD is inserted. Select the **Setup** file and click open, then click **OK** from the Run window.



SmartBox® System Manager Setup (continued):

Step 2 (continued)

The following screens will follow:



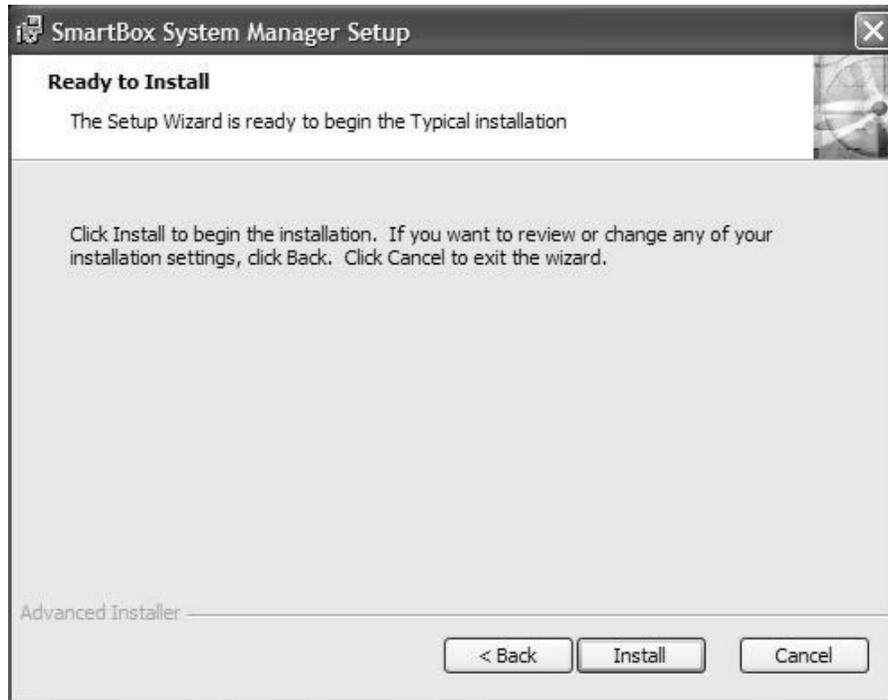
Step 3

Click the **Next** button.

SmartBox® System Manager Setup (*continued*):

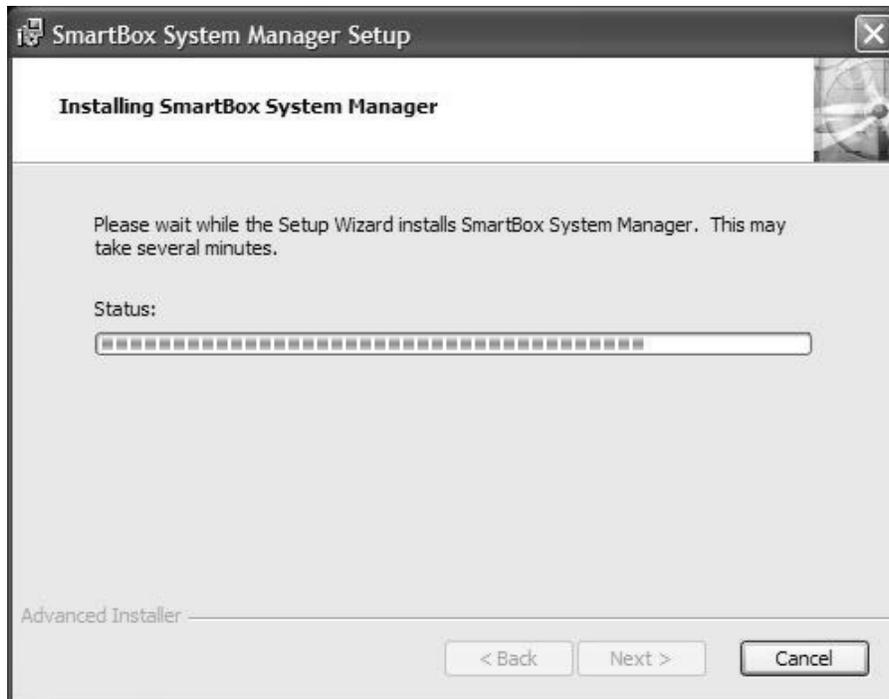
Step 4

Click the **Install** button.



Step 5

The following window will appear:



SmartBox® System Manager Setup (*continued*):

Step 6

Click the **Finish** button.



Step 7

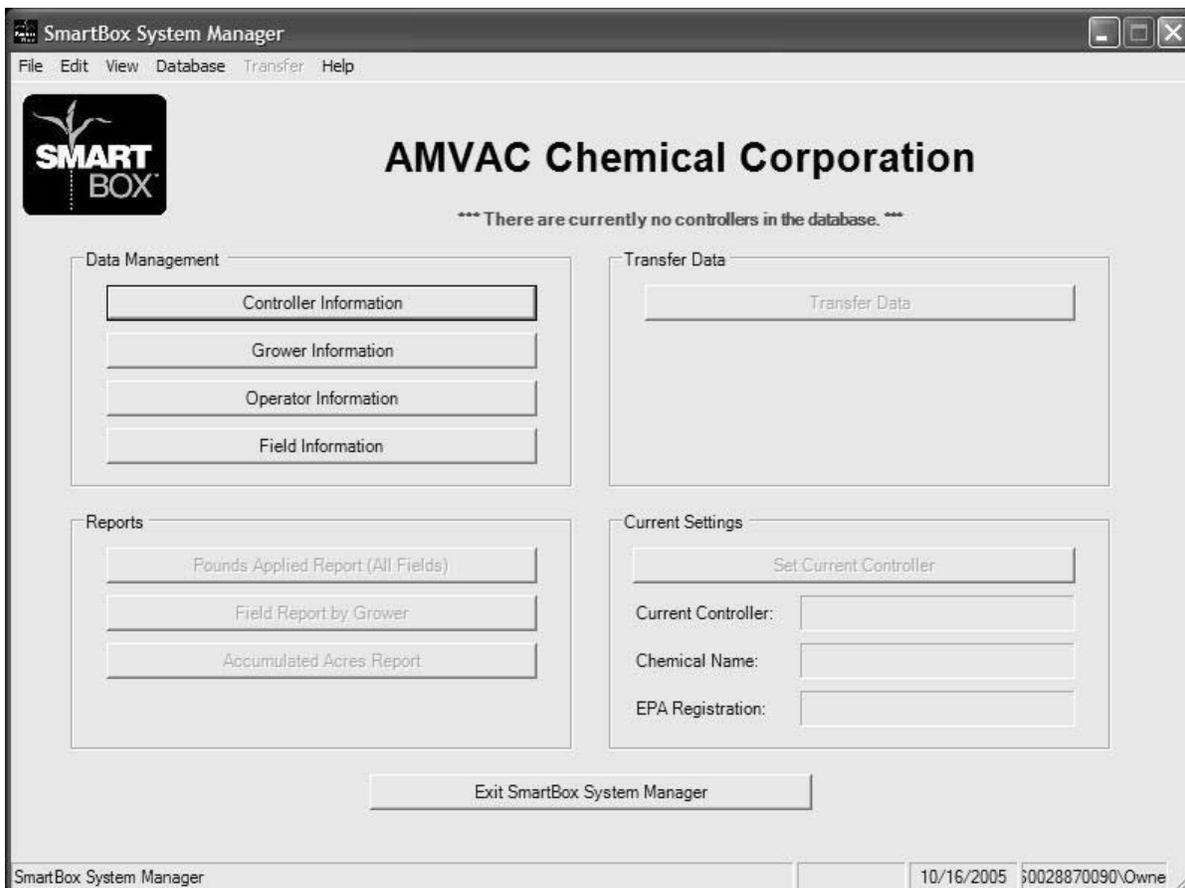
Remove the CD from the drive.

SmartBox® System Manager

Add a New Controller:

Step 1

Open the **SmartBox® System Manager** by going to the Start menu, Programs, Amvac Chemical Corporation, then clicking on SmartBox System Manager.



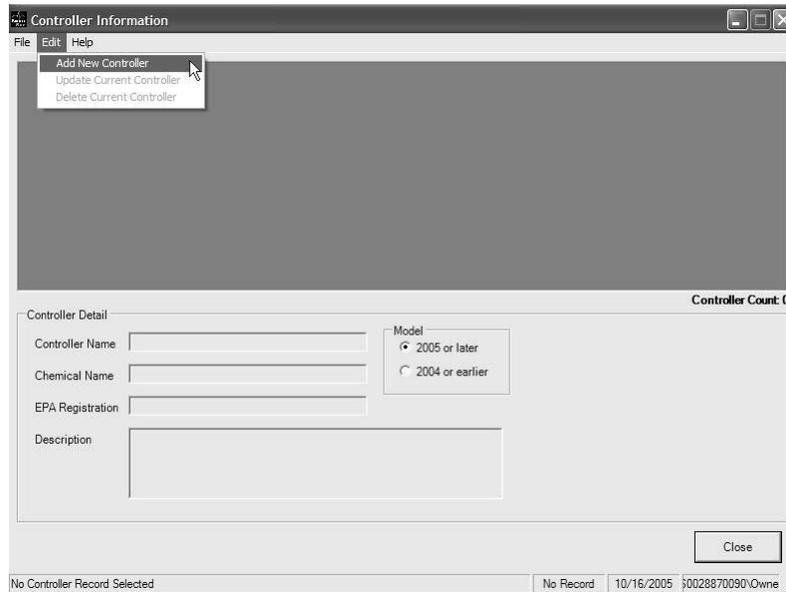
Step 2

Click on the **Controller Information** button to add a new controller.

Add a New Controller (continued):Step 3

The **CONTROLLER INFORMATION** screen is displayed.

From the Controller Information screen select the edit menu then choose **Add New Controller**. The grower information can now be added.



Select the **Model** controller. **Important:** The Model controller must be correct to complete the data download. The controller will have a model number under the SmartBox® logo.

Model: SBC-2000 = 2004 or Earlier

Model: SBC-2005 = 2005 or Later

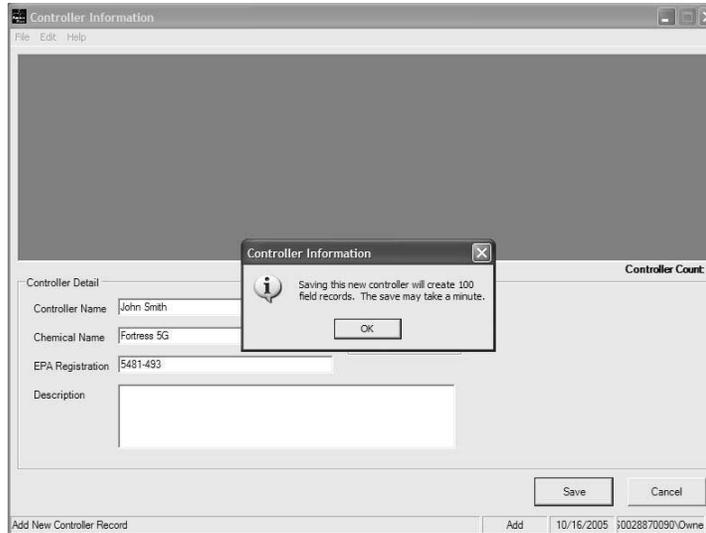
In the **Controller Name** field, type in the name of the Controller. Note that the controller name is simply the name of the file in which information will be stored or transferred. The controller name should be kept to 20 characters or less. Do not use punctuation marks or special characters in the controller name.

The **Chemical Name**, **EPA Registration**, and **Controller Description** fields are **optional**. Enter information desired.

Add a New Controller (*continued*):

Step 4

Click on the **Save** button to add the Controller. Click the **OK** button to create the field records.



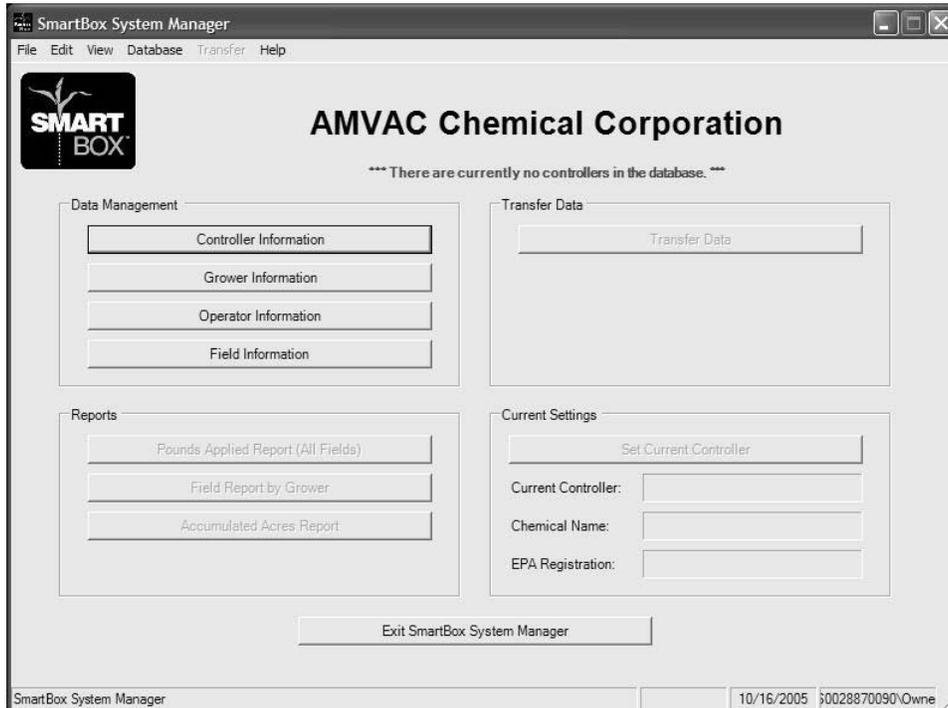
Step 5

Click the **Close** button

Set Current Controller:

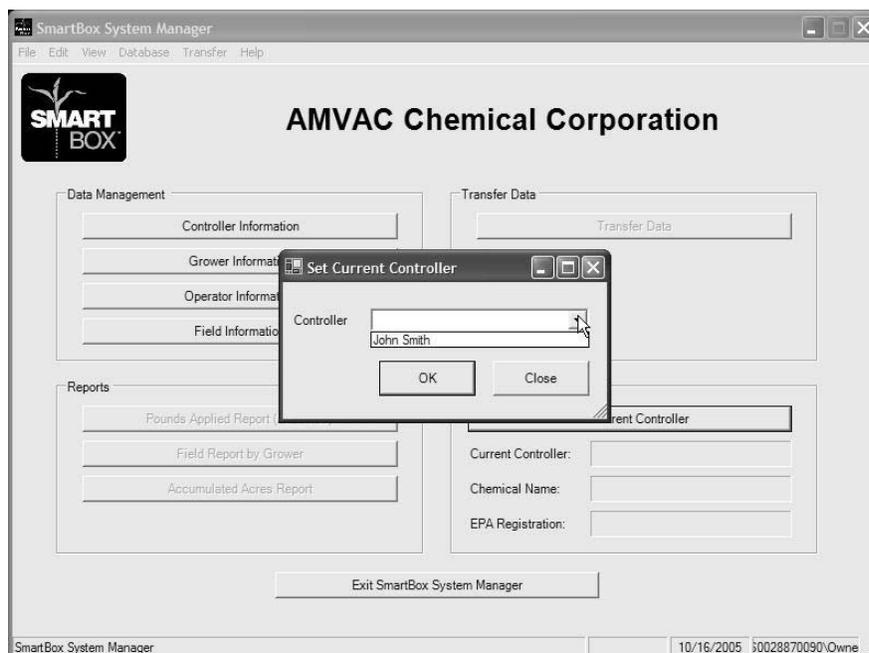
Step 1

From the Main Menu, click the **Set Current Controller** button.



Step 2

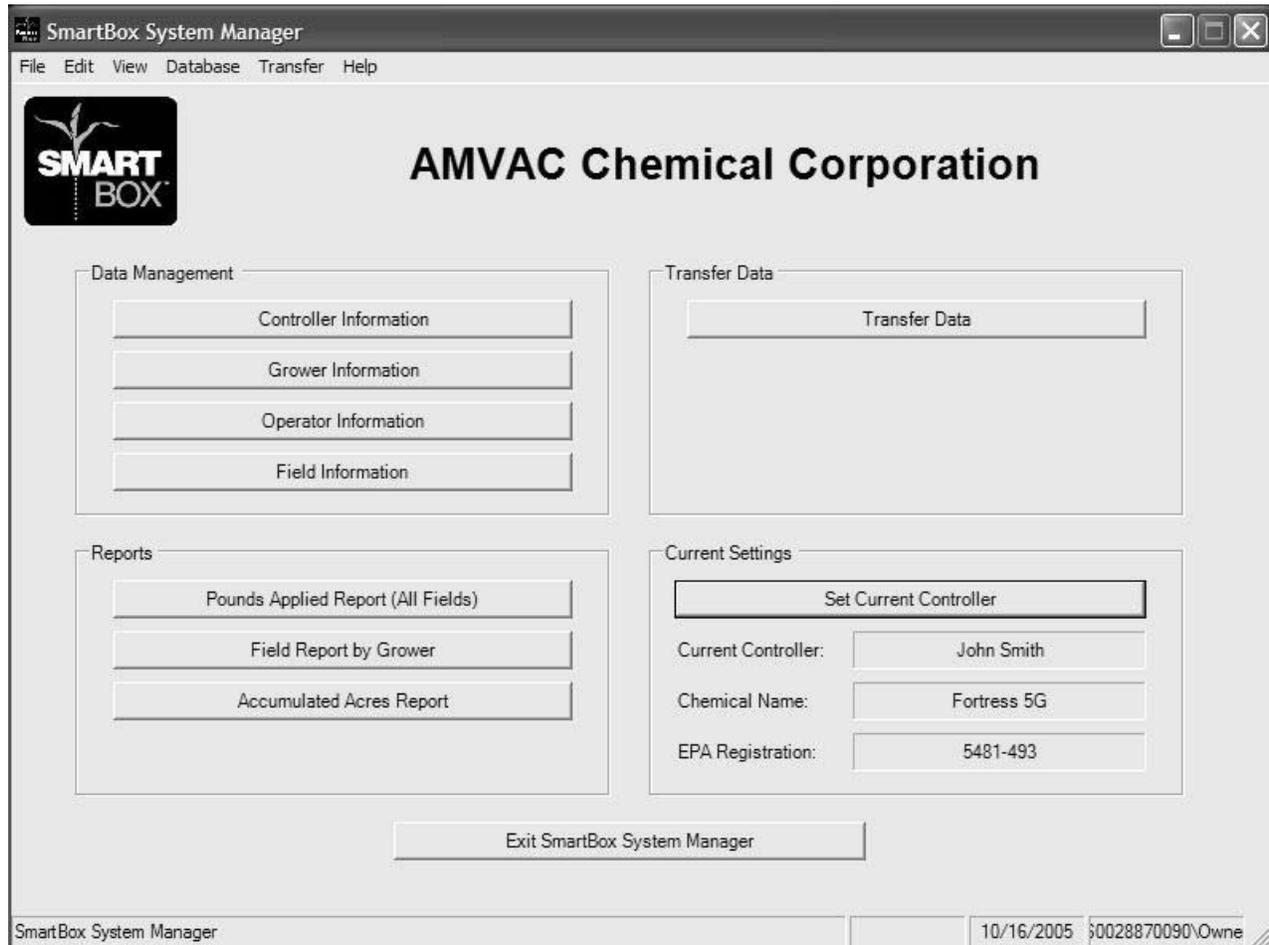
Select the controller from the drop-down menu, then click **OK**.



Set Current Controller (*continued*):

End

The controller selected is displayed in the **Current Settings** section of the Main Menu screen.

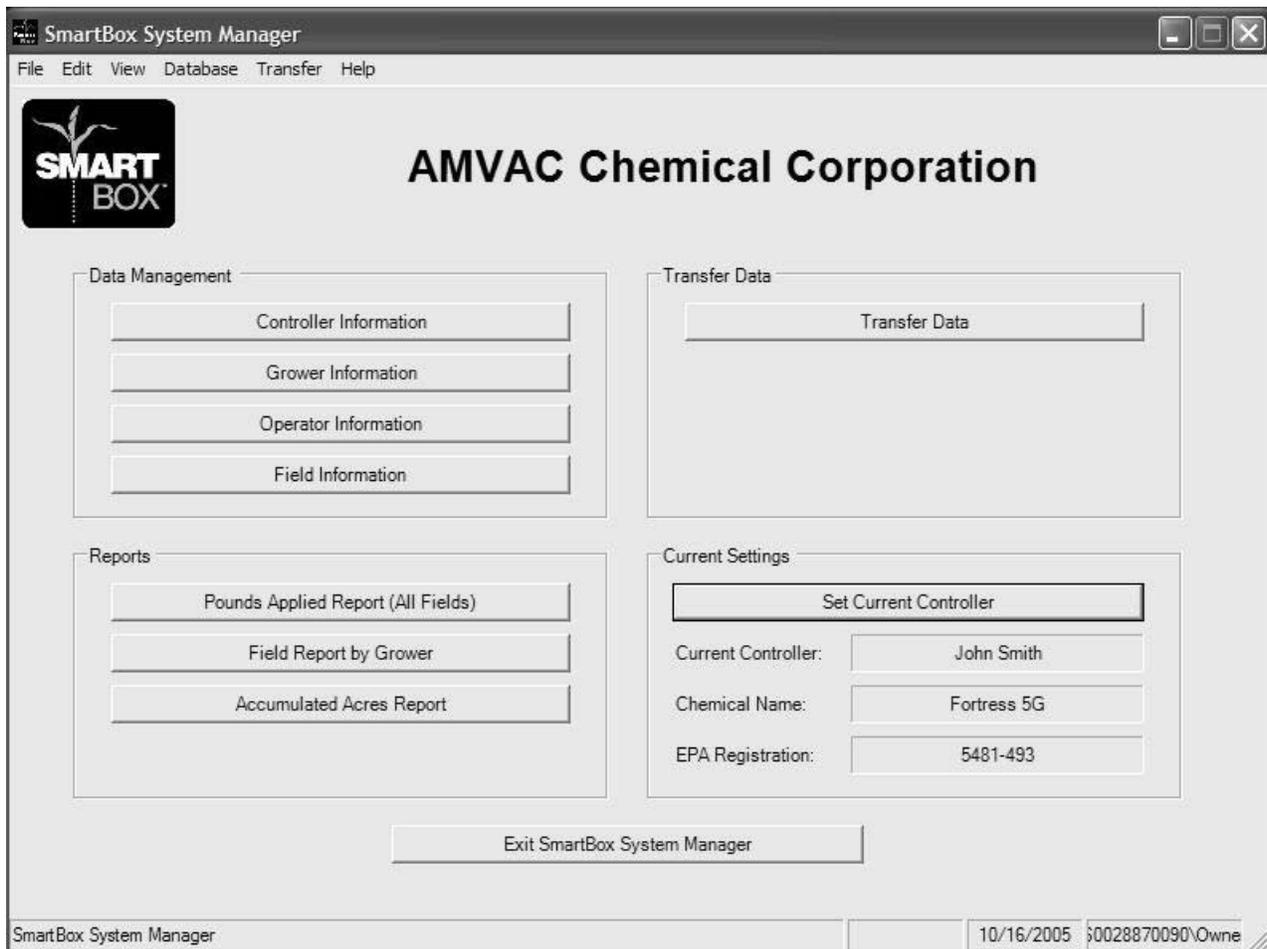


Data Download - 2005 or Later Controllers:

Step 1

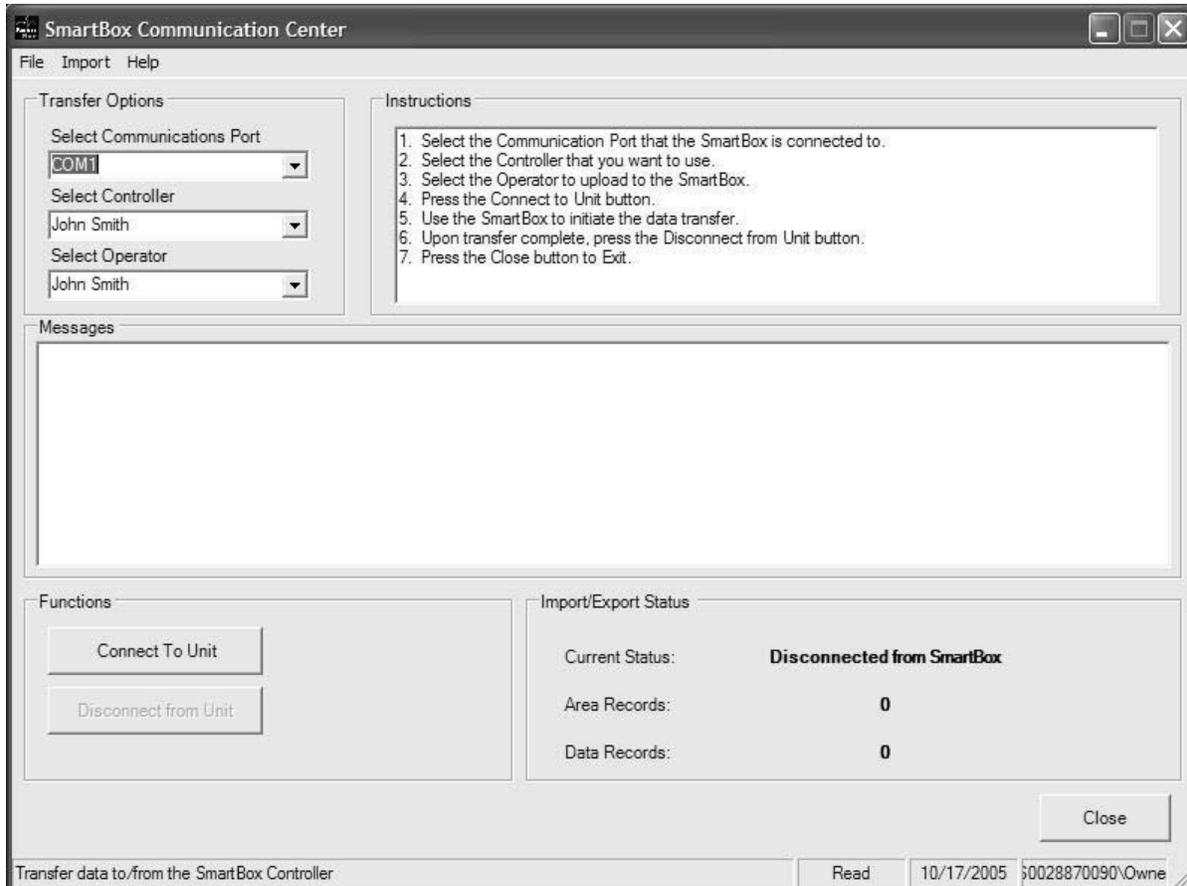
From the Main Menu, click on the **Transfer Data** button..

Note: A current 2005 or later controller must be selected before choosing Transfer Data. See Set Current Controller.



Data Download - 2005 or Later Controllers (continued):**Step 2**

The **SmartBox® Communication Center** screen is displayed.



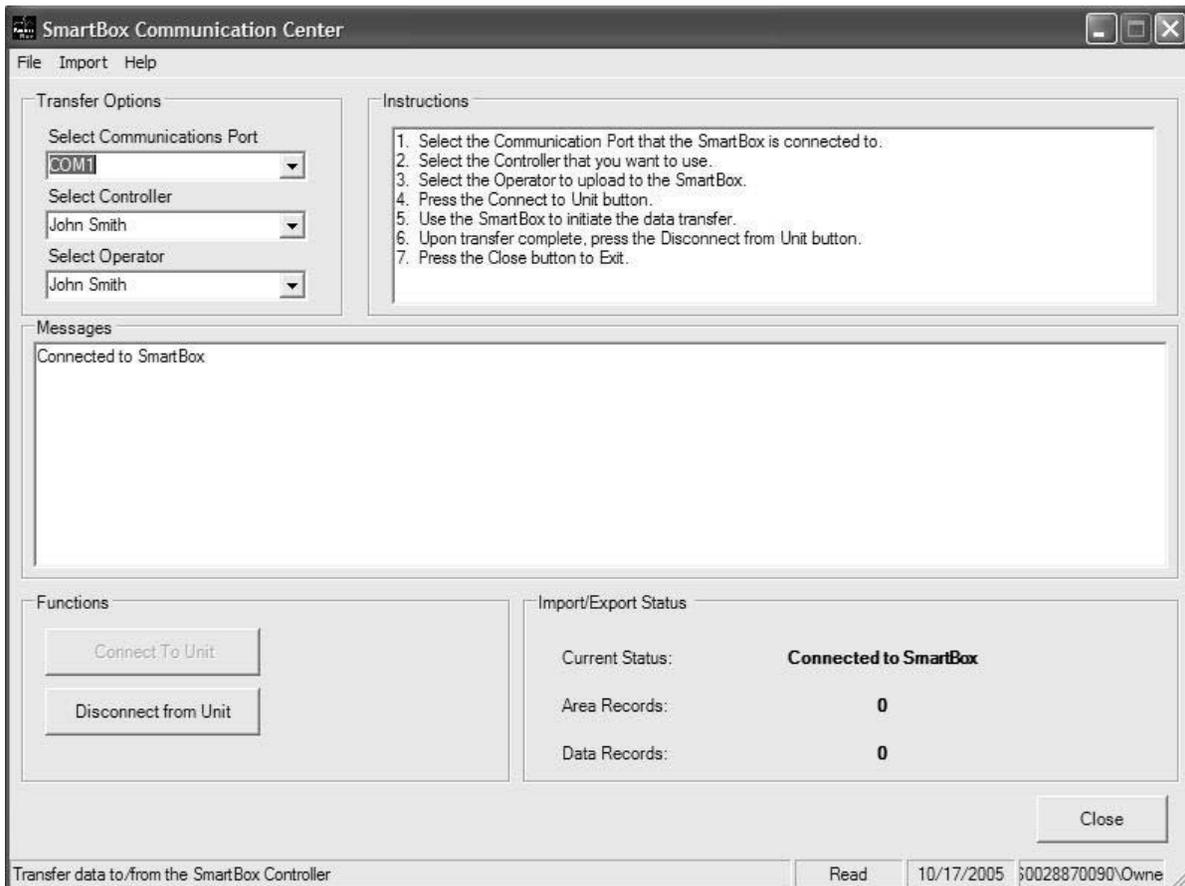
Follow the **Instructions** that are displayed.

- A. Select the appropriate **Communications Port** that the Controller will be connected to.
- B. Select the appropriate **Controller**.
- C. Select the appropriate **Operator**. (Optional)
- D. Connect the Controller to the COM port selected above on the PC.

Data Download - 2005 or Later Controllers *(continued)*:

Step 3

Once the Controller is connected, click on the **Connect to Unit** button. The following screen will appear:



Data Download - 2005 or Later Controllers (continued):Step 4

Use the SmartBox® Controller to initiate the data transfer.

When transferring information from the SmartBox® controller to a personal computer, there are four options:

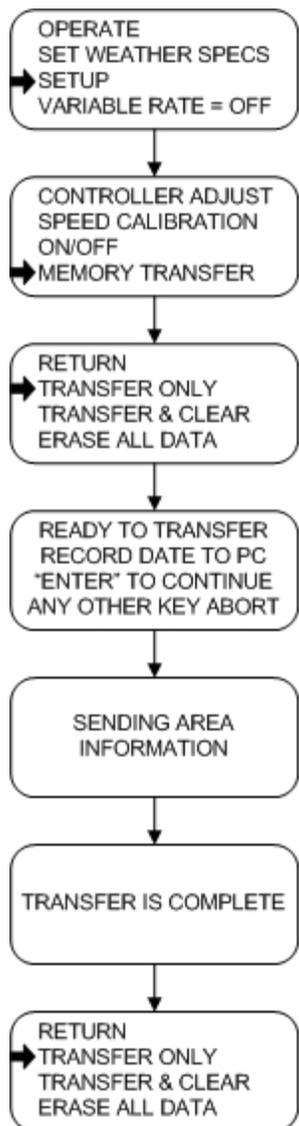
1. **TRANSFER ONLY** - Transfers all stored application data without erasing any information from the controller to the computer.
2. **TRANSFER AND CLEAR** - Transfer all stored application data and erases all field data. User information, such as Field Locations, Chemical Info, and User Info remain in the controller.
3. **ERASE ALL DATA** - Does not transfer information, but clears all stored data from the controller memory.
4. **TRANSFER PC INFORMATION** - Transfers grower information, operator information, and field information (field name and address) from the SmartBox® System Manager to the SmartBox® Controller.

Data Download - 2005 or Later Controllers (*continued*):

REQUIRED
 OPTIONAL

Step 4 (continued)

Transfer Only Option



Connect the 9-pin RS232 port from the back of the controller to the computer.

Step 1

From the Main Menu select **SETUP**.

Step 2

Using the arrow keys, scroll to **MEMORY TRANSFER** and press **ENTER**.

Step 3

To transfer data without clearing it from memory, select **TRANSFER ONLY** and press **ENTER**.

Step 4

Press **ENTER** at the **READY TO TRANSFER** screen.

Step 5

While data is being transferred, the **SENDING AREA INFORMATION** screen will appear.

Step 6

When transfer is complete, the **TRANSFER IS COMPLETE** screen will display momentarily then advance to the Memory Transfer Menu.

Step 7

Click the **DISCONNECT FROM UNIT** button on the SmartBox® Communication Center.

End

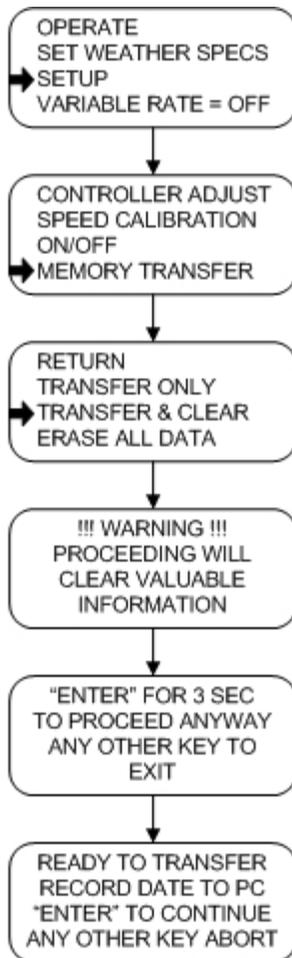
To return to the Setup Menu, select **RETURN** and press **ENTER**.

Data Download - 2005 or Later Controllers (*continued*):

REQUIRED
 OPTIONAL

Step 4 (*continued*)

Transfer and Clear Option



Step 1

From the Main Menu select **SETUP**.

Step 2

Using the arrow keys, scroll to **MEMORY TRANSFER** and press **ENTER**.

Step 3

To transfer data and automatically clear all field related information while keeping user and chemical information in memory, select **TRANSFER & CLEAR** and press **ENTER**.

Step 4

Press **ENTER** and hold for three (3) seconds to confirm transferring and clearing data. **CAUTION:** Proceeding will clear valuable information.

Step 5

Press **ENTER** at the **READY TO TRANSFER** screen.

Step 6

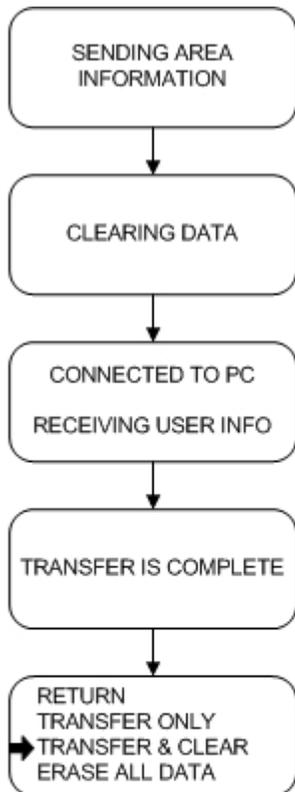
Press **ENTER** to continue.

Data Download - 2005 or Later Controllers (*continued*):

■ REQUIRED
□ OPTIONAL

Step 4 (continued)

Transfer and Clear Option



Step 7

While data is being transferred and cleared, the **SENDING INFORMATION** and **CLEARING DATA** screens will appear.

Step 8

The **CLEARING DATA** screen will automatically advance to the **CONNECTED TO PC RECEIVING USER INFO** screen.

Step 9

When transfer is complete, the **TRANSFER IS COMPLETE** screen will display momentarily then advance to the Memory Transfer Menu.

End

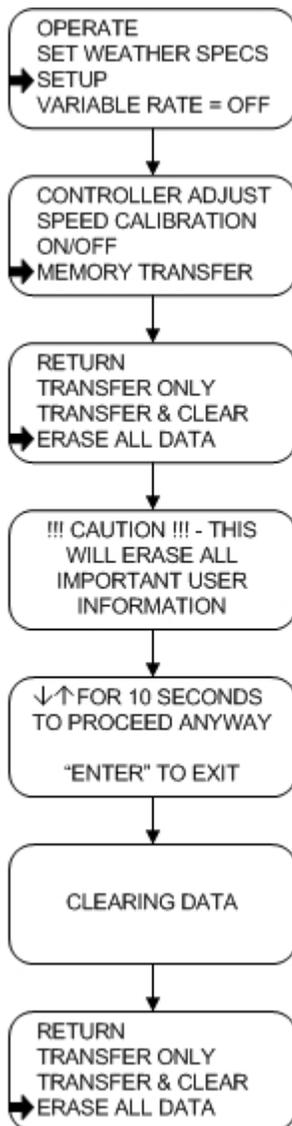
To return to the Setup Menu, select **RETURN** and press **ENTER**.

Download Data - 2005 or Later Controllers (continued):

■ REQUIRED
□ OPTIONAL

Step 4 (continued)

Erase All Data Option



Step 1

From the Main Menu select **SETUP**.

Step 2

Using the arrow keys, scroll to **MEMORY TRANSFER** and press **ENTER**.

Step 3

To transfer data and clear memory, select **ERASE ALL DATA** and press **ENTER**.

Step 4

Press both arrow keys simultaneously and hold for ten (10) seconds to begin clearing data. **CAUTION:** Proceeding will erase all important user information.

Step 5

While data is being cleared, the **CLEARING DATA** screen will appear.

Step 6

When completed, the screen will automatically advance to the Memory Transfer Menu.

End

To return to the Setup Menu, select **RETURN** and press **ENTER**.

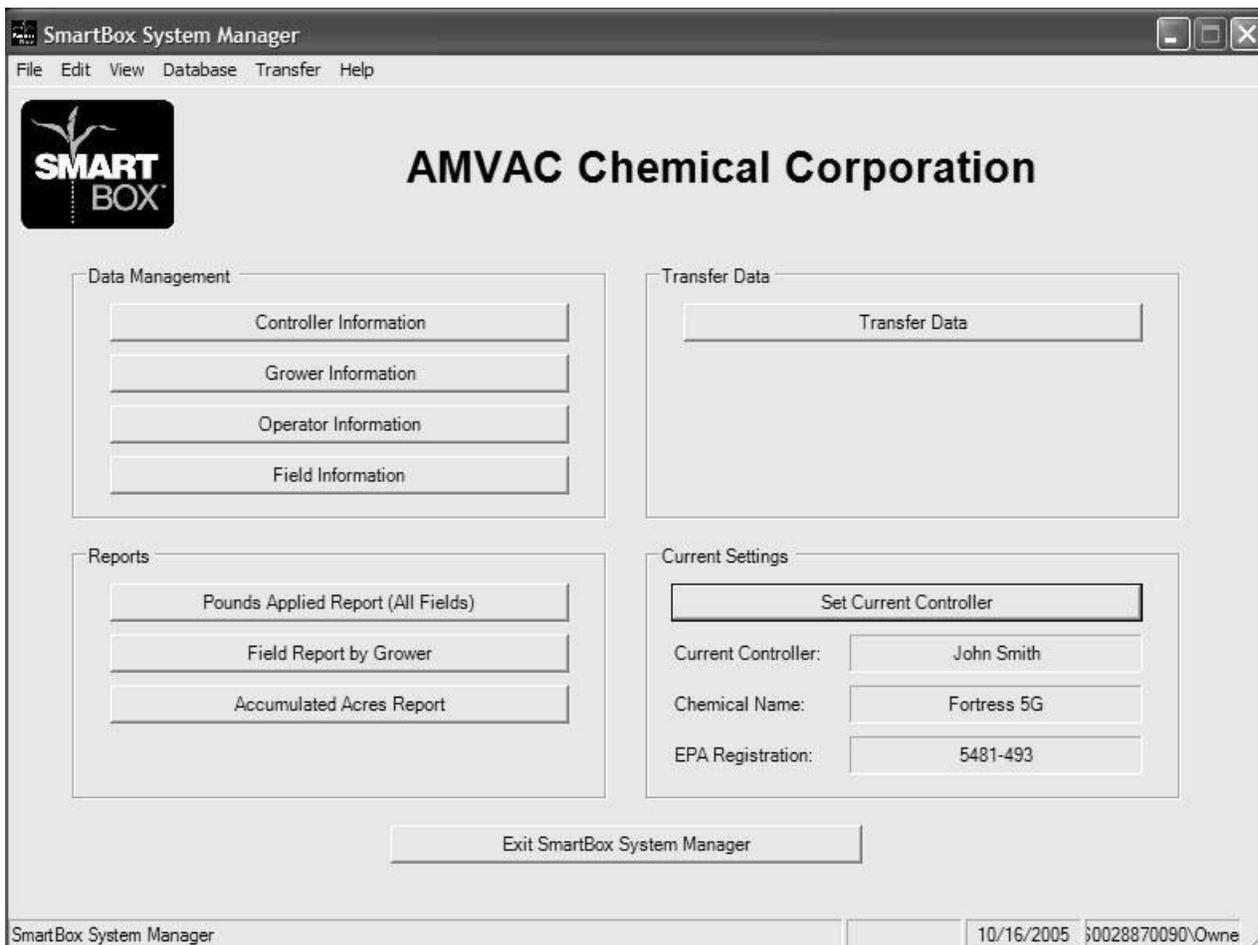
Data Upload - 2005 or Later Controllers:

This option is used to upload information from a SmartBox® System Manager controller file to the SmartBox® controller. Grower, Operator, and Field information can be entered into a controller file.

Step 1

From the Main Menu, click on the **TRANSFER DATA** button.

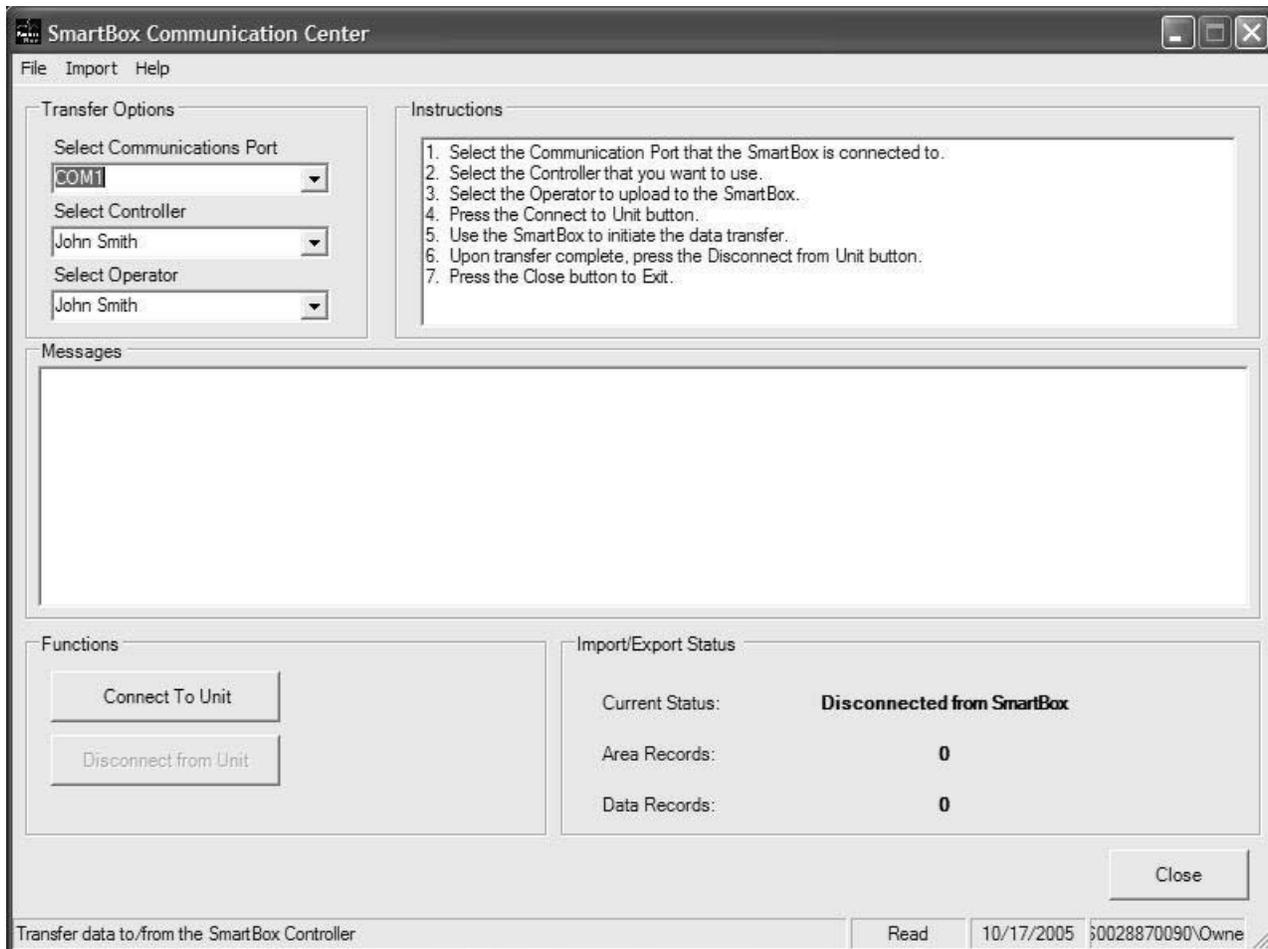
Note: A current 2005 or later controller must be selected before choosing Transfer Data. See Set Current Controller.



Data Upload - 2005 or Later Controllers (*continued*):

Step 2

The **SmartBox® Communication Center** screen is displayed.



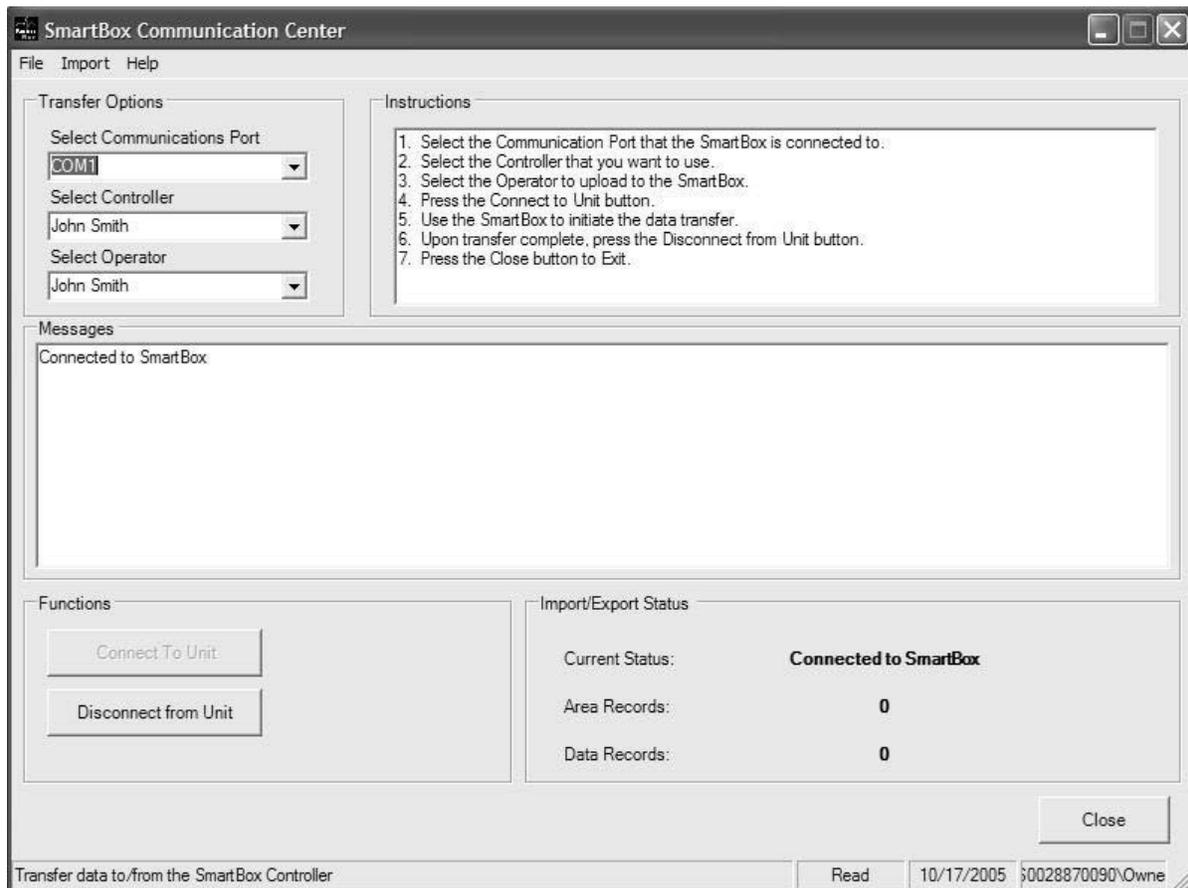
Follow the **Instructions** that are displayed.

- A. Select the appropriate **Communications Port** that the Controller will be connected to.
- B. Select the appropriate **Controller**.
- C. Select the appropriate **Operator**. (Optional)
- D. Connect the Controller to the COM port selected above on the PC.

Data Upload - 2005 or Later Controllers (*continued*):

Step 3

Once the Controller is connected, click on the **Connect to Unit** button. The following screen will appear:



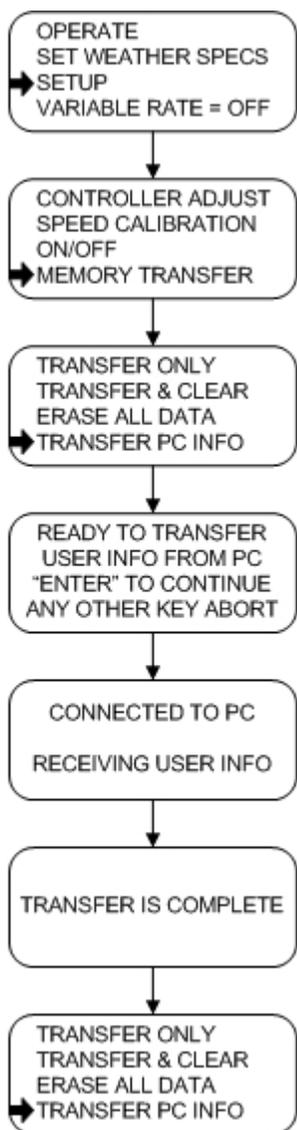
Data Upload - 2005 or Later Controllers (continued):

■ REQUIRED
□ OPTIONAL

Step 4

Use the SmartBox Controller to initiate the data transfer.

Transfer PC Info Option



Connect the 9-pin RS232 port from the back of the controller to the computer.

Step 1

From the Main Menu select **SETUP**.

Step 2

Using the arrow keys, scroll to **MEMORY TRANSFER** and press **ENTER**.

Step 3

To transfer data from a personal computer with SmartBox Program Manager installed, scroll to **TRANSFER PC INFO** and press **ENTER**.

Step 4

Press **ENTER** to continue.

Step 5

While data is being transferred **CONNECTED TO PC RECEIVING USER INFO** screen will appear. The **TRANSFER IS COMPLETE** screen will display momentarily then advance to the Memory Transfer Menu.

End

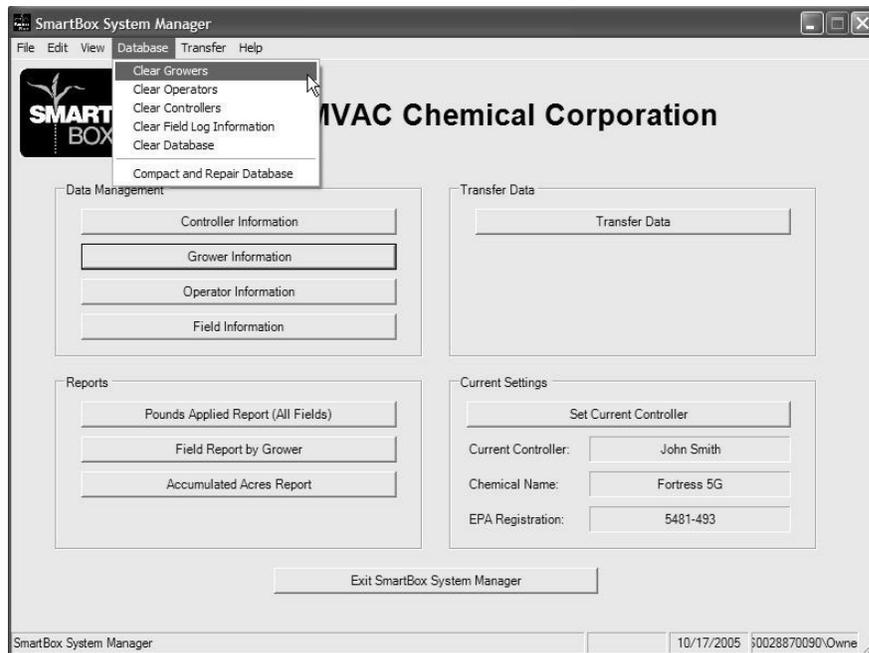
To return to the Setup Menu, select **RETURN** and press **ENTER**.

Clear Growers, Operators, Controllers, Field Log Information, or Database:

Step 1

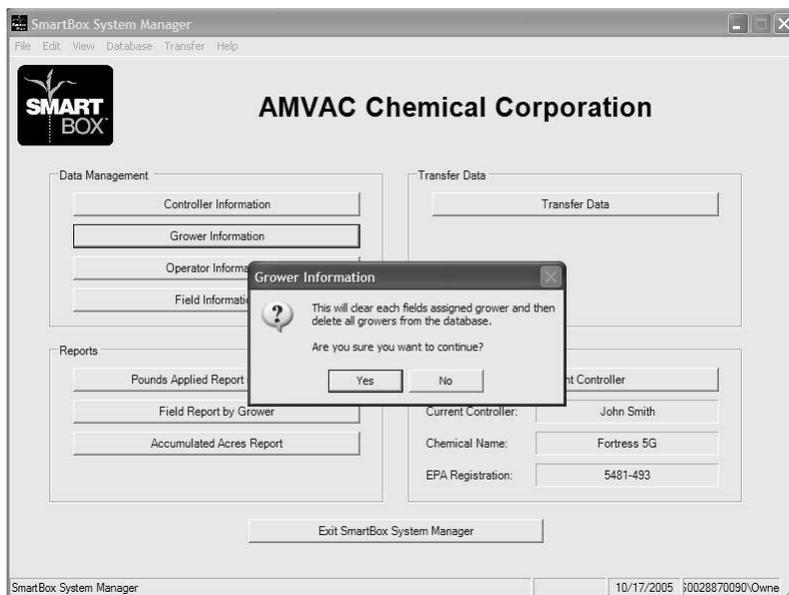
From the Main Menu, click on the **Database** menu and select the field to clear.

Note: If multiple controllers are in the SmartBox System Manager, the clear function will clear all fields, not just the current controller.



Step 2

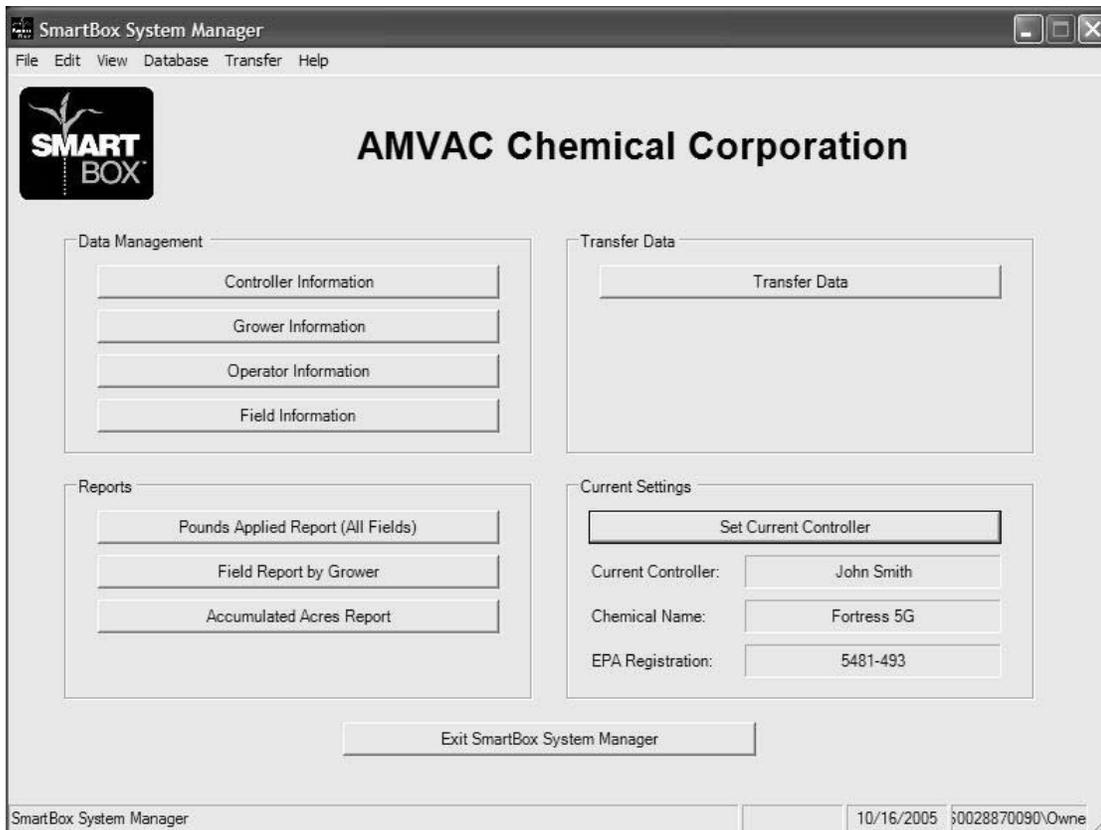
Click **Yes** to continue.



Delete A Controller:

Step 1

From the Main Menu, select the controller you wish to delete and set it to the current controller. See Set Current Controller.



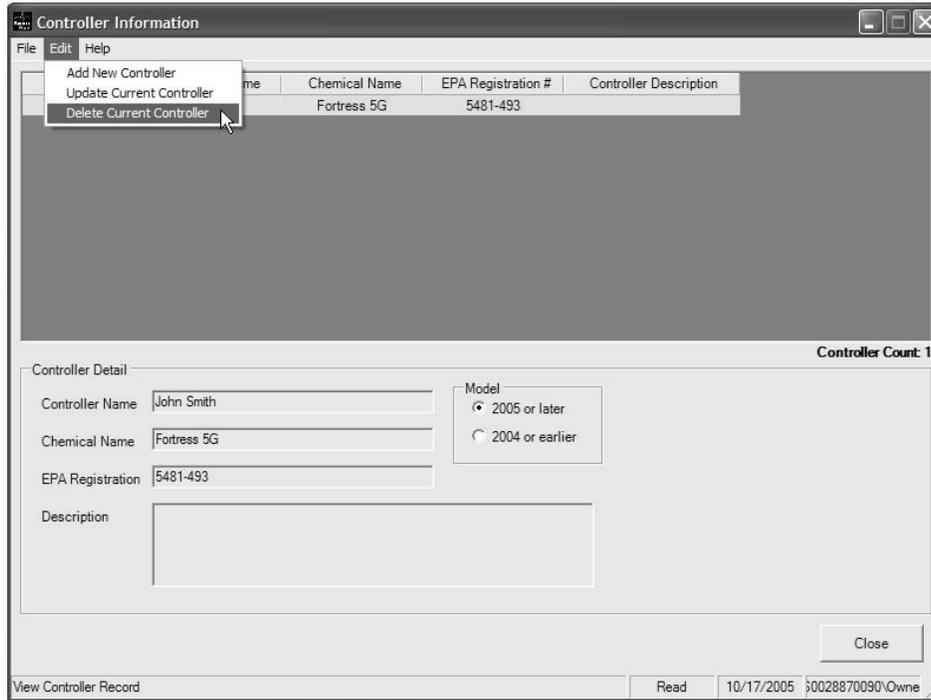
Step 2

From the Main Menu, click on the **Controller Information** button.

Delete A Controller (continued):

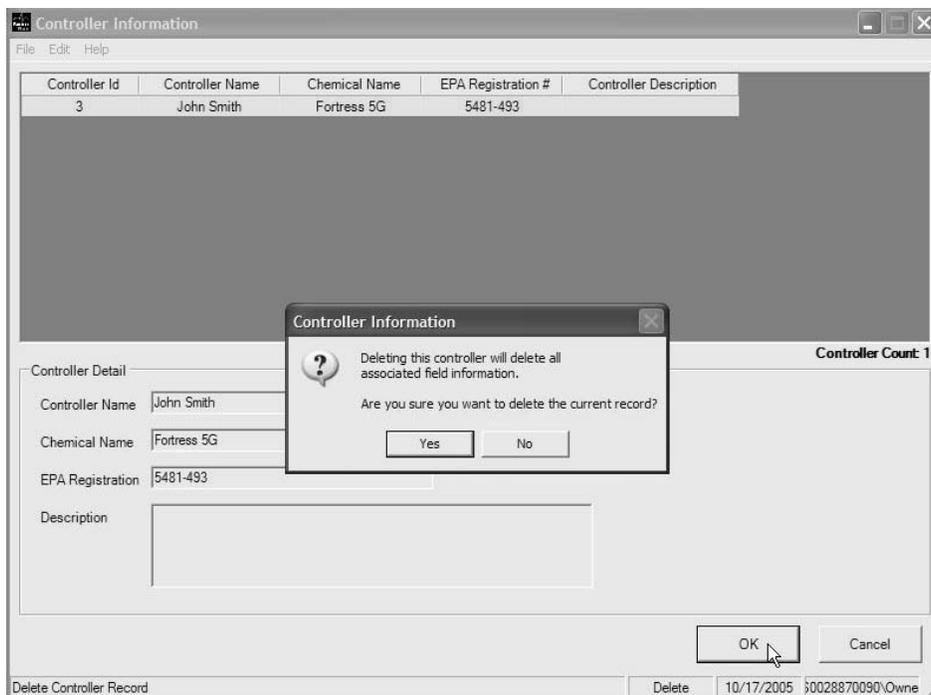
Step 3

Select the Edit Menu and select **Delete Current Controller**.



Step 4

Click the **OK** button to proceed. An additional window will pop up. Click **Yes** to proceed.



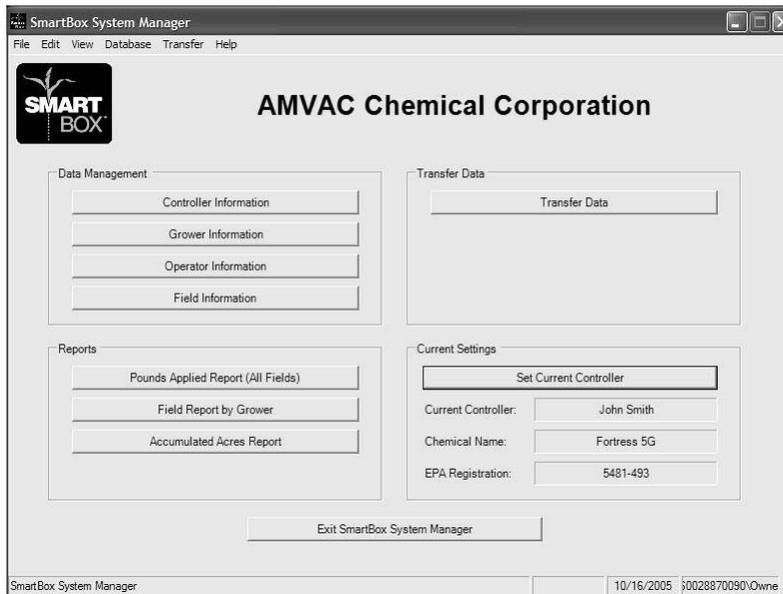
Grower Information

Add A New Grower:

Use this function to enter the Grower's name, address and applicator's License Number. This optional information is used for record keeping and reports.

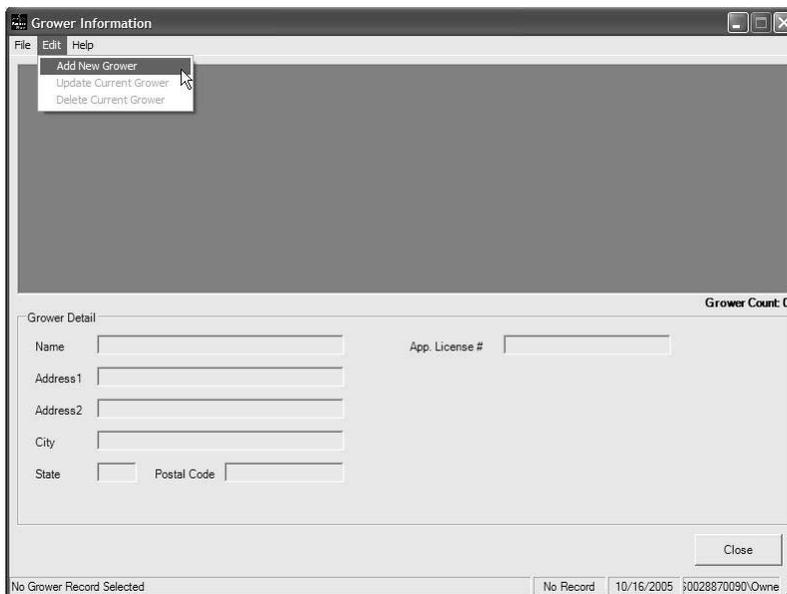
Step 1

From the Main Menu, click on the **Grower Information** button.



Step 2

The **GROWER INFORMATION** screen is displayed. Select the Edit Menu and select **ADD NEW GROWER**.



Add A New Grower (continued):

Step 2 (continued)

Enter the appropriate information in the following fields, as needed:

1. **Name** - Enter the Grower's name.
2. **Address 1/Address 2/City/State/Zip** - Enter the Grower's address.
3. **App. Lic. No.** - Enter the Grower's Applicator License Number.

Step 3

Click the **Save** button.

Grower Id	Name	Address Line 1	Address Line 2	City	State	Postal Code	Applicator License #
2	John Smith						

End

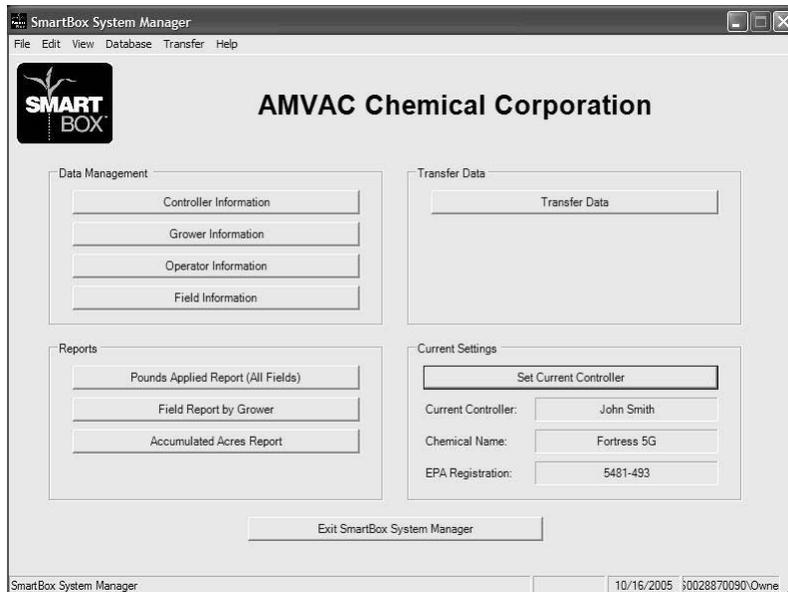
Click on the **Close** button to return to the **MAIN MENU**.

Update Grower Info:

Use this function to enter corrections to previously entered grower information.

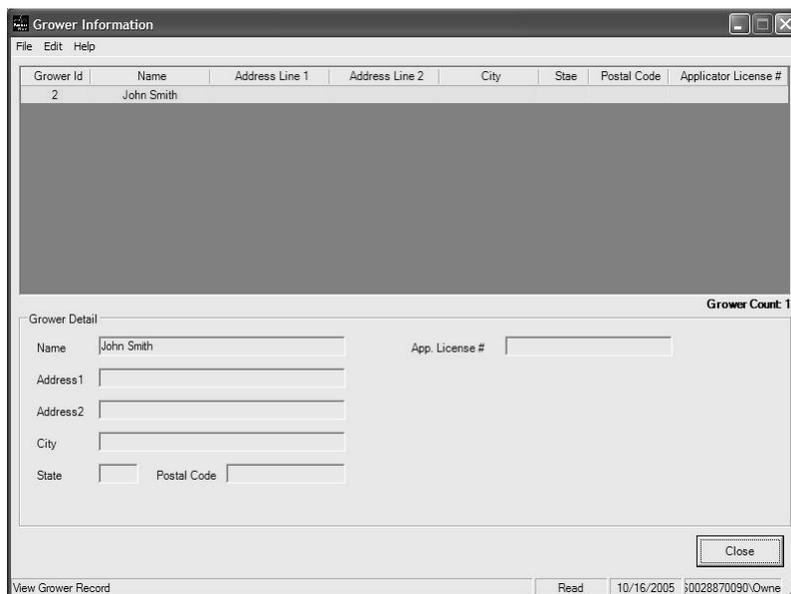
Step 1

From the Main Menu, click on the **Grower Information** button.



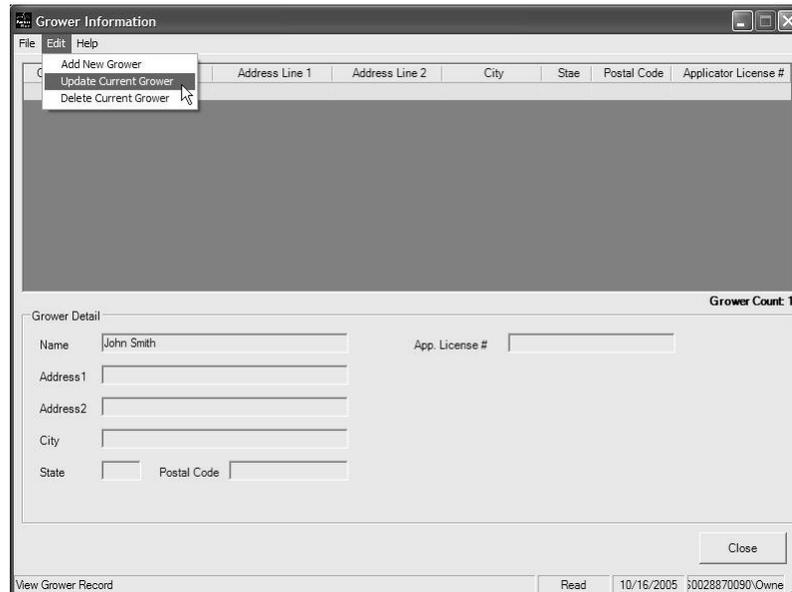
Step 2

The **GROWER INFORMATION** screen is displayed, click on the Grower to be corrected to highlight it.



Update Grower Info (continued):Step 3

From the **Grower Information** screen select the Edit Menu then choose **Update Current Grower**. The grower details can now be changed.

Step 4

Enter the corrections to each field, as needed.

Step 5

Click the **Save** button to accept the changes.

End

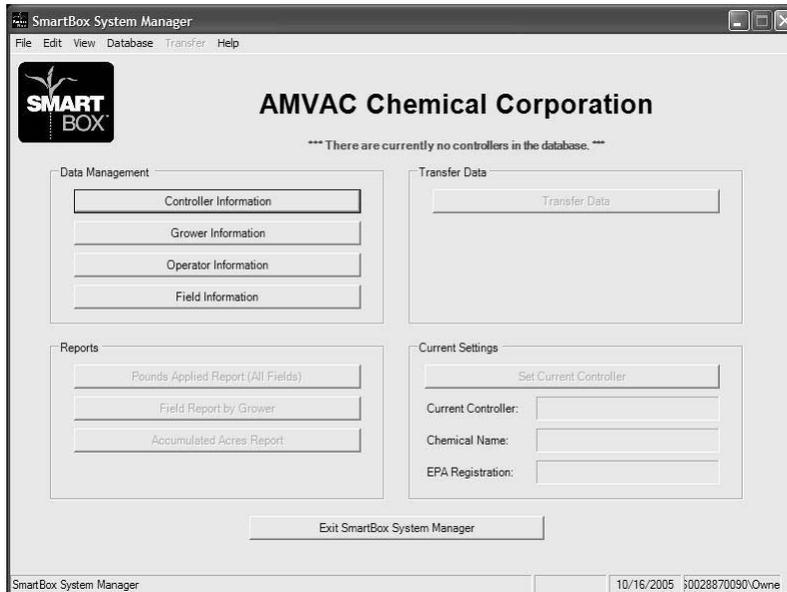
Click the **Save** button then the **Close** button to return to the **MAIN MENU**.

Delete A Grower:

Use this function to delete a previously entered grower.

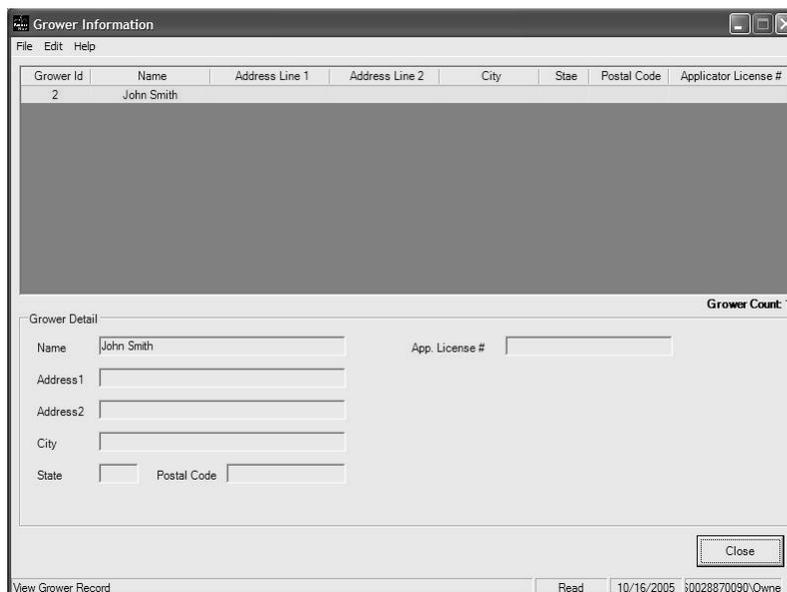
Step 1

From the Main Menu, click on the **Grower Information** button.



Step 2

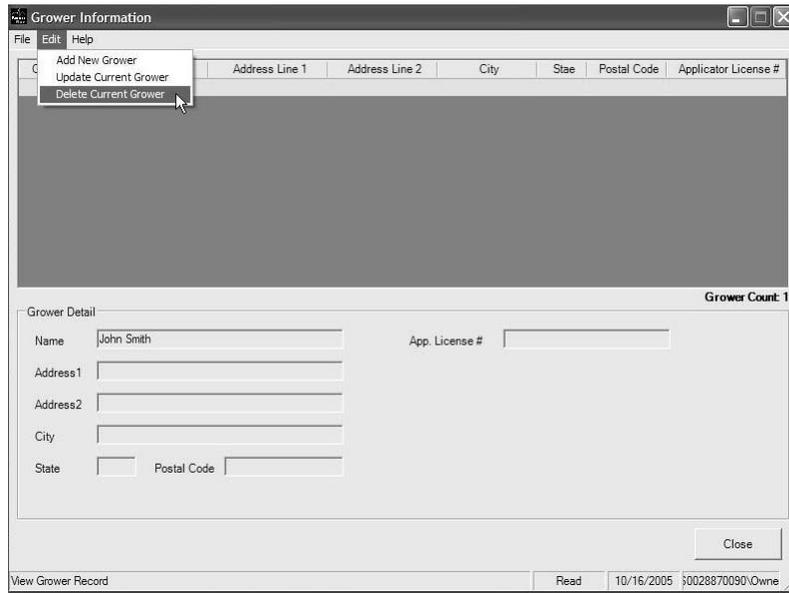
The **GROWER INFORMATION** screen is displayed, click on the Grower to be deleted to highlight it.



Delete A Grower (continued):

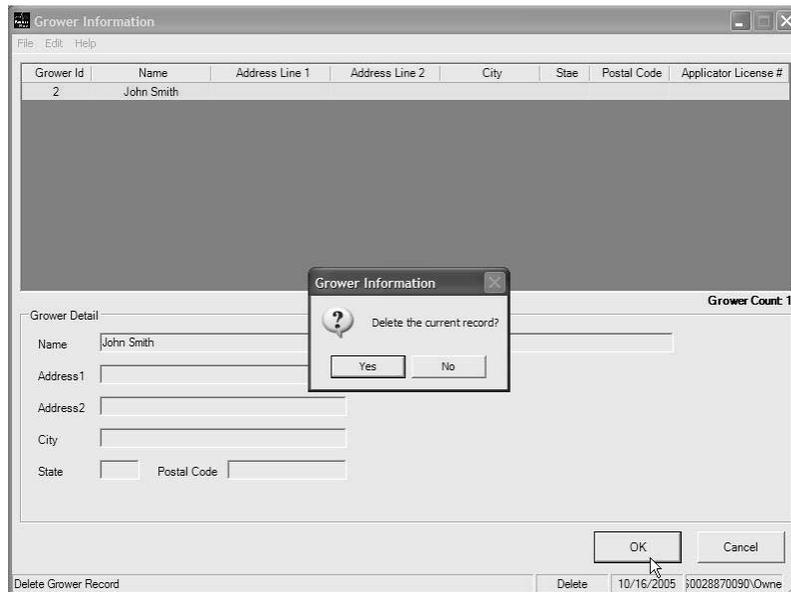
Step 3

From the **Grower Information** screen select the Edit Menu then choose **Delete Current Grower**.



Step 4

Click **OK** to proceed. An additional window will pop up, Click **Yes** to proceed.



End

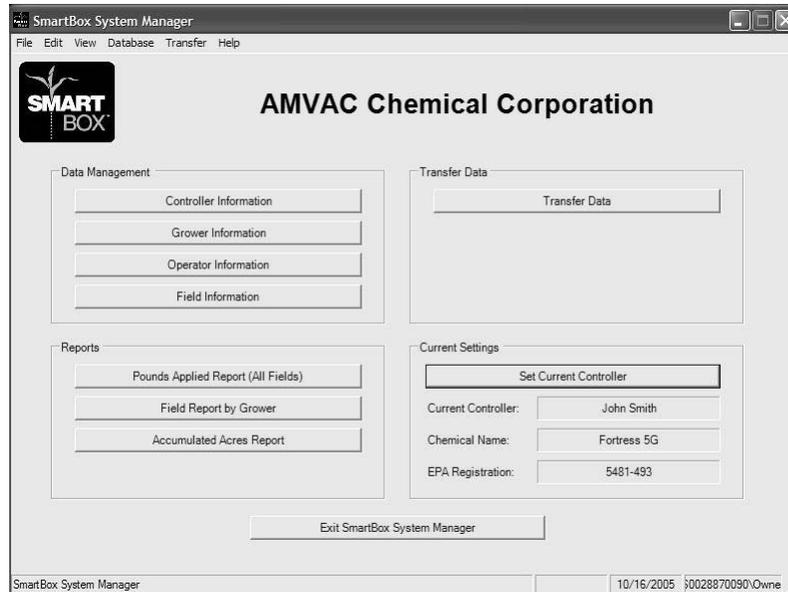
Click the **Close** button to return to the **MAIN MENU**.

Print Grower Information Report:

Use this function to print the Grower Info Report.

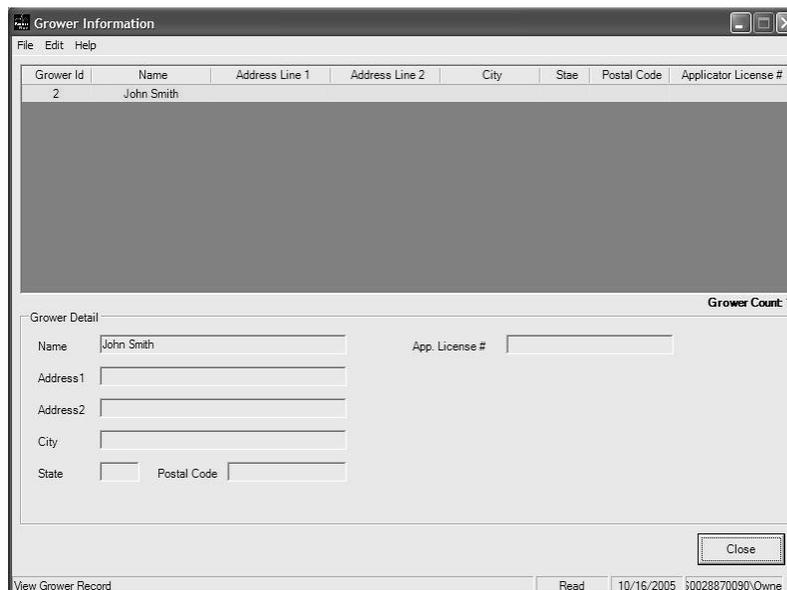
Step 1

From the Main Menu, click on the **Grower Information** button.



Step 2

The **GROWER INFORMATION** screen is displayed.

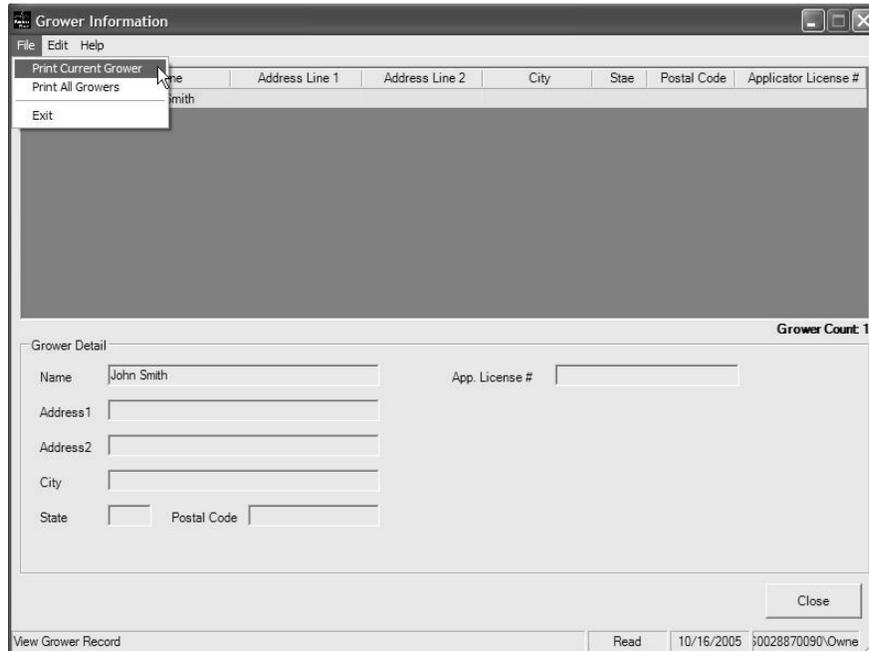


Print Grower Information Report (continued):

Step 3

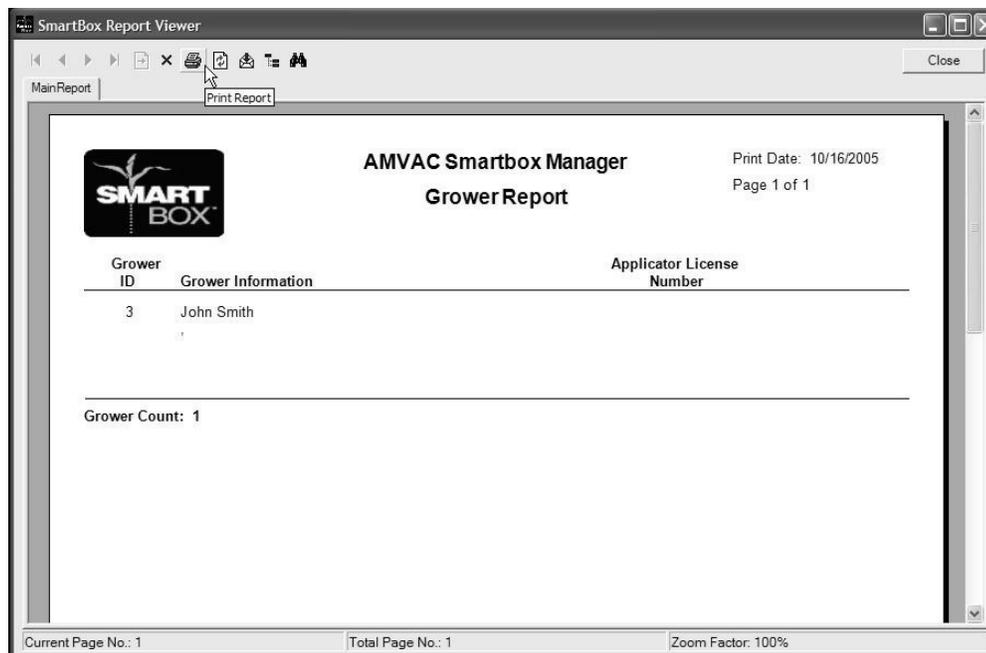
From the **Grower Information** screen select the File Menu then choose **Print Current Grower**.

Note: To print the current grower, the grower must be selected (highlighted in yellow).



Step 4

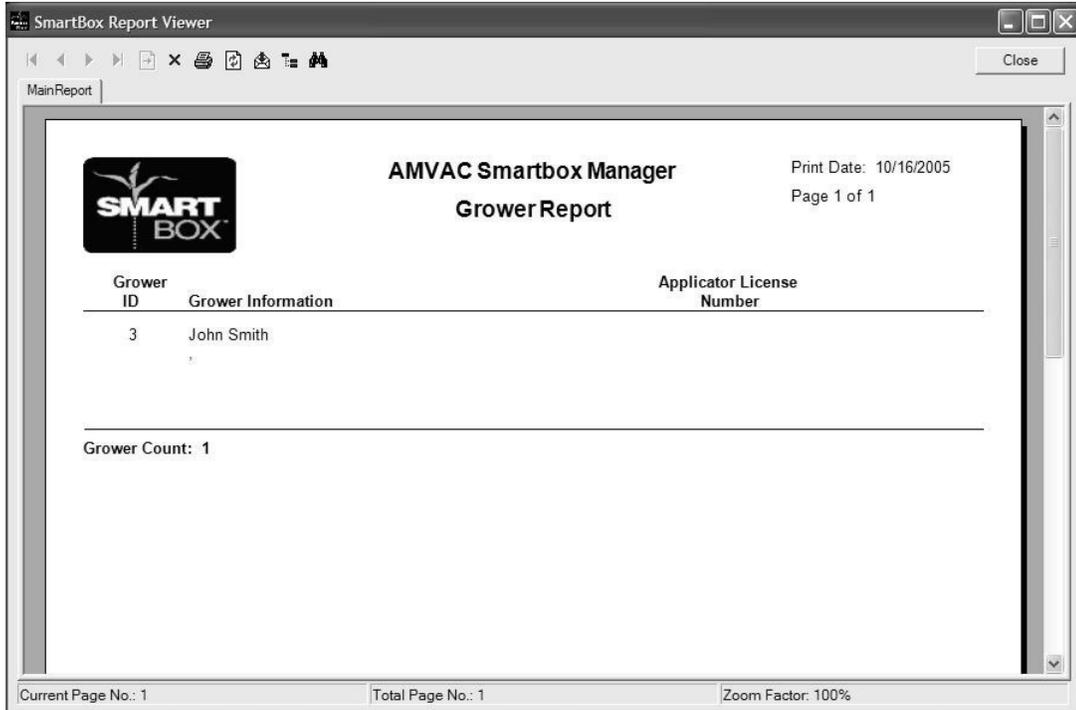
The **SmartBox Report Viewer** will appear. Click on the **print icon** at the top of the screen.



Print Grower Information Report (*continued*):

Step 5

Click the **CLOSE** button to close the SmartBox Report Viewer.



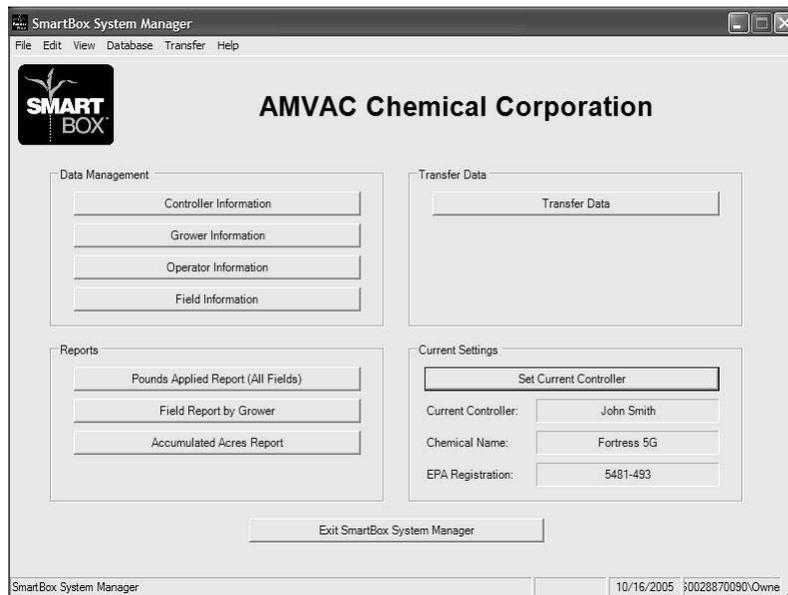
Operator Information

Add A New Operator:

Use this function to enter the Operator's name, address, and Applicator's license number. This optional information is used for record keeping.

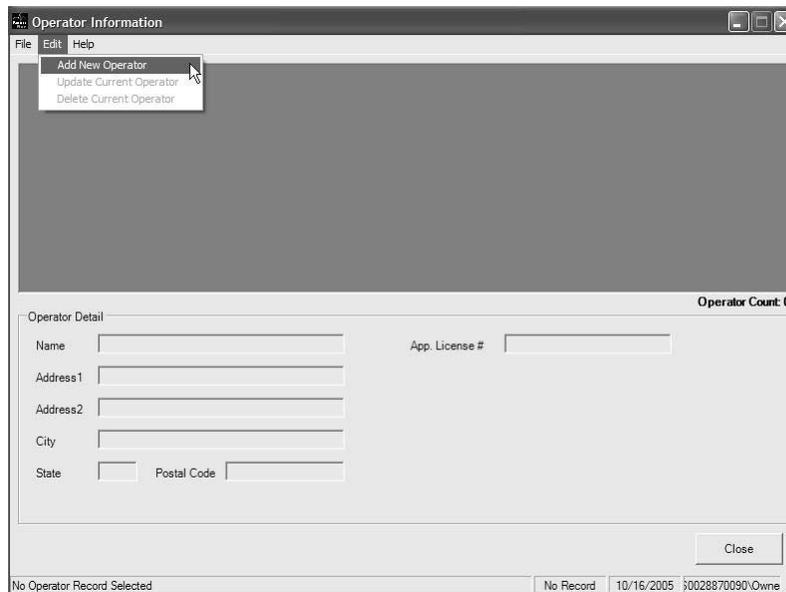
Step 1

From the Main Menu, click on the **Operator Information** button.



Step 2

The **OPERATOR INFORMATION** screen is displayed. Select the Edit Menu and select **ADD NEW OPERATOR**.



Add A New Operator (*continued*):

Enter the appropriate information in the following fields, as needed:

1. **Name** - Enter the Operator's name.
2. **Address 1/Address 2/City/State/Zip** - Enter the Operator's address.
3. **App. Lic. No.** - Enter the Operator's Applicator License Number.

Operator Information

File Edit Help

Operator Count: 0

Operator Detail

Name: John Smith App. License #:

Address1:

Address2:

City:

State: Postal Code:

Save Cancel

Add New Operator Record Add 10/16/2005 0028870090\Owne

Step 3

Click the **Save** button.

Operator Information

File Edit Help

Operator Id	Name	Address Line 1	Address Line 2	City	State	Postal Code	Applicator License #
2	John Smith						

Operator Count: 1

Operator Detail

Name: John Smith App. License #:

Address1:

Address2:

City:

State: Postal Code:

Close

View Operator Record Read 10/16/2005 0028870090\Owne

End

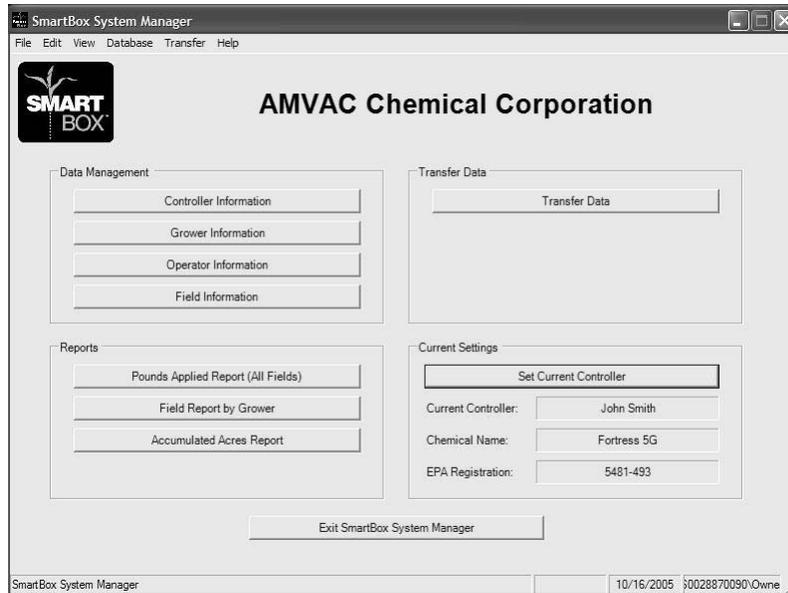
Click the **Close** button to return to the **MAIN MENU**.

Update Operator Info:

Use this function to enter corrections to previously entered Operator Information.

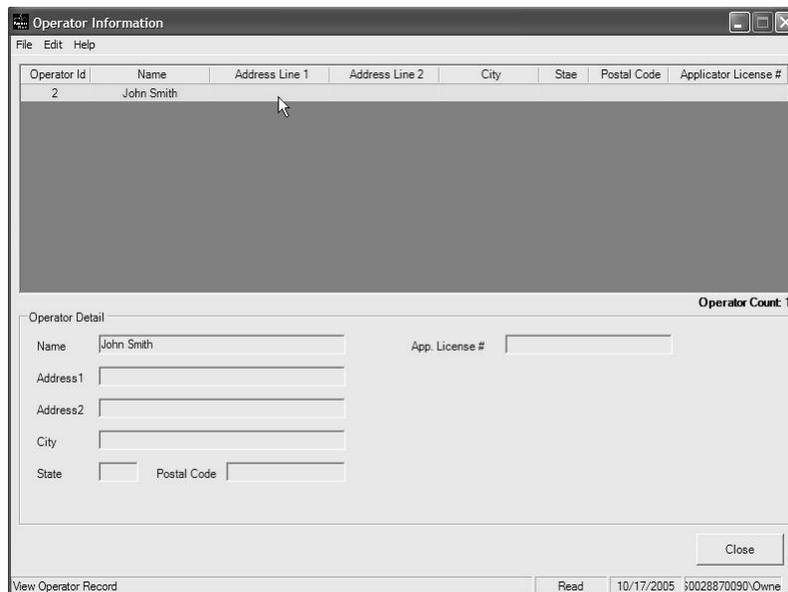
Step 1

From the Main Menu, click on the **Operator Information** button.



Step 2

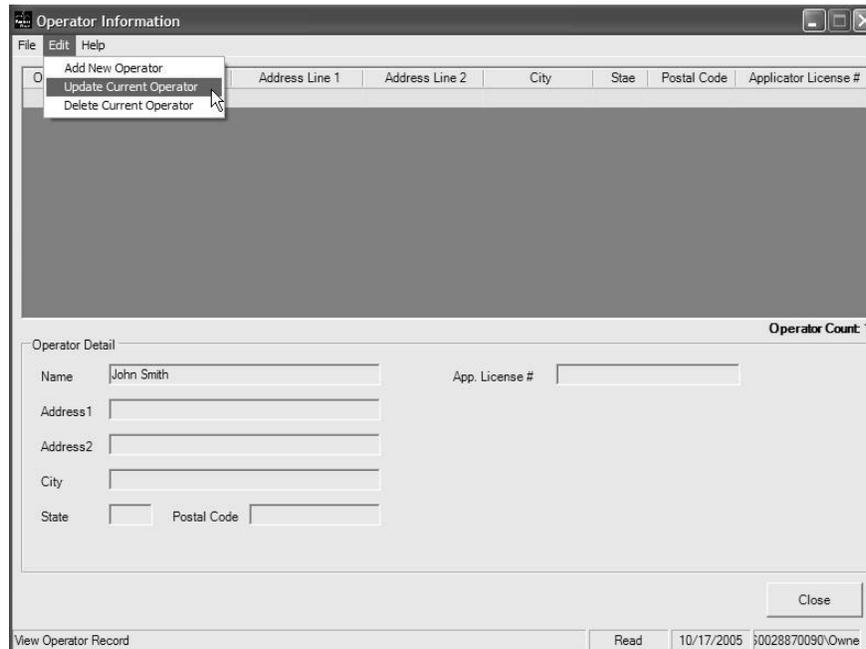
In the **Operator Information** screen, click on the Operator to be corrected to highlight it



Update Operator Info (*continued*):

Step 3

From the **Operator Information Screen** select the Edit Menu then choose **Update Current Operator**. The Operator Information can now be changed.



Step 4

Enter the corrections to each field, as needed.

Step 5

Click the **Save** button to accept the changes.

End

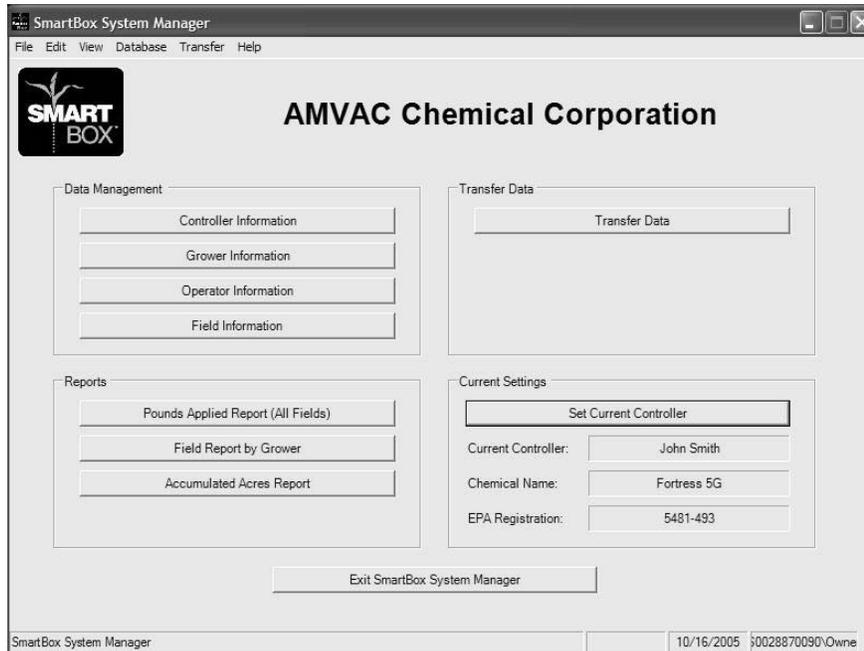
Click the **Save** button then the **Close** button to return to the **MAIN MENU**.

Delete An Operator:

Use this function to delete a previously entered Operator.

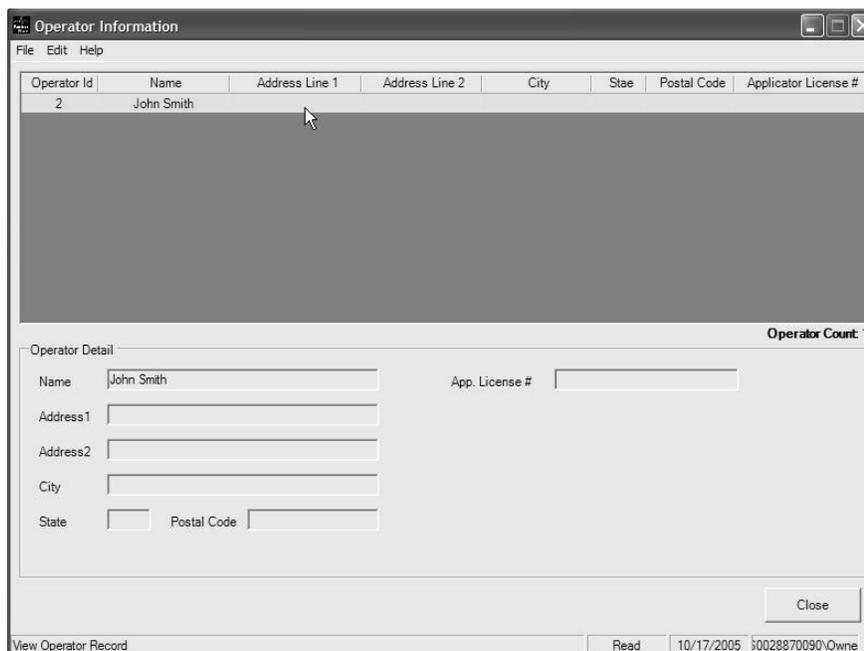
Step 1

From the Main Menu, click on the **Operator Information** button.



Step 2

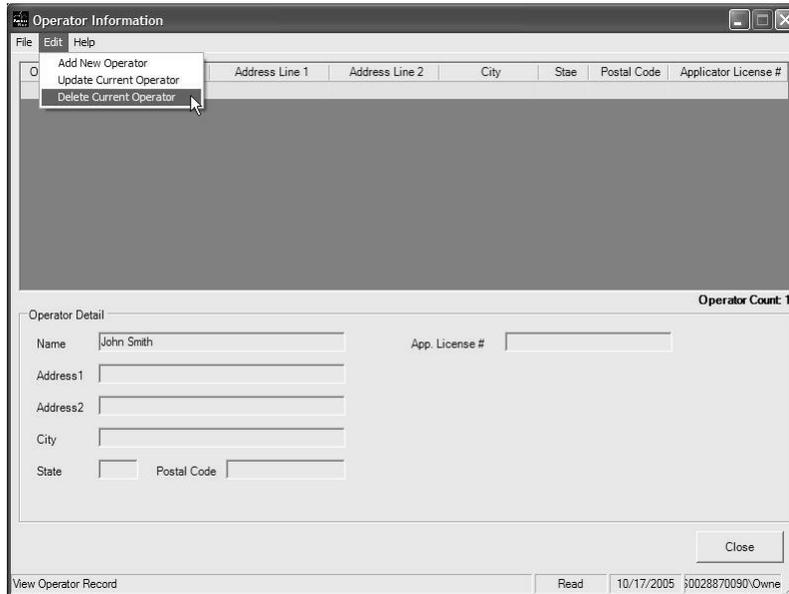
In the **Operator Information** screen, click on the Operator to be deleted to highlight it.



Delete An Operator (*continued*):

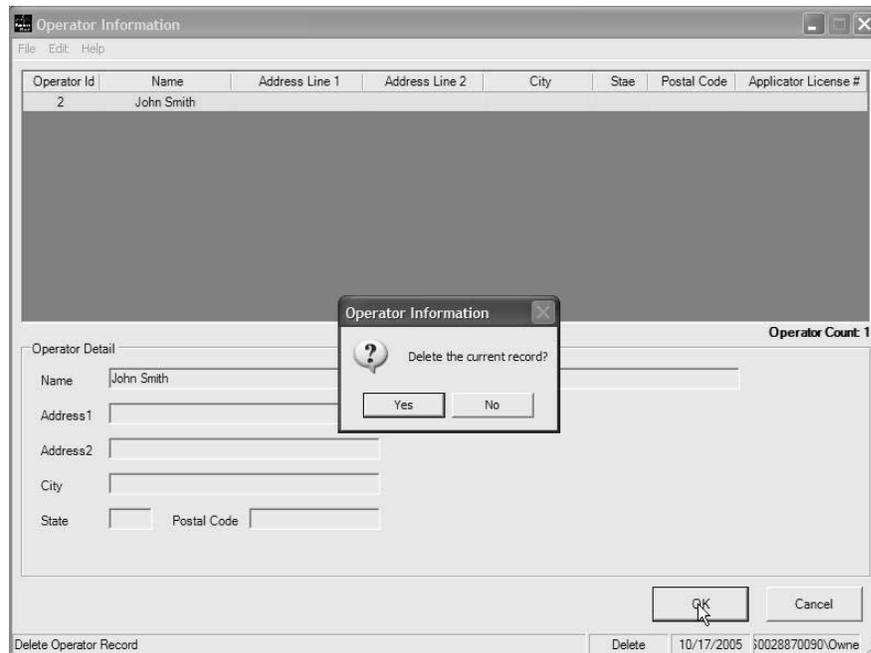
Step 3

Select the Edit Menu then choose **Delete Current Operator**.



End

Click on the **OK** button. An additional window will pop up. Click **Yes** and **Close** to return to the **MAIN MENU**.

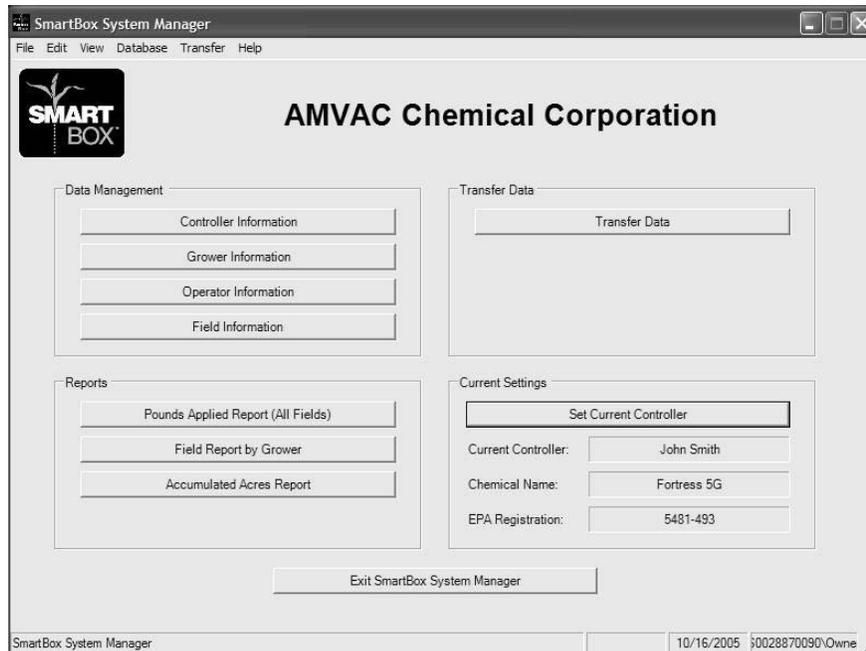


Print Operator Listing:

Use this function to print the Operator.

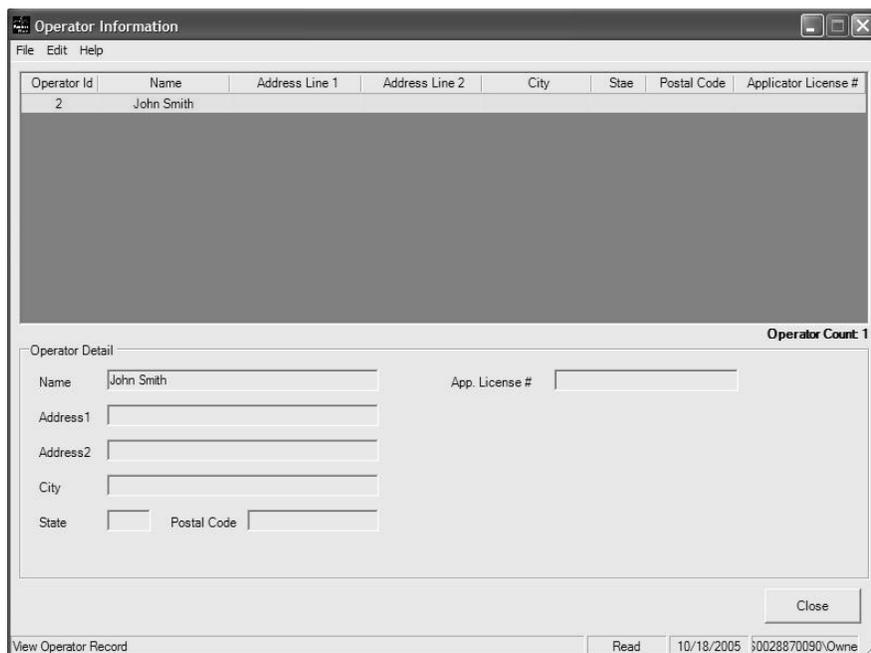
Step 1

From the Main Menu, click on the **Operator Information** button.



Step 2

The **OPERATOR INFORMATION** screen is displayed.

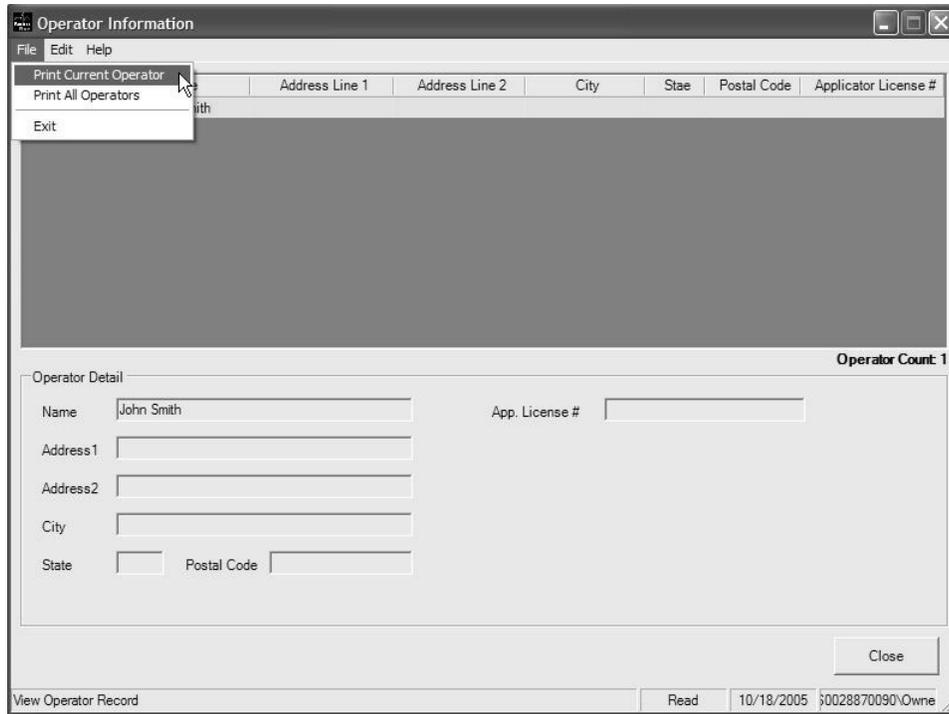


Print Operator Listing (continued):

Step 3

From the **Operator Information** screen select the File Menu then choose **Print Current Operator**.

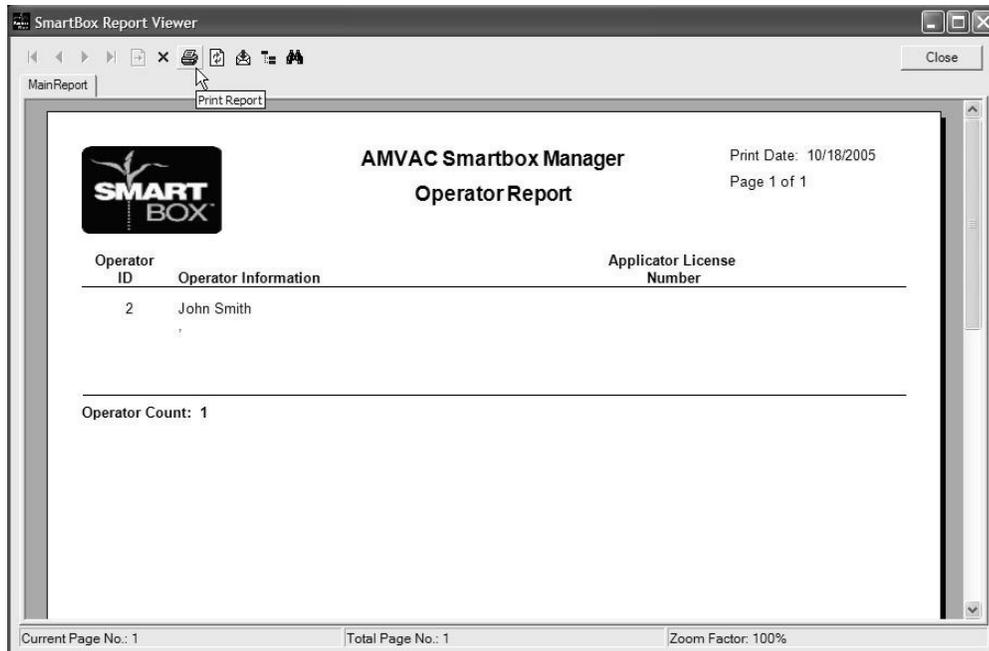
Note: To print the current operator, the operator must be selected (highlighted in yellow).



Print Operator Listing (*continued*):

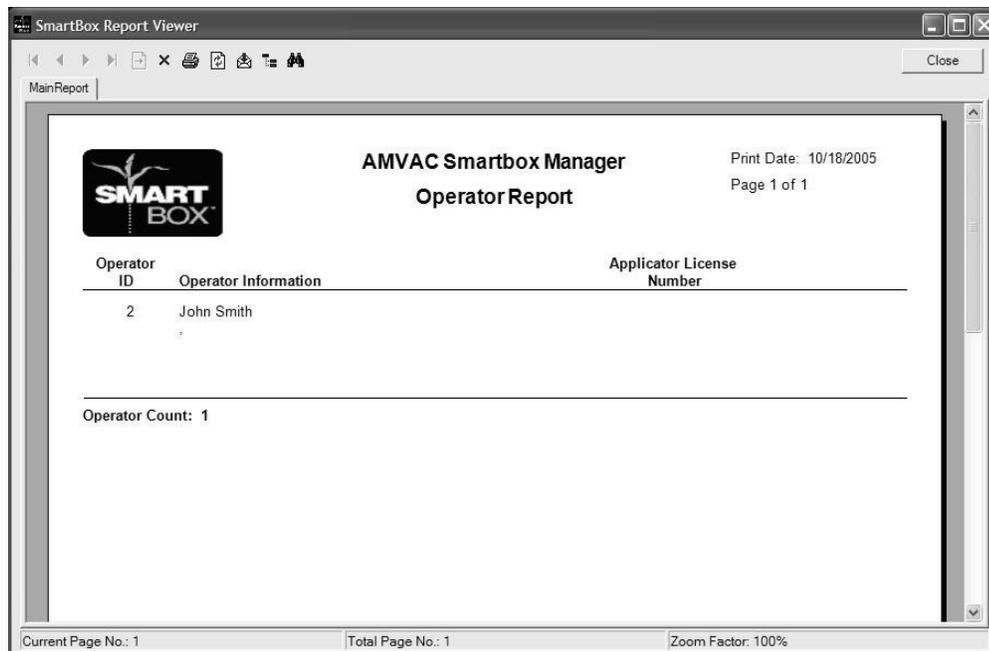
Step 4

The **SmartBox® Report Viewer** will appear. Click on the **print icon** at the top of the screen.



Step 5

Click the **Close** button to close the SmartBox® Report Viewer.



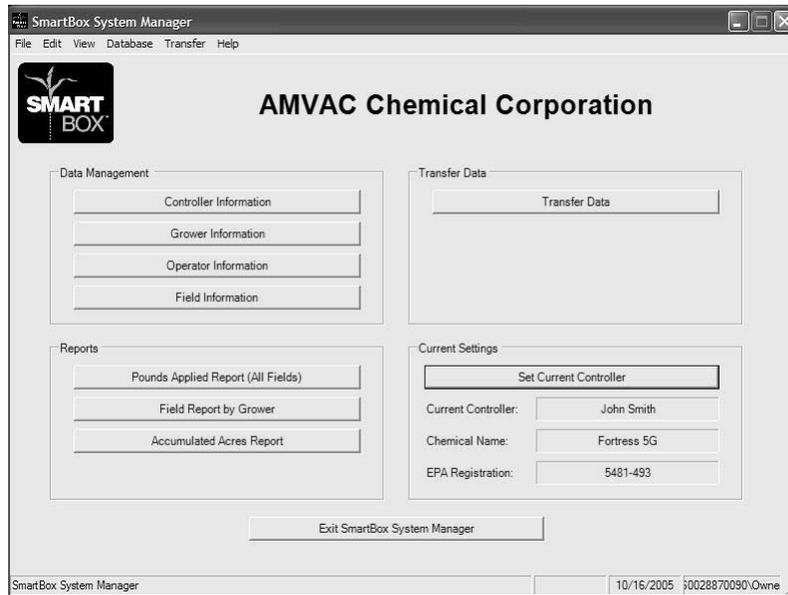
Field Information

Update Field Info:

Use this function to update field information.

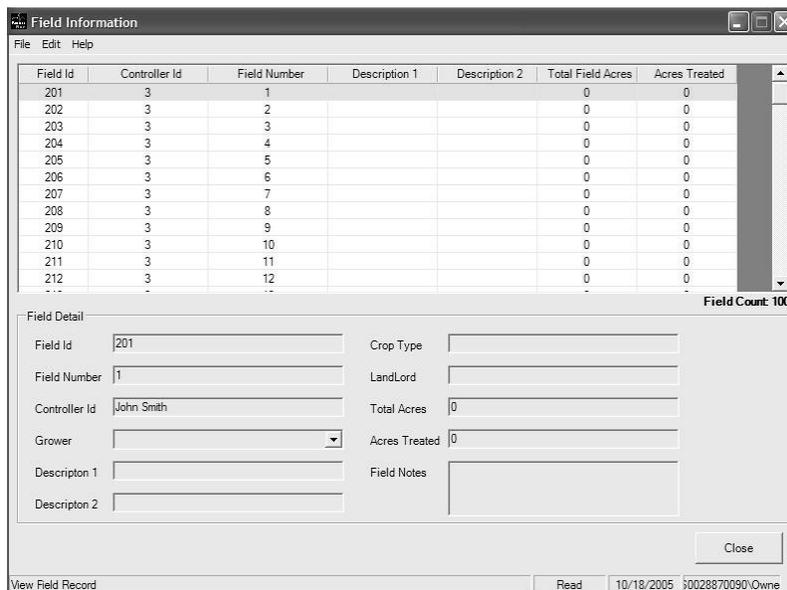
Step 1

From the Main Menu, click on the **Field Information** button.



Step 2

The **FIELD INFORMATION** screen is displayed. In the **Field Listing** section, click on the Field to highlight and select it.

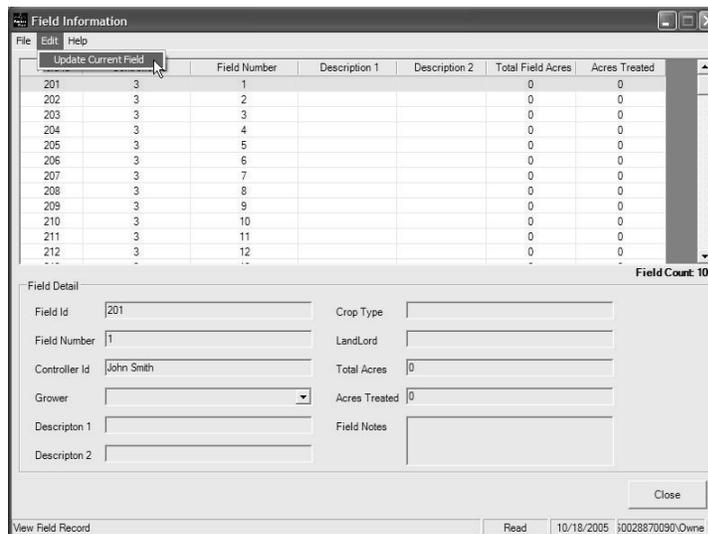


Update Field Info (*continued*):

Step 3

From the **Field Information** screen, select the Edit Menu then choose **Update Current Field**. The field information can now be changed.

1. **Field Number** - Displays the number of the Field chosen.
2. **Grower ID** - Enter a Grower ID previously entered in the Grower Info function.
3. **Description1/Description2** - Displays data transferred from the controller.
4. **Crop Type** - Enter Crop Type for this Field.
5. **LandLord** - Enter the landlord for this Field.
6. **Total Acres** - Enter the total acres in Field.
7. **Acres Treated To Date** - Displays data transferred from the controller.
8. **Field Notes** - Enter miscellaneous information about the Field.



Step 4

Click the **Save** button to accept the changes.

End

Click the **Close** button to return to the main menu.

NOTE:

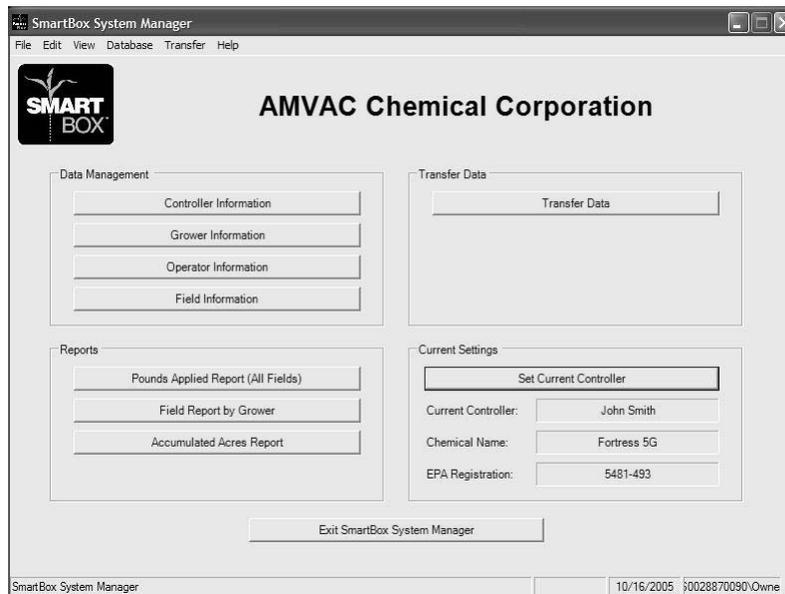
1. THE *FIELD NUMBER*, *DESCRIPTION 1*, *DESCRIPTION 2*, AND *ACRES TREATED TO DATE* FIELDS DISPLAY INFORMATION DOWNLOADED.
2. THE *FIELD NUMBER* AND *ACRES TREATED TO DATE* FIELDS ARE DISPLAY ONLY AND CAN'T BE CHANGED.
3. THERE ARE 28 CHARACTER SPACES EACH ALLOTTED FOR CROP TYPE AND LAND LORD.
4. THERE ARE 9 CHARACTERS SPACES ALLOTTED FOR TOTAL ACRES.
5. THERE ARE 128 CHARACTER SPACES ALLOTTED FOR FIELD NOTES.

Print Field Listing:

Use this function to print the Field Info Report.

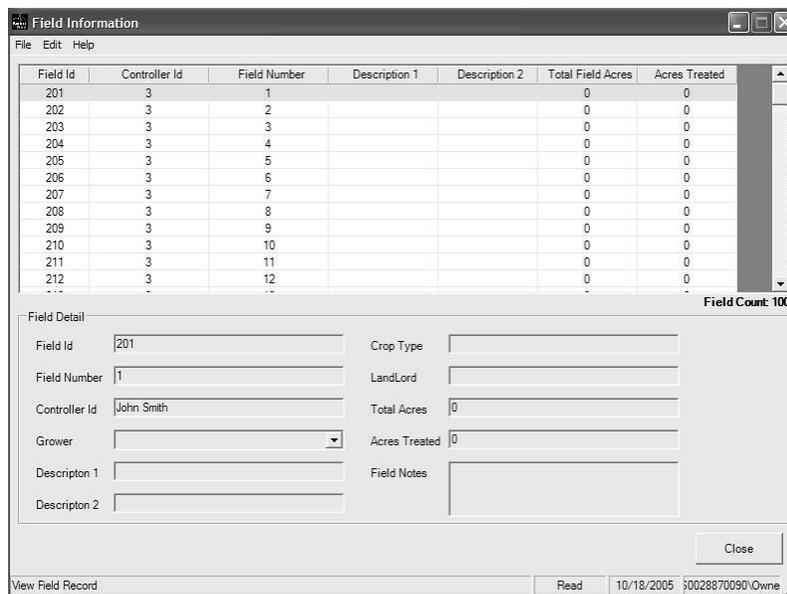
Step 1

From the Main Menu, click on the **Field Information** button.



Step 2

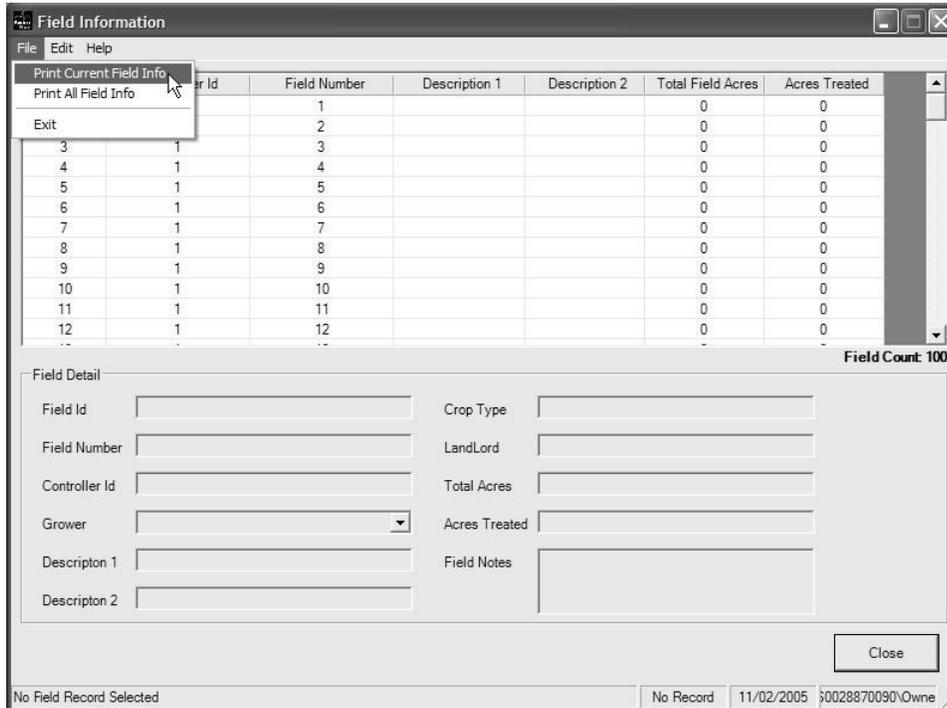
The **FIELD INFORMATION** screen is displayed.



Print Field Listing (continued):

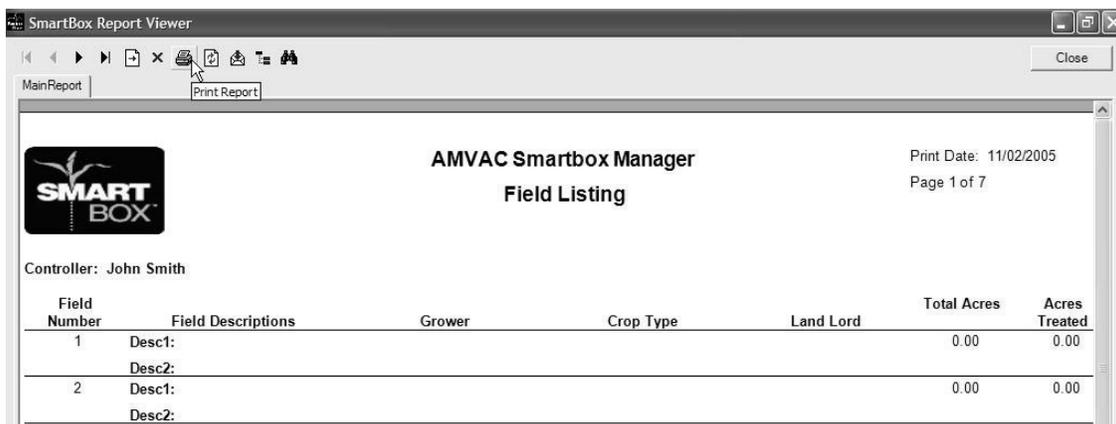
Step 3

From the **Field information** screen select the file menu then choose **Print Current Field Info**.



Step 4

The **SmartBox® Report Viewer** will appear. Click on the **print icon** at the top of the screen.



Print Field Listing (continued):

Step 5

Click the **Close** button to close the SmartBox[®] Report Viewer.

The screenshot shows a window titled "SmartBox Report Viewer" with a "Close" button in the top right corner. The report content includes the AMVAC Smartbox Manager logo, the title "AMVAC Smartbox Manager Field Listing", and the print date "11/02/2005". The controller is listed as "John Smith". The main part of the report is a table with the following columns: Field Number, Field Descriptions, Grower, Crop Type, Land Lord, Total Acres, and Acres Treated. The table contains 7 rows of field data, each with two description lines (Desc1 and Desc2) and values of 0.00 for Total Acres and Acres Treated.

Field Number	Field Descriptions	Grower	Crop Type	Land Lord	Total Acres	Acres Treated
1	Desc1: Desc2:				0.00	0.00
2	Desc1: Desc2:				0.00	0.00
3	Desc1: Desc2:				0.00	0.00
4	Desc1: Desc2:				0.00	0.00
5	Desc1: Desc2:				0.00	0.00
6	Desc1: Desc2:				0.00	0.00
7	Desc1: Desc2:				0.00	0.00

Report Options

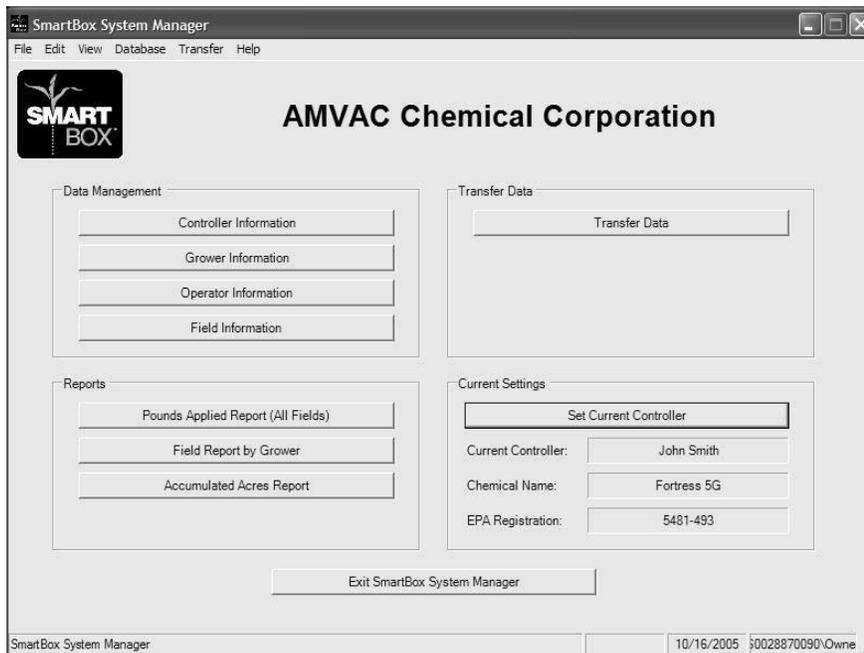
Printing Reports:

Use this function to print reports.

Step 1

From the Main Menu, click on the **Report** button you wish to print.

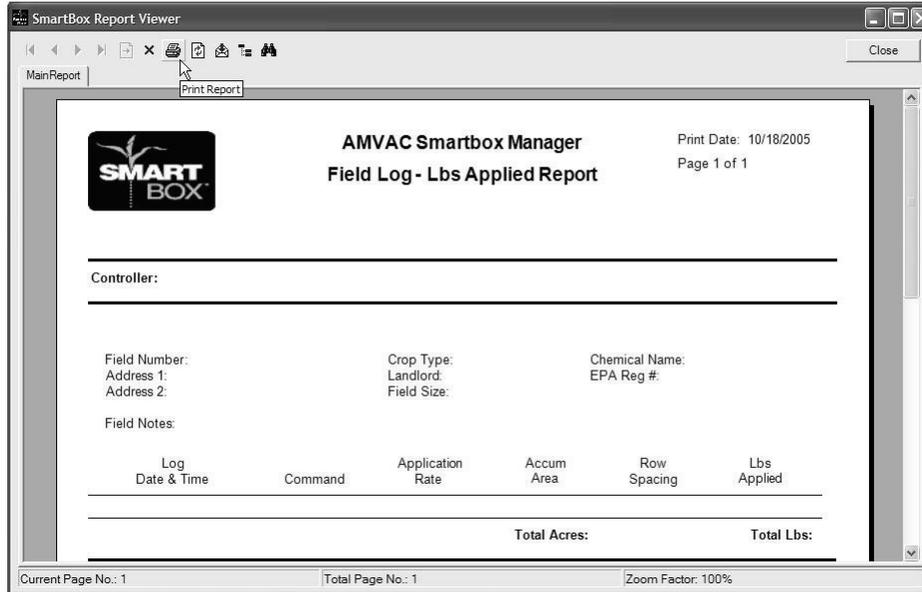
1. The **Lbs Applied Report (All Fields)** button prints the FIELD LOG - LBS APPLIED REPORT.
2. The **Field Report By Grower** button prints the FIELD REPORT BY GROWER REPORT.
3. The **Accumulated Acres Report** button prints the ACCUMULATED ACRES REPORT BY DATE.



Printing Reports (*continued*):

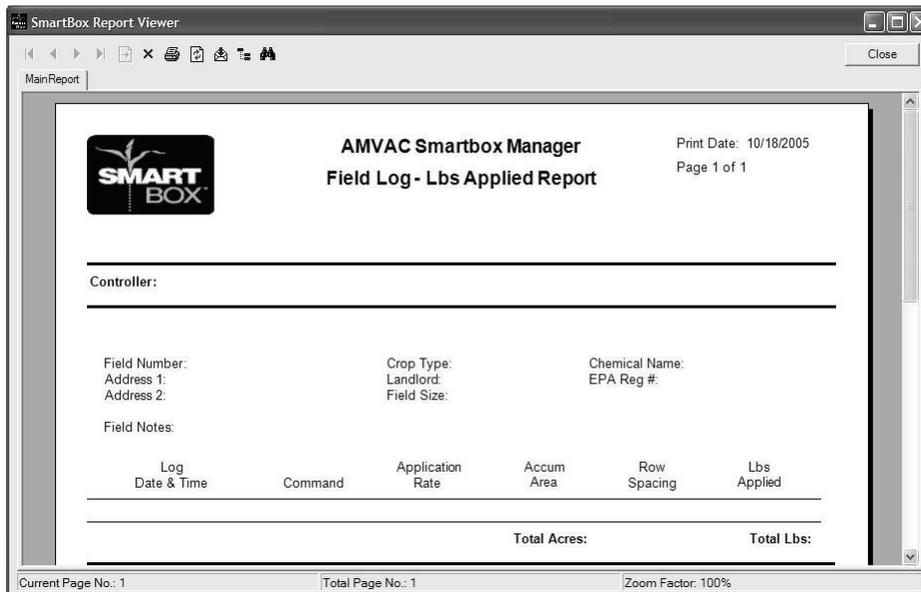
Step 2

The **SmartBox® Report Viewer** will appear. Click on the **print icon** at the top of the screen.



Step 3

Click the **Close** button to close the SmartBox® Report Viewer.



Pre-Season Checklist

THE FOLLOWING STEPS ARE REQUIRED PRIOR TO THE START OF EACH SEASON.

In order to operate the SmartBox[®] system and obtain accurate application of insecticide, the following steps must be followed prior to the start of each season. In particular, failure to properly calibrate both the speed monitoring equipment and the SmartBox[®] meters will result in either over - or under - application of insecticide and incorrect calculation of chemical used, application rate, and area treated. Such application error resulting from failure to properly calibrate the system will void all claims, either stated or implied, concerning expected accuracy of the SmartBox[®] system.

The pre-season checklist below is divided into two sections:

1. System preparation - These steps include routine maintenance, and possible component upgrades that should be completed prior to each season's initial calibrations.
2. System calibration - These steps include items normally conducted at the time of each season's initial meter calibration.

System users should plan on attending a training session in late winter to review the steps involved in meter calibration. Contact your local AMVAC Representative for further information.

Operation

Once the controller has been setup by inputting the row and the planter configuration, both meters and speed input have been calibrated, and any additional optional information has been input for record keeping, then the system is ready to do its job.

The **OPERATE** mode must be used during application of insecticide. In this mode, the user can select the field in which to store information, change the insecticide application rate on the move, and either monitor true planter speed or change the fixed speed setting. The user is able to see the accumulated acres covered in the field. Also, information concerning functioning or failure of the system will be displayed on the controller and accompanied by auditory signals while in the OPERATE mode.

The **SET WEATHER SPECS** mode is available to identify weather conditions experienced during planting. The information entered in this mode is stored for record keeping. Use of the **SET WEATHER SPECS** mode is optional.

The **VARIABLE RATE = OFF MODE** is a new option for the SmartBox® controller to read prescription (variable) rates from an external GPS controller. An external GPS controller must be used with a prescription map to use this option. Contact your local AMVAC representative or call 888-SMARTBOX for more details.

The final mode available is the **MPH..AREA MONITOR** mode created to monitor speed and total acreage for a field in which no insecticide is being applied. In this mode, the controller will be active without use of the row units. Therefore, it may be used to view tractor speed and accumulate acreage covered with the planter or with other implements. When using this tool without the planter (and lift switch), the acre counter may be stopped by moving the main controller switch to the "OFF" position. This feature was added to the SmartBox® system as a benefit for the users, and its use is not required.

The Field **CAL ADJUST** option added to the **SETUP** menu allows the SmartBox® user to fine tune the system to specific planting conditions. To use this option, a complete set of insecticide boxes (one 50 pound container of insecticide per planter row) must be run completely through the SmartBox® system. The base containers should be empty when the new set of insecticide boxes are loaded, then the System should be operated until row alarms sound indicating the base containers have been emptied. Actual acres covered during the run must be carefully measured and noted. Once the complete load of insecticide has been dispersed, the actual acres covered may be inputted. This value will be compared with the expected acreage calculated for the planter (based on rate set, number of rows, and row spacing). This option may be used to adjust meter calibration by up to 10% of the set rate; adjustment beyond 10% will require the grower to do a complete meter calibration.

The following routines show the steps required to use each mode. For further information on controller messages and alarms, see the SmartBox® Troubleshooting Guides included in this manual.

Transfer Container

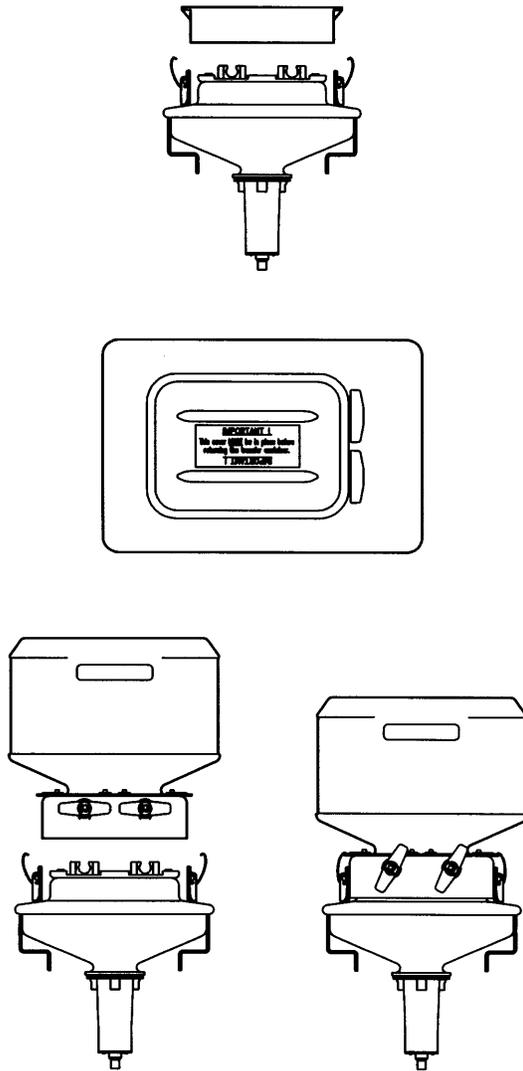


Figure 12

1. Remove rain cover from base container (see Figure 12). Store rain cover for use whenever transfer container is not installed on base container.
2. **Apply a light dusting of baby powder/talc on the base container seal prior to seating transfer container. This step is necessary to avoid damage to the seals during removal of transfer container. Do not use a petroleum based silicon spray to lubricate the seals. Do not use graphite.**
3. Remove the transfer container valve cover. Store cover for return of used container to Chemical Dealer.
4. Orient the transfer container so that the valve handles face away from the planter seed hopper.
5. Lower the transfer container so each valve is fully inserted into the mating base container valve. If valves are not fully seated, they will not open to release product to the base container.
6. Clamp transfer container to base container. **Rock each transfer container from side to side to make sure that clamps are secure.** If the transfer container is not clamped securely, the clamps may be made more secure by increasing the bend in the clamp arm which hooks onto the transfer container. If your base

containers are supplied with locking pins, insert the pins through the clamps to further secure the transfer containers.

7. Turn valves toward off position before trying to open. Turn valves counter-clockwise 60° to open. If valve does not open smoothly, then the valve is not seated properly; unclamp container and repeat steps 4 through 6 above. Both valves must be closed before the transfer container can be removed.

Meter Calibration

REQUIRED
 OPTIONAL

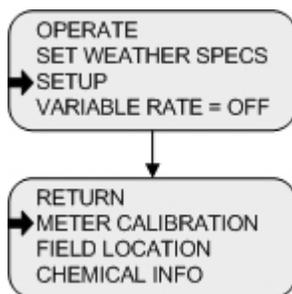
Meter calibration is performed to adjust each meter to release an accurate insecticide rate. The meter calibration routine must be performed on all meters at the beginning of each season. In addition, any time a replacement meter is installed, that row must be re-configured and its new meter calibrated. **For best results, growers should recalibrate after planting 150 acres and/or when application rates are not accurate.**

Pre-calibration Instructions:

1. **Persons conducting meter calibrations must insure that proper safety equipment is used during calibrations.**
2. Prior to meter calibration, run each meter in the Operate mode for a minimum of five minutes with the tractor running. Meters may be run without chemical during the warm-up period.
 - To do this in the shop you will need to set the speed mode to fixed, instead of radar (refer to section D). Then go to operate on the main screen of your controller and set the controller as you would to plant your crop.
 - You will need to trip the lift switch to allow the meters to run.
 - This will also test your flow sensors on each meter.
3. Confirm that each base container is full of chemical. To fill, place a loaded transfer container on each base container and open valves.
4. Confirm that the scale used for weighing the catches is set to weigh grams and placed on a flat surface located out of the wind for proper measuring.

Preliminary Steps

- a. Number calibration bottles to correspond with the number of planter rows.
- b. Measure and record the tare (empty) weight of the empty catch bottle or apply tape to the calibration bottles to make the weight of each bottle match the weight of the heaviest one. Record the tare weight.
- c. Install a catch bottle under each meter discharge opening, matching the bottle number with the corresponding row number as configured in the controller. Position bottles so that bottle cap hinges are not damaged during installation. On John Deere planters with row mount brackets you will need to remove the bottle caps to allow them to fit over the meter discharge opening.
- d. Turn the main toggle switch in the lower left corner of the controller to the ON (up) position.
- e. Turn the A and B toggle switches to the ON (up) position.



Step 1

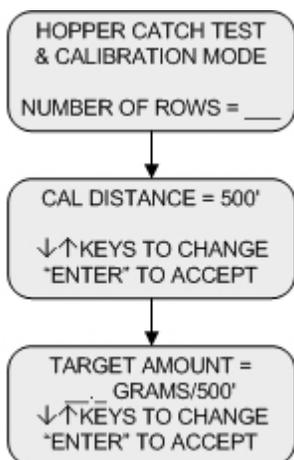
From the Main Menu select **SETUP** and press **ENTER**.

Step 2

Using the arrow keys, scroll to **METER CALIBRATION** and press **ENTER**.

Meter Calibration (continued)

■ REQUIRED
□ OPTIONAL



Step 3

The value shown should equal the number of rows on the planter. The screen will automatically advance.

Step 4

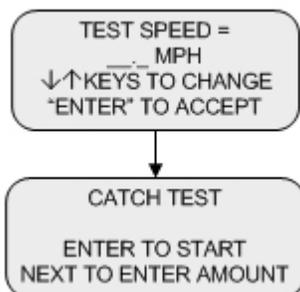
Using the arrow keys, enter the desired calibration distance. The two options are 500' or 1,000'. The longer calibration distance, the more accurate the calibration will be.

Step 5

Using the arrow keys, enter the target catch amount corresponding to the desired application rate. The controller will be preset at 42.5 grams / 500 ft. (corresponding to 3.0 oz. / 1000 ft. of Fortress) but will allow a value between 5.0 to 120.0 grams / 500 ft. See chart below. Press **ENTER** to continue.

SmartBox® Application Rate Table

Product	Rate	Target Catch (500')	Passing Catch Range (500' cal. distance)	Target Catch (1,000')	Passing Catch Range (1,000' cal. distance)
Fortress® 5G	3.7 oz/1000 ft	52.5	49.9 - 52.5 grams	105.0	99.8 - 105.0 grams
Aztec® 4.67G	3.0 oz/1000 ft	42.6	40.5 - 42.6 grams	85.2	80.9 - 85.2 grams
Force® 3G	4.0 oz/1000 ft	56.8	53.9 - 56.8 grams	N/A	N/A
Bolster™ 15G	5.5 oz/1000 ft	78.1	74.2 - 78.1 grams	N/A	N/A



Step 6

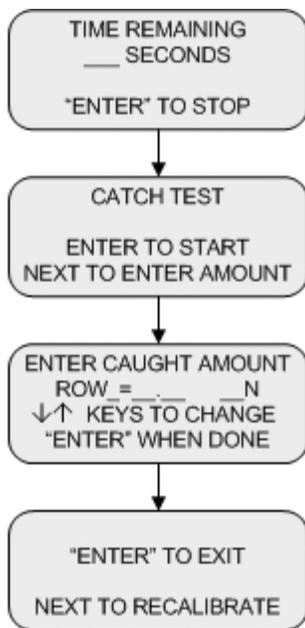
Using the arrow keys, enter the test speed equal to the expected planting speed. For example, if the expected average planting speed is 5.5 mph, then scroll until the test speed is set at 5.5 mph. The controller will be preset at 6.0 mph but will allow a value between 1.0 to 14.0 mph. Press **ENTER** to continue.

Step 7

Press **ENTER** to start catch test.

Meter Calibration (*continued*)

REQUIRED
 OPTIONAL



Step 8

The **TIME REMAINING** value that first appears indicates the seconds required to plant 500 or 1000 feet of a row at the selected ground speed. The catch test will end automatically once the **TIME REMAINING** value has counted down to zero.

Step 9

Catch test completed. Press **NEXT PAGE** to enter catch amounts (or press **ENTER** to start another catch test).

Step 10

Weigh the caught amount for each row (not including the tare weight). A sample form to record the catch weights and the N and P number is included at the end of this section. Using the arrows, enter the caught amount for each row. Press **ENTER** to move to the next row. Once a catch amount has been entered for each row, the controller will automatically advance to the next screen.

End

If all catch amounts were within 5% of the target weight, then press **ENTER** to return to the **SETUP** mode. If any catch weight was outside of the 5% calibration variance, press **NEXT** and conduct another catch test. To complete another test catch return to step 4 and repeat.

AMVAC Chemical has provided calibration assistance and in-field calibration programs to allow you to monitor your application rate. The correct insecticide application rate is the responsibility of the farmer/operator.



SmartBox® System - Operations

SmartBox Calibration Record

Section D

Farmer: _____

Date: _____

Address: _____

City: _____

Chemical Dealer: _____

Calibrated By: _____

Make and Model of Planter: _____

_____ MPH - Calibration Speed

_____ oz/1000 ft - Calibration rate

Important: If application speed and application rate differ from calibrated speed and calibrated rate more than +/-10%, then the system should be recalibrated at desired application speed and application rates.

Used	Product	Rate	Target Catch (500')	Passing Catch Range (500' cal. distance)	Target Catch (1,000')	Passing Catch Range (1,000' cal. distance)
	Fortress® 5G	3.7 oz/1000 ft	52.5	49.9 – 52.5 grams	105.0	99.8 – 105.0 grams
	Aztec® 4.67G	3.0 oz/1000 ft	42.6	40.5 – 42.6 grams	85.2	80.9 – 85.2 grams
	Force® 3G	4.0 oz/1000 ft	56.8	53.9 – 56.8 grams	N/A	N/A
	Bolster™ 15G	5.5 oz/1000 ft	78.1	74.2 – 78.1 grams	N/A	N/A

Row	Catch Test 1		Catch Test 2		Catch Test 2		Row	Catch Test 1		Catch Test 2		Catch Test 3	
	Grams	N/P Num	Grams	N/P Num	Grams	N/P Num		Grams	N/P Num	Grams	N/P Num	Grams	N/P Num
1							25						
2							26						
3							27						
4							28						
5							29						
6							30						
7							31						
8							32						
9							33						
10							34						
11							35						
12							36						
13							37						
14							38						
15							39						
16							40						
17							41						
18							42						
19							43						
20							44						
21							45						
22							46						
23							47						
24							48						

Replacing A Meter:

!!!! NOTICE !!!!

This meter assembly is intended for use only on the SmartBox® Insecticide Application System and only with products licensed for application using the SmartBox® system. Any other usage of this meter will result in the following actions:

1. All warranty for this meter and any other SmartBox® system component will be voided immediately.
2. User will be in violation of U.S. Patent laws and will be prosecuted to the fullest extent of the law.

!!!! Always replace the meter gasket !!!!

These instructions must be followed when removing or replacing a used meter:

A. Safety precautions: All SmartBox® system maintenance must be performed in strict compliance with all applicable product safety restrictions and recommendations as stated on the product label. Persons working with a SmartBox® system either containing or having contained a product are responsible for obtaining, reading, and following the product manufacturer's safety instructions. The following instructions are included in, but are not a complete statement of, the requirements for use of AMVAC's Fortress® 5G, a restricted use pesticide. These steps may or may not be applicable to the use of other products which may be available for use in a SmartBox® system. For detailed information concerning the safety requirements of any product, contact the applicable Chemical Dealer or manufacturer's representative.

1. Comply with the following personal protective equipment requirements:
 - a. long-sleeved shirt
 - b. long-legged pants
 - c. shoes plus socks
 - d. coveralls
 - e. waterproof gloves
 - f. protective eyewear
 - g. organic vapor respirator
2. Comply with the following user safety recommendations: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
3. Comply with all applicable storage and disposal regulations.

B. Removal of existing meter and / or meter gasket:

1. Turn off controller.
2. Unplug meter from wiring harness.
3. Close transfer container valves and remove transfer container.
4. Secure rain cover on base container.
5. Remove the eight bolts attaching the base container to the cradle as shown in Figure 1.

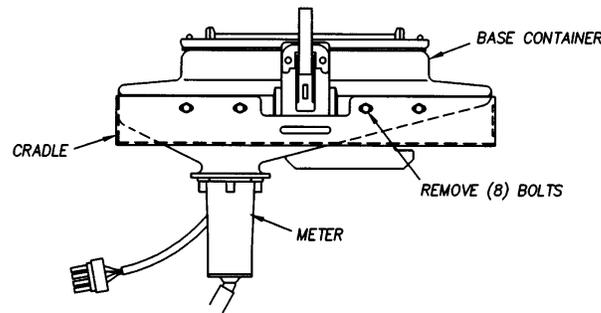


Figure 1

6. Invert the base container and remove the four 1/4" -20x3/4" bolts attaching the meter to the base container as shown in Figure 2. The 1/4" flat washer shown in Figure 2 may have been installed on the meter side of the joint as shown in the original SmartBox® Operator's Manual.

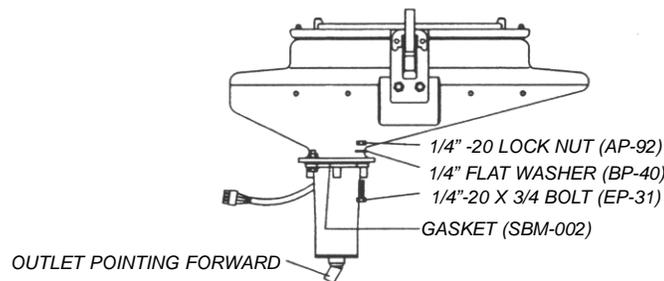


Figure 2

7. Remove the meter from the base container.
8. Clear any wet product or obstruction from the meter screen and base container. If meter is to be re-installed, examine and clear any wet product or obstruction from the meter.
9. Properly dispose of the used meter gasket. If meter is being replaced, place the non-functional meter in a sealed plastic bag for return to AMVAC at a later date. Your AMVAC sales representative will provide instructions on the return procedures.

C. Installation of new meter and / or meter gasket:

1. Install the meter assembly as stated below and in the SmartBox® Operator's Manual under "Installation: Meter to Base Container".
 - a. Position the meter with the 45° meter discharge opening facing forward (pointing toward the short side of the base container and pointing toward the planter tool bar).
 - b. Ensure the gasket (always use a new meter gasket) and meter screen are properly installed on the meter.
 - c. Place the 1/4" x 1" bolts up through the meter, base container flange, and 1/4" flat washer as shown in Figure 2 above. Lightly secure with the lock nuts.
 - d. Examine meter gasket to make sure it is centered to provide a good seal.
 - e. Tighten all bolts securely. Torque bolts to 25-30 in-lbs. Do not over-tighten or under-tighten bolts. **NOTE: A 60% to 75% compression ration is required for the gasket to properly seal.**

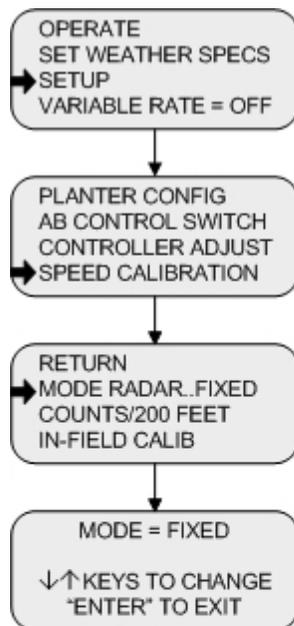
2. Place the base container back on the cradle and replace the eight bolts holding it into position as stated in the SmartBox[®] Operator's Manual under: "Installation: Base Container to Cradle".
3. Replace the transfer container.
4. Turn on controller. Follow directions on controller screen to configure meter.
5. Plug meter into wiring harness. Configure and calibrate if a new meter has been installed. Used meters returned to their original rows do not require re-configuration or re-calibration.

Speed Calibration

REQUIRED
 OPTIONAL

The Speed Calibration routine is used to accomplish two objectives: to choose either true or fixed speed and to calibrate the true speed device if used. For further details on Speed Calibration, refer to Section B of the manual.

The in-field calibration described below is critical for accurate speed measurement and insecticide application. You must calibrate the speed device with the SmartBox® controller by performing the 200' in-field calibration steps stated below. Do not enter the radar calibration number used for other monitors. If speed calibration is not performed correctly, then the values recorded for planter speed will produce errors in calculations of acreage treated, pounds of chemical applied, and pounds of chemical applied per acre. Inaccuracies resulting from failure to properly calibrate are the responsibility of the user.



Step 1

From the Main Menu select **SETUP** and press **ENTER**.

Step 2

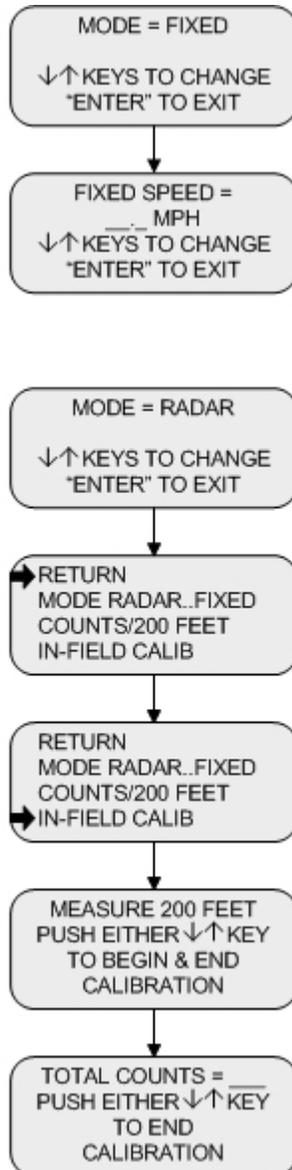
Using the arrow keys, scroll to **SPEED CALIBRATION** and press **ENTER**.

Step 3

To choose true speed or fixed speed input, select **MODE RADAR..FIXED** and press **ENTER**.

Speed Calibration (continued)

■ REQUIRED
□ OPTIONAL



Step 4

Use the arrow keys to choose **RADAR** (for either radar or true wheel speed monitor) or **FIXED** speed. Press **ENTER** to advance.

Step 5

If **FIXED** speed is chosen, use the arrow keys to change the speed. Press **ENTER** to return to the **SPEED CALIBRATION** menu.

Step 6

If **RADAR** is chosen, press **ENTER** to return to the **SPEED CALIBRATION** menu. If an in-field calibration has already been done, scroll to **RETURN** and press **ENTER** to return to the **SETUP** menu.

Step 7

If an in-field calibration has not been done, use the arrow keys to scroll to **IN-FIELD CALIB** and press **ENTER**.

Step 8

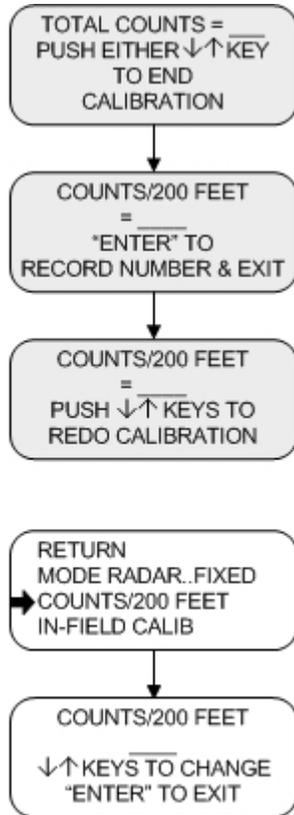
Measure and mark a linear course of 200 feet.

Step 9

Press either arrow key as you enter the course. The controller will then measure the counts of the radar. If your controller fails to count pulses as you move through the course, restart controller and repeat above steps. If pulses still do not register, you may need a signal booster for the radar system. See recommended contacts in Section A.

Speed Calibration (*continued*)

■ REQUIRED
□ OPTIONAL



Step 10

Press the opposite arrow key as you exit the course. The controller will then calibrate according to the counts of the radar.

Step 11

Press **ENTER** to accept the calibration and return to the **SETUP** menu. Or, push either arrow to return to the **MEASURE 200 FEET** screen to redo the in-field calibration.

Step 12

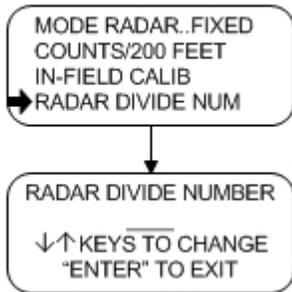
To change radar counts per 200 feet (6096 counts is preset), select **COUNTS / 200 FEET** and press **ENTER**.

Step 13

Use the arrow keys to change the radar count value. Press **ENTER** to the **SPEED CALIBRATION** menu. This step may be done to move the radar reading slightly to agree with a monitor already calibrated and correct. **Do not use the value provided in the radar system owner's manual or obtained from calibration with a different monitor without confirming calibration with an in-field test.**

Speed Calibration (*continued*)

REQUIRED
 OPTIONAL



Step 14

To reduce the count number for certain wheel sensors, select **RADAR DIVIDE NUM** and press **ENTER**.

Step 15

Using the arrow keys, select a number that will put the counts under 10,000. Press **ENTER** when complete.

End

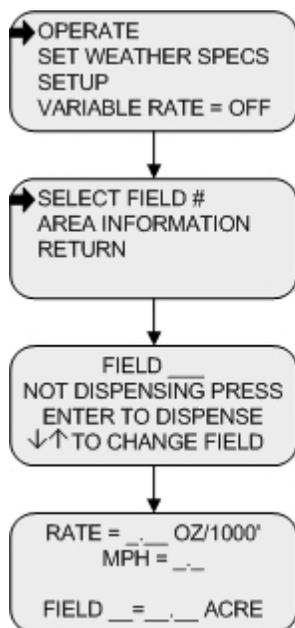
Select **RETURN** to go to the **SETUP** menu.

Select Field Number

REQUIRED
 OPTIONAL

The **OPERATE** mode is used during application of insecticide. **When ready to apply insecticide, follow the steps in this SELECT FIELD NUMBER routine. Make sure the controller is showing the field number in which you want to collect and store data. If not, scroll to find the correct field number, then push the ENTER button to begin dispensing chemical. Verify rate in oz / 1000' is set correctly. If the system does not dispense, refer to the Troubleshooting Guide located in Section C.**

To return to the main menu during operation, press the "NEXT PAGE" and "PREVIOUS PAGE" buttons simultaneously.



Step 1

From the Main Menu select **OPERATE** and press **ENTER**.

Step 2

Choose **SELECT FIELD #** and press **ENTER**.

Step 3

Using the arrow keys, enter the field number and press **ENTER** to begin dispensing insecticide.

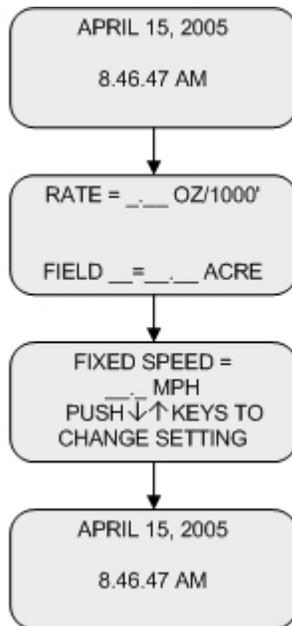
Step 4

The screen shown on the left is the planting screen displayed when using radar or true wheel speed. Use the arrow keys to change the application rate.

Important: If application speed and application rate differ from calibrated speed and calibrated rate more than +/-10%, then the system should be recalibrated at desired application speed and application rates.

Select Field Number (*continued*)

REQUIRED
 OPTIONAL



Step 5

Press **NEXT PAGE**, **PREVIOUS PAGE**, or **ENTER** to show date and time.

Step 6

The screen shown on the left is the planting screen displayed when using a fixed speed. Use the arrow keys to change the application rate. Press **ENTER** to move to the next screen.

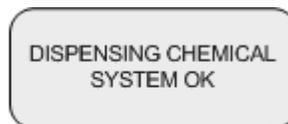
Step 7

Use the arrow keys to change the fixed speed.

Step 8

Press **NEXT PAGE**, **PREVIOUS PAGE**, or **ENTER** to show date and time.

The following screen will appear every 30 seconds when the screen is operating properly.

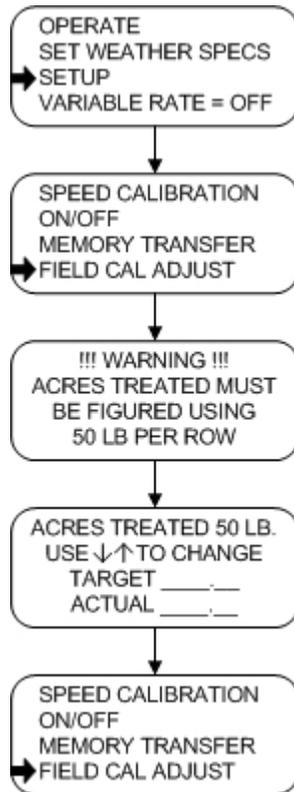


If a message other than the “System OK” message is displayed indicating that the system is not dispensing chemical, then the Troubleshooting Guide located in Section D may be used to diagnose the cause and make the necessary corrections.

Field Cal Adjust

REQUIRED
 OPTIONAL

As stated previously, this option is used to fine tune the system to specific planting conditions. To use this option, a complete set of insecticide containers must be run completely through the SmartBox® system. Actual acres covered during the run must be carefully measured and noted. Once the complete load of insecticide has been dispensed, the actual acres covered value may be input. This value will be compared with the expected acreage calculated for the planter (based on rate set, number of rows, and row spacing), and the system will be adjusted to compensate for any environmental or field conditions affecting system accuracy.



Step 1

From the Main Menu select **SETUP** and press **ENTER**.

Step 2

Choose **FIELD CAL ADJUST** and press **ENTER**.

Step 3

If actual acreage has been measured while a complete set of full insecticide boxes have been run completely through the SmartBox® system, press **ENTER** to go on. Otherwise, do not use this function to adjust calibration.

Step 4

Use the up and down arrow keys to adjust the actual acre value. Press **ENTER**. The controller will then advance to the **SETUP** menu.

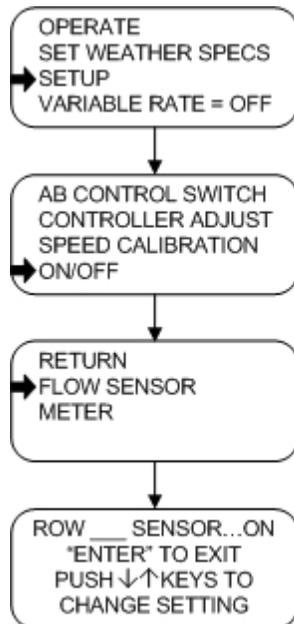
On/Off

■ REQUIRED
□ OPTIONAL

The On/Off routine is performed to turn individual flow sensors or meters on or off as needed. This function can be used to shut off individual rows during re-calibration, during troubleshooting of the system, or whenever a row will not be used.

This function may be used in place of the AB programming function. Once a meter or flow sensor has been turned off, it can only be turned back on by using this routine again.

Should a flow sensor malfunction during planting, this routine may be used to eliminate repeated auditory warnings concerning the meter. Should such a failure occur, however, it should be corrected as soon as possible to avoid the chance of running out of chemical in the row for which the flow sensor has been disabled.



Step 1

From the Main Menu select **SETUP**.

Step 2

Using the arrow keys, scroll to **ON/OFF** and press **ENTER**.

Step 3

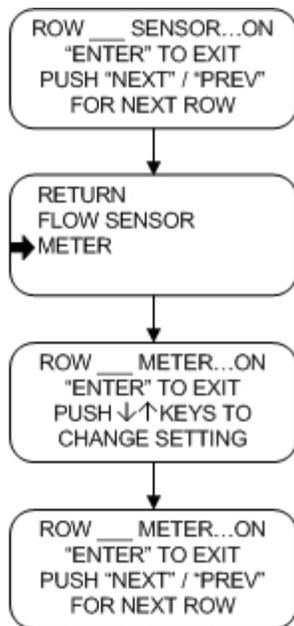
Using the arrow keys, scroll to **FLOW SENSOR** and press **ENTER**.

Step 4

Using the arrow keys, select **ON** or **OFF** for the flow sensor on row 1. If **OFF** is selected, then the meter on row 1 will still operate but the flow sensor will be turned off. Press the "PREVIOUS PAGE" or "NEXT PAGE" button to move to another row. Press **ENTER** to return to the **ON/OFF** menu.

On/Off (continued)

■ REQUIRED
□ OPTIONAL



Step 5

Using the arrow keys, scroll to **METER** and press **ENTER**.

Step 6

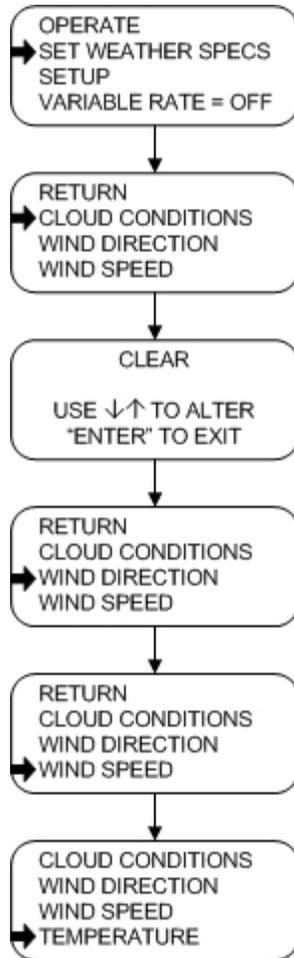
Using the arrow keys, select **ON** or **OFF** for the meter on row 1. If **OFF** is selected, then the meter on row 1 will not operate. Press the "PREVIOUS PAGE" or "NEXT PAGE" button to move to another row. Press **ENTER** to return to the **ON/OFF** menu.

End

Select **RETURN** to go to the **SETUP** menu.

Set Weather Specs

■ REQUIRED
□ OPTIONAL



Step 1
From Main Menu select **SET WEATHER SPECS** and press **ENTER**.

Step 2
Using the arrow keys, scroll to **CLOUD CONDITIONS** and press **ENTER**.

Step 3
Use the arrow keys to find the applicable condition. Press **ENTER** to select the condition and return to the **SET WEATHER SPECS** menu. The condition selected will be stored for record keeping.

Step 4
Repeat Steps 2 and 3 for **WIND DIRECTION, WIND SPEED AND TEMPERATURE**.

Step 5
Press **RETURN** to return to the Main Menu.

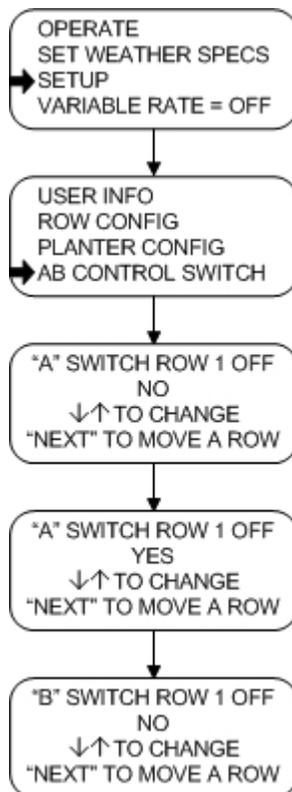
AB Control Switch

REQUIRED
 OPTIONAL

The AB Control Switch routine is used to select certain meters to be controlled by the A or B switch. This function is beneficial when planting point rows or planting along the edge of a field. Those rows which are not needed can be shut off simply by pre-assigning those rows to the A or B switch, and then flipping the corresponding switch to the off, or down, position.

The simplest way to understand this function is to ask the following question while programming the controller: When the A (or B) switch is off (pushed to the down position), do I want row 1 (or other row) shut off? If the row is to be shut off, then the answer is "yes". If the row is to be on, then the answer is "no".

Use of this function is optional.



Step 1

From the Main Menu select **SETUP**.

Step 2

Using the arrow keys, scroll to **AB CONTROL SWITCH** and press **ENTER**.

Step 3

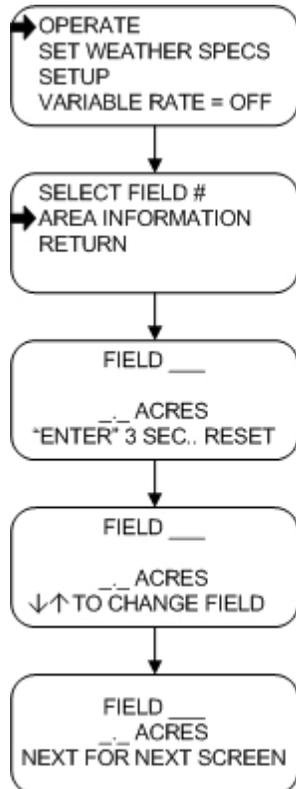
Using the arrow keys, select **YES** or **NO** for row 1 on the A switch. If **YES** is selected, then the meter on row 1 will shut off when the A switch is flipped to the down position. Press the "NEXT PAGE" button to advance to the next row. Press **ENTER** to move to the B switch.

Step 4

Repeat Step 3 for B switch assignments. Press **ENTER** and return to the **SETUP** menu.

Area Information

■ REQUIRED
□ OPTIONAL



Step 1

From the Main Menu select **OPERATE** and press **ENTER**.

Step 2

Choose **AREA INFORMATION** and press **ENTER**.

Step 3

Use the arrow keys to scroll through the fields to view areas accumulated in each.

Step 4

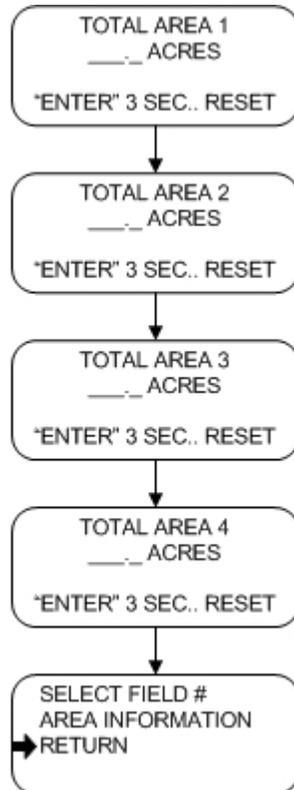
To reset the acres to 0.0, press and hold **ENTER** for 3 seconds.

Step 5

Press **NEXT PAGE** to move to the next screen.

Area Information (*continued*)

■ REQUIRED
□ OPTIONAL



Step 6

This acreage accumulator may be reset a any time to keep track of acres planted during any period. Press **NEXT PAGE** to move to the next screen and repeat for Total Areas Steps 2 through 4. These accumulated values will be stored for record keeping. Press **NEXT PAGE** to return to the **OPERATE** menu.

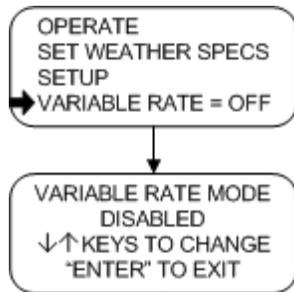
Step 7

Select **RETURN** and press **ENTER** to return to the Main Menu, or choose **SELECT FIELD #** to continue planting.

Variable Rate

REQUIRED
 OPTIONAL

The Variable Rate option is used when operating an external GPS controller. The GPS controller can send prescribed application rates to the SmartBox® controller for variable rates across the field. Typically, the Variable Rate will be disabled (off) for standard planting conditions. The Variable Rate should be enabled if you are using an external GPS controller and sending prescribed application rates to the SmartBox® controller.



Step 1

From the Main Menu select **VARIABLE RATE = OFF** and press **ENTER**.

Step 2

Use the arrow keys to select either “**DISABLED**” or “**ENABLED**” mode.

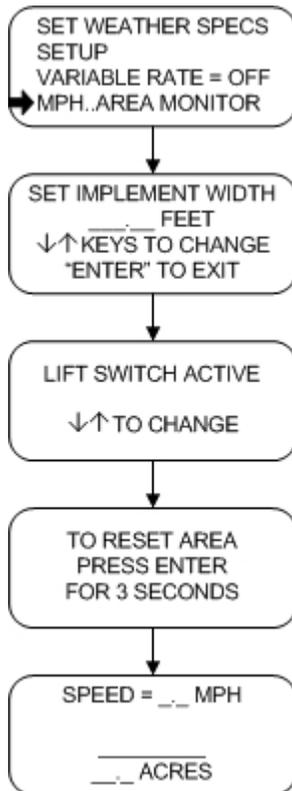
Step 3

To return to the Main Menu, press **ENTER**.

MPH..Area Monitor

■ REQUIRED
□ OPTIONAL

The MPH..Area Monitor routine is used to monitor speed and acreage when not applying insecticide. This function may be used with the lift switch (active) or without the lift switch (inactive). In the inactive mode, acreage accumulation is stopped by moving the main meter switch to the OFF position. Although the controller will show the speed and accumulated acres while in this mode, the information will not be stored for record keeping or printout.



Step 1

From the Main Menu select **MPH..AREA MONITOR** and press **ENTER**.

Step 2

Set the implement width using the arrow keys and press **ENTER**.

Step 3

Use the arrow keys to select either "ACTIVE" or INACTIVE" mode.

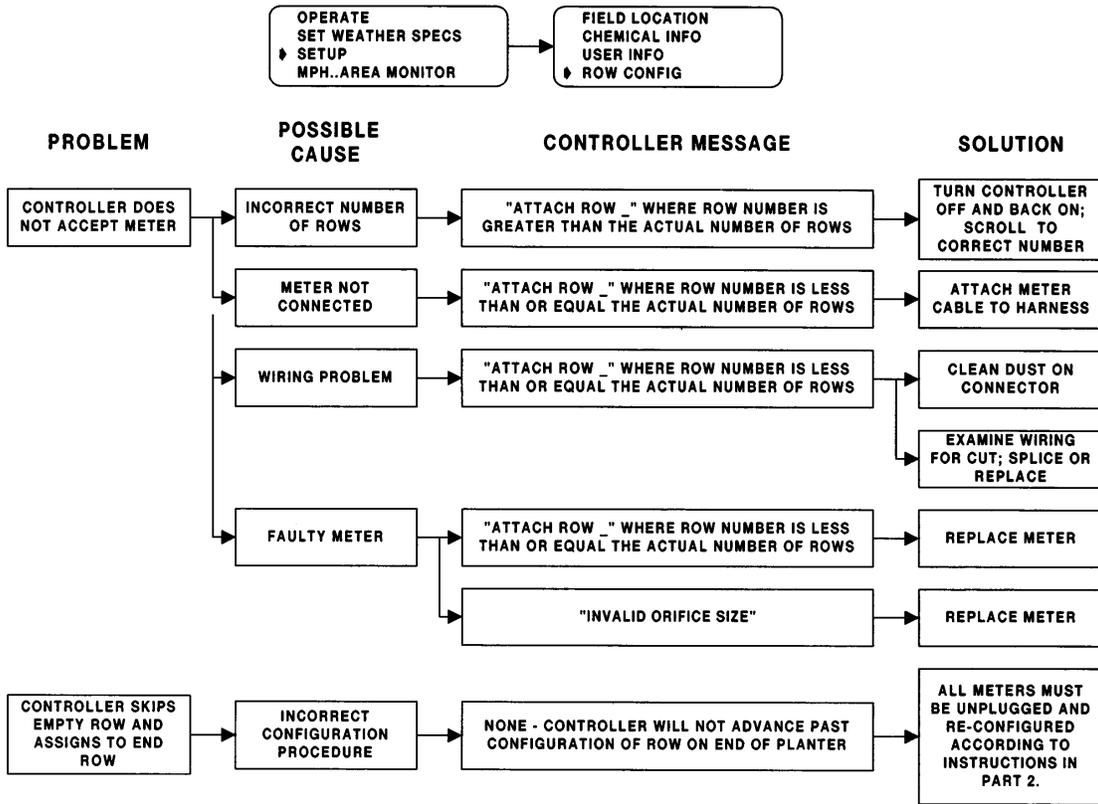
Step 4

To reset the area, press **ENTER** and hold for 3 seconds. The screen will automatically advance if the area is not reset.

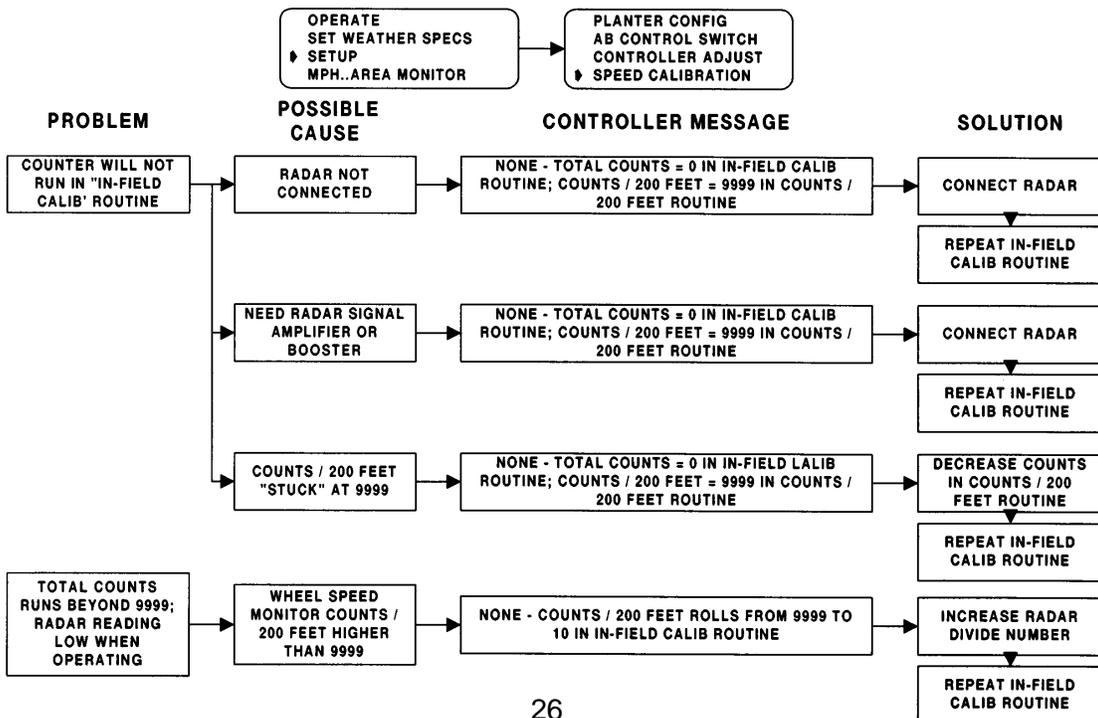
Step 5

To Return to the Main Menu, press **PREVIOUS PAGE AND NEXT PAGE** simultaneously.

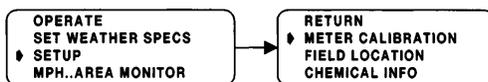
TROUBLESHOOTING GUIDE ROW CONFIGURATION



TROUBLESHOOTING GUIDE SPEED CALIBRATION



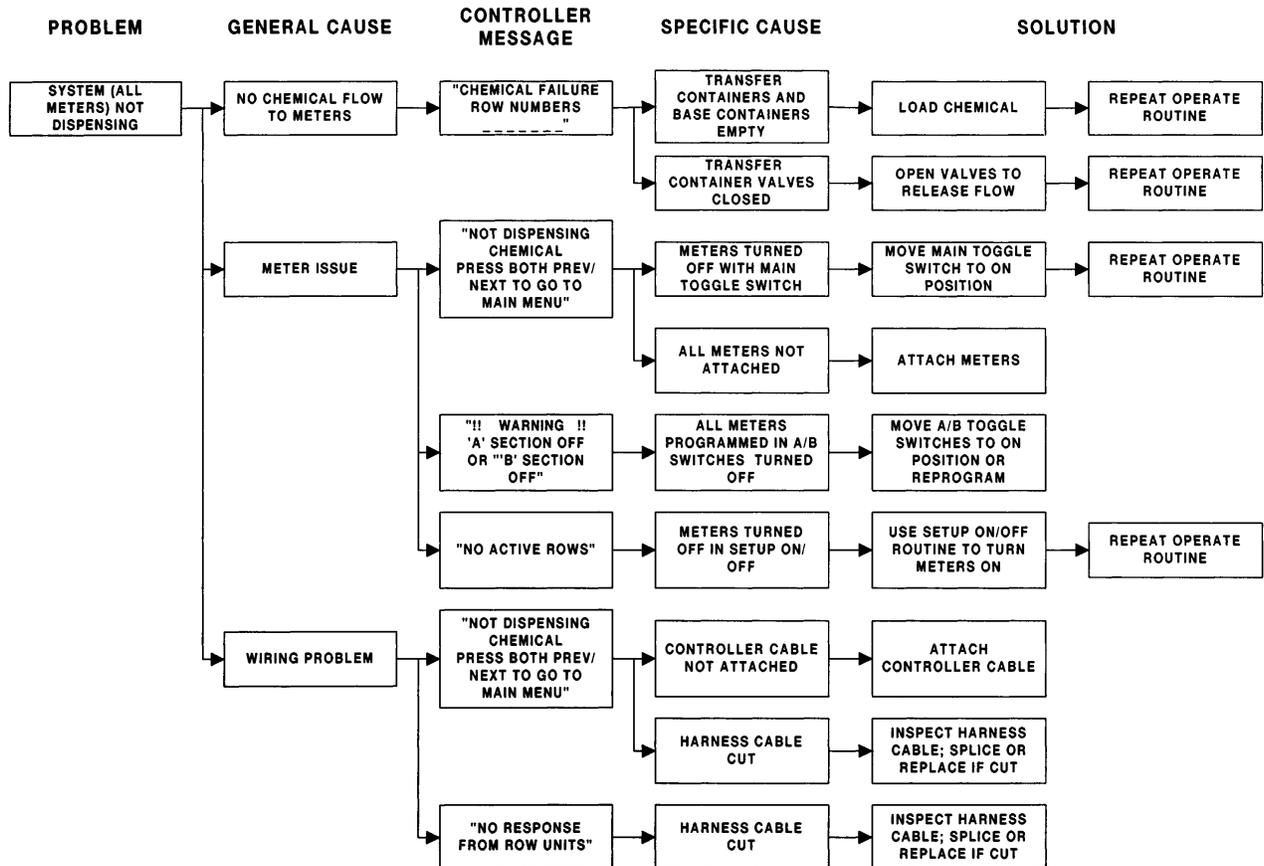
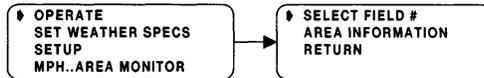
TROUBLESHOOTING GUIDE METER CALIBRATION

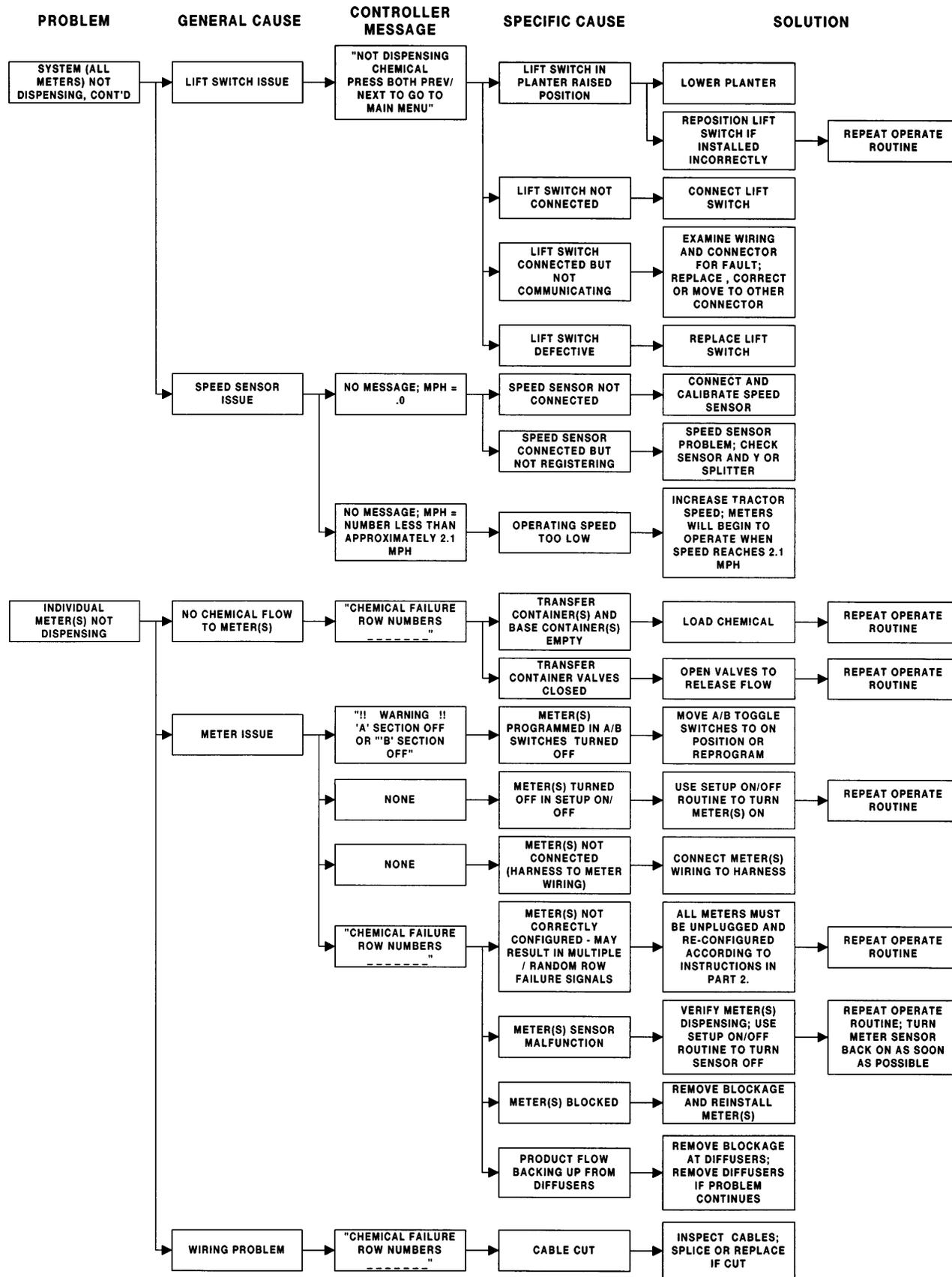


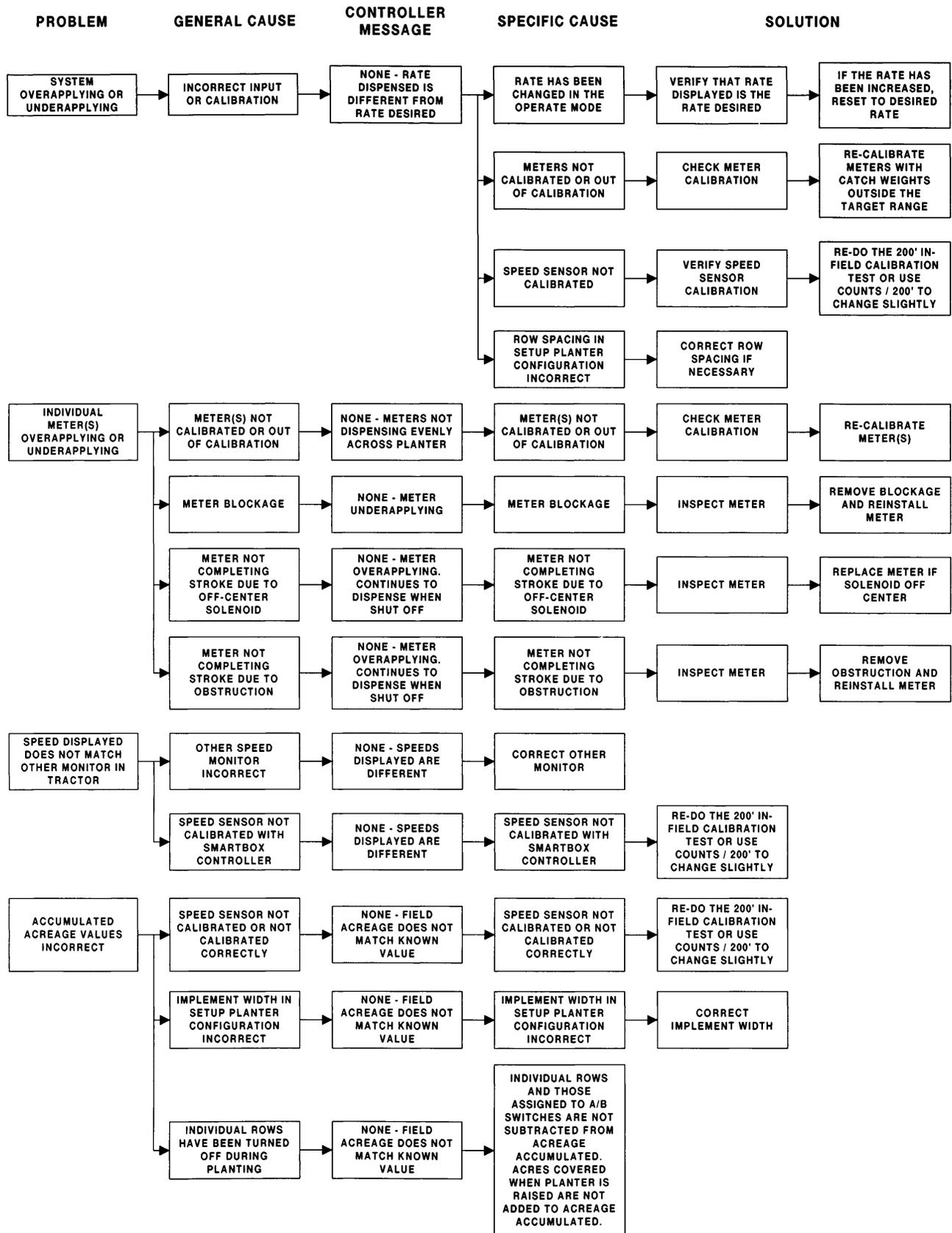
PROBLEM	POSSIBLE CAUSE	CONTROLLER MESSAGE		SOLUTION
		CATCH TEST	ENTER CAUGHT AMOUNT	
SYSTEM (ALL METERS) NOT DISPENSING	MAIN TOGGLE SWITCH IN OFF POSITION	"MAIN TOGGLE SWITCH MUST BE ON"	NONE	MOVE MAIN TOGGLE SWITCH TO ON POSITION
	A SWITCH IN OFF POSITION	"A SWITCH MUST BE ON"	NONE	MOVE A SWITCH TO ON POSITION
	B SWITCH IN OFF POSITION	"B SWITCH MUST BE ON"	NONE	MOVE B SWITCH TO ON POSITION
	METERS TURNED OFF	NONE	"ROW # DISABLED"	TURN METERS ON IN SETUP MODE
	NO CHEMICAL FLOW THRU METERS	NONE	NONE	FILL BASE CONTAINERS
	WIRING PROBLEM	NONE	NONE	INSPECT CONTROLLER CABLE AND HARNESS; SPLICE OR REPLACE IF CUT
"NO RESPONSE FROM ROW UNITS"		NONE	INSPECT HARNESS CABLE; SPLICE OR REPLACE IF CUT	
INDIVIDUAL METER(S) NOT DISPENSING	METER(S) TURNED OFF	NONE	"ROW # DISABLED"	TURN METERS ON IN SETUP MODE
	NO CHEMICAL FLOW THRU METER(S)	NONE	NONE	FILL BASE CONTAINER(S)
	METER(S) OPERATING WITH "WEAK PULSE"	NONE	NONE - N NUMBER GREATER THAN 60	PRESS THE UP AND DOWN ARROWS; RECALIBRATE AFFECTED METER(S)
	WIRING PROBLEM	NONE	NONE	INSPECT CONTROLLER CABLE AND HARNESS; SPLICE OR REPLACE IF CUT
METER CATCH WEIGHT DRIFTED FROM TARGET	METER WEAR OR PRODUCT VARIATION	NONE - CATCH WEIGHT OUT OF TARGET RANGE	NONE	ENTER NEW CATCH WEIGHT; RECALIBRATE AFFECTED METER
	FAULTY METER	NONE - CATCH WEIGHT OUT OF TARGET RANGE	NONE - HIGH N OR P NUMBER (>50)	RETURN METER TO ORIGINAL CALIBRATION BY PRESSING THE UP AND DOWN ARROW BUTTONS SIMULTANEOUSLY; RECALIBRATE AFFECTED METER
			NONE - N/P NUMBER GREATER THAN 60	RETURN METER TO ORIGINAL CALIBRATION BY PRESSING THE UP AND DOWN ARROW BUTTONS SIMULTANEOUSLY; RECALIBRATE AFFECTED METER
	LOW CATCH WEIGHT FROM BLOCKAGE IN METER	NONE - CATCH WEIGHT SIGNIFICANTLY LOW	NONE	REMOVE BLOCKAGE AND REINSTALL METER
	HIGH CATCH WEIGHT FROM OFF-CENTER SOLENOID	NONE - LOOK FOR FLOW WHEN SYSTEM SHUTDOWN	NONE	REPLACE METER; RECONFIGURE AND CALIBRATE METER
	HIGH CATCH WEIGHT FROM SOLENOID OBSTRUCTION	NONE - LOOK FOR FLOW WHEN SYSTEM SHUTDOWN	NONE	REMOVE OBSTRUCTION AND REINSTALL METER

TROUBLESHOOTING GUIDE OPERATION

- WHEN SYSTEM IS NOT DISPENSING IN THE OPERATE MODE, USE THE FOLLOWING CHECKS TO DETERMINE THE GENERAL CAUSE:
- HAVE TRANSFER CONTAINERS BEEN LOADED ONTO THE BASE CONTAINERS, ARE THE TRANSFER CONTAINER VALVES OPEN, AND IS THERE CHEMICAL IN THE BASE CONTAINERS?
YES - GO TO NEXT QUESTION
NO - LOAD CHEMICAL AND OPEN VALVES
 - IS THE MAIN TOGGLE SWITCH IN THE ON POSITION?
YES - GO TO NEXT QUESTION
NO - MOVE SWITCH TO THE ON POSITION
 - ARE ALL METERS ASSIGNED TO A/B SWITCHES AND ARE THE SWITCHES IN THE OFF POSITION?
YES - MOVE SWITCHES TO THE ON POSITION
NO - GO TO THE NEXT QUESTION
 - ARE ALL METERS TURNED OFF IN THE SETUP ON/OFF ROUTINE?
YES - TURN METERS BACK ON
NO - GO TO NEXT QUESTION
 - IF USING RADAR (OR TRUE WHEEL SPEED), IS TRACTOR TRAVELLING AT LEAST 2.1 MPH?
YES - GO TO NEXT QUESTION
NO - INCREASE SPEED; METERS WILL NOT OPERATE BELOW 2.1 MPH
 - DO THE METERS OPERATE IN THE CALIBRATE MODE BUT NOT THE OPERATE MODE?
YES - PROBLEM IS A LIFT SWITCH OR SPEED SENSOR ISSUE
NO - PROBLEM IS A METER OR WIRING ISSUE
 - IF "YES" TO QUESTION 6, DO THE METERS OPERATE WITH FIXED SPEED BUT NOT RADAR (OR TRUE WHEEL SPEED)?
YES - PROBLEM IS A SPEED SENSOR ISSUE
NO - PROBLEM IS A LIFT SWITCH ISSUE
 - IF "NO" TO QUESTION 7, DO THE METERS OPERATE WHEN THE LIFT SWITCH IS ROTATED TO THE OPPOSITE POSITION (CHECK WITH PLANTER LOWERED AND USING FIXED SPEED)?
YES - LIFT SWITCH IS INSTALLED INCORRECTLY
NO - PROBLEM IS LIFT SWITCH OR LIFT SWITCH WIRING ISSUE
 - IF "NO" TO QUESTION 8, MOVE THE LIFT SWITCH TO ANOTHER WIRING HARNESS CONNECTOR. DO THE METERS OPERATE NOW (CHECK WITH PLANTER LOWERED AND USING FIXED SPEED)?
YES - PROBLEM IS DEFECTIVE HARNESS WIRING OR CONNECTOR
NO - PROBLEM IS DEFECTIVE LIFT SWITCH







TROUBLESHOOTING GUIDE
MPH..AREA MONITOR

OPERATE
SET WEATHER SPECS
SETUP
MPH..AREA MONITOR

PROBLEM	POSSIBLE CAUSE	CONTROLLER MESSAGE	SOLUTION
ACRE COUNTER DOES NOT COUNT	LIFT SWITCH NOT CONNECTED WITH MODE SET "ACTIVE"	NONE	CONNECT LIFT SWITCH IF AVAILABLE SET MODE TO "INACTIVE" IF LIFT SWITCH IS NOT AVAILABLE INSTALL JUMPER WIRE FROM C TO D PINS IN CONTROLLER CABLE
	MAIN SWITCH IN OFF POSITION WITH MODE SET "INACTIVE"	NONE	MOVE MAIN SWITCH TO ON POSITION
ACRE COUNTER DOES NOT COUNT AND SPEED = .0 MPH	RADAR NOT CONNECTED	NONE	CONNECT RADAR
ACRE COUNT INCORRECT	RADAR NOT CALIBRATED	NONE	CALIBRATE RADAR
	IMPLEMENT WIDTH INCORRECT	NONE	RESET IMPLEMENT WIDTH IN MPH..AREA MONITOR

NOTE: IN THE MPH...AREA MONITOR MODE, JUST AFTER ENTERING THE IMPLEMENT WIDTH, MODE MAY BE SET TO EITHER "ACTIVE" OR "INACTIVE". "ACTIVE" MODE IS USED IF THE LIFT SWITCH IS CONNECTED. ACRE ACCUMULATION WILL DISCONTINUE WHEN THE LIFT SWITCH IS RAISED. "INACTIVE" MODE IS USED IF THE LIFT SWITCH IS NOT CONNECTED. ACRE ACCUMULATION WILL DISCONTINUE WHEN THE CONTROLLER'S MAIN SWITCH IS MOVED TO THE OFF POSITION.

IN AN EMERGENCY, PLEASE CONTACT YOUR LOCAL SMARTBOX EQUIPMENT DEALER. YOUR DEALER HAS BEEN FACTORY CERTIFIED AND TRAINED ON INSTALLATION, SETUP, AND OPERATION OF THE SMARTBOX SYSTEM. YOUR DEALER WILL HAVE REPLACEMENT PARTS ON HAND.

SHOULD YOU NEED ADDITIONAL HELP, PLEASE CALL THE SMARTBOX 24-HOUR HELP LINE AT 1-888-SMARTBOX.

The Employees of



would like to thank you for purchasing the SmartBox® System. We are proud of our quality and believe this product will exceed your expectations!

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