MID-TECH®

Midwest Technologies Illinois, LLC

TASC 6200/6500

TOTAL APPLICATION

SPREADER CONTROL SYSTEM

OPERATING MANUAL

PN - 999-1511

Revision# -96162

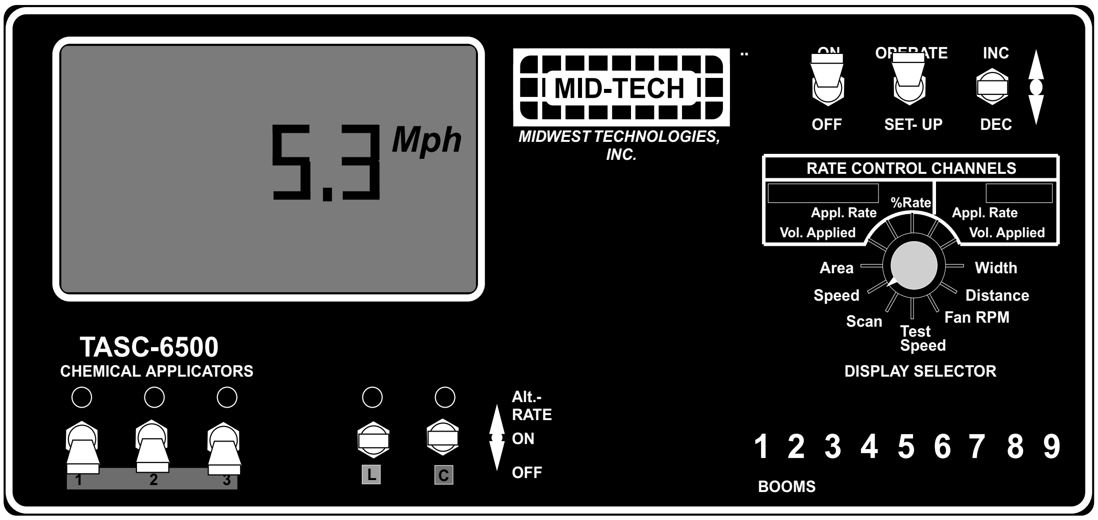
Midwest Technologies Illinois, LLC
Springfield, IL 62703

INDEX OF CHANGES

DATE	DATE CODE	DESCRIPTION
01/10/94	94010	Software Ver 1.5 update, Entire Manual
05/20/94	94139	Software Ver 2.2 update, Entire Manual
04/11/95	95090	Minor corrections, reformate entire manual
07/14/95	95195	Software Ver 2.5 update, Entire Manual
08/21/95	95233	Cal. Constants 6-12, Fld cal Gran. Biins
06/10/96	96162	Minor corrections

TABLE OF CONTENTS

MIDWEST TECHNOLOGIES, INC.
TASC 6200/6500 SPREADER CONTROL



1.0 INTRODUCING TASC FOR THE NEW GENERATION SPREADERS

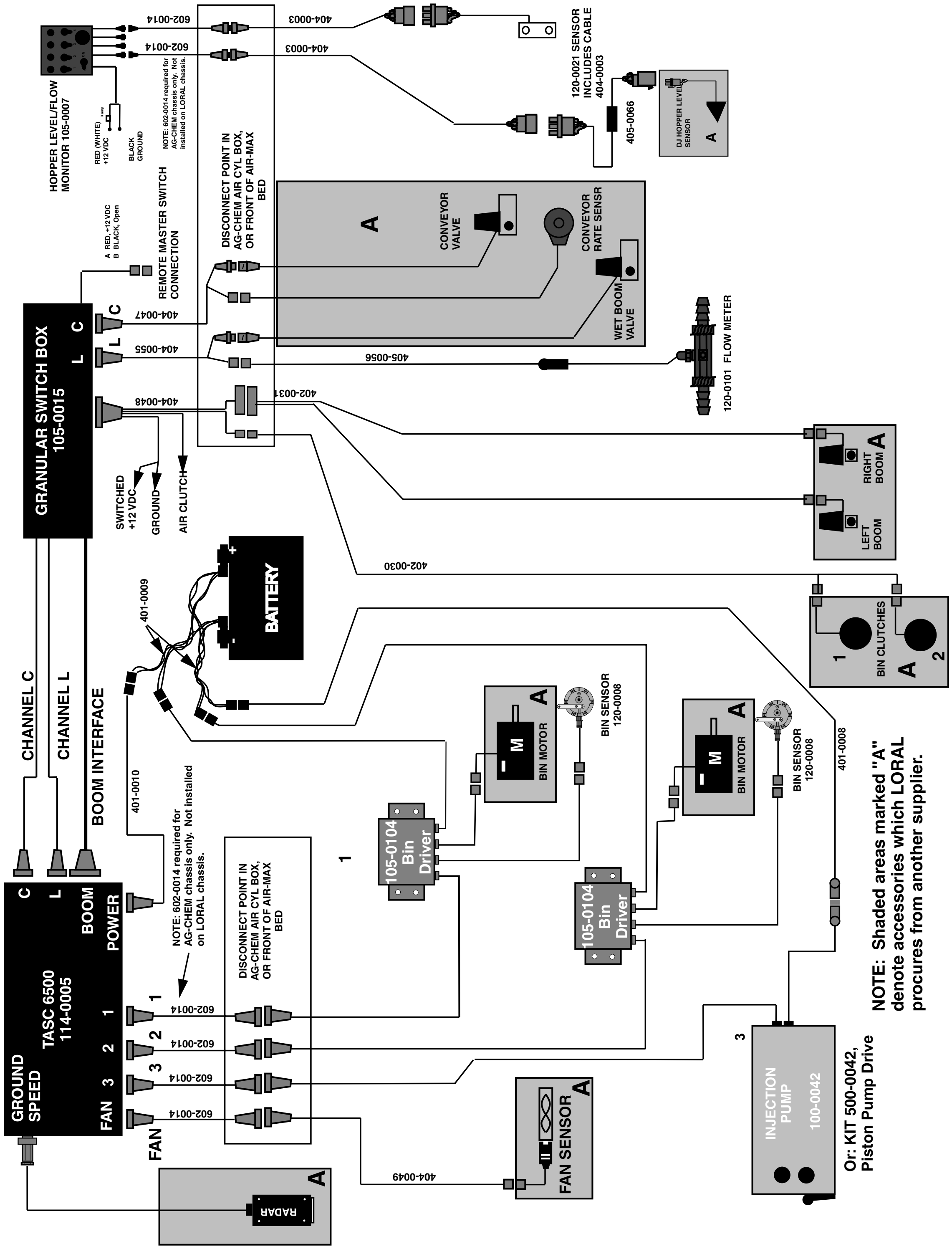
The TASC 6500 is a five channel controller. Two channels are designed to operate positional control valves while the other three channels are designed to operate either proportional control valves or DC motors. This gives the MID-TECH TASC 6500 the flexibility to control almost any mobile applicator using a single console.

All five channels control spread or spray rates in relation to ground speed and width. Each channel has two programmable rates or can be changed by a percentage amount ON THE GO. The TASC 6500 is easy to calibrate and operate and incorporates many self check features to help the operator keep his system running in top condition.

The TASC 6200 is a simpler version of the TASC Spreader Control. TASC 6200 controls two channels designed to operate positional control valves. Typically, this would be a conveyor and a wet boom.

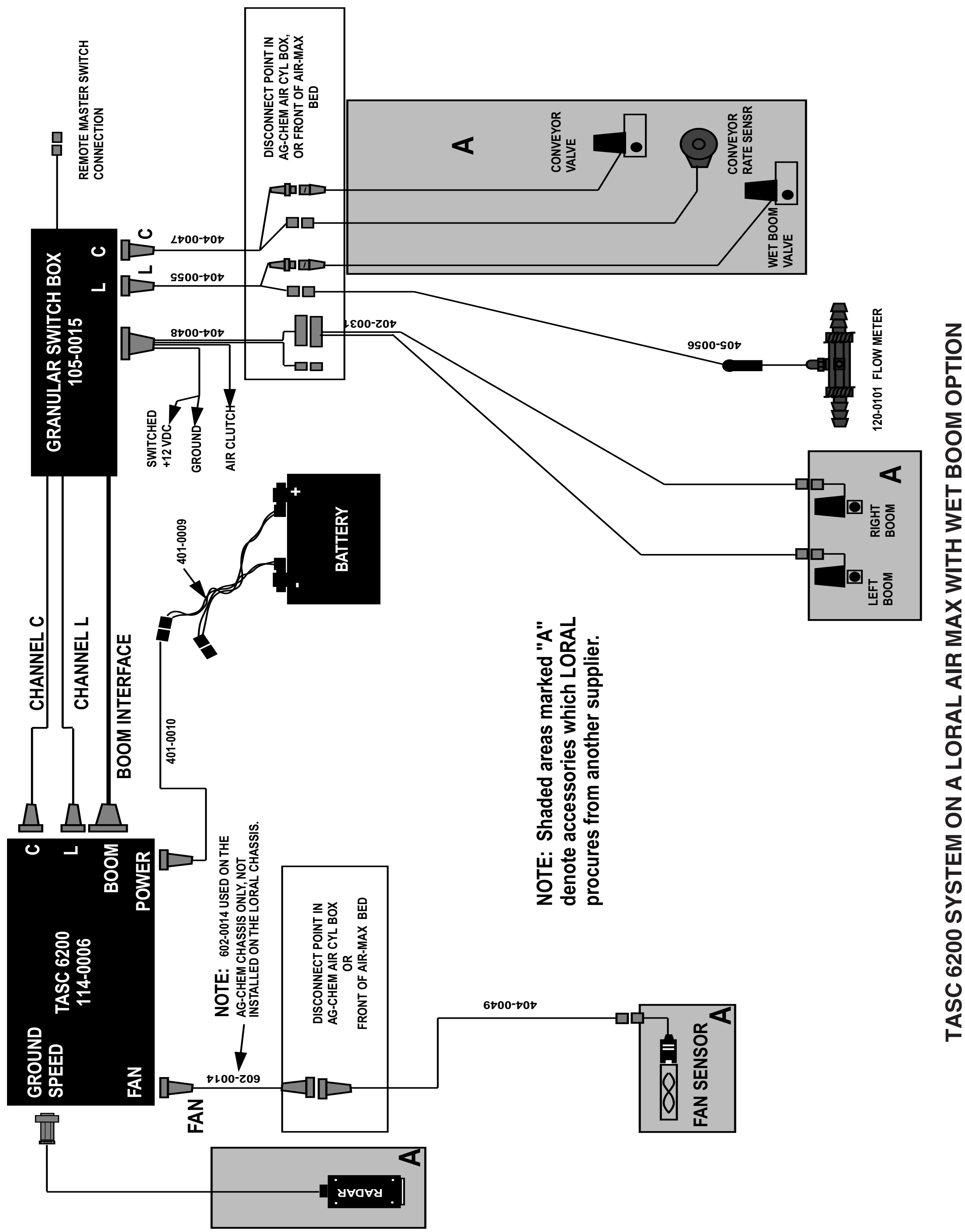
The following schematics show a few MID-TECH TASC 6500 system possibilities.

TASC 6500 SYSTEM DIAGRAM



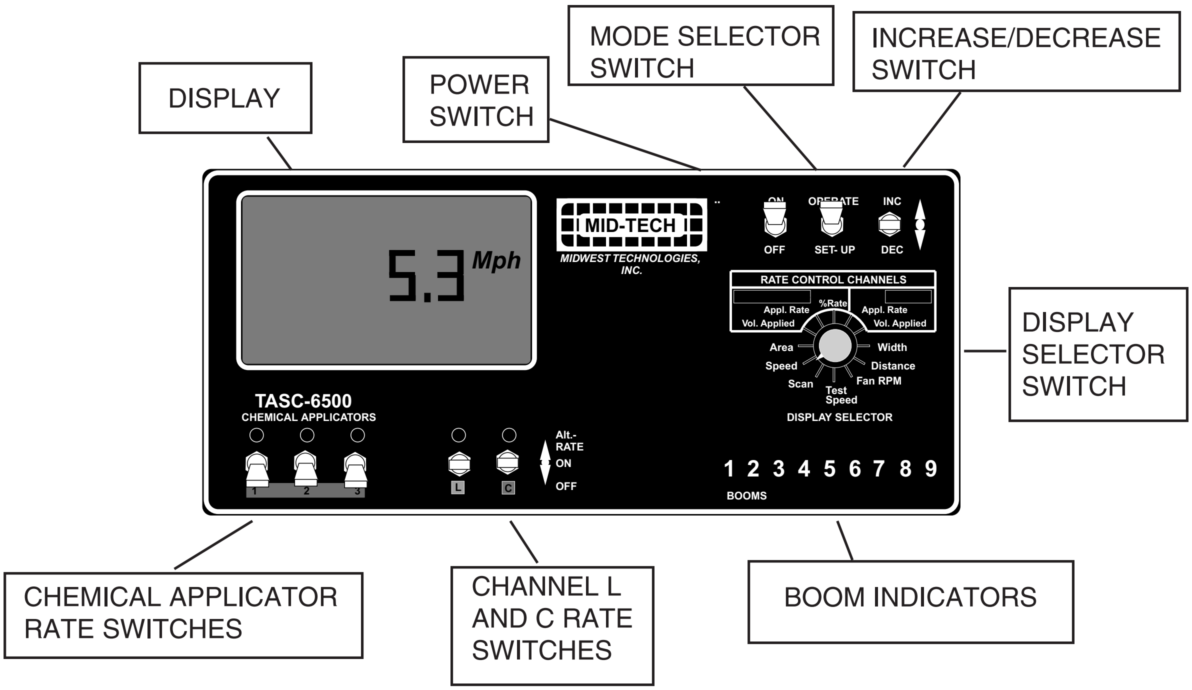
TASC 6500 ON LORAL AIR MAX WITH THE WET BOOM OPTION, ONE INJECTION PUMP AND TWO GRANULAR COAPPLICATOR BINS ON THE CONVEYOR.

TASC 6200 SYSTEM DIAGRAM



2.0 SWITCHES AND CONTROLS

The figure below shows the switches and displays on the TASC Spreader Control.



2.1 POWER SWITCH

The power switch controls power to the console. Turn power OFF when not in use. The console has a nonvolatile memory so it will remember the constants and data previously entered, even if the vehicle battery goes dead.

2.2 MODE SELECTOR " OPERATE/SET-UP " SWITCH

The mode selector switch selects between the operate mode and the set-up mode. This switch must be in the operate position to begin applying. The set-up position is used for entering information to the console. Anytime an incorrect switch setting is selected, an **Err** message will appear.

2.3 THE INC/DEC SWITCH

The INC/DEC switch is used to change values appearing in the display. This switch is also used to zero accumulated data and to select special programming modes for the console.

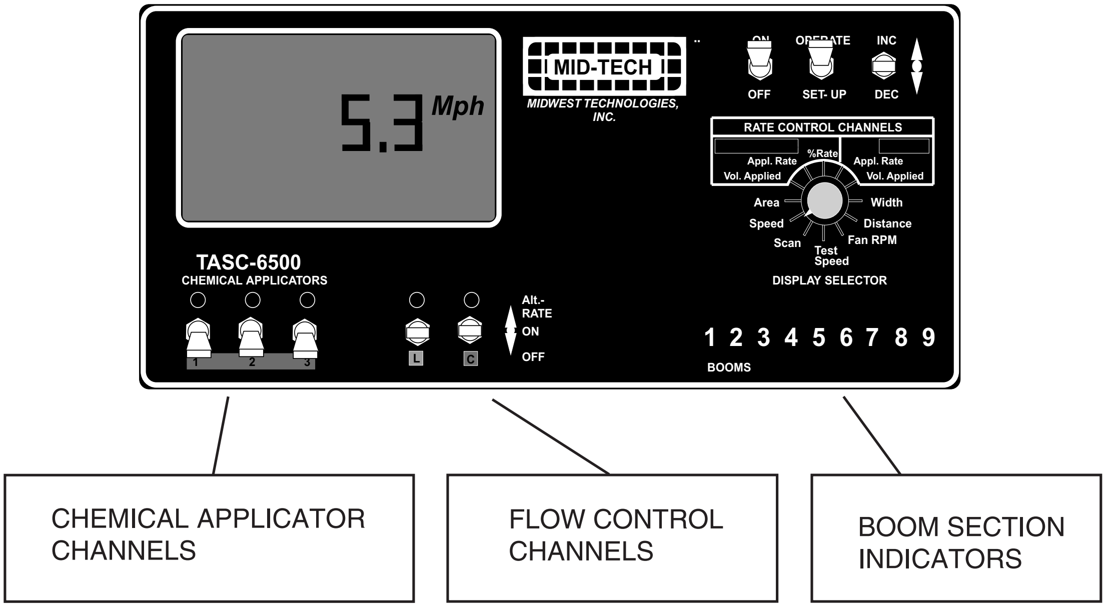
2.4 THE DISPLAY SELECTOR SWITCH

The display selector switch is used to select and display the different console functions. It will display different things depending on the mode selector switch setting. The following table will explain the functions appearing for each display selector switch setting. Anytime an incorrect switch setting is selected, an **Err** message will appear.

DISPLAY SELECTOR SWITCH POSITION TABLE

SWITCH SETTING	DISPLAY SELECTOR FUNCTIONS IN THE OPERATE MODE	DISPLAY SELECTOR FUNCTIONS IN THE SET-UP MODE
Speed	The current vehicle speed in MPH	The minimum speed for the GSO function. INC/DEC switch changes.**
Area	Accumulated area in hundreths of an acre (999.99 Maximum)*	Accumulated area in tenths of an acre (9999.9 Maximum) *
L & Chemicals Vol. Appl.	The amount of material actually discharged by channels 1,2,3 and L. Units are not displayed. The display cycles through each position in sequence unless a specific applicator is turned on. *	Calibration numbers for applicator positions 1,2,3 and L. **Err** will be displayed until an applicator position is selected. When channel is non-peristaltic, density is displayed. When applicator is in split drive, all booms must be on to view calibration number. INC/DEC changes.**
L & Chemicals Appl. Rate	The target application rates (per acre) for channels 1,2,3. The display cycles through the active postions. INC/DEC changes by %. ***	The amount per acre to be applied by channels 1,2,3 and L. Each channel must be selected to ON and Alt-RATE in sequence. Two rates are programable for each channel. **Err** means incorrect switch setting.**
L & Chemicals % Rate	The percent of programmed rate at which all five channels are operating. INC/DEC changes by a pre-set percentage. Alarm beeps and flashes indicating abnormal operation. Switching display selector cancels. ***	The percent of change in application rate caused by each actuation of the INC/DEC switch when in the operate mode. INC/DEC changes. **
Carrier Appl. Rate	The actual application rate by the conveyor while the vehicle is applying. Shows the programmed rate while vehicle is at rest. INC/DEC changes by a percentage. ***	The desired application rate for the Channel C. Two rates are programmable, the standard and the alternate rates. Channel switch (C) must be on to set. INC/DEC changes. Product Density, C OFF**
Carrier Vol. Applied	The accumulated amount discharged by the conveyor. Reads pounds to 20,000 then shifts to hundredths of tons. *	The channel C/product calibration number. Calibrations should be verified for any change in density, flowability, gate setting, etc. INC/DEC changes. **
Width	The active boom width in feet. Depends on the actual boom sections turned on.	Individual boom section programmed widths (inches). Display cycles through all sections unless one is turned on. Boom section C is test boom width. INC/DEC changes. **
Distance	Accumulated distance, miles after 5280. *	The distance calibration number. **
Fan RPM	Fan RPM.	If no applicators are selected the display indicates the pulses per rev of the fan sensor. INC/DEC changes. **
Test Speed	The speed the console will use for stationary tests of the system. When this switch sequence is selected, booms and applicators on, the system will apply as if it were traveling at this speed. INC/DEC changes. **	The current test speed. INC/DEC changes. **
Scan	The display will scan operational functions, holding for about two seconds at each position.	**Err** , invalid switch setting.

NOTES: * Totals can be zeroed in this mode. ** Values are programmable in this mode.
*** Values changeable by a % increase or decrease.



2.5 BOOM SECTION "ON/OFF" INDICATORS

The boom section on/off indicators show which boom sections have been selected by the operator. There are a maximum of nine boom sections available. When a boom section is selected, its indicator light will light.

2.6 FLOW CONTROL CHANNELS, RATE SELECTION SWITCHES

Two channels on the TASC are designated as flow control channels. Both are designed to operate positional control valves. Channel C is set aside to control the spreader conveyor using a positional hydraulic control valve.

Channel L would be used to control a liquid application using either a positional flow control valve or a positional hydraulic control valve. This could be either a wet boom applicator or a liquid impregnation applicator.

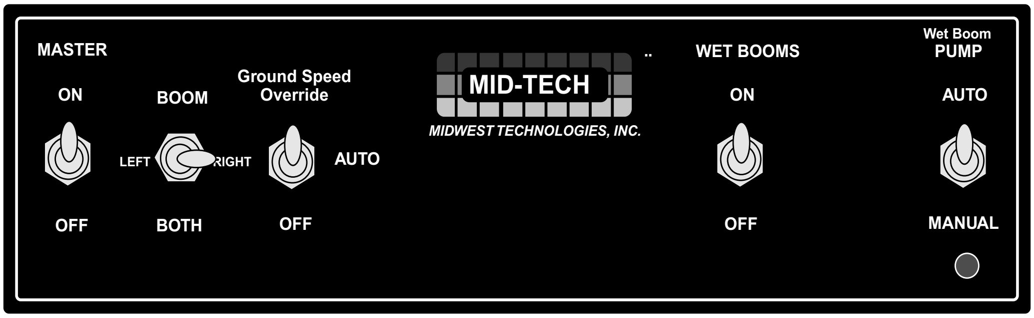
Both channels can be preset for a standard rate and an alternate rate. When the switch is turned on, its indicator will light to show the applicator has been selected at its standard rate. When the alternate rate is selected, the indicator light will flash to indicate a non-standard application.

2.7 CHEMICAL APPLICATOR CHANNELS, RATE SELECTION SWITCHES

(not applicable to 6200) Channels will not run without either Channel L or C ON.

Channels 1,2 and 3 are used to turn on and select the rate of up to three separate chemical applicators. These three channels control using proportionally switched DC voltage. Typical installations will control liquid injection pumps on a wet boom or granular coapplicators with a dry conveyor.

All three channels can be set for a standard rate and an alternate rate. When the switch is turned on, its indicator will light to show the applicator has been selected at its standard rate. When the alternate rate is selected, the indicator light will flash to indicate a non-standard application.



Mid-Tech 105-0015 Switch Box used on LOR*AL Air Max

2.8 BOOM CONTROL SWITCHES

Externally mounted boom control switches are necessary for the proper operation of TASC. MIDWEST TECHNOLOGIES can provide several optional configurations for these switches to meet differing needs. The console must receive 12 VDC on the boom status line whenever a boom is turned ON.

A boom master switch is a good feature. It should be used to turn on or off all selected booms simultaneously.

2.9 GROUND SPEED OVERRIDE SWITCH

An optional ground speed override (GSO) switch can be used to temporarily operate the system using a pre-selected minimum speed. GSO will bring the applicator on line quickly when starting from a dead stop. GSO can also be used to maintain a minimum application rate when maneuvering the vehicle at very low ground speeds. Finally, GSO can be used to empty the applicator from the cab while the vehicle is stopped.

TASC operates normally, so long as the GSO switch is turned OFF. When the GSO switch is closed (ON), and the actual ground speed is less then the minimum speed preset in the console, TASC automatically selects the minimum speed value to control application rates. As soon as the switch is turned OFF, or the actual ground speed increases above the minimum speed, TASC will control application rates based on the actual ground speed.

If your GSO Switch is labeled "OFF / AUTO / GSO", the functions will be as follows. GSO will operate the same as GSO ON above. AUTO will operate like GSO OFF above. The OFF position will operate the same as turning the STATUS switch off. **(See paragraph 2.10 below)**

CAUTION: controlling application rates based on minimum speed is not as accurate as using the actual ground speed. When GSO is being used and the actual ground speed is less than the minimum speed, the console will sound a warning beep and flash a "Too Slow" message to warn the operator of possible over application.

2.10 STATUS SWITCH

An externally mounted status switch can be used to turn TASC on and off. So long as this switch is ON (closed) TASC will operate normally. Whenever the switch is OFF (open), TASC will turn off the applicator channels.

The intent of the status switch is to control TASC through the normal operation of the vehicle. The status switch may sense the ON/OFF condition of the main applicator or it may sense an implement UP/DOWN condition. Use of the status switch can lessen the operator work load.

2.11 FUSES AND POWER CONNECTIONS

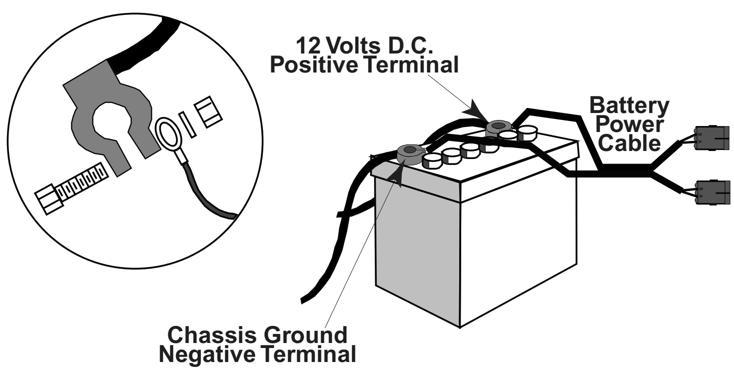
TASC uses the inherent capacitance of the vehicle battery to protect the electronics against voltage spikes and electrical ground reference variations. For this reason:

IT IS EXTREMELY IMPORTANT THAT ALL CONNECTIONS BE MADE DIRECTLY TO THE VEHICLE BATTERY. ON VEHICLES WITH MORE THAN ONE BATTERY, ALL CONNECTIONS SHOULD BE MADE TO THE SAME BATTERY.

All fuses will be located near the battery connection. TASC components use automotive type, in line fuses that are readily available from any auto parts store or most automotive repair facilities.

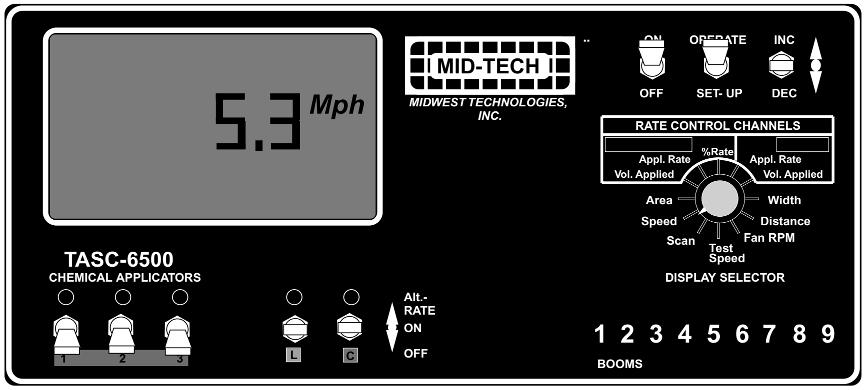
CAUTION!

CONNECT ALL POWER LEADS DIRECTLY TO THE VEHICLE BATTERY



DO NOT SUBSTITUTE HIGHER AMPERAGE FUSES

THIS SYSTEM HAS BEEN DESIGNED TO GIVE OPTIMUM PERFORMANCE WHEN CONNECTED AS SHOWN. POWER CONNECTIONS OTHER THAN DIRECTLY TO THE VEHICLE BATTERY AND/OR THE USAGE OF HIGHER AMPERAGE FUSES MAY DAMAGE THE SYSTEM AND VOID THE WARRANTY.



3.0 OPERATION

TASC is designed to operate automatically. It will accurately apply chemicals, according to the instructions it has received from the operator. Before applying chemicals, it is important to verify that the proper registers are zeroed, and that the proper calibrations are entered in the console.

3.1 NORMAL START UP AND OPERATION

3.1.1 CALIBRATION NUMBERS AND CONSTANTS

With all boom sections OFF, check to see that the proper calibration numbers and constants are entered in the console. Pay particular attention to the density factors for Channel C and any granular bin channels. Refer to the calibration section of the manual for specific help.

3.1.2 APPLICATION RATES

With all boom sections OFF, and the MODE SELECTOR switch in the SET-UP position, review the application rates for each control channel. Remember to look at the alternate rates also.

3.1.3 ACCUMULATED AREA

The area accumulators can be reset to zero by selecting AREA and holding the DEC switch until the display resets to zero. There are two accumulators, one in the OPERATE mode and one in the SET-UP mode. The accumulators are zeroed independently. Keep track of field area in the OPERATE AREA and keep track of total area in the SET-UP AREA.

3.1.4 ACCUMULATED AMOUNTS

Check the accumulated total discharge from each channel by viewing CARRIER, VOL. APPLIED or L & CHEMICALS, VOL. APPLIED, while in the OPERATE mode. Use the DEC switch to reset to zero.

3.1.5 OPERATE

TASC 6500 is ready to start applying. Set the MODE SELECTOR switch to OPERATE. Turn ON the proper control channels. Select an appropriate display function, SCAN for example.

3.1.6 CHECK THE VEHICLE

Make sure the hydraulics (or liquid) pumps are engaged and operating normally.

3.1.7 START APPLYING

Drive the vehicle toward the application area and turn booms ON to start applying. TASC is automatically controlling application of the selected channels. Area and amounts applied will begin to accumulate. The console will display actual application rates.

3.1.8 STOP APPLYING

Reaching the end of the field, turn the booms OFF. The application will stop. After the vehicle has turned, switch the booms back ON to control application.

3.2 GROUND SPEED OVERRIDE (GSO)

An optional ground speed override switch can be used to operate the sprayer using the GSO speed. Ground speed override is used to bring the applicator channels on line quickly when starting from a dead stop. Ground speed override will also ensure a minimum acceptable pattern when the vehicle is maneuvering at very low ground speeds. GSO can also be used to flush the applicator channels from the cab, with the vehicle stopped.

TASC operates normally when the GSO switch is in the OFF (open) condition. When the GSO switch is ON (closed), and the actual ground speed is less than the GSO speed, TASC selects the GSO speed to adjust the conveyor and chemical flow rates. When the actual ground speed increases above the preset GSO speed, TASC will control flow rates using the actual ground speed. See the following table for a better example of GSO operation.

GSO	GSO speed	GROUND SPEED	TASC CONTROL
OFF	5 MPH	6 MPH	6 MPH
OFF	5 MPH	4 MPH	4 MPH
ON	5 MPH	6 MPH	6 MPH
ON	5 MPH	4 MPH	5 MPH

CAUTION: Controlling application rates using GSO is not as accurate as using actual ground speed. When GSO is active and the actual ground speed is less than the GSO speed, the console will sound an alarm and the display will flash a Too Slow message to warn the operator about over application.

3.3 CHANGING ACTIVE BOOM SECTIONS

The active boom sections can be changed at any time by turning the boom switches ON or OFF. TASC will automatically adjust application flow rates to account for the change in width. Area accumulators and total applied accumulators also correct automatically for the change in width. When all boom sections are turned OFF, application stops.

3.4 CHANGING APPLICATION CHANNELS

TASC allows the operator to change the application channels ON THE GO. When an application channel is turned OFF, the flow of material stops and the total accumulator for that channel stops. If any of the other application channels are still active however, the area accumulator will continue to count area.

3.5 CHANGING APPLICATION RATES ON THE GO

TASC allows the operator to change the rates of any or all of the application channels ON THE GO. The change can be to a predetermined rate or, using the INC/DEC switch, percentage changes can be made.

3.5.1 ALTERNATE APPLICATION RATES FOR EACH CHANNEL

An alternate application rate can be selected for each channel using the ALT-RATE position on its rate selection switch. Selection of an alternate rate for one channel will not affect the rates of the other channels. TASC will continue to apply material at the alternate rate until the rate selection switch is returned to the normal ON position.

The programmed rates and alternate rates can be viewed with the vehicle stopped, booms OFF, and TASC in the SET-UP mode. Turn the display selector to L & CHEMICALS, APPL. RATE and select one of the channels 1,2,3 or L. Switching the rate selection switch for that channel between ON and ALT-RATE will display both preset rates. To view the rates set for the conveyor, turn the display selector switch to CARRIER, APPL. RATE and select ON or ALT-RATE with channel C rate selection switch. Normal and alternate rates can be changed in the SET-UP mode using the INC/DEC switch.

CAUTION: Operating in an alternate application rate is not a normal condition. TASC will continue to remind the operator that he has selected an alternate rate. TASC will beep an alarm, flash the channel indicator light and display a flashing RATE message on the display.

3.5.2 CHANGING THE PERCENT RATE ON THE CARRIER CHANNEL ONLY

TASC allows the operator to change the application of the carrier channel (C) by a percentage amount using the INC/DEC switch. The change will not affect the other control channels. The percentage change will affect either the normal or alternate rate of the channel, depending on which has been chosen with the rate selector switch.

The operator selects the CARRIER, APPL. RATE position while in the OPERATE mode. The console displays the actual application rate while applying (or the desired rate with the vehicle at rest). Toggling the INC/DEC switch will change the channel rate up or down by the percentage set in the % RATE position. The display will momentarily show the new target rate of channel C before displaying the actual discharge rate. The percent rate change is canceled by switching out of the CARRIER, APPL. RATE function.

CAUTION: Operating with a changed conveyor application rate is not a normal condition. TASC will continue to remind the operator that he has selected a changed rate. TASC will beep an alarm and display a flashing % RATE message on the display.

3.5.3 CHANGING THE PERCENT RATE OF CHANNELS 1,2,3 AND L SIMULTANEOUSLY

TASC allows the operator to change the application rate of channels 1,2,3 and L by a percentage amount using the INC/DEC switch. The change will not affect channel C. The percentage change will affect either the normal or alternate rate of each channel, depending on which has been chosen with the rate selector switch.

The operator selects the L & CHEMICALS, APPL. RATE position while in the OPERATE mode. The console displays the actual application rates while applying (or the desired rates with the vehicle at rest). Toggling the INC/DEC switch will change rates up or down by the percentage set in the % RATE position. The display will momentarily show the new percentage target rate before displaying the actual discharge rates. The percent rate change is canceled by switching out of the L & CHEMICALS, APPL. RATE function.

CAUTION: Operating with a changed chemicals application rate is not a normal condition. TASC will continue to remind the operator that he has selected a changed rate. TASC will beep an alarm and display a flashing % RATE message on the display.

3.5.4 CHANGING THE PERCENT RATE OF ALL CHANNELS SIMULTANEOUSLY

TASC allows the operator to change the application rate of all channels by a percentage amount using the INC/DEC switch. The percentage change will affect either the normal or alternate rate of each channel, depending on which has been chosen with the rate selector switch.

The operator selects the % RATE position while in the OPERATE mode. The console displays 100. Toggling the INC/DEC switch will change all rates up or down by the percentage set in the % RATE position. The display will show the new percentage target. The percent rate change is canceled by switching out of the % RATE function.

CAUTION: Operating with a changed application rate is not a normal condition. TASC will continue to remind the operator that he has selected a changed rate. TASC will beep an alarm and display a flashing % RATE message on the display.

3.6 MANUAL OVERRIDE OF FLOW CONTROLS

Sometimes it is necessary to manually override the flow control valves. This feature is useful for stationary unloading of the vehicle using the spreader conveyor, or for priming of the liquid pump when first starting the sprayer. TASC allows the control valves on channels C and L to be overridden easily.

3.6.1 OVERRIDE CHANNEL C CONTROL

Select the CARRIER, Appl. Rate position on the display selector switch while in the SET-UP mode. Switch the channel C rate switch to the center ON position. Use the DEC switch to zero the channel C application rate. Switch the mode selector to OPERATE. The display will show **"Flow Contl OFF Auto"**. Channel C flow control valve will now respond to toggling of the INC/DEC switch. INC opens the valve and DEC closes the valve. The switch must be held for a few seconds for the valve to open or close all the way.

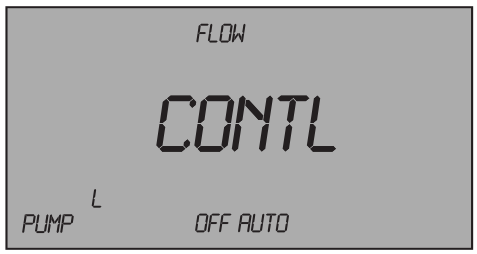
To view the actual application rate while in the manual override mode, switch the associated rate switch to the alternate rate position. There must also be some ground speed.

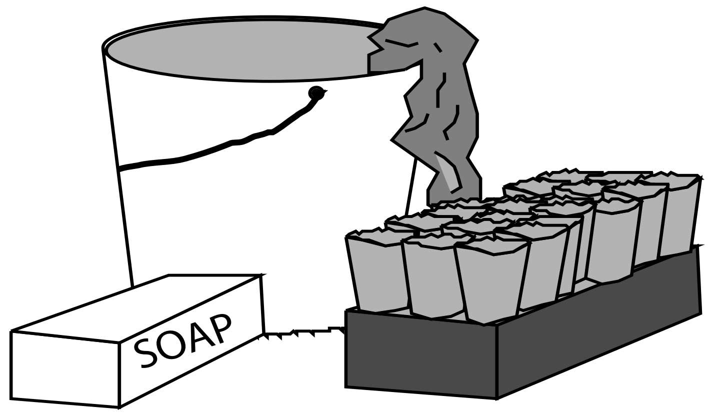
To escape from this condition, enter an application rate for channel C. TASC will then perform normally.

3.6.2 OVERRIDE CHANNEL L CONTROL

Select the L & CHEMICALS, Appl. Rate position on the display selector switch while in the SET-UP mode. Switch the channel L rate switch to the center ON position. Use the DEC switch to zero the channel L application rate. Switch the mode selector to OPERATE. The display will show **"Flow Contl OFF Auto".** Channel L flow control valve will now respond to toggling of the INC/DEC switch. INC opens the valve and DEC closes the valve. The switch must be held for a few seconds for the valve to open or close all the way.

To escape from this condition, enter an application rate for channel L. TASC will then perform normally.





4.0 FLUSHING AND CLEANING

It is important to keep the chemical applicator clean. Chemicals are becoming more and more potent and environmental considerations are becoming more demanding. Keeping the equipment clean also makes it easier to maintain the vehicle and increases its working life.

Always refer to the chemical manufacturer's directions regarding cleaning and flushing. For example; if the manufacturer requires a triple rinsing, then all parts of the applicator that have come in contact with the chemical must be triple rinsed with clear water. If the manufacturer requires rinsing with a special solution, then all parts of the applicator that have come in contact with the chemical should be rinsed with the solution.

WARNING: Failure to follow the manufacturer's recommended cleaning and flushing procedures may result in chemical damage to crops receiving later treatment. Of course, all flushed material must be collected and disposed of in accordance with the applicable federal, state and local regulations for your area.

As a general rule, MID-WEST TECHNOLOGIES recommends the following:

1. Do not leave chemical in injection or application lines overnight. The system should be flushed and cleaned at the end of each day's operation. Some chemicals will bind to the walls of the containers and lines. The longer the chemical is in contact, the greater the possibility this will occur. Bound chemical has been known to release during subsequent application operations, seriously affecting the crop being treated. Flushing and cleaning so that chemical is not left in the sprayer for long periods of time will make this less of a concern.

2. All injection pumps should be flushed daily, regardless of use. Exercising the pumps is good for them. It helps to keep pumps in good working order. Also, unless the pump has a positive shut off valve, some of the chemical applied that day may have migrated up the injection line. Flushing all the injection pumps helps guard against contamination.

5.0 MAINTENANCE

Maintenance is a matter of common sense. Here are a few tips.

5.1 TASC CONTROL CONSOLE

The TASC console requires no maintenance other than general cleanliness and auditing the constants stored in memory. The console can be kept clean by wiping with a damp cloth. Unused connectors should be covered with the dust covers provided. The constants can be monitored by checking each of the calibration constants and each of the desired application rates.

TASC uses non-volatile memory to store constants. It is unlikely there will be a need to reenter constants, however, there have been rare cases of constants being changed as a result of random electrical interference. For this reason, MIDWEST TECHNOLOGIES strongly recommends keeping a written record of the calibration constants. Check daily, before commencing applications.

5.2 GROUND SPEED SENSOR

5.2.1 WHEEL SENSOR:

Check the sensor daily for loose or bent fittings. Mud or trash can push the sensor out of alignment or knock magnets off. Repair or replace any damaged parts immediately and calibrate the sensor.

5.2.2 RADAR SENSOR:

Check the sensor daily to make sure its face is clean and the mounting bracket and hardware is tight. The sensor can be wiped clean with a damp cloth. If it is suspected that the radar sensor mounting position has shifted, the mounting bracket must be tightened and the sensor must be calibrated.

> CAUTION: While inspecting and cleaning the radar speed sensor, do not look directly into the face of the unit. The radar generates a low level microwave signal which could be dangerous to the eyes.

5.3 FLOW METER

Prior to each day's application, inspect the flow meter to be sure there are no leaks around its fittings. At the end of the day, take care to thoroughly flush the flow meter with clean water.

BE CAREFUL THAT WATER OR SEDIMENT IS NOT TRAPPED IN THE FLOW METER, PARTICULARLY IN COLD WEATHER, AS DAMAGE TO THE MECHANISM WILL OCCUR.

The flow meters supplied by MIDWEST TECHNOLOGIES are inherently rugged but continued use will eventually wear the internal bearings and shafts until the meter becomes inaccurate. Replacement kits are available to repair the meters.

5.4 HYDRAULIC FLOW CONTROL VALVES

The most critical maintenance item for the hydraulic valves is the hydraulic oil filter. Keep the filters clean and always use a good grade of replacement oil. Also do a daily check of the oil cooler heat exchanger to be sure it has a good flow of air. Cool oil last longer and performs better.

Some valves have a removable cover over the motor actuator. Be sure the cover is secure and that any gaskets are in place.

5.5 LIQUID FLOW CONTROL VALVES

Inspect the liquid flow control valve before each day's operation. Look for leaks around the attachment fittings and valve stems. If the valve has a removable cover over the motor actuator, be sure the cover is secure and that any gaskets are in place.

At the end of the day, care should be taken to thoroughly flush the valve with clean water.

BE CAREFUL THAT WATER OR SEDIMENT IS NOT TRAPPED IN THE FLOW CONTROL VALVE, PARTICULARLY IN COLD WEATHER, AS DAMAGE TO THE MECHANISM MAY OCCUR.

5.6 ROTATIONAL SENSORS

Check periodically that rotational sensors are secured tightly to the shafts being measured. Also check the torsion strap on slotted disc sensors to be sure it is not damaged or loose. Be sure the mounting brackets for proximity sensors have not been bent or damaged. Replace any damaged parts immediately and calibrate the associated channel.

5.7 MID-TECH PERISTALTIC LIQUID INJECTION PUMPS

(not applicable to 6200)

5.7.1 DAILY

Clean and lubricate the flexible tubing in the injection pumps prior to each day's operation. Use only the tube lube from your supplier.

At the end of the day, disconnect the pump from the MID-TECH TANK (or turn OFF the valve at the outlet of the chemical tank), connect the pump to fresh water and flush according to the chemical manufacturers's directions. Then, remove the tube from the pump housing to prevent it from developing a hard spot under the roller. This is particularly important in cold weather, or when the pump will be idle the next day.

> CAUTION: BE SURE THE CHEMICAL LINES ARE DISCONNECTED OR THE TANK VALVES ARE OFF, SO THAT LIQUIDS CAN NOT DRAIN OR SIPHON INTO THE MAIN BOOM SUPPLY LINE WHEN THE TUBES ARE REMOVED FROM THE INJECTION PUMP.

5.7.2 WEEKLY

Check the flexible tubing for wear. Look for cracking, side splits or other signs of material fatigue. Damaged tubing must be replaced immediately. When tubing is replaced, the pump should be calibrated. Replacement tubing kits are available through the MID-TECH dealer.

5.7.3 SEASONAL

Replace the flexible tubing before application season begins each year. Calibrate the pump at the start of each season.

5.7.4 PERIODIC

Check calibration whenever it is suspected the system accuracy has deteriorated, or anytime tubing is changed.

5.8 OTHER INJECTION PUMPS

(not applicable to 6200)

At the end of the day, disconnect the pump from the MID-TECH TANK (or turn OFF the valve at the outlet of the chemical tank), connect the pump to fresh water and flush according to the chemical manufacturer's directions.

> CAUTION: BE SURE THE CHEMICAL LINES ARE DISCONNECTED OR THE TANK VALVES ARE OFF, SO THAT LIQUIDS CAN NOT DRAIN OR SIPHON THROUGH THE PUMP INTO THE MAIN BOOM SUPPLY LINE.

BE CAREFUL THAT WATER OR SEDIMENT IS NOT TRAPPED IN THE INJECTION PUMP, PARTICULARLY IN COLD WEATHER, AS DAMAGE TO THE MECHANISM MAY OCCUR.

5.8.1 SEASONAL:

Calibrate the pump at the start of each season.

5.8.2 PERIODIC:

Check calibration whenever it is suspected the system accuracy has deteriorated.

5.9 WIRING HARNESS

Inspect the external cabling for abrasion, stretched or pinched wires. If such a condition is seen, reroute the cabling and wrap it to protect it from further damage. If a broken wire is found, temporarily repair it by stripping the wire back on either side of the break, twisting it together and soldering the connection (USE ONLY ROSIN CORE SOLDER). The bare connection must be well insulated with heat shrinkable tubing or electrical tape.

MID-TECH strongly recommends replacement of damaged cables as soon as possible. Once a cable is damaged, moisture and chemicals can work their way under the insulation and cause corrosion to the conductor. In the end, continued problems will be experienced until the cable is replaced.

Periodically inspect the connectors on all cables. Use a non-lubricating spray solvent to clean connectors. Lubricating sprays leave a film which collects dirt and will eventually lead to connector failure. Clean connectors with a soft swab, like a Q-TIP. Do not use abrasive materials to clean connector contacts.

Check all fuses and fuse holders for any signs of corrosion and clean as necessary. There are fuses on the power connections at the battery, some boom control cables have a fuse for each boom section, and some of the newer motorized boom valves have fuses in the connector cables.

6.0 CALIBRATION AND SET UP

NOTE: PLEASE READ THROUGH THE FOLLOWING SECTIONS COMPLETELY BEFORE YOU BEGIN CALIBRATION!

TASC requires certain information before it is ready to use. First, it needs to know the specific details of your applicator (i.e. Application Rates, Boom Widths, Test Speed, etc.). Next, the conveyor rate and ground speed sensors both need to be calibrated. Finally the other application channels must be calibrated for each installation. Set-up and calibration processes are not difficult, however; they must be followed precisely in order to get the maximum accuracy from the system.

6.1 SETTING APPLICATION RATES

TASC will maintain a constant, preset application rate from each channel. To do this, the operator must enter the desired application rates.

6.1.1 SETTING CONVEYOR APPLICATION RATE

A. Set the console switches to the following positions:

Power ON
Mode Selector SET-UP
Channel C Rate ON (CENTER)
Display Selector CARRIER, APPL. RATE

The display will show the current channel C application rate (Amount/Acre).

B. Use the INC/DEC switch to cycle the value displayed to the new desired rate.

C. Repeat with the Channel C Rate set to ALT-RATE. This will establish an alternate rate.

6.1.2 SETTING CONVEYOR PRODUCT DENSITY

TASC needs to know the product density in order to control the conveyor. Product density is entered in pounds per cubic foot.

A. Set the console switches to the following positions:

Power ON
Mode Selector SET-UP
Channel C Rate OFF
Display Selector CARRIER, APPL. RATE

The display will show the current channel C product density (pounds/cubic foot).

B. Use the INC/DEC switch to cycle the value displayed to the new desired rate.

C. NOTE: if channel C is being used as a liquid control channel, set the Product Density to 1.0

6.1.3 SETTING ALL OTHER APPLICATION RATES

A. Set the console switches to the following positions:

Power ON
Mode Selector SET- UP
Display Selector L & CHEMICALS, APPL. RATE
Channel 1,2,3 or L Rate CENTER, ON POSITION

The display will show the current standard application rates (Amount/Acre) for each channel.

B. Use the INC/DEC switch to set the desired rate. Example, 64.0 for 64 Fluid Oz. (2 qts.) per acre.

C. Repeat with the Channel Rate set to ALT-RATE. This will establish an alternate rate.

D. Program the remaining channels in sequence, using the same procedure outlined in steps **A** through **C** above.

NOTE: Set the rates for granular co-applicators as if they were Lbs/acre. Set the rates for chemical injection pumps as if they were ounces per acre.

6.1.4 SETTING PRODUCT DENSITY, CHANNELS 1, 2 and/or 3

Whenever channels 1, 2 or 3 are set to the non-peristaltic drive mode, the TASC controller demands a product density value in order to control accurately. It is important to ensure the density is set correctly for the material you are applying.

A. Set the console switches to the following positions:

Power ON
Mode Selector SET-UP
Display Selector L & CHEMICALS, VOL. APPLIED
Channel 1, 2 or 3 Rate CENTER, ON POSITION

B. Use the INC/DEC switch to set the density. Example cu25.0 for 25.0 pounds per cubic foot.

C. NOTE: *If the channel is being used to control a liquid pump in the non-peristaltic mode, set the density to 1.0. The calibration number (ALT POSITION) will then be ounces discharged per sensor pulse, times 1000.*

6.2 SETTING THE % RATE CHANGE

This feature allows the operator to change application rates ON THE GO. Rates are changed with a simple actuation of the INC/DEC switch. The amount of change each switch actuation makes is proportional to the value set into the %RATE position, (e.g. 20 =20% change in the target rate). For example, if the conveyor rate (on channel C) is set to 400 Lb per acre, a single actuation of the INC switch will cause the rate to go to 480 Lb per acre (400 + 20% = 480).

A. Set the Console switches to the following positions;

Power ON
Mode Selector SET- UP
Display Selector % RATE

The display will show the current % change value.

B. Use the INC/DEC switch to set this number to the desired % change.

6.3 SETTING BOOM WIDTHS

TASC will automatically compensate for changes in the swath width, caused by changing active boom sections. To do this, it is necessary for the operator to define the boom geometry. Use the following procedure to define the boom geometry to TASC.

A. Set the Console switches to the following positions;

Power ON
Mode Selector SET- UP
Display Selector WIDTH
All Boom Switches (external) OFF

The display will cycle through each boom position and display its current width in inches.

B. As each boom position appears on the display, use the INC/DEC switch to set the display to the number of **inches** covered by that boom. Repeat for each section.

C. Set all unused boom sections (up to a total of nine) to a width of zero “0” inches. This will insure that an accidental boom switch ON signal will not affect application rates.

D. Finally, let the boom width display cycle through the boom sections until it shows Boom C. As the width of C is displayed, it can also be changed with the INC/DEC switch. This value is used by the console to select an operating rate for each channel during calibration sequences where the boom switches are normally OFF. This value should be the normal operating width of the entire applicator, in inches.

E. The boom geometry is set. Turn all boom switches to the ON position and return to the OPERATE mode, the new total boom width will be displayed in **feet**. If this does not agree with your total boom width, check the individual boom widths again, (steps B and C).

6.4 SETTING THE SPLIT DRIVE OPTION

Each TASC control channel has the option of operating in either standard or split drive. Split drive is used to control a channel when changes in boom settings do not affect the drive speed of the controlled shaft or motor. An example is a split conveyor with two separate drive motors feeding a two boom granular air delivery applicator.

If you can't decide whether to use split drive or standard on a particular control channel, contact your MID-TECH supplier, or the factory, for help.

A. Use the following switch settings to change from standard to split drive (you should have to do this only once).

Power OFF Mode selector SET-UP Display selector L & CHEMICALS, APPL. RATE Booms and pumps OFF Turn the power on while holding the INC switch UP

The display will show an **Err** message when power up is finished.

B. Turn the desired channel rate switch ON and the display will show which drive configuration is set (Stnrd for standard or SPLit for split).

C. Select the desired configuration by holding the INC switch UP. The display will shift between standard and split. The one showing after you release the INC switch is set.

D. Repeat steps **B** and **C** for each channel independently.

E. Rotate the display selector switch or switch to the OPERATE mode to exit this function.

NOTE: Whenever a channel is set to the split drive option, boom widths must be entered and all booms must be ON before the calibrate number can be changed (SEE 6.8, 6.9, and 6.10). If a boom position will not be used it must be set to 0.

6.5 SETTING CHEMICAL APPLICATOR CHANNELS TO PERISTALTIC OR NON-PERISTALTIC

(not applicable to 6200)

TASC uses a slightly different drive method to power peristaltic or non-peristaltic application channels. The difference is not usually noticeable. If you are not using a peristaltic pump on the control channel however, it is recommended the channel be set to non-peristaltic drive. This tends to give a smoother operation at low rates.

A. Use the following switch settings to enter non-peristaltic drive (you should have to do this only once).

Power OFF Mode selector in SET-UP Display selector to DISTANCE

B. Turn ON the rate selector switches for the channels (1,2 or 3) that you want to set to non-peristaltic drive.

C. Hold the DEC switch while turning on the TASC power. The display will settle on a series of o's and -'s. The o's correspond to the channels that are set to non-peristaltic drive.

0 0 -

Indicates channels 1 and 2 are set to non-peristaltic drive and channel 3 is set for peristaltic.

D. If it is ever necessary to reset a channel to peristaltic drive, simply repeat the above procedure but leave that channel rate selector OFF.

E. Whenever TASC power is turned ON, the console will momentarily display the drive status of the three chemical applicator channels.

6.6 SET THE GROUND SPEED OVERRIDE SPEED (GSO)

The GSO speed creates a minimum speed signal TASC will use whenever the GSO switch is turned on.

A. Use the following switch settings to enter the GSO speed (you should have to do this only once).

Power ON Mode selector SET-UP Display selector SPEED

B. Use the INC/DEC switch to set the right speed.

C. The GSO speed will be used by TASC whenever the GSO switch is ON (closed).

NOTE: If you do not have a GSO switch, the only way to turn GSO off is to set the GSO speed to zero.

6.7 DISTANCE CALIBRATION

The ground speed sensor must be calibrated to ensure accurate application rates. This calibration should be periodically checked, especially if the sensor has been moved or the tires have been changed.

6.7.1 INITIAL CALIBRATION SETTINGS

The following settings will be close. Use them for the initial settings so you get an initial reading of distance during the calibration procedure.

NOTE: IT IS IMPORTANT TO FIELD CALIBRATE THE DISTANCE SENSOR TO INSURE OPTIMUM ACCURACY.

RADAR - **1000**	WHEEL SENSOR - 3500	SPEEDOMETER SENSOR - 3500

A. Use the following switch settings to enter the initial distance calibration number.

Power ON
Mode selector SET-UP
Display selector DISTANCE

B. The INC/DEC switch is used to set the initial number.

6.7.2 DISTANCE CALIBRATION PROCEDURE

A. Fill the main tank 1/2 full of water to approximate average load conditions.

B. Measure a known distance of 400 feet or more along a field or roadway. It should be in an easy place to maneuver the vehicle. The longer the distance, the more accurate the test will be.

C. Drive to the starting point and STOP. Make sure all booms are OFF. Turn ON the TASC power switch.

D. Turn the display selector to DISTANCE and put the mode selector in SET-UP. TASC will display the current distance calibration number. Record this number for reference.

E. Put the mode selector switch to the OPERATE position and use the DEC switch to set the accumulated distance reading to ZERO. (If the console shows a distance being accumulated while the vehicle is stationary, the radar is vibrating. Change engine RPM or install dampening material under the radar mounting bracket to stop the vibration.)

F. Drive the vehicle toward the other end of the measured distance. Use a speed of five to ten miles per hour. Stop at the end marker.

G. TASC will display the accumulated distance. Compare the accumulated distance to the measured distance, if they are the same, calibration is complete. If they are different, correct as follows:

H. Calculate the new calibration number using the formula:

(MEASURED DISTANCE ÷ DISPLAYED DISTANCE) X CALIBRATION NUMBER = NEW CALIBRATION NUMBER. (If the distance shown on the console is greater than the measured distance, the calibration number will decrease.

Use the INC/DEC switch to change the distance calibration number, in the SET-UP mode, until the displayed distance in the OPERATE mode is the same as the measured distance.

RECORD THE DISTANCE CALIBRATION NUMBER HERE

6.8 CONVEYOR CALIBRATION, CHANNEL C

It is necessary to enter a spreader constant in TASC to ensure an accurate output from the conveyor. The spreader constant is the number of sensor pulses per cubic foot of material discharged. The conveyor must be calibrated whenever there are changes to the discharge gate openings. *(NOTE: other factors, such as moisture content, granule size, granule shape, etc., may also affect this constant.)*

THE CALIBRATE PROCEDURE IS SIMPLE. IT IS IMPORTANT TO CALIBRATE FOR THE MATERIAL AND GATE OPENINGS YOU ARE USING. Be sure you have entered the proper PRODUCT DENSITY (SEE 6.1.2).

A. Use the following switch settings.

Power ON Mode selector SET-UP Display selector CARRIER, VOL. APPLIED Booms ON (if channel is in split drive) Channel C switch ON

The display will show the current spreader constant. Record for reference. Turn the booms OFF.

B. Weigh the truck and load. Back up to a location where you can safely collect the discharged material.

C. Switch the mode selector to OPERATE and use the DEC switch to zero the display.

D. Turn the booms ON, Make sure there is some speed programmed into GSO (see page 6-5), and turn the GSO switch on. Switch channel C rate switch ON. The conveyor will begin to discharge.

E. Discharge enough material to get an accurate measurement. For example: if your scale reads in 20 lb increments, you must discharge at least 1000 lbs to be able to measure within 1% accuracy.

F. When enough material has been discharged, switch channel C OFF and rotate the display selector to CARRIER, VOL. APPLIED. TASC displays the indicated amount discharged by the conveyor in pounds.

G. Weigh the truck and load (be sure the driver is included if he was in the truck when it was weighed the first time). The difference between the starting weight and the ending weight is the actual amount discharged by the conveyor.

H. To correct the calibration number, use the following formula:

(INDICATED WEIGHT ÷ ACTUAL WEIGHT) X SPREADER CONSTANT = NEW SPREADER CONSTANT. If the weight read from the console is greater than the weight actually measured, the calibration number will increase.

I. Put the mode selector switch in SET-UP and use the INC/DEC switch to change the calibration number. **(REMEMBER, IF YOU ARE IN SPLIT DRIVE, YOU MUST HAVE THE BOOM SWITCHES ON.)** Switch back to OPERATE and the corrected indicated weight will be displayed. If the indicated weight now matches the actual weight, the conveyor is calibrated.

WRITE DOWN THE SPREADER CONSTANTS FOR DIFFERENT MATERIALS AND DIFFERENT GATE SETTINGS. USE THOSE NUMBERS WHENEVER YOU ARE SPREADING THAT MATERIAL AT THE SAME GATE SETTING.

J. Note: If channel C is being used as a liquid control channel, start with the typical flow meter calibration number for the flow meter installed. Adjust the calibration number according to the testing and adjustment procedure in Section 6.9. (Remember, channel C Product Density must be set to 1.0 to use it as a liquid control channel, Section 6.1.2.)

IF IT IS NOT CONVENIENT TO CONDUCT AN ACTUAL CATCH TEST, FIELD EXPERIENCE WILL ALLOW YOU TO FINE TUNE THE FLOW METER CALIBRATION NUMBER. IF CHANNEL C IS APPLYING TOO MUCH, DECREASE THE CALIBRATION NUMBER BY THE SAME PERCENTAGE AS THE OVER APPLICATION. IF CHANNEL C IS APPLYING TOO LITTLE (YOU HAVE MATERIAL LEFT OVER) INCREASE THE CALIBRATION NUMBER BY THE SAME PERCENTAGE AS THE UNDER APPLICATION.

6.9 CALIBRATING THE LIQUID CHANNEL, L

Channel L is typically a liquid control channel and It is necessary to enter a calibrate number in TASC to get an accurate application. The calibrate number is related to the number of sensor pulses per unit of material discharged.

A. Use the following switch settings to start the calibration:

Power ON
Mode selector SET-UP
Display selector L & CHEMICALS, VOL. APPLIED
Channel L ON

TASC will display the current calibration number for channel L. Record for reference. The INC/DEC switch will change this number.

B. If the system uses a flow meter to sense the liquid flow, use the following calibration numbers for the flow meter you have installed.

SIZE	SUPPLIER	CAL.#	SIZE	SUPPLIER	CAL.#
.75 inch	(Mid-Tech)	396.9	3.00 inch	(Mid-Tech)	5.0
1.00 inch	(Mid-Tech)	153.1			
1.50 inch	(Mid-Tech)	38.8	1.25 inch	(Raven)	75.0*
2.00 inch	(Mid-Tech)	23.8	3.00 inch	(Raven)	16.4*

* Raven flow meters, use the factory calibration number divided by 10. All other flow meters, use the manufacturers' supplied information regarding the pulses per gallon.

C. If channel L uses a rotational rate sensor, an initial calibration number can be calculated as follows: divide the number of sensor pulses for each pump revolution by the pump output (gallons) per pump revolution (positive displacement pump).

D. Use a catch test (or weight loss test) to fine tune the calibration. Divert channel L output to an appropriate catch basin through an adjustable pressure relief valve or manually operated throttling valve.

E. Switch the mode selector to OPERATE and use the DEC switch to set the accumulated gallons to zero.

F. Rotate the display selector to TEST SPEED and turn ON the boom switches. Channel L will begin to discharge. When sufficient material has been collected, turn OFF the booms and rotate the display selector to L & CHEMICALS, VOL. APPLIED.

G. TASC will display an indicated amount. Measure the amount actually discharged into the catch basin. Correct the calibration number using the following formula:

(INDICATED AMOUNT ÷ MEASURED AMOUNT) X CALIBRATION NUMBER = NEW CALIBRATION NUMBER. If the amount read from the console is greater than the measured amount, the calibration number will increase.

H. Set the mode selector switch to SET-UP and change the calibration number using the INC/DEC switch. Return the mode selector to OPERATE and TASC should display the amount actually measured. The calibration is complete.

CALIBRATING WITH WATER WILL BE SUFFICIENT FOR MOST MATERIALS; HOWEVER, FACTORS SUCH AS VISCOSITY AND DENSITY CAN AFFECT THE CALIBRATION. FOR MATERIALS THAT ARE MUCH DIFFERENT THAN WATER, THE CHANNEL SHOULD BE CALIBRATED WITH THE MATERIAL TO BE APPLIED.

IF IT IS NOT CONVENIENT TO CONDUCT AN ACTUAL CATCH TEST, FIELD EXPERIENCE WILL ALLOW YOU TO FINE TUNE THE FLOW METER CALIBRATION NUMBER. IF CHANNEL L IS APPLYING TOO MUCH, DECREASE THE CALIBRATION NUMBER BY THE SAME PERCENTAGE AS THE OVER APPLICATION. IF CHANNEL L IS APPLYING TOO LITTLE (YOU HAVE MATERIAL LEFT OVER) INCREASE THE CALIBRATION NUMBER BY THE SAME PERCENTAGE AS THE UNDER APPLICATION.

6.10 CALIBRATING CHANNELS 1,2 AND 3 (not applicable to 6200)

Channels 1,2 or 3 can be either liquid injection channels or granular co-applicator channels. The calibration methods are similar. It is necessary for you to be able to catch and measure the discharge from each channel.

6.10.1 CALIBRATING MID-TECH® INJECTION PUMPS

If you are using a MID-TECH® injection pump, use the following calibration numbers to get started. *(Be sure the channel is set to peristaltic drive, section 6.5 of the manual.)*

The following values are typical PC#'s you can expect to see on MID-TECH injection pumps after performing the field calibration procedure. If your pump calibration number differs from the typical range, check the calibration. Use these numbers for your initial pump calibration numbers, before conducting the actual prime or pump calibration procedure.

MODEL #	DESCRIPTION	TYPICAL PC#	RANGE
ISC-20 PUMP	0.2 to 20-Oz./Min. (1/4"Dia. Tube)	32.0	27/37
ISC-50 PUMP	2.6 to 53-Oz./Min. (1/4"Dia. Tube)	110.0	100/120
ISC-50 PUMP	1.5 to 29-Oz./Min. (3/16"Dia. Tube)	65.0	58/72
ISC-100 PUMP	1.0 to 100-Oz./Min. (3/8"Dia. Tube)	145.0	130/160
ISC-150 PUMP	1.5 to 150-Oz./Min. (3/8"Dia. Tube)	145.0	130/160
ISC-200 PUMP	6.4 to 128-Oz./Min. (3/8"Dia. Tube)	285.0	256/314
ISC-200 PUMP	10.7 to 213-Oz./Min. (1/2"Dia. Tube)	485.0	436/534
ISC-350 PUMP	22.0 to 220-Oz./Min. (3/8"Dia. Tube)	285.0	256/314
ISC-350 PUMP	37.0 to 370-Oz./Min. (1/2"Dia. Tube)	485.0	436/534

A. Use the following switch settings to start the calibration:

Power ON Mode selector SET-UP Display Selector L & CHEMICALS, VOL. APPLIED Channel 1, 2 or 3 ON All booms OFF

TASC will display the current calibration number for the channel selected. Change the number using the INC/DEC switch. Record the number for reference. (Remember, if the channel is set for split drive, the booms must be ON to view the calibration number.)

B. Divert the output of the selected channel to an appropriate catch container. Place the magnet on the (*) target on the pump drive module. The pump will run. Run until the pump is primed and air is purged from the lines.

C. Set the mode selector switch to OPERATE and use the INC/DEC switch to set the display to zero.

D. Divert the output of the selected channel to an appropriate catch container. You will need to collect enough material to give a good sample. You will need to be able to measure the collected material very accurately.

E. Set the mode selctor back to SET-UP and again place the magnet on the (*) target. The pump will discharge into the catch container. When enough material has been collected, remove the magnet to stop the pump.

F. Set the mode selector to OPERATE. TASC displays the indicated amount discharged. Measure the actual amount discharged and correct the calibration number using the following formula:

(MEASURED AMOUNT ÷ INDICATED AMOUNT) X CALIBRATION NUMBER = NEW CALIBRATION NUMBER. If the amount read from the console is greater than the amount actually measured, the calibration number will decrease.

G. Set the mode selector switch to SET-UP and enter the corrected calibration number using the INC/DEC switch. Return to OPERATE and the display should indicate the actual measured amount collected. That channel is calibrated. Calibrate each channel independently using this procedure.

6.10.2 CALIBRATING GRANULAR BIN APPLICATORS

You will need to calibrate the feed mechanism of the granular co-applicator bin. Use the initial calibration number supplied by the equipment manufacturer. If an initial number is not available, you can estimate an initial calibration number by dividing the weight discharged during one revolution of the feed mechanism by the number of sensor pulses generated during each revolution. Multiply the result by 1,000,000 and multiply that result by the product density (pounds per FT^3). Use this number for the initial calibration.

For LORAL Air Max co-applicator bins, use the following initial calibration numbers:

HIGH RATE ROLLER (deep grooves)	LOW RATE ROLLER (shallow grooves)
-900	-450

The minus sign indicates this is a non-peristaltic drive channel.

A. Use the following switch settings to start the calibration *(Be sure and set the proper product density, section 6.1.4)*:

Power ON
Mode selector SET-UP
Display Selector L & CHEMICALS, VOL. APPLIED
Channel 1, 2 or 3 ALT RATE POSITION
(Select only one channel at a time)
All booms ON *(for observing split drive channels)*

TASC will display the current calibration number for the channel selected. Change the number using the INC/DEC switch. Record the number for reference. *(Remember, if the channel is set for split drive, the booms must be ON to view the calibration number, turn the booms OFF before proceeding further.)*

B. Set the mode selector to OPERATE, rotate the display selector to TEST SPEED and turn ON the booms. Allow material to discharge until you are sure the flow is even. *(NOTE: Channel C or L must also be turned on, set that channel application rate to 0.0 (zero) to keep alarms from sounding.)* Turn OFF the booms.

C. Rotate the display selector to L & CHEMICALS, VOL. APPLIED and use the DEC switch to set the display to zero.

D. Divert the output of the selected channel to an appropriate catch container. You will need to collect enough material to give a good sample. You will need to be able to measure the collected material very accurately.

E. Rotate the display selector to TEST SPEED and turn all booms ON. The channel selected will discharge into the catch container. When enough material has been collected, turn OFF the booms and rotate the display selector back to L & CHEMICALS, VOL. APPLIED.

F. TASC displays the indicated amount discharged. Measure the actual amount discharged and correct the calibration number using the following formula:

(MEASURED AMOUNT ÷ INDICATED AMOUNT) X CALIBRATION NUMBER = NEW CALIBRATION NUMBER. If the amount read from the console is greater than the amount actually measured, the calibration number will decrease.

G. Set the mode selector switch to SET-UP and enter the corrected calibration number using the INC/DEC switch. *(Remember, if the channel is set for split drive, the booms must be ON to view the calibration number, turn the booms OFF before proceeding further.)* Return to OPERATE and the display should indicate the actual measured amount collected. That channel is calibrated. Calibrate each granular bin channel independently using this procedure.

6.11 SETTING THE HOLD OR CLOSE RESPONSE OF CHANNEL C AND L CONTROL VALVES

The operator has the option of selecting the response of the control valve to the booms OFF condition. When the valve response CLOSE is selected, TASC will close the control valve when the booms are shut OFF. When the HOLD response is selected, TASC will hold the valve in its current position when the booms are turned OFF. HOLD is useful in maintaining pressure to the boom shut-off valves on a liquid control channel.

To check or change the valve response, use the following procedure:

A. Set the console switches as shown:

Power ON
Mode selector SET-UP
Display selector SCAN
Booms OFF
Channel L or C ON

The display will read HOLD or CLOSE. The response can be changed using the INC switch. (Hold the INC switch up until the display changes. The reading left on the display after the switch is released is the selected response for that channel.)

B. If neither the L or C channels are selected or, if both the L and C channels are selected, the display will read **Err**.

OOPS! ERROR!

WHAT DO WE DO NOW?

7.0 TROUBLE SHOOTING TASC

Trouble shooting of the MIDWEST TECHNOLOGIES TASC System begins when the TASC Control Console senses a problem or inconsistency in the system. When this happens, TASC alerts the operator by signaling a visible and audible alarm.

7.1 ERROR MESSAGE Err, INVALID SET-UP PROCEDURE

TASC will display an Err error message when the switch settings on the console are not compatible. If you encounter the Err message, check the switches to be sure you have the proper combination for the operation you are trying to perform. The Err message will clear once the proper switch combinations are selected. When the console is in the SET- UP Mode, the following switch combinations will cause the Err message to be displayed:

A. If the Display Selector is turned to the L & CHEMICALS, VOL. APPLIED or APPL. RATE position and either; no channel 1,2,3 or L rate switches are turned ON or, more than one of these rate switches are turned ON. This ensures the appropriate calibration number, density, or application rate value is displayed.

B. When the Display Selector is in the WIDTH position and more than one boom switch is turned ON. Only one boom section width can be entered at a time.

C. When the Display Selector is in the SCAN position.

7.2 ERROR MESSAGE Err E, INVALID MEMORY

TASC stores all critical SET-UP values in two separate internal memory locations and periodically compares the two sets of values. If the two values do not match, the console automatically shuts down all control functions and displays the Err E message in the OPERATE Mode.

This feature prevents application errors in the unlikely event that electrical interference or a power surge has disrupted the information used by the console. If the Err E message appears, hold the INC/DEC switch down until the alarm quits (approximately 5 seconds). This resets all errant values to zero (“0”). Now check all programed values, looking for those reset to zero, and enter the correct values as needed. For this reason, MIDWEST TECHNOLOGIES strongly recommends recording your current calibration numbers in a convenient location.

NOTE: Check all values, this type of error usually involves more than one position.

7.3 ERROR MESSAGE Err 0, INVALID CONSTANT SET TO ZERO

An Error message Err 0 means one of the necessary constants for calibration, application rates, flow meter calibration, ground speed sensor calibration or boom width is erroneously set to a zero value. TASC is therefore unable to resolve a control solution and it indicates an Error. Check the programed values, looking for those set to zero, and enter the correct values as needed. For this reason, MIDWEST TECHNOLOGIES strongly recommends recording your current calibration numbers in a convenient location.

A. The message Err 0/Pump ? indicates that a zero value is stored in the calibration number or application rate for the identified channel. An error message Err 0/ Pump C indicates there is a zero value in the channel C calibration register. **NOTE: an Err 0 on a particular channel (1,2,3 or L) will not cause a shut down of the other channels but, an Err 0 in channel C calibration will cause a shut down of TASC until the condition is corrected.**

> **NOTE: All control channels must have a calibration number other than zero entered, whether they are being used, or not. If any calibration number is set to zero, an Err 0 and an audible alarm will occur, even if that channel switch is not turned ON. The console is shipped with default calibration numbers in each channel.**

B. The message Err-0/ Dist. Cal. # indicates the distance calibration constant is set at zero, TASC will be shut down until this condition is corrected.

C. The message Err-0/Boom ? indicates the width for the boom section selected has been set to zero.

7.4 ERROR MESSAGE Err-1, 2, 3, 4, & 5, INVALID OPERATION

Any time TASC senses an invalid operating condition, the Console will display an error message indicating the condition and which channel is associated with this condition. The format of this message is a continuous audible alarm accompanied by a display designating the Error number (1, 2, 3, 4, or 5) and the channel number.

7.4.1 ERROR MESSAGE Err-1

The error message Err-1/Pump ? indicates that the system is calling for a higher output than the channel can supply. An Err-1/Pump C indicates TASC is demanding a higher channel C flow rate than the applicator can provide. In addition a visual message TOO FAST will flash on the display. Slowing down will usually clear this error condition.

The console may display an intermittent Err-1/Pump ? message at normal operating speeds. This usually indicates there is a hard spot in the injection pump tubing which causes the pump to momentarily stall. If this condition is encountered, carefully inspect the tubing and replace as necessary. The pump must be calibrated whenever the tubing is replaced.

7.4.2 ERROR MESSAGE Err-2

An Err-2/Pump ? message indicates that the channel is operating too slowly for an accurate delivery of chemical. In addition, a visual message TOO SLOW will flash on the display. Speeding up the vehicle will usually clear this condition. If this condition cannot be corrected, contact your MID-TECH dealer or the factory for help.

7.4.3 ERROR MESSAGE Err-3

The Err-3/Pump ? (1, 2, 3 or L) message indicates that the channel is either not working, or the console is not receiving a rate signal from that channel. When the console displays the Err-3/Pump ? message, it has already turned off the power to the errant channel. This protects against over application.

A. If the channel is an injection pump, first check the injection pump and pump housing for obstructions. Be sure there is nothing caught in the injection pump tubing. If you find obstructions, clear them or replace the tubing and check the calibration of the pump.

B. Check to see if the channel runs for 15 seconds or more before the Error 3 condition is detected and the console turns the channel OFF again. This can be checked by turning the display selector to TEST SPEED and then turning the errant channel rate switch ON. If the Error 3 condition re-occurs, it is an indication that the rate sensor is faulty. Check the sensor wiring, connections and mounting location for proper clearance. Repair or replace the sensor if required.

C. If the channel does not operate at all, check the power to the channel drive. Carefully inspect the battery contacts, the in line fuse, and the wiring harness between the battery and the injection pump. Also, check for the proper polarity between the positive and negative terminals on the battery. If the power cables from the battery to the channel drive are connected to the wrong polarity, the channel will not operate. If you find a problem, repair it and the channel should begin to operate normally.

D. If the channel is a wet boom, the boom solenoid switches may be failing to open the boom section valves. It is possible to have TASC indicate a boom section is on when the boom section valve has not actually opened. Check to ensure the boom valves are actually opening when the boom solenoid switches are actuated. If they are not, the most likely cause of failure is a disruption in the wiring from the solenoid switches to the solenoid actuated valves.

E. If all the above checks fail to resolve the difficulty, contact your MID-TECH dealer, or the factory, for additional help.

The Err-3/Pump C message indicates TASC is not receiving a signal from the channel C (conveyor) rate sensor. This could indicate a major problem, stop the vehicle, turn off all boom sections and look for the following possible faults.

A. The hydraulic flow control valve fails to open. Check for power, ground, and correct polarity. If there is no power at the flow control valve, check the in-line fuse near the positive battery connection. Also inspect the wiring harness from the valve to the battery. If there is power, ground and correct polarity, check the signal cable between the console and the flow control valve for pinched or broken wires.

B. If the conveyor is turning, but TASC is not recognizing it, the most likely cause is the wiring between the rate sensor and the TASC Control Console. Carefully check the integrity of the wiring .

C. If the above checks are made and the system still doesn't respond, contact your MID-TECH dealer, or the factory, for additional help.

NOTE: Error 3 requires all booms OFF, status switch OFF, or zero groundspeed in order to clear.

7.4.4 ERROR MESSAGE Err-4

The Err-4/Pump ? (1,2,3 or L) message indicates the channel is applying when it should be OFF or it is applying faster than TASC requires and it cannot be controlled. If this condition persists for more than 5 seconds, it is an indication of a faulty control module. (Call your MID-TECH dealer for assistance.)

CAUTION: THIS IS A MAJOR FAULT CONDITION. THE ALARM WILL CONTINUE TO SOUND UNTIL THE ERROR CONDITION IS CLEARED. STOP IMMEDIATELY AND SHUT THE SPRAYER OFF. CHECK ALL CHANNELS, DISCONNECT ALL ERRANT CHANNELS AT THE POWER CABLE CONNECTION. THIS WILL REMOVE POWER TO THE DRIVE AND STOP THE CHANNEL.

7.4.5 ERROR MESSAGE Err-5

The Err-5/Pump C message indicates that the conveyor flow rate is exceeding the target rate and the control valve is not responding to the console's throttling commands. The alarm will activate within 10 to 15 seconds after the flow rate exceeds 15% of target rate and no valve response is indicated. The Err 5 alarm condition will not shut down the spreader. If the fault cannot be cleared easily by the following procedures, the field can still be finished with reasonable accuracy by adjusting the speed of the vehicle to maintain the target conveyor application rate. All other control functions are still operating.

The most likely cause of an Err 5 condition is a faulty hydraulic flow control valve which has stuck in a partially open position. Check for power, ground, and correct polarity. If there is no power at the flow control valve, check the in-line fuse near the positive battery connection. Also inspect the wiring harness from the valve to the battery. If there is power, ground and correct polarity, check the signal cable between the console and the flow control valve for pinched or broken wires.

If the above checks fail to resolve the difficulty, contact your MID-TECH dealer, or the factory, for additional help.

7.5 ERROR MESSAGE OFLO, NUMERIC OVERFLOW

The OFLO error message indicates the value to be displayed exceeds the maximum size allowable for that function. This typically occurs in one of the accumulator positions (Area, Vol. Applied, or Distance Traveled). This error can be quickly cleared by zeroing the display, using the INC/DEC switch.

7.6 ERROR MESSAGE Err L, LOW VOLTAGE

The message Err L, indicates a low system voltage is being experienced by TASC. Error L will occur when the console sees power voltages less than 10.0 VDC. First check the positive and negative connections at the vehicle battery. If everything appears all right, check the condition of the vehicle battery and alternator. There may be a problem with the vehicle’s electrical system.

7.7 ERROR MESSAGES Err C, n, hook (backward 7), INTERNAL DIAGNOSTICS

These error messages may appear from time to time, usually during start up of TASC. A momentary appearance, followed by no other problems, can be safely ignored. If the messages occur very frequently during operation, or if they come on and stay on, contact your MID-TECH dealer, or the factory, for further assistance.

7.8 ERROR MESSAGE Err P, PRINT UNABLE

This message only occurs if you have connected the TASC Control Console to the external printer. It simply means the printer is asking for data but the console cannot respond until the application function is complete. This error message is covered in more detail in the printer manual.

FLUID OUNCES CONVERSION TABLE

1/8 Pint	=	2 Fluid Ounces
1/4 Pint	=	4 Fluid Ounces
1/3 Pint	=	5.33 Fluid Ounces
1/2 Pint	=	8 Fluid Ounces
2/3 Pint	=	10.67 Fluid Ounces
3/4 Pint	=	12 Fluid Ounces
1 Pint	=	16 Fluid Ounces
1 1/2 Pint	=	24 Fluid Ounces
2 Pints/1 Quart	=	32 Fluid Ounces
2 1/2 Pints	=	40 Fluid Ounces
3 Pints	=	48 Fluid Ounces
4 Pints/2 Quarts	=	64 Fluid Ounces
5 Pints	=	80 Fluid Ounces
6 Pints/3 Quarts	=	96 Fluid Ounces
7 Pints	=	108 Fluid Ounces
8 Pints/4 Quarts/1 Gallon	=	128 Fluid Ounces
1 Liter	=	33.8 Fluid Ounces

LIQUID MEASURE WEIGHT TABLE (WATER)

1 Pint Water @ 60F = 16 Fl. Oz. = 1.042 Lbs.

1 Quart Water @ 60F = 32 Fl. Oz. = 2.084 Lbs.

1 Gallon Water @ 60F = 128 Fl. Oz. = 8.337 Lbs.

(Note: Fluid Ounces are not = Dry Weight Ounces)

USEFUL FORMULAS

CARRIER RELATED, (Liquid):

Noz. Press. = [(Rate x Speed x Noz.Spacing) / (GPM40 x 939.2)]2
Where; Rate = GPA , Speed = MPH, Noz. Spacing = Inches and GPM40 = Noz.Flow @ 40 PSI

GSOP. Min = [GPM40 x 939.2 x (PMin)1/2] / (Noz. Spacing x GPA)

GSO(10 PSI) = (GPM40 x 2970) / (Noz. Spacing x Rate)
GSO(15 PSI) = (GPM40 x 3637.5) / (Noz. Spacing x Rate)
Where; GSO = Speed to Maintain a Min. Press(PMin), Rate = GPA, Noz. Spacing = Inches and GPM40 = Noz. Flow @ 40 PSI

Gal/MinBoom = (Rate x Speed x Boom Width) / 495
Where; Rate = GPA , Speed = MPH and Boom Width = Ft.

Gal/MinNoz = (Rate x Speed x Noz. Spacing) / 5940
Where; Rate = GPA , Speed = MPH and Noz. Spacing = Inches

CARRIER RELATED, (Granular):

Lbs/MinConv = (Rate x Speed x Width)/495
Where; Rate = Lb/Ac , Speed = MPH and Boom Width = Ft.

RPMConveyer = (Lb/Min x Spreader Const.) / (Prod. Density x Pulses/Rev)
Where; RPM = Conveyer Speed, Spreader Const. =Pulses/Cu.Ft., Prod. Density = Lbs/Cu.Ft.

LORAL Trucks
RPM360 = (Lb/MinConv x Spreader Const.) / (Prod. Density x 720) w/ a 360 Slot Sensor
RPM60 = (Lb/MinConv x Spreader Const.) / (Prod. Density x 120) w/ a 60 Slot Sensor

INJECTION PUMPS, (Liquid):

Oz/Min = (Rate x Speed x Boom Width) / 495
Where; Rate = Oz/Ac , Speed = MPH and Boom Width = Ft.

RPMPump = (Oz/Min x 1000) / (PC# x Pulses/Rev.)
Where; Oz/Min. = Pump Rate, PC# = Pump Cal. # and Pulses/Rev. = No. of Magnets/Rev.

RPMBarnet = (Oz/Min x 333.33) / (PC#)
RPMRandolph = (Oz/Min x 500) / (PC#)

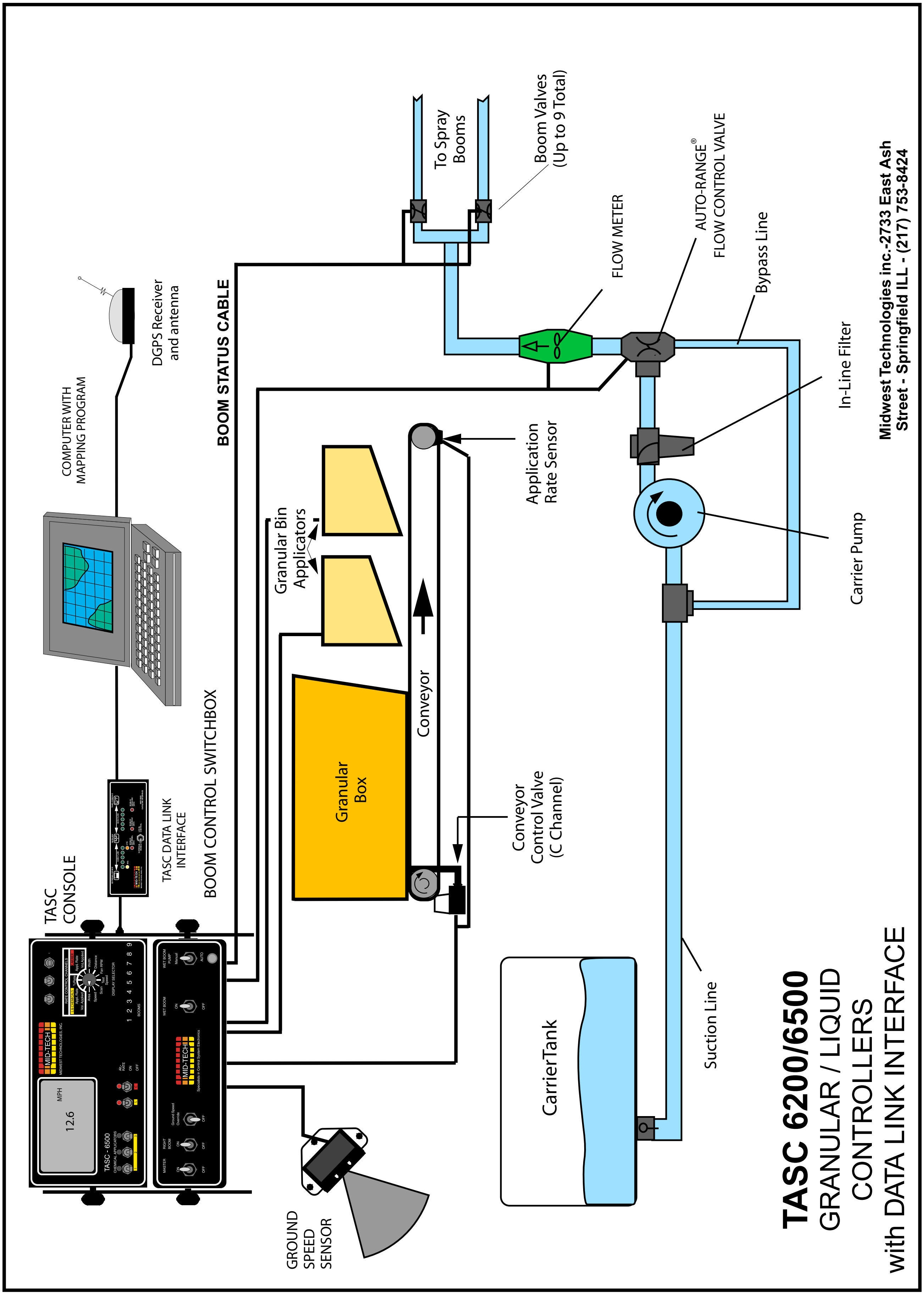
GRANULAR BIN APPLICATORS:

Lbs/Min = (Rate x Speed x Boom Width) / 495
Where; Rate = Lb/Ac , Speed = MPH and Boom Width = Ft.

RPMBin = (Lb/Min x 1,000,000) / (PC# x Prod. Density x Pulses/Rev.)
Where; PC# = Bin Cal. #, Prod. Density = Lbs/Cu.Ft., and Pulses/Rev. = No. of Sensor Slots /Rev.

RPM30 = (Lb/Min x 33333.3) / (PC# x Prod. Density), 30-Slot Sensor
RPM60 = (Lb/Min x 16666.7) / (PC# x Prod. Density), 60-Slot Sensor
RPM34 = (Lb/Min x 29411.8) / (PC# x Prod. Density), Sensor on Motor Shaft

TASC 6200/6500 SYSTEM DIAGRAM



This document is an addendum to revision 96233 of the TASC 6200/6500 operating manual, PN-999-1511. It contains changes that will appear in revision 96162 of the manual

Please make the following changes.

PAGE 2-2 / "L & Chemicals Appl." - CHANGE TO READ:

L & Chemicals Vol. Appl.

PAGE 2-2 / "L & Chemicals Rate" - CHANGE TO READ:

L & Chemicals Appl. Rate

PAGE 2-2 / "L & Chemicals Rate" - CHANGE SECOND COLUMN TO READ:

The target application rates (per acre) for channels 1, 2, 3, and L. The display cycles through the active positions. INC/DEC changes by %. ***

PAGE 3-4 / PAR. 3.6.1 - ADD:

To view the actual application rate while in the manual override mode, switch the associated rate rate switch to the alternate rate position. There must also be some ground speed.

PAGE 6-7 / PAR. 6.8/ITEM D - REPLACE WITH:

D. Turn the booms ON, Make sure there is some speed programmed into GSO (see page 6-5), and turn the GSO switch on. Switch channel C rate switch ON. The conveyor will begin to discharge.

PAGE 6-12 & FIELD CALIBRATION SHEET FOLLOWING PAGE 7-5 / SWITCH SETTINGS - CHANGE TO READ:

Power ON
Mode selector SET-UP
Display Selector L & CHEMICALS, VOL. APPLIED
Channel 1, 2 or 3 ALT RATE POSITION
(Select only one channel at a time)
All booms ON *(for observing split drive channels)*

PAGE 6-12 & FIELD CALIBRATION SHEET FOLLOWING PAGE 7-5 / FIRST PARAGRAPH - CHANGE:

Multiply the result by 1000 and multiply that result by the product density (pounds per FT^3).

TO READ:

Multiply the result by 1,000,000 and multiply that result by the product density (pounds per FT^3).

MIDWEST TECHNOLOGIES, INC. WARRANTY INFORMATION

WARRANTY

MIDWEST TECHNOLOGIES, INC. (herein called Seller) warrants to the original purchaser that, if any part of the product proves to be defective in material or workmanship, upon inspection and examination by Seller, within thirty months (2-1/2 years) of the date of manufacture, and is returned to Seller, transportation prepaid, within thirty days after such defect is discovered, Seller will (at its option) either replace or repair said product, except that the warranty for expendable parts such as light bulbs and batteries is limited to thirty (30) days. No product will be considered defective if it substantially fulfills the performance specifications. Purchaser shall be responsible for all maintenance services, if any, all in accordance with procedures outlined in Seller's maintenance literature.

WARRANTY LIMITATION AND EXCLUSION

Seller will have no further warranty obligation hereunder if the product is subjected to abuse, misuse, improper or abnormal usage, faulty installation, improper maintenance as provided in Seller's maintenance literature, or any repairs other than those provided by the Seller and/or its authorized representatives or if damages or failure is caused by or attributable to acts of God. Seller neither assumes nor authorizes anyone to assume for it any other obligation or liability in connection with said product.

DISCLAIMER OF UNSTATED WARRANTIES

THE WARRANTY PRINTED ABOVE IS THE ONLY WARRANTY APPLICABLE TO THIS PURCHASE. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE DISCLAIMED.

LIMITATION OF LIABILITY

IT IS UNDERSTOOD AND AGREED THAT SELLER'S LIABILITY, WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLIGENCE OR OTHERWISE, SHALL NOT EXCEED THE RETURN OF THE AMOUNT OF THE PURCHASE PRICE PAID BY PURCHASER AND UNDER NO CIRCUMSTANCES SHALL SELLER BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES. THE PRICE STATED FOR THE EQUIPMENT IS A CONSIDERATION IN LIMITING SELLER'S LIABILITY. NO ACTION, REGARDLESS OF FORM, ARISING OUT OF THE TRANSACTIONS UNDER THIS AGREEMENT MAY BE BROUGHT BY PURCHASER MORE THAN ONE YEAR AFTER THE CAUSE OF ACTION HAS ACCRUED.

Purchaser accepts these terms and warranty limitations unless the product is returned within fifteen (15) days for full refund of purchase price.