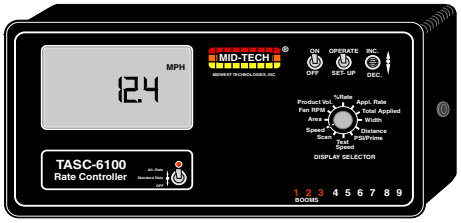
TASC-6100

LIQUID/GRANULAR
APPLICATION CONTROL SYSTEM
USER GUIDE
PN - 98-05018
R2
Software Version 1.30

CE & Standard Version



Midwest Technologies, Inc. of Illinois
Springfield, IL 62703

CHANGE LOG

DATE:	DATE CODE:	PAGES AFFECTED:	SW VERSION
4/24/98	98114	New Manual(TASC-6100 w/Fan RPM)	1.20
10/1/98	98114	A-4 (No Revision Change)	1.20
5/15/00	00060	All - New Format/SW, CE Console	1.30
2/20/00	01110	Corrected graphic, updatedlogo & warranty, cleaned up text	1.30

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List of Illustrations

How to Use This Manual

This manual is designed to provide you with the basic information needed to set up and operate the Mid-Tech® TASC 6100 control system. Actual procedures may vary somewhat, depending on the configuration of your system.

When you see "Mitch", he is pointing out special information that you should be aware of, regarding safety, preventing console damage, an easier way to perform an operation, etc..

Below is a listing of the chapters in this manual, along with a brief description of the information found in each chapter.

Chapter 1 - Switches and Controls - Lists each control switch, on the face of the console, and gives a brief description of its use.

Chapter 2 - Calibration and Setup - Takes you, step by step, through the calibration of each sensor providing input to the console, and entering other information the console needs to perform the functions you require.

Chapter 3 - Operation - Briefly describes how to initiate the application operation.

Chapter 4 - Trouble shooting - Lists possible causes and remedies for the error codes that appear on the TASC display if the console detects a problem.

Chapter 5 - Maintenance - Covers the basic maintenance needed to keep your system operating at peak performance.

Chapter 6 - Emergency Operations - Suggests ways to operate, **under reduced accuracy**, in the event of a major fault.

Appendix A - Sample system wiring and plumbing diagrams.

Appendix B - System Overview - Describes the major components of the TASC system and their individual functions in application control.

Appendix C - Glossary/Tables

Back Cover - Quick Start/Quick Set Up Guides

CHAPTER 1 SWITCHES AND CONTROLS

Several switches and indicators serve as the interface between the operator and the Mid-Tech control system.

CONSOLE SWITCHES AND INDICATORS

This section shows the location of each switch and indicator found on the TASC 6100 control console and discusses its function in both the Operate and Setup modes.

POWER SWITCH

The power switch (see #1 in Fig. 1-1) controls power to the console. The CE console has an "Auto Power Down" feature which powers the console off after a operator selectable time has elapsed. The console has a nonvolatile memory so it "remembers" the constants and data previously entered, even with the power removed.

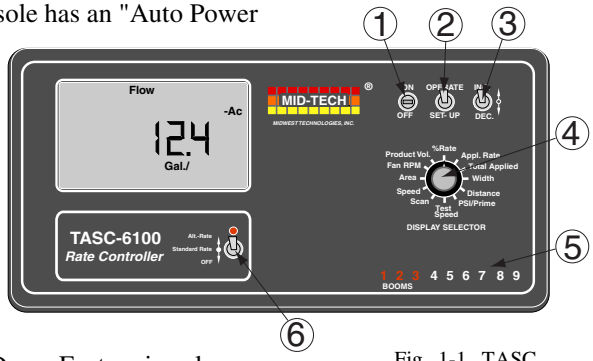


Fig. 1-1. TASC Console Switches and Indicators

NOTE: The "Auto Power Down Feature is only available on the CE version of the console (CE designation label on back of console).

MODE SELECTOR SWITCH

The Mode Selector switch (see #2 in Fig. 1-1) switches between the OPERATE and SET-UP modes of the control console. This switch must be in the "OPERATE" position when applying product. The "SET-UP" position is used for entering set-up information into the console. In the SET-UP Mode an "**Err**" message appears if a position which can not be programmed is selected.

INC / DEC Switch

The Increase/Decrease (INC/DEC) switch (see #3 in Fig. 1-1) is used, in both the OPERATE and SET-UP modes, to adjust the values appearing in the display.

Boom Section "ON/OFF" Indicators

The boom section On/Off indicators (see #5 in Fig. 1-1) indicate which boom sections the operator has selected. When a boom is turned on, its indicator is lit. There are a maximum of nine boom sections available.

Rate Switch

The Rate Selector switch (see #6 in Fig. 1-1) is a three position switch that allows the operator to select either a pre-selected standard rate, an alternate rate, or stop the application.

Display Selector Switch

The Display Selector (see #4, Fig. 1-1) is used to choose which of the console functions is displayed on the screen and is available for setting by the operator.

Display Selector - Operate Mode (Liquid)

(See Fig. 1-2)

Speed: The current vehicle speed.

Area: Area Accumulator #1. The total area treated since the counter was last reset.*

Fan RPM: Not used in liquid mode.

Product Vol: Amount of product aboard the vehicle. Value counts down as the product is applied and alarm sounds when 10 % of the full load is left.**

% Rate: The percent of programmed application rate at which the system is applying product.***

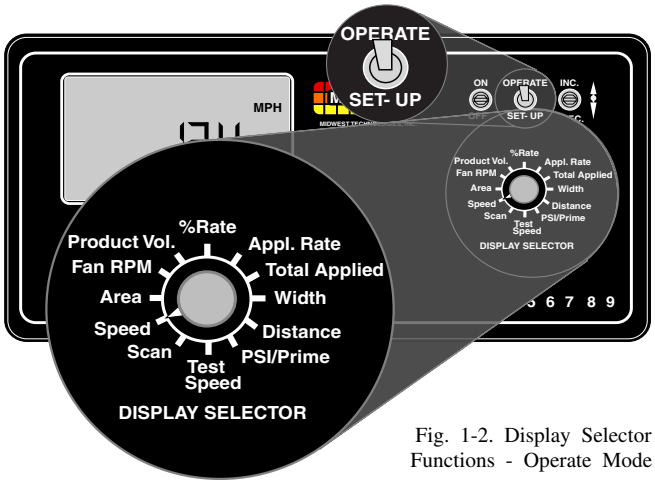


Fig. 1-2. Display Selector Functions - Operate Mode

Application Rate: Displays the target application rate when the ground speed is zero or all booms are OFF.** The actual application rate is displayed here once application has started.

Total Applied: The total volume of product applied since the last time the counter was reset, as measured by the pressure sensor or flow meter.*

Impl. Width: The active boom width, (total of all boom sections turned ON).

Distance: The total distance traveled since the last time the counter was reset.

PSI/Prime: Used to open the control valve during product pump priming, for fast unload, and to display boom pressure when operating in pressure based mode.

Test Speed: The speed the console uses for stationary tests of the sprayer.**

Scan: The display scans **Speed**, **Area #1**, **Product Vol.**, **Application Rate**, **Total Applied**, and **Fan RPM**, stopping at each position for approximately two seconds before automatically cycling to the next.

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

Display Selector - Setup Mode (Liquid)

(See Fig. 1-3)

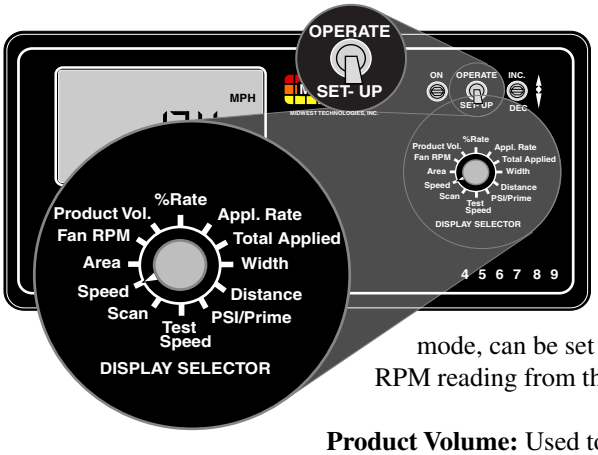


Fig. 1-3. Display Selector Functions - Set-Up Mode

Speed: Ground speed override (GSO) value.**

Area: Area Accumulator #2. The total area treated since the counter was last reset.*

Fan RPM: The current fan RPM. calibration number. Since not used in liquid mode, can be set to zero to remove the fan RPM reading from the scan feature.**

Product Volume: Used to set the full load value of the vehicle.**

% Rate: The percent rate change value (the percent by which the programmed application rate can be changed with each activation of the INC/DEC switch).**

Application Rate: Psi mode - A flow sensor cal. # correction factor that allows for corrections due to differences in product viscosities without changing the base cal. #. STnrd and rEFLO modes - ERR, No function in this mode.

Total Applied: The pressure sensor or flow meter calibration number. **NOTE: Must have all booms ON when in REFLOW Mode.****

Width: Individual boom section widths. The display cycles through the individual boom sections, in order, unless a particular boom switch is activated and the boom master switch is ON.**

Distance: The current distance calibration number.**

PSI/Prime: The current console operating mode.**

Test Speed: The current test speed.**

Scan: ERR, No function in SETUP mode.

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

Display Selector - Operate Mode (Gran.)

(See Fig. 1-2)

Speed: The current vehicle speed.

Area: Area Accumulator #1. The total area treated since the counter was last reset.*

Fan RPM: The current speed of the fan (spinners).

Product Vol.: Amount of product aboard the vehicle.**

% Rate: The percent of programmed application rate at which the product is being applied.***

Application Rate: Displays the target application rate, when the ground speed is zero or all booms are OFF. ** Once application begins, the actual application rate is displayed here.

Total Applied: The total volume applied since the accumulator was last reset, as measured by the rate sensor.*

Impl. Width: The active spread width, (total of all spreader sections turned "ON").

Distance: The total distance traveled since the last time the counter was reset.

Prime: Used to open the control valve. It can be used in the granular application to unload the vehicle at its maximum discharge rate.

Test Speed: The speed the console uses for stationary tests of the spreader.**

Scan: The display scans **Speed**, **Area #1**, **Product Volume**, **Application Rate**, **Total Applied**, and **Fan RPM** (if Fan RPM Cal # not set to zero). The display stops at each position for approximately two seconds before automatically cycling to the next.

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

Display Selector - Set-Up Mode (Gran.)
(See fig. 1-3)

Speed: Ground Speed Override (GSO) value.**

Area: Area Accumulator #2. The total area treated since the counter was last reset.*

Fan RPM: The current fan RPM calibration number. This cal # can be set to zero to remove the fan RPM reading from the scan feature.**

Product Volume: Used to set the full load capacity of the vehicle.**

% Rate: The percent rate change value (the percent by which the programmed application rate can be changed with each activation of the INC/DEC switch).**

Application Rate: Product density.**

Total Applied: The rate sensor calibration number [spreader constant].**

Width: Individual boom section widths.**

Distance: The current distance calibration number.**

Prime: The current console operating mode.**

Test Speed: The current test speed.**

Scan: Err, No function in the SETUP mode.

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

IMPLEMENT STATUS INPUT

An external “Implement Status” input can be used to override the TASC control. The input must present a positive voltage (+12.0 VDC) on the boom interface cable sense line. As long as this condition is present, the control console operates normally. If the voltage is interrupted, the control console automatically stops applying. At the same time, the control console will either "HOLD" or

"CLOSE" the control valve, depending on the response selected by the operator. (See Page 2-7).

This feature allows the operator to control the operation of the control valve through the normal operation of the vehicle. The implement status input can be used to sense the **ON/OFF** condition of the main vehicle pump switch, a separate Master switch, or, an external switch sensing an implement "UP"/ "DOWN" condition.

GROUND SPEED OVERRIDE SWITCH (GSO)

If your TASC system includes an optional MID-TECH® Boom Control Switch Box, the GSO switch is already installed. An optional, externally mounted, GSO switch can be used to temporarily operate the vehicle using a pre-selected GSO minimum speed rather than the actual speed registered by the ground speed sensor. The override feature is used to allow the vehicle to reach the application rate quickly when starting from a complete stop or to maintain a good application pattern when the vehicle is moving at very low ground speeds. It can also be used to allow the operator to flush or empty the tank of a sprayer, or empty the bed of a spreader, from the cab, with the vehicle stopped.

Fig. B-8, in Appendix B, shows a "Boom Control Switch Box" which incorporates the Implement Status Switch and the GSO function into one switch. The "OFF" position provides a Status Switch "OFF" condition, "AUTO" furnishes Status Switch ON, and "GSO" activates the GSO function. Other methods of controlling these functions are also available. This switchbox also includes an individual ON/OFF switch for each boom section.

The control console operates normally as long as the GSO switch condition is open (OFF). Whenever the override switch is closed (ON) and the actual ground speed is <u>less than</u> the GSO Speed, the control console automatically uses the GSO Speed to control application rate. As soon as the switch reverts to its normally open (OFF) condition, or the actual ground speed increases above the preset GSO speed, the control console will adjust the rate based on the actual ground speed.

CAUTION: Controlling application rates based on a GSO Speed is not as accurate as using the actual ground speed. When GSO is being used and the true ground speed is less than the GSO speed", the console sounds an alarm and the display flashes a "Too Slow" message to warn the operator of over application.

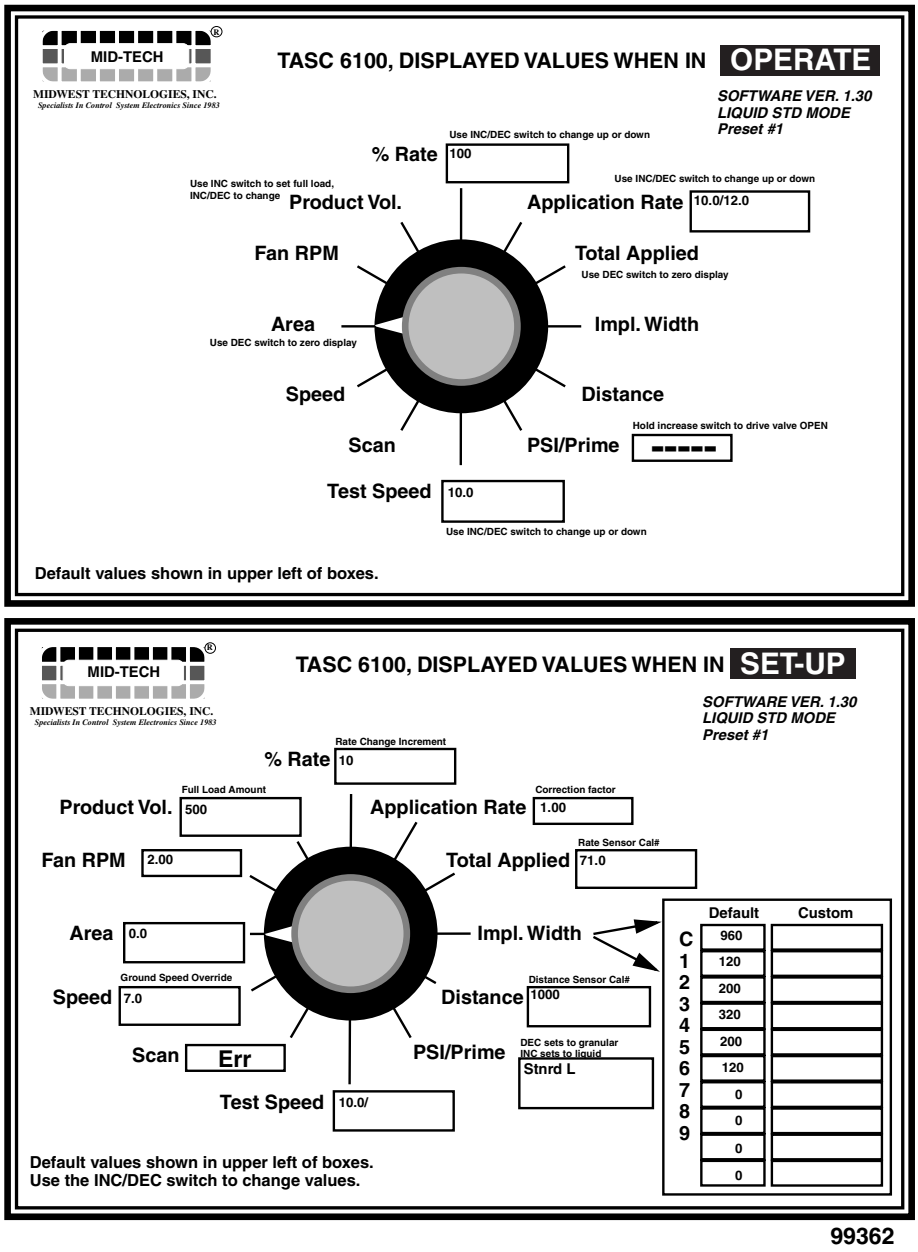


Fig. 1-4. TASC 6100 Default Values - Liquid Standard Mode

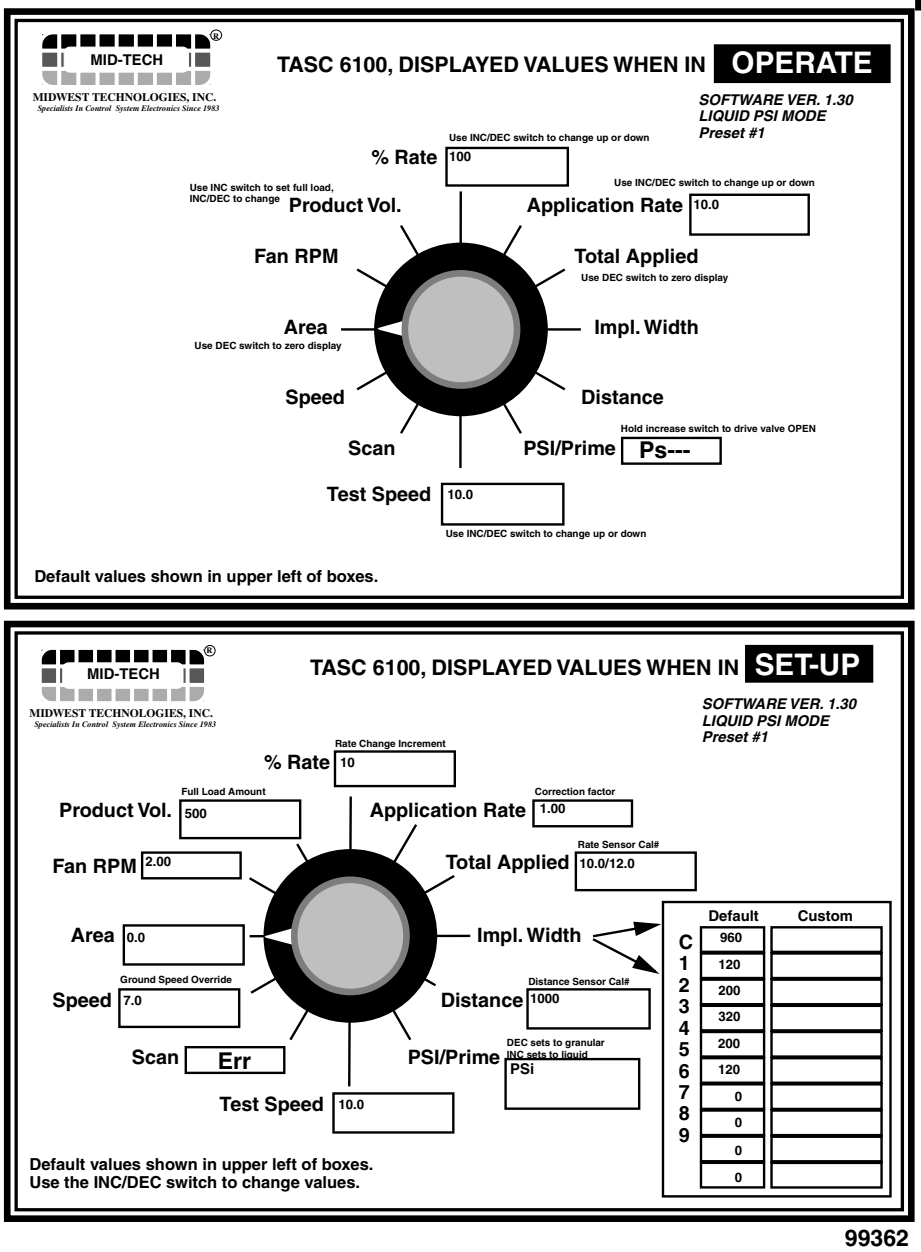


Fig. 1-5. TASC 6100 Default Values - Liquid Pressure Mode

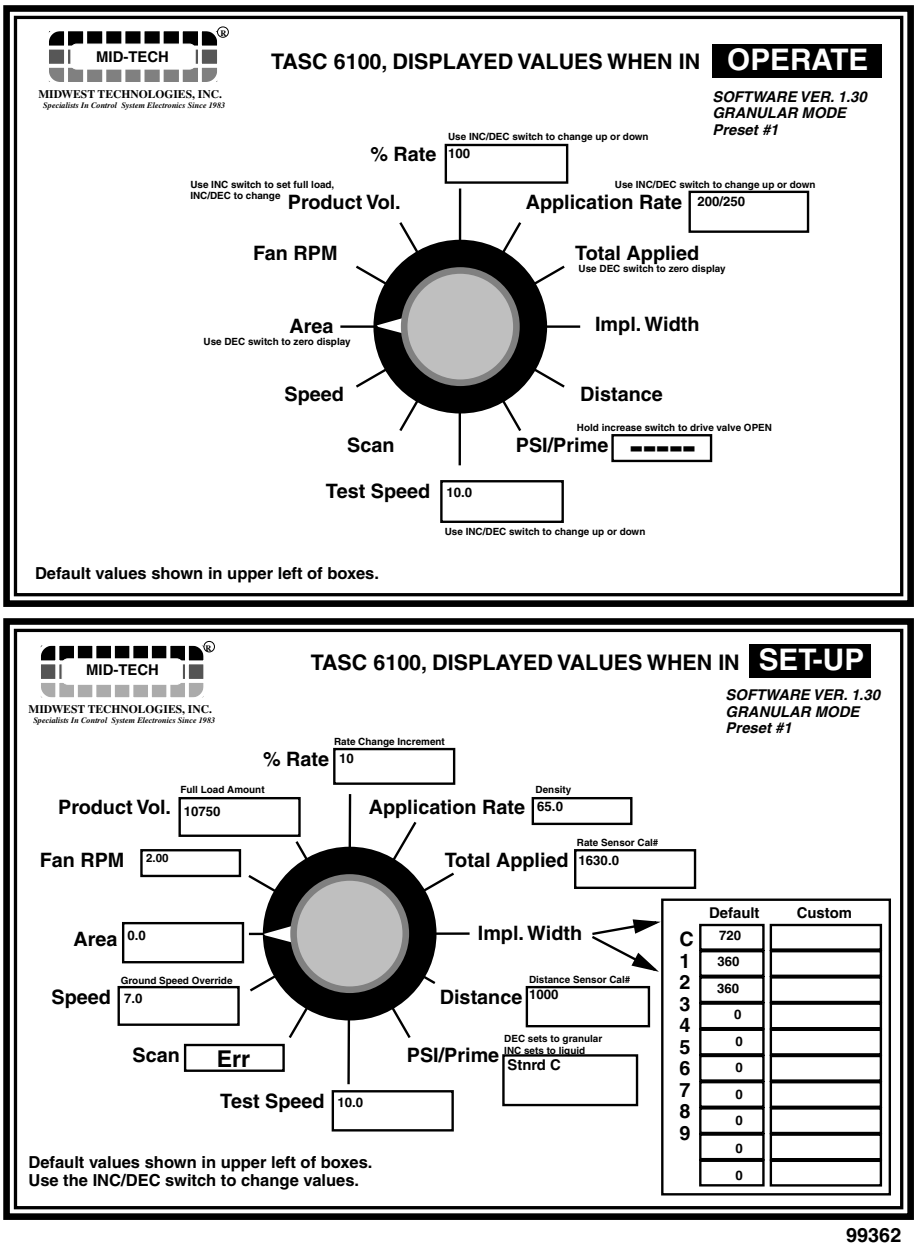


Fig. 1-6. TASC 6100 Default Values - Granular Mode

CHAPTER 2 CALIBRATION

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

Setup & Cal.

Specific information about your applicator (i.e. application rates, boom widths, test speed, etc.) must be programmed into the control console and the flow/rate and ground speed sensors must be calibrated before the system is ready to use. The calibration and set up procedures are not difficult but must be followed precisely in order to get the maximum possible accuracy out of the system.

SELECTING THE APPLICATION PROGRAM

Verify that the proper console application program is selected.

To view the program currently selected, set the Mode switch to **Setup** and the Display Selector to **PSI/Prime**.

Pump L PSi(bAr) is LIQUID PRESSURE application (normal pressure based spraying)
Pump L STnrd is STANDARD LIQUID application (normal flow based spraying)
Pump L rEFLO is LIQUID REFLOW application (for use on some European sprayers)
Pump C STnrd is standard GRANULAR application (single conveyor spreaders)
Pump C SPLit is GRANULAR SPLIT DRIVE application (dual conveyor spreaders)

To change programs, hold the INC. switch up to set LIQUID and cycle between standard, reflow, and pressure. Hold the DEC. switch down to set GRANULAR and cycle between standard and split drive. The display changes about every ten seconds. The program being displayed, when the INC./DEC. switch is released, is the program selected. If you have a question about which application to use, check with your dealer or call MID-TECH Customer Service.

SELECTING ENGLISH OR METRIC, UNITS

The control console is capable of displaying either US or Metric units of measure.

UNITS FOR EACH DISPLAY SELECTOR SWITCH POSITION

(Liquid Mode)**

POSITION	US	METRIC
Speed	Miles/Hour (mph)	Kilometers/Hour (kmph)
Field Area	Acres (acre)	Hectares (ha)
Total Area	Acres (acre)	Hectares (ha)
Product Vol.	US Gallons (gal.)	Liters (l)
Appl. Rate	US Gallons/acre (gpa)	Liters/Hectare (l/ha)
Total Applied	US Gallons (gal.)	Liters (l)
Impl. Width	Inches - Feet (in., ft.)	Meters (m)
Distance	Feet - Miles (ft.-miles)*	Meters - Kilometers (m-km)*
Test Speed	Miles/Hour (mph)	Kilometers/Hour (kmph)

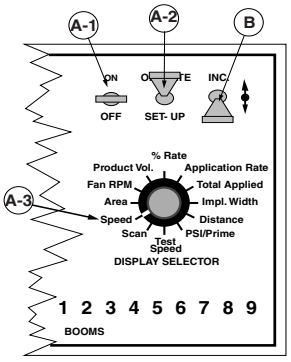
UNITS FOR EACH DISPLAY SELECTOR SWITCH POSITION

(Granular Mode)**

POSITION	US	METRIC
Speed	Miles/Hour (MPH)	Kilometers/Hour (KPH)
Field Area	Acres (Ac)	Hectares (-Ha)
Total Area	Acres (Ac)	Hectares (-Ha)
Product Vol.	Pounds (lb)	Kilograms
Appl. Rate	pounds/Acre (lb/Ac)	Kilograms/Hectare (-Ha)
Total Applied	Pounds-Tons (lb -Tons)	Kilograms-Metric Tons
Impl. Width	Inches-Feet (In.-Ft.)	Meters (Meters)
Distance	Feet-Miles (Ft.)*	Meters-Kilometers (Meters)*
Test Speed	Miles/Hour (MPH)	Kilometers/Hour (KPH)
Prod. Density	Pounds/Cubic Ft. (Cu Ft.)	Kilograms/Tenths Meter^3 (Meters Cu)

* No units displayed after roll over of feet to miles or meters to kilometers
** Items in parenthesis are the abbreviations that appear on the screen.

CHANGING UNITS



A. Set the console switches to the following positions:

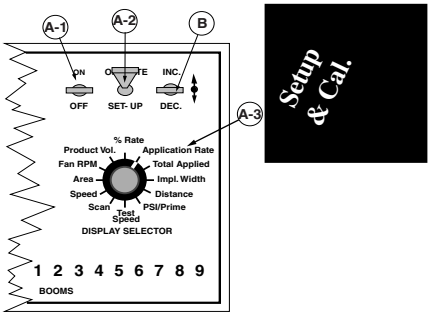
1. Power	**ON**
2. Mode Selector	**OPERATE**
3. Display selector	**Speed**

The display shows the current speed units.

B. Hold down the INC./DEC. switch for approximately 5 sec. The display alternates between MPH (US) and KPH (Metric). Release the switch when the mode that you desire is being displayed.

SETTING APPLICATION RATES

The TASC 6100 system is designed to maintain a constant, pre-selected application rate. In order for the control console to do this, the operator must enter the desired application rate. Two, switch selectable, rates can be pre-programmed into the console.

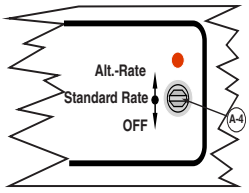


Standard Rate

A. Set the console switches to the following positions:

1. Power **ON**
2. Mode Selector **OPERATE**
   (APPLICATION RATE IS SET IN THE OPERATE MODE!!!)
3. Display Selector **Application Rate**
4. Rate switch **Standard Rate**

The display shows the current application rate.



B. Use the INC./DEC. switch to set the desired rate.

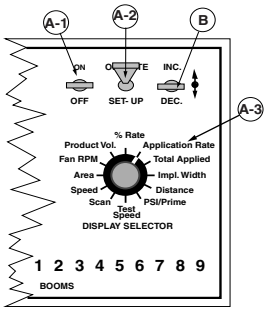
Setting the APPLICATION RATE to 0.0 will turn off the flow control function.

Alternate Rate

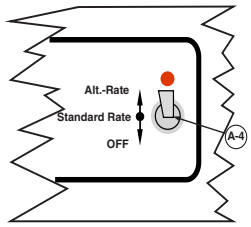
C. Set the console switches to the following positions:

1. Power **ON**
2. Mode Selector **OPERATE**
   (APPLICATION RATE IS SET IN THE OPERATE MODE!!!)
3. Display Selector **Application Rate**
4. Rate switch **Alt.- Rate**

The display shows the current application rate.



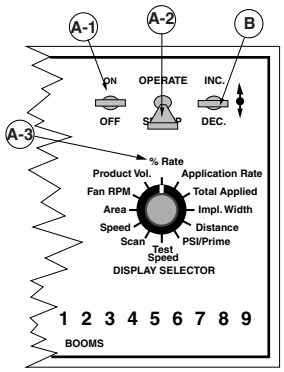
D. Use the INC./DEC. switch to set the desired rate.



SETTING THE % RATE CHANGE

This feature allows the operator to change the application rate "ON THE GO" with a simple actuation of the INC./DEC. switch. The amount of change each switch actuation makes is proportional to the value programmed into this position, (e.g. 20 =20%

change in the target rate). For example, with the application rate set to 10.0 gallons per acre, a single actuation of the INC. switch causes the system to control flow at the rate of 12.0 gallons per acre (10.0 + 20% = 12.0).



A. Set the console switches to the following positions:

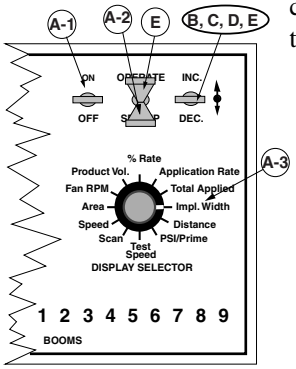
1. Power	**ON**
2. Mode Selector	**SET-UP**
3. Display Selector	**% Rate**

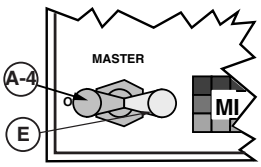
The display shows the current % change value.

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

SETTING BOOM WIDTHS

The MID-TECH control console is designed to automatically compensate for changes in the swath width, caused by turning boom sections on or off. To accurately respond to changes in swath width, the console must know the length of each boom section. Use the following procedure to set boom section widths.





A. Set the console to the following positions;

1. Power	**ON**
2. Mode Selector	**SET- UP**
3. Display Selector	**Impl. Width**
4. Boom switches (or Master switch)	**OFF**

The display cycles through each boom position (1 through 9) and displays its current width in inches (meters).

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

C. Set all unused boom sections to a width of zero “0” inches (meters). This insures that accidentally turning a boom switch **ON** doesn’t affect the control console. (An ERROR 0 Boom # will then result if an unused boom gets accidentally turned on)

D. Finally, let the boom width display cycle through the boom sections until it shows “Boom C”. When the “C” width is displayed, set it to the normal operating width of the entire sprayer, **in inches (meters)**, using the INC./DEC. switch.

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

Record these calibration numbers on last page of manual.

Boom widths are entered in inches in the US system. For example; for a liquid boom with 7 nozzles on 30" spacings, enter 210 for that boom. There is no need to convert to feet, the control console does that automatically when it is switched back to the Operate Mode. (In metric, all widths are entered in meters.)

DISTANCE CALIBRATION - GROUND SPEED SENSOR

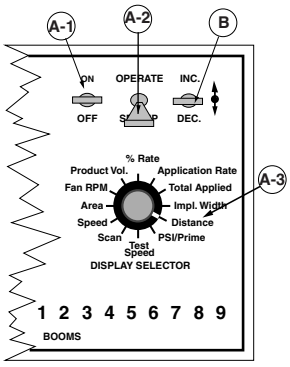
General Considerations and Initial Calibration Numbers

The control console must be calibrated for the ground speed sensor installed to ensure accurate application rates. The procedure involves physically measuring an accurate distance along a road or field, driving the vehicle through that distance, mathematically comparing the distance computed by the control console to the actual measured distance, and making any necessary adjustments to the distance calibration number. Follow the recommended procedure below to ensure accuracy of operation.

The distance calibration should be checked periodically to maintain its accuracy. This is especially important if the sensor mounting has become loose or has been repositioned, or if the tires have been changed.

Use the following initial calibration numbers. **It is important to field calibrate the distance sensor to insure maximum accuracy!**

MID-TECH® COMPACT RADAR - 780
Dj RADAR - 1000
WHEEL SENSOR - 3500
SPEEDOMETER SENSOR - 3500



A. Set the control console switches to the following settings:

1. Power	**ON**
2. Mode Selector	**SETUP**
3. Display Selector	**Distance**

The display shows the current distance calibration value.

B. Use the INC./DEC. switch to enter the initial distance calibration number suggested.

You can now perform the distance calibration.

Distance Calibration Procedure

The following procedure is recommended by MIDWEST TECHNOLOGIES for establishing an accurate distance calibration. **NOTE: All boom switches should remain OFF during the entire procedure.**

A. Fill the vehicle 1/2 full of material (unless it is a pull type unit with the speed sensor mounted on the tow vehicle), to approximate average load conditions.

B. Measure a known distance of at least 400 ft. in a field or roadway (preferably in terrain similar to that being treated). A longer distance, allows for a more accurate calibration.

C. Record the current distance cal. #, which can be viewed using the switch settings shown in the "**GENERAL CONSIDERATIONS AND INITIAL CALIBRATION NUMBERS"** section above. For this example assume an initial cal. # of 760.

D. Move the vehicle to the starting point of the measured distance.

E. Reset the distance accumulator to zero (see page 2-11)

F. Drive the vehicle to the other end of the measured distance at a speed of between five and ten miles per hour. Distance will accumulate on the display.

G. Stop the vehicle at the measured distance end marker. Compare the distance indicated by the console to the actual measured distance, to determine how much correction is necessary. For example: if the indicated distance is 396 Ft. after driving over a 400 foot range, the error in the distance calibration is 1.0%.

H. Calculate the new distance calibration number using the following formula:

$$\frac{\text{Measured distance}}{\text{Indicated distance}} \times \text{Old DC\#} = \text{New DC\#}$$

Example:

$$\frac{400}{396} \times 760 = 768, \text{ the New DC\#}$$

NOTE: Use the same equation, regardless of the type of distance sensor .

I. Enter the corrected cal. # using the switch settings shown in the "**GENERAL CONSIDERATIONS AND INITIAL CALIBRATION NUMBERS**" section above. Switch back to the **OPERATE** mode. The distance accumulator should now agree with the measured distance that you traveled. If it doesn't , recheck your calculations.

RECORD THIS CALIBRATION NUMBER ON LAST PAGE OF MANUAL.

SETTING THE HOLD/CLOSE RESPONSE OF THE FLOW CONTROL VALVE

The operator can select a "Hold" or "Close" response of the flow control valve to both "Implement Status switch" and "All Booms **OFF**" conditions. These responses are independent of each other, allowing the operator to select a "Hold" condition for one and a "Close" for the other. Careful consideration should be given to both conditions and the response selected for your application.

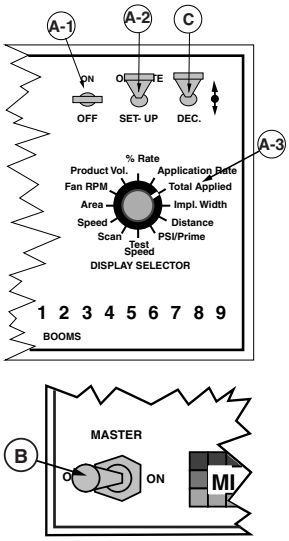
Implement Status Switch

When the operator selects the "Hold" condition, deactivation of the Implement Status switch (open circuit) hold's the flow control valve in its current position. When

turning on the Implement Status switch (closed circuit) the flow control valve is already open and product flow is instantaneous. This response assumes that some other device, such as a boom section valve, has stopped the product flow.

When the operator selects the "Close" condition, deactivation of the Implement Status Switch (open circuit) automatically causes the flow control valve to close. This response is preferred when it is necessary to use the flow control valve to stop the product flow.

Use the following procedure to set the Status switch response.



A. Set the console to the following positions;

1. Power	**ON**
2. Mode Selector	**OPERATE**
3. Display Selector	**Total Applied**
4. Boom switches (or Master switch)	**OFF**

B. Hold the INC./DEC. switch up to display the current setting (**Hold** or **Close**). Continuing to hold the INC. switch up will cause the display to alternate between the two options at about three to ten second intervals. The option appearing in the display when the INC. switch is released is the response selected.

All Booms Off

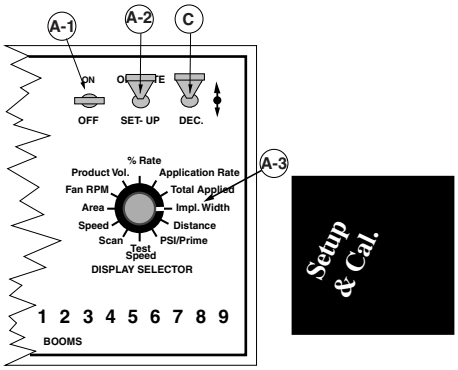
When the operator selects a "Hold" condition, an “All Booms **OFF**" condition (either all Boom switches or the Master switch **OFF**) hold’s the flow control valve in its current position. When the boom valves are turned **ON** again the flow control valve is already open and product flow is instantaneous.

When the "Close" condition is selected, an “All Booms **OFF**" condition automatically causes the flow control valve to close. This response is preferred when it is necessary to use the flow control valve to stop the product flow.

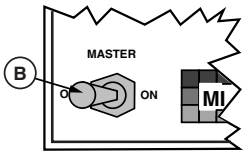
Use the following procedure to set the "All Booms **OFF**" response.

A. Set the console to the following positions;

1. Power	**ON**
2. Mode Selector	**OPERATE**
3. Display Selector	**Impl. Width**
4. Boom switches (or Master switch)	**OFF**



B. Hold the INC./DEC. switch up to display the current setting (**Hold** or **Close**). Continuing to hold the switch up causes the display to alternate between the two options at about three to ten second intervals. The option appearing in the display when the INC. Switch is released is the response selected.



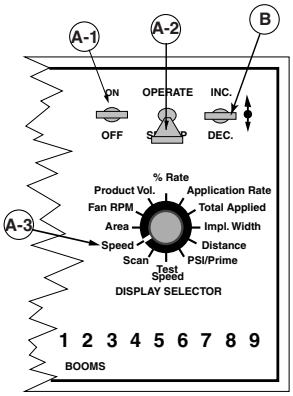
SETTING THE GROUND SPEED OVERRIDE (GSO) VALUE

To use the GSO feature, set the GSO value to the minimum ground speed you want to control to when the GSO switch is activated. This should be the lowest speed at which the vehicle can dispense material satisfactorily. If you do not intend to use this feature, set this value to zero (0.0). (See page 1-7 for a more complete description of GSO operation.)

Use the following procedure to set the GSO Speed.

A. Set the console to the following positions;

1. Power	**ON**
2. Mode Selector	**SET-UP**
3. Display Selector	**Speed**

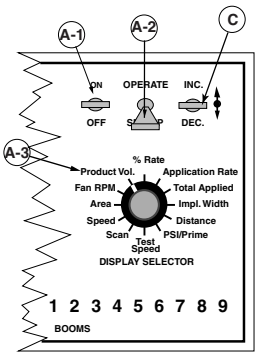


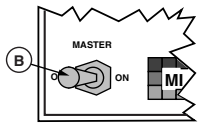
B. Use the INC./DEC. switch to set the GSO speed to the desired value.

CAUTION: When traveling at a speed slower than the GSO speed setting, this feature will cause the product to be applied at a rate consistent with the GSO speed, rather than the true ground speed, possibly resulting in serious over application. When Ground Speed Override is being used, and the true ground speed is less

than the pre-selected GSO Speed, the console will sound an alarm and the display will flash a "Too Slow" message to warn the operator of possible over application.

PRODUCT VOLUME (FULL LOAD VALUE)





Setting the Full Load Value

The Full Load Value of the vehicle can be preset into the console and automatically recalled when the vehicle is reloaded.

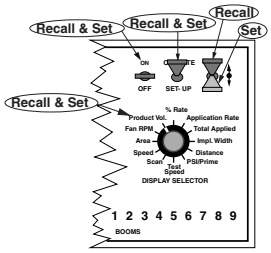
Use the following procedure to set the Full Load Value into the console.

A. Set the console to the following switch settings:

1. Power	**ON**
2. Mode Selector	**SET-UP**
3. Display Selector	**Product Vol.**
4. Boom switches (or Master switch)	**OFF**

The display shows the current Full Load Value.

B. Use the INC./DEC. switch to set the desired Full Load Value.



Recalling the Full Load Value

When **Product Vol.** and **OPERATE** mode are selected, the Full Load Value of the vehicle can be recalled by holding the INC. switch up for at least three seconds.

Setting a Load Value Less than Full Load

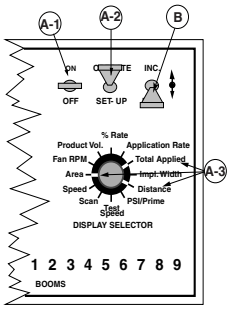
If a full load is not taken aboard the vehicle, the actual amount loaded can be set without changing the Full Load Value. First recall the Full Load Value as explained in the previous section, then use the INC./DEC. switch to set the actual volume loaded into the tank.

Low Product Alarm

The Low Product Alarm alerts the operator when the Product Vol., displayed on the console, reads 10% of the Full Load Capacity. The console beeps for three seconds and displays the message "LO" - "PROD". Console control functions are not affected by this alarm. To disable the alarm, do not recall the Full Load Capacity.

Setup & Cal.

Resetting Accumulators



Use the following method to reset the Area, Distance, and Total Applied accumulators to zero:

A. Set the Console to the following switch settings:

1. Power	**ON**
2. Mode Selector	**OPERATE**
3. Display Selector	**Area / Total Applied /Distance**

B. Hold the INC./DEC. Switch to DEC. until the display reads zero (Approximately 3 sec.)

NOTE: There is also an Area/SET-UP accumulator.

Operating Under External Rate Commands

When the TASC 6100 console is operating under external rate commands, it must be connected to the computer running the field mapping program through a Mid-Tech Data Link. Minimum and maximum anticipated rates must be programmed into the **Standard Rate** and **Alt.-Rate** positions of the Rate switch respectively and the Rate switch must be placed in the **Alt.-Rate** position. The instructions, received with the Data Link, explains in more detail how to set up the TASC 6100 and Data Link.

LIQUID ONLY SET-UP

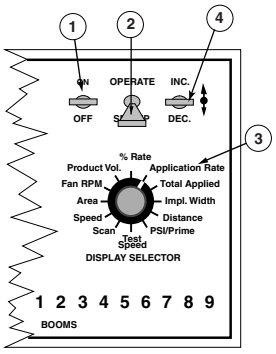
SETTING THE CORRECTION FACTOR

(Pressure based (Pump L Psi (br)) only)

NOTE: The Correction Factor is locked at 1.00 when in STnrd and rEFLO modes

If you are spraying water solutions, the correction factor should be set to 1.00. If you are spraying a solution with a specific gravity different than that of water, adjust the correction factor according to the following chart.

Weight of Solution	Correction Factor
7.0 lbs/gal	.92
8.0 lbs/gal	.98
8.34 lbs/gal - Water	1.00
9.0 lbs/gal	1.04
10.0 lbs/gal	1.10
10.65 lbs/gal - 28% Nitrogen	1.13
11.0 lbs/gal	1.15
12.0 lbs/gal	1.20
14.0 lbs/gal	1.30



To enter the correction factor, set the console to the following switch settings:

1. Power **ON**
2. Mode Selector **SET-UP**
3. Display Selector **Application Rate**
4. Use the INC./DEC. switch to adjust the correction factor.

FLOW SENSOR CALIBRATION

Determining The Initial Calibration Number

The control console **must be calibrated** for the flow sensor being used. The calibration number required by the control console is the actual number of electrical pulses per unit volume generated by the sensor, or, for the pressure sensor, the gallons per acre rating of the nozzles being used. **If you have any doubts as to the accuracy of the application rate,**

a field calibration/catch test should be performed. (see page 2-16)

Verify that the correct application program is selected. (see page 2-1)

Check the Correction Factor, to ensure that it is set correctly. (see page 2-11)

FLOWMETER
(for Pump L STnrd applications)

Flowmeters are calibrated for water at the factory and the suggested calibration numbers are listed below. These numbers are meant to be initial cal. #'s since actual flow characteristics may differ, due to plumbing variations or other factors.

STANDARD FLOWMETERS

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*

MID-TECH RAPID CHECK FLOWMETERS

SIZE	RANGE	CAL. #	SIZE	RANGE	CAL. #
1.00 inch	0.75 - 5 gpm	3200	1.50 inch	2.5 - 25 gpm	612.4
1.00 inch	2.5 - 16 gpm	800	1.50 inch	2.6 - 53 gpm	361.9
			2.00 inch	20.0 - 195 gpm	94.5

* Raven flow meters, use the factory calibration number divided by 10. All other flowmeters use the manufacturers' supplied information regarding the pulses per gallon (usually provided on a tag on the flowmeter).

Once the initial calibration number is entered into the console, per page 2-14, proceed to page 2-16 to fine tune the flowmeter for maximum accuracy.

Pressure Sensor (U.S. Units)
(for Pump L Psi "US" applications)

The **Pressure Sensor** calibration number can be found by determining the "Gallons per Acre" rating for the type of nozzles being used. Find the chart that represents the nozzle series you are using and the nozzle spacing of your boom. Then find the nozzle size needed for the

range of speeds and the rate needed. When the nozzle is selected, find the column of nozzle ratings in "Gallons per Acre" at 10 MPH. Then, on the left of the chart, find the horizontal line representing the ratings at 30 PSI. Where the column and row intersect you will find the "Gallons per Acre" rating of your nozzles at 10 MPH and 30 PSI. This is the value to enter into the console as the pressure sensor cal. #. For example, in the following chart, for a floodjet K-SS10 nozzle, the row for 30 PSI and column for 10 MPH intersect at 26 gallons per acre, the pressure sensor cal. number for this particular nozzle.

NOTE: You must use the 30 PSI / 10 MPH value regardless of the speed and pressure at which you are operating.

Type		Liquid Pressure in PSI	Capacity in GPM MPH	Gallons per Acre 40" Spacing			
Floodjet Tip No.	Floodjet Nozzle			6 MPH	8 MPH	10 MPH	12
TK-SS10	K-SS10	10	1.0	25.0	16.6	**14.9**	12.4
		20	1.4	35.0	26.0	**21.0**	17.5
		30	**1.7**	**43.0**	**32.0**	**26.0**	**21.0**
		40	2.0	50.0	37.0	**30.0**	25.0
TK-SS15	K-SS15	10	1.5	37.0	28.0	**22.0**	18.6
		20	2.1	53.0	39.0	**32.0**	26.0
		30	2.6	64.0	48.0	**39.0**	32.0
		40	3.0	74.0	56.0	**45.0**	37.0

Use the circled number for the flowmeter cal. number in this example.

Pressure Sensor (Metric Units)
(for Pump L bAr "Metric" applications)

The **pressure sensor** calibration number can be found by determining the "Liters per Hectare" rating for the type of nozzles being used. First find the chart that represents the nozzle series you are using and the nozzle spacing of your boom. Then find the nozzle size needed for the range of speeds and the rate needed. When the nozzle is selected find the column of nozzle ratings in "Liters per Hectare" at 10 KPH. Then, on the left of the chart, find the horizontal line representing the ratings at 2.0 BAR. Where the column and row intersect you will find the "Liters per Hectare" rating of your nozzles at 10 KPH and

2.0 BAR. This is the value to enter into the console as the pressure sensor cal. #. For example, in the following chart, for a 8002-SS nozzle, the row for 2.0 BAR and column for 10 KPH cross at 78.0 Liters per Hectare, the pressure sensor cal. # for this particular nozzle.

NOTE: You must use the 2.0 BAR / 10 KPH value regardless of the speed and pressure at which you are operating.

Tip No.	Liquid Pressure in bar	Capacity in l/min	Liters per Hectare 50 cm Spacing 7 km/h	8 km/h	10 km/h	12 km/h
	2.0	**0.65**	**111**	**97.5**	**78.0**	**65.0**
TP8002-SS	2.5	0.72	123	108	**86.4**	72.0
	3.0	0.79	135	119	**94.8**	79.0

Use the circled number for the pressure sensor calibration number.

Entering The Flow Sensor Calibration Number

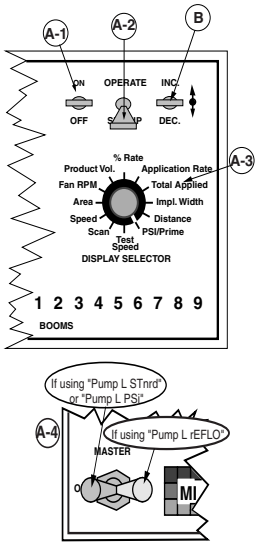
Use the following procedure to enter the flow sensor calibration number.

A. Set the console to the following positions;

1. Power	**ON**
2. Mode Selector	**SET- UP**
3. Display Selector	**Total Applied**
4. Master switch /Booms	**OFF** (ON If using Pump L rEFLO)

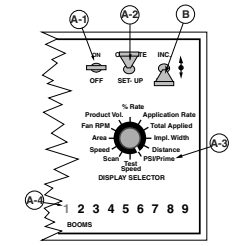
B. Use the INC./DEC. switch to set the desired flow sensor calibration number.

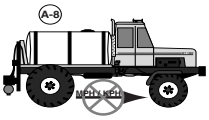
NOTE: If the console is in Reflow Mode (Pump L rEFLOW), the flowsensor cal. # can only be viewed or changed when all programmed booms are on.



Pressure Sensor High/Low Calibration

The pressure sensor's Zero and High Set Point values must be set to match the readings from your manual pressure gauge. To do this, follow the procedure below.





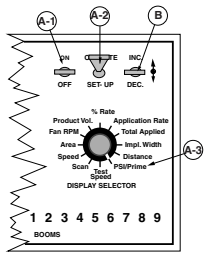
Setting The Zero Set Point

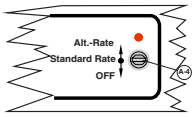
A. Set the console to the following positions;

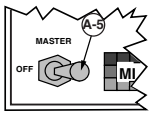
1. Power switch	**ON**
2. Mode Selector	**OPERATE**
3. Display Selector switch	**PSI/Prime**
4. At least one Boom switch (to release any trapped pressure)	**ON**
5. Master switch	**ON**
6. GSO switch	**OFF**
7. Supply Pump	**OFF**
8. Zero ground speed (vehicle not moving)	

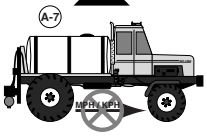
NOTE: Before adjusting the Zero Set Point, make sure there is no pressure in the boom. It may be necessary to loosen the diaphragm check valves on the boom to achieve this.

B. Hold INC./DEC. switch to **DEC.** until console reads “PSi 0” (“br 0”).









Setting The High Set Point

A. Set the console to the following positions;

1. Power Switch	**ON**
2. Mode Selector	**OPERATE**
3. Display Selector Switch	**PSI/Prime**
4. Rate Switch	**Standard Rate**
5. Master Switch	**ON**
6. Supply Pump	**ON**
7. Zero ground speed (Vehicle not moving)	

B. Hold INC./DEC. switch to **INC.** for about 3 seconds. Display will read "OPEN". Release the INC as soon as the “OPEN” message appears. Slowly increase the engine RPM to adjust the pressure reading, on the pressure gauge, to a maximum of no

more than 100 PSI (6.8 br). Push INC. switch again and hold for about 3 seconds. Display reads "PSi (br) xxx". The xxx is a pressure reading. The INC./DEC. switch can now be used to adjust the pressure reading on the console to match the reading on the pressure gauge. If no switch changes are detected for 3 seconds, the console display reverts to "OPEN" again. Actuating the DEC. switch when the console reads "OPEN" causes the console to read "CLOSE" and the valve closes.

Note: A display reading of "PSi (br) - - " indicates that the pressure sensor is not connected. A reading of "PSi (br) -0" indicates a reading of less than 0 PSI (br). This suggests that the sensor may need to be recalibrated to 0 pressure. (See "Setting The Zero Set Point" on the previous page.)

Fine Tuning The Flow Sensor Sensor Cal.

NOTE: We recommend that these tests be done using water, and only after neutralizing the tank and system.

Once the initial calibration number is determined and entered into the console, a calibration run should be made to adjust the number for maximum accuracy.

The most critical part of the calibration procedure is accurately measuring the discharge of large volumes of liquid. Increased accuracy of measurement means increased calibration accuracy. Since each operator's facilities are different, it is not possible to prescribe a standard method of measuring discharge. Successful methods include using a second, calibrated flow meter, using a truck scale and calculating volumes based on weight and density of the liquid discharged, and by discharging into a calibrated tank.

It will be necessary to pump and measure at least 100 gallons and as much as 300 gallons, depending on the accuracy required. Larger volumes allow greater accuracy.

A method similar to the following is recommended.

1. If using Pump L Psi, enter the appropriate "Correction Factor" for the material that you will be using for the test (Use factor of 1.00 for Pump L STnrd applications) (see page 2-11).

2. Enter the desired application rate (see page 2-3).

3. Verify that the boom switches are **OFF**.

4. Verify that the correct initial flow sensor calibration number is entered into the console (See pages 2-12 through 2-14). Use the INC./DEC. switch to adjust as necessary.

5. Reset the Total Applied accumulator to zero (see page 2-11).

6. Make sure there is enough liquid in the main tank to perform the test. Weigh the sprayer and load of water. Position the sprayer in the test area.

7. Start the main carrier pump. Set the Display Selector switch to **Test Speed** and the Rate Switch to “Standard Rate”. Turn **ON** the Master switch and the Boom switches. The sprayer starts to spray. Allow the sprayer to run until the desired amount of liquid is discharged. Turn **OFF** the booms

8. Weigh the sprayer again and calculate the amount of water discharged.

9. View the total amount of dispensed liquid as measured by the console (**Total Applied/OPERATE**). If the total shown on the console agrees with the total amount actually discharged, no further action is necessary. The pressure sensor, or flowmeter, is now calibrated.

10. If the indicated volume pumped does not agree with the actual volume pumped, calculate a new calibration # as follows:

Pressure Sensor:

$$\text{New Cal. \#} = \frac{\text{Measured Amount}}{\text{Indicated Amount}} \text{ X Old Cal. \#}$$

If the measured amount is more than the indicated amount, the new cal# should be larger.
If the measured amount is less than the indicated amount, the new cal# should be smaller.

Flow Meter:

$$\text{New Cal. \#} = \frac{\text{Indicated Amount}}{\text{Measured Amount}} \text{ X Old Cal. \#}$$

If the measured amount is more than the indicated amount, the new cal. # should be smaller.
If the measured amount is less than the indicated amount, the new cal# should be larger.

11. Correct the cal. # in the console. Return the mode selector to **OPERATE**. The amount displayed should now match the amount measured. The flow sensor is now calibrated.

11a. An alternate method, of correcting the cal. #, at this point, is to switch back and forth, between **OPERATE/Total Applied** and **SET-UP/ Total Applied**, changing the cal. # until the **Total Applied** display, in operate mode, equals the amount actually dispensed.

12. Write this number down for future reference. This is the number to use for this specific combination (material and applicator configuration).

Another method of fine tuning the sensor cal. # is to weigh the sprayer with a full tank of water, reset the **Total Applied to zero (see page 2-11),** set the GSO speed to 10 MPH, and start spraying while watching the **Total Applied** accumulate. When the **Total Applied** reaches at least 100 gallons, re-weigh the sprayer and determine the actual amount dispensed as compared to that indicated by the console. Use the method described in step 9 and 10 above to correct the Cal. #.

The calibration number can also be calibrated based on field experience.

L Psi (bAr) Mode - Material left over - Adj. Cal. # down slightly
- Short of material - Adj. Cal. # up slightly

L STnrd Mode - Material left over - Adj. Cal. # up slightly
- Short of material - Adj. Cal. # down slightly

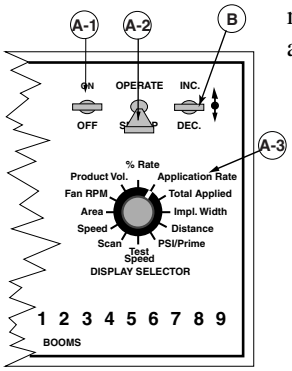
GRANULAR ONLY SET-UP

Verify that the correct application program has been selected. (see page 2-1)

SETTING THE PRODUCT DENSITY (for granular applications only.

The Product Density must be entered into the TASC 6100 for the console to <u>accurately</u> control the application rate.

Product density is entered as pounds per cubic foot (Lb / Ft^3) in US units and kilograms per tenths of a cubic meter (Kg / $0.1m^3$) in Metric units. Product Density should be measured and entered frequently to ensure accurate application.



A. Set the console to the following positions:

1. Power	**ON**
2. Mode Selector	**SET-UP**
3. Display Selector	**Application Rate**

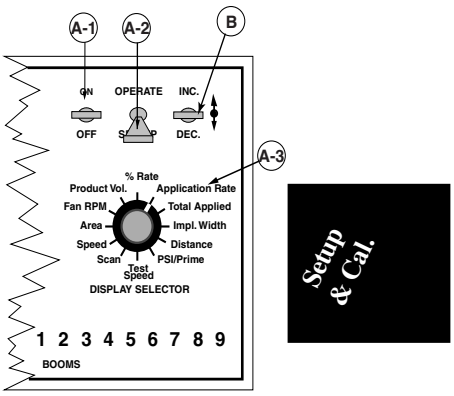
The current product density is displayed.

B. Use the INC./DEC. switch to set the display to the desired density.

SETTING THE FAN TACH CAL.

The TASC 6100 console includes a Tach port that allows you to monitor the speed of the fan (spinner) on a granular spreader. For the console to accurately measure the fan (spinner) RPM, the number of pulses generated by the fan RPM sensor for each revolu-

tion of the fan (spinner) must be entered using the following procedure:



A. Set the console to the following positions;

1. Power	**ON**
2. Mode Selector	**SET- UP**
3. Display Selector	**Fan RPM**

The current Fan Calibration number is displayed.

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

RATE SENSOR CALIBRATION

Calculating The Initial Rate Sensor Cal.
(Spreader Constant)

It is necessary to enter a Spreader Constant in TASC 6100 to ensure an accurate output from the conveyor. The spreader constant represents the number of sensor pulses per cubic foot of material discharged. The constant is different for different gate settings on adjustable spreaders. **Constants relating to particular gate settings should be calibrated and recorded for the spreader.**

Calculation of the initial spreader constant requires the following information:

1) Gate height **(H)** and width **(W)** in inches
2) Number of sensor pulses for each revolution of the spreader rate sensor **(P)**
3) The distance the conveyor moves during one revolution of the spreader rate sensor **(D)**, in inches.

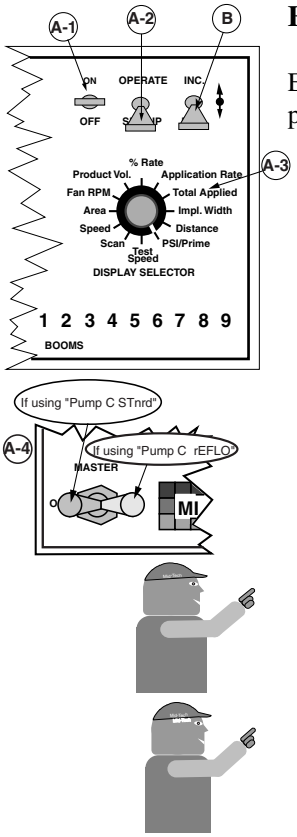
Calculate the initial spreader constant as follows:

$$\frac{D \times W \times H}{1728} = Ft^3_r$$

Where: Ft^3_r is the volume discharged during each revolution of the spreader rate sensor, in Cubic Feet**.**

Continue as follows:

$$\frac{P}{Ft^3_r} = \textbf{Initial Calibration Number (Spreader Constant)}$$



Entering The Rate Sensor Calibration Number

Enter this calibration number into the console using the procedure that follows.

A. Set the console to the following positions:

1. Power	**ON**
2. Mode Selector	**SET-UP**
3. Display Selector	**Total Applied**
4. Booms	**ON**

(If Split Drive option is active)

The current Spreader Constant is displayed.

NOTE: If you have a single conveyor bed, the "Pump C STnrd" application program must be selected in order to view or set the Spreader Constant (See page 2-1)

NOTE: If the console is in Split Drive Mode (Pump C SPLit), the Spreader Constant can only be viewed or changed when all programmed booms are on.

B. Use the INC./DEC. switch to set the display to the calculated Spreader Constant.

Fine Tuning The Rate Sensor cal.

The accuracy of the Spreader Constant should be verified and adjusted as necessary. The following procedure is suggested as a simple means of testing the calibration of the spreader constant. BE SURE THE PROPER PRODUCT DENSITY HAS BEEN ENTERED BEFORE PERFORMING THE CALIBRATION OR THE RESULTS WILL BE INACCURATE.

A. Verify the current Spreader Constant (see previous page)**.** Record this number for reference.

B. Enter the desired application rate (see page 2-3).

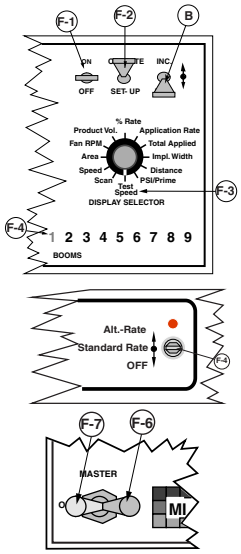
C. Load the vehicle with product of known density. Be sure the Density is properly entered in the TASC 6100 (see page 2-20). Use enough material

to get an accurate measurement but be careful to keep the conveyor running full. As an example: if the truck scale reads in 20 lb. (10 Kg.) increments, at least 1000 lbs. (500Kg.) must be discharged to be able to calibrate within 2%.

D. Weigh the truck and load and record this weight. Back up to a location where you can safely unload the material through the conveyor.

E. Reset the **Total Applied** accumulator (see page 2-11).

F. Dispense the desired amount of material by setting the console switches as follows:



1. Power	**ON**
2. Mode Selector	**OPERATE**
3. Display Selector	**Test Speed**
4. Rate Switch	**Standard Rate**
5. Programmed Booms	**ON**
6. Master Switch	**ON**

The conveyor will start to discharge. Allow the conveyor to run until the desired amount has been discharged.

7. Turn **OFF** the Master switch.

G. Rotate the Display Selector to Total Applied. TASC 6100 displays the INDICATED AMOUNT discharged by the conveyor in lbs (Kg.) or tons if over 20,000 lbs. (metric tons if over 10,000 Kg.).

H. Weigh the truck and load (be sure the driver's weight is included if he was on 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. (This procedure assumes fuel use is minimal during the test).

I. To adjust the Spreader Constant, use the following formula:

$$\frac{\textbf{Indicated Amount}}{\textbf{Actual Amount}} \textbf{ X Current Spreader Constant = New Spreader Constant}$$

If the weight displayed on the console is greater than the weight actually measured, the calibration number will increase.

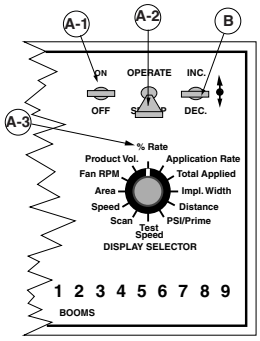
J. Turn the Mode Selector to **SET-UP** and use the INC./DEC. switch to change the Spreader Constant. (REMEMBER, IF SPLIT DRIVE IS ACTIVE, THE BOOMS MUST BE **ON**.) Turn the booms **OFF** and switch the Mode Selector back to **OPERATE**, the corrected Indicated Amount will be displayed. If this number does not match the actual amount, check the calculation.

If it is not convenient to conduct an actual test, field experience will allow fine tuning of the spreader constant. If the vehicle is applying too much, decrease the spreader constant by the same percentage as the over application. If too little material is being discharged, increase the spreader constant by the same percentage as the under application.

Suggestion: Make a list of spreader constants for different product/gate setting combinations. This will allow you to change from one product or gate setting to another with a minimum of recalibration.

SETTING AUTO POWER DOWN TIME

The CE console has an "Auto Power Down" feature which powers the console off after an operator selectable period (default is 30 min) has elapsed. If no input is received from the speed sensor or any console switch during this time the APD feature is activated. The APD time can be set from 15 to 60 minutes. Selecting a period less than 15 minutes disables the APD feature.



A. Use the following switch settings to adjust the Auto Power down time:

1. Power	**OFF**
2. Mode selector	**SET-UP**
3. Display selector	**% Rate**
4. Hold the INC switch	**UP** while turning the power on

The display will show the current Auto Power Down time.

B. Select the desired time using the INC/DEC switch.

C. Exit this set-up mode by moving the Display Selector to another position, the Mode Selector to OPERATE, or turning the console OFF and back ON.

NOTE: The "Auto Power Down Feature is only available on the CE version of the console (CE designation label on back of console). If you have the standard console model always turn the console power off when not in use to prevent unnecessary drain on the battery.

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Chapter 3 Operation

Normal Start-up and Operation

It is important to verify that the control console is programmed correctly before beginning operations each day. **Refer to Chapter 2 to review the procedures for entering this information.**

A. CONSTANTS: Verify that the proper Distance, Flow/Rate Sensor, and Boom/Spread Width constants are still entered in the console. **It is a good idea to write these constants down in a convenient location like the space provided on last page of this manual.**

B. APPLICATION RATES: Verify the application rate settings (**Standard Rate** & **Alternate Rate**).

C. ACCUMULATED AREA: If desired, the two acre accumulators can be reset to zero independently to allow the tracking of two separate areas.

D. ACCUMULATED VOLUME: Accumulated volume can be reset to zero. Product Vol. (the count down register) can be set for the load aboard.

E. The control system is now ready to begin automated application. Set the Mode Selector switch to the **OPERATE** position. Select an appropriate display, such as **Scan**.

F. Start the vehicle engine and make sure the pumps and/or hydraulics are engaged.

G. As you reach the starting point of the first swath, turn **ON** the desired Boom switches, and the Master switch. The TASC 6100 controls application. The function selected on the Display Selector begins to register.

H. When you reach the end of the swath, turn **OFF** the Boom switches, or Master switch to temporarily stop application. When the vehicle has been turned and is ready to start applying on the next swath, turn the Booms back **ON** and controlled application resumes.

Changing Active Boom Sections

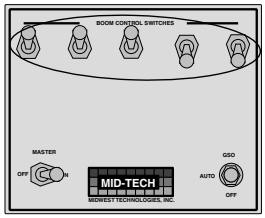


Fig. 3-1. Boom Section Switches

The active boom sections can be changed at any time using Boom switches, similar to those seen at the top of Fig. 3-1. The control system, automatically adjusts the flow rate as individual boom sections are activated or deactivated. When the Master switch (or all Boom switches) is turned **OFF**, the application stops. This allows the operator to select active boom sections “on the go”, while depending on the control system to adjust the flow rate appropriately.

Changing Application Rate

The TASC 6100 console provides two ways to change the chemical application rate “on the go”.

Alternate Application rate

During the set-up procedure, the operator can set a second application rate into the **Alt.-Rate** position of the Rate switch (see page 2-3). The operator can now select this rate "on the go" by simply moving the Rate switch to the Alt.-Rate position. The console now controls at the new rate until Standard Rate is again selected. The indicator lamp, above the Rate switch, flashes to remind the operator that a non-standard rate is selected.

% Rate Change

We will use an example to illustrate the use of this feature.

The operator choses a desired application rate and enters this value into the console using the procedure outlined on page 2-3. Anticipating the need to increase or decrease the application rate, the operator also establishes a **% Rate** change using the procedure described on page 2-3 of the manual. As an example, assume the console is set up to apply 10.0 gallons per acre with the **% Rate** change set at 20%

During normal spraying, the control console maintains the application rate at 10.0 gallons per acre. However,

if the operator is spraying an aqueous fertilizer and encounters a soil type change that requires a 40% higher application in order to reach desired fertility levels, the operator can select **% Rate** with the Display Selector. The display shows the current percent of the programmed application rate, in this case 100%, being applied. Pushing the INC/DEC switch up twice increases the application rate by 2 X 20% = 40%. The display shows 140%. The flow control valve opens until the flow meter measures a rate providing 14.0 gallons per acre. None of the other control functions of the console are affected.

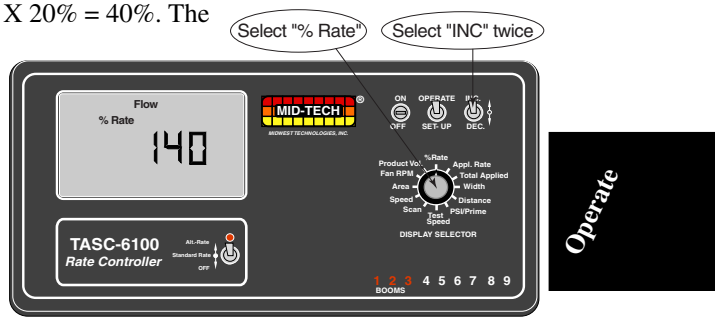


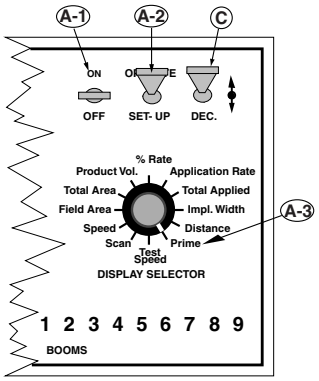
Fig. 3-2. Changing App. Rate "On The Go".

The new application rate is maintained until a further activation of the INC./DEC. switch requires additional change, or a different position is selected with the Display Selector. When the Display Selector is turned to any other position, the TASC 6100 reverts to controlling application rate according to the original target rate. The **% Rate** value remains at the last setting so the operator can reselect it by moving the Display Selector switch back to % Rate. There is an approximate two second delay in valve response after the console has been switched to **% Rate** to prevent the rates from changing by mistake if the Display Selector is turned through the % **Rate** position.

Operation at a changed application rate is not a normal condition. The console beeps and controls at the changed rate only as long as the Display Selector is turned to % Rate.

Priming the Main Pump and Boom

Use the following procedure to **Prime** the main product pump and boom lines prior to spraying. **Instructions unique to pressure based operation are so noted.**



A. Set the console switches to the following positions:

1. Power	**ON**
2. Mode Selector	**OPERATE**
3. Display Selector	**PSI/Prime**

B. Five dashes (**- - - - -**) appear on the display. (If in pressure based mode the display reads **Pr - - -**.)

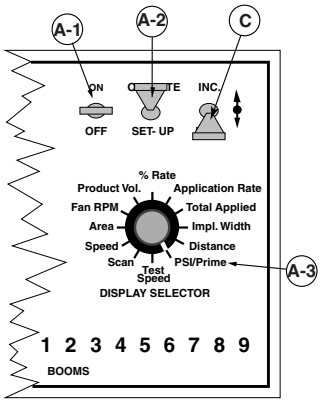
C. Hold the INC./DEC. switch up for about three seconds. The main control valve moves to full open and the display reads (**OPEN**). While operating in this mode, there is no accumulation of area, distance or carrier.

D. The main pump can be run, with the booms or handgun open, to prime the sprayer. The control valve remains open.

E. To resume normal spraying, hold the INC./DEC. switch down for three to five seconds to close the control valve (the display reads CLOSE), or move the Display Selector switch away from the **PSI/ Prime** position.

RAPID UNLOAD USING THE CONVEYOR

(Granular Application)



Use the following procedure to operate the spreader conveyor at maximum speed.

A. Set the console switches to the following positions:

1. Power	**ON**
2. Mode Selector	**OPERATE**
3. Display Selector	**PSI/Prime**

B. Five dashes (**- - - - -**) appear on the display.

C. Hold the INC./DEC. switch up for about three seconds. The display reads "**OPEN**" and the hydraulic control valve moves to full open and remains there. While operating in this mode, there is no accumulation of area, distance or product.

D. When the vehicle hydraulics are engaged, the conveyor operates at maximum speed. This procedure is useful for rapid unloading of the vehicle.

E. To return to normal operation, hold the INC./ DEC. switch down for three to five seconds or move the Display Selector switch away from the PSI/Prime position.

Ground Speed Override (GSO)

An optional Ground Speed Override switch can be used to allow temporary operation using the "GSO Speed" instead of the actual speed registered by the ground speed sensor (see page 2-9). The override feature is used to bring the applicator up to rate quickly when starting from a complete stop or to maintain an adequate pattern when the vehicle is operating at very low ground speeds.

The TASC 6100 operates normally when the Ground Speed Override switch is in the **OFF** (open) condition. **(If you do not have a GSO switch, the shorting connector must be in place in the Boom Interface cable connector labled "GSO".)** This feature can then be disabled by setting the GSO speed to zero.

When the Override switch is **ON** (closed), and the actual ground speed is less than the GSO speed, the console automatically uses the "GSO speed" value to control application rate. If the actual ground speed increases above the preset GSO speed, the control console reverts to controlling application rate on the basis of the actual ground speed.

Examples:

GSO Switch	"GSO Speed"	Ground Speed	Speed controlled
to			
"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: When traveling at a speed slower than the GSO speed setting, this feature will cause the product to be applied at a rate consistent with the GSO speed, rather than the true ground speed. Caution must be exercised when operating in this mode as serious over application can occur, if not used properly.

CHAPTER 4 MAINTENANCE

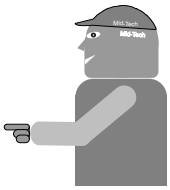
MID-TECH recommends the following maintenance to keep your Control System operating at peak efficiency.

Flushing and Cleaning

Always follow carefully the chemical manufacturer's directions regarding cleaning and flushing.

As a general rule, MID-TECH recommends the following. Do not leave chemicals in the applicator overnight. The system should be cleaned at the end of each day's operation.

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



Maintenance

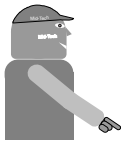
Control Console

The control console requires no maintenance, other than checking the constants stored in memory and an occasional cleaning. Clean the console by wiping with a damp cloth and by covering unused connectors with the attached dust covers. Verify the constants by checking each of the calibration numbers, and the desired application rate values (Refer to Chapter 2, Calibration.)

Since the control console uses nonvolatile memory for storing the constants, reentering them is seldom necessary. However, there have been cases of constants being distorted as a result of electromagnetic interference. For this reason, MID-TECH strongly

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

WARNING: Always disconnect all Mid-Tech power cables, at the battery, when welding on the sprayer. Serious damage can result if left connected during these times.



WARNING: While inspecting and cleaning the radar speed sensor, do not to look directly into the face of the unit. When operating, the radar generates a low level microwave signal that may be dangerous to the eyes.

recommends recording the current calibration numbers in a convenient location and checking them daily, before operating the sprayer. The last page of this manual provides space for recording this information.

Ground Speed sensor

WHEEL SENSOR: Check the sensor frequently for loose or bent parts. Repair or replace any damaged parts immediately and recalibrate the sensor (Refer to page 2-5, Distance Calibration Procedure).

RADAR SENSOR: Check the sensor frequently to ensure the face of the sensor is relatively clean (no dirt build up) and that the mounting bracket and hardware is tight and has not shifted in position. Clean the sensor using a damp cloth. If it is suspected that the radar sensor mounting position has shifted, the mounting bracket must be tightened and the sensor recalibrated. (Refer to page 2-5, Distance Calibration Procedure)

Flow And Pressure Sensor

(Liquid Application)

Prior to each day's spraying, inspect the flow meter or pressure sensor to ensure there are no leaks around the attachment fittings. Thoroughly flush the flow sensor with clean water at the end of the day.

Make sure that water or sediment is not trapped in the flow sensor, particularly in cold weather, as damage to the mechanism may occur.

The impeller type flowmeters supplied by MIDWEST TECHNOLOGIES are inherently rugged. However, continued use eventually wears the internal bearings and shafts until the flowmeter becomes inaccurate. Replacement kits are available to repair the flowmeters. Contact your MID-TECH dealer for these parts.

CONVEYOR RATE SENSOR
(Granular Application)

Prior to each day's operation, check the restraining strap to make sure it is securely attached to the sensor. Some installations require two restraining straps mounted at right angles to each other. This keeps the sensor from emitting false signals to the control console.

Flow Control Valve

Inspect the flow control valve occaisionally to ensure there are no leaks around the attachment fittings. Thoroughly flush the flow control valve with clean water at the end of the day.

Make sure that water or sediment is not trapped in the flow sensor, particularly in cold weather, as damage to the mechanism may occur.

Wiring Harness

Most failures of electronic systems, like the MID-TECH control system, are the result of broken wires or poor connections. Taking time to periodically inspect and clean the wiring harness will help prevent these types of failures.

Inspect the external cabling for abrasion, and stretched or pinched wires. Reroute any damaged cabling and wrap it to protect it from further damage. A broken wire can be temporarily repaired by stripping the wire back on each side of the break, twisting it together, and soldering the connection' (Do not use acid core solder). Insulate the bare connectionwith heat shrink material or electrical tape.

Periodially inspect and clean the connectors at the ends of the cables. Use a non-lubricating spray solvent (such as a tuner cleaner) to clean the connections. If the contact is so dirty it must be wiped clean, use a non abrasive swab (like a Q-

TIP), along with the solvent, to avoid wear to the contact.

If your connectors become damaged or worn out, contact your MID-TECH supplier for a replacement connector kit.

MID-TECH strongly recommends replacement of damaged cables as soon as possible. Once the cable insulation is damaged, moisture and chemicals can work their way under the insulation and cause corrosion of the conductor resulting in continued problems with the cable.

NOTICE: A Returned Material Authorization Number (RMA #) must be obtained from Mid-Tech or your dealer for all items returned to Mid-Tech for repair or replacement.

Mid-Tech product(s) returned for repair or replacement must be cleaned and free of all chemical contamination before arriving at the Mid-Tech facility.

Due to increasing OSHA requirements regarding the handling of chemically contaminated items, along with EPA restrictions regarding the disposal of chemical contaminants, Mid-Tech technicians will not be allowed to handle, nor will we be able to dispose of the contaminants on, returned item(s).

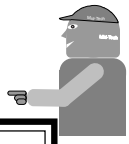
The chemically contaminated items will be returned to you without action taken by Mid-Tech.

The items can then be returned, after a thorough cleaning, to Mid-Tech, by requesting a new RMA #.

Chapter 5 Trouble Shooting - Error Messages

Trouble shooting of the Mid-Tech control system begins when the control console senses a problem or inconsistency in the system. When this happens, the control console alerts the operator with a visual and audible alarm. The following charts present the error messages that may appear on the display and possible causes and remedies.

LIQUID ERROR MESSAGES



FIRST check the battery connections!!

ERROR CODE	CAUSE	REMEDY
Err 0	A required calibration number is set to zero.	
	Sometimes caused by poor power connections at the battery.	Err 0/Pump L: reset flow meter or pressure sensor Cal#. Err 0/Dist. Cal#: reset distance Cal#. Err 0/Boom #: reset boom widths (including boom width C.
Err 1 Pump L (TOO FAST)	Pump servo valve, or liquid flow control valve is fully open, or is no longer responding to an open signal, and the system cannot meet the rate called for.	
	Traveling too fast for desired application rate.	Slow down, or check hydraulic flow to a hydraulically driven pump.
	Nozzles are too small for rate and speed. (pressure will read HIGH).	Change to larger nozzles or slow down.
	Too much product being diverted to sparge.	Reduce sparging or increase pump output.

Err 1 Pump L (Cont.)	Strainer or nozzle screens plugged. Pressure LOW, main strainer; Pressure HIGH, nozzle screens.	Clean screens.
Err 2	Not a diagnostic function in the TASC 6100 console.	Contact your MID-TECH dealer if you see this message on a TASC 6100 controller.
Err 3 Pump L	Console is not receiving pulses from the flow sensor. **Check for actual spraying at nozzles.**	
	No flow in the product line.	
	Main supply tank is empty.	Refill tank.
	Leak in main feed line.	Check for ruptures or leaks at joints, fittings, etc.
	No output from product pump.	Turn product pump ON. Check for correct operation of hydraulic valves feeding the pump motor. Check for air lock in the product pump, causing no output. Purge pump using the PRIME function.
	Obstruction in main supply line.	Check for blockage in product strainers.
	Main flow control valve not opening.	Check “Flow Control” connections on the back of the console. Secure if loose. Check in-line fuse (optional) near + battery connection. Check valve control signals.

Err 3 Pump L (Cont.)		Check cables, from "Flow Control" port on back of console, to valve for bad connections, abrasions, and pinched or broken wires.
	Boom valves are not opening.	Check for blown fuses Check cables, from "Boom Interface" port on back of console, to valves for bad connections, abrasions, and pinched or broken wires.
	Flow in the product line.	Check for blockage of the flow meter rotor. Check cables, from "Flow Control" port on back of console, to flowmeter for bad connections, abrasions, and pinched or broken wires.
Err 4	Not a diagnostic function in the TASC 6100.	Contact your MID-TECH dealer if you see this message on a TASC 6100 controller.
Err 5 Pump L	Application rate is exceeding the target rate by 15%. Valve is not responding.	Check "Flow Control" connections on the back of the console. Secure if loose.
	Often caused by loss of power to valve.	Check in-line fuse (optional) near positive battery connection. Check valve control signals. Check cables, from "Flow Control" port on back of console, to valve, for bad connections, abrasions, and pinched or broken wires.
Err	Incorrect switch sequence is selected on the console.	Consult Operator's Manual for the correct switch sequence.

Err E	Memory error. **This is often the result of a poor battery connection.**	Hold down the decrease switch until the alarm stops. Check for any constants that may have been set to zero and re-enter the correct values. (See Chapter 2)
OFLO	Value to be displayed on console exceeds the maximum allowable size.	Hold down the decrease switch until the display re-sets to zero.
Err L	The vehicle electrical system voltage has fallen below about 10.0 VDC.	Establish good ground and battery connections. This is the most common fault when system is acting erratically. Check and service or replace the vehicle battery. Check and service or replace the vehicle alternator/ voltage regulator.
Err C, n, hook (back-ward 7)	Internal Diagnostics.	A momentary appearance, followed by no other problems, can be safely ignored. If messages occur frequently during operation, or come on and stay on, contact your dealer for further assistance.
PSI - - (br - -)	Pressure sensor is not con-nected.	Connect pressure sensor.
PSI - 0 (br - 0)	Pressure sensor is detecting a pressure less than its 0 setting.	Recalibrate pressure sensor to 0 PSI (br).

FIRST check the battery connections!!

Err 0	**A required constant is set to zero.**	Err 0, Pump C and Cal#: reenter rate sensor Cal# (Spreader Constant).
	This can be caused by poor power connections at the battery.	Err 0, Dist. Cal#: reset distance Cal#.
		Err 0, Boom #: reset boom widths (including boom width C).
Err 1 Pump C	**Servo valve is fully open, traveling too fast for desired application.**	Slow down.
		If spreader has an adjustable gate height, open the gate higher and adjust the spreader constant.
	Hydraulic strainer plugged.	Clean screens (replace filter elements).
	Pressure LOW, main strainer;	
	pressure HIGH, strainer upstream from valve.	
	Hydraulic oil temperature too high.	Check Oil cooler for blockage, check temperatures and oil levels.
	Low hydraulic oil.	Check oil levels and refill as necessary. Be sure to use **clean** oil.
	Worn hydraulic pump or motor.	Check hydraulic pump or motor output and rebuild or replace as necessary.
Err 2	**Not a diagnostic function in the TASC 6100.**	Contact MID-TECH if you see this message on a TASC 6100 controller.

Err 3 Pump C	**Conveyor is not running.**	Turn hydraulic system ON. Check for correct operation of hydraulic valves feeding the conveyor motor. Check clutch if applicable. Clear blockage in hydraulic oil lines. Check Flow control and Boom connections on the back of the console. Secure if loose.
	Conveyor runs but no rate sensor signals registered.	Check continuity of wiring and connectors. Test rate sensor and replace if faulty.
Err 4	**Not a diagnostic function in the TASC 6100.**	Contact MID-TECH if you see this message on an TASC 6100 controller.
Err 5 Pump C	**Application rate is exceeding the target rate by 15%. Valve is stuck.** **Often this is caused by loss of power to the valve.**	Check, at the valve connector, for the proper voltages during the OPEN and CLOSE commands to the valve. Replace faulty wiring or driver module if necessary. Verify the servo control valve is responding, fix faulty wiring or replace actuator if the problem is diagnosed as the valve.

Err	**Incorrect switch sequence is selected on the console.**	Consult Operator's Manual for the correct switch sequence.
Err E	**Memory error.** **This is often the result of a poor battery connection.**	Hold down the decrease switch until the alarm stops. Check to see which constants have been set to zero and re-enter the correct values.
OFLO	**Value to be displayed exceeds the maximum allowable size.**	Hold down the decrease switch until the display re-sets to zero.
Err L	**The vehicle electrical system voltage has fallen below about 10.0 VDC.**	**Establish good ground and battery connections. This is the most common fault when system is acting erratically.** Check and service or replace the vehicle battery. Check and service or replace the vehicle alternator/voltage regulator.

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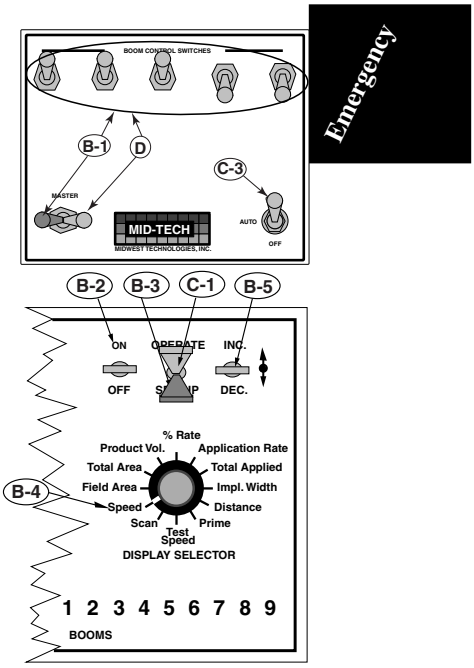
CHAPTER 6 EMERGENCY OPERATION

If the operator is experiencing a failure of the ground speed sensor, the main flow control valve, or the flow or rate sensor, the first step is to carefully check the wiring harnesses for obvious problems and follow the suggested troubleshooting advice outlined in chapter 5.0 of this manual. Assuming there is no success in getting the failed component to respond, the following procedures are suggested, **as temporary measures**, until the component can be repaired or replaced.

The operator, choosing to use one of the following procedures, should realize that application accuracy is reduced. If this reduced accuracy is acceptable, these procedures will allow operation to continue on a temporary basis.

GROUND SPEED SENSOR FAILURE

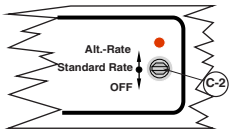
The control console internally generates a speed signal when operated with the "GROUND SPEED OVERRIDE" (GSO) function activated. When the unit is operated in the GSO mode, the control console establishes the application rate as if the vehicle were actually moving across the field at the programmed GSO speed. This feature can be used to operate the unit, under reduced accuracy, in the event of a failure of the speed sensor.



A. Disconnect the speed sensor cable from the back of the TASC 6100 console.

B. **With the vehicle stopped, condition the console as follows:**

1. All Boom switches (or Master switch)**OFF**
2. Power **ON**
3. Mode Selector **SET-UP**
4. Display Selector **SPEED**
5. Using the INC./DEC. switch, set the GSO speed for the normal spraying speed, (See Page 3-5 for additional information).



C. Prepare the sprayer

1. Mode Selector switch **OPERATE**
2. Rate switch Desired position (**Standard Rate/Alt.-Rate**)
3. GSO switch **ON**
4. Drive toward the desired swath, accelerating to normal application speed (as close as possible to the GSO speed value).

D. Start Spraying - As the vehicle reaches the start of the desired swath, turn booms **ON** and begin applying.

E. The control console controls the application as if the vehicle is moving at the established GSO speed. The actual accuracy of application therefore depends upon the ability of the operator to maintain the desired vehicle speed. If the vehicle is traveling at the GSO speed, the application is nearly exact.

MID-TECH recommends this procedure as a temporary, emergency procedure only. The problem should be resolved as soon as possible to allow full automatic control of the sprayer to be reestablished.

F. The console still keeps track of the Total Applied, and the system still adjusts to changes in boom width. These functions can be monitored on the display.

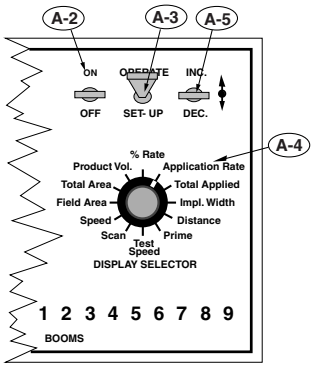
G. The TASC 6100 display flashes a too slow message, and an audible alarm sounds, to indicate abnormal operation. There is no speed displayed, areas do not accumulate, and displayed application rate information is meaningless.

FLOW CONTROL VALVE FAILURE

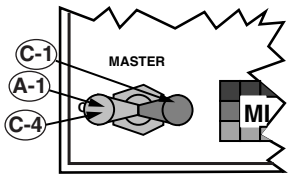
The TASC 6100 system can be operated, at a reduced level of control, in the event of a flow control valve failure. To operate the sprayer, it is necessary to manually adjust the flow control valve so that sufficient pressure is available to the booms to give a good spray pattern. Thus, there is no longer positive control over the flow. Use the following procedure to manually position the flow control valve.

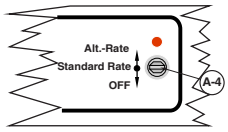
A. **With the vehicle stopped**

1. All boom sections **OFF**
2. Power **ON**
3. Mode Selector **OPERATE**
4. Display Selector **Application Rate**
5. Rate Switch **Standard Rate**
6. Use the INC/DEC switch to set an application rate of 0.0.



B. Disconnect the flow control valve at the cable disconnect. If the valve has failed in a position that does not allow proper flow for a good spray pattern at the nozzles, it will be necessary to remove the electric actuator assembly and manually rotate the valve stem to an suitable position. **CAUTION. MARK THE VALVE POSITION BEFORE REMOVING ACTUATOR. FULL OPEN TO FULL CLOSE IS ONLY 90⁰ OF ROTATION.** For machines that use Mid-Tech's EXR II hydraulic control valve to regulate the pump speed, loosen the locking collar at the base of the actuator, and rotate the complete actuator until the desired boom pressure is achieved. Retighten the locking collar.



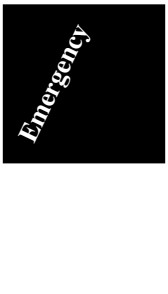


C. Adjust the Boom Pressure:

1. Turn **ON** the desired boom sections
2. Using a nozzle chart, determine the boom pressure that gives the desired application rate at the target speed.
3. Adjust the pump bypass valve (if one is provided) or manually turn the valve stem to generate the desired boom pressure.
4. Turn all boom sections **OFF**.

D. Drive to the area to be covered. When the vehicle reaches the starting point of the desired swath, turn **ON** the appropriate Boom switches and the sprayer starts to spray. At this point, the operator is enjoying some monitoring functions of the TASC 6100, but has no positive control of the flow control valve.

E. Monitor Application Rate. Actual application rate is displayed. Adjust the ground speed to maintain the desired rate.

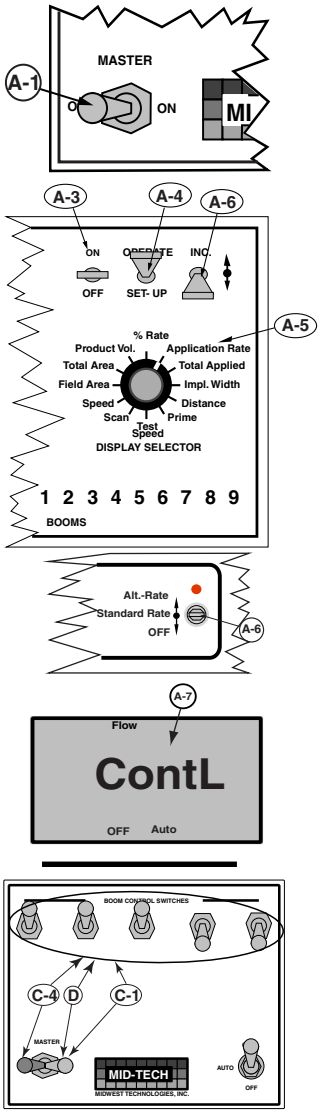


MID-TECH recommends this procedure as a temporary, emergency procedure only. The problem should be resolved as soon as possible to allow full automatic control of the sprayer to be reestablished.

F. The console cannot automatically adjust for changes in boom widths. If booms are shut off, pressure must be reset. Volumes and areas accumulate normally. Speed reads correctly.

Flowmeter or Pressure Sensor Failure

This procedure is very similar to operating without the flow control valve except the flow control valve is controlled using a manual override procedure.



A. **With the vehicle stopped:**

1. Boom Sections **OFF**
2. Disconnect the flowmeter cable at the first connector back from the flowmeter (3 pin connector).
3. Power **ON**
4. Mode Selector switch **OPERATE**
5. Display Selector **Application Rate**
6. Rate Switch **Standard Rate**
7. Using the DEC. switch, set the display to 0.0. and continue to hold the DEC. switch down for another 5 seconds until the display indicates "Flow Contl OFF Auto" (see screen display to left).

B. The flow control valve now responds only to manual commands from the INC./DEC. switch on the control console. The control system remains in this mode until the control console power has been switched **OFF** and back ON. **NOTE: When returning to automatic control, the application rate must be reentered.**

C. Adjust the Boom Pressure.

1. Turn **ON** the desired boom sections and allow spray.

2. Use a nozzle chart to determine the boom pressure that gives the desired application rate at the target speed.

3. Adjust the boom pressure using the INC./ DEC. switch on the control console. INC. will open the flow control valve and DEC. will close the valve.

4. Once the desired pressure is attained, turn all boom sections **OFF**.

D. Drive to the area to be covered. When the vehicle reaches the starting point of the desired swath, turn on the appropriate boom switches and the sprayer starts to spray. At this point, the operator is enjoying some monitoring functions of the TASC, but has no automatic control of the flow control valve.

E. Monitor Speed. Adjust the ground speed to reach the target speed desired.

F. The console cannot automatically adjust for changes in boom widths. If booms are shut off, pressure must be reset using the INC./DEC. switch. Areas accumulate normally. Speed reads correctly.

MID-TECH recommends this procedure as a temporary, emergency procedure only. The problem should be resolved as soon as possible to allow full automatic control of the sprayer to be reestablished.

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Appendix A

System Diagrams

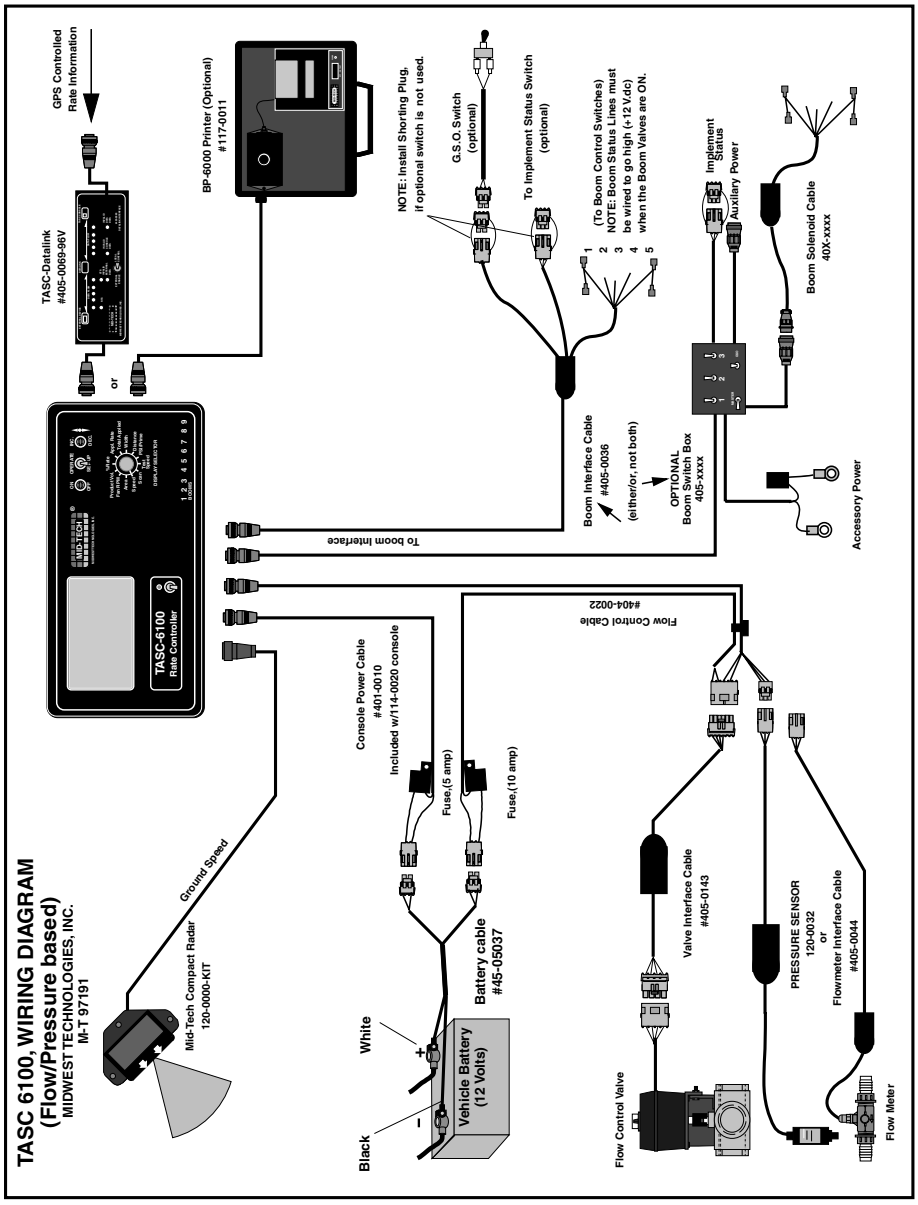
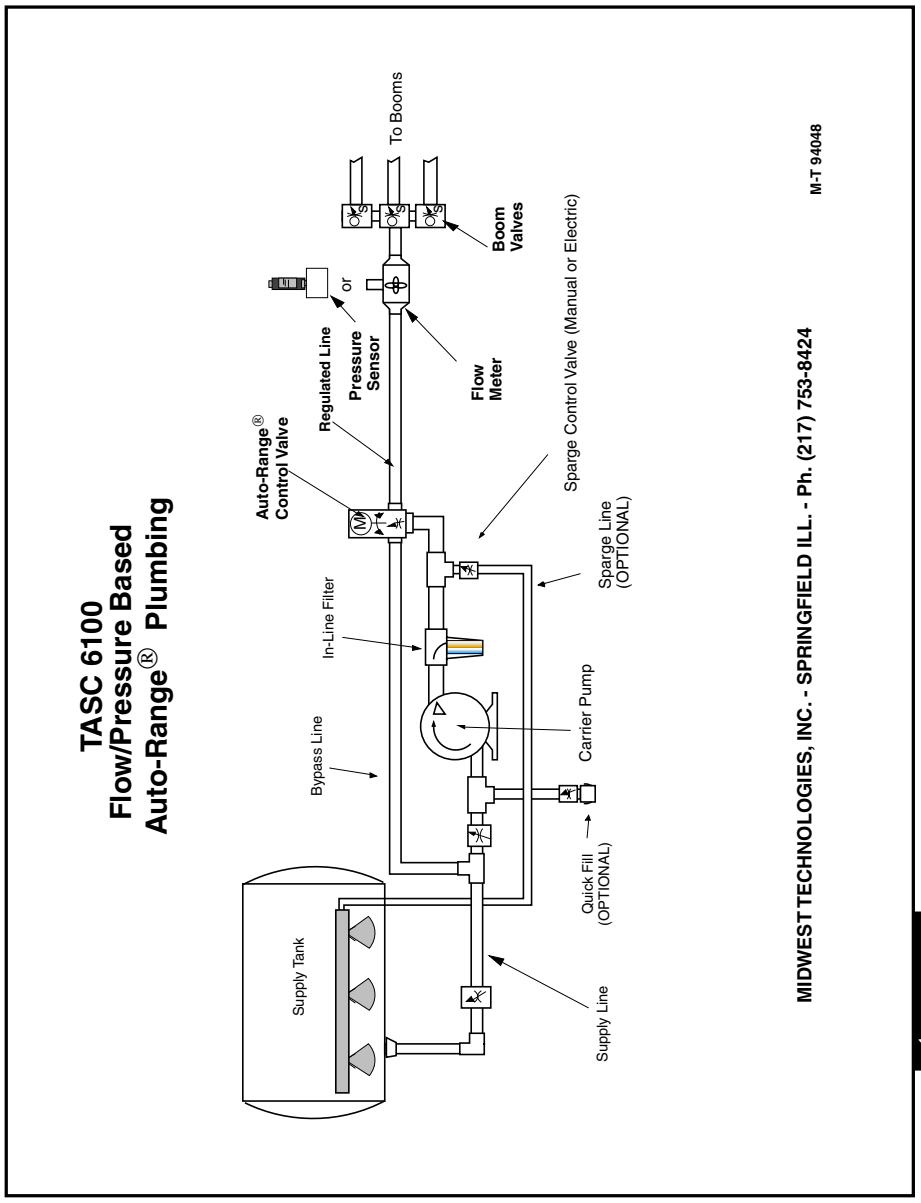


Fig. A1 - Typical Flow/Pressure Based Wiring Diagram



Appndx-A

Fig. A 2. Typical Flow/Pressure Based Plumbing Diagram

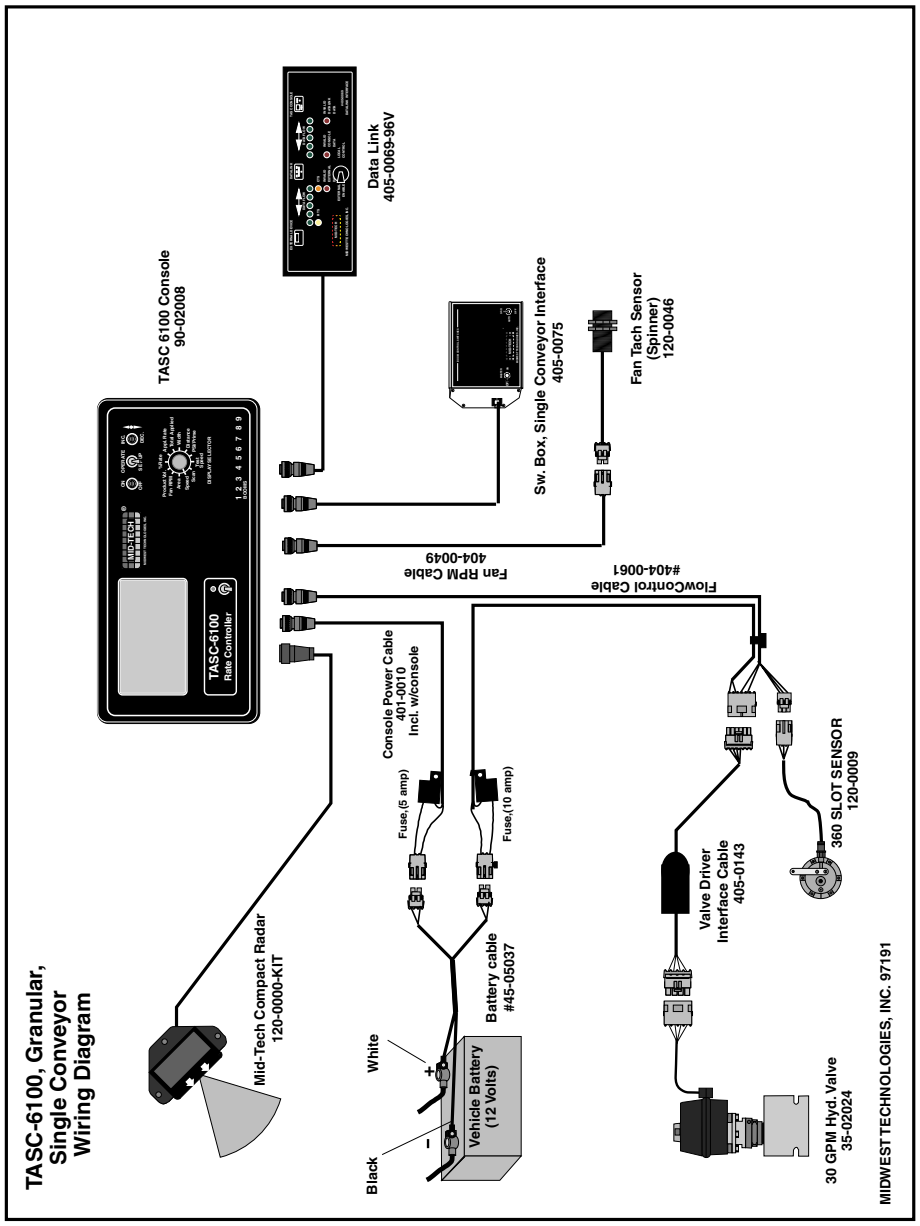


Fig. A 3. Typical TASC 6100 Granular System Wiring Diagram

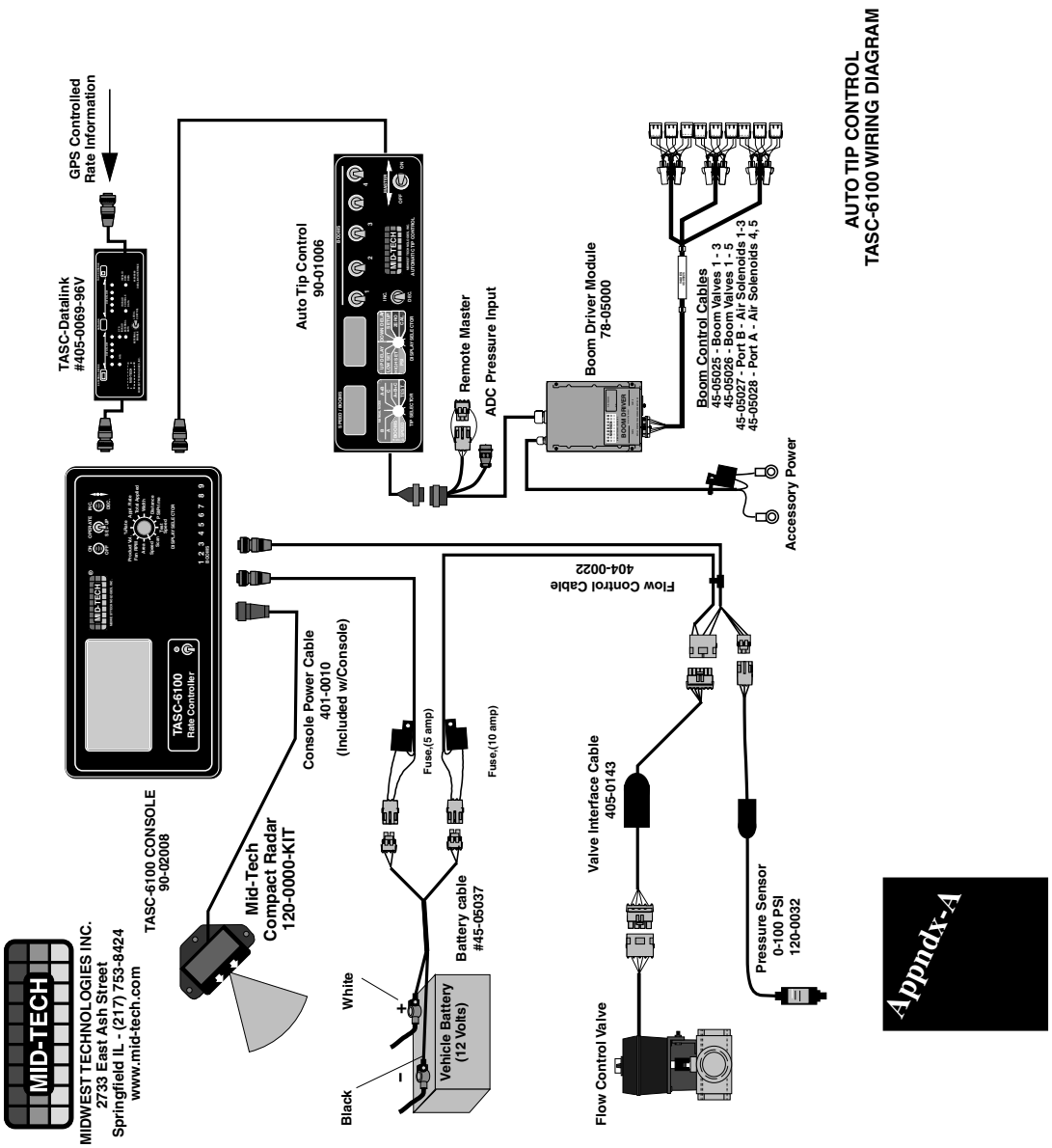


Fig. A 4. TASC 6100 w/Auto Tip Control Wiring Diagram

VALUES DISPLAYED BY TASC 6100
FILL OUT BEFORE CALLING FOR FASTER SERVICE

SOFTWARE VERSION: _____

Number displayed when console first powers up; e.g. 1.20

MODE SWITCH SETTING	OPERATE	SET-UP
AREA		
FAN RPM		
PRODUCT VOL.		
% RATE		
APPLICATION RATE		
TOTAL APPLIED		
IMPL. WIDTH		
DISTANCE		
PSI/PRIME		
TEST SPEED		
SCAN		
SPEED		

ERROR MESSAGE DISPLAYED?

_____

_____

OTHER INFORMATION?

_____

_____

_____

_____

BOOM WIDTHS

C	
1	
2	
3	
4	
5	
6	
7	
8	
9	

Fig. A 5. Service Form

Appendix B

System Overview

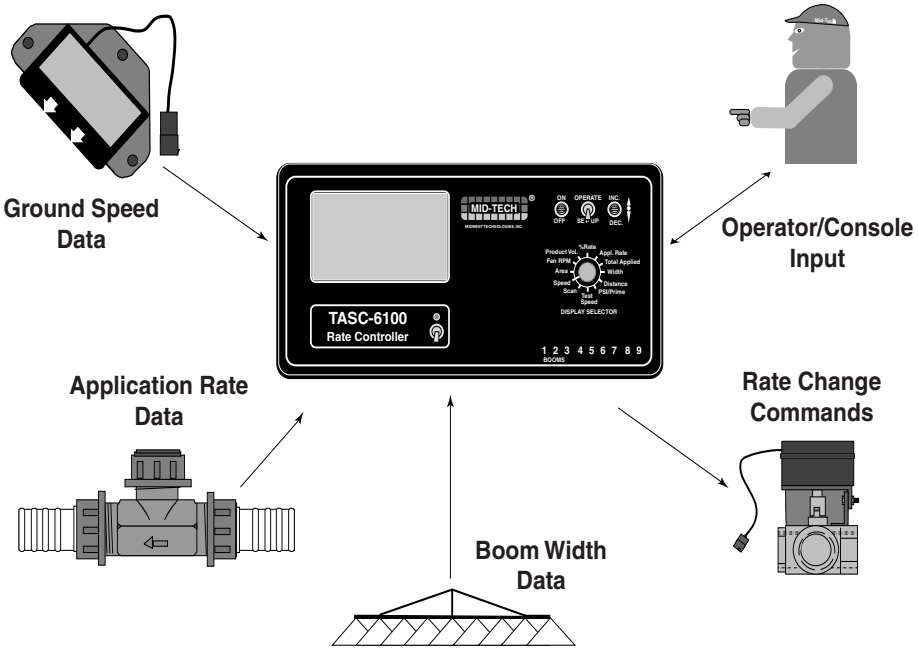
Appendix B System Overview

How The TASC 6100 Controls Application

The TASC 6100 system is designed as a controller for both liquid and granular application. There are two independent programs in the console, one for liquid and one for granular. The operator can select either program with a simple switch activation. Calibration constants that are set in the granular program stay in memory, even if the corresponding constants are changed in the liquid program. This allows a single console to be moved between a spreader and a sprayer, without requiring complete reprogramming.

The TASC 6100 system senses ground speed, active application width, and product flow rate. A change in ground speed or boom width results in a proportional change of material flow rate to maintain a constant, pre-selected application rate. Comparisons of flow

Fig. B-1 TASC 6100
System Data Flow



rate, active boom width, and ground speed are made approximately four times each second and any necessary flow rate corrections are made as soon as the need is detected. High speed microprocessors and high resolution sensors are used in the TASC 6100 system to allow it to control the carrier application rate precisely.

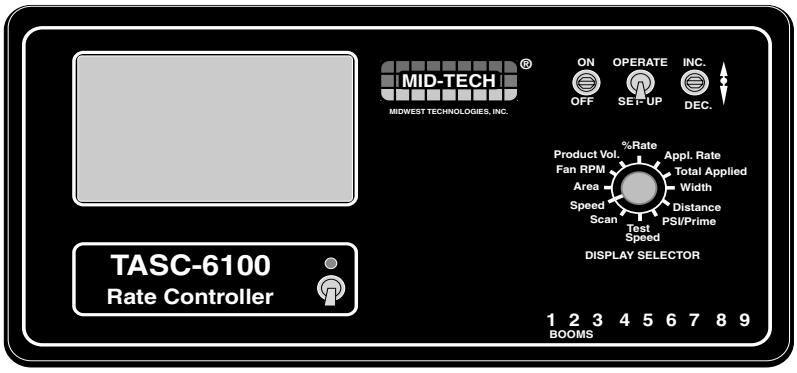


Fig. B-2. TASC 6100 Console

TASC 6100 System Components

Each of the five major components are described below so the operator has a general understanding of how each part performs its job.

1. Control Console

The TASC 6100 control console is the heart of the system and actually performs three separate functions.

The console contains a small computer with a sophisticated control program developed by MIDWEST TECHNOLOGIES. The console continually monitors ground speed and active boom width. As these values change, the console immediately recalculates the required flow rate and makes necessary corrections.

The TASC 6100 console performs the second function of allowing the operator to command the entire system “ON THE GO” from the operator’s seat. The operator has complete control over the application rate which can be altered “on the go”.

The third control console function is to keep the operator informed of the status of the applicator. The control console continually monitors the flow rate, vehicle ground speed and swath width, and immediately warns the operator if the system can no longer maintain accurate application. The warnings are both visual and audible, to attract immediate attention. The large, backlighted liquid crystal display(LCD) gives instant readouts of application rate, volume applied, vehicle ground speed, active boom width, distance traveled, and the area covered while applying.

2. Ground Speed Sensor

The TASC 6100 requires an accurate ground speed sensor. A magnetic pickup wheel sensor, mounted on a non-driven wheel, is very accurate and dependable for most operations.

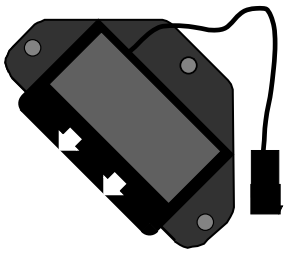


Fig. B-3. Ground Speed Radar

An optional radar ground speed sensor is available from MID-TECH® for applications where wheel slippage and variations in ground conditions are a concern. The radar sensor does not depend on ground contact and is unaffected by these variables.

Some applicators may already be equipped with a ground speed sensor. If the sensor meets the accuracy requirements of the TASC 6100 system, it can often be adapted for use with the TASC 6100 Console. Check with your MID-TECH® dealer, or the factory, regarding the use of a specific sensor.

3. Application Rate Sensor

Liquid Application

Liquid TASC 6100 systems require a flowmeter or pressure sensor in the main boom feed line to measure flow rate and to determine when changes are needed in the position of the flow control valve.

Flowmeter

The flowmeter precisely measures the flow rate of the liquid being discharged. The flowmeter is an impeller device. This means a specific volume of liquid flowing through the flowmeter rotates an impeller a specific

number of revolutions. The TASC 6100 System counts the revolutions of the impeller very accurately, allowing the console to calculate the exact flow rate of the liquid in the applicator supply line.

Sometimes an applicator is already equipped with a flowmeter. Existing flowmeters can usually be adapted to work with the TASC 6100 system, as long as the flowmeter measures the total liquid flow to the booms. Check with your MID-TECH® dealer, or the factory, regarding the use of a specific flowmeter. **Note:** Some flowmeters may require a special adapter cable.

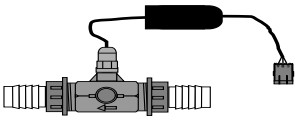


Fig. B-4. Flowmeter

Pressure Sensor

When an TASC system is operating in the pressure based mode, a pressure sensor, rather than a flow meter, is used to determine rate of flow. Knowing the characteristics of the nozzles being used, the console can determine the flow rate of the liquid by monitoring the pressure in the boom line.

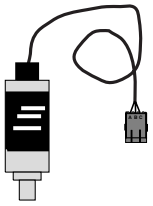


Fig. B-5. Pressure Sensor

GRANULAR APPLICATION

When using the TASC console to control a granular application, a rate sensor is necessary to measure the flow of material to the distribution system. Granular rate sensors are usually devices used to measure the rotation of a conveyor feed shaft. Each rotation of the shaft is directly related to the discharge of a specific volume of material.

The most successful rate sensors are usually the slotted disk type, giving 50 to 360 signals per revolution of the shaft. Rate sensors which give only a few signals for each revolution are usually not precise enough for MID-TECH® controllers.

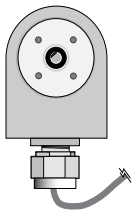


Fig. B-6. 100 Pulse Sensor

4. FLOW CONTROL VALVE

TASC 6100 systems require a flow control valve to provide automatic rate control. The console uses this valve to control the chemical flow rate. To be effective in controlling flow, this valve must be both fast acting and precise in its movements.

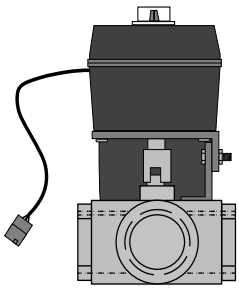


Fig. B-7. Flow Control Valve

The flow control valve may be a straight through valve, or a three port Auto-Range® type valve (poly or stainless), controlling the liquid flow directly, or it may be a hydraulic valve, controlling the speed of a hydraulic motor driving the liquid pump or granular conveyor.

Sometimes an applicator is already equipped with an electronically controlled flow control valve. If the valve meets the speed and precision requirements of the TASC 6100 system, it can possibly be adapted for use. Check with your MID-TECH® dealer, or the factory, about the use of a specific valve.

5. BOOM INTERFACE

The TASC 6100 control console must know what boom sections are active at any time, in order to adjust chemical flow rates appropriately. The console can monitor the status of as many as nine separate boom sections. The console can also sense the operation of an Implement Status switch which would result in a selectable response by the flow control valve (position held or full closure). Finally, the system can be equipped with an optional Ground Speed Override switch which, when activated, will cause the control console, under certain conditions, to ignore the actual ground speed and use a pre-selected "Override Speed" to control the application rate.

The standard TASC 6100 System is supplied with a five position boom interface cable which plugs directly into the rear of the TASC 6100 console and allows connection of up to five boom control switches and one status switch. An optional nine boom interface cable is available for larger applicators.

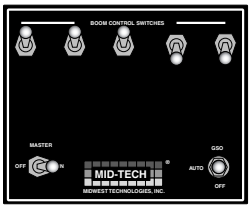


Fig. B-8. Boom Control Switchbox

An optional boom control switch box, such as the one shown in Fig. B-8, is available to serve those sprayers not already equipped with boom switches. Boom switch boxes are offered in three, five, or nine boom sizes and they are complete with wiring harnesses. The switch box also provides a Master ON/OFF boom switch and a Ground Speed Override switch and acts as an interface for an implement status switch. The wiring harness from the boom switch box plugs directly into the back of the TASC 6100 control

console and usually receives 12 VDC power from the vehicle's accessory electrical circuit.

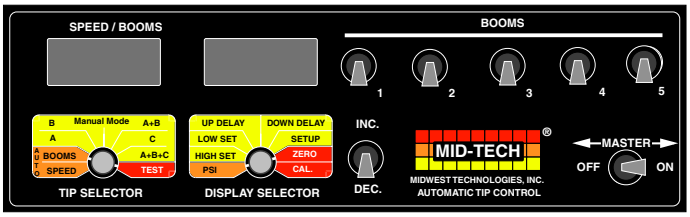


Fig. B-9. Auto Tip Control Box

Auto Tip Control

The TASC 6100 has additional capabilities that enhances its operation with the 90-01006 Auto Tip Control System. This allows the automatic control of up to three different sized sets of nozzles, extending the speed and application rate ranges of the system. Enhanced control of the displays allow simultaneous viewing of speed, pressure, and application rate.

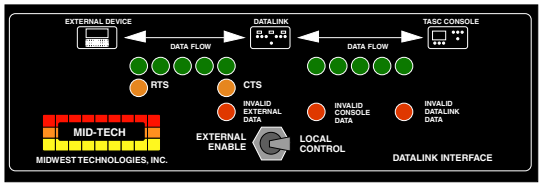


Fig. B-10. Data Link

External Rate Control

Using the Mid-Tech Data Link, the TASC 6100 console is capable of operating under the control of external rate commands from a large variety of GPS/GIS and Field Control systems.

Appndx-B

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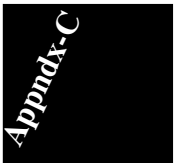
Appendix C

Glossary/Tables



Glossary

The definitions in this glossary are worded to fit the needs of this manual only and may not apply to all sprayer operations in general.

Auto-Range® Valve - A three port valve which controls both the main liquid flow and bypass flow.

Boom - An application width that is assigned a value and is used to calculate area.

Boom Section - A complete boom or part of a boom that can be turned on or off independent of other boom sections.

Bypass - The process of routing excess product pump output back to the low pressure side of the pump to control the amount of product available to the spray booms for application. This process is also used in hydraulic flow control also.

Carrier - A liquid or dry material that is used to convey herbicide, insecticide, fungicide, micronutrients, etc., to the ground.

Control Console - An operator console that constantly monitors all application conditions, such as speed, swath width, and current product flow rate, etc., and sends the necessary control signals to the spray system to maintain the application rate at that designated by the operator.

Electromagnetic Interference - Externally generated electromagnetic fields, such as those from a high voltage transmission line, a vehicle alternator with a bad diode, sparkplugs, etc., which can disrupt the normal operation of an electronic device.

Flow Control System - A system that includes a Control Console, a rate sensor device, and a servo control. This system is designed to control product to a target rate.

Flowmeter - A device which measures volumetric liquid flow. Mid-Tech uses two different basic types of flowmeters.

Standard Flowmeters - Each standard flowmeter has a standard range that it can accurately measure. To change ranges requires changing flowmeters.

Rapid Check Flowmeters - Similar to a standard flowmeter but has several different "inserts", each with a different effective range, that can be installed. To change the range of the flowmeter just remove one insert and insert one having the desired flow range.

GSO - Ground Speed Override is a minimum application speed. When the vehicle speed drops below GSO, the Control Console controls the output to the GSO speed. Area is accumulated at the actual ground speed.

Hydraulic Servo Control Valve – The term used to describe a control valve that is capable of receiving and acting upon increase and decrease information from the Control Console and in turn controls the flow of hydraulic fluid.

Impeller - A metallic device, similar to a propeller, used in a flowmeter to monitor the liquid flow. Liquid flowing past the impeller causes it to turn. A magnet sensor, placed near the flowmeter wall, senses the impeller blades as they pass and generates pulses to be sent to the control console.

Implement Status Switch - Provides another means to stop the spraying operation. This switch may take the form of a foot swich or an implement switch mounted on the toolbar that opens a circuit as the tool bar is raised, effectively stopping the spraying operation..

Liquid Flow Control Valve – The term used to describe a control valve that is capable of receiving and acting upon increase and decrease information from the Control Console and in turn controls the flow of liquid product.

Master switch - A control switch that allows the operator to turn on and off all active booms with one switch.

Product – Refers to the material that is to be metered and therefore controlled by the Control Console. This material can be grouped into the following categories:

Liquid – Includes, but is not limited to, liquid fertilizer, liquid fertilizer with chemical, water, water with chemical, liquid lime, deicing solutions, salt solutions, liquid manure, etc.

Chemical – Includes, but is not limited to, herbicide, liquid fertilizer, spray adjuvants, fungicides, insecticide, etc.

NH_3 – (Anhydrous Ammonia) A fertilizer material that is condensed from a gas to a liquid in order to be metered. Density of this material is entered into the equation in order for pounds of Nitrogen to be targeted and recorded.

Returned Material Authorization Number (RMA) - A number obtained from Mid-Tech or your dealer, which serves as your approval to return the item and informs Mid-Tech of the circumstances of the return so that proper action (repair, replacement, credit, etc.) can be initiated quickly upon receit of the item at Mid-Tech.

Swath – A boom section or group of boom sections that should accumulate area and volume as a group.

Sparge - The process of routing excess product pump output back to the product tank for agitation to keep dissolved products in suspension.

Valve Driver Module - An electronic circuit, usually enclosed in a “potted boot” attached to a cable. This unit acts as an interface between the console control signals and the actual drive signals to the valve.

USEFUL FORMULAS

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

English/Metric Conversion

U.S. to Metric

1 Acre = 0.405 Hectares
1 mile = 1.61 Kilometers
1 Foot = 0.305 Meters
1 Inch = 2.54 Centimeters
1 US Gallon = 3.785 Liters
1 Fluid Ounce = 29.57 Milliliters
1 pound = 0.454 Kilogram
1 Cubic Foot (ft^3) = 0.028 Cubic Meters (M^3)
1 Pound per Gallon = 119.68 Grams per Liter
1 US Gallon per Acre = 9.35 Liters per Hectare

Metric to U.S.

1 Hectare = 2.471 Acres
1 Kilometer = .62 Miles
1 Meter = 3.28 Feet
1 Centimeter = 0.394 Inches
1 Liter = 0.2642 Gallons
1 Milliliter = 0.034 - Fluid Ounces
1 Kilogram = 2.205 Pounds
1 Cubic Meter = 35.31 Cubic Feet
1 Kilogram per Liter = 8.36 Pounds per Gallon
1 Liter per Hectare = 0.107 Gallons per Acre

CALIBRATION NUMBERS

Booms:

1. _____ **3. _____** **5. _____** **7. _____** **9. _____**

2. _____ **4. _____** **6. _____** **8. _____** **C. _____**

DISTANCE: _____

FLOW METER: _____

MISCELLANEOUS NOTES