

MT-3405F™ II

“Dual Display” Automatic Rate Controller



OPERATION AND CALIBRATION REFERENCE MANUAL



MICRO-TRAK®
SYSTEMS, INC.

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Overview of MT-3405F™ II Console Functions

The MT-3405F™ II features two large, easy-to-read liquid crystal displays and a lighted panel for night use. The right-hand display always shows the application rate and the left-hand display shows data selected by the rotary switch. *Press the On/Off button to turn console on or off.*

VOLUME (1) (2) (3): Displays total gallons (liters) or lbs. (kg) of NH₃ applied. May be reset. (Note: VOLUME and AREA counters work in pairs, if VOLUME counter 1 is reset, it also resets AREA counter 1).

AREA (1) (2) (3): Keeps a running count of the total acres (hectares) worked. May be reset. (Note: VOLUME and AREA counters work in pairs, if AREA counter 1 is reset, it also resets VOLUME counter 1).

VOLUME/MINUTE: Displays total gallons (liters) of liquid applied per minute, or lbs. (kg) NH₃ per minute.

TANK: Displays gallons (liters) of liquid remaining or lbs. (kg) of NH₃ remaining.

RATE: Displays application rate GPA(LPH), or lbs. N/acre (kg of N/hectare).



DISTANCE: Displays distance traveled in feet (meters). May be reset.

AREA/HOUR: Displays current work rate in acres per hour (hectares per hour).

SPEED: Displays ground speed in miles per hour (kilometers per hour).

Calibration Positions

FLOW CAL: Used in calibration mode to enter the calibration value assigned to your flowmeter (see flowmeter tag.)

MIN FLOW: Used in the calibration mode to enter the minimum flow rate (GPM/LPM) of the spray boom.

ADJUST RATE: Used in calibration mode to enter an amount of change for on-the-go adjustments to the target rate (GPA/LPH), or lbs/acre (kg/hectare) N.

TARGET RATE: Used in calibration mode to enter the target application rate (GPA/LPH) or lbs/acre (kg/hectare) N.

WARNING LIGHT: Indicates over or under application of plus or minus 10% from the Target Rate or if the tank is low. Also lit when in CAL.

Calibration Positions

WIDTH CAL: Used in calibration mode to enter the working width of your sprayer booms or other equipment.

SPEED CAL: Used in calibration mode to enter the speed calibration number in inches (cm) per pulse.

INLINE/BYPASS: For establishing servo polarity. (If servo is in the main spray line, select "Inline". If servo is installed in a return line, select "Bypass".)

TEST SPEED: Used in calibration mode to enter a test speed in miles per hour (kilometers per hour).

Key Functions:



ON / OFF

ON/OFF: Press to turn the console ON or OFF. Left-hand display shows hours of operation for 2 seconds, then software version for 2 seconds, then begins normal operation.



AUTO/MAN: Key which changes operation from automatic control to manual.

CAL: This key is used to enter & exit the calibration mode.



PROGRAM KEYS: Used to increment and decrement the different calibration values.

- RESET when not in CAL, clears the selected counter when held for two seconds.
- When in CAL, the "+" key increases and the "-" decreases the value displayed.



RUN/HOLD SWITCH: Selecting the RUN position will turn on all active boom valves for AUTO or MANUAL control operation. (Boom switches must be in the up (ON) position.) Selecting the HOLD position will shut off all active boom valves. (Boom switches may remain in the up (ON) position.) The HOLD position is the master hold for the system. It will override a RUN condition from any remote run/hold switches connected to the system.

BOOM SWITCHES: The console accumulates area based on the calibrated boom widths. When an individual boom is turned OFF, the respective width is subtracted from the total width to accumulate area based on the new active application width. If a boom switch is ON (up), its respective boom shut off valve should be on. If a boom switch is OFF (down), its respective boom shut-off valve should be off. No shut-off valves should be ON if the Run/Hold switch is in HOLD, or in RUN and AUTO while speed is zero.

Calibration - Loading Default Calibration Values

English or Metric?

The MT-3405F™II is capable of displaying information in American English or standard Metric measurement. The MT-3405F™II is shipped from the factory programmed for English. **NOTE: The following procedures will also load factory default calibration values. To simply change units without loading defaults, see the "Special Calibration" section.**

METRIC

- You must be in HOLD or have all booms OFF to enter Cal. To activate the Metric mode, turn power OFF and place the rotary switch at "AREA." Hold down both the "CAL" and "-" keys and turn power ON. *See Illustration 11.* The console will display LOAD. Once LOAD is displayed, release the two keys. To "lock-in" Metric mode you must enter and exit calibration. Press and hold the CAL key until "CAL" icon appears on the display. The console is now in calibration and Metric mode is selected. Exit CAL by pressing and holding the "CAL" key until CAL disappears from the display (approximately 1 second). **NOTE: You must exit CAL to lock in Metric units.**

ENGLISH

- You must be in HOLD or have all booms OFF to enter Cal. To activate the English mode, turn power OFF and place the rotary switch in the VOLUME position. Hold down both the "CAL" and "-" keys and turn power ON. The console will display LOAD. Once LOAD is displayed, release the two keys. To "lock-in" English mode you must enter and exit calibration. Press and hold the CAL key until "CAL" lights on the display. The console is now in calibration and English mode is selected. Exit CAL by pressing and holding the "CAL" key until CAL disappears from the display (approximately 1 second). **NOTE: You must exit CAL to lock in English units.**

Entering Calibration Values

To enter or change any of the system's calibration values, you must enter calibration mode. To enter calibration mode, STOP the vehicle, turn all booms OFF or put the console in HOLD and press and hold the CAL button until the "CAL" icon appears (approximately one second). (**NOTE: Calibration may be entered while moving, but it is not recommended to attempt calibration while the vehicle is moving.**) The console will remain in calibration mode, with the RED warning light illuminated until you exit calibration or turn power OFF.

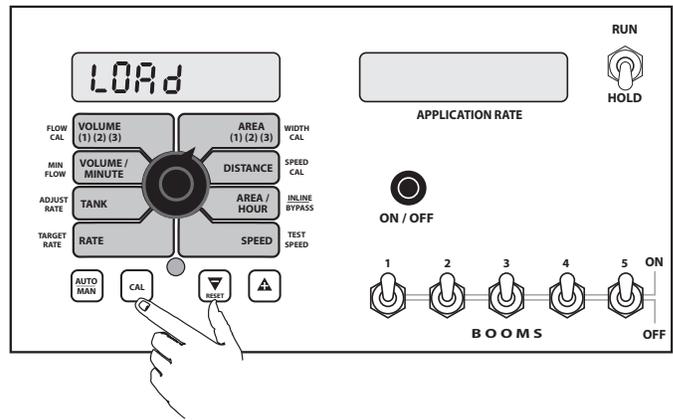
Once in calibration mode, you may change any one, all, or none of the values, in any order.* To select a calibration position, simply turn the rotary selector to the desired position. Calibration positions are identified by the WHITE labeling on each side of the rotary selector. All values are entered and adjusted using the "+" and "-" buttons on the front panel.

*TEST SPEED MUST BE LAST.

Hold the "CAL" key again for 1 second to exit calibration. "CAL" will disappear from the display.

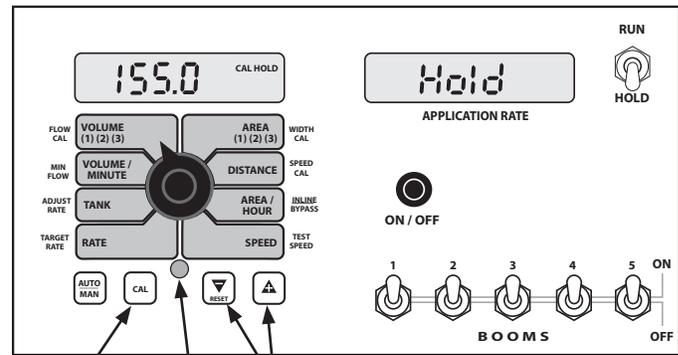
NOTE: you must exit CAL to save changes.

Illustration 11



NOTE: In metric, the width will have a decimal point, in English there is no decimal point. Also, changing from English to Metric mode may change or alter any previously entered calibration values. After switching measurement modes, confirm that all calibration values are correct.

Illustration 12

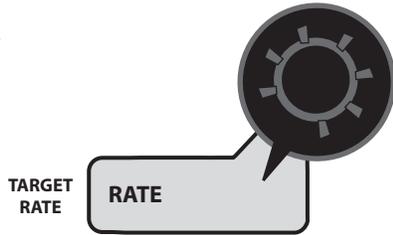


Press to enter or exit calibration mode.
 Press to increase or decrease values.
 Red warning light will be lit when in CAL.

Calibration (cont)

Entering Calibration Values (cont)

TARGET RATE: Enter the value for the desired target application rate in gallons per acre (liters per hectare) or lbs. of N per acre (kgs of N per hectare). This is the application rate that the console will lock onto when operating in AUTO.



ADJUST RATE: Enter the value for the desired amount of change in gallons per acre (liters per hectare) to be used for making on-the-go rate adjustments when operating in AUTO. For example, if a value "1.0" is entered, you will be able to increase or decrease your application rate in one-gallon (liter) or lb. (kg) increments during operation in AUTO. To disable this feature, simply enter ".0" for a value.

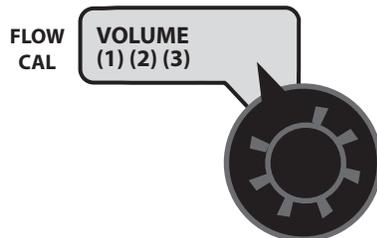


MIN FLOW: The purpose of this calibration value is to prevent the system from applying below the recommended minimum rate for the nozzles. The minimum flow rate in gallons per minute (liters per minute) based on the nozzles being used, for the entire boom on the sprayer. **DO NOT** enter the actual flow of your spray application. **FOR EXAMPLE:** If the minimum flow rate for the nozzle you are using is .22 GPM at their minimum recommended pressure and your boom has 20 nozzles, enter 4.4 as the MIN FLOW value (.22 x 20 = 4.4). The system **WILL NOT** apply at a rate lower than this value when spraying in AUTO. This value should be checked/ changed for each different nozzle that you use.



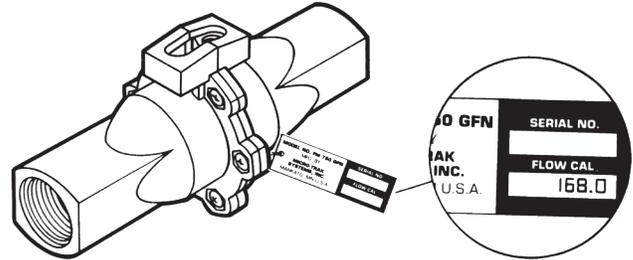
APPLICATION NOTE: Over-application may occur with MIN FLOW set if ground speed is too slow.

FLOW CAL: This position is used to calibrate the flowmeter for accurate liquid measurement.



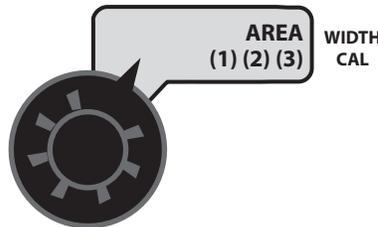
Your Micro-Trak flowmeter has been tested at the factory and assigned a "FLOW CAL" value to make it operate properly with the MT-3405F™ II console. This number is stamped on the metal tag attached to the flowmeter. See **Illustration 13**. This is a starting point only. If your spray solution has a specific gravity or viscosity that is different than water, flowmeter calibration should be done for the specific solution (Please refer to **Fine-Tuning Flowmeter Calibration in Appendix C on page 45.**)

Illustration 13



CAUTION: If spray lines are pressurized, nozzles may spray during WIDTH calibration (below).

WIDTH: Enter the effective working width, in inches (meters) for the boom section currently shown on the display. It is simplest to start with all booms ON and then turn each boom OFF, from left to right, after calibrating the width. Note that the system must be in RUN (not HOLD) to display boom numbers. Repeat this procedure for each boom section. Enter a value of "0" (.000) for any unused boom sections.



Your "working" width per boom section will be the number of nozzles on the boom section times the nozzle spacing in inches (mm). For example, if you have 7 nozzles spaced at 20 inches, the working width of the boom section is 140 inches.

Calibration (cont)

Entering Calibration Values (cont)

SPEED CAL: This position is used to calibrate the speed sensor for accurate speed and distance measurement. When this position is selected, the display will show the SPEED CAL value along with "CAL" on the display. See *Illustration 14*. In English units, the SPEED CAL number is displayed in inches, in metric it is displayed in centimeters.

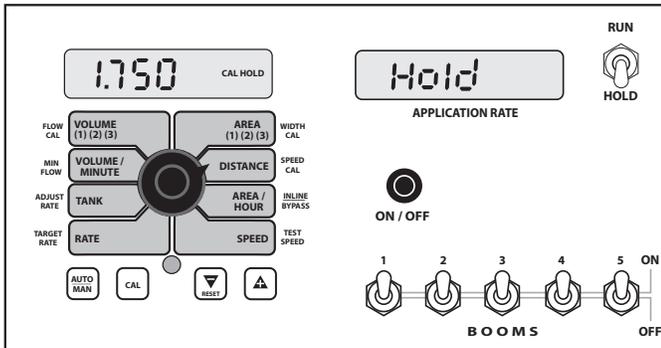


INLINE/BYPASS: The display will show InLinE or bYPASS. Use the "+" or "-" buttons to toggle to desired selection. Inline is used when the servo is in the line going out to the booms; Bypass is used when the servo is in a return line. **NOTE: if used on a Micro-Trak NH3 system, it must be set to Bypass.**



SPEED CAL FOR RADAR OR GPS SPEED SENSORS: See the following table for SPEED CAL numbers to enter for various radar models or GPS speed sensors. To fine tune the SPEED CAL number, see Appendix B on page 44.

Illustration 14



Radar or GPS Speed Sensor Calibration

Radars	English Cal # in.	Metric Cal # in.	Hz/MPH
Vansco	.150	.38	58.90
Raven	.148	.38	59.80
Magnavox	.154	.39	57.40
Dickey-john (NOTE: Dickey-john radars may be factory calibrated for any of these four settings).	.149	.38	58.94
	.199	.51	44.21
	.319	.81	27.64
	.518	1.32	17.034
GPS Speed			
Astro II & 5	.189	.48	46.56
SkyTrak (Std)	.150	.38	58.94
SkyTrak (MT)	.910	2.31	9.82
Dickey-john	.210	.53	42.00
John Deere (In-cab speed signal)	.197	.50	44.70

Calibration (cont)

Determining the SPEED CAL

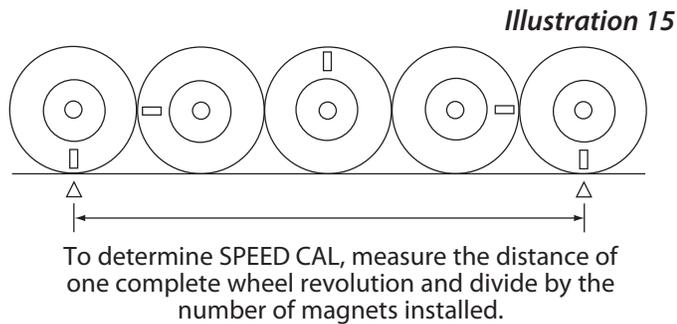
For the console to calculate the correct speed and measure distance accurately, the circumference of the sensor-equipped wheel must be entered. Determine the circumference of the sensor-mounted wheel to the nearest tenth of an inch (tenth of a centimeter) with the following method:

METHOD

Mark the tire with a piece of chalk and measure the distance traveled on the ground for one complete revolution. See Illustration. For improved accuracy, it is recommended that you perform this function in field conditions, measure several revolutions, and take the average.

Divide the measured revolution by the number of magnets installed to get your starting SPEED CAL calibration value. Once calibration of the system is complete, this number should be fine-tuned for optimum accuracy.

For fine-tuning the SPEED CAL value, see Appendix B on page 44.



Drive Shaft Speed Sensor Calibration

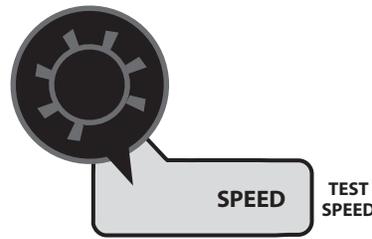
NOTE: If you have mounted the magnetic speed sensor on a wheel, skip this step and go on to Fine Tuning Speed/Distance Calibration Values.

Because of the difference in wheel-to-drive shaft ratios, it is difficult to determine a calibration value for installation on a drive shaft by measuring a wheel. You must start with an estimated calibration value and then fine-tune the calibration.

Any number between 10 and 15 (255 mm to 380 mm) is a good starting value.

NOTE: For fine-tuning the SPEED CAL value, see Appendix B on page 44.

TEST SPEED: Test speed is a built-in ground speed simulator that is used in performing pre-field checks. When a typical operating speed is entered, the MT-3405F



It will respond as if you were actually driving that speed. It allows you to simulate your spraying application with water, while remaining stationary, to

make certain that all of the equipment is operating properly and that your sprayer can actually perform the intended application. Test speed will not accumulate Distance or Area measurements. (The CAL indicator flashes to remind the user that TEST SPEED mode is active.) TEST SPEED is cancelled by exiting CAL.

EXITING CALIBRATION: Upon completion of the calibration process, exit calibration by pressing and holding the CAL button until the RED warning light turns off (one second). Basic calibration is now complete. BEFORE beginning application, confirm that the system is set up to do the job that you want it to. Please refer to Pre-Field System Checkout to confirm calibration settings, nozzle selection and overall system performance. **NOTE:** You must exit CAL to save any changes.

Factory-Loaded Calibration Values

Calibration Factor	Measurements Effected	Default Values	
		English	Metric
TARGET RATE	Application Rate in Auto	10.00 gallons/acre	100.00 liters/hectare
ADJUST RATE	Amount of increase or decrease per +/- press (in auto)	1.00 gallons/acre	10.00 liters/hectare
WIDTH BOOMS 1-3*	Area, Application Rate	240 inches	6.000 meters
SPEED CAL	Distance, Area, App. Rate, Area/Hour	0.189 inches	4.44 centimeters
MINimum FLOW	App. Rate, Lowest Allowable Flow Rate	0.0 gallons/minute	0.0 liters/minutes
FLOW CALibration	Flow/App. Rats, Volume	145.0 pulses/gallon	145.0 pulses/gallon
INLINE/BYPASS	Application Rate	Bypass	Bypass
TEST SPEED	none	0.00	0.00

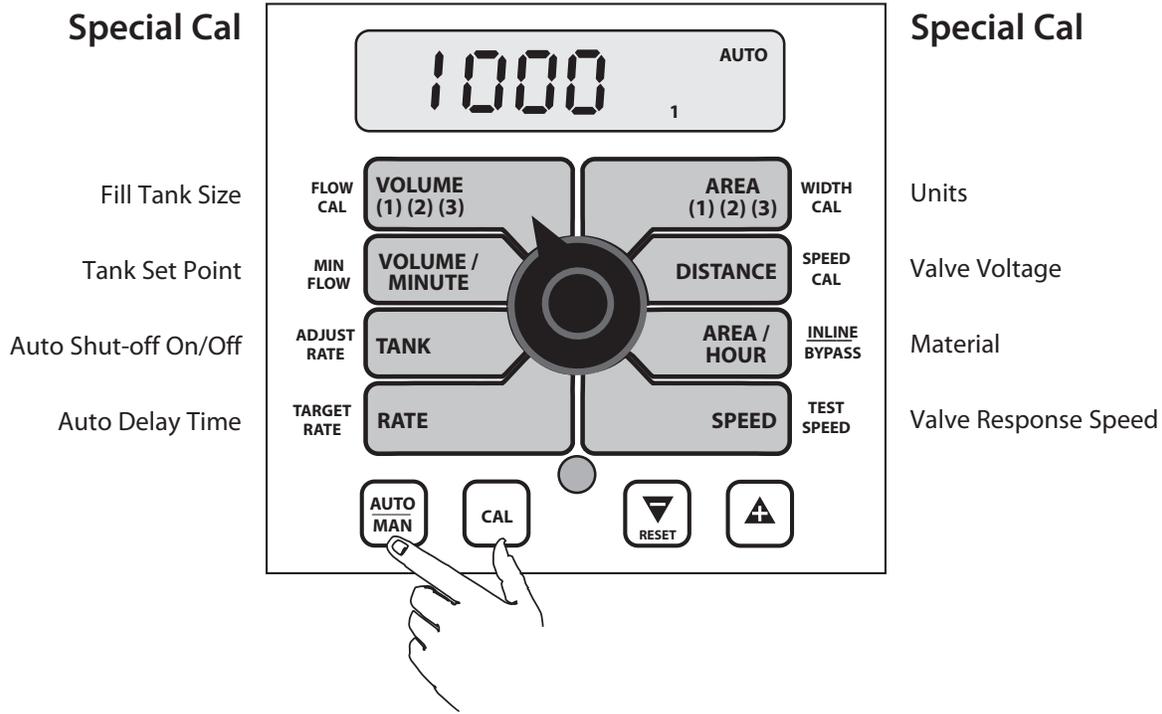
* BOOMS 4 AND 5 ARE SET TO 0.

“Special” Calibration

The “Special” calibration mode is used to set up system parameters that rarely need to be changed or adjusted. To enter Special Cal, put the system in HOLD, turn the console OFF, press and hold both the AUTO/MAN button and CAL button while turning console ON. The console will display SPEC for 2 seconds to show that the console is in the Special Calibration mode. Release the AUTO/MAN and CAL buttons.

The CAL icon and Warn LED will turn on. The desired Special Calibration parameter(s) can then be accessed with the rotary switch per the illustration below. To exit Special Calibration, press and hold the CAL button for 2 seconds. The console will store any changes and revert to normal operation.

NOTE: you must exit Special Calibration to save changes.

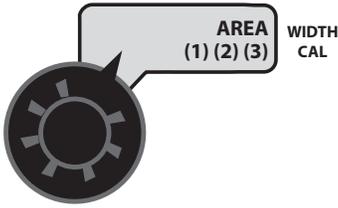


NOTE: The following table describes the “Special” Cal parameters and shows the factory settings. More detailed descriptions follow the table.

Parameter	Description	Factory Setting
Units	System of Units EnG (English) or mEt (Metric) / TurF (Turf)	EnG (English)
Valve Voltage	Servo Valve Drive Voltage (8/12)	12
Material	Choose Liquid (H2O) or Anhydrous (NH3)	H2O
Valve Response Speed	Set Valve Response (-4 to 3)	-1
Fill Tank Size	Size (volume) of Full Tank (Off or 1-65,535)	Off
Tank (Low) Set Point	Sets Alarm Set Point if using TANK Function (Off or 1-65,535)	Off
Auto Shut-off	Runs Servo Toward Minimum when in Hold (On/Off)	Off
Auto Delay Time	Delay Servo Response when going from Hold to Run (Off to 4 sec.) Allows slow shutoff valves enough time to open before adjusting servo	1

“Special” Calibration (cont)

Units: Choose the system of units desired. Turf units are the same as English units except Area is in thousands of square feet. Use the “+” and “-” buttons to choose between EnG (American English Units), MEt (Metric) and TurF (Turf units).



Valve Voltage: Selects the operating voltage for the servo valve. Factory setting is 12 volts. Use the “+” and “-” buttons to toggle between 8 and 12 on display. **NOTE: if using an old style Micro-Trak servo valve, (See Illustration below), set to 8 volts.**



1" old servo
8 volts



3/4" old servo
8 volts

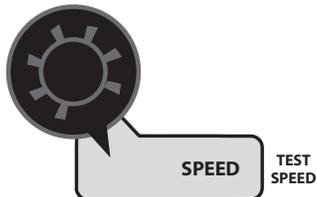


1" Electric Servo
12 volts

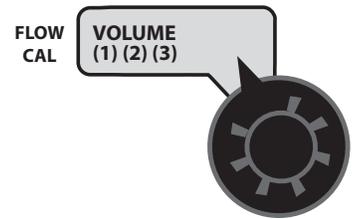
Material: Use “+” and “-” buttons to select between liquid (H2O displayed) or anhydrous ammonia (nH3 displayed). If in NH3 mode, rates will be displayed in pounds (kg) actual N and totals will be displayed in pounds (kg) anhydrous ammonia (NH3). **NOTE: if NH3 is selected, see Appendix F for NH3 specific instructions.**



Valve Response Speed: Allows adjustment of response to “tune” the system for use with very fast or slow valves. For example, if using a ball valve that takes several seconds to open or close in manual mode, and the system responds sluggishly, use the “+” button to adjust the valve response number to 1, 2, or 3. The range of adjustment is -4 to 3, factory setting is -1. **NOTE: exercise caution when increasing the valve response speed. If using a relatively fast valve (1-3 seconds open-to-close), the system may become unstable with higher valve response speed numbers entered.**



Fill Tank Size: If using the Tank feature, this setting can be used to enter the volume of the tank. Use the “+” and “-” buttons to choose OFF or any value from 1-65,535. Then when the tank is filled, the tank counter can be reset to full by simply turning the rotary switch to the TANK position and pressing the “+” button. Depending on the “UNITS” setting, the TANK SIZE units will be either gallons or liters. If “material” is set to NH3, the Tank Size will be in lbs. or kg. Anhydrous Ammonia (NH3).



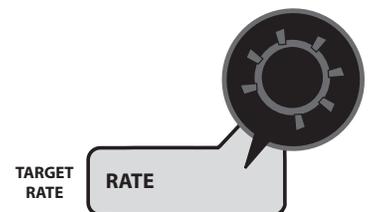
Tank Alarm Set Point: Use the “+” and “-” buttons to set the desired value. This value sets the level at which the Warning LED starts flashing and the word “FILL” flashes on the display. Range is OFF or 1-65,535. When the tank value drops below the set point, the alarms will notify the user that the tank level is low.



Auto Shutoff ON/OFF: When Auto Shutoff is enabled (ON) the servo will run toward minimum flow for 4 seconds any time the system is put in HOLD or all booms are turned off, or if in AUTO mode and speed goes to zero. This feature is normally used only in Dry Application systems where the HOLD condition must stop a hydraulic auger or conveyor belt.



Auto Delay Time: Typically used when using relatively slow ball valves for boom shut-off, this feature delays adjustment of the servo valve until the boom valves are open. Use “+” and “-” buttons to set from zero (OFF) to 4 seconds.



To exit “Special” Calibration, press and hold the CAL button for 2 seconds. The console will store any changes and revert to normal operation.

NOTE: you must exit “Special” Calibration to save changes.

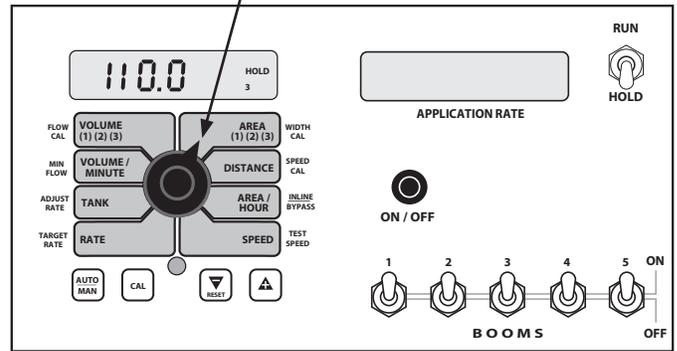
Operation

Make sure your system is properly calibrated before beginning to apply product. We also recommend completion of the Pre-Field System Checkout described on pages 39-40 prior to beginning any field operations.

Press the ON/OFF button to turn the console on. After displaying the hours of operation and software version, the console will start normal operating mode.

The MT-3405F™ II can be operated in Manual (MAN) or Automatic (AUTO) mode. In either mode, the right-hand display will always show the Application Rate (except when in HOLD or when displaying error messages, see Troubleshooting section starting on page 33). The left hand display will show data as selected by the rotary switch.

Turn rotary dial to display desired readout.



Manual Operation

The manual mode is used when the operator wants to manually control the servo valve using the "+" and "-" keys, and thus the application rate. The application rate (gal/acre or liter/hectare) will vary depending on ground speed. Use the AUTO/MAN button to select MANUAL mode ("MAN" icon will be displayed).

IN HOLD: If the console is in HOLD, or if all Boom Valves are OFF, the "+" and "-" buttons will not control the servo valve unless the rotary switch is in the VOLUME/MINUTE position. In that position only, the servo valve can be adjusted without any boom valves on. This can be useful for system pressure tests, etc.

IN RUN, WITH SPEED SIGNAL: If the system is in RUN, with at least one boom valve ON and there is a speed signal, the "+" and "-" buttons can be used to adjust the servo valve with the rotary switch in any position except TANK, VOLUME, and AREA and the application rate can be monitored on the right-hand display.

IN RUN, NO SPEED SIGNAL: If there is no speed signal, "no SPEED" will flash in the right-hand display and the Application Rate will be invalid. The "+" and "-" buttons will adjust the servo valve if the rotary switch is in the VOLUME/MINUTE position, and the flow rate (GPM or LPM) can be monitored.

Operation (cont)

Automatic Operation

When the Automatic mode is selected, the console will control the servo valve to maintain the desired application rate (GPA/LPH) when the vehicle speed changes or when booms are turned on or off. Press the AUTO/MAN button to select AUTOMATIC mode; the AUTO icon will appear in the display.

To operate the system in AUTOMATIC mode, turn on the desired booms, toggle the RUN/HOLD switch to RUN, and drive. **IMPORTANT NOTE: In AUTO mode, when no speed signal is available, the system automatically turns all booms off.** "no SPEED" will flash in the right-hand display until the vehicle starts moving, then the console will turn the booms on and the Application Rate will be displayed in the right-hand display. The system will automatically adjust the servo valve to maintain the calibrated TARGET RATE (GPA/LPH).

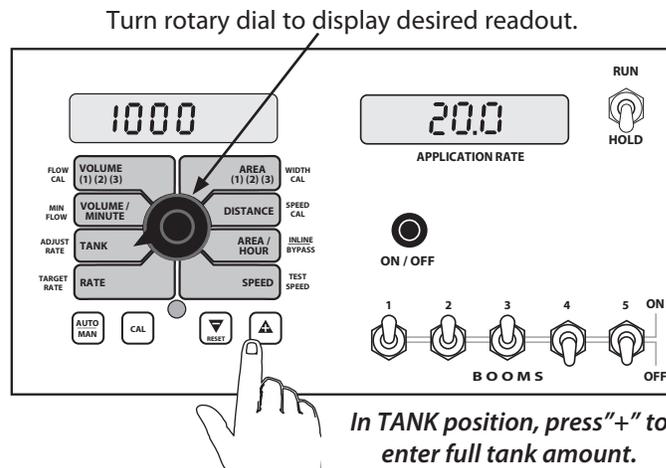
ON-THE-GO "DELTA" RATE ADJUSTMENTS (ADJUST RATE): To adjust the target application rate on-the-go, each time the "+" or "-" buttons are pressed, the TARGET RATE will be increased or decreased by the amount of the ADJUST RATE which was entered in calibration. Example: calibrated TARGET RATE = 10.0 GPA and ADJUST RATE = 1.0 GPA, pressing the "+" key once will increase the target rate from 10.0 to 11.0. The rate display will momentarily show the new target rate of 11.0 and then show the actual application rate. Pressing the "-" key once will decrease the target from 11.0 to 10.0. **NOTE: When you "DELTA" the target rate, the display will momentarily show you the new target rate and then resume showing the actual application rate. The new target rate is maintained until further adjustments are made using the "DELTA" feature or calibration changes occur, or if the unit is turned off. Important: to use the DELTA feature, the console must be in AUTOMATIC mode and the rotary switch can be in any position except TANK, VOLUME, or AREA.**

IN HOLD: If the system is in AUTO mode and in HOLD or all booms are off, the "+" and "-" buttons will adjust the TARGET RATE with the rotary switch in any position except TANK, VOLUME or AREA; **CAUTION:** we recommend that the rotary switch is in the RATE position, because that is the only position where the new TARGET RATE is displayed while in HOLD. In RATE position, the left-hand display will momentarily display the new TARGET RATE, then will revert to .00, because all the boom valves are off so there is no product being applied.

USING THE TANK COUNTER: With the rotary switch in the TANK position, the left-hand display shows the amount remaining in the tank. If a FILL TANK SIZE (tank full) number has been entered in Special Calibration, the "AUTO FILL" feature is active; this feature allows the TANK counter to be quickly reset to a full tank amount by simply pressing the "+" button with the rotary switch in the TANK position. The "-" button can be used to reduce the tank counter, but any press of the "+" will set the counter to the calibrated FILL TANK SIZE value.

If no TANK VALUE has been entered in calibration, the tank counter can still be used, but the counter must be manually adjusted when filled, by pressing and holding the "+" button until the desired value is reached.

TANK ALARM: If a TANK SET POINT (tank low) number has been entered in Special Calibration, the TANK ALARM feature is active. When the tank counter value drops below the TANK SET POINT, the red warning light will flash and "FILL" will flash on the left-hand display. The "FILL" message will flash no matter what position the rotary switch is in. Adjusting the tank value to a value greater than the SET POINT will turn the alarm off.



DATA DISPLAYED IN ROTARY SWITCH POSITIONS

(See the NH3 section in the Appendix for NH3 data description.)

RATE: Actual number of gallons per acre (liters per hectare) being applied.

TANK: Amount (gal or lit) remaining in tank.

VOLUME/MINUTE: Flow rate in GPM (LPM).

SEEDS (1) (2) (3): Three independent pairs of counters.
AREA (1) (2) (3): In either the AREA or the VOLUME position, select a pair of counters by pressing the "+" button. The active pair of counters (1,2,3) is indicated by the small numbers in the lower right corner of the left-hand display. DO NOT attempt to select the counter pair by using the "-" button because it will reset the selected counter pair to zero. See additional data description below and see RESETTING SYSTEM COUNTERS section.

VOLUME (1) (2) (3): Total gallons (liters) applied since the active counter was last reset to zero.

AREA (1) (2) (3): The acres (hectares) covered since the counter was last reset to zero. The area counters do not accumulate area when the console is in HOLD or if all booms are turned OFF.

DISTANCE: The feet (meters) driven since the counter was last reset to zero. This counter does not accumulate when the console is in HOLD. This counter may be reset to zero independent of other system counters.

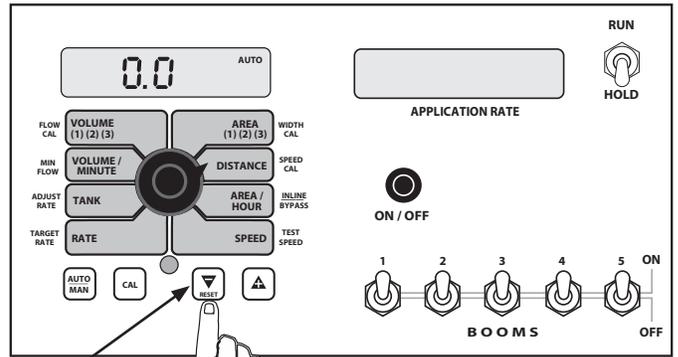
AREA/HOUR: Rate of coverage in acres/hour (hectare/hour).

SPEED: Ground speed in miles (kilometers) per hour. **IMPORTANT:** all booms automatically shut off if system is in "HOLD" or if in AUTO with NO SPEED.

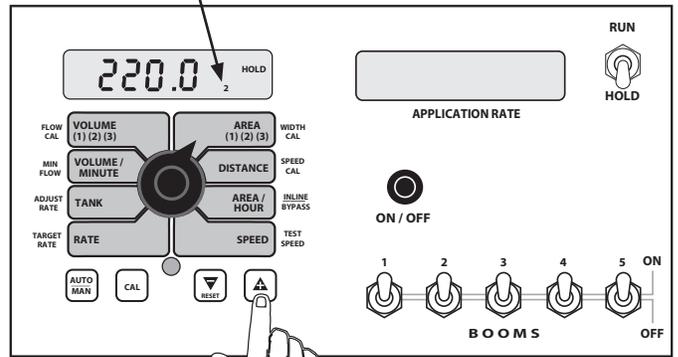
Resetting System Counters

The AREA, DISTANCE and VOLUME counters maintain a running count during operation regardless of the position of the rotary switch. When any of these counters reach their maximum capacity, or when you want to start a new count, the value may be reset to zero by performing the following routine. Counter pairs may be reset independently of other counter pairs.

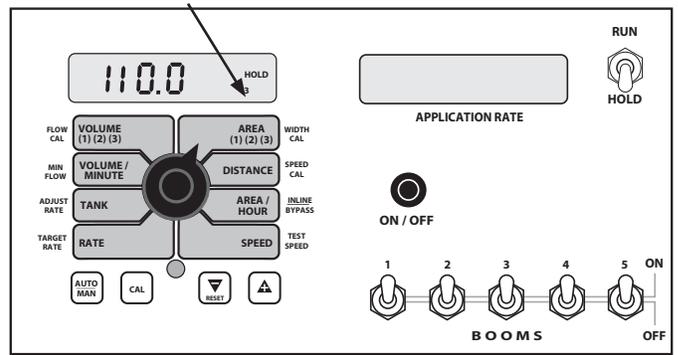
1. Turn the booms OFF or put the system in HOLD.
2. Turn the rotary switch to the counter to be reset.
3. To reset distance turn the rotary switch to DISTANCE and simply press and hold the RESET button until the display reads zero. The display will show the word "CLEAR" during this process, and will show 0.0 when reset to zero is complete.
4. To reset the volume and area counters; there are three independent AREA counters, paired with three VOLUME counters. The active pair of counters is indicated by the small numbers in the lower right area of the display (1, 2, or 3) when the rotary switch is in the AREA or VOLUME position. Select the pair of counters you want to use by pressing the "+" button. The small number will increment each time the "+" button is pressed (from 1 to 3, then rolls back to 1). DO NOT attempt to select the counter number by using the "-" button, because that will clear the active pair of counters if held for 1 second. If the "-" button is accidentally pressed, the console will display "CLEAR" to alert the user that the counters will be cleared. If the user continues to hold the "-" button for 1 second "CLEAR" will disappear and be replaced by .0, indicating that the selected pair of counters has been cleared.



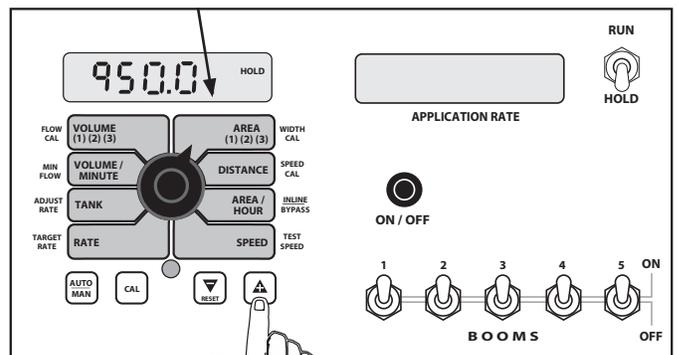
Display indicates counter pair #2 is selected



Display indicates counter pair #3 is selected

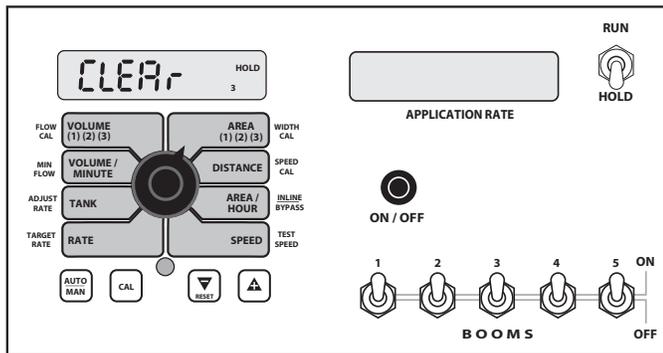


Display indicates counter pair #1 is selected



Clearing Counters

When the desired counter number is displayed, press the "-" (RESET) button and "CLEAR" will be displayed. **NOTE: holding the "-" (RESET) button for 1 second will clear both the #3 AREA counter and the #3 VOLUME counter whether the rotary switch is in the AREA or the VOLUME position.** If the "-" button is released before 1 second has elapsed, the counters will not be cleared and the "CLEAR" message will be replaced with the previous total.



After the "-" (RESET) button has been held for 1 second, the "CLEAR" message will be replaced by ".0", indicating that counter pair #3 has been cleared.



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