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 that the following procedures will also load factory default calibration values.*** To simply change units without loading defaults, see the "Special Calibration" section.

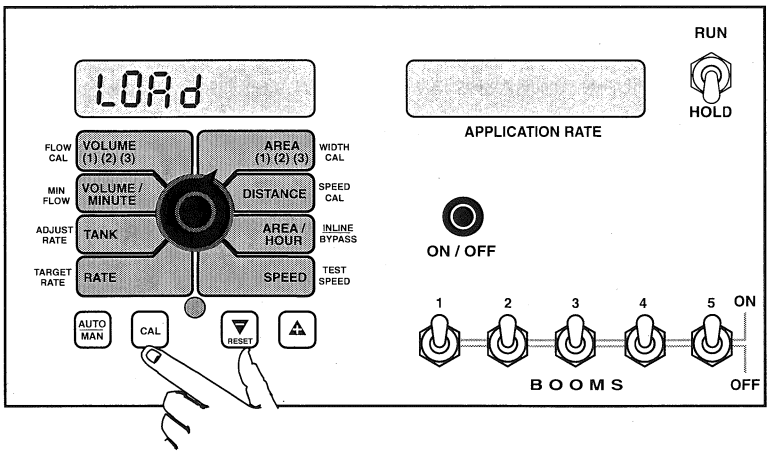
METRIC

- 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.**

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.

Entering Calibration Values:

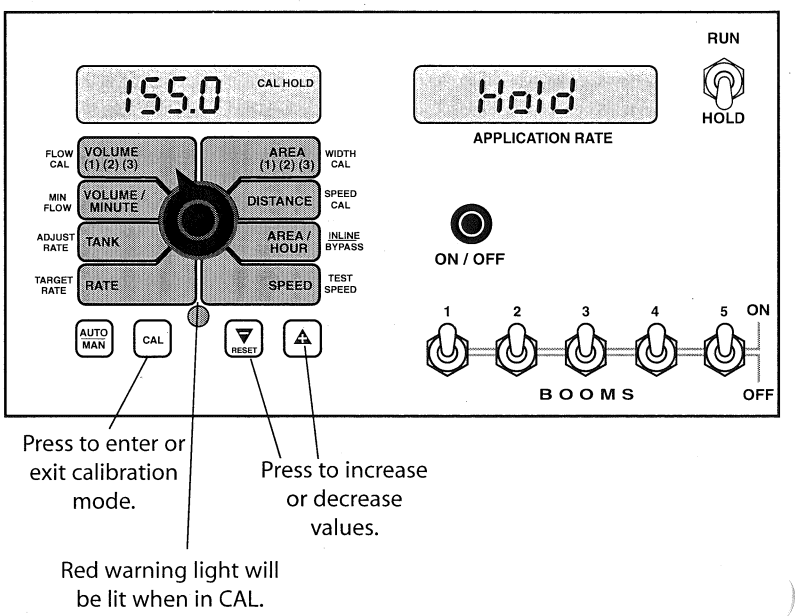
To enter or change any of the system's calibration values, you must enter calibration mode. To enter calibration mode, STOP the vehicle, turn all booms OFF or put the console in HOLD and press and hold the CAL button until the "CAL" icon appears (approximately one second). (NOTE: Calibration may be entered 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.

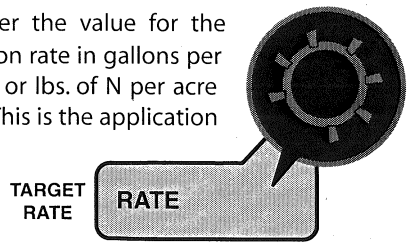
*Test speed must be last.

Hold the "CAL" key again for 1 second to exit calibration. "CAL" will disappear from the display. **NOTE: you m ust exit CAL to save changes.**

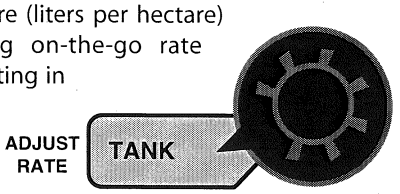
Illustration 12



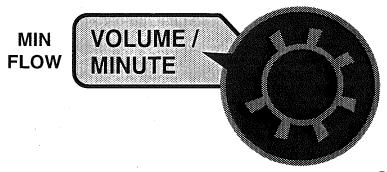
TARGET RATE: Enter the value for the desired target application rate in gallons per acre (liters per hectare) or lbs. of N per acre (kgs of N per hectare). This is the application rate that the console will lock onto when operating in AUTO.



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.

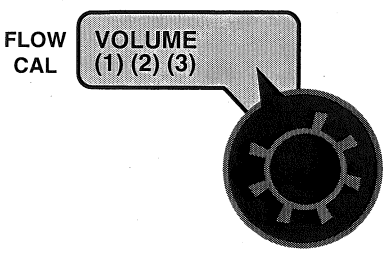


MIN FLOW: The purpose of this calibration value is to prevent the system from applying below the recommended minimum rate for the nozzles. The *minimum* flow rate in gallons per minute (liters per minute) based on the nozzles being used, for the entire boom on the sprayer. **DO NOT enter the actual flow 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.



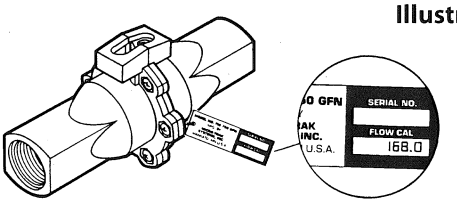
APPLICATION NOTE: Over-application may occur with MIN FLOW set if ground speed is too slow.

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



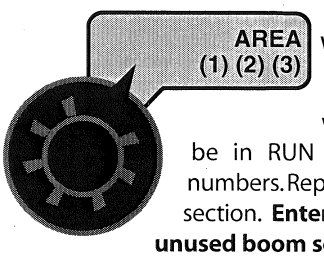
Your Micro-Trak flowmeter has been tested at the factory and assigned a "FLOW CAL" value to make it operate properly with the MT-3405F™ II console. This number is stamped on the metal tag attached to the flowmeter. *See Illustration 13.* This is a starting point only. If your spray solution has a specific 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 50.)

Illustration 13



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

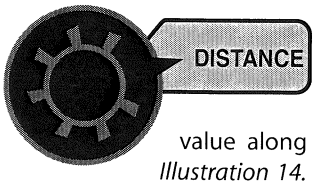
WIDTH: Enter the effective working width, in inches (meters) for the boom section currently shown on the display. It is simplest to start with all booms ON and then turn each boom OFF, from left to right, after calibrating the width. Note that the system must be in RUN (not HOLD) to display boom numbers.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

Entering Calibration Values cont.:

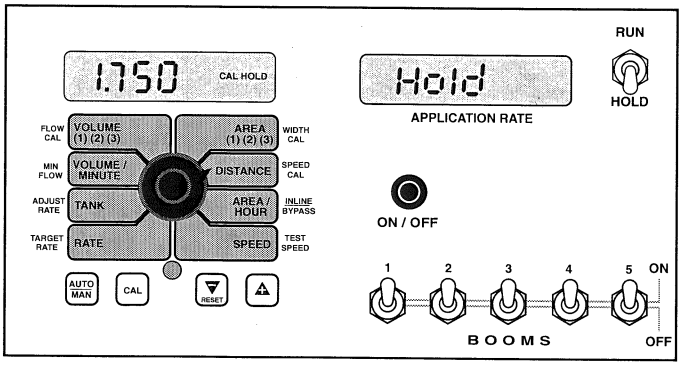
SPEED CAL: This position is used to calibrate the speed sensor for accurate speed and distance measurement. When this position is selected, the display will show the SPEED CAL value along with "CAL" on the display. *See Illustration 14.* In English units, the SPEED CAL number is displayed in inches, 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 49.

Illustration 14



Change Bypass to Inline

Radar or GPS Speed Sensor Calibration

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

Determining the SPEED CAL

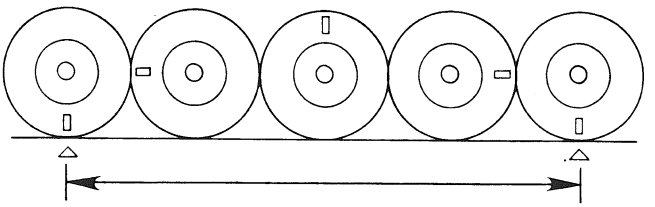
For the console to calculate the correct speed and measure distance accurately, the circumference of the sensor-equipped wheel must be entered. Determine the circumference of the sensor-mounted wheel to the nearest tenth of an inch (tenth of a centimeter) with the following method:

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 49.

Illustration 15



To determine SPEED CAL, measure the distance of one complete wheel revolution and divide by the number of magnets installed.

Drive Shaft Speed Sensor Calibration

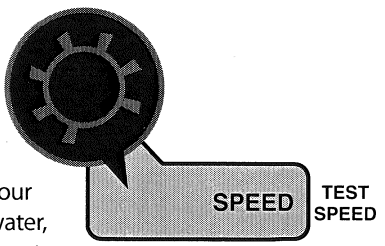
NOTE: If you have mounted the magnetic speed sensor on a wheel, skip this step and go on to Fine Tuning Speed/Distance Calibration Values.

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 49.

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 II 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.**

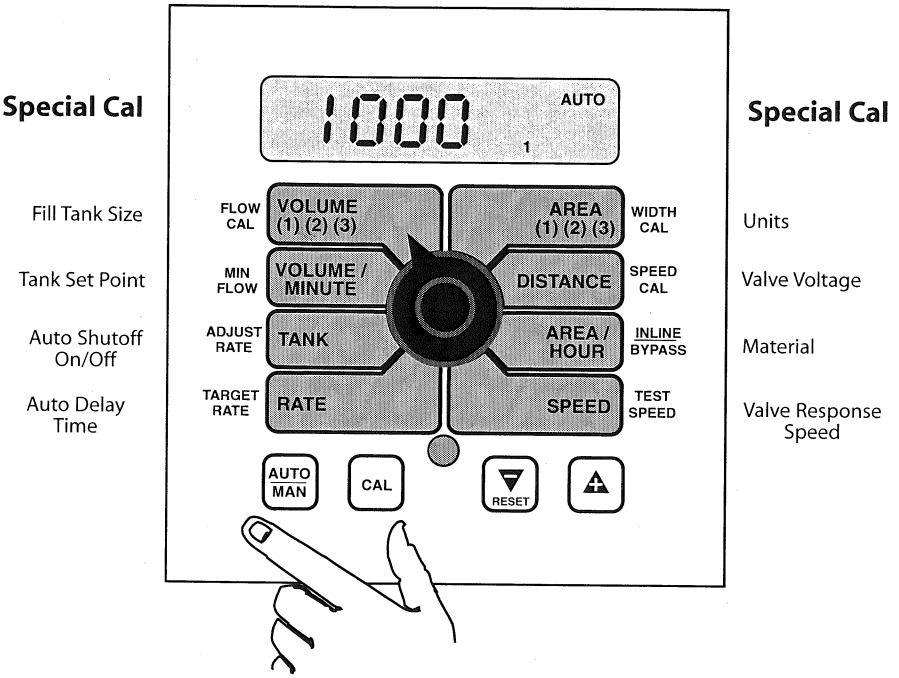
Factory-Loaded Calibration Values

Calibration Factor	Measurements Affected	Default Values	
		English	Metric
TARGET RATE	Application Rate in Auto	10.0 gallons/acre	100.0 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, App. Rate	240 inches	6.000 meters
SPEED CAL	Distance, Area, App. Rate, Area/Hour	1.750 inches	4.44 centimeters
MINimum FLOW	App. Rate, Lowest allowable flow rate	0.0 gallons/minute	0.0 liters/minute
FLOW CALibration	Flow/App. Rates, Volume	145.0 pulses/gallon	145.0 pulses/gallon
INLINE/BYPASS	App. Rate	Bypass	Bypass
TEST SPEED	none	.0	.0

* 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.**

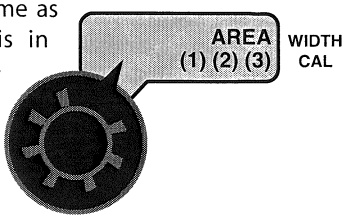


The following table describes the special cal parameters and shows the factory settings. More detailed descriptions follow the table.

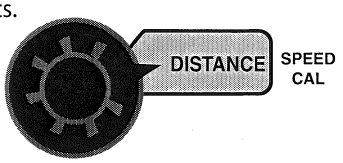
Parameter	Description		Factory Setting
Units	System of units: EnG (English) / mEt (Metric) /TurF (Turf)		EnG (English)
Valve Voltage	Servo Valve Drive Voltage (8/12)		12
Material	Choose Liquid (H20) or Anhydrous (NH3)		H20
Valve Response Speed	Set Valve Response	(-4 to 3)	-1
Fill Tank Size	Size (volume) of Full Tank	(Off or 1-65,535)	Off
Tank (Low) Set Point	Sets alarm point if using Tank function	(Off or 1-65,535)	Off
Auto Shutoff	Runs servo toward minimum when in hold	(On/Off)	Off
Auto Delay Time	Delay servo response when go from Hold to Run *- Allows slow shutoff valves enough time to open before adjusting servo*	(Off) to 4 sec.)	1

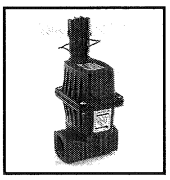
"Special" Calibration cont.

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).

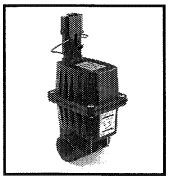


Valve Voltage: Selects the operating voltage for the servo valve. Factory setting is 12 volts. Use the "+" and "-" buttons to toggle between 8 and 12 on display. NOTE: if using an old style Micro-Trak servo valve, (see illustration), set to 8 volts.

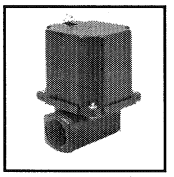




1" old servo
8 volts



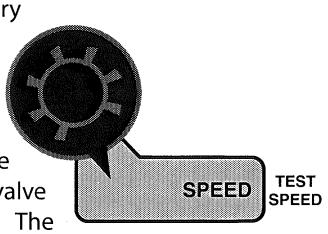
3/4" old servo
8 volts



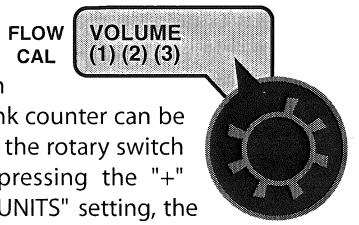
new servo
12 volts

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.

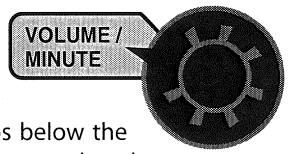
Valve Response Speed: Allows adjustment of response to "tune" the system for use with very fast or slow valves. For example, if using a ball valve that takes several seconds to open or close in manual mode, and the system responds sluggishly, use the "+" button to adjust the valve response number to 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).

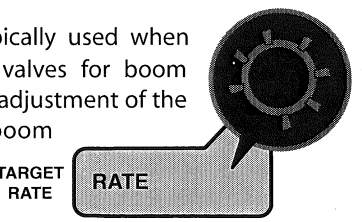


Tank Alarm Set Point: Use the "+" and "-" buttons to set the desired value. This value sets the the level at which the Warning LED starts flashing and the word "FILL" flashes on the display. Range is OFF or 1-65,535. When the tank value drops below the set point, the alarms will notify the user that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