FORM NO. 42952

TORO®

MODEL NO. 41520, 41521, 41020, 41021 and 41522

OPERATOR'S INSTRUCTIONS

PRO-CONTROL SPRAY SYSTEM
FOR USE ON THE MULTI-PRO 5200 VEHICLE

Keep this Operators Manual, the Vehicle Operators Manual, the Engine Manual and all other Accessory Manuals in the plastic tube behind the operator seat.

It is very important that all persons operating this equipment have easy access to these instructions and safety information at all times!

The installation of accessories on the TORO Vehicle other than those designed and sold for that express purpose by TORO, may adversely affect the performance and safety characteristics of the Vehicle.

To assure maximum safety, optimum performance, and to gain knowledge of the product, it is essential that you or any other operator of this Vehicle read and understand the contents of this manual before the engine is ever started. Pay particular attention to the SAFETY INSTRUCTIONS highlighted by this symbol —

The safety alert symbol means CAUTION, WARNING or DANGER — personal safety instruction. Failure to comply with the instruction may result in personal injury.

INSTALLING AND USING ATTACHMENTS:

Always read the operating instructions that are included with the accessories BEFORE actually operating the unit. Carefully read and follow any "set-up" instructions that are given.

The addition of accessories, with their added weight and bulk will make the vehicle somewhat less stable. When turning or driving on slopes, always SLOW the vehicle before making a turn, and then SLOWLY turn the vehicle to prevent loss of control and possibly upset the vehicle.

DO NOT OVERLOAD THE VEHICLE. Maximum load limits are shown on decals used on all accessories . . . do not exceed these limits.

Failure to position loads carefully can result in their shifting or tipping over suddenly, causing the vehicle to upset.

Distribute loads evenly, keeping them low so as to prevent the vehicle from becoming top-heavy. When loading the cargo bed, have heavy loads to the front of the rear axle. Heavy loads in back of the rear axle can raise the front wheels clear of the ground, causing a loss of steering control and making the vehicle unstable.

DRIVE SAFELY

Always SLOW the vehicle when approaching, and while making, a turn.

Always SLOW the vehicle when driving in unfamiliar areas or over rough terrain.

Always SLOW the vehicle when changing the direction of travel or preparing to stop.

DO NOT make sudden or sharp turns or change direction of travel, on an incline, ramp, grade, slope or similar surface.

Adjust the vehicle speed to allow for existing conditions such as wet, slick surfaces, low visibility, etc.

Drive the vehicle UP and DOWN the face of the slopes, inclines or grades whenever possible. DO NOT drive ACROSS the face if at all possible. There is a risk of upsetting the vehicle, which can result in serious injury or death.

Be especially careful when driving a heavily loaded vehicle down an incline or slope. SLOW the vehicle with the Vehicle Drive Control Lever. In case of the need for an emergency stop, use the foot brake.

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safety

RECOGNIZE SAFETY INFORMATION

This safety-alert symbol is used to call attention to a dangerous situation, which could result in serious injury or death to the operator, a passenger or a bystander.

Follow recommended precautions and safe operating practices.

It is important to always replace any lost or damaged safety-alert and informational decals on the vehicle and accessories immediately.

UNDERSTAND SIGNAL WORDS

Be aware of the symbols and signal words used throughout this manual.

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

Safety signs with signal word DANGER or WARNING are typically near specific hazards.

General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

Instructions beginning with the signal words "**IMPORTANT**" or "**NOTE**", provide essential information regarding the operation and maintenance of this machine.

FOLLOW SAFETY INSTRUCTIONS

This Manual is provided as a guide for the safe operation and proper maintenance of this equipment. However, the operator's personal safety, as well as those persons in the work area, will depend on the careful actions and good judgement of the operator

Carefully read the Vehicle's Operators Manual BEFORE attempting to operate the Vehicle and/or any of the Accessories.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

Read the engine manufacturer's operating instructions. Make note of the safety-alert messages and follow them.



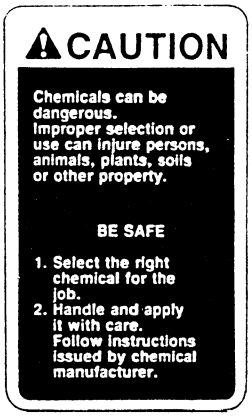
⚠ DANGER

⚠WARNING

⚠CAUTION

IMPORTANT!

NOTE:



#41186 Located on Top of Tank Lid



USE PROPER CHEMICALS FOR THE JOB



Chemicals can be dangerous. Improper selection or use can injure persons, animals, plants, soils or other property.

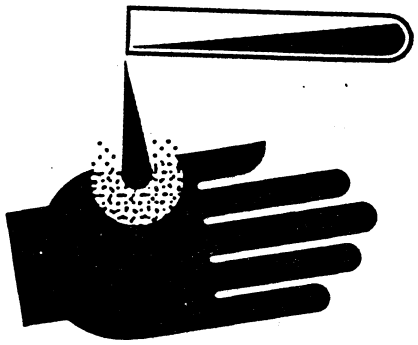
Read and observe manufacturer's recommendations.

Study all labels carefully. DO NOT remove labels.

Apply chemicals at recommended time, rate, and manner. Do not allow chemicals to drift to neighboring areas.

Properly dispose of chemical containers, unused chemicals and left-over treated seed and fertilizer.

HANDLE CHEMICALS SAFELY



Handle and apply chemicals with care.

Do not smoke while handling chemicals.

Wash hands before eating.

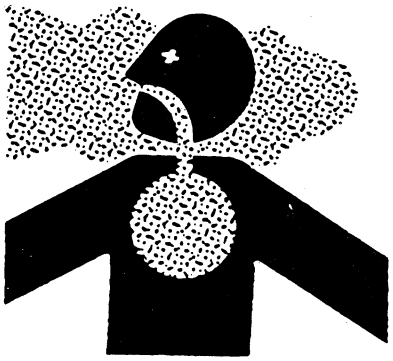
See a physician immediately if symptoms of illness occur during or shortly after the use of any chemicals.

Wash exposed skin areas frequently—do not leave chemicals on your skin.

Remove clothing and bathe skin immediately if chemicals contact skin. Launder contaminated clothing.

Wear goggles to protect your eyes.

AVOID TOXIC FUMES



Some chemicals are toxic and, in sufficient quantities, may be fatal. Ill effects or death does not have to be from direct contact.

Wear a filtered respirator. Wear goggles to protect your eyes.

Keep dust away from skin and hair.

Keep containers low when pouring.

Let the wind blow fumes away from you when mixing or filling.

controls and operation

SPRAY PUMP CONTROL HANDLE: Pull the Handle up to engage the Spray Pump. Push the Handle down to disengage the Pump and stop the spraying action.

JET AGITATOR VALVE LEVER: Opens and closes the Agitator Valve, to activate or stop the agitation of spray solution in the Tank.

CONSOLE COMPUTER: Receives data for desired rate of application and automatically maintains that rate, regardless of vehicle speed.

PUMP PRESSURE ADJUSTMENT: Turn the By-Pass Adjustment Screw clockwise or counter-clockwise to increase or decrease the Pump pressure, until the desired pressure is indicated on the Pressure Gauge.

BEFORE OPERATION:

Check all of your equipment . . . make certain that all components are clean . . . including the Tank, Pump, Control Valves, Check Valves, Hoses, Strainers, Nozzles and Spray Tips. WARNING . . . never use a metal object to clean Nozzle orifices.

IMPORTANT: Replace all worn tips and those with streaky or uneven patterns.

- Refer to the Nozzle charts and related text in the Nozzle Catalog. Determine which chart gives the information needed for your particular spraying job.

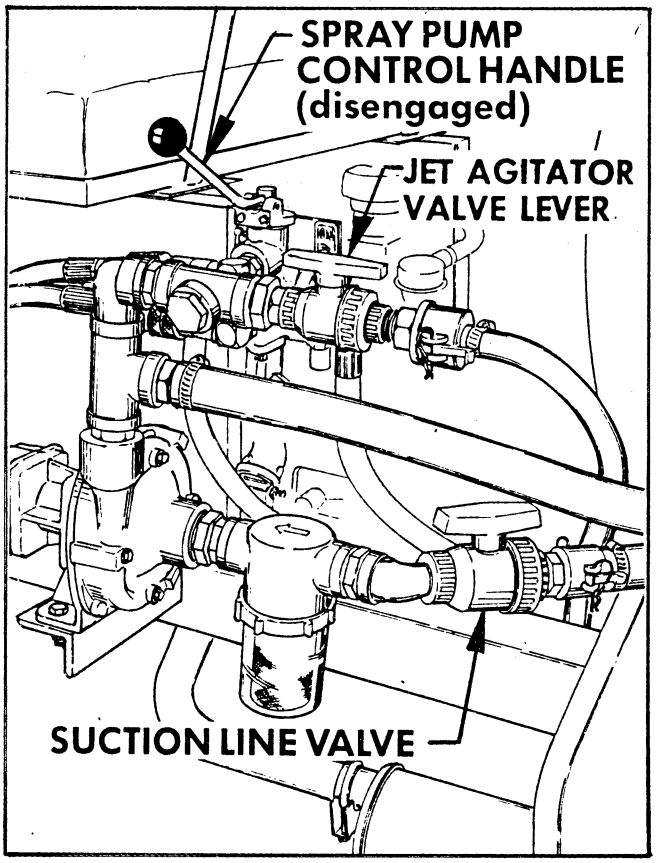
TO USE THE CHARTS, YOU NEED TO KNOW:

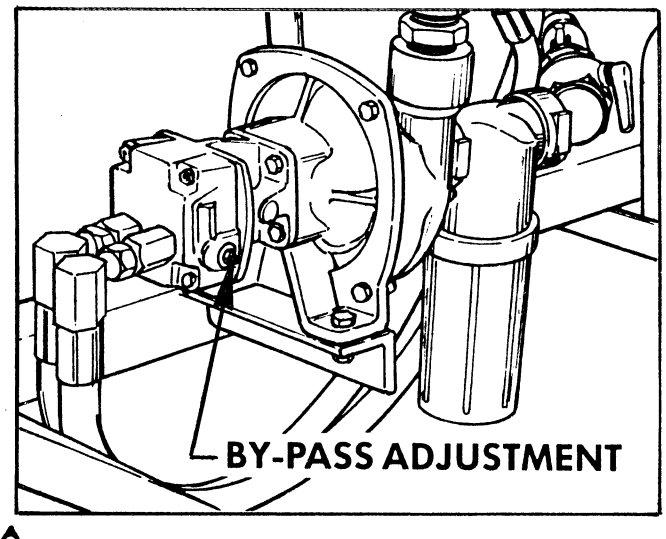
- The nozzle spacing of your Boom, which is 20 inches.
- How many gallons per acre (or gallons per 1000 sq. ft.) you need to apply. This information is acquired from the chemical container label.

DETERMINE FROM NOZZLE CHART:

- Which Nozzle Tip provides the necessary application rate as previously determined.
- What pressure (p.s.i.) is recommended for the Nozzle Tip to be used.
- What ground speed is desired.

"Right" and "Left" as used in this manual refer to the operators' right or left, when seated in the normal operating position. Likewise "Front" and "Rear" as seen from the operators' position.





⚠ **CAUTION** CHEMICALS CAN BE DANGEROUS. IMPROPER SELECTION OR USE CAN SERIOUSLY INJURE PERSONS, ANIMALS, PLANTS, SOIL OR OTHER PROPERTY. BE SAFE: SELECT THE RIGHT CHEMICAL FOR THE JOB. HANDLE IT WITH CARE. FOLLOW THE INSTRUCTIONS ON THE CONTAINER LABEL

After all installation procedures have been completed and Console power is turned **"ON"**, the Console will flash "CAL" in the RATE display. This means you must calibrate or program the Console before it can be operated. This is a one-time operation which does not have to be repeated unless you disconnect your Battery wires.

After the initial programming of the Console Computer, it is not necessary to repeat the programming unless the Console or battery wires are disconnected . . . or the battery is discharged.

INITIAL SYSTEM SET-UP:

- Fill the Tank with water only and open the Suction Line Valve. **IMPORTANT! The Pump will be damaged if it is activated before it is completely filled with liquid.**
- Place MASTER ON/OFF to **"ON"** and BOOM ON/OFF switches to **"OFF"**.
- Place MAN/AUTO switch to **"MAN"**.
- Place POWER ON/OFF switch to **"ON"**.
- Verify that correct Boom widths and calibrations for Speed, Meter, Valve, Rate 1 and Rate 2 have been entered in Console.
- Run Pump at normal operating RPM.
- Verify that each Boom Solenoid Valve is operating and that no nozzles are plugged by operating.
- Operate BOOM ON/OFF switches to verify that each Boom Solenoid Valve is operating and that there are no plugged nozzles.
- Place all BOOM ON/OFF switches to **"ON"**.
- Hold the MAN. ADJ. switch in **INCR.** position for approximately 12 seconds. This assures that motorized Control Valve is fully **open.**
- Note the maximum pressure shown on Pressure Gauge. Adjust with ball valve in By-Pass Line to 80 p.s.i. **max.**.
- Adjust ball valve in Agitator Line for desired agitation. Verify that maximum pressure is still present.
- Hold the MAN. ADJ. switch in **DECR.** position for approximately 12 seconds. This assures that motorized Control Valve is fully **closed.**
- Verify that minimum pressure can be achieved.

INITIAL SYSTEM FIELD TEST:

- Drive Vehicle at target speed with Sprayer Booms off to verify MPH readout on Console.
- Engage the Spray Pump, place MASTER ON/OFF switch to "ON" and BOOM ON/OFF switches to "ON".
- Place the RATE 1/RATE 2/MAN switch to RATE 1.
- Increase or decrease vehicle speed by one MPH. The system should automatically correct to the target application rate.

If the system does not correct to the desired GPA, check for an empty Tank, a plugged line, a malfunctioning Pump, improper Vehicle speed or a defect in the system. First review the "INITIAL SYSTEM SET-UP".

If after eliminating the possibilities listed above the system is unable to correct to the desired GPA, refer to the "TROUBLESHOOTING GUIDE" in the SERVICE MANUAL.

- At the end of each swath sprayed, switch the MASTER ON/OFF to **"OFF"** to shut off flow. This also shuts off the acreage totalizer.
- Verify acres covered and gallons used.

FILLING THE SOLUTION TANK:

IMPORTANT: Do not add chemical to Tank until just before use. Follow the chemical manufacturer's instructions for mixing spray solution to obtain desired application rate and effect.

⚠ CAUTION: Read carefully the directions printed on the chemical manufacturer's labels before handling chemicals.

Instructions on chemical manufacturer's container labels, regarding mixing proportions, should be read and strictly followed. The concentrate should not be poured into an empty Tank: fill Tank about one-half full with clean, clear water, add chemical concentrate and finish filling Tank with water.

⚠ Keep spray material from skin. If spray material comes in contact with body, wash it off immediately with clean water and detergent.

USING THE SPRAYER:

IMPORTANT: Be certain the Suction Line Valve is OPEN!

- Operate at full throttle to give the necessary pressure and volume.
- Do not overlap areas that have been sprayed.
- Watch for plugged nozzles.
- Stop the spray flow before stopping the Vehicle.

PROGRAMMING OF CONSOLE COMPUTER:

Refer to the "Installation and Service" Manual and the "Set-Up Instructions" furnished with the PRO-CONTROL, to familiarize yourself with the details of the Console and its calibration.

After all installation procedures have been completed and Console power is turned "ON", the Console will flash "CAL" in the RATE display. This means you must calibrate or program the Console before it can be operated. This is a one-time operation which does not have to be repeated unless the Console or Vehicle battery wires are disconnected . . . or the Vehicle battery is discharged.

After the battery wires have been reconnected, the Console will flash "CAL" in the RATE display and will have to be re-programmed as follows:

NOTE: Use the following calibration and programming instructions in conjunction with those found in the Raven SCS 440 Installation and Service Manual. While the calibration figures shown below are useful guidelines, calculations should be carried out for your particular machine and refined to accommodate varying operating conditions and desired applications.

NOTE: Turning the POWER ON/OFF switch to "OFF" does not affect the Console memory. All data is retained.

SELECT APPLICATION MODE:

Position power switch to "ON". A flashing "CAL" will appear in the RATE window and "US" in the DATA window.

Depress "CE" momentarily to step from "US" (volume per acre) to "SI" (volume per hectare) to "TU" (volume per 1000 sq. ft.). Select application mode by depressing "ENTER" when desired code (US, SI or TU) is displayed. The DATA display will now read "SP 1".

SELECT SPEED SENSOR TYPE:

Depress "ENTER" when DATA display reads "SP 1". (wheel drive speed sensor) The DATA display will now read "O". Continue initial programming of Console Computer as follows;

1. "BOOM CAL" - For the **TORO** Boom, having nozzles at 20" spacing, the Console should be programmed as follows: "Boom 1 (left)" - 80: "Boom 2 (center)" - 60: "Boom 3 (right)" - 80.

2. "SPEED CAL" - Inflate front and rear tires to proper pressure. Measure 10 revolutions of the sensored wheel in soil conditions to be sprayed and with Tank half full. Measure 2 to 3 times and average the distance traveled in inches. Enter this measurement in inches under "SPEED CAL".

NOTE: This measurement is extremely critical. Tire manufacturer's specs call for SPEED CAL figure to be 673. Use this number as a reference point only. Check tire pressures often and re-measure periodically.

3. "METER CAL" - The Flow meter calibration number is stamped on the yellow tag attached to each Flow Meter. Record this number in a safe place in case the tag is ever lost or disfigured.

4. "VALVE CAL" - The four digits of the Control Valve calibration number control separate and significant functions. On the **TORO** PRO-CONTROL, program VALVE CAL initially, at 2611. You may wish to refine this number as experience and application dictate.

- 1st Digit (Valve Backlash) - Controls the time of the first correction pulse after a change in correction direction is detected.
  Range: 1-9. 1-short pulse; 9-long pulse.
- 2nd Digit (Valve Speed) - Controls the speed of the Control Valve motor. CAUTION: Running the valve too fast will cause the spray flow to pulsate.
  Range: 1-9. 1-Slow; 9-Fast.
- 3rd Digit (Brake Point) - Sets the point at which the Control Valve motor begins braking so as not to overshoot the target application rate. Digit is percent away from target rate.
  Range: 0-9. 0 = 5%, 1 = 10%, 9 = 90%.
- 4th Digit (Dead Band) - Set allowable difference between target and actual application rate.
  Range: 1-9. 1 = 1%, 9 = 9%

5. "RATE 1 and RATE 2 CAL" - Determine application rates (GPA), (GAL/1000 SQ. FT.) or (lit/ha) you wish to apply and consult nozzle manual to be sure your spray nozzles have this capacity, at the vehicle speed you wish to travel. Enter values (with decimal point) in RATES 1 and 2. NOTE: RATE 2 should not differ more than 20% from RATE 1. If you do not use a second rate, enter the same rate in both RATE 1 and 2.

NOTE: If using "TU" mode, enter RATE with two-place decimal, e.g. 1.55 gal. per 1000 sq. ft.

PROGRAMMING OF CONSOLE COMPUTER: (Cont'd.)

6. "VOLUME TANK" - Enter the amount of material in the Tank. This number must be re-entered each time the Tank is refilled. The function monitors Tank volume while spraying, based on application rate.

7. "TIME" - Enter time of day based on 24 hours. (i.e., 1:30 p.m. is 13:30), or enter "0" to measure elapsed time.

For further programming details and functions, preventive maintenance and troubleshooting guide, refer to the Raven SCS 440 Installation and Service Manual.

POWER DOWN DELAY FEATURE:

To conserve the Vehicle's 12-volt battery, the Power Down Delay should be set. In this "power down" mode, all data will be retained, but the time of day clock will not operate. The Power Down Delay is initially set at 10 days.

TO CHANGE DELAY TIME:

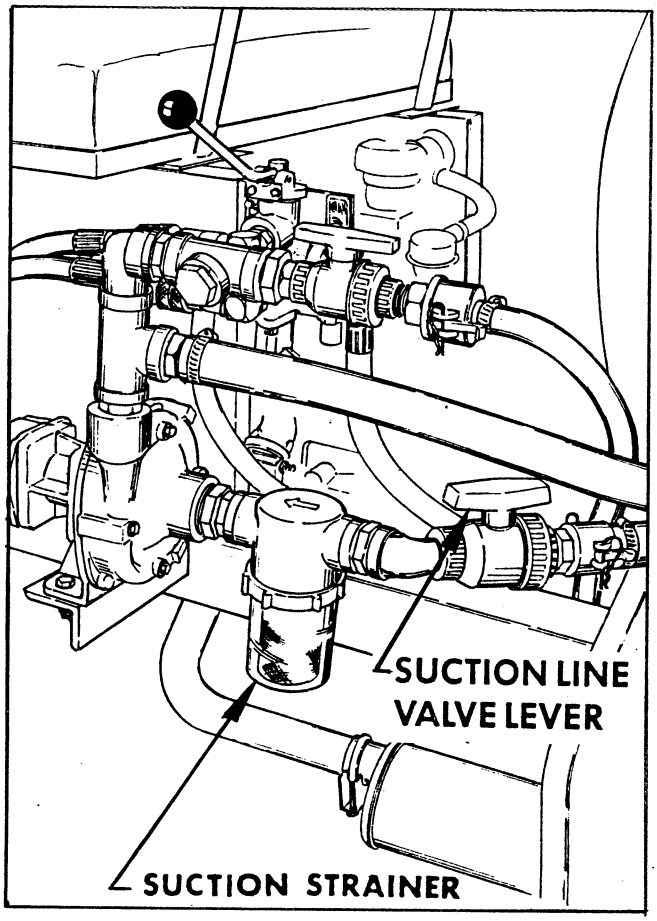
- Depress "TIME" for 5 seconds and the current delay time will appear.
- Reset the delay time by pressing "ENTER", the desired delay time (normally 1-2 days) and "ENTER".

maintenance

Preventive maintenance will pay off many times over in peak performance and efficient operation.

Flush the entire spraying system with clear water and flushing agent after each spray job. Failure to clean the system can result in a chemical residue which can plug the Flow Meter, Solenoids, Control Valve, Hoses and/or Nozzle Tips, and seriously damage the Centrifugal Pump.

Wash spray tips thoroughly with water or cleaning solution (appropriate for chemical sprayed). Blow out orifice, clean and dry. If orifice remains clogged, clean it with a soft bristled brush...never use a metal object.



SUCTION STRAINER:

Turn off Suction Line Valve if Tank is full of spray solution. Remove the cap and clean the strainer screen daily when spraying wettable powders–after every 50 hours when using liquid chemical.

IMPORTANT: Be certain Suction Line Valve is opened when spraying is resumed. Damage to Spray Pump can result when operating the Sprayer with Valve closed.

⚠ **DO NOT OPERATE THE PUMP DRY!**

FLOW METER

See the "Installation and Service" Manual for detailed instructions regarding the maintenance, adjustment and calibration of the Flow Meter.

storage

Flush the entire spraying system with clear water and flushing agent. Let system drain and run some diesel fuel through the entire system. FREEZING TEMPERATURES MAY DAMAGE THE FLOW METER IF WATER IS NOT DRAINED.

Remove and clean the Flow Meter at the end of each spraying season. See the "Installation and Service" Manual for detailed instructions.

Should the Raven Console require service, refer to the serial no. decal on the bottom of the Console when requesting assistance or information.

HYDRAULIC PUMP

If equipment is used in freezing or near freezing conditions, protect pump and system by draining liquid and pumping anti-freeze solution through system, coating pump interior. Use anti-freeze with rust inhibitor to help prevent rust and corrosion.

SERVICING AFTER STORAGE:

Flush the entire spraying system with clean water and detergent.

Flush the entire spraying system again with clean, clear water to rinse.

Let system drain.

Store chemicals in a separate, plainly marked, LOCKED building.

Store chemicals in original containers with labels intact.

Federal and state laws govern the use of chemicals. Before using any chemical, consult state agricultural agent or chemical supplier for proper uses.

See a physician or druggist for first aid kits and learn how to use them.

