FORM NO. 104-9084 REV. A

TORO®

MODEL NO. 41086

OPERATOR'S MANUAL

PRO CONTROL™ SPRAY SYSTEM

for the Multi-Pro® 5600 Turf Sprayer

To assure maximum safety, optimum performance, and to gain knowledge of the product, it is essential that you or any other operator of this equipment read and understand the contents of this manual before the vehicle 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.

SAFETY INSTRUCTIONS

Keep this Operator's Manual in the plastic tube behind the operator seat.

It is very important that all persons operating this equipment have easy access to these instructions at all times.

Carefully read and follow the "Set-Up" Instructions that are provided with this equipment and the Safety Instructions in the Multi-Pro™ Operator's Manual.

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 or a bystander.

Safety, mechanical and some general information in this manual are emphasized. **DANGER**, **WARNING** and **CAUTION** identify safety messages. Whenever the triangular safety symbol appears, it is followed by a safety message that must be read and understood. For more details concerning safety, read the Safety Instructions on this page and page 2. **IMPORTANT** identifies special mechanical information and **NOTE** identifies general information worthy of special attention.

These instructions are provided as a guide for the safe operation and 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. **To reduce the potential for injury or death, comply with the following safety instructions.**

BEFORE OPERATING

1. Operate this machine only after reading and understanding the contents of this manual. A replacement manual is available by sending complete model and serial number to: The Toro Company, 8111 Lyndale Ave. So., Bloomington, MN 55420-1196.

2. Lean how to operate the Sprayer and how to use the controls properly. **DO NOT** let anyone operate this equipment without first receiving thorough instructions.

3. Keep all shields, safety devices and decals in place. If a shield, safety device or decal is malfunctioning, illegible or damaged, repair or replace it before operating the machine.

4. Chemicals can injure persons, animals, plants, soils or other property. To eliminate environmental damage and personal injury:

A. Select the proper chemical for the job.

B. Follow manufacturer's instructions on chemical container labels. Apply and handle chemicals as recommended.

C. Handle and apply chemicals with care. Wear goggles and other necessary protective equipment. Handle chemicals in well ventilated areas. Never smoke while handling chemicals.

D. Properly dispose of chemical container and unused chemicals.

SAFETY INSTRUCTIONS

WHILE OPERATING

5. Make certain everyone is clear of the machine before starting the engine to move the vehicle or before engaging the Sprayer Pump.

6. If equipment begins to vibrate abnormally, stop immediately. Shut off the vehicle engine and disengage all power. Repair all damage before commencing operation.

MAINTENANCE

7. Before servicing or making any adjustments to the Sprayer:

A. Stop the Vehicle and set the parking brake.

B. Shut off the Vehicle's engine and remove key from ignition.

C. Disengage all power and wait until all moving parts have stopped.

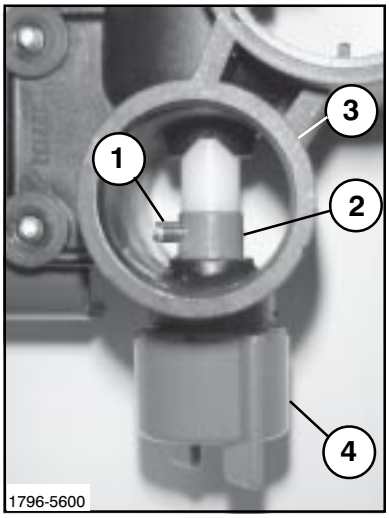
8. Keep all nuts, bolts and other fasteners tightened securely. Replace any shields removed during servicing or adjustments.

9. To be sure of optimum performance and safety, always purchase genuine TORO replacement parts and accessories. Replacement parts and accessories made by other manufacturer's could be dangerous. Altering this equipment in any manner may affect the machine's operation, performance, durability or its use may result in injury or death. Such use could void the product warranty of the TORO Company.

INTRODUCTION

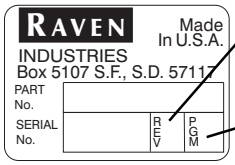
The Toro Pro-Control™ Spray System is designed to improve the accuracy and uniformity of spray applications. Its performance relies on the correct installation and preventive maintenance of the complete Sprayer. This Manual provides a simple step-by-step procedure for operating the Toro Pro-Control™ Spray System.

The Toro Pro-Control™ System consists of a computer based Control Console, a Speed Sensor, and a Turbine Type Flow Meter. Appropriate cabling is furnished with Vehicle for installation. The operator sets the target volume per area to be sprayed and the Control Console automatically maintains the flow regardless of vehicle speed. A manual override switch allows the operator to manually control flow for system check out and spot spraying. Actual volume per area being applied is displayed at all times. The Pro-Control™ Spray System additionally functions as an area monitor, speed monitor and volume totalizer. This Toro Pro-Control™ System is designed to work with the diaphragm pump and bypass boom valves. The Pro-Control™ system has been designed to operate with the **boom by-pass valves closed**. Before trying to operate the spray system with this Toro-Pro-Control™, close all by-passes on your boom valves. Close the by-passes on your boom valves by turning the red knob at the bottom of the boom valves clockwise as far as they will turn.



1. Roll Pin
2. Boom Bypass Valve
3. Distribution Valve ASM
4. Adjustment Knob

CONSOLE FEATURES



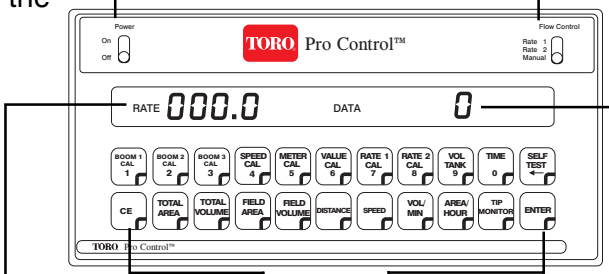
Console REV. (Revision) can be determined by letter stamped in REV. box on label.

Console PGM (Program) can be determined by letter stamped in PGM box on label.

IMPORTANT: This Console requires selection of area measurement in **US** (acres); **SI** (hectares) or **TU** (1,000 sq. ft.) and type of speed sensor **SP1** (wheel drive, etc.), **SP2** (radar), or **SP3** speed sensor. **(The Toro® Pro-Control™ for the Multi-Pro™ 5600 uses the SP3 gear tooth sensor.)** Refer to **Initial Console Programming** on page 12.

POWER - Turns Console power OFF or ON. Turning Console OFF does not affect data sorted in the computer

Selects manual or fully automatic control. Can automatically control two rates.



2033-1

Displays operating rate of application.

Displays function and calibration data.

CE - Used like a CE key on a calculator. This key is also used to select an area base measurement of US (acres), SI (hectares), or TU (1,000 sq. ft.).

ENTER - Used only to enter data into the Console.

CALIBRATION KEYS - Used to enter data into the Console to calibrate the system.

BOOM 1 CAL	Length of Boom 1
BOOM 2 CAL	Length of Boom 2
BOOM 3 CAL	Length of Boom 3
SPEED CAL	Determined by Rolling Radius
METER CAL	Flow Meter Calibration Number
VALVE CAL	Control Valve Response Time
RATE 1 CAL	Target Application Rate
RATE 2 CAL	Target Application Rate
SELF TEST	Simulates Vehicle Speed

FUNCTION KEYS - Used to display data.

TOTAL AREA	Total Area Sprayed
TOTAL VOLUME	Total Volume Sprayed
FIELD AREA	Field Area Sprayed
FIELD VOLUME	Volume Applied to Field
DISTANCE	Distance Traveled
SPEED	Speed of Vehicle
VOLUME/MIN	Volume Sprayed per Minute at Speed Being Traveled
VOLUME/TANK	Volume Remaining in Tank
AREA/HOUR	Area Sprayed per Hour at Speed being Traveled
TIME	24-hour clock(Military Time)

CONSOLE FEATURES

CALCULATING "BOOM CAL" (Boom 1, Boom 2, Boom 3):

BOOM CAL is calculated by multiplying the number of spray tips times the tip spacing. For the Toro Pro-Control™, having nozzles at 20" spacing, the Console should be programmed as follows:

BOOM1 CAL 1 **(left) - 80**

BOOM2 CAL 2 **(center) - 60**

BOOM3 CAL 3 **(right) - 80**

CALCULATING "SPEED CAL"

NOTE: This SPEED CAL number is critical to the performance of the Toro Pro Control™ Spray System. Be sure tires are properly inflated and Tank is half full before executing the following procedure.

1. Enter a SPEED CAL number of **"148"** into the key labeled: SPEED

2. On a flat ground surface (with Tank half full), mark off a distance of 500 feet. Verify that the distance readout reads "0". To set the Distance readout to "0", depress DISTANCE, ENTER, then depress TIME 0 and ENTER. Drive vehicle straight ahead the marked distance of 500 feet.

3. Verify that the distance readout on the Computer Console reads "500". This distance should be correct plus or minus 2% (in 500 feet, this distance should be between 490 and 510 feet).

4. If the distance readout does not read "500" (plus or minus 2%) re-calibrate SPEED CAL using the following equation:

New SPEED CAL # =

$$148 \times \frac{500}{\text{Distance Readout}}$$

For example, if the vehicle travels 500 feet and the Console reads 484 feet, correct as follows:

New SPEED CAL # =

$$148 \times \frac{500}{484} = 153$$

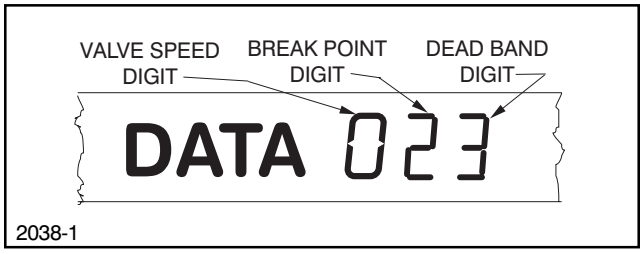
Enter new SPEED CAL number of "153" into the Console.

CALCULATING "METER CAL" METER CAL 5

The Flow Meter calibration number is stamped on the white tag attached to each Flow Meter. There is a gallon calibration number to be used for gallons per acre or gallons per 1000 and also a liter calibration number to be used for liters per hectare.

CALCULATING "VALVE CAL": VALVE CAL 6

1. The initial Valve calibration number for VALVE CAL IS 023. This number is recommended for most spray applications. The VALVE CAL number is used to control response of the hydraulic Control Valve to the change in vehicle speed. After operating the system, you may desire to refine this number. See definitions below:



Valve Speed digit -
Controls response time of Control Valve motor. **CAUTION: Running the Control Valve too fast (number greater than zero) will cause the system to oscillate.**

Range: 0 to 9 0 - Slow, 9 - Fast

Brake Point Digit Percent -
Sets the point at which the Control Valve motor begins braking, so as not to over shoot the desired rate. Digit is percent away from target rate.

Range: 0 to 9 0 = 5%, 1 = 10% 9 = 90%

Dead=Band Digit -
Allowable difference between target and actual application rate, where rate correction is not performed.

Range: 1 to 9 1 = 1%, 0 = 9%

NOTE: For Application Rates below 20 gallons per acre .50 gallons per 1000 sq. ft. or 190 liters/hectare (i.e. Toro Number 95-9221 Yellow Nozzles), Valve Cal or 043 or 063 will stabilize control response.

BEFORE SPRAYING

CONSOLE CALIBRATION (CONT'D):

CALCULATING "RATE 1" AND "RATE 2"

Refer to the Chemical Manufacturer's instructions on the chemical container label to determine the application rate of the chemical to be sprayed.

Enter the application rate (with decimal) in RATE 1 and RATE 2. Enter the rates in gallons per acre (US mode), gallons per 1000 sq. ft. (TU mode) or liters per hectare (SI mode) depending on the base measurement selected. **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 RATE 2.**

IMPORTANT: See the nozzle charts on pages 7-11 to be sure that your spray nozzles have the capacity necessary to achieve the application rate selected.

CONSOLE PROGRAMMING:

SYMBOL DEFINITIONS AND CONVERSIONS:

SYMBOL DEFINITIONS:

GPM	- Gallons per minute
lit/min	- Liters per minute
dl/min	- Deciliter per minute
PSI	- Pounds per square inch
kPa	- Kilopascal
GPA	- Gallons per acre
lit/ha	- Liters per hectare
ml/ha	- Milliliter per hectare
GAL/1000 FT^2	- Gallons per 1,000 sq. ft.
mm	- Millimeters
cm	- Centimeters
dm	- Decimeters
m	- Meter
MPH	- Miles per hour
km	- Kilometers
km/h	- Kilometers per hour
US	- Volume per ACRE
SI	- Volume per HECTARE
TU	- Volume per 1,000 sq. ft.

LIQUID CONVERSIONS

U.S. Gallons x 128 = Fluid Ounces
U.S. Gallons x 3.785 = Liters
U.S. Gallons x 0.83267 = Imperial Gallons
U.S. Gallons x 8.34 = Pounds (Water)

AREA

1 Acre = 43,560 sq. feet
1 Square Meter = 10.76 sq. feet
1 Hectare (ha) = 2.471 acres; 10,000 sq. meters

LENGTH

1 Millimeter (mm) - 0.039 inch
1 Centimeter (cm) = 0.393 inch
1 Meter (m) = 3.281 feet
1 Kilometer (km) = 0.621 mile
1 Inch = 25.4 millimeters; 2.54 centimeters
1 mile = 1.609 kilometers

PRESSURE

1 PSI = 6.89 kPA

FORMULAS:

$$^{\#}\ \text{Speed (mph)} = \frac{\text{Distance (ft.) x 60}}{\text{Time (seconds) x 88}}$$

$$\text{GPM per nozzle} = \frac{\text{GPA x mph x w*}}{5{,}940}$$

$$\text{GPM per nozzle} = \frac{\text{Gal/1000 ft x mph x w*}}{136}$$

$$\text{GPA} = \frac{\text{5,940 x GPM (per nozzle)}}{\text{mph x w*}}$$

$$\text{Gal/1000 ft.} = \frac{\text{138 x GPM (per nozzle)}}{\text{mph x w*}}$$

*** w = Nozzle spacing in inches.**

 # Use this equation to determine or verify ground speed.

BEFORE SPRAYING
NOZZLE SELECTION GPA/GAL FT²

Refer the nozzle charts to be sure that your spray nozzles have the capacity necessary to achieve the application rate selected.

To select the proper nozzle, you need to know the following information:

1. Recommended chemical application rate in gallons per acre or gallons per 1000 sq. ft. or liters per hectare.

2. Average Vehicle speed in Miles per hour or kilometers per hour.

3. Nozzle spacing (20 inches or 50 centimeters).

With this information you can calculate the volume per minute per nozzle, using one of the three formulas listed. Use Gal/Min and pressure or Lit/Min and pressure to select the appropriate nozzle from the corresponding charts.

EXAMPLE (GPA FORMULA)
Application Rate = 75 Gallons/Acre
Vehicle Speed = 4 M.P.H.
Nozzle Spacing = 20 inches

$$\frac{75 \text{ G.P.A.} \times 4 \text{ M.P.H.} \times 20}{5940} = 1.00 \text{ G.P.M. (per nozzle)}$$

With 1.00 G.P.M. and a pressure of 40 P.S.I. you would select Nozzle No. 95-9188.

EXAMPLE (GAL.1000 FT² FORMULA):
Application Rate = 1.70 Gal./1000 sq. ft.
Vehicle Speed = 4 M.P.H.
Nozzle Spacing = 20 inches

$$\frac{1.70 \text{ GAL/1000 FT} \times 4 \text{ M.P.H.} \times 20}{137} = 1.00 \text{ G.P.M. (per nozzle)}$$

EXAMPLE (LIT/HA FORMULA):
Application Rate = 907 lit/hectare
Vehicle Speed = 5 km/h
Nozzle Spacing = 50 cm

$$\frac{907 \text{ lit/ha} \times 5 \text{ km/h} \times 50}{60{,}000} = 3.78 \text{ lit/min. (per nozzle)}$$

With 3.78 LIT/HA and a pressure at 275 kPa you would select nozzle No. 95-9188.

NOTES:

BEFORE SPRAYING
NOZZLE SELECTION GPA/GAL FT²

Liters Per Hectare Application Rates

TORO Part No.	Nozzle Number	Pressure (kPa)	Capacity 1 Nozzle (L/min)	Liters per Hectare at 50 cm Spacings							
	Color Code			4 km/h	5 km/h	6 km/h	7 km/h	8 km/h	9 km/h	10 km/h	11 km/h
		150	0.56	168	135	112	96	84	75	67	61
		200	0.65	194	156	130	111	97	86	78	71
		275	0.76	228	182	152	130	114	101	91	83
		350	0.86	257	206	171	147	129	114	103	94
		415	0.93	280	224	187	160	140	124	112	102
		480	1.00	301	241	201	172	151	134	120	110
95-9221	1/4TTJ02/VS	555	1.08	324	259	216	185	162	144	130	118
	Yellow	630	1.15	345	276	230	197	173	153	138	125
		705	1.22	365	292	243	209	183	162	146	133
		780	1.28	384	307	256	219	192	171	154	140
		150	1.12	335	268	223	191	167	149	134	122
		200	1.29	386	309	258	221	193	172	155	140
		275	1.51	453	362	302	259	227	201	181	165
		350	1.70	511	409	341	292	256	227	204	186
		415	1.85	556	445	371	318	278	247	223	202
		480	1.99	598	479	399	342	299	266	239	218
95-2222	1/4TTJ04-VS	555	2.15	644	515	429	368	322	286	257	234
	Red	630	2.29	686	549	457	392	343	305	274	249
		705	2.42	725	580	484	414	363	322	290	264
		780	2.54	763	610	509	436	381	339	305	277
		150	1.12	336	268	223	191	167	149	135	122
		200	1.29	483	309	258	221	193	172	155	140
		275	1.87	561	449	374	621	281	249	224	204
		350	2.11	633	506	422	362	316	281	253	230
		415	2.30	689	551	459	394	345	306	276	251
		480	2.47	741	593	494	424	371	329	296	270
	1/4TTJ05-VS	555	2.66	797	638	531	455	398	354	319	290
95-2223	Brown	630	2.83	849	679	566	485	425	377	340	309
		705	2.99	898	719	599	513	449	399	359	327
		780	3.15	945	756	630	540	472	420	378	344
		150	1.68	504	402	335	287	251	224	201	183
		200	1.94	582	465	387	332	290	258	232	211
		275	2.27	681	545	454	389	341	303	272	248
		350	2.56	768	615	512	439	384	341	307	279
		415	2.79	837	669	558	478	418	372	335	304
		480	3.00	900	720	600	514	450	400	360	327
	1/4TTJ06-VS	555	3.22	967	774	645	553	484	430	387	352
95-2224	Grey	630	3.44	1031	825	687	589	515	458	412	375
		705	3.63	1090	872	727	623	545	485	436	396
		780	3.82	1147	918	765	655	573	510	459	417
		150	2.23	669	535	446	382	335	297	268	243
		200	2.58	773	619	515	442	386	343	310	281
		275	3.02	906	725	604	518	453	403	362	329
		350	3.41	1022	818	681	585	511	454	409	372
		415	3.71	1113	890	742	636	556	495	445	405
		480	3.99	1197	958	798	684	598	532	479	435
95-2225	1/4TTJ08-VS	555	4.29	1287	1030	858	735	644	572	515	468
	White	630	4.57	1371	1097	914	784	686	640	549	499
		705	4.84	1451	1161	967	829	725	645	580	527
		780	5.09	1526	1221	1017	872	763	678	610	555
		150	2.79	838	670	558	478	419	372	335	305
		200	3.22	967	774	644	552	483	430	387	352
		275	3.78	1134	907	756	648	567	504	454	412
		350	4.28	1279	1023	853	731	640	569	512	465
		415	4.64	1393	1114	929	796	697	619	557	507
		480	4.99	1498	1199	999	856	749	666	599	544
	1/4TTJ10-VS	555	5.37	1611	1289	1073	921	805	716	644	586
95-9188	Light Blue	630	5.72	1716	1373	1144	981	858	763	686	624
		705	6.05	1816	1453	1211	1038	908	807	726	660
		780	6.37	1910	1528	1273	1091	955	849	764	695
		150	4.19	1256	1005	838	718	628	558	503	457
		200	4.84	1451	1160	967	829	725	645	580	527
		275	5.67	1701	1361	1134	972	851	756	680	619
	1/4TTJ15-VS	350	6.40	1920	1635	1280	1097	959	853	768	648
95-9226	Light Green	415	6.97	2090	1672	1393	1194	1045	929	836	760

BEFORE SPRAYING
NOZZLE SELECTION GPA/GAL FT²

Gallons Per Acre Application Rates											
Toro Part No.	Nozzle Number Color Code	Pressure (PSI)	Capacity 1 Nozzle (GPM)	Gallons per Acre at 20" Spacings							
				2.5 MPH	3 MPH	3.5 MPH	4 MPH	4.5 MPH	5 MPH	5.5 MPH	6 MPH
		20	0.14	16.6	13.9	11.9	10.4	9.2	8.3	7.6	6.9
		30	0.17	20.2	16.8	14.4	12.6	11.2	10.1	9.2	8.4
		40	0.20	23.8	19.8	17.0	14.9	13.2	11.9	10.8	9.9
		50	0.22	26.1	21.8	18.7	16.3	14.5	13.1	11.9	10.9
		60	0.24	28.8	24.0	20.6	18.0	16.0	14.4	13.1	12.0
		70	0.26	31.1	25.9	22.2	19.4	17.3	15.6	14.1	13.0
95-9221	1/4TTJ02-VS Yellow	80	0.28	33.3	27.7	23.8	20.8	18.5	16.6	15.1	13.9
		90	0.30	35.3	29.4	25.2	22.1	19.6	17.6	16.0	14.7
		100	0.31	37.2	31.0	26.6	23.2	20.7	18.6	16.9	15.5
		110	0.33	39.0	32.5	27.9	24.4	21.7	19.5	17.7	16.3
		20	0.28	33.3	27.7	23.8	20.8	18.5	16.6	15.1	13.9
		30	0.35	41.6	34.7	29.7	26.0	23.1	20.8	18.9	17.3
		40	0.40	47.5	39.6	33.9	29.7	26.4	23.8	21.6	19.8
		50	0.45	53.5	44.6	38.2	33.4	29.7	26.7	24.3	22.3
		60	0.48	57.6	48.0	41.2	36.0	32.0	28.8	26.2	24.0
		70	0.52	62.2	51.9	44.5	38.9	34.6	31.1	28.3	25.9
95-9222	1/4TTJ04-VS Red	80	0.56	66.5	55.4	47.5	41.6	37.0	33.3	30.2	27.7
		90	0.59	70.6	58.8	50.4	44.1	39.2	35.3	32.1	29.4
		100	0.63	74.4	62.0	53.1	46.5	41.3	37.2	33.8	31.0
		110	0.66	78.0	65.0	55.7	48.8	43.3	39.0	35.5	32.5
		20	0.35	41.6	34.7	29.7	26.0	23.1	20.8	18.9	17.3
		30	0.43	51.1	42.6	36.5	31.9	28.4	25.5	23.2	21.3
		40	0.50	59.4	49.5	42.4	37.1	33.0	29.7	27.0	24.8
		50	0.56	66.5	55.4	47.5	41.6	37.0	33.3	30.2	27.7
		60	0.61	72.0	60.0	51.4	45.0	40.0	36.0	32.7	30.0
		70	0.65	77.8	64.8	55.6	48.6	43.2	38.9	35.4	32.4
95-9223	1/4TTJ05-VS Brown	80	0.70	83.2	69.3	59.4	52.0	46.2	41.6	37.8	34.7
		90	0.74	88.2	73.5	63.0	55.1	49.0	44.1	40.1	36.8
		100	0.78	93.0	77.5	66.4	58.1	51.7	46.5	42.3	38.7
		110	0.82	97.5	81.3	69.7	60.9	54.2	48.8	44.3	40.6
		20	0.42	49.9	41.6	35.6	31.2	27.7	24.9	22.7	20.8
		30	0.52	61.8	51.5	44.1	38.6	34.3	30.9	28.1	25.7
		40	0.60	71.3	59.4	50.9	44.6	39.6	35.6	32.4	29.7
		50	0.67	79.6	66.3	56.9	49.7	44.2	39.8	36.2	33.2
		60	0.73	86.4	72.0	61.7	54.0	48.0	43.2	39.3	36.0
		70	0.79	93.3	77.8	66.7	58.3	51.9	46.7	42.4	38.9
95-9224	1/4TTJ06-VS Gray	80	0.84	99.8	83.2	71.3	62.4	55.4	49.9	45.4	41.6
		90	0.89	105.8	88.2	75.6	66.2	58.8	52.9	48.1	44.1
		100	0.94	111.6	93.0	79.7	69.7	62.0	55.8	50.7	46.5
		110	0.98	117.0	97.5	83.6	73.1	65.0	58.5	53.2	48.8

BEFORE SPRAYING
NOZZLE SELECTION GPA/GAL FT²

Gallons Per Acre Application Rates											
Toro Part No.	Nozzle Number Color Code	Pressure (PSI)	Capacity 1 Nozzle (GPM)	Gallons per Acre at 20" Spacings							
				2.5 MPH	3 MPH	3.5 MPH	4 MPH	4.5 MPH	5 MPH	5.5 MPH	6 MPH
		20	0.57	67.7	56.4	48.4	42.3	37.6	33.9	30.8	28.2
		30	0.69	82.0	68.3	58.6	51.2	45.5	41.0	37.3	34.2
		40	0.80	95.0	79.2	67.9	59.4	52.8	47.5	43.2	39.6
		50	0.89	105.7	88.1	75.5	66.1	58.7	52.9	48.1	44.1
		60	0.99	117.3	97.7	83.8	73.3	65.2	58.6	53.3	48.9
		70	1.07	126.7	105.6	90.5	79.2	70.4	63.3	57.6	52.8
95-9225	1/4TTJ08-VS	80	1.14	135.4	112.9	96.7	84.6	75.2	67.7	61.5	56.4
	White	90	1.21	143.6	119.7	102.6	89.8	79.8	71.8	65.3	59.9
		100	1.27	151.4	126.2	108.2	94.6	84.1	75.7	68.0	63.1
		110	1.34	158.8	132.3	113.4	99.3	88.2	79.4	72.1	66.2
		20	0.71	84.3	70.3	60.2	52.7	46.9	42.2	38.3	35.1
		30	0.87	103.4	86.1	73.8	64.6	57.4	51.7	47.0	43.1
		40	1.00	118.8	99.0	84.9	74.3	66.0	59.4	54.0	49.5
		50	1.12	133.1	110.9	95.0	83.2	73.9	66.5	60.5	55.4
		60	1.23	146.1	121.7	104.4	91.3	81.2	73.0	64.0	60.9
		70	1.33	157.8	131.5	112.7	98.6	87.7	78.9	71.7	65.8
95-9188	1/4TTJ10-VS	80	1.42	168.7	140.6	120.5	105.4	93.7	84.3	76.6	70.3
	Light Blue	90	1.51	178.9	149.1	127.8	111.8	99.4	89.5	81.4	74.6
		100	1.59	188.6	157.2	134.7	117.9	104.8	94.3	85.7	78.6
		110	1.67	197.8	164.8	141.3	123.6	109.9	98.9	89.9	82.4
		20	1.06	125.9	104.9	89.9	78.7	70.0	63.0	57.2	52.5
		30	1.30	154.4	128.7	110.3	96.5	85.8	77.2	70.1	64.3
		40	1.50	178.2	148.5	127.3	111.4	99.0	89.1	81.0	74.3
95-9226	1/4TTJ15-VS	50	1.68	199.6	166.3	142.6	124.8	110.9	99.8	90.7	83.2
	Light Green	60	1.84	218.2	181.8	155.8	136.4	121.2	109.1	99.2	90.9

BEFORE SPRAYING
NOZZLE SELECTION GPA/GAL FT²

Gallons Per 1000 Sq. Ft. Application Rates											
Toro Part No.	Nozzle Number Color Code	Pressure (PSI)	Capacity 1 Nozzle (GPM)	Gallons per 1000 Sq. Ft. at 20" Spacings							
				2.5 MPH	3 MPH	3.5 MPH	4 MPH	4.5 MPH	5 MPH	5.5 MPH	6 MPH
95-9221	1/4TTJ02-VS Yellow	20	0.14	0.38	0.32	0.27	0.24	0.21	0.19	0.17	0.16
		30	0.17	0.46	0.39	0.33	0.29	0.26	0.23	0.21	0.19
		40	0.20	0.54	0.45	0.39	0.34	0.30	0.27	0.25	0.23
		50	0.22	0.60	0.50	0.43	0.37	0.33	0.30	0.27	0.25
		60	0.24	0.66	0.55	0.47	0.41	0.37	0.33	0.30	0.27
		70	0.26	0.71	0.59	0.51	0.45	0.40	0.36	0.32	0.30
		80	0.28	0.76	0.63	0.54	0.48	0.42	0.38	0.35	0.32
		90	0.30	0.81	0.67	0.58	0.50	0.45	0.40	0.37	0.34
		100	0.31	0.85	0.71	0.61	0.53	0.47	0.43	0.39	0.35
		110	0.33	0.89	0.74	0.64	0.56	0.50	0.45	0.41	0.37
95-9222	1/4TTJ04-VS Red	20	0.28	0.76	0.63	0.54	0.48	0.42	0.38	0.35	0.32
		30	0.35	0.95	0.79	0.68	0.60	0.53	0.48	0.43	0.40
		40	0.40	1.09	0.91	0.78	0.68	0.60	0.54	0.49	0.45
		50	0.45	1.22	1.02	0.87	0.77	0.68	0.61	0.56	0.51
		60	0.48	1.32	1.10	0.94	0.82	0.73	0.66	0.60	0.55
		70	0.52	1.42	1.19	1.02	0.89	0.79	0.71	0.65	0.59
		80	0.56	1.52	1.27	1.09	0.95	0.85	0.76	0.69	0.63
		90	0.59	1.62	1.35	1.15	1.01	0.90	0.81	0.73	0.67
		100	0.63	1.70	1.42	1.22	1.06	0.95	0.85	0.77	0.71
		110	0.66	1.79	1.49	1.28	1.12	0.99	0.89	0.81	0.74
95-9223	1/4TTJ05-VS Brown	20	0.35	0.95	0.79	0.68	0.60	0.53	0.48	0.43	0.40
		30	0.43	1.17	0.97	0.84	0.73	0.65	0.58	0.53	0.49
		40	0.50	1.36	1.13	0.97	0.85	0.76	0.68	0.62	0.57
		50	0.56	1.52	1.27	1.09	0.95	0.85	0.76	0.69	0.63
		60	0.61	1.65	1.37	1.18	1.03	0.92	0.82	0.75	0.69
		70	0.65	1.78	1.48	1.27	1.11	0.99	0.89	0.81	0.74
		80	0.70	1.90	1.59	1.36	1.19	1.06	0.95	0.87	0.79
		90	0.74	2.02	1.68	1.44	1.26	1.12	1.01	0.92	0.84
		100	0.78	2.13	1.77	1.52	1.33	1.18	1.06	0.97	0.89
		110	0.82	2.23	1.86	1.59	1.40	1.24	1.12	1.01	0.93
95-9224	1/4TTJ06-VS Gray	20	0.42	1.14	0.95	0.82	0.71	0.63	0.57	0.52	0.48
		30	0.52	1.41	1.18	1.01	0.88	0.79	0.71	0.64	0.59
		40	0.60	1.63	1.36	1.17	1.02	0.91	0.82	0.74	0.68
		50	0.67	1.82	1.52	1.30	1.14	1.01	0.91	0.83	0.76
		60	0.73	1.98	1.65	1.41	1.24	1.10	0.99	0.90	0.82
		70	0.79	2.14	1.78	1.53	1.34	1.19	1.07	0.97	0.89
		80	0.84	2.28	1.90	1.63	1.43	1.27	1.14	1.04	0.95
		90	0.89	2.42	2.02	1.73	1.51	1.35	1.21	1.10	1.01
		100	0.94	2.55	2.13	1.82	1.60	1.42	1.28	1.16	1.06
		110	0.98	2.68	2.23	1.91	1.67	1.49	1.34	1.22	1.12

BEFORE SPRAYING
NOZZLE SELECTION GPA/GAL FT²

Gallons Per 1000 Sq. Ft. Application Rates											
Toro Part No.	Nozzle Number Color Code	Pressure (PSI)	Capacity 1 Nozzle (GPM)	Gallons per 1000 Sq. Ft. at 20" Spacings							
				2.5 MPH	3 MPH	3.5 MPH	4 MPH	4.5 MPH	5 MPH	5.5 MPH	6 MPH
		20	0.57	1.55	1.29	1.11	0.97	0.86	0.78	0.70	0.65
		30	0.69	1.88	1.56	1.34	1.17	1.04	0.94	0.85	0.78
		40	0.80	2.18	1.81	1.55	1.36	1.21	1.09	0.99	0.91
		50	0.89	2.42	2.02	1.73	1.51	1.34	1.21	1.10	1.01
		60	0.99	2.69	2.24	1.92	1.68	1.49	1.34	1.22	1.12
		70	1.07	2.90	2.42	2.07	1.81	1.61	1.45	1.32	1.21
95-9225	1/4TTJ08-VS White	80	1.14	3.10	2.58	2.21	1.94	1.72	1.55	1.41	1.29
		90	1.21	3.29	2.74	2.35	2.06	1.83	1.64	1.49	1.37
		100	1.27	3.47	2.89	2.48	2.17	1.93	1.74	1.58	1.45
		110	1.34	3.64	3.03	2.60	2.27	2.02	1.82	1.65	1.52
		20	0.71	1.93	1.61	1.38	1.21	1.07	0.97	0.88	0.80
		30	0.87	2.37	1.97	1.69	1.48	1.31	1.18	1.08	0.99
		40	1.00	2.72	2.27	1.94	1.70	1.51	1.36	1.24	1.13
		50	1.12	3.05	2.54	2.18	1.90	1.69	1.52	1.38	1.27
		60	1.23	3.34	2.79	2.39	2.09	1.86	1.67	1.52	1.39
		70	1.33	3.61	3.01	2.58	2.26	2.01	1.81	1.64	1.51
95-9188	1/4TTJ10-VS Light Blue	80	1.42	3.86	3.22	2.79	2.41	2.15	1.93	1.76	1.61
		90	1.51	4.10	3.41	2.93	2.56	2.28	2.05	1.86	1.71
		100	1.59	4.32	3.60	3.09	2.70	2.40	2.16	1.96	1.80
		110	1.67	4.53	3.77	3.23	2.83	2.52	2.26	2.06	1.89
		20	1.06	2.88	2.40	2.06	1.80	1.60	1.44	1.31	1.20
		30	1.30	3.54	2.95	2.53	2.21	1.96	1.77	1.61	1.47
		40	1.50	4.08	3.40	2.92	2.55	2.27	2.04	1.86	1.70
95-9226	1/4TTJ15-VS Light Green	50	1.68	4.57	3.81	3.26	2.86	2.54	2.28	2.08	1.90
		60	1.84	5.00	4.16	3.57	3.12	2.78	2.50	2.27	2.08

BEFORE SPRAYING

After all installation procedures have been completed, boom bypass valves closed, and Console power is turned "ON", the Console will flash "CAL" and "US VOLUME PER ACRE". This means you must calibrate or program the Console before it can be operated.

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

While the calibration figures shown below are useful guidelines, calculations should be carried out for your particular machine and refined to accommodate carrying operating conditions and desired applications.

DATA ENTRY

When entering data into the consoles, the entry sequence is always the same. (NOTE: DATA MUST BE ENTERED INTO THE FIRST EIGHT KEYS).

1. Depress the key in which you wish to enter data.

2. Depress the "ENTER" key. An "E" will illuminate in the data DISPLAY.

3. Depress the keys corresponding to the number you wish to enter (i.e. "1", "0", "2", "4"). The numbers will be displayed in the DATA display as they are entered.

4. Complete the entry by again depressing the "ENTER" key.

INITIAL CONSOLE PROGRAMMING:

If an entry selection error is made during the next four steps, the Console can be reset by turning the Console off and, while depressing CE , turn Console back on. Display will show "CAL" and "US Volume Per Acre".

1. Display US (volume per acres), SI (volume per hectares), or TU (volume per 1000 sq. ft.).

a. Depressing momentarily CE steps the DATA display from US - Volume per Acre to SI - Volume per Hectare.

b. Depressing momentarily CE steps the DATA display from SI - Volume per Hectare to TU - Volume per 1000 Sq. Ft.

c. Depressing momentarily CE steps the DATA display from TU - Volume per 1000 Sq. Ft. to US - Volume per Acre.

2. Selecting US, SI or TU.

a. To select US, SI or TU, Depress CE until the desired code is displayed in DATA display.

b. Momentarily depress ENTER . The DATA display will now display SP1 - Wheel Drive.

3. Display SP1 - Wheel Drive, SP2 - Radar Speed Drive, **SP3 - Gear Tooth Drive (Toro Multi Pro® 5600 Pro-Control ™)**.

a. Depressing momentarily CE steps the DATA display from SP1 - Wheel Drive to SP2 - Radar Speed Drive.

b. Depressing momentarily CE steps the DATA display from SP2 - Radar Speed Drive to SP3 - Gear Tooth Drive.

4. Selecting SP1, SP2, and SP3.

a. To select SP1, SP2, and SP3 step with CE until SP3 is displayed in DATA display.

b. Momentarily depress ENTER the DATA display will now display 0.

5. Enter BOOM 1 CAL (80) in key labeled: BOOM1 CAL 1

6. Enter BOOM 2 CAL (60) in key labeled: BOOM2 CAL 2

7. Enter BOOM 3 CAL (80) in key labeled: BOOM3 CAL 3

8. Enter SPEED CAL (148) in key labeled: SPEED CAL 4

9. Enter METER CAL calibration number in key labeled: METER CAL 5 (METER CAL Number is located on Flow Meter).

10. Enter VALVE CAL calibration number (023) in key labeled: VALVE CAL 6 (Note - for Yellow Nozzles at low rates use 043 or 063).

11. Enter the Application Target Rate in gallons per acre, liters per hectare, gallons per 1000 sq. ft. that you want to spray in the key labeled: RATE1 CAL 7

12. Enter a second target application rate in gallons per acre, liters per hectare or gallons per 1000 sq. ft. that you want to spray in key labeled: RATE2 CAL 8 if desired.

BEFORE SPRAYING

NOTE: RATE 2 should not differ more than 20% from RATE 1, or Spray Pattern may suffer. If you do not use a second rate, enter the same rate in both RATE 1 and RATE 2.

YOU HAVE NOW COMPLETED PROGRAMMING THE CONSOLE. The flashing "CAL" will now extinguish. If not, repeat procedure starting at step 5.

INITIAL CONSOLE PROGRAMMING:
You may also want to enter data in the keys labeled: VOL TANK and TIME 0 although it is not required for operation of the system.

13. **Key 9** "VOLUME TANK" (Optional) - 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 the total amount applied.

14. **Key 0** "TIME" (Optional) - Enter time of day based on 24 hours (i.e. 1:30 p.m. is 13:30), or enter "0" to measure elapsed time. To set Date, press TIME 0 , And "Month" appears; press ENTER to change month. Set DAY by pressing TIME 0 until "DAY" appears; press ENTER to change DAY. Set YEAR by pressing TIME 0 until "YEAR" appears; press ENTER to change year. Press TIME 0 again to set POWER DOWN day. See Page 10 for Power Down instructions.

OTHER DISPLAY FEATURES:

1. To display TOTAL AREA covered, momentarily depress key labeled: TOTAL AREA

To "zero out" this total at any time, enter a "0" in this key.

2. To display TOTAL VOLUME sprayed, momentarily depress key labeled: TOTAL VOLUME

To "zero out" this total at any time, enter a "0" in this key.

3. To display FIELD AREA covered, momentarily depress key labeled: FIELD AREA

To "zero out" this total at any time, enter a "0") in this key.

4. To display FIELD VOLUME sprayed, momentarily depress key labeled: FIELD VOLUME

To "zero out" this total at any time, enter a "0" in this key.

5. To display DISTANCE (feet [m] traveled), momentarily depress key labeled: DISTANCE

To "zero out" this total at any time, enter a "0" in this key.

6. To display MPH (km/h), momentarily depress key labeled: SPEED

7. To display VOL/MIN (volume per minute) being sprayed at speed being traveled, momentarily depress key labeled: VOL/MIN

8. To display AREA/HOUR (area per hour) momentarily depress the key labeled: AREA/HOUR

This is an actual calibration of the area per hour at the present speed you are traveling. It is not an average over time.

9. To display US, TI or TU and SP1, SP2 or SP3 selections, depress and hold SELF TEST . These selections will be alternately displayed.

10. The Data Menu button is used when additional devices are attached like a data logger or GPS. (See manuals for additional devices for programming.) Other values for PWM should not be changed; they are preset for this system.

SELF TEST FEATURE

SELF TEST allows speed simulation for testing the system while the vehicle is not moving. Enter the simulated operating speed in the key labeled: SELF TEST

If 4 MPH (6.4 km/h) is desired, enter 4.0 (6.4).

Verify speed by depressing key labeled: SPEED

4.0 (6.4) will appear in the DATA display.

The SELF TEST speed will clear itself when motion of vehicle is detected by the Speed Sensor. A SPEED CAL value of 148; the number calculated from page 4.

THE FEATURES LISTED BELOW ARE NOT NECESSARY FOR THE OPERATION OF THE PRO-CONTROL™ SYSTEM, BUT ARE INCLUDED AND CAN BE ACCESSED AT THE OPERATOR'S OPTION.

SEQUENCE TO ACTIVATE DATA-LOCK (This is an optional feature which prohibits the entry of data without first entering the DATA LOCK CODE).

1. Depress DATA MENU several times until "Press Enter for Data Lock" is displayed. Press "Enter" and Display will show New Code E.

2. Enter 4 digit code within 15 seconds.

EXAMPLE: For 1058 depress:

BOOM1 CAL 1 TIME 0 METER CAL 5 RATE2 CAL 8 and ENTER .

BEFORE SPRAYING

SEQUENCE TO CHANGE DATA-LOCK

1. Press DATA MENU button several times until, "Press Enter for Data Lock" is displayed - Press "Enter". Display will show Old Code E.

2. Enter 4 digit code within 15 seconds.

NEW CODE message will appear. Enter 4 digit code within 15 seconds.

EXAMPLE: FOR 1258 DEPRESS

BOOM1 CAL 1, BOOM2 CAL 2, METER CAL 5, RATE2 CAL 8 and ENTER.

ENTER MODE SEQUENCE WITH ACTIVATED DATA-LOCK

1. Depress the key into which you wish to enter data.

2. Depress ENTER CODE message will appear. Enter your DATA LOCK Code. If code is correct, "E" will appear. Now enter data normally.

The DATA LOCK CODE may be cleared by entering a code of "0" or by resetting console. (Place power switch to "OFF", hold "CE" button while placing power switch to "ON".)

POWER DOWN DELAY FEATURE (Optional):

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 Day is initially set at 10 days.

TO CHANGE POWER DOWN DELAY TIME (Optional):

1. Depress "TIME" 5 times and Power Down Day appears. Press "Enter" and the Power Down Day can be changed. Then press "Enter" and the Power Down Day is saved.

2. Reset the delay time by pressing "ENTER", the desired delay time (Normally 1-2 days) and "ENTER".

CONSOLE ALARM FEATURE (Optional):

Console alarm sounds if application rate is 30% or more away from target application rate for 5 seconds.

1. Displaying "Alarm On" or "Alarm Off".

a. Depressing DATA MENU several times until "Alarm On" is displayed. Depress the CE and "Alarm Off" is displayed.

2. 'Alarm On' means audible alarm is enabled. 'Alarm Off' means audible alarm is disabled.

LOW LIMIT FLOW SET POINT AND LOW LIMIT ALARM (Optional)

Depress VOL TANK until DATA display flashes.

A low limit flow rate may be entered.

If actual Volume Per Minute falls below this limit, the Control Valve stops closing, the Alarm sounds and the rate display flashed "-LL-". The Low Limit value should be determined with all Booms "ON". This value is automatically proportional to the percentage of Booms that are "on". (i.e. If the entered low limit is 4 GAL/MIN and half the Total Boom length is shut off, the Console automatically reduced the low limit to 2 GAL/MIN).

INITIAL SYSTEM SET-UP

1. Attach Supply Hose to Anti-Siphon tube and fill the Tank one-half full with water (no chemicals at this point).

IMPORTANT: INSPECT AND CLEAN ALL SYSTEM COMPONENTS BEFORE SPRAYING, INCLUDING THE TANK, STRAINER, PUMP, VALVES, AND NOZZLES IN YOUR INSPECTION.

2. Start the engine. Refer to "STARTING ENGINE" section on page 22 of the Multi-Pro™ 5600 Operator's Manual. Move the Throttle Lever to 7/8 to full throttle to simulate desired spraying speed.

3. Turn Boom ON/OFF switches to "OFF".

4. Turn MAN/RATE switch to "MAN".

5. Place POWER ON/OFF to "ON".

6. Turn the Spray Pump Control Switch to the "ON" position.

7. Verify that correct Boom widths and calibrations for Speed CAL, Meter CAL, Valve CAL, RATE 1 and RATE 2 have been entered in Console.

8. Use the "SELF TEST" Feature as described on page 22 of the Multi-Pro™ 5600 Operator's Manual for speed simulation for testing the Spray system while the vehicle is not moving.

NOTE: Some value of speed must be entered for the pump to run with controller any mode (i.e. Rate1, Rate 2 or Manual).

9. Switch "ON" the Boom Switches. If the switch lights don't light, the foot switch is OFF. Switch foot switch ON.

10. Using the Pressure Adjust Switch, increase the pressure to 20 psi, then decrease the pressure back to zero. (It will take several seconds for the pressure to increase).

11. Turn MAN/RATE switch to "RATE 1". The Pump should increase pressure until desired rate is achieved.

12. Turn the Boom switches off. The system will stop the Pump.

13. The Pro-Control™ System is designed to regulate Agitation pressure automatically. The Pro-Control™ is pre-programmed and will provide Agitation pressure with the Spray Booms turned Off. However, the pre-programmed Agitation should be tested and modified, if needed, per the following procedure.

Turn the Agitation switch ON. The System will start the Pump and Increase Pump speed until the Preset Agitation pressure is achieved. The System goes to this pressure anytime the Booms are Off and the Pump and Agitation Switch are On.

If your Preset Agitation is at a pressure you deam acceptable (we recommend 40 to 60 psi), no programming is required.

If you would like to change your Preset Agitation pressure, press the DATA MENU button. Preset Agitation 80 will be displayed. Increase or Decrease the Preset Agitation value by increments of 5 until the pressure is close to what you desire. Then Increase or Decrease by increments of 1 until your desired pressure is reached.

NOTE: If the Preset Agitation is zero, start with a value of 90. If the Preset Agitation pressure is greater than 120 psi, start with a value of 60.

14. Turn the Booms, Agitation and Pump Switch Off.

15. Refer to Initial System Field Test.

INITIAL SYSTEM FIELD TEST:

1. Drive Vehicle at desired spraying speed with Sprayer Booms "OFF". Verify MPH readout on Console by depressing SPEED.

2. Turn The Spray Pump Control switch to "ON".

3. Turn POWER, FOOT SWITCH ON/OFF, and BOOM switches to "ON".

4. Place the MAN/RATE switch to RATE 1.

5. Increase or decrease vehicle speed by one MPH (2 Km/h). The system should automatically correct the target application rate.

If the system does not appear to be correcting properly, first review the "INITIAL SYSTEM SET-UP", then refer to the SERVICE MANUAL and TROUBLESHOOTING GUIDE".

6. At the end of each swath sprayed, switch the FOOT SWITCH ON/OFF to 'OFF' to shut off flow. This also shuts off the acreage totalizer.

7. Verify area covered and volume used.

FILL FRESH WATER WASH TANK (See FIG. 1):

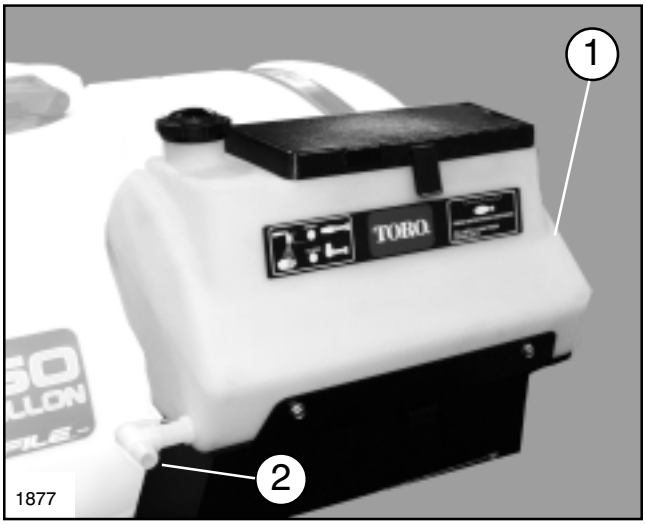


FIG. 1

1. Fresh Water Tank **2. Spigot**

In case of chemical contact with skin or eyes, a fresh water wash tank has been installed on the left side of the vehicle. Refer to the Chemical Manufacturer's label for instructions on seeking medical attention.

NOTE: Fill Fresh Water Wash Tank with clean water only. Check to assure tank is full before each operation.

1. Turn Tank Spigot to ON position.

2. Hold contaminated area directly in water stream. Flush thoroughly.

BEFORE SPRAYING

FILLING THE SOLUTION TANK:

⚠ CAUTION

CHEMICALS ARE HAZARDOUS AND CAN CAUSE PERSONAL INJURY!

- **Carefully read 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.**
- **Keep spray material away from skin. If spray material comes in contact with body, wash it off immediately with clean water and detergent.**
- **Always wear goggles and other personal protective equipment as recommended by the Chemical Manufacturer.**

IMPORTANT: Follow the chemical manufacturer's instructions for mixing spray solution to obtain desired application rate. Do not add chemical to Tank until just before use. The concentrate should not be poured into an empty Tank: Fill tank about 3/4 full with clean clear water. With agitation ON, add chemical concentrate slowly and finish filling Tank with water. Dispose of excess chemicals, solution and containers, per chemical manufacturer's instructions.

Premix wettable powders in one or two 5-gallon containers. Then slowly add premix to 3/4 tank of clean clear water with agitation ON.

OPERATION

USING THE SPRAYER:

1. Drive Vehicle to the area to be sprayed.

2. Position the throttle at 7/8 to full engine speed to provide the necessary ground speed, pressure and volume.

3. Turn Pump ON/OFF, switch to "ON", and begin forward motion. Switch FOOT SWITCH ON/OFF to "ON", and use the Master, or Individual Boom Switches to control the Boom Sections while spraying.

IMPORTANT! PROPER APPLICATION OF TURF-GRASS CHEMICALS IS ESSENTIAL.

While operating the Sprayer:

- **Do not overlap areas that have been sprayed previously.**

- **Watch for plugged Nozzles. Replace all worn Nozzles or those producing streaky or uneven patterns.**

4. Stop the spray flow **before** stopping the vehicle.

AFTER SPRAYING:

It is extremely important to carefully wash and rinse the System after **every** use. This includes the Tank, Pump, Hoses, Nozzles, Strainer Screen, and also the exterior of the Spray Vehicle.

Flush Pump After Use:

One of the most common causes for faulty pump performance is "gumming" or corrosion inside the pump. Flush the pump and entire system with a Tank cleaning agent. Mix according to the manufacturer's directions. This will dissolve most residue remaining in the pump, leaving the inside of the pump clean for the next use.

The addition of a detergent cleaner may be advisable in the initial washing. Directions for such an addition, if required, are included on the chemical container.

Cleaning of Sprayer should be accomplished in an area where there is no potential for the chemicals to be washed off in surface water or to enter subsurface drainage systems.

When Sprayer is not to be used for an extended period, refer to the **STORAGE** section on page 19 for the detailed instructions to prevent damage to the components.

PREVENTIVE MAINTENANCE

Preventative maintenance is most important to assure long life of the Pro-Control ™ Spray System. The following maintenance procedures should be followed on a regular basis.

Flush the entire spraying system as described above after each use. Failure to clean the system can result in a chemical residue which can plug the Flow Meter, Motor Valves, Hoses and/or Nozzle Tips, and seriously damage the Pump.

Wash spray nozzles thoroughly with water. Using compressed air, blow out orifice, clean and dry. If orifice remains clogged, clean it with a soft bristled brush. Never use a metal object.

Check all of the nozzles frequently to spot any inconsistencies in the spray pattern. Worn nozzle orifices which allow a greater volume of spray material to flow through the nozzle can cause an expensive loss in chemical and/or turf damage.

SUCTION STRAINER:

Remove the Strainer and clean the Strainer Screen daily when spraying wettable powders - after every 50 hours when using liquid chemical.

CONTROL CONSOLE:

Always cover or otherwise protect the Control Console from moisture to prevent damage to the electronic system.

MAINTENANCE

PROCEDURE TO TEST THE FLOW METER CABLE:

Disconnect the Console Control Cable from the Flow Meter Cable. Hold the Cable connector so that the key way is pointing in the 12 o'clock position. See FIG. 2.

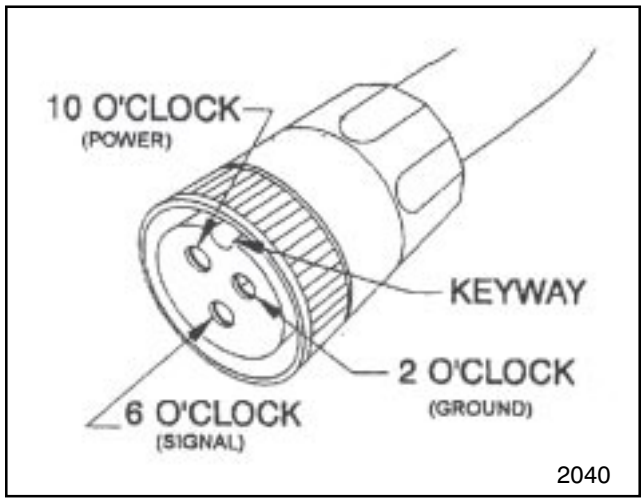


FIG. 2

VOLTAGE READINGS

2 o'clock to 6 o'clock (+5 VDC)
2 o'clock to 10 o'clock (+5 VDC)

1. Enter a METER CAL number of one (10) in key labeled: METER CAL 5

2. Depress key labeled: TOTAL VOLUME

3. Place PUMP, FOOT and BOOM switches "ON".

4. With small jumper wire (or paper clip), short between 2 o'clock and 6 o'clock sockets with a "short - no short" motion. Each time a contact is made, the TOTAL VOLUME total should increment up 1 or more counts.

5. If TOTAL VOLUME does not count up, replace defective cable.

6. Perform above voltage checks.

7. If cables all test good, replace Flow Sensor.

NOTE: After testing is complete, re-enter correct METER CAL number before spraying.

FLOW METER MAINTENANCE AND ADJUSTMENT PROCEDURES:

Once per season the Flow Meter should be flushed and cleaned. Perform this procedure more often if suspension type products are being sprayed.

1. Thoroughly rinse and drain the entire spraying system.

2. Remove Flow Meter from Sprayer and flush with clean water to remove any chemicals.

3. Remove Retainer Ring on up stream side. See FIG. 3.

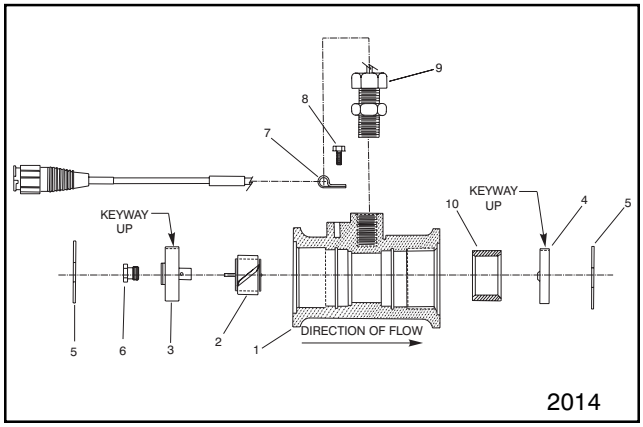


FIG. 3

1. **Modified Flanged Body**
2. **Rotor/Magnet ASM**
3. **Hub/Bearing ASM**
4. **Hub ASM**
5. **Retaining Ring**
6. **Turbine Stud ASM**
7. **Cable Clamp**
8. **Thread Screw**
9. **Sensor ASM**
10. **Flow Reducing Sleeve**

4. Clean turbine and turbine hub of metal filings and any other foreign material, such as wettable powders. Confirm that turbine blades are not worn. Hold turbine in your hand and spin turbine. It should spin freely with very little drag.

5. Reassemble Flow Meter.

6. Using a low pressure 5 PSI (50kPa) jet of air, verify that the turbine spins freely. If there is a drag, loosen the hex stud on the bottom of the turbine hub by 1/16 turn, until the turbine spins freely.

7. If Turbine spins freely and if cables have checked out, but Flow Meter is not totalizing properly, replace Flow Meter Sensor ASM.

MAINTENANCE

PROCEDURE TO RE-CALIBRATE FLOW METER

1. Enter the specific METER CAL number, listed on the Flow Meter, in the key labeled METER CAL 5

2. Enter a TOTAL VOLUME of **0** in the key labeled TOTAL VOLUME .

3. Fill applicator tank with a predetermined amount of measured liquid (i.e. 100 gallons).

NOTE: For best results, measure fluid using an independent method. For greater accuracy it is recommended that the predetermined amount of measured liquid should fill the applicator tank to its fullest level.

4. Empty applicator tank by boom spraying under normal operating conditions (it is not necessary to set vehicle in motion). Once the predetermined amount of measured liquid has been emptied from the applicator tank, check the TOTAL VOLUME number. This number should equal the predetermined amount of measured liquid. If the number displayed under TOTAL VOLUME is different from the predetermined amount of measured liquid, than recalculate the METER CAL using the formula below. Under normal circumstances, the correct METER CAL should be within +/- 3% of the METER CAL number stamped on the tag of the Flow Meter.

EXAMPLE: METER CAL = 1660
TOTAL VOLUME = 103
Predetermined amount of measured liquid = 100

$$\text{Corrected METER CAL} = \frac{\text{METER CAL X TOTAL VOLUME}}{\text{Predetermined amount of measured liquid}}$$

$$= \frac{1660 \times 103}{100} = 1710$$

Corrected METER CAL = 1710 - Enter this as the new METER CAL number.

NOTE: Repeat this calibration procedure several times to confirm accuracy. (Always "zero out" the TOTAL VOLUME display before retesting).

NOTE: If the Pro-Control™ Console should malfunction or need repairs, spraying CAN BE RESUMED in manual mode by unplugging the cables from the rear of the Computer Console. The unit can be controlled using the Center Console Controls.

STORAGE

SPRAYING SYSTEM

1. Flush pump and entire spraying system with water and tank cleaning agent. Drain pump and spray system completely.

2. Add a rust inhibiting antifreeze solution to the pump and recirculate through the system, coating the pump interior. Drain solution completely.

3. Remove Flow Meter at the end of each spraying season. Clean Flow Meter turbine and inlet hub. Clean off all metal fillings and wettable powders which have hardened on the plastic and metal parts. Check the inlet hub and turbine assembly for worn or damaged turbine blades and bearings. Flush Flow Meter with clear water and drain. **FREEZING TEMPERATURES MAY DAMAGE FLOW METER IF WATER IS NOT DRAINED.**

4. Remove console from Sprayer Vehicle when not in use for extended periods of time.

5. Check condition of spray hoses. Tighten all hose connections securely.

6. Lubricate boom pivot grease fittings and pivot points.

IMPORTANT! WHEN A HIGH PRESSURE WASHER OR GARDEN HOSE IS USED FOR CLEANING, IT IS NECESSARY TO COVER AND PROTECT THE CONTROL CONSOLE. WATER ENTERING THE CONTROL CONSOLE WILL CAUSE SERIOUS DAMAGE TO THE ELECTRONICS.

Remove the Control Console from the vehicle for storage, or otherwise protect it from the elements. If repairs are ever needed or assistance is required, contact an Authorized TORO Distributor.

SERVICING AFTER STORAGE: Flush the entire Spraying System with clean water and detergent. Rinse and drain the entire Spraying System.

STORAGE AND DISPOSAL OF CHEMICALS: Follow Chemical Manufacturer's recommendations for storage and disposal of chemicals.

NOTES:

MAINTENANCE
TROUBLESHOOTING GUIDE

NO.	PROBLEM	CORRECTIVE ACTION
1	NO DISPLAY LIGHTS WITH POWER ON	1. Check fuse on back of Console. 2. Check battery connections. 3. Check operation of POWER ON/OFF switch. 4. Return Console to Raven, Inc. to replace Processor Board Assembly.
2	ALL KEYBOARD LIGHTS ON AT SAME TIME	1. Return Console to Raven, Inc. to replace Face Plate Sub-assembly.
3	A DIGIT CANNOT BE ENTERED VIA KEYBOARD	1. Return Console to Raven, Inc to replace Face Plate Sub-assembly.
4	AN INDICATOR ON A KEY WILL NOT ILLUMINATE	1. Return Console to Raven, Inc. to replace Face Plate Sub-assembly and/or Processor Board Assembly.
5	CONSOLE DISPLAYS FLASHING "CAL" WHEN-EVER VEHICLE ENGINE IS STARTED	1. Check battery voltage and battery connections.
6	CONSOLE DISPLAYS FLASHING "CAL" WHEN-EVER MASTER SWITCH IS TURNED ON OR OFF	1. Check battery voltage and battery connections.
7	CONSOLE DISPLAYS "CAL" WHENEVER SPEED IS CHANGED	1. Check battery voltage and battery connections.
8	ONE DISPLAY DIGIT HAS ONE OR MORE MISSING SEGMENTS	1. Return Console to Raven, Inc. to replace LCD Display Board Assembly.
9	SPEED DISPLAY '0'	1. Check Speed Sensor cable connector and plug on back of Console for loose pins. 2. Clean pins and sockets on Speed Sensor cable connectors. 3. Replace Speed Sensor Switch Assembly.
10	SPEED INACCURATE OR UNSTABLE	1. Verify "SP3" setting. 2. Verify correct SPEED CAL number.
11	RATE READS "0000"	1. Verify Speed is registering accurately. If SPEED is zero, refer to Troubleshooting Problem 10. 2. Verify TOTAL VOLUME is registering flow. If not, refer to Troubleshooting Problem 16.
12	RATE INACCURATE OR UNSTABLE	1. Verify that all numbers "keyed" in Console are correct. Verify SPEED is registering accurately. If SPEED is inaccurate, refer to Troubleshooting Problem 10. 2. In RATE 1 or 2 operation, verify that RATE display (GPA) holds constant when SPEED is held constant. If not, refer to Trouble-shooting Problem 16. 3. In MAN (Manual) operation with agitation ON, Booms OFF and high end pressure range. If pressure cannot be adjusted manually, refer to Troubleshooting Problem 13. 4. If problem persists, return Console to Raven, Inc. to replace Processor Board Assembly 5. Check valve CAL - see page 4.

MAINTENANCE
TROUBLESHOOTING GUIDE (CONT'D)

NO.	PROBLEM	CORRECTIVE ACTION
13	CANNOT VARY RATE IN MANUAL OPERATION OR IN AUTO	1. Check cabling to hydraulic Control Valve for breaks. 2. Check connections in cable line for cleanliness 3. Verify that there is voltage at the valve connector by placing MASTER switch ON RATE 1/RATE 2/MAN switch to MAN with Booms OFF; and Power switch to ON. Manually operate INCR/DECR switch to verify voltage.
14	SPRAYER PRESSURE IS CORRECT BUT RATE IS LOW	1. Verify that nozzle check valves are not plugged. 2. Verify that pressure at each bottom is the same. 3. Verify all nozzles are of proper and same orifice size.
15	TOTAL VOLUME DOES NOT REGISTER	1. Check Flow Meter Cable for breaks and shorts. See page 17 for test procedure. 2. Check internals of Flow Meter; Clean and adjust. See pages 17 and 18. 3. Replace Flow Meter Transducer.
16	TOTAL VOLUME REGISTERS FLOW INACCURATELY	1. Verify that arrow on Flow Meter is pointing in direction of flow. 2. See page 17.

BOOM CONTROL VALVE:

IMPORTANT: Before performing any maintenance, make sure electrical power to the Pump and Boom Control Valves have been shut off for several minutes. This will relieve line pressure.

• Keep all electrical connections and motor clean at all times.

• A protective coating may be applied to the completed electrical connections, if desired.

INSPECT VALVE CONE AND O-RING'S:

See parts drawing (FIG. 8, page 22) for reference.

1. Flush the sprayer with clean water and open all Boom Control Valves. Shut sprayer engine *OFF*.

2. Remove fork and remove hose for the Boom Bypass valves. When the housing is drained make sure everything is clear from the hose.

3. Start the sprayer. There should not be any flow of liquid through the Boom Bypass passage. If there is any leakage, the valve cone must be changed. Shut sprayer engine *OFF*.

MAINTENANCE

REPLACE VALVE CONE AND O-RING'S:

1. Disconnect 2-Pin electrical terminal.

2. Remove fork and pull the motor assembly off the valve housing.

3. Remove screw and replace the valve cone.

4. Inspect or replace two O-Ring's located on Piston.

5. Replace the O-Ring's on the exterior of the Housing.

6. Reassemble in opposite sequence.

7. Retest per inspection procedure.

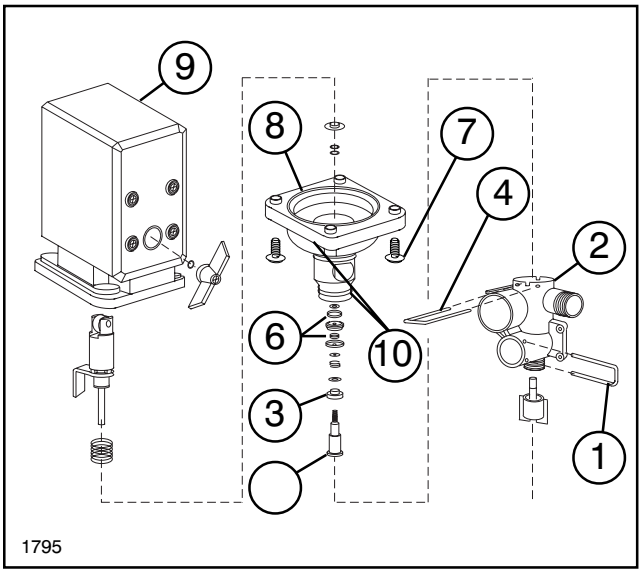


FIG. 8

1. **Fork**
2. **Housing**
3. **Valve Cone**
4. **Fork, Motor ASM**
5. **Screw**
6. **O-Rings**
7. **Screw**
8. **Housing ASM**
9. **Motor Unit**
10. **O-Rings**

CONDITION	POSSIBLE CAUSES	HOW TO CHECK
1. Valve won't open	No electrical power to valve	Manually activate valve with ignition switch *OFF*. If stem moves freely, check and clean electrical connections. Inspect Electrical system. The two-pin connector at each valve should have 12 volts with the ignition switch and the Master ON/OFF Foot Switch *ON*. Moving the Individual Boom Valve Switch should reverse the polarity.
2. Valve won't shut off	Valve Cone deteriorated	Pull fork under Individual Boom Valve motor housing. Pull motor and stem out of the base. Inspect and make repairs as necessary.
3. Leakage around bottom of motor housing	O-Ring deteriorated	Disassemble valve and replace O-Ring's.
4. Blowing fuses	Short circuit in power	Inspect wires for worn insulation and check connections.
5. Valve operating properly, but pressure drop too high.	Obstruction in valve body	Remove inlet and outlet connections and inspect body.

MAINTENANCE

⚠ WARNING

Fluids under high pressure can penetrate the human skin and can cause severe injury, possibly resulting in amputation or death.

- **Hot liquids and chemicals can also cause burns or injury.**
- **DO NOT at any time place hand or any other part of the body in front of spray stream.**
- **If any part of the body comes in contact with the spray stream, immediately consult a physician.**

CHANGING OF VALVES AND DIAPHRAGMS:

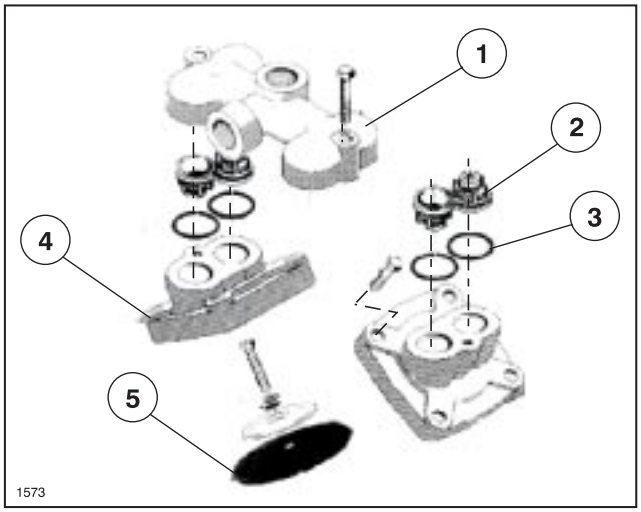


FIG. 3

1. **Valve Compartment**
2. **Valves**
3. **Gaskets**
4. **Diaphragm Cover**
5. **Diaphragm**

⚠ WARNING

- **BOLTS SECURING THE VALVE COMPARTMENT ARE WHITWORTH THREAD TYPE. DO NOT SUBSTITUTE ENGLISH OR METRIC THREAD BOLTS.**

VALVES:

Dismantle valve compartment. Before changing the valves, note the orientation of the valves so that they may be replaced correctly. It is recommended to use new gaskets when changing or checking valves, and tighten bolts securely.

DIAPHRAGM:

If fluid is seen coming out of the Weep Hole at the bottom of the Pump, a Diaghragm has ruptured and must be replaced.

Remove the Diaphragm cover after having dismantled the valve compartment as indicated in FIG. 3. The diaphragm may then be changed. If fluids have reached the crankcase it is strongly recommended to lubricate the entire pump with ample amount of grease.

PUMP LUBRICATION:

Once or twice during the season, depending on how often the sprayer is used, it is recommended to lubricate the pump with 2-3 pumps from a grease gun of a high quality multipurpose grease. (See FIG. 4)

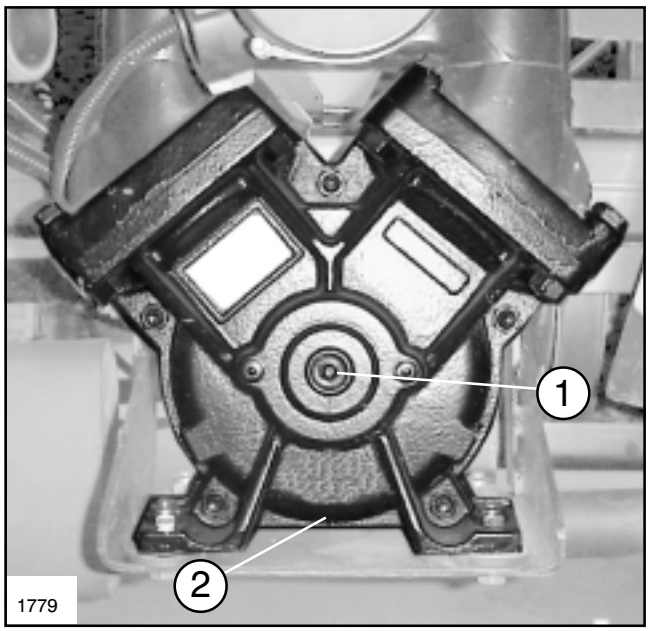


FIG. 4

1. **Lubrication Point on Pump**
2. **Weep Hole**

SUCTION AND PRESSURE DAMPENER MAINTENANCE:

It is normal for the Suction Dampener to move when fluid is being pumped. A tear or rupture in the Dampener can cause a suction leak. The Pump will not operate properly in this condition. Replace the Dampener if Dampener is ruptured.

NOTES

NOTES

Helping you put quality into play.®

The Toro General Commercial Products Warranty

A Two-Year Limited Warranty

Conditions and Products Covered

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrant your 1996 or newer Toro Commercial Product ("Product") purchased after January 1, 1997, to be free from defects in materials or workmanship for two years or 1500 operational hours*, whichever occurs first. Where a warrantable condition exists, we will repair the Product at no cost to you including diagnosis, labor, parts, and transportation. This warranty begins on the date the Product is delivered to the original retail purchaser.

* Product equipped with hour meter

Instructions for Obtaining Warranty Service

You are responsible for notifying the Commercial Products Distributor or Authorized Commercial Products Dealer from whom you purchased the Product as soon as you believe a warrantable condition exists.

Toro Commercial Products Service Department
Toro Warranty Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196
612-888-8801
800-982-2740
E-mail: commercial.service@toro.com

Owner Responsibilities

As the Product owner, you are responsible for required maintenance and adjustments stated in your operator's manual. Failure to perform required maintenance and adjustments can be grounds for disallowing a warranty claim

Items and Conditions Not Covered

Not all product failures or malfunctions that occur during the warranty period are defects in materials or workmanship. This express warranty does not cover:

• Product failures which result from the use of non-Toro replacement parts, or from installation and use of add-on, modified, or unapproved accessories.

• Product failures which result from failure to perform required maintenance and/or adjustments.

• Product failures which result from operating the Product in an abusive, negligent or reckless manner.

• Parts subject to consumption through use unless found to be defective. Examples of parts which are consumer, or used up, during normal Product operation include, but are not limited to, blades, reels, bed knives, tines, spark plugs, castor wheels, tires, filters, belts, etc.

• Failures caused by outside influence, items considered to be outside influence include, but are not limited to, weather storage practices, contamination, use of unapproved coolants, lubricants, additives, or chemicals, etc.

• Normal "wear and tear" items. Normal "wear and tear" includes, but is not limited to, damage to seats due to wear or abrasion, worn painted surfaces, scratched decals or windows, etc.

Parts

Parts scheduled for replacement as required maintenance are warranted for the period of time up to the scheduled replacement time for that part.

Parts replaced under this warranty become the property of Toro. Toro will make the final decision whether to repair any existing part or assembly or replace it. Toro may use factory re-manufactured parts rather than new parts for some warranty repairs.

General Conditions

Repair by an Authorized Toro Distributor or Dealer is your sole remedy under this warranty.

Neither The Toro Company nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of the Toro Products covered by this warranty, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty. Except for the Emissions warranty referenced below, if applicable, there is no other express warranty. All implied warranties of merchantability and fitness for use are limited to the duration of this express warranty.

Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above, exclusions and limitations may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Note regarding engine warranty: The Emissions Control System on your Product may be covered by a separate warranty meeting requirements established by the U. S. Environmental Protection Agency (EPA) and/or the California Air Resources Board (CARB). The hour limitations set forth above do not apply to the Emissions Control System Warranty. Refer to the Engine Emission Control Warranty Statement printed in your operator's manual or contained in the engine manufacturer's documentation for details.

Countries Other than the United States or Canada

Customers who have purchased Toro products exported from the United States or Canada should contact their Toro Distributor (Dealer) to obtain guarantee policies for your country, province, or state. If for any reason you are dissatisfied with your Distributor's service or have difficulty obtaining guarantee information, contact the Toro importer. If all other remedies fail, you may contact us at Toro Warranty Company.