CALIFORNIA

Proposition 65 Warning

WARNING: Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer and birth defects or other reproductive harm.

WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

ANY PICTURES CONTAINED WITHIN THIS OPERATOR'S MANUAL THAT DEPICT SITUATIONS WITH SHIELDS, GUARDS, RAILS, OR LIDS REMOVED ARE FOR DEMONSTRATION PURPOSES ONLY. HAGIE MANUFACTURING COMPANY STRONGLY URGES THE OPERATOR TO KEEP ALL SHIELDS AND SAFETY DEVICES IN PLACE AT ALL TIMES.

OPERATOR'S MANUAL
FOR
HAGIE MODEL DTS 8T HI-TRACTOR

HAGIE MANUFACTURING COMPANY

721 CENTRAL AVENUE WEST
BOX 273
CLARION, IOWA 50525-0273 (515) 532-2861

COVERS MACHINE SERIAL NUMBERS: U1220880001 thru U1220880100

U1220890001 thru U1220890100

01-09 493407

ABBREVIATIONS

A/C ..... AIR CONDITIONING
ACCUM ..... ACCUMULATOR
ADJ ..... ADJUST
ADPTR ..... ADAPTER
AGI ..... AGITATOR
ALT ..... ALTERNATOR
AMP ..... AMPERE
APPROX ..... APPROXIMATELY
ASSY ..... ASSEMBLY
AUX ..... AUXILIARY
BRKT ..... BRACKET
BTTRY ..... BATTERY
C ..... CELSIUS
CAL ..... CALIBRATION
CCA ..... COLD CRANKING AMPS
CHEM ..... CHEMICAL
CYL ..... CYLINDER
DIA ..... DIAGRAM
DISPL ..... DISPLACEMENT
EA ..... EACH
ELECT ..... ELECTRIC
F ..... FAHRENHEIT
FIG ..... FIGURE
FLO ..... FLOW
FRT ..... FRONT
FT ..... FOOT OR FEET
GA ..... GAUGE
GAL ..... GALLON
GPA ..... GALLONS PER ACRE
GPM ..... GALLONS PER MINUTE
GPS ..... GLOBAL POSITIONING SATELLITE
HAL ..... HALOGEN
HR ..... HOUR
HYD ..... HYDRAULIC
HYDRO ..... HYDROSTATIC
ID ..... INSIDE DIAMETER
IN ..... INCH
INFO ..... INFORMATION
Km/H ..... KILOMETERS PER HOUR
LB ..... POUND
MAINT ..... MAINTENANCE
MIN ..... MINUTE
M/F ..... MAINFRAME
MPH ..... MILES PER HOUR
MT ..... MOUNT
MTH ..... MONTH
MTR ..... MOTOR
NO ..... NUMBER
OD ..... OUTSIDE DIAMETER
PLT ..... PLATE
POLY ..... POLYETHYLENE
PRESS ..... PRESSURE
PRKNG ..... PARKING
PSI ..... POUNDS PER SQUARE INCH
QT ..... QUART
RAD ..... RADIATOR
REC ..... RECOMMENDED
REQ ..... REQUIRED
RPM ..... REVOLUTIONS PER MINUTE
SEC ..... SECOND
SERV ..... SERVICE
SLCTR ..... SELECTOR
SMV ..... SLOW MOVING VEHICLE
SOLE ..... SOLENOID
SOLU ..... SOLUTION
SPCNG ..... SPACING
SPEC ..... SPECIFICATION
STRG ..... STEERING
SQ ..... SQUARE
TACH ..... TACHOMETER
TEMP ..... TEMPERATURE
TERM ..... TERMINAL
TRD ..... TREAD
TT ..... TUBE-TYPE
TU ..... TUBELESS
VAR ..... VARIABLE
V ..... VOLT
VFC ..... VARIABLE FLOW CONTROL
VLV ..... VALVE
W/ ..... WITH
W/O ..... WITHOUT
W ..... WEIGHT
WD ..... WHEEL DRIVE
WHL ..... WHEEL

TO THE OWNER

A WORD FROM HAGIE MANUFACTURING COMPANY

Congratulations on your selection of a Hagie Model DTS 8T sprayer. We recommend that you study this Operator's Manual and become acquainted with the adjustments and operating procedures before attempting to operate your new sprayer. As with any piece of equipment, certain operating procedures, service, and maintenance are required to keep it in top running condition.

We have attempted herein to cover all of the adjustments required to fit varying conditions. However, there may be times when special care must be considered.

Hagie Manufacturing Company reserves the right to make changes in the design and material of any subsequent sprayer without obligation to existing units.

We thank you for choosing a Hagie sprayer and assure you of our continued interest in its satisfactory operation for you. If we might be of assistance to you, please call us.

We are proud to have you as a customer.

TO THE OPERATOR

The following pages and illustrations will help you operate and service your new sprayer. It is the responsibility of the user to read the Operator's Manual and comply with the safe correct operating procedures and lubricate and maintain the product according to the maintenance schedule.

The user is responsible for inspecting the machine and having parts repaired or replaced when continued use of the product causes damage or excessive wear to other parts.

Keep this manual in a convenient place for easy reference when problems arise. This manual is considered a permanent fixture with this machine. In the event of resale, this manual should accompany the sprayer. If you do not understand any part of the manual or require additional information or service, contact the Hagie Customer Support Department:

Hagie Manufacturing Company
721 Central Avenue West
Box 273
Clarion, IA 50525-0273
(515) 532-2861

The following symbols, found throughout this manual, alert you to potentially dangerous conditions to the operator, service personnel, or the equipment.

DANGER — *This symbol indicates a hazardous situation which, if not avoided, will result in death or serious injury.*

WARNING — *This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or injury.*

CAUTION — *This symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.*

TABLE OF CONTENTS

I. SAFETY/DECALS

SAFETY PRECAUTIONS

Most accidents occur as the result of failure to follow simple and fundamental safety rules. For this reason, most accidents can be prevented by recognizing the real cause and doing something about it before the accident occurs.

Many conditions cannot be completely safeguarded against without interfering with efficient operation and/or reasonable accessibility. Therefore, you must study this Operator's Manual and learn how to use the sprayer controls for safe operation. Likewise, do not let anyone operate without instruction.

Do not make modifications such as weldments, add-ons, adaptations, or changes from the original design of sprayer. Such changes and/ or modifications may become safety hazards to you and to others and will void all warranties.

DRIVING

- Before moving sprayer, make sure no persons or obstructions are in path of travel.
- Do not permit passengers on sprayer when it is moving; they may fall off or obstruct operator's view.
- Never drive near ditches, embankments, holes, mounds, or other obstacles.
- Never drive on hills too steep for safe operation.
- Always drive at a reasonable field speed.
- Reduce sprayer's speed before turning.
- Come to a complete stop before reversing direction.
- Pull over to side of road before stopping.
- Additional weight caused from partially full or full solution tanks may cause erratic or increased stopping distance. Do not drive on road with full tanks
- Do not activate parking brake while machine is in motion or damage may occur to sprayer.
- Use flashing/hazard warning lights when traveling on public roads, day or night, unless prohibited by local law.
- Make sure SMV emblem is in place and visible from rear when traveling on public roads.

I. SAFETY/DECALS

 OPERATING

TREAD WIDTH

- Select widest tread setting to fit between crop rows.
- Never manually adjust the tread width on sprayer until wheels have been properly blocked. Loosen leg clamp bolts only enough for leg to slide on frame.
- If equipped with hydraulic tread adjust, never loosen leg mounting bolts to adjust bearing clearance. Add additional shims only to gain clearance.
- Only adjust in or out while moving.

SPRAYER BOOMS

- Cradle booms when leaving sprayer unattended.
- Make sure booms are folded when cradled.
- Select a safe area before unfolding booms. Avoid power lines and overhead structures.

GENERAL OPERATION SAFETY

- Do not adjust factory engine RPM settings.
- Operate engine at one bump up or 1800 RPM's to assure proper charge pressure for brakes to work properly .
- Start engine from the operator's seat only. Do not by-pass safety-start switch.
- Starting fluid is not recommended for use.
- Never run sprayer engine in a closed building. Proper exhaust ventilation is required.
- If equipped with ground speed sensing radar, do not look directly into radar beam. It emits a very low intensity microwave signal which may cause possible eye damage.

I. SAFETY/DECALS

 REPAIR/MAINTENANCE

HYDRAULICS

- Use caution when working with hydraulic fluid under pressure. Escaping hydraulic fluid can have sufficient force to penetrate your skin, causing serious injury. This fluid may also be hot enough to burn.
- Always lower load or relieve hydraulic pressure before repairing a hydraulic oil leak.
- Avoid torching, welding, and soldering near pressurized hydraulic lines.

FUELING

- Always turn the engine off and allow it to cool before refueling.
- Do not smoke while refueling.
- Do not fill fuel tank completely. Fuel may expand and run over.

GENERAL REPAIR/MAINTENANCE

- Turn off engine before checking, adjusting, repairing, lubricating, or cleaning any part of sprayer.
- When servicing radiator, let engine cool before removing pressurized cap.
- Disconnect battery ground cable before servicing electrical system or welding on machine.
- When charging battery, connect positive cable to positive terminal and negative cable to negative terminal. Failure to do so may result in an explosion and cause injury. Likewise, avoid battery acid contact and incurring injuries.

I. SAFETY/DECALS

CHEMICAL HANDLING

- Never allow chemicals to come in contact with skin or eyes. Wear protective clothing or respirators as recommended by chemical manufacturer. Store this clothing outside cab so as not to contaminate filtered cab environment. Also, clean your boots to remove soil or other contaminated particles prior to entering cab.
- Never pour chemicals into an empty tank, fill tank half full of water first.
- Follow chemical manufacturer's instructions for mixing chemicals.
- Dispose of empty chemical containers properly.
- Wash spilled chemicals or spray residue from sprayer to prevent corrosion and deterioration.
- Select a safe area to fill, flush, calibrate, and clean sprayer where the chemicals will not drift or run off to contaminate people, animals, vegetation, or water supply.
- Never place nozzle tips or other parts to one's lips in an attempt to unclog spray tip.
- Do not spray when wind is in excess of chemical manufacturer's recommended speed.
- Store pesticides in their original containers with label intact. Keep them in a separate, locked building.

GENERAL SAFETY

- Keep a fire extinguisher close at all times.
- Keep all shields in place.
- Keep clear of all moving parts and keep others away when operating.
- Do not wear loose fitting clothing that may be blown or drawn into moving parts.

I. SAFETY/DECALS

WARNING DECALS

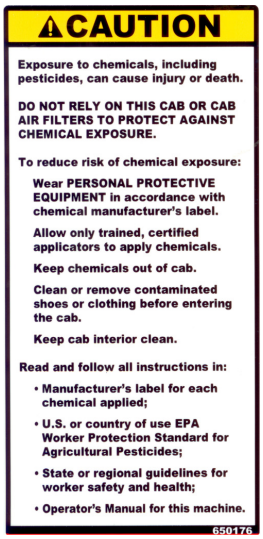
Decals warning you of avoidable danger are located on various parts of the sprayer. They are there for your personal safety and protection. DO NOT remove them. They will fracture upon attempted removal and therefore must be replaced.

Following are locations of important safety decals. Replace them if they are torn or missing. All warning decals and other instructional Hagie decals or machine striping may be purchased through the Hagie Customer Support Department. To replace decals, be sure that the installation area is clean and dry; decide on exact position before you remove the backing paper.

DECAL LOCATION

650175

Right hand cab, monitor mount.



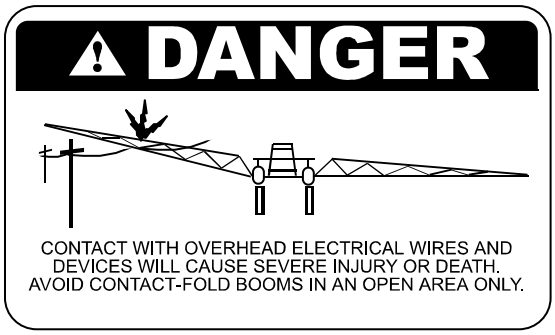
650175

Lower left hand corner of front cab window.

I. SAFETY/DECALS

650336

On cab insulation above control panel.



650337

On cab insulation above control panel.

650339

On steering column.

I. SAFETY/DECALS

650340

Above brake switch below spray monitor.

650822

Front nose shield.

650831

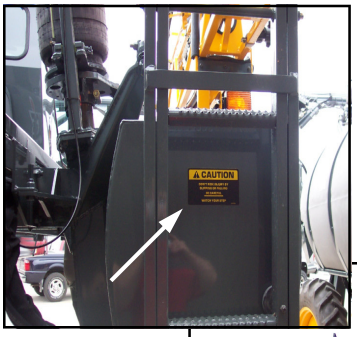
Steering column.

I. SAFETY/DECALS

650847

Outside, left-hand, rear panel of cab

650848



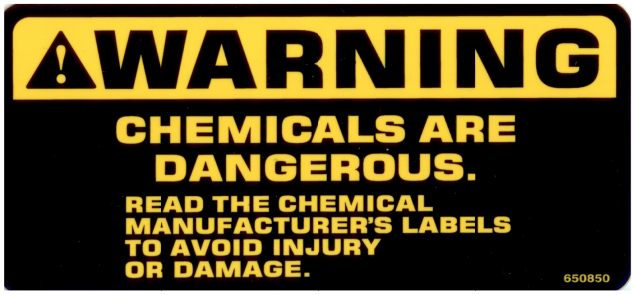
Rear of right-hand fuel tank.

Top of left-hand ladder.

650849

Top of each fuel tank.

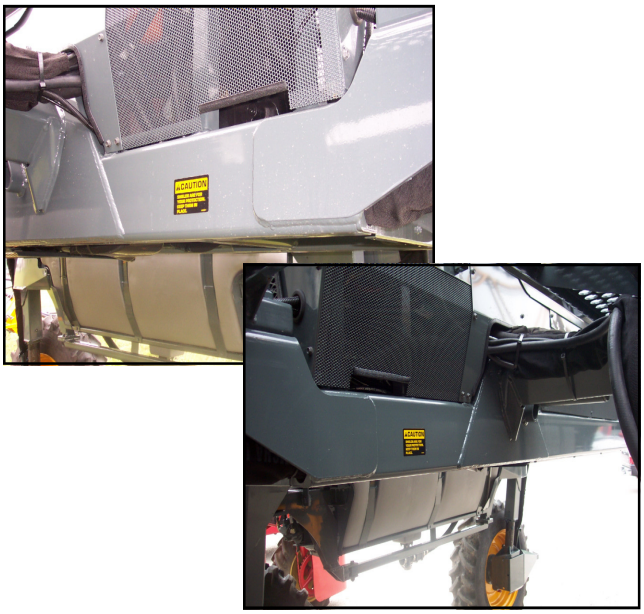
I. SAFETY/DECALS



650850

Top of each solution tank.

650851



Left rear mainframe

Right rear mainframe.

650852

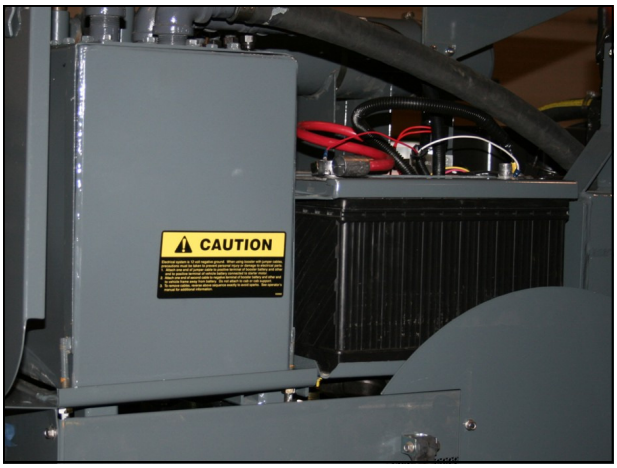
Inside cab door.

I. SAFETY/DECALS

650981

Front of mullion to left of radiator cap.

650982



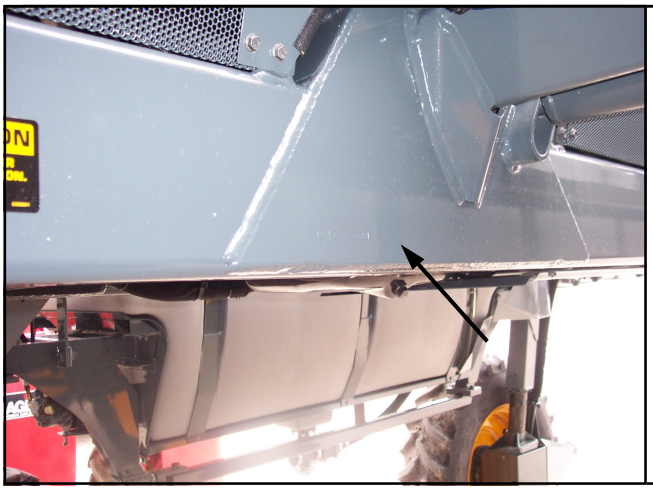
Left of the battery on hydraulic reservoir.

II. IDENTIFICATION NUMBERS

SPRAYER IDENTIFICATION

Each Hagie sprayer is identified by means of a frame serial number. This serial number denotes the model, year in which it was built, and the number of the sprayer. For further identification, the engine has a serial number, the hydrostatic pumps have serial numbers, the wheel motors have identification tags, and the planetary hubs have identification plates that describe the type of mount and gear ratio. To ensure prompt, efficient service when ordering parts or requesting service repairs from Hagie Manufacturing Company, record the serial and identification numbers in the space provided below.

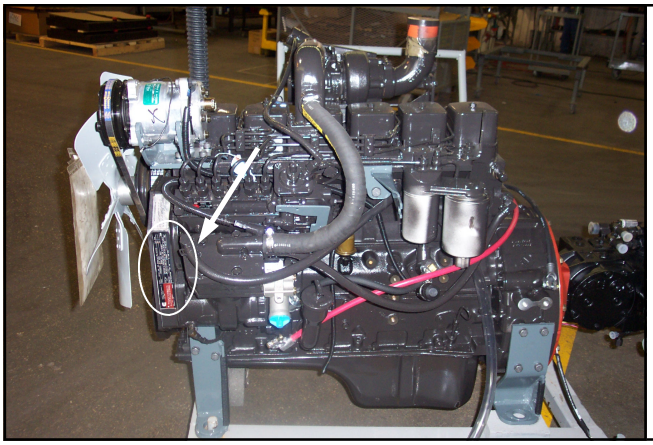
NOTE:
Reference to left-hand and right-hand used throughout this manual refers to the position when seated in the operator's seat facing forward.



Sprayer

_____

NOTE: Sprayer serial number stamped in the frame on right rear corner.



Engine

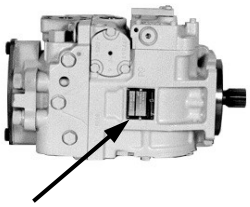
_____

NOTE: Diesel engine serial number located on the side of the front left gear housing.

II. IDENTIFICATION NUMBERS

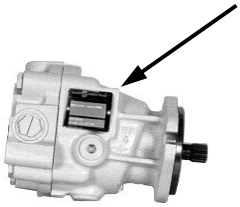
Planetary Hubs

	Left	Right
Front:	_____	_____
Rear:	_____	_____



Hydrostatic Pump

_____

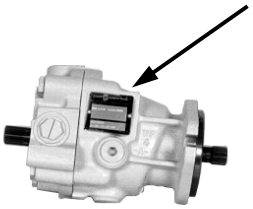


Front Wheel Motors

Left: _____

Right: _____

Refer to parts manual.



Rear Wheel Motors

Left - w/ Sensor: _____

Right - w/o Sensor: _____

Refer to parts manual.

III. SPECIFICATIONS

ENGINE

Manufacturer and model	Cummins
Model	6B5.9A Turbocharged
Type	In line, liquid cooled
Number of cylinders	6
Displacement	5.9 liter
Horsepower	152 @ 2500 RPM
Peak torque	415 lb·ft @ 1700 RPM
Type of fuel	Number 1 or number 2 diesel
Fuel system	Filtered, direct-injected
Air cleaner	Dry-type, single element
Slow idle	800 RPM
Fast idle	2730 RPM (no load)

POWER TRAIN

Drive

Hydrostatic pump		Sauer-Danfoss 90 series
Range		113 cc variable displacement
Drive train		Selectable two or four wheel drive
Speed	- 2 wheel drive	0-20 mph
	- 4 wheel drive	0-14 mph
Hydrostatic wheel motor - front and rear		Sauer-Danfoss M35
Final drives		
	Type	Planetary gear reduction hubs
	- front and rear	Torque Hub® MW3B1
	Lubrication	Oil bath

Brakes

Type	Multiple disc Spring applied Hydraulically released

Steering System

Type	Hydraulic, priority on demand
Control	Full-time power
Steering cylinders	Double action

III. SPECIFICATIONS

AUXILIARY HYDRAULIC SYSTEM

Type .....Open

Pump type .....Tandem gear

Pressure setting .....2600 PSI

SPRAY SYSTEM

Booms

Type .....Dry, with variable row spacing

Standard.....60 ft. (3 spray sections)

Controls.....Electro-hydraulic: fold/lift/level

Hydraulic level shock absorber .....Hagie boom level accumulator

Hoses

Front fill connection (female w/ adapter for male).....2" I.D.

Solution hose from tank .....1 ½" I.D.

Boom section feeder hose .....1" I.D.

Boom nozzle hose..... ¾" I.D.

Solution Tanks

Standard.....Two 400 gal. polyethylene with sight gauge

Agitation .....Mechanical - hydraulically driven with variable speed control

General Spray System

Pump.....Diaphragm - hydraulically driven with variable speed control

Solution valves .....Electric ball valves

Pressure gauge.....100 PSI glycerin filled

Monitor .....Raven 460 (GPS-ready)

III. SPECIFICATIONS

ELECTRICAL SYSTEM

General Electrical System

Battery.....Single 12V, negative ground

Alternator.....130 AMP, voltage regulated

Starter.....12V with solenoid

Circuit Breakers

Front and rear cab lights (see below) .....40 AMP

Auxiliary power points .....30 AMP

A/C .....30 AMP

Starter relay.....30 AMP

Wire harness from engine.....30 AMP

Wire harness from engine.....50 AMP

Fuses

Windshield washer, and traction valve.....10 AMP

Gauges, AM/FM radio, dome light, and C.B. radio .....10 AMP

Boom hydraulic controls, tread adjust valve, parking brake .....20 AMP

Fuel switch, boom solution valves, and seat motor .....20 AMP

Hazard/warning lights, turn signal, and wiper .....10 AMP

Solution tank shutoff valves .....10 AMP

Lights

Front of cab.....4 halogen field lights

Rear of cab.....2 halogen work lights

Auxiliary Power Supplies

Monitor mount panel .....12V binding post-type
12V cigarette lighter-type

III. SPECIFICATIONS

CAB AND INSTRUMENTS

Cab

General cab	Tilt steering Windshield wiper Flashing/hazard warning lights Turn signals Side mirrors Dome light Tinted glass
Temperature control	Full-range
A/C charge type	R-134a
Fresh air filtration	Paper and charcoal filter
Seat	Air ride with adjustment for: Fore-aft Backrest Height Ride firmness Armrest tilt
Windshield washer	Standard
Stereo	AM/FM stereo with dual speakers

Instruments

Dial gauges	Hour meter Fuel Temperature Alternator Oil pressure
Digital gauge	Speedometer (MPH-Km/H) Tachometer (RPM)
Engine air filter monitor	Filter Minder®

III. SPECIFICATIONS

TIRES/RIMS

Rims (front and rear)

Standard.....W 10x34

Tires (front and rear)

Standard.....320/85R34 (Radial TU)

- Air pressure.....30 PSI
- Tire width.....12.6”
- Load capacity (at 20 MPH).....4540 lbs.
- Overall diameter.....55.4”
- Static load radius (suggested—will vary with load).....25.8”
- Rolling circumference.....166.9”

CAPACITIES

Solution tanks (2).....400 gallons each

Fuel tanks (2).....40 gallons each

Cooling system.....7 gallons

Hydraulic reservoir.....20 gallons

Rinse system tank (optional).....45 gallons

Foam marker stainless steel tank (optional).....20 gallons

Engine crankcase (including filter).....17 quarts

Torque Hub® (4).....26 oz. each (approx.)

IV. OPERATING INFORMATION

A. CAB

Steering Column

1. Turn Signals
2. Upper Steering Column Tilt
3. Lower Steering Column Tilt

FIG 18-1

FIG 18-2

FIG 18-3

TURN SIGNALS– To activate the front turn signals (fig. 18-4, item 1) and the rear turning signals (figure 18-4, item 2), move the turn signal lever (figure 18-1) right during a right-hand turn and left during a left-hand turn. Steering column mounted turn signal indicators will correspondingly flash when either side of the turn signal is activated. The turn signal lever is not self-centering; you must return it to the OFF position after completing your turn.

FIG 18-4

FIG 18-5

UPPER STEERING COLUMN TILT– To adjust the upper tilt, locate the tilt lock lever on the right-hand side of the steering column (fig. 18-2); rotate the lever counterclockwise to release the steering column tilt lock. Move the steering column to desired position and rotate the lever clockwise to lock column in place (fig. 18-5)

FIG 18-6

LOWER STEERING COLUMN TILT– To ease exit and entry, entire steering column tilts out of the driver's way. To operate the column base tilt, locate the foot pedal at the base of the steering column (fig. 18-3) and press down to release the column base lock. Pull or push the column to the desired position and release the foot pedal to re-lock the column base (fig. 18-6)

IV. OPERATING INFORMATION

A. CAB

Front Console and Gauges

1. Res-Q-Me Emergency Exit Tool
2. Power Port
3. Dual Binding Posts
4. Parking Brake
5. Raven Monitor 460
6. Filter Minder®
7. Hour Meter
8. Volt Meter
9. Fuel Gauge
10. Engine Oil Pressure
11. Water Temperature
12. Speedometer/Tachometer

FIG 19-3

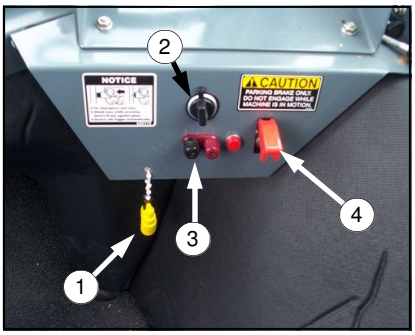


FIG 19-1

FIG 19-2

Res-Q-Me Emergency Exit Tool– The Res-Q-Me tool (fig. 19-1, item 1) is used to break the cab glass if an emergency exit is needed. Use caution while using this tool; shield your eyes from breaking glass, cover your hands and arms to push the glass outward, and be careful not to cut your body on the glass while exiting the cab.

Power Port and Dual Binding Posts– The Hagie DTS 8 has two auxiliary power supplies in the cab for powering 12 volt accessories. They are both “hot” regardless of ignition key position. Turn the accessory OFF if the engine is not running for an extended period of time.

The cigarette lighter-type (fig. 19-1, item 2) and the binding post-type (fig. 19-1, item 3) power supplies are located on the panel below the spray system monitor. Replace the insulated plug when not using the lighter-type power supply. Auxiliary power supplies are protected by a 30 AMP circuit breaker.

IV. OPERATING INFORMATION

A. CAB

Parking Brake– The parking brake, located on the panel below the spray system monitor (fig. 20-1), is NOT to be engaged while the machine is in motion. Refer to **Operating Information: Hydrostatic Drive Systems** for more information on the use of the parking brake.

FIG 20-1

FIG 20-2

Raven Monitor 460– The Raven Monitor 460 (fig. 20-2) is the "brains" of the spray system. The monitor must be properly calibrated before any spraying occurs. Read the **Calibration** section for more information on the Raven Monitor 460.

Filter Minder®- (fig. 20-3, item 1) The Filter Minder® is an engine air filter restriction monitoring device. For information on servicing and resetting the Filter Minder®, see the service and maintenance section on filters.

Hour Meter- (fig. 20-3, item 2) The hour meter progressively records elapsed time of the sprayer operation. It is useful for determining service intervals.

Volt Meter- (fig. 20-3, item 3) The volt meter measures voltage from the alternator on the diesel engine. A "red" indicator light will alert the operator if the system is operating either too low or too high.

Fuel Gauge- (fig. 20-3, item 4) The fuel gauge measures the amount of fuel in either fuel tank, depending on the tank selected with the fuel switch. A "yellow" indicator light alerts the operator of low level operation.

FIG 20-3

Engine Oil Pressure- (fig. 20-3, item 5) The oil pressure gauge monitors pressure of the engine lubricating system. A "red" indicator light alerts the operator of low level operation.

Water Temperature- (fig. 20-3, item 6) The water temperature gauge monitors the engine cooling system. A "red" indicator light alerts the operator of unsafe operating temperatures.

Speedometer/Tachometer- (fig. 20-3, item 7) The unit will display either engine RPM or speed of travel depending on the operator's selection. See the next page for more information on the speedometer/tachometer.

NOTE:

Immediately reduce engine speed and shut off ignition if any of the above RED indicator lights illuminate. Determine cause and correct before continuing operation.

IV. OPERATING INFORMATION

A. CAB

Speedometer/Tachometer

The speed/tach unit is programmable with a digital read-out indicating MPH or RPM. The parameters have been factory set.

Turn the ignition key to the “ON” position. The display will show “0000”, which indicates RPM. Press the MPH button; the readout will display “00.0” which indicates MPH.

To check the parameter settings, press the desired button and hold until four “8’s” are shown, then release (fig. 21-1, item B). The parameter setting will be displayed for four seconds.

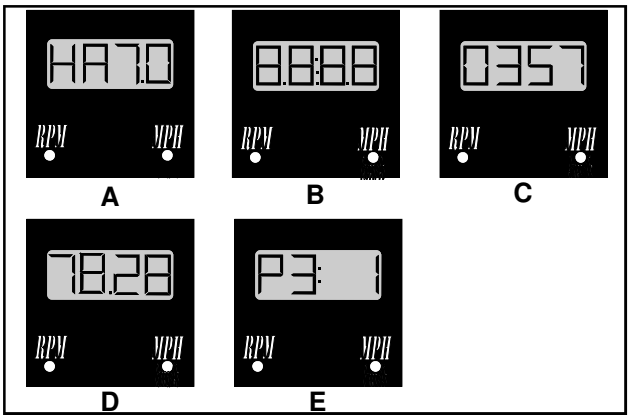


FIG 21-1

A = Torque-Hub® reduction

B = speedometer ring pick-up

C = static loaded radius

Y = MPH parameter setting

$$\frac{168 \times A \times B}{C} = X$$

$$\frac{600{,}000}{X} = Y$$

FIG 21-2

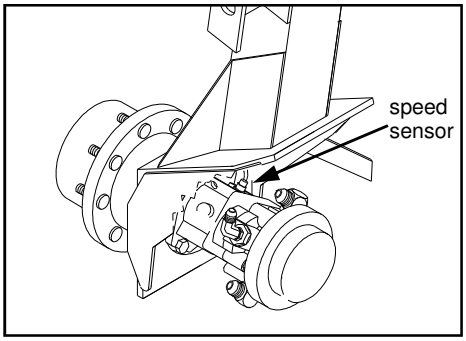


FIG 21-3

PARAMETER SETTING

RPM ..... 357(fig. 21-1, item C)
MPH (320/85R34 tire) ..... 78.3(fig. 21-1, item D)

To change or re-enter the parameters, press the desired button and hold in until the four “8’s” are displayed. Release the button and the parameter setting will appear. If you want to increase the setting, press the RPM button. To decrease, press the MPH button.

PROGRAMMING MPH - To program the MPH, use the formula from figure 21-2. Example (320/85R34 tires): **168** times Torque Hub® reduction of **25.59** times number of speedometer ring pick-up sensors on sensor disc of **46** equals **197759.52**;divided by front tire static loaded radius of **25.8** inches equals **7665.1**;**7665.1** divided into **600,000** equals parameter setting of **78.28**.

This parameter setting should be checked when you receive your sprayer.

ADDITIONAL PARAMETERS – To access the miscellaneous parameters screen (fig. 21-1, item E), hold down both buttons at the same time until the screen with four “8’s” appears.

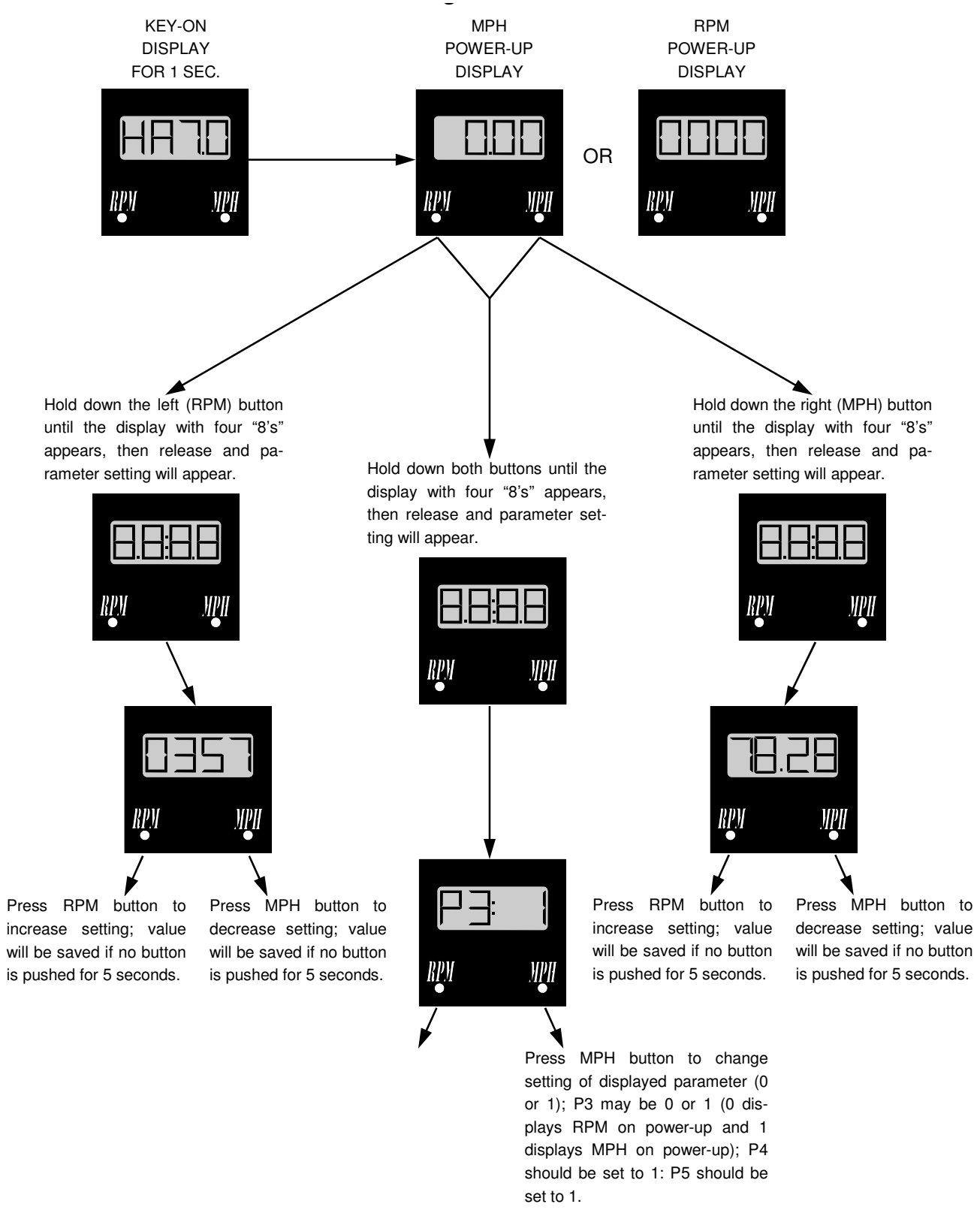
Use the RPM buttons to scroll the parameter settings (P3 = power-up display, P4 = signal tracking speed, P5 = input device). Use the MPH button to change the setting of the displayed parameter (either 0 or 1).

See the next page for more information.

IV. OPERATING INFORMATION

A. CAB

Speedometer/Tachometer Display Screen Quick Reference Chart



IV. OPERATING INFORMATION

A. CAB

Overhead Controls

1. Radio
2. Climate Controls
3. Dome light
4. Air circulation filters
5. Vents

FIG 23-1

FIG 23-2

FIG 23-3

FIG 23-4

Radio– The radio (fig. 23-1) is an AM/FM tuner with Weather Band broadcasting. There are dual speakers mounted in the cab.

Climate Control- The climate controls are continuous adjusting dial switches located on the front upper cab headliner.

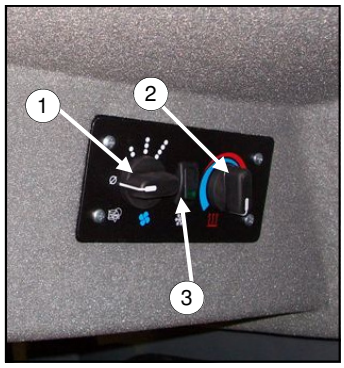


FIG 23-5

Adjusting Fan Blower Speed– fan blower speed is controlled by the left rotary dial (fig. 23-5, item 1). To increase the fan speed, rotate the dial clockwise. To reduce the fan speed, rotate the dial counterclockwise.

Adjusting Temperature Setting– forced air temperature adjustments are controlled by the right rotary dial (fig. 23-5, item 2). Temperature control is a continuously variable adjustment. To increase the forced air temperature, rotate the dial clockwise. To decrease the forced air temperature, rotate the dial counterclockwise.

Operating the Air Conditioning– to activate the air conditioner, press the air conditioning switch (fig. 23-5, item 3). Adjust fan speed and temperature accordingly. See section B under Service for servicing information.

IV. OPERATING INFORMATION

A. CAB

Dome Light– The cab has a dome light that can be turned on manually.

FIG 24-1

Air Filters- The cab is equipped with fresh air filters (fig. 24-2, item 1). These filters are for your safety and comfort. Change the filters as soon as a chemical odor enters the cab. See the Service section for information.

Vents– The cab has adjustable vents (fig. 24-2, item 2). They may be adjusted by rotating them for desired direction, or individually turned off with the directional fins.

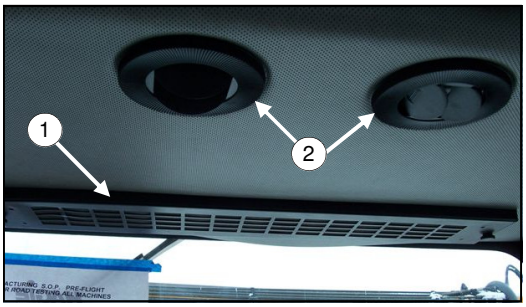


FIG 24-2

IV. OPERATING INFORMATION

A. CAB

Side Console

FIG 25-1

1. The RINSE switch in the DTS 8T does not control anything.
2. The FENCE ROW switch in the DTS 8T does not control anything.
3. The INDICATOR LIGHTS do not light up because there is no fence row.
4. IGNITION– has 3 positions, ON, START, and OFF. Refer to Starting instructions.
5. LEFT BOOM HORIZONTAL FOLD– pushing the top will horizontally extend the left boom out. Pushing the bottom will retract (fold it back in) the left boom.
6. RIGHT BOOM HORIZONTAL FOLD– pushing the top will horizontally extend the right boom out. Pushing the bottom will retract (fold it back in) the right boom.
7. The EXTENSION switch does not control anything since there are no boom extensions to fold out.
8. The TREAD switch controls the tread adjust. Push the top of the switch to adjust the tread out and the bottom of the switch to adjust the tread in.
9. The LEFT TANK switch controls the valves on the left solution tank. Pressing the top of the switch will open the valve, pressing the bottom of the switch will close the valve.
10. The RIGHT TANK switch controls the valves on the right solution tank. Pressing the top of the switch will open the valve, pressing the bottom of the switch will close the valve.
11. LIGHTS– rotating the switch all the way counterclockwise is the OFF position. Rotating the knob to the first stopping point will turn on the running lights. Rotating the knob to the second stopping point will turn on the field lights.
12. THROTTLE– to increase speed, push the lever forward. To decrease the speed, pull the lever backward.
13. SOLUTION VALVE switches control the valves on the transom. The 60 foot boom has three valves. The first and last switch will not control anything.

continued on next page

IV. OPERATING INFORMATION

A. CAB

continued from previous page

14. FOUR WHEEL DRIVE– pull the knob out completely to engage the four wheel drive. Push the knob in completely to return to two wheel drive.
15. AGITATION– move the lever forward to the desired agitation rate. Pull the lever all the way back to turn off the agitation .
16. SPRAY PRESSURE– push the lever forward to manually increase the amount of spray pressure. Pull the lever back to decrease the pressure.
17. FUSES– the fuses for the switches are located in the lower right corner of the side console. To remove a fuse, press down and twist the cap of the fuse you want to replace. Find more information in the Service section of this manual.
18. HYDROSTATIC LEVER– controls the direction of the machine and many spray functions.

FIG 26-1

1. WIPER/WASHER– to activate the windshield wiper, press the top of the switch. To activate the washer fluid, press and hold the top of the switch until the desired amount of fluid is dispensed. Return the switch to the OFF position (press the bottom of the switch) once all the fluid is wiped away.
2. HAZARD/WARNING LIGHTS– to activate the flashing hazard/warning lights, press the top of the switch. Use the hazard lights when operating on a public roadway day or night unless prohibited by law. Press the bottom of the switch to turn the lights off.
3. FUEL SELECTOR switch allows you to switch which tank fuel is being used from. To select the right tank, press the top of the switch. To select the left tank, press the bottom of the switch.
4. The HYDROSTATIC LEVER controls the direction of the machine, spray functions, and lift functions.

IV. OPERATING INFORMATION

A. CAB

Auxiliary Power Supplies

FIG 27-1

The Hagie DTS 8 has two auxiliary power supplies in the cab for powering 12 volt accessories. They are both “hot” regardless of ignition key position. Turn the accessory off if the engine is not running for an extended period of time.

The cigarette lighter-type (fig. 27-1, item 1) and the binding post -type (fig. 27-1, item 2) power supplies are located in the panel below the spray system monitor. Replace the insulated plug when not using the cigarette lighter-type power supply. Auxiliary power supplies are protected by a 30 AMP circuit breaker.

Air Suspended Cab Seat

-1- **Ride Firmness**. Pull knob out to release air and “soften” ride. Push knob in to pump air and “stiffen” ride. (Ignition key must be in the “ON” position in order to activate the seat pump.)

-2- **Fore-Aft Adjustment**. Release fore-aft lock by pulling lever out. Slide forward or back to desired position. Release lever to lock.

FIG 27-2

-3- **Height Adjustment**. Release height lock by pulling lever up. Apply body weight slowly to lower seat position or remove body weight slowly to raise seat position. When at desired height release lever to lock.

-4- **Back Angle Adjustment**. Rotate knob counter-clockwise to tilt backrest forward and clockwise to tilt backrest back.

-5- **Armrest Adjustment**. Unzip either armrest to expose the armrest adjustment bolt. Turn bolt in to raise armrest tilt and out to lower arm rest tilt (fig. 27-2, item 6).

IV. OPERATING INFORMATION

B. Hydrostatic Drive System

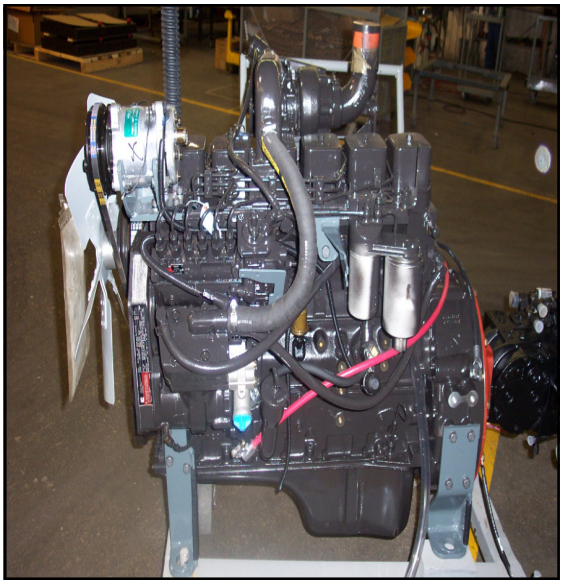


FIG 28-1

1. Cummins Diesel Engine
2. Planetary Hubs
3. Hydrostatic Pump
4. Front Wheel Motors
5. Rear Wheel Motors

Torque Hub®

FIG 28-2

Hydrostatic pump

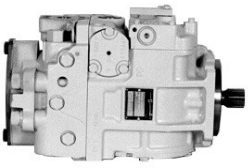


FIG 28-3

Front wheel motor

Rear wheel motor

FIG 28-4

Cummins diesel engine and hydrostatic pump– The DTS 8T comes standard with a 5.9 liter turbo-charged Cummins diesel engine (fig. 28-1). The engine has a Sauer-Danfoss 130cc hydrostatic pump (fig. 28-3) that is responsible for the distribution of hydraulic fluids throughout the hydrostatic drive system's components.

Wheel motors and hubs– The DTS 8's selectable 2-wheel or 4-wheel drive power train, consists of the Torque Hub® planetary gear reduction hubs (fig. 28-2) and the Sauer-Danfoss hydrostatic wheel motors (fig. 28-3).

IV. OPERATING INFORMATION

B. Hydrostatic Drive System

Operating the Engine

Pre-operational Checks

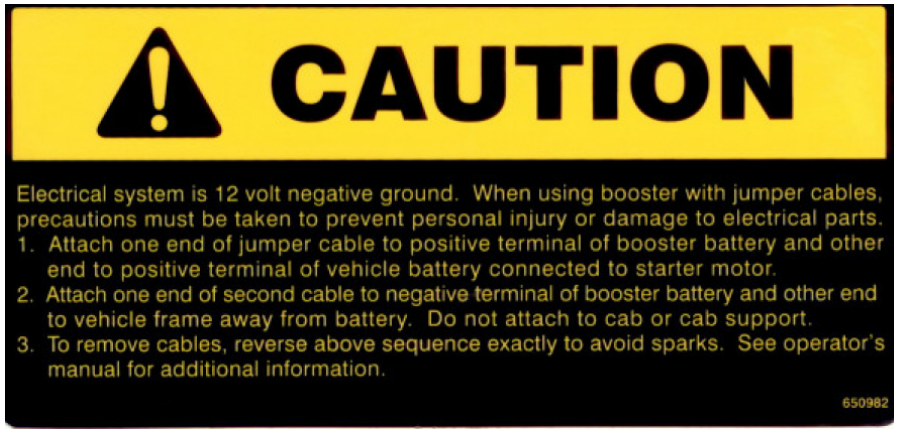
1. Check the engine oil level. Do not operate the engine when oil is below the low mark on dipstick.
2. Check the coolant level in the radiator and the coolant overflow reservoir.
3. Check the hydraulic oil reservoir level.
4. Check cooling air intake screens.
5. Check engine drive belt.
6. Drain fuel/water separator.
7. Check the Filter Minder®.
8. Check for any oil or fuel leaks and correct if needed.

IV. OPERATING INFORMATION

B. Hydrostatic Drive System

Starting the Engine

1. Position hydrostatic control lever to “N” (neutral) position.
2. Put the parking brake switch to the ON position.
3. When starting procedure is complete, return switch to OFF position.
4. Turn key to the “ON” position to check instruments.
5. Turn the ignition key switch to the start position to engage the starter. If the engine fails to start after 15 seconds, turn the key OFF, wait one minute and repeat the procedure. If the engine does not start after three attempts, check the fuel supply system. Absence of blue or white exhaust smoke during cranking indicates no fuel is being delivered.
6. When the engine starts, immediately reduce throttle lever setting to 1/3.
7. Inspect indicator lights and gauges for correct operation. If any lights or gauges do not operate, shut off engine and determine the cause.
8. Always allow at least a five minute warm-up period before operating the engine at high RPM. This means the engine must reach operating temperature and oil pressure must stabilize in the normal operating range before it is run faster than an idle (1000 RPM or less). Cold oil may not flow in quantities adequate to prevent pump cavitations.



NOTE:

Do not use starting fluid when starting an engine. The use of too much starting fluid will cause engine damage.

CAUTION

Start engine from operator’s seat only. When running engine in a building, be sure there is adequate ventilation.

CAUTION

When using an external electrical source to start the engine, turn the disconnect switch to the “OFF” position. Remove the key before attaching the jumper cables to prevent unintentional starter engagement.

IV. OPERATING INFORMATION

B. Hydrostatic Drive System

Operating the Hydrostatic Drive

Driving the machine-

1. Increase the engine RPM with the throttle lever (fig. 31-1, item 2) to the maximum recommended engine speed setting.
2. To move forward, slowly push the hydrostatic control lever (fig. 31-1, item 1) forward. The farther the control lever is moved, the faster the sprayer will travel. To stop, slowly pull the lever to the “N” (neutral) position.
3. To reverse the machine, slowly pull the hydrostatic control lever back. To stop, slowly push the lever to the “N” (neutral) position.

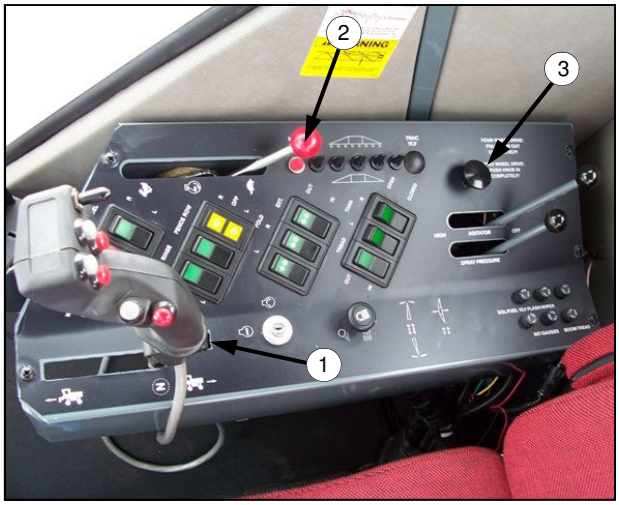


FIG 31-1

4. To engage the hydrostatic system in four wheel drive, pull up on the control knob (fig. 31-1, item 3). To return to two wheel drive, push the control knob down.

FIG 31-1

Four wheel drive– To operate in four wheel drive, as stated above, pull up on the control knob (fig. 31-2). You may want to operate in four wheel drive when the field and soil conditions are not ideal. While operating in four wheel drive, you will have a higher torque, but a lower speed.

It is not recommended that the machine be operated in four wheel drive for extended periods of time or while you are driving at higher speeds. Damage to the wheel motors may occur.

IV. OPERATING INFORMATION

B. Hydrostatic Drive System

Operating the Hydrostatic Drive

Parking brake– The brakes are controlled by charge pressure. When the engine is shut off or if the charge pressure falls below 150 PSI, the brakes will become activated. To set the brakes while the engine is running, activate the switch located below the spray system monitor (fig. 32-2)

Lift the RED switch cover as shown in figure 32-3. To engage the brakes, flip the switch up to the ON position as shown in figure 32-3, item C. To release the brakes, close the RED cover and this in turn will flip the brake switch to the OFF position. Always return the brake switch the OFF position before moving the sprayer.

FIG 32-2

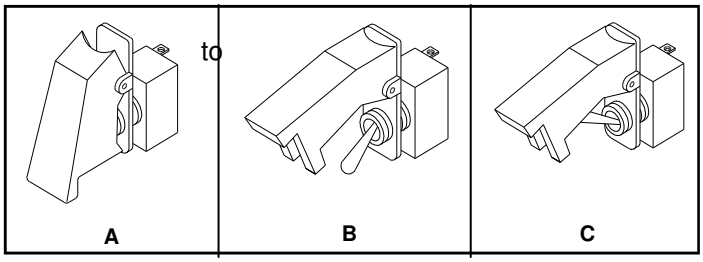


FIG 32-3

⚠ CAUTION

Activating the brake switch while the machine is moving is potentially hazardous to the operator and the sprayer.

IV. OPERATING INFORMATION

C. Hydraulic System

1. Auxiliary hydraulic pumps
2. Low level indicator light
3. Hydraulic tread adjust
4. Hydraulic boom controls
5. Mechanical agitation
6. Solution pump
7. Power steering
8. Hydraulic reservoir

FIG 33-1

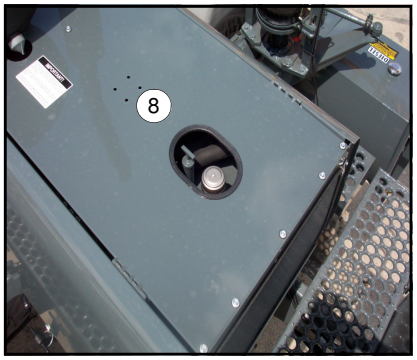


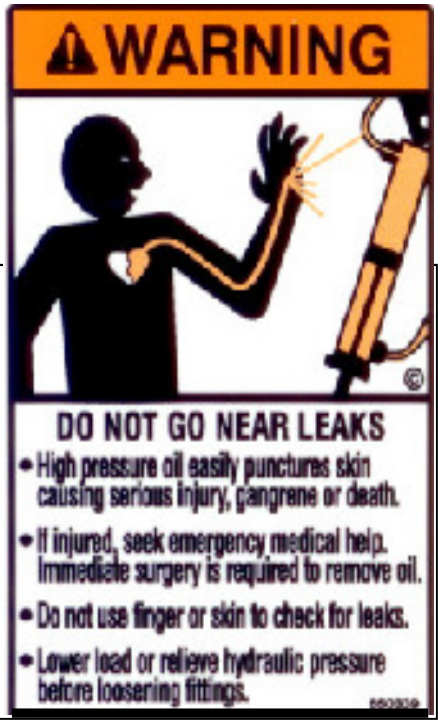
FIG 33-4

NOTE:

Immediately shut down engine if low level hydraulic oil light comes on in cab (fig. 33-1, item 2)).

Auxiliary hydraulic system– The auxiliary hydraulic system is an open type mounted directly behind the heavy duty variable displacement pump. This system consists of dual gear pumps that supply the required hydraulics to operate the full time power steering unit, boom control cylinders (lift and level), the solution pump, mechanical agitation, and if equipped, the hydraulic tread adjust.

After supplying each of these systems, the hydraulic oil is sent to the oil cooler in front of the engine coolant radiator. Here it is cooled and then sent back to the hydraulic reservoir. (fig. 33-4)



IV. OPERATING INFORMATION

C. Hydraulic System

Low level indicator light– The low level indicator light will illuminate if the hydraulic reservoir level is too low for safe operation. Immediately shut down the machine if the light comes on. Operating the machine without the proper amount of fluid may result in system damage and void the warranty

FIG 34-1

Mechanical agitation– The mechanical agitation motors (fig. 34-3) are controlled with the AGITATION lever located on the side console (fig. 34-2).

FIG 34-2

FIG 34-3

Solution pump– The solution pump is a centrifugal pump that is hydraulically driven with variable speed control (fig. 34-4). To engage the solution pump, push forward on the solution pump lever located on the side console (fig. 34-5).

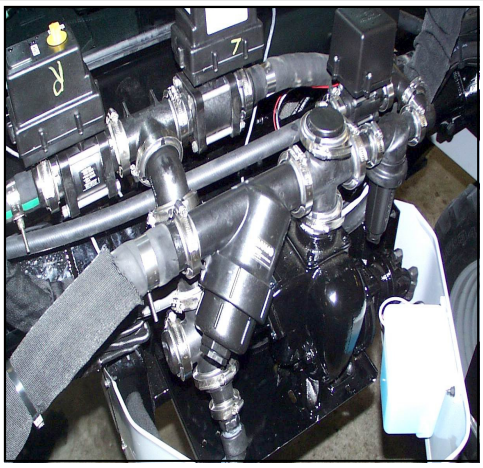


FIG 34-4

FIG 34-5

Power steering– The DTS 8 has all-time power steering. The power steering motor is located at the end of the steering column.

IV. OPERATING INFORMATION

C. Hydraulic System

Hydraulic tread adjust– The width of the tread can be adjusted from within the cab if you have the hydraulic tread adjust option. If you do not have the hydraulic option, you may still adjust the tread (see pages 40). To adjust the tread hydraulically, follow these steps:

1. Make sure the nylon material on the tread adjustment brackets on both the front and rear legs has an adequately lubricated surface to slide on during an adjustment (fig. 35-1)
2. Survey the surroundings and allow yourself enough room to adjust tread between one and two miles per hour in either forward or reverse.
3. Locate the hydraulic tread adjust switch on the console panel (fig. 35-2). To adjust the tread in or out, depress and hold the corresponding side of the switch. All four wheels will move at the same time.
4. When all of the tread cylinders have stroked completely, release the hydraulic tread adjust switch and resume operation.
5. To recalibrate toe-in: while slowly driving forward, turn the steering wheel all the way one way until the steering cylinder bottoms out; continue turning the wheel a little more to let fluid bypass the cylinder. Then turn the steering wheel all the way the other direction and repeat the process. (This process is referred to as “phasing”.) When the wheels are then straightened, steering cylinders should be centered and correct toe-in should be obtained.

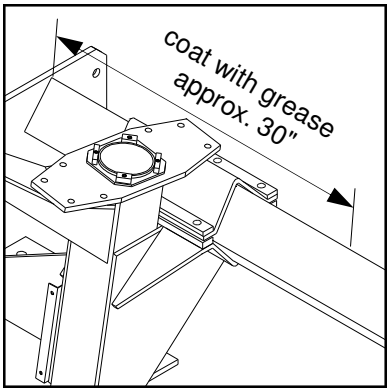


FIG 35-1

FIG 35-2

CAUTION

Never adjust the hydraulic tread on a public roadway. Make sure the sprayer is on level ground where there are no ditches or valleys to interfere when you perform the adjustment.

NOTE:

The hydraulic tread adjust bearing clearance has been factory set. If further adjustment is required for more or less clearance, additional shims will need to be added or removed (see page 96).

NOTE:

When operating the hydraulic tread adjust you will notice a squealing-type noise. This noise is the hydraulic fluid reaching the relief setting. Do not be alarmed of this noise during adjustment.

IV. OPERATING INFORMATION

C. Hydraulic System

Hydraulic Boom Controls

Spray booms– Hydraulically controlled spray booms are available in the 60 ft., length only on the DTS 8T.

The spray booms are controlled by an electro-hydraulic system. This system consists of operator manipulated switches located in the sprayer's cab and hydraulic cylinders attached to the booms. It provides control of lift (page 37), level (page 38), and horizontal fold (page (39).

All DTS 8 spray booms are equipped with a main boom two-way, spring-loaded breakaway.

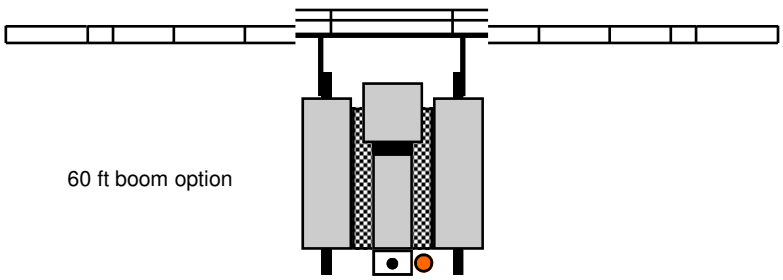


FIG 36

IV. OPERATING INFORMATION

C. Hydraulic System

Lift

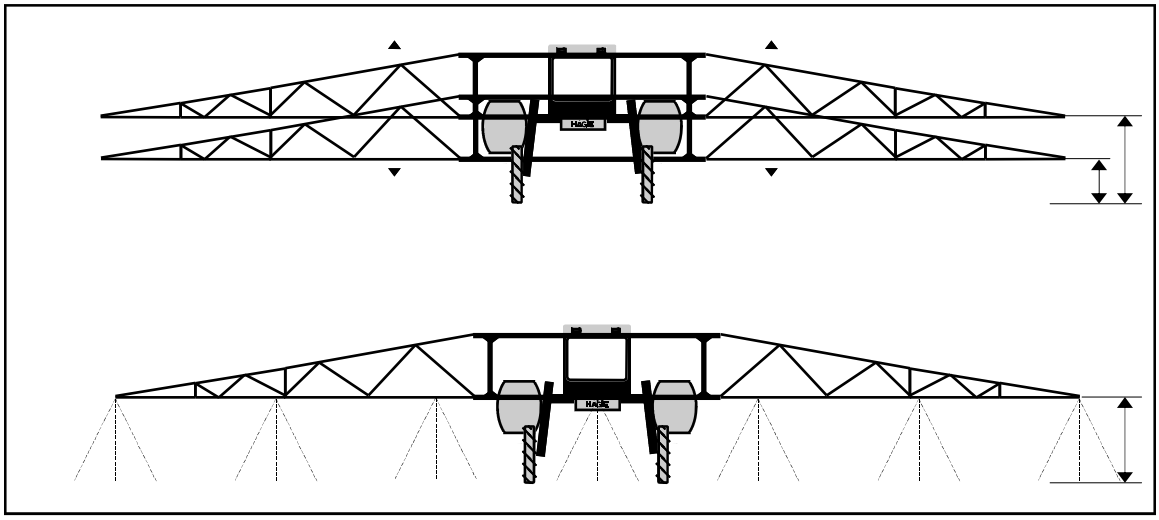


FIG 37-1

NOTE:
See your spray tip manufacturer's guide for information regarding spray tip height.

FIG 37-2

FIG 37-3

Lift– To raise and lower the transom/ boom assembly, depress the GRAY (UP) or the RED (DOWN) buttons on the hydrostatic drive handle (fig. 37-2, items 1 & 2). While depressed, either button activates the transom lift cylinders (fig. 37-3).

See your spray tip manufacturer's guide for information regarding spray tip height (fig. 37-1).

IV. OPERATING INFORMATION

C. Hydraulic System

Level

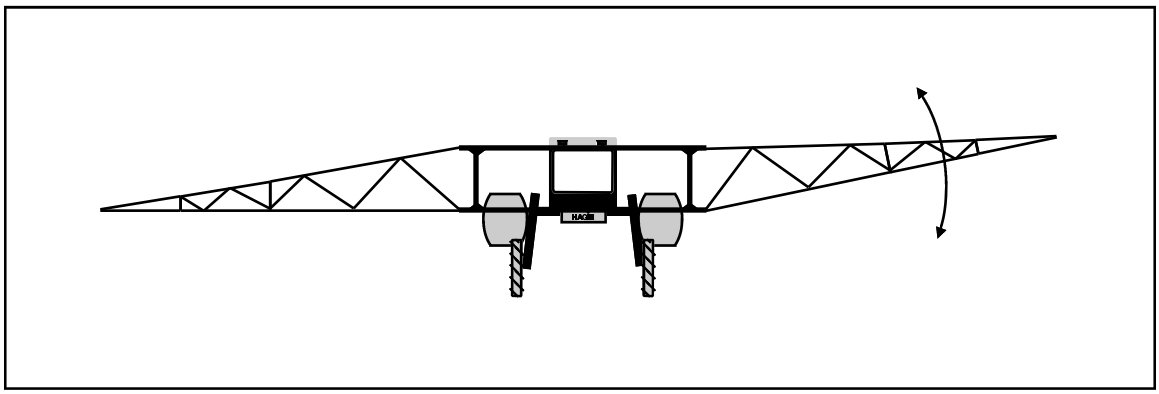


FIG 38-1

FIG 38-2

FIG 38-2

Level– To increase or decrease the angle of each individual boom level, depress the left or right GRAY (UP) button or the left or right RED (DOWN) button on the hydrostatic drive handle (fig. 38-2, items 1 thru 4). While depressed, these buttons activate the level cylinders connecting either boom to the transom (fig. 38-3).

This adjustment also aids in placing the booms correctly in the cradles for transporting and storing.

IV. OPERATING INFORMATION

C. Hydraulic System

Horizontal Fold

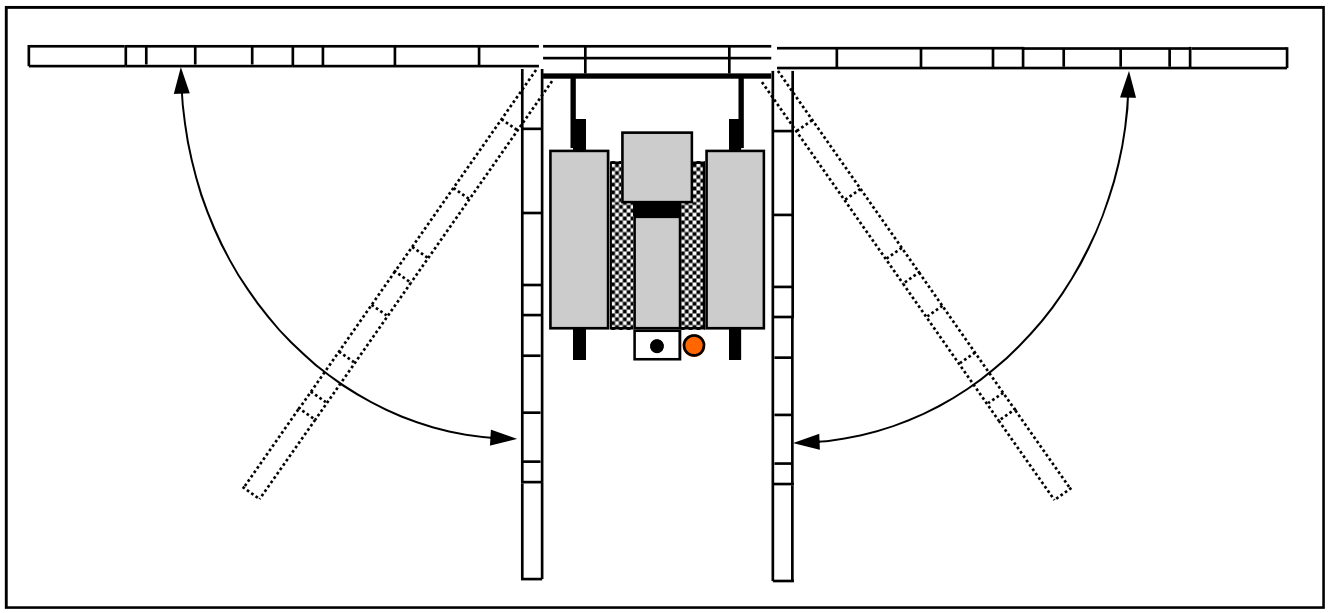


FIG 39-1

Horizontal boom fold– To fold either boom horizontally in toward the machine or out away from the machine, depress the IN or OUT of either or both the BOOM FOLD switches (fig. 39-2, items 1&2). While depressed, these switches activate cylinders connecting either boom breakaway mount to the transom (fig. 39-3).

Fold or unfold the booms in an open area only. Make sure no one is standing in the path of the boom fold's travel path.

FIG 39-2

FIG 39-3

IV. OPERATING INFORMATION

D. Non- Hydraulic Tread Adjust

Non-hydraulic tread adjust– To adjust the tread setting of a non-hydraulic tread adjust machine you must follow these steps:

1. To adjust the tread width in or out, park the machine on level ground and shut off the engine.
2. Loosen the leg mounting bolts on both the front and rear legs on one side of the machine only (fig. 40-1).
3. Loosen rear lock nut on the leg brace (fig. 40-2). This will allow one leg to move further than the other without binding while adjusting the tread setting.
4. Lubricate the slide path the leg mount will travel along the mainframe. (fig. 40-3)
5. Place a suitable block under the airbag mounting plate before raising the sprayer (fig. 40-4). This will prevent the suspension from telescoping.
6. Raise the sprayer until the tires on the side being adjusted are just touching the ground.
7. To adjust the tread out, place a suitable prying tool under the center of the tire and pry out at the same time that you push out at the top of the leg (fig. 40-5). Carefully lower the sprayer to the ground which, in turn will allow the leg to slide outward. Repeat the procedure until the desired tread setting is obtained.
8. To adjust the tread in, raise the sprayer until the tires are just off the ground. Carefully lower the sprayer which, in turn will allow the top of the leg to slide in on the mainframe.
9. Retighten the leg brace lock mounting bolts following the torque specs on page ????.
10. Retighten the leg brace lock nut.

FIG 40-5

11. Repeat the above procedures to adjust and set the opposite side of legs. When finished, all four legs should be the same distance from the mainframe.
12. Re-calibrate toe-in by phasing the cylinders according to the instructions in the Service section.

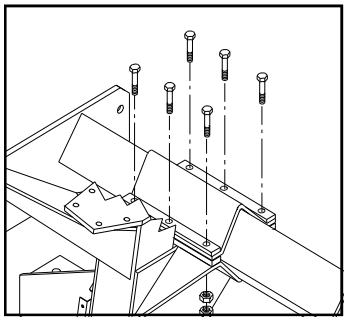


FIG 40-1

FIG 40-2

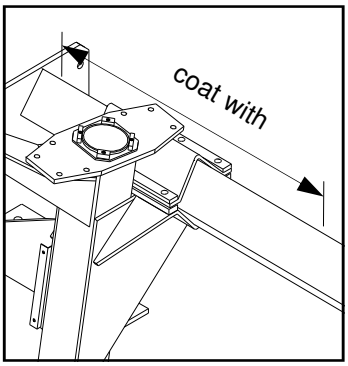


FIG 40-3

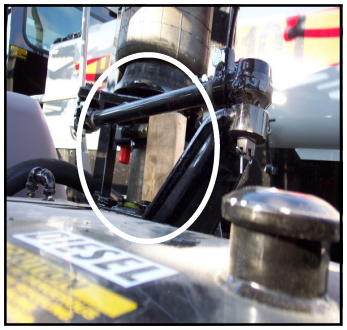


FIG 40-4

⚠ CAUTION

Empty solution tanks before raising the sprayer.

IV. OPERATING INFORMATION

F. Spray System

Introduction

The spray system is a constantly-monitored and continuously-adjusted computer controlled system. The cab-mounted digital monitor receives information from various inputs to help determine GPM (gallons per minute) and GPA (gallons per acre).

In the following section, the spray system will be explained. Please read the entire section before attempting to spray. This section is not designed to take the place of the information in the Raven manual, the numbers used may not reflect your specific situation. Read all manuals before using this equipment.

Instructions

OPERATION

1. Calibrate spraying system monitor.
2. Check contents and quantity in spray tank.
3. Completely open the tank valves.

NOTE:

Never attempt to operate the spray system without solution in the spray tank. Operating the spray system with no solution in the tank will cause severe damage and void the warranty.

4. Start engine and maintain a relatively low engine RPM setting (1,000 RPM). Increase engine RPM slowly until full recommended operating RPM is reached.
5. If desired, activate the agitation system.
6. Turn on the solution pump switch.
7. Turn on main spray power.
8. Place individual boom solution valve switches to the “ON” position.
9. Slowly move the hydrostatic control lever forward to obtain the desired ground speed.
10. Frequently observe the pressure gauge. When it drops to zero, or spray pattern deteriorates, shut off main spray power, solution pump, and agitation system until refilling solution.

IV. OPERATING INFORMATION

F. Spray System

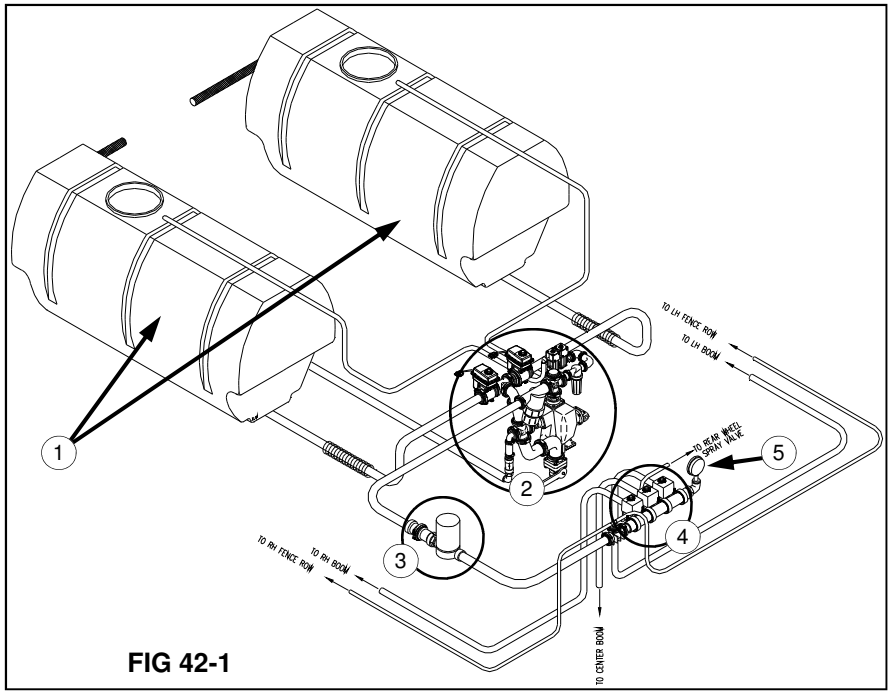


FIG 42-1

FIG 42-2

FIG 42-3

FIG 42-4

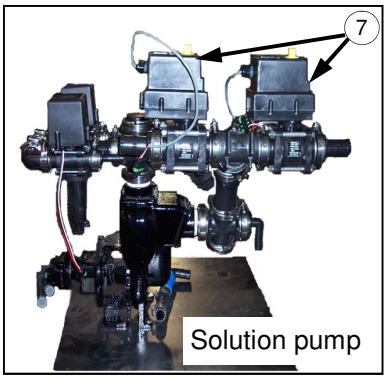


FIG 42-5

1. Dual tanks
2. Solution pump
3. Flow meter
4. Electric solution valves
5. Pressure gauge
6. Manual tank shut-off
7. Electric tank shut-off
8. Tank valve control switches
9. Individual solution valve switches
10. Agitation control lever
11. Solution control lever
12. Fence row applicator
13. Main solution switch

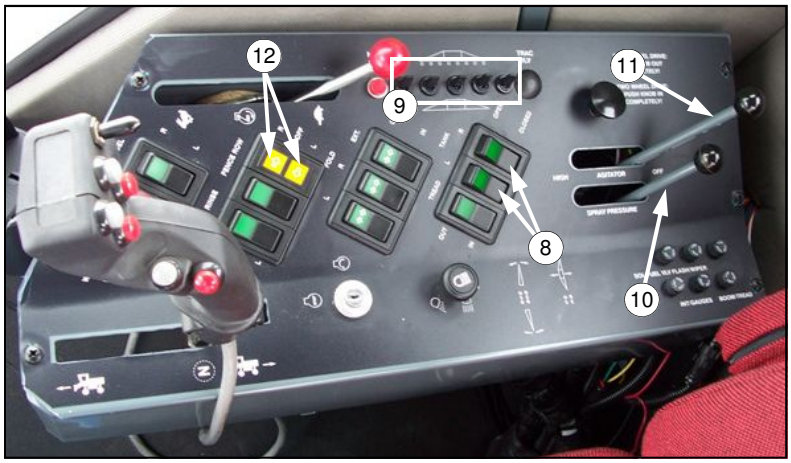


FIG 42-6

IV. OPERATING INFORMATION

F. Spray System

Dual solution tanks– The DTS 8 sprayer has dual tanks saddled on both sides of the machine (fig. 43-1). The tanks are 400 gallons each and each has it's own sight gauge.

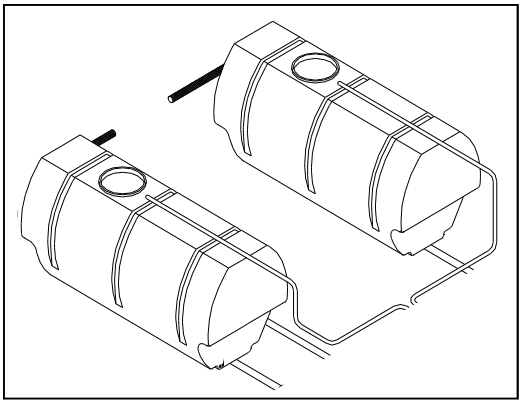


FIG 43-1

FIG 43-2

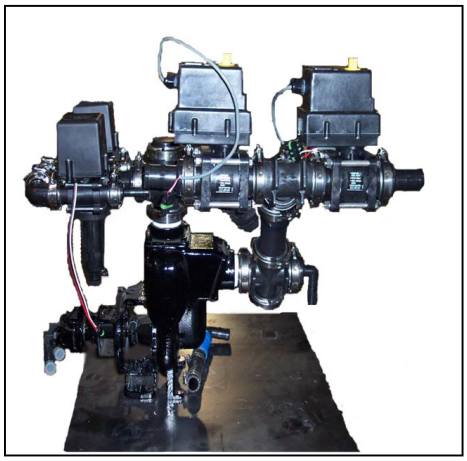


FIG 43-3

Solution pump– The solution pump is a hydraulically driven centrifugal pump (fig. 43-3) with variable speed control. To activate the solution pump, push the SOLUTION CONTROL lever forward (fig. 43-4). Do not engage the solution pump at engine RPM's over 1000. Increase the engine RPM slowly and maintain full recommended RPM for field operation.

DO NOT allow the pump to continue running when the boom valve switches are turned off. Failure to do so will result in overheating and cause severe pump damage and void the warranty.

FIG 43-4

IV. OPERATING INFORMATION

F. Spray System

Flow meter– The flow meter (fig. 44-1, item 1) is located in the main solution line. It measures the amount of solution that goes through the solution lines to the booms and sends the information back to the spray monitor. Note the direction of the flow meter if removed.

The control valve (fig. 44-1, item 2), attached to the flow meter, opens or closes depending on the amount of flow being measured and the parameters set by the operator during calibration.

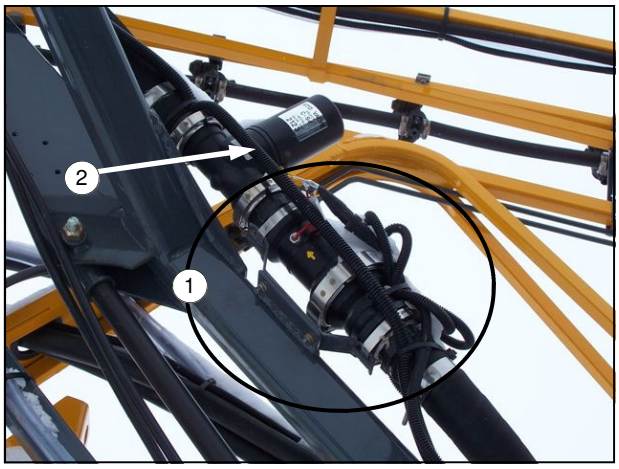
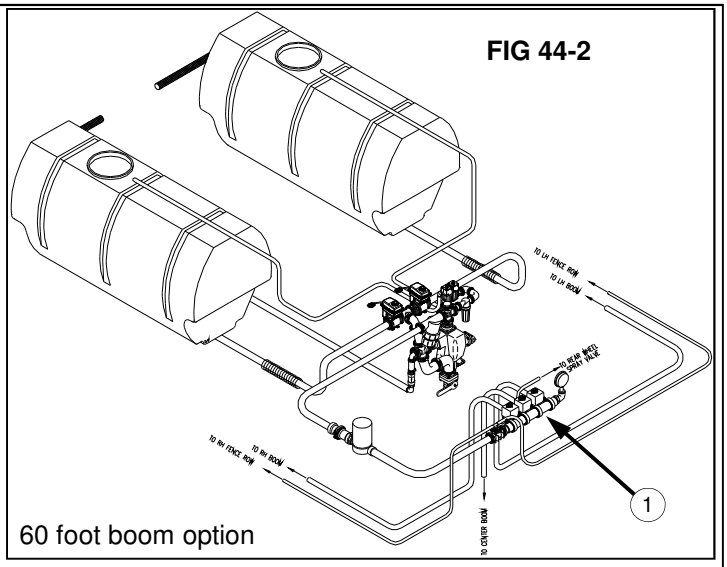


FIG 44-1

Electric solution valves– The spray booms are divided into sections that are independently supplied with solution and can therefore be independently shut off or tuned on. Sixty foot booms are divided into three sections and the valves are mounted on the transom (fig. 44-2, item 1).

FIG 44-2



60 foot boom option

IV. OPERATING INFORMATION

F. Spray System

Boom valve switches– The individual solution valves are turned on and off with switches located on the side console (fig. 45-1). The switches correspond with the valves going from left to right.

On the sixty foot boom, the first switch is the left solution valve and so on. The last two switches are not operational.

FIG 45-1

Remember that the directions (left and right) refer to the position of the operator while seated in the operator seat facing forward!

Pressure gauge– The pressure gauge (fig. 45-2) gives the operator a constant visual display of the amount of solution being applied (measured in PSI). The pressure (as determined by the monitor controlled butterfly valve) will vary according to ground speed. If you are applying solution manually, the solution pressure gauge visually informs the operator of needed manual adjustments.

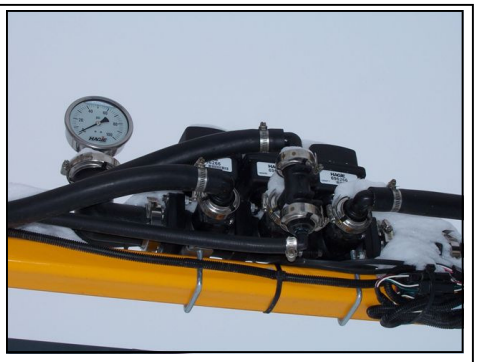


FIG 45-2

Main solution switch– The main solution switch is a floor-mounted "dimmer-style" switch (fig. 45-3) . It controls the power supply to the console's boom solution valve switches. The main floor switch must be ON to supply the console switches with voltage. This way you can turn all of the boom solution valves ON and OFF al lat once in a hands-free execution such as turning the main solution switch OFF as you arrive at the end rows of a field and turn it back ON as you enter the field again.

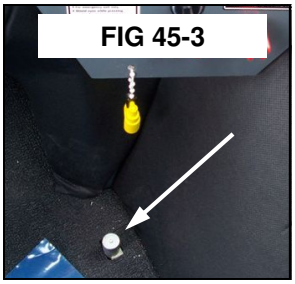


FIG 45-3

When the main solution switch is ON a GREEN indicator light mounted at the bottom of the instrument panel will light up (fig 4.5-4). When the light is not lit, the main solution switch is OFF.

FIG 45-4

IV. OPERATING INFORMATION

F. Spray System

Tank shut-off valves– To shut off either or both tank sumps, manually close either or both of the 1 1/2" ball valve(s) located under the solution tank (fig. 46-1). Your sprayer is equipped also with 1 1/2" electric tank shut-off valves.

FIG 46-1

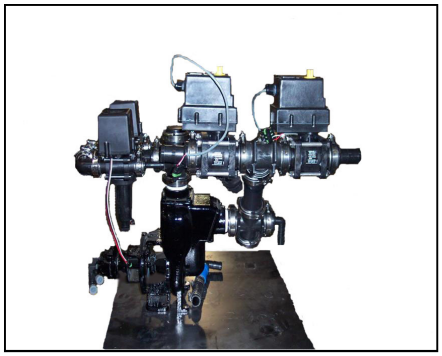


FIG 46-2

To operate the electric tank shut-off valves (46-2), locate the solution tank switches on the console. To open or close the left solution tank, depress the OPEN or CLOSED side of the left switch (fig. 46-3, item 1). To open or close the right solution tank, depress the OPEN or CLOSE side of the right switch (fig. 46-3, item 2).

FIG 46-3

Utilize the tank shut-off valves when: 1) you wish to draw solution from only one tank or the other, 2) such as when you are on unlevel ground.

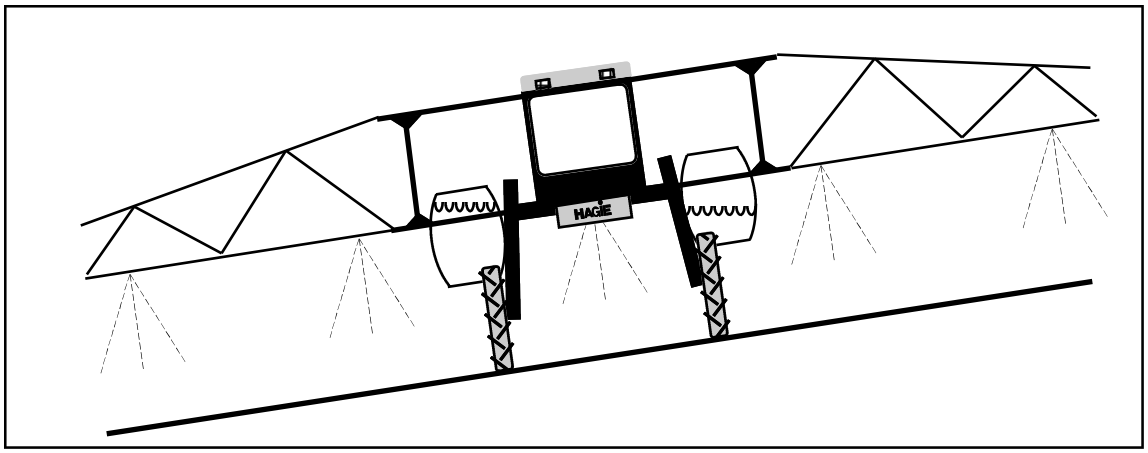


FIG 46-4

IV. OPERATING INFORMATION

F. Spray System

Agitation control lever– The Hagie DTS 8 comes standard with a hydraulically driven mechanical agitation system to maintain suspension of solution in the sprayer's tanks.

To activate the system, push the TANK AGITATION lever (fig. 47-1) forward, opening the hydraulic variable flow control valve (fig. 47-2). This will deliver hydraulic fluid to agitator motors on both solution tanks (fig. 47-3) turning the agitator shaft assemblies clockwise. The further you push the lever ahead, the faster the agitation assembly will rotate. To turn the agitation system off, return the lever back to its original position.

NOTE:

Operation of the agitation system with no solution in the spray tanks will void the warranty on the agitation system.

FIG 47-1

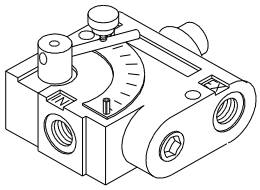


FIG 47-2

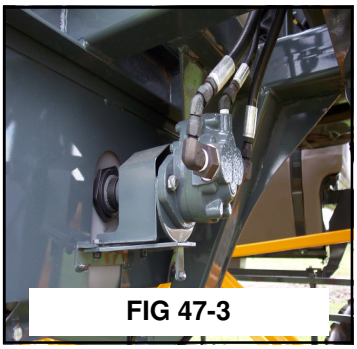


FIG 47-3

The gland packing (fig. 47-4, item 1) may require adjustment during start-up. If adjustment is required, shut off the agitation system and adjust the gland nut (fig. 7.4F-4, item 2).

When replacing the packing, be sure to wrap the packing clockwise on the agitator shaft (reference to direction when seated in the operator's seat facing forward).

The agitator motors for the polyethylene tanks are held in place with a motor mount yoke (fig. 7.4F, item 3). The yoke tap must be extended through the motor mounting plate (fig. 47-4, item 4). This allows the motor to float with the agitator shaft.

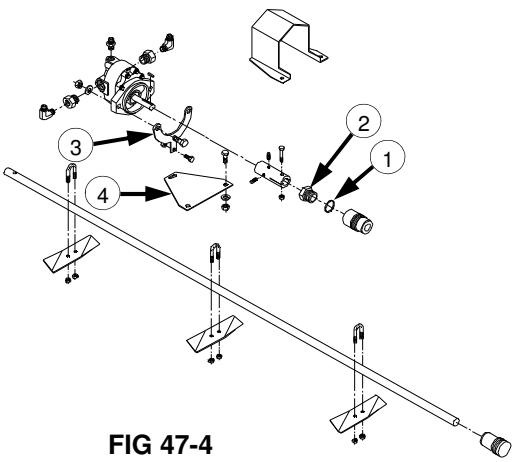


FIG 47-4

CAUTION

DO NOT adjust the gland nut with the agitation system running.

NOTE:

Damage will occur to the agitator system if the motor mounting yoke is not properly installed in the motor mounting plate.

IV. OPERATING INFORMATION

F. Spray System

Quick fill– To fill the solution tanks, make sure both the tank shutoff valve under the tank (fig. 48-1) and the electric valve (fig. 5.8F-4) for the tank you want to fill are open (you may fill both tanks at the same time). Open the valve on the quick fill attachment (fig. 48-3).

Connect your solution supply and fill to the desired level (fig. 48-4). When finished, close the quick fill valve.

FIG 48-1

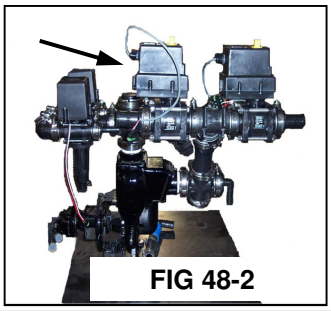


FIG 48-2

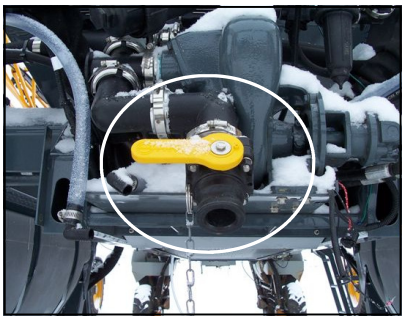


FIG 48-3

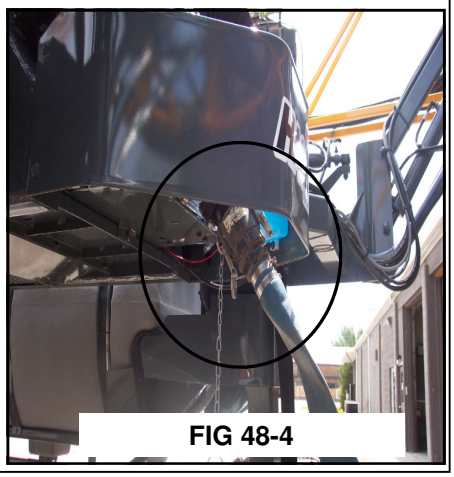


FIG 48-4

V. TRANSPORTING

FIG 49-1

Cradling Booms

The booms should always be cradled when traveling, transporting, or parking for an extended period of time. The booms must be folded when cradled. To cradle the booms, fold the boom extensions in, raise the transom, and fold the booms in toward the machine. The closer the booms get to the cradle, the more careful you need to be while making adjustments to avoid damage. Raise each individual boom level until it clears the outer cradle stop (fig. 49-1). Fold the boom in toward the cradle back-stop. When it touches the back-stop, lower the boom level until the full weight of the boom rests in the cradle (fig. 49-2).

FIG 49-2

NOTE:

Booms must be in folded position when cradled. Failure to do so may cause boom damage.

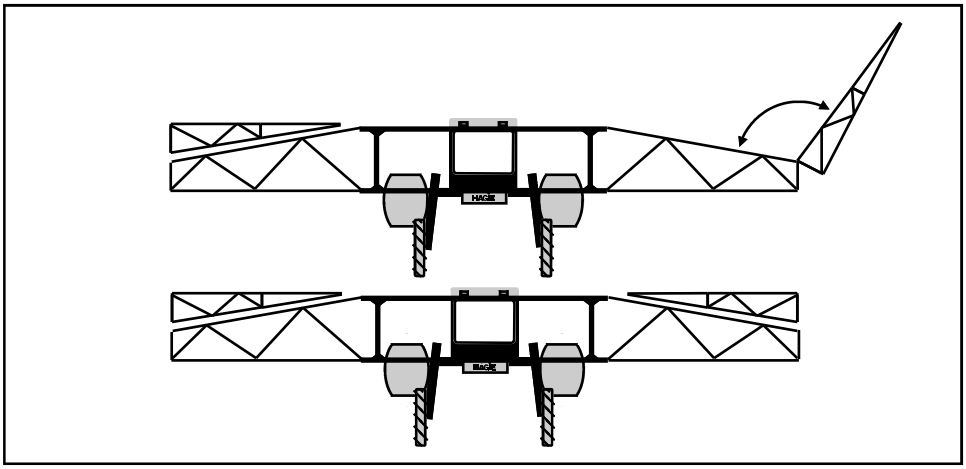


FIG 49-3

V. TRANSPORTING

A. DRIVING

When driving the sprayer on a public road or highway, drive carefully and follow these steps.

1. Always have the booms in the folded position and cradled when driving or transporting. Adjusting level cylinders, so the full weight of the boom rests in the cradle.
2. Flashing hazard/warning lights have been placed on the sprayer to warn other drivers.
3. A SMV (Slow Moving Vehicle) emblem has been mounted on the sprayer to warn other drivers that one is moving slowly. Keep it properly displayed, unless prohibited by law.
4. Know and obey all state laws for driving farm equipment on a public road or highway.
5. Adjust the sprayer's speed to suit the conditions.
6. Slow down and use turn signals before turning.
7. Pull over to side of road before stopping.
8. Keep a proper lookout, and maintain control of the sprayer.
9. Do not drive under trees, bridges, wires, or other obstructions unless there is clearance.
10. Use extra care before entering or leaving a public road or highway
11. Do not drive or highway machine on road when loaded.

B. TRAILERING:

NOTE:

Extra care should be taken when loading the sprayer onto any trailer. Consider whether it is best to back the sprayer on or drive the sprayer forward.

1. Loading:

⚠ WARNING

Never load or unload a sprayer with solution in the tanks.

NOTE:

Be sure to read and understand the trailer's owner and operator manual. Hitch the trailer to the pulling vehicle as shown in the trailer's owner and operator manual.

V. TRANSPORTING

When moving the sprayer onto a trailer, follow these steps completely:

a. Pull the trailer to flat ground. Apply the pulling vehicle's parking brake and turn off the engine. Use tire chocks to keep the trailer from moving.

b. Fold in the sprayer's booms and lower to the boom cradle.

c. Lower the trailer ramps and set the ramp spacing for the sprayer's tread setting.

d. Get someone to help guide you onto the trailer. Keep everyone a safe distance from the sprayer.

⚠WARNING

Stopping the sprayer on the trailer loading ramps may result in sprayer tip-over.

e. Allow enough room between the sprayer and the pulling vehicle for turning.

f. Secure the sprayer to the trailer with chains. See the trailer's owner and operator manual for instructions.

g. Cover or remove the SMV (Slow Moving Vehicle) emblem when traveling over 25 miles per hour.

NOTE:

The loaded height and width of the trailer must conform to the law of the state in which it is being used.

2. Unloading:

When moving the sprayer off the trailer, follow these steps completely:

a. Pull the trailer to flat ground. Apply the pulling vehicle's parking brake and turn off the engine. Use tire chocks to keep the trailer from moving.

b. Lower the trailer ramps and set ramp spacing for the sprayer's tread setting.

c. Release securing restraints carefully.

d. Get someone to help guide off the trailer. Keep everyone a safe distance from the sprayer.

e. Uncover or replace the SMV (Slow Moving Vehicle) emblem.

NOTE:

It is not recommended that the Model DTS 8T be towed.

VI. SERVICE AND MAINTENANCE

PAGE NO	Service Point	CLEAN	CHANGE	CHECK	GREASE	DRAIN
	ENGINE OIL		A	DAILY		
	RADIATOR COOLANT LEVEL			DAILY		
	COOLANT OVERFLOW RESERVOIR LEVEL			DAILY		
	COOLANT CONCENTRATION		AS REQ	500 HRS*		
	RADIATOR GRILLE SCREENS	AS REQ				
	ENGINE DRIVE BELT		AS REQ	DAILY		
	A/C COMPRESSOR BELT		AS REQ	250 HRS		
	A/C COMPRESSOR		B			
	A/C DRYER		AS REQ			
	PRIMARY FUEL FILTER (WATER SEPARATOR)		500 HRS*			DAILY
	SECONDARY FUEL FILTER		500 HRS*			
	IN-LINE FUEL PRE-FILTER		AS REQ			
	AIR INTAKE FILTER	NOT REC	C			
	FILTER MINDER®		D	DAILY		
	HYDRAULIC RESERVOIR OIL LEVEL		500HRS**	DAILY		
	HYDRAULIC SUCTION FILTER		E*			
	HYDROSTATIC CHARGE PRESSURE FILTER		E*			
	NEUTRAL SETTING OF HYDROSTATIC PUMP		AS REQ	DAILY		
	HIGH-PRESSURE IN-LINE FILTER (BOOM CTRL VALVES)	AS REQ				
	SOLUTION LINE STRAINER	AS REQ		DAILY		
	TORQUE HUB® OIL LEVEL		F	DAILY		
	TORQUE HUB® ZERK (4 PLACES - 1 EACH)				50 HRS	
	WET TANK					DAILY
	LEG BEARING ZERKS (4 PLACES - 2 EACH FRT LEG)				DAILY	
	TRANSOM, LIFT ARM, AND LIFT CYL ZERKS (16 PLACES)				AS REQ	
	BOOM/BREAKAWAY ZERKS (60 12-6EA OR 80/90 14-7EA)				AS REQ	
	TREAD ADJUST SLIDE-PATH ON MAINFRAME				AS REQ	
	LEG MOUNT BOLT TORQUE			DAILY		
	BATTERY	100 HRS	AS REQ	DAILY		
	LUG NUT TORQUE			G		
	TIRE PRESSURE			50 HRS		
	FRESH AIR CAB FILTER	AS REQ*	AS REQ			
	CHARCOAL CAB FILTER		AS REQ			
	RECIRCULATION FILTER	AS REQ				
	FUSES/CIRCUIT BREAKERS		AS REQ			
	SPRAY NOZZLE DIAPHRAGMS & SPRAY TIPS			500HRS**		

*OR YEARLY, WHICHEVER COMES FIRST; OR AS REQUIRED
**OR AT THE BEGINNING OF THE SEASON, WHICHEVER COMES FIRST; OR AS REQUIRED
NOTE A: SEE ENGINE MANUFACTURER'S HAND BOOK
NOTE B: CHARGE AS REQ; USE PROPER EQUIPMENT
NOTE C: FOLLOW FILTER MINDER READINGS
NOTE D: RESET EACH TIME YOU SERVICE AIR FILTER
NOTE E: 1ST 50 HRS, THEN 250 HRS THEREAFTER
NOTE F: 1ST 50 HRS, THEN 100 hrs.
NOTE G: IMMEDIATELY, THEN 50 HRS THEREAFTER
NOTE H: ADJUST FLUID LEVEL ACCORDINGLY

VI. SERVICE AND MAINTENANCE

SERVICE INTERVALS

Initial checks after receiving machine

IMMEDIATELY 

then 

1) Check lug nut torque, then every 50 hours

FIRST 50 HOURS 

then 

or 

1) Change Torque Hub® oil, 50 hrs. then 250 hrs.
2) Change hydrostatic charge pressure filter, then every 250 hours
3) Change hydraulic suction filter, then every 250 hours

Daily 

1) Check engine oil
2) Drain primary fuel filter (water separator)
3) Check radiator coolant level
4) Check radiator coolant overflow reservoir level
5) Check engine drive belt
6) Check Filter Minder®
7) Check hydraulic oil reservoir level
8) Check for neutral setting of hydrostatic pump
9) Check solution line strainer
10) Drain wet tank
11) Grease all leg bearings daily
12) Check leg mount bolts
13) Check battery

Every Other Day 

1) Grease transom, lift arm, and lift cylinder zerks

VI. SERVICE AND MAINTENANCE

As Required 

1) Change coolant concentration
2) Clean radiator grille screens
3) Change engine drive belt
4) Change A/C compressor belt
5) Change A/C dryer
6) Charge A/C compressor
7) Change primary fuel filter (water separator)
8) Change secondary fuel filter
9) Change in-line fuel pre-filter
10) Change hydraulic reservoir oil
11) Adjust neutral setting of hydrostatic pump
12) Clean high-pressure in-line filter on boom control stack valve
13) Clean solution line strainer
14) Grease all boom folding and breakaway zerks
15) Grease tread adjust slide path on mainframe
16) Change battery
17) Clean fresh air intake cab filter
18) Change fresh air intake cab filter
19) Change charcoal cab filter
20) Clean recirculating cab filter
21) Replace fuses and circuit breakers
22) Check and replace spray nozzle diaphragms and spray tips

VI. SERVICE AND MAINTENANCE

Every 25 HOURS 

1) Grease transom, lift arm, and lift cylinder zerks

Every 50 HOURS 

1) Check tire pressure
2) Check lug nut torque
3) Grease Torque Hub® seal boot

Every 100 HOURS 

1) Check Torque Hub® oil level
2) Clean battery

Every 250 HOURS 

1) Check A/C compressor belt
2) Change hydrostatic charge pressure filter
3) Change hydraulic suction filter

Every 500 HOURS 

or 

1) Check coolant concentration
2) Change primary fuel filter (water separator)
3) Change secondary fuel filter
4) Change hydraulic reservoir oil
5) Change Torque Hub® oil
6) Check spray nozzle diaphragms and spray tips

VI. SERVICE AND MAINTENANCE

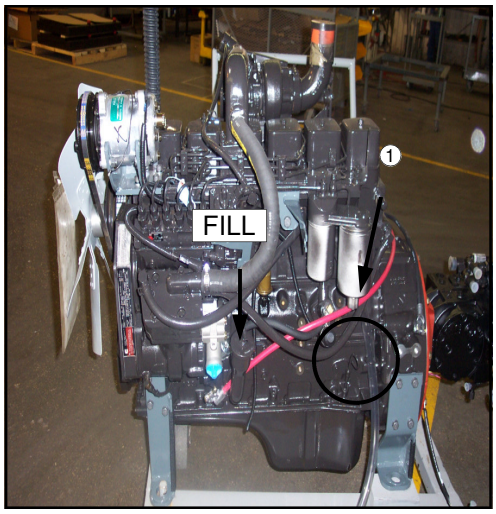


FIG 56-1

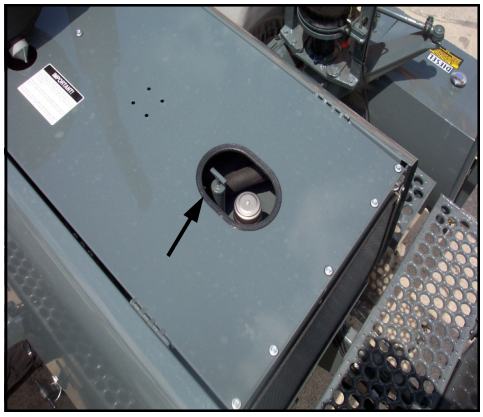


FIG 56-2

FLUIDS

Engine oil

OIL LEVEL - The engine oil level dipstick is located on the left-hand side of the engine (fig. 56-1, item 1). Never operate the engine with the oil level below the “L” (low) mark or above the “H” (high) mark. Wait at least five minutes after shutting off the engine to check the oil level; this allows time for the oil to drain to the oil pan. Check the engine oil level daily.

CAPACITY - Low to high mark capacity is 2.0 quarts. Engine oil pan capacity is 15 quarts. Refer to Engine Operation and Maintenance manual for maintenance schedule.

NOTE:
The engine must be level when checking the oil level to make sure the measurement is correct.

Hydraulic Oil Reservoir

OIL LEVEL - Check the hydraulic oil level in the reservoir daily (fig. 56-2). Add just enough fluid so the level reaches the bottom tip of the dipstick. Always check the hydraulic oil level when it is cool. Hydraulic oil will expand when heated in a system and measuring the reservoir by these levels allows for expansion.

TYPE - Premium hydraulic fluids containing high quality rust/ oxidation/and foam inhibitors are required. Hydraulic oil must conform to one of the following types: anti-wear hydraulic oil, type F automatic transmission fluid, or agricultural hydraulic transmission fluid. Replace the oil in the hydraulic reservoir at 500 hours or at the beginning of each spraying season, whichever comes first.

NOTE:
Cleanliness is standard: Keep area clean when changing filters and oils.

VI. SERVICE AND MAINTENANCE

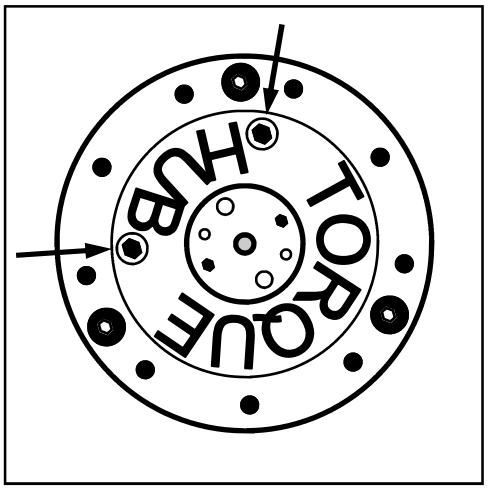


FIG 57-1

Torque Hub® Oil

OIL LEVEL - Each Torque Hub® should maintain an oil level of half full at all times. Less than that would limit lubrication, and over half full could cause overheating and damage. To check oil level, position Torque Hub® so one of the face plugs is positioned at 12 O'clock (fig. 57-1). The other plug will be either at 9 O'clock or 3 O'clock. Remove the lower plug: if no oil comes out, oil level is too low. Check Torque Hub® oil level daily.

If 85-140 oil is needed, remove the top plug and fill just until it starts to come out the lower hole. With the oil at a satisfactory level, re-install plugs.

CHANGE - The Torque Hub® oil should be changed after the first 50 hours of operation, preferably in a loaded condition. Subsequently, it should be changed every 100 hours after that, or once a year whichever comes first.

To change the Torque Hub® oil, position one of the plugs at 6 O'clock, and the other at either 3 O'clock or 9 O'clock. Remove the bottom plug to drain the oil. Once all of the oil is drained, re-install the bottom plug and remove the top plug. Refill Torque Hub® with 85-140 oil as described above.

GENERAL MAINTENANCE - If your sprayer is going to sit for an extended period of time, occasionally rotate the hubs by driving the sprayer forward or backward a few feet to adequately coat all internal hub parts. This will prevent rusting if moisture inadvertently entered the hub during an oil change. Failure to rotate hub and disperse oil may cause rusting and internal damage.

VI. SERVICE AND MAINTENANCE

FIG 58-1

Cooling System

COOLANT TYPE - Your cooling system should always be sufficiently charged with an adequate mixture of antifreeze and water, regardless of the climate, in order to maintain a broad operating temperature range. Your cooling system has been factory-charged with an ethylene glycol-based antifreeze.

NOTE:

Ethylene glycol-based antifreeze and propylene glycol-based antifreeze should never be mixed.

CHECKING CONCENTRATION - The radiator cap is located immediately behind the rear of the cab (fig. 58-1). Never remove a cap from a hot engine. Always allow the engine to cool before servicing cooling system.

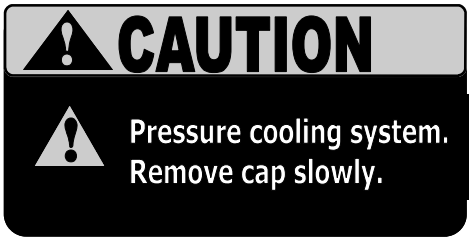


FIG 58-2

A 50/50 antifreeze/water mixture is a conservative mixture which allows good protection against both overheating and freezing. If a stronger antifreeze mixture is required, be sure not to exceed the engine manufacturer's guidelines for antifreeze mixing. The table in figure 8.6 gives a few examples of ethylene glycol antifreeze/water mixture protection values. Consult the engine manufacturer's handbook for further information.

Ethylene Glycol		
40%	-23ºC	-10ºF
50%	-37ºC	-34ºF
60%	-54ºC	-65ºF

FIG 58-3

Concentration should be checked every 500 hours or at the beginning of each winter, whichever comes first. It should be checked using a refractometer; "floating ball"-type density testers or hydrometers are not accurate enough for use with heavy duty diesel cooling systems.

VI. SERVICE AND MAINTENANCE

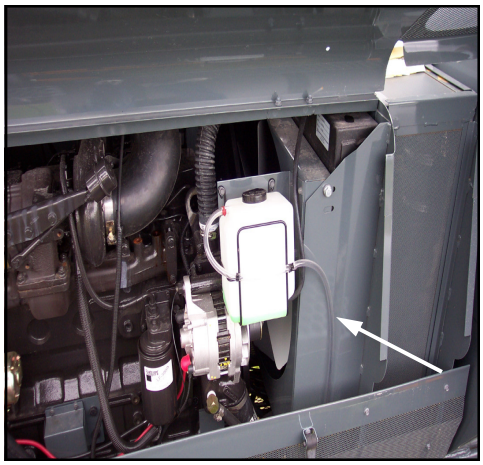


FIG 59-1

COOLANT RESERVOIR - The coolant reservoir is located under the right-hand hood behind the radiator (fig. 59-1). Check its level everyday while the engine is cold. Maintain the coolant reservoir level within the normal cold range marks.

CHANGING COOLANT - Your coolant should periodically be changed to eliminate the buildup of harmful chemicals. Drain and replace the coolant every other spraying season or every 1,000 hours of operation, whichever comes first. Refill only with ethylene glycol coolant. Antifreeze should be mixed only with soft water because hard water contains minerals which break down the anti-corrosion properties of antifreeze.

FIG 59-2

Fuel

TYPE - No. 2 diesel fuel is recommended for the best economy and performance under most operating conditions. In operating conditions under 32° F, use a blend of No. 1 and No. 2 diesel fuel. The addition of No. 1 diesel fuel may cause loss of power and/or fuel economy.

STORING - See section on sprayer storage.

REFILLING - Always turn off the engine and allow it to cool before refueling. Never smoke while fueling. Keep a fire extinguisher within reach while refueling.

Each tank holds 40 gallons - do not fill them completely: fuel can expand and run over. Wipe up all spilled fuel and clean with detergent and water before starting the engine.

PRIMING - If the fuel system should happen to run dry and lose its prime, there is a priming bulb located on the left side of the engine for use in filling the engine fuel filters (fig. 59-3).

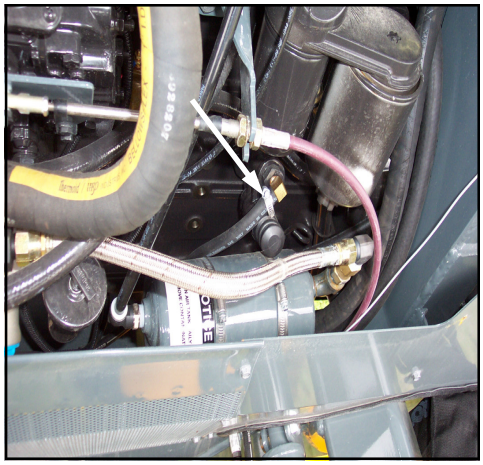


FIG 59-3

VI. SERVICE AND MAINTENANCE

FIG 60-1

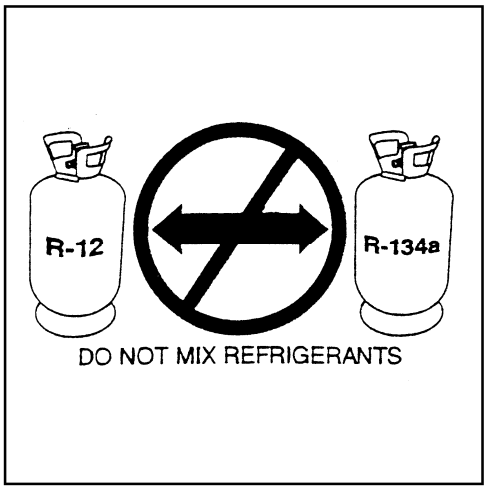


FIG 60-2

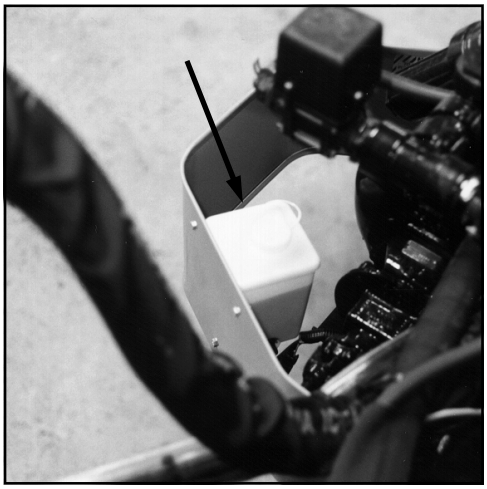


FIG 60-3

Air Conditioning

TYPE - The cab on your sprayer is equipped with a R-134a air conditioning system.

RECHARGING - Recharge it only with R-134a refigerant. If your air conditioning system is mistakenly charged with R-12 refigerant, serious problems, such as compressor seizure, may result. Therefore, confirm refigerant before recharging system.

If you do not have the proper recharging equipment, it is recommended that you allow an independent service agent service your air conditioning system.

Windshield Washer Fluid

The windshield washer reservoir is located toward the front of the sprayer behind the center front shield (fig. 60-3). Check it occasionally and refill it with non-freezing automotive windshield cleaner as required.

FLUID CAPACITIES AND TYPES

Engine oil pan, including filter	17 quarts SAE 15W-40
Engine oil dipstick, L-H mark	2 quarts
Hydraulic oil reservoir	20 gallons anti-wear hydraulic oil
Torque Hub® oil level (4)	approx. 26 oz. ea. EP-90 or 85-140
Engine cooling system	10 gallons ethylene glycol
Fuel tanks (2)	40 gallons ea. No. 1 or 2 diesel

FILTERS

FIG 61-1

FIG 61-2

FIG 61-3

Engine Air Intake

REMOVAL - The engine air intake filter element should only be removed if it is going to be replaced. After loosening the air cleaner clamp and removing the end cap, carefully remove the filter so as to not knock any dust off the filter and into the air intake passage (fig. 61-1 and 61-2).

REPLACEMENT - Your sprayer is equipped with a Filter Minder® to notify you of filter element efficiency. Follow its guidelines for servicing. (See below.) At appropriate service time, install the new element carefully to ensure proper sealing.

CLEANING - It is not recommended to clean the air filter element. However, a clean damp cloth should be used to wipe dust and foreign material from the air cleaner housing before a new element is installed.

Filter Minder®

LOCATION - The Filter Minder® is an air restriction monitoring system that progressively and constantly indicates how much air filter capacity remains. It is mounted at the top of the instrument panel in the cab (fig. 61-3). Check its reading daily.

SERVICE - Service the air cleaner when the Filter Minder® reads 20" (80% of average dirt holding capacity). Reset the Filter Minder® to zero each time you replace the air filter element.

NOTE:

Service the air cleaner before the yellow indicator reaches the red line of the Filter Minder®.

VI. SERVICE AND MAINTENANCE

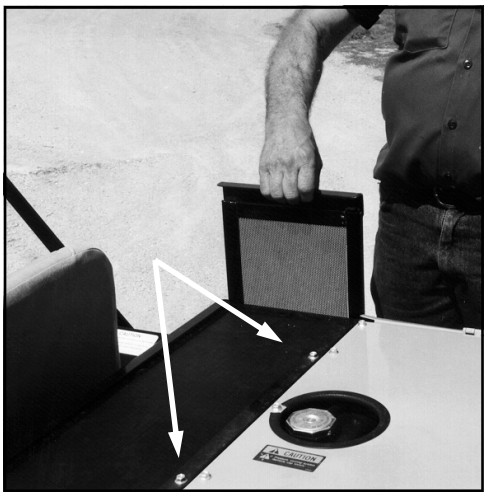


FIG 62-1

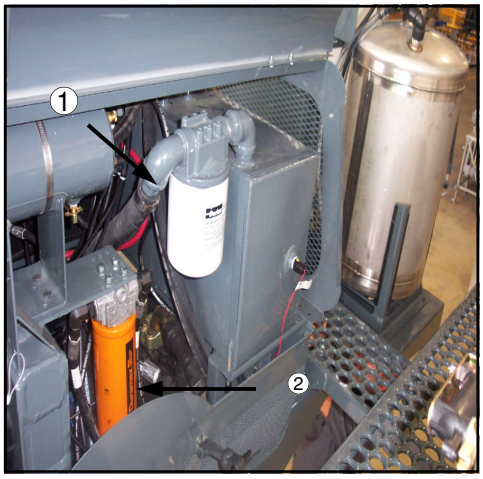


FIG 62-2

Grille Screens

In order to maintain maximum air flow through the engine cooling system's radiator, oil cooler, and air conditioning condenser, the cooling air intake grille screens must be inspected often and periodically removed for cleaning.

REMOVAL - The side grille screens are easily removed by sliding them up out of their housings (fig. 62-1). The top screen is held in place by two bolts (fig. 62-1) and may also be removed for cleaning.

CLEANING - Compressed air will dislodge most large trash or loose dirt after the screens have been removed. Blow out the screens away from the machine. Water from a pressurized hose may also be used, or if necessary the screens may be soaked in soapy water and scrubbed with a brush.

NOTE:

When cleaning cooling fins of the radiator, oil cooler, or A/C condenser with compressed air or water, be careful not to damage cooling fins which may impair cooling capabilities.

Hydraulic Suction Filter

Remove and install a new 10 Micron rated suction filter (fig. 62-2, item 1) at the end of the first 50 hours of use; subsequently, replace the filter every 250 hours, or once a year, whichever comes first.

Hydrostatic Charge Pressure Filter

Remove and install a new 4 Micron rated charge pressure filter (fig. 62-2, item 2) at the end of the first 50 hours of use; subsequently, replace the filter every 250 hours, or once a year, whichever comes first.

VI. SERVICE AND MAINTENANCE

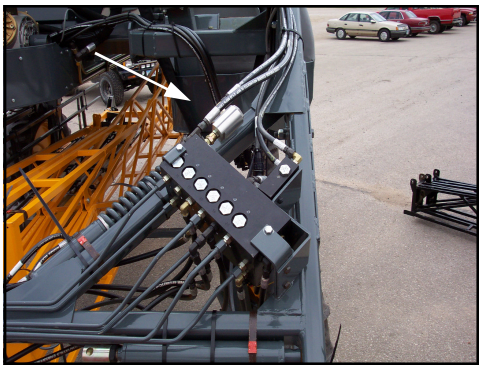


FIG 63-1

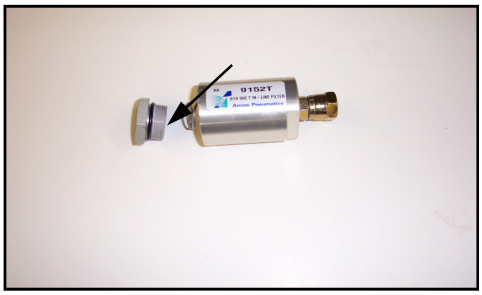


FIG 63-2

FIG 63-4

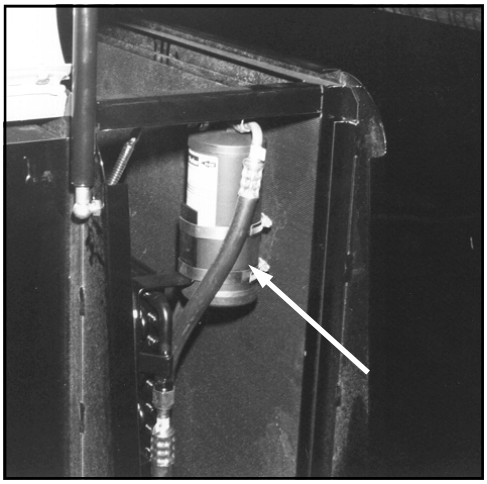


FIG 63-5

High Pressure In-line Filter

STACK VALVES - The valves on the boom control stack valve are protected by a 90 Micron in-line sintered bronze filter (fig. 8.18). When the filter element is removed for cleaning, caution should be taken so the gasket is in the proper place when re-installing (fig. 63.2). Also, re-install filter paying attention to direction of flow so the end marked “OUT” is oriented correctly.

Solution Line Strainer

To help maintain consistent application rates, check the solution line strainer (fig. 63-4) daily for blockage. To remove the strainer, close the tank shutoff valves. Clean the strainer screen as required. Be sure to wear the appropriate clothing while removing and cleaning the line strainer screen. Confirm the gasket is in place before re-installing the screen. Line strainers for the high pressure pumps are located under each solution tank. Remove and clean them in the same manner.

Air Conditioning System Dryer

The A/C system receiver/dryer (fig. 63-5) should be replaced if the A/C loop is ever opened such as replacing a compressor or condenser line, etc.

VI. SERVICE AND MAINTENANCE

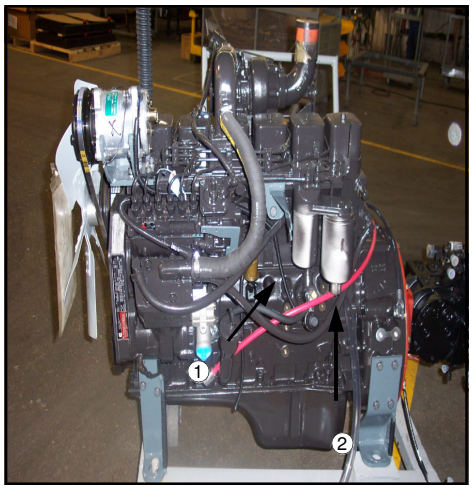


FIG 64-1

Fuel Filters

PRIMARY (WATER SEPARATOR) - (fig. 64-1, item 1) Drain water and sediment from the separator daily. Replace every 500 hours or once a year, whichever comes first.

SECONDARY - (fig. 64-1, item 2) Replace every 500 hours or once a year, whichever comes first.

IN-LINE STRAINER - (fig. 64-1, item 3) Note direction of fuel flow arrow when replacing.

Fresh Air Cab Filters

PAPER FILTER - (fig. 64-2, item 1) The paper filter should be cleaned once a year, or more often if necessary. Remove the paper element and gently tap it against a flat surface. Direct low pressure compressed air through the filter to remove larger particles. Replace the paper filter if necessary.

CHARCOAL FILTER - (fig. 64-2, item 2) Remove and replace at the first sign of chemical odor entering the cab.

RECIRCULATING FILTER - (fig. 64-2, item 3) The recirculating filter may be cleaned with soap and water. Replace if it becomes worn.

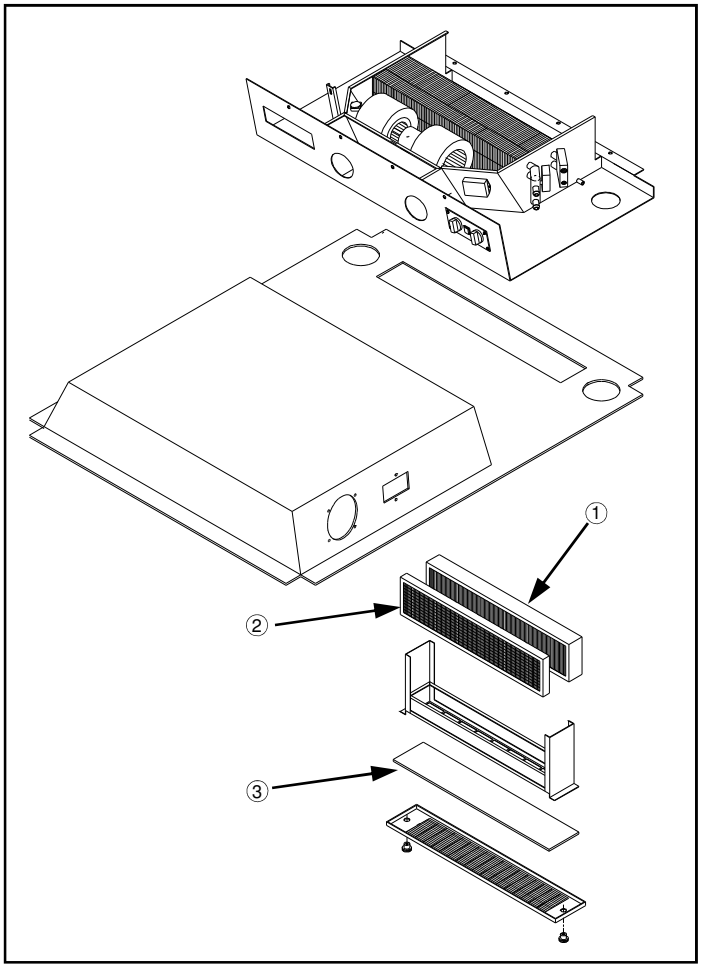


FIG 64-2

CAB FILTER LOCATION
FIG 64-3

VI. SERVICE AND MAINTENANCE

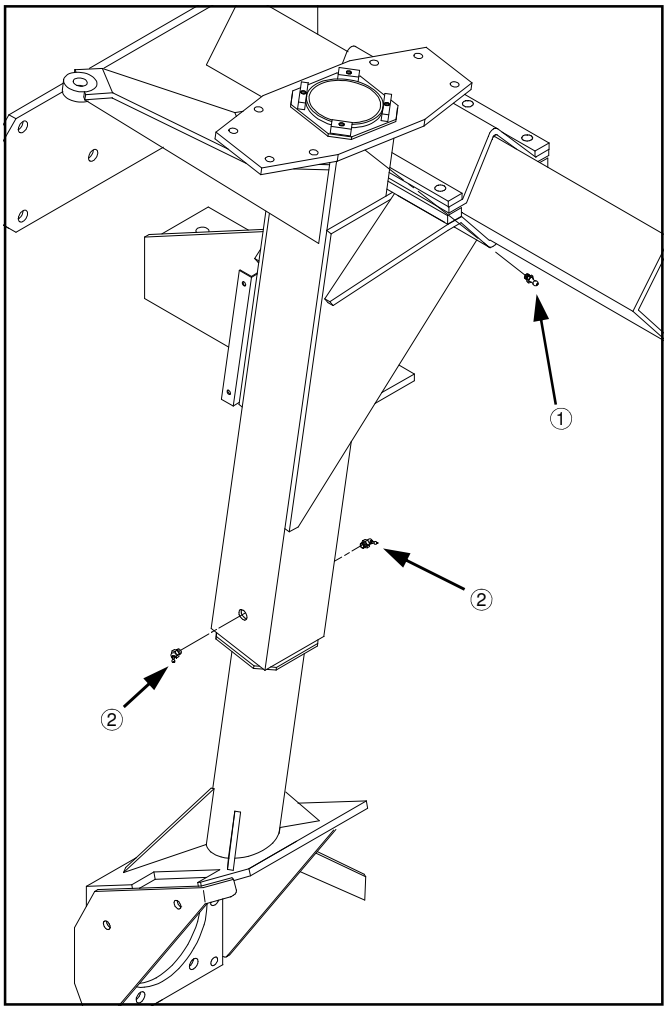


FIG 65-1

LUBRICATION

Leg Bearings

Hagie DTS 8T leg assemblies are constructed with upper and lower nylon bearings for suspension telescoping between the inner and outer leg weldments. These bearings must be lubricated to avoid bearing failure and ensure optimal ride quality. There are grease zerks located on the sides of the leg assemblies, one for the upper bearing (fig. 65-1, item 1) and two for the lower bearing (fig. 65-1, item 2). Greasing all bearings on all four legs daily is very important.

In late season crop applications, the grease may possibly be wiped off by passing crop leaves, so the bearing should be greased at least twice a day. Suggested times are in the morning and at noon. If the crop is mature enough, or plant population is high enough, more frequent leg bearing grease application may be required. This will ensure proper lubrication allowing optimal performance.

VI. SERVICE AND MAINTENANCE

FIG 66-1

Torque Hub® Seal Boot

Each leg has a seal boot located between the wheel motor and Torque Hub®. Grease the zerk on the wheel motor (fig. 66-1) every 50 hours.

An over-greased seal boot will leak some grease out around the seal and when heated may cause the appearance of a failed wheel motor leaking hydraulic fluid. Wipe off any excess grease after servicing.

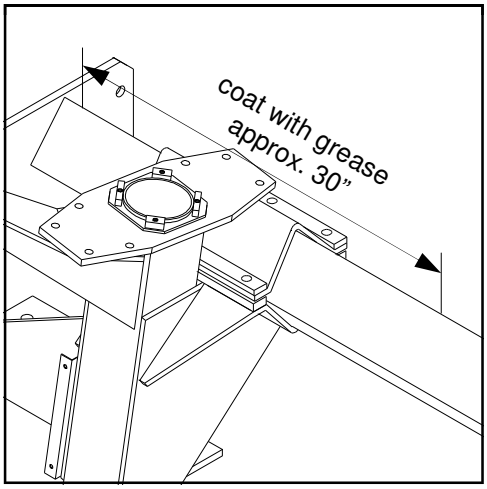


FIG 66-2

Hydraulic Tread Adjust Bearing Slide-Path

The slide-path (fig. 66-2) for the hydraulic tread adjust nylon bearings should be generously coated with an appropriate lubricant. Standard grease applied by hand over the entire length of the bearing’s range of travel should suffice.

Inspect this area often and lubricate as required. Failure to do so may cause one of the legs to hang up while the other is still sliding during adjustment. This will cause damage to the machine. Bear in mind that late season or taller crops may wipe off some or all of the exposed grease on the under-side of the mainframe.

VI. SERVICE AND MAINTENANCE

Transom/Lift Arm/Lift Cylinders

The transom, lift arm, and lift cylinders are fitted with grease zerks that should be lubricated every other day or 25 hours, whichever comes first. They are located as follows:

Lift arm lift pivots: eight places (fig. 67-1, items 1)

Lift cylinder pivots: four places (fig. 67-1, items 2)

Boom fold pivots on transom: four places (fig. 67-1, items 3)

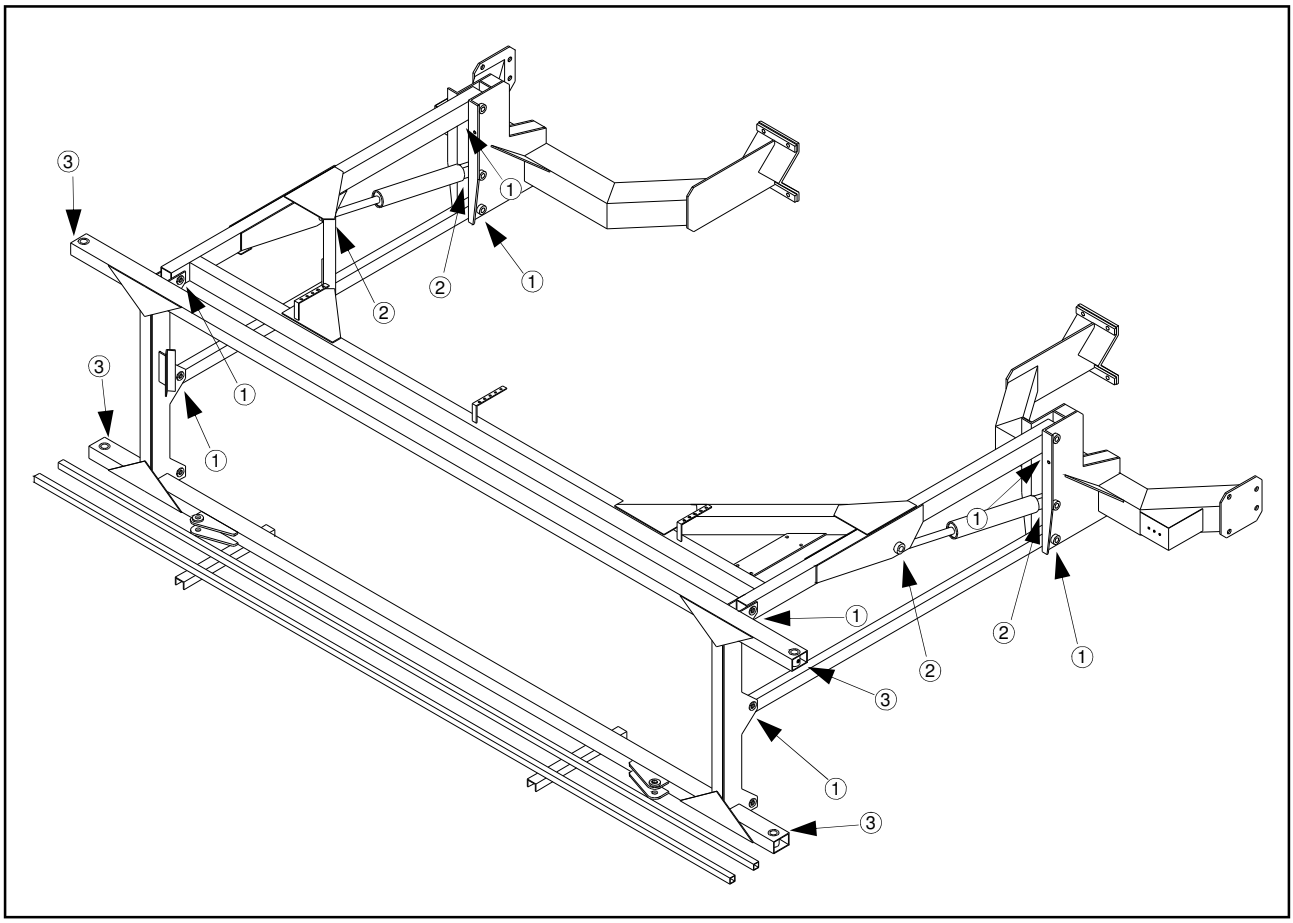


FIG 67-1

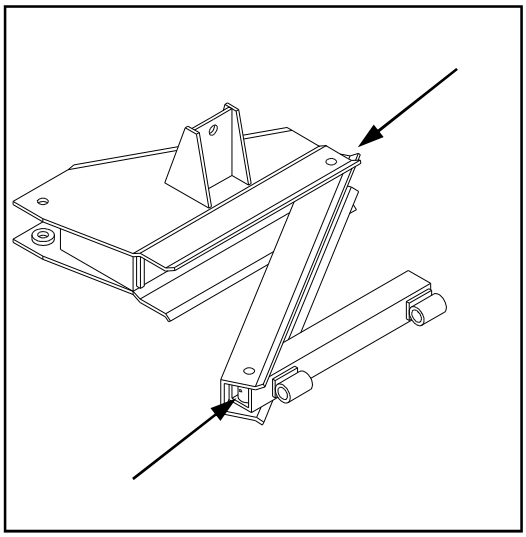


FIG 68-1

Boom Hinge and Breakaway Pivots

Each breakaway located between the transom and each inner boom section has two zerks (four total) that need to be greased as required (fig. 8.29).

Sixty foot boom options have a grease zerk on the boom level pivot point connected to the breakaway (fig. 68-2, item 1) and the boom extension vertical folding pivot point (fig. 68-2, item 2). Check all and grease as required.

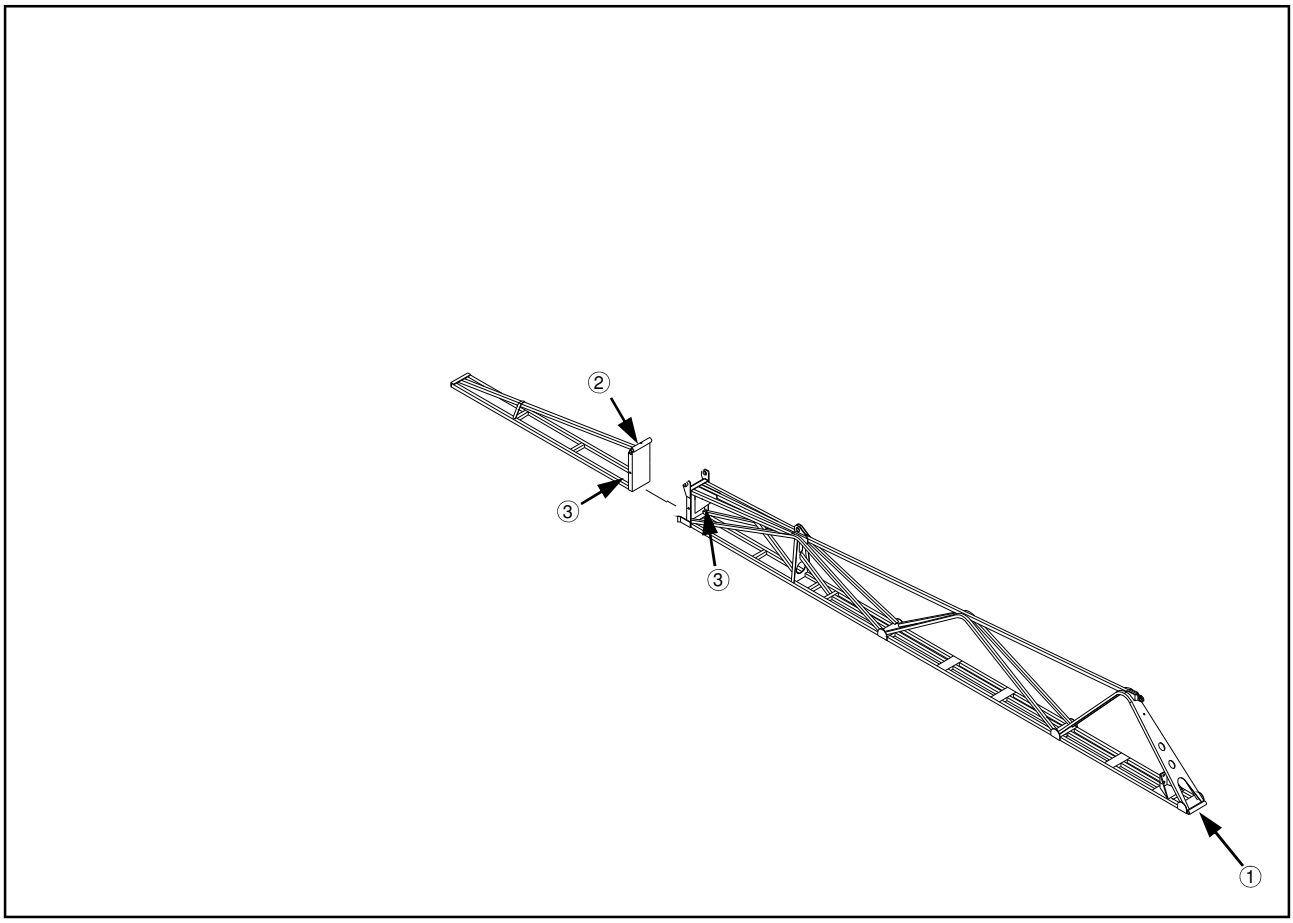


FIG 68-2

VI. SERVICE AND MAINTENANCE

ELECTRICAL

Battery

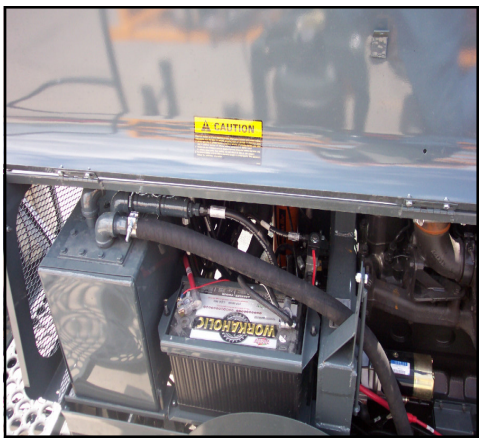


FIG 69-1

VOLTAGE.....	12 V (only)
COLD CRANKING AMPS (30 sec. at 0° F).....	950 CCA
RESERVE CAPACITY.....	185 min. at 25 amps

FIG 69-2

SAFETY

CAUTION

Batteries contain sulfuric acid. Avoid contact with skin, eyes, or clothing. Do not inhale fumes or ingest liquid. Batteries contain gases which can explode. Keep sparks and flame away while servicing.

NOTE:

When servicing electrical system always disconnect the battery. Remove ground cable first and connect it last.

CLEANING - Disconnect battery cables from battery. Remove all corrosion with a wire brush or battery post brush. Wash the cable connections and battery posts with a weak solution of baking soda or ammonia. Apply petroleum jelly or grease to prevent future corrosion. Reconnect the cables to the battery making sure they are tight. Clean every 100 hours.

CAUTION

Electrical system is 12 volt negative ground. When using booster with jumper cables, precautions must be taken to prevent personal injury or damage to electrical parts.

1. Attach one end of jumper cable to positive terminal of booster battery and other end to positive terminal of vehicle battery connected to starter motor.
2. Attach one end of second cable to negative terminal of booster battery and other end to vehicle frame away from battery. Do not attach to cab or cab support.
3. To remove cables, reverse above sequence exactly to avoid sparks. See operator's manual for additional information.

REPLACEMENT - When replacing the battery, install a battery with ratings equivalent to or higher than the specs listed in figure 69-2.

STORAGE– Store in a cool dry place. Keep from freezing.

VI. SERVICE AND MAINTENANCE

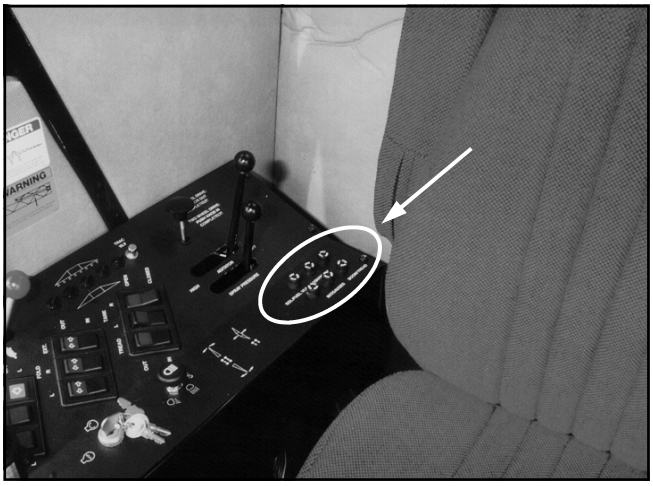


FIG 70-1

Fuses

Fuses protect individual lighter duty electrical circuits. They are located toward the rear of the console panel to the right of the operator's seat (fig. 70-1).

If a fuse blows, remove it by rotating the fuse cap counterclockwise as you push down. Then pull the fuse straight out (fig. 70-3). Replace each blown fuse with the same amperage fuse only.

Correct fuse location and amperage is shown in figure 70-2. If the fuse continues to blow, determine the cause and correct it.

Rinse system, windshield washer (opt), and
Traction valve (opt) ..... 10 AMP

Gauges, AM/FM radio, dome light, and
C.B. radio ..... 10 AMP

Boom hydraulic controls, tread adjust valve, and
Parking brake..... 20 AMP

Fuel selector switch, boom solution valves, and
Seat motor ..... 20 AMP

Hazard/warning lights, turn signal, and
Windshield wiper..... 10 AMP

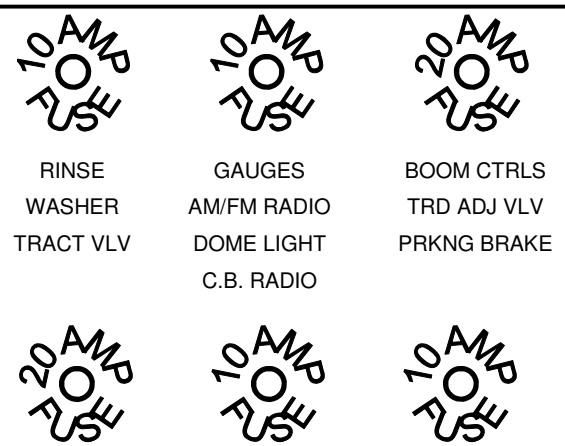


FIG 70-2

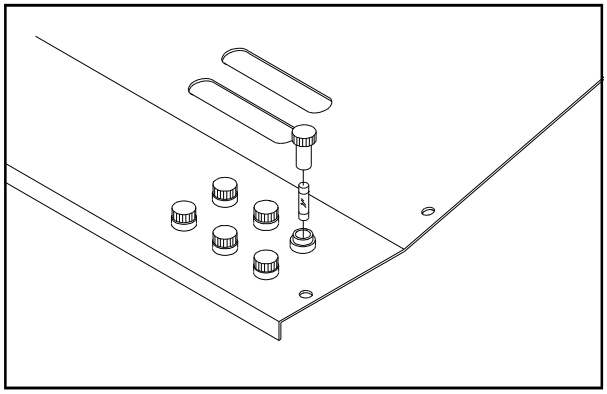


FIG 70-3

VI. SERVICE AND MAINTENANCE

Circuit Breakers

MOUNTED IN CAB

Circuit breakers handle the functions of the heavier duty electrical circuits on the sprayer. They trip when overloaded and automatically reset themselves after they cool down. They will continue to trip and reset as long as the overload or short exists. If the circuit breaker does not reset, replace it with the same amperage breaker only. Correct circuit breaker location and amperage is shown in figure 71-3.

To access the circuit breakers remove the hydrostatic handle (fig. 71-1, item 1), engine throttle knob (fig. 71-1, item 2), VFC lever knobs (fig. 8.36, item 3), four wheel drive knob (fig. 71-1, item 4), and panel screws (fig. 71-1, item 5). The circuit breakers are located toward the rear of the console.If a circuit breaker does not reset and continues to trip, determine the cause and correct it.

MOUNTED ON ENGINE

The wire harnesses are protected by circuit breakers mounted on the engine (fig. 71-2). If the breakers do not reset and continue to trip, determine the cause and correct it.

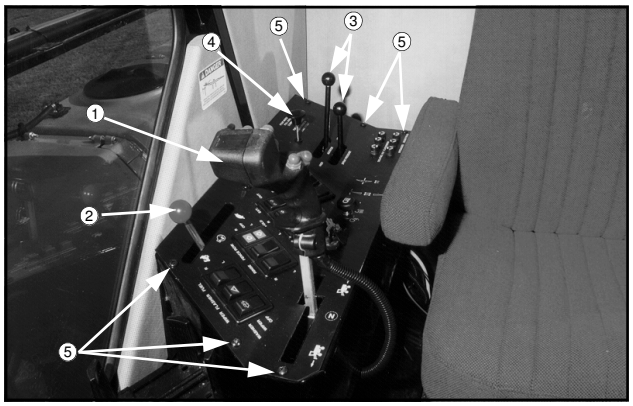


FIG 71-1

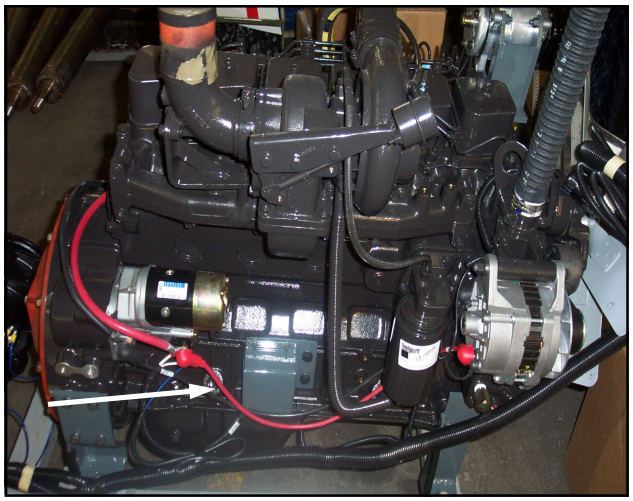


FIG 71-2

Front and rear cab lights.....40 AMP

Foam marker and
Auxiliary power supplies.....30 AMP

A/C System.....30 AMP

Starter relay.....30 AMP

Wire harness .....30 AMP

Wire harness .....50 AMP

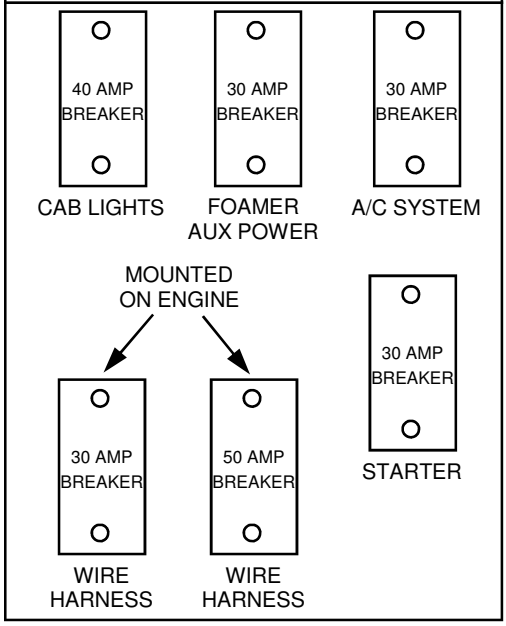


FIG 71-3

VI. SERVICE AND MAINTENANCE

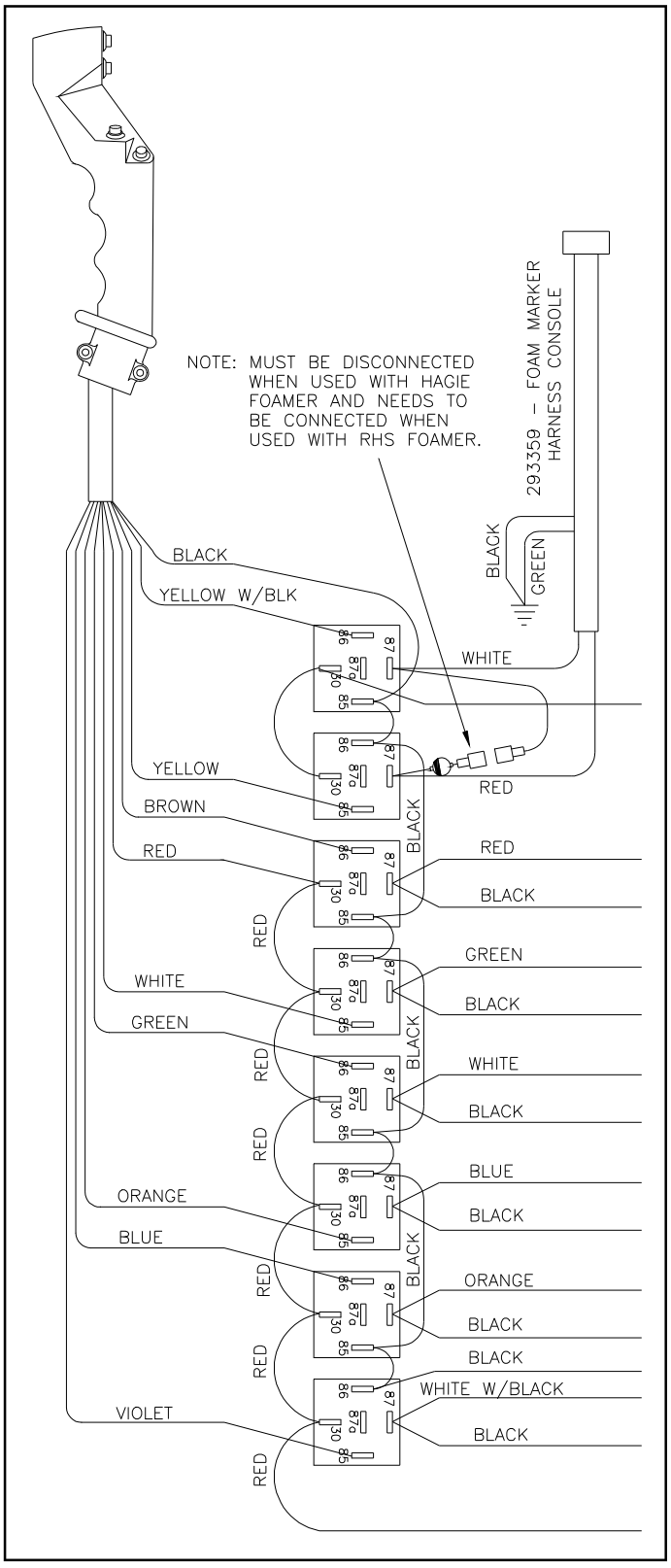


FIG 72-1

Circuit Relays

Relays carry large electrical loads and are controlled by switches. They can be replaced, if necessary. It is recommended to contact the Hagie Customer Support Department or your local authorized Hagie Service Technician when servicing electrical relays. This will ensure maintaining proper wire location on the relay panel (fig.72-1).

Remove the console panel as described on page 90 to access the relay panel (fig. 72-2). If it is necessary to remove a relay, tag all the wires going to that relay.

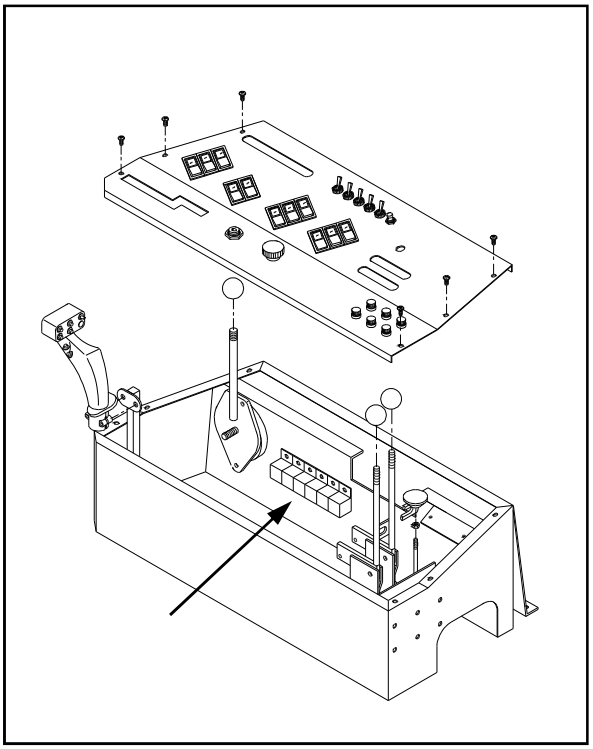


FIG 72-2

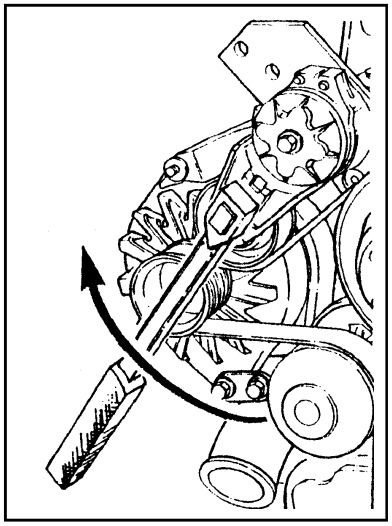


FIG 73-1

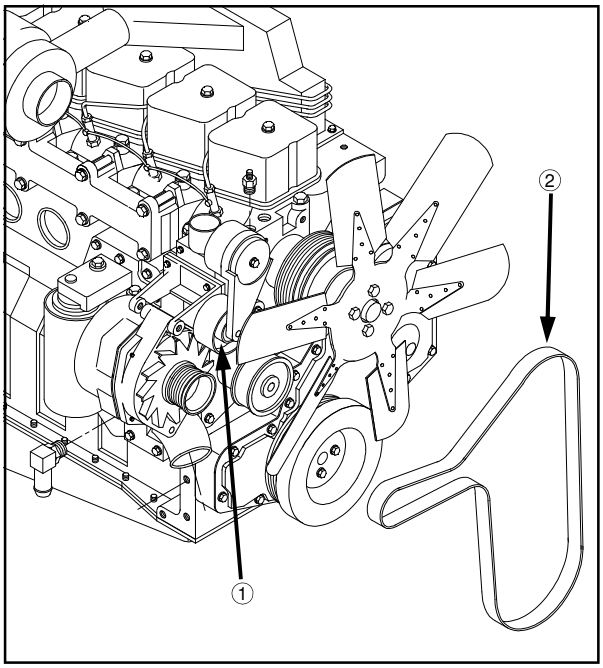


FIG 73-2

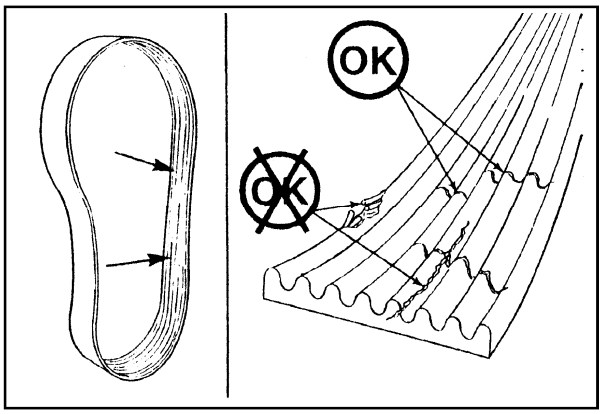


FIG 73-3

BELTS

Engine Drive Belt

REMOVAL - Insert a 3/8 inch square ratchet drive (fig. 73-1) into the belt tensioner (fig. 73-2, item 1) and lift upward to remove the belt (fig. 73-2, item 2).

INSPECTION - Visually inspect the belt daily. Check the belt for intersecting cracks (fig. 73-3). Transverse (across the belt width) cracks are acceptable. Longitudinal (direction of belt length) cracks that intersect with transverse cracks are not acceptable. Replace the belt if it is frayed or has pieces of material missing.

A/C Compressor Belt

To tighten air conditioner compressor belt, loosen the two pivot bolts (fig. 73-4, item 1) and the two slide bolts (fig. 8.44, item 2). Using a suitable prying tool, adjust tension on belt to desired tautness. While maintaining tension, re-tighten all four bolts. Inspect belt every 250 hours.

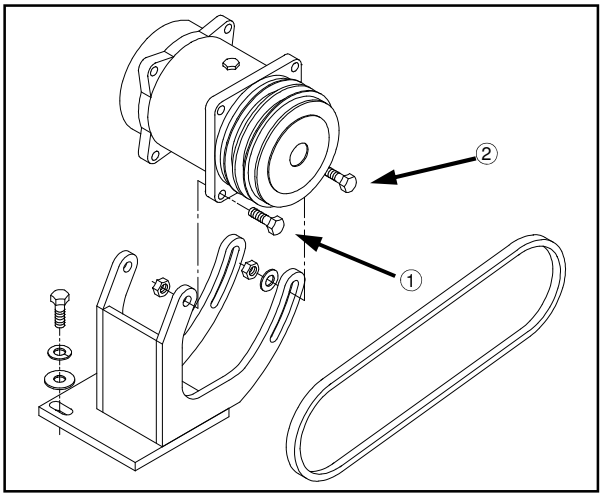


FIG 73-4

VI. SERVICE AND MAINTENANCE

DRIVE TRAIN

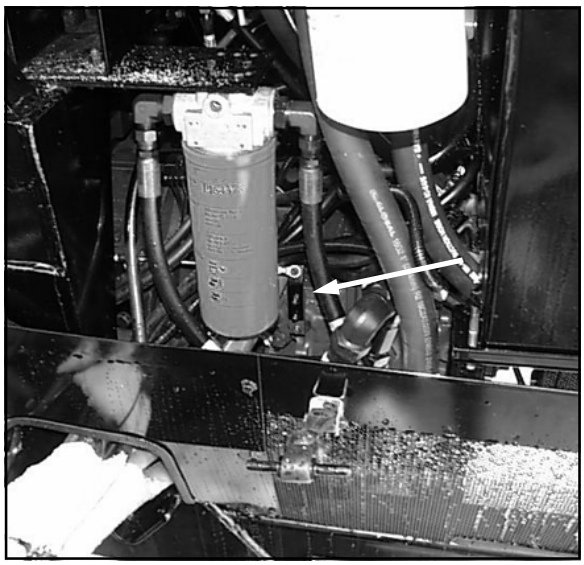


FIG 74-1

Hydrostatic Pump

NEUTRAL SETTING - When the hydrostatic lever is in the neutral position, the machine should not be moving in either direction. If it does, the neutral setting of the hydrostatic pump lever below the hydraulic suction filter (fig. 74-1) needs to be adjusted.

REPAIR/REPLACEMENT - Hydrostatic pumps are available as a core exchange item from Hagie Manufacturing Customer Support Department.

Auxiliary Gear Pumps

REPAIR/REPLACEMENT - . Gear pumps available from the Hagie Manufacturing Customer Support Department.

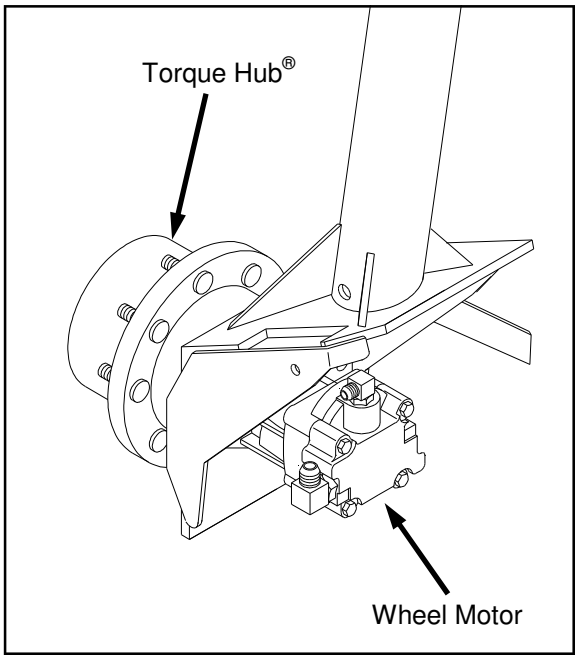


FIG 74-2

Wheel Motors

REPAIR/REPLACEMENT- Wheel motors are available as core exchange item from Hagie Manufacturing Customer Support Department.

Torque Hubs®

GREASE - Grease seal boot .

OIL - Maintain oil level.

REPLACEMENT - Torque Hubs® are available as a core exchange item from Hagie Manufacturing Customer Support Department.

VI. SERVICE AND MAINTENANCE

FIG 75-1

To install wheel and tire assembly on the Torque Hub®, lubricate studs with anti-seize grease. Align the wheel bolt holes with the Torque Hub® studs and mount the wheel on the hub.

NOTE:

To achieve even torquing consistency, the tire should be completely off the ground.

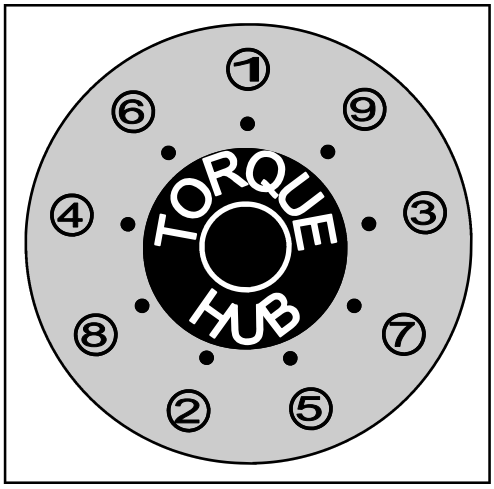


FIG 75-2

Start all of the lug nuts on and tighten them until they are just snug. Following the torque sequence in figure 75-1, first turn each lug nut to a torque value of 120 dry foot-pounds. Use slow, even pressure on the torque-wrench. Quick or jerky movements cause inaccurate values. Repeat the same sequence to 150 dry foot-pounds and again finally to 180 dry foot-pounds.

If the wheel turns during lug nut torquing, lower the machine

⚠ CAUTION

Check lug nut torque immediately after receiving machine and every 50 hours thereafter.

to the ground just enough for the tire to touch and prevent rotation or preferably, place a suitable wedge between the tire and the ground.

Lower the machine and resume operation. Recheck torque after 30 minutes of operation. For torquing purposes the wheel studs should be clean and lubed.

VI. SERVICE AND MAINTENANCE

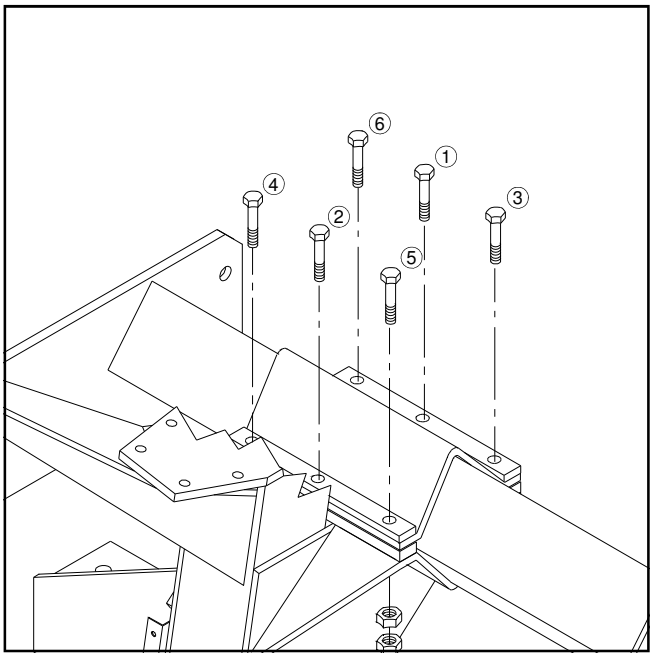


FIG 76-1

FIG 76-2

Leg Mounting Bolts

See page 77 for additional information regarding leg mounting bolts.

After changing hydraulic tread adjust bearings or adding or removing mounting shims, follow these procedures for torquing the leg mounting bolts:

⚠ CAUTION

Never remove more than three leg mounting bolts from any single leg mount.

Start the nuts on the mounting bolts and tighten them until they are just snug. Following the torque sequence in figure 76-1, turn each lug nut to a torque value of 100 dry foot-pounds. Use slow, even pressure on the torque wrench. Quick or jerky movements cause inaccurate values.

Lower the sprayer to the ground and repeat the same sequence to 130 dry foot-pounds and again finally to 160 dry foot-pounds.

Resume operation and recheck torque values after 30 minutes of operation.

Jack Mount

Mounts to front or rear of the four legs, using two 1/2 x 2 1/2 inch bolts. Use a jack to lift machine up to remove the tire and wheel (Fig 76-2).

VI. SERVICE AND MAINTENANCE

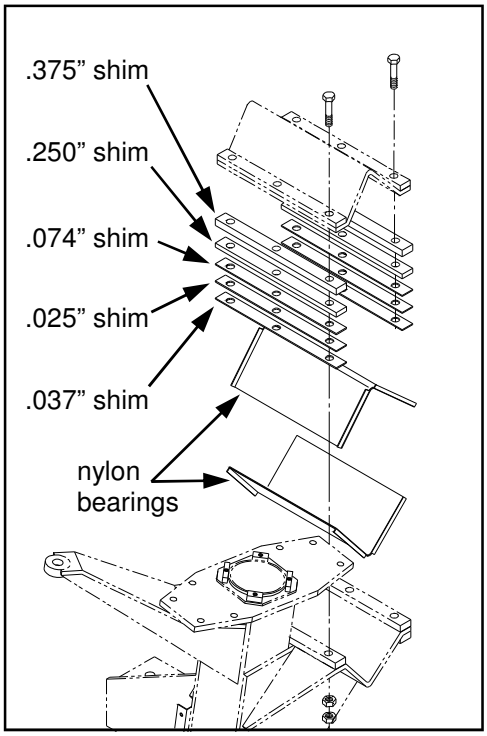


FIG 77-1

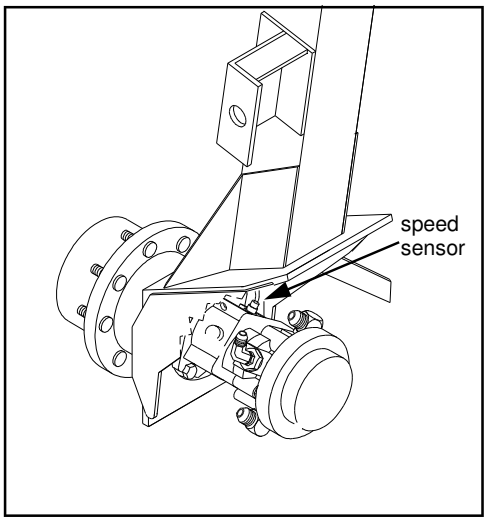


FIG 77-2

TREAD ADJUST SHIM ADJUSTMENT

NOTE:

If the leg mount bolts have been tightened to the proper torque and the mount is loose, it may be that the bearing has worn and needs to be replaced. Check the bearing before you remove shims.

When adjusting for more or less bearing clearance, park the sprayer on level ground and shut off the engine. Block the wheel of the opposite side, both front and rear. Remove only three of the six leg mounting bolts at one time when removing or adding shims to the leg assembly. Refer to page 76 for leg mount bolt torque values and sequence.

⚠ WARNING

DO NOT loosen the leg mounting bolts to obtain more clearance for the leg to slide on the frame. Follow the above directions only for bearing clearance adjustment.

SPEED SENSOR ADJUSTMENT

(Left rear wheel motor - fig. 77-2) When installing or adjusting sensor, turn sensor in by hand until contact is made with speed ring. Back out one half turn (.030 gap). Rotate sensor until the wrench flats on housing are positioned at a 22 degree angle to motor shaft. Lock in place with lock nut. For further adjustment, see Sauer-Danfoss service manual.

VI. SERVICE AND MAINTENANCE

TOE-IN

To correctly gauge toe-in, use a tape measure placed at one-half tire height on the front center seam of the front tire compared to the same measurement of the rear of the front tire (subtract the front measurement from the rear measurement - it must be a positive number). Correct toe-in should fall somewhere between one half and three quarters of an inch.

Toe-in is pre-set at the factory and should not have to be adjusted unless the steering cylinders are removed.

Difficulty steering one way versus the other may also indicate incorrect toe-in and may require adjustment. For further assistance regarding toe-in measurement and adjustment, contact the Hagie Customer Support Department.

NOTE:

See page 79 for instructions on adjusting toe-in. See also Operating Information for information on recalibrating self-centering cylinders.

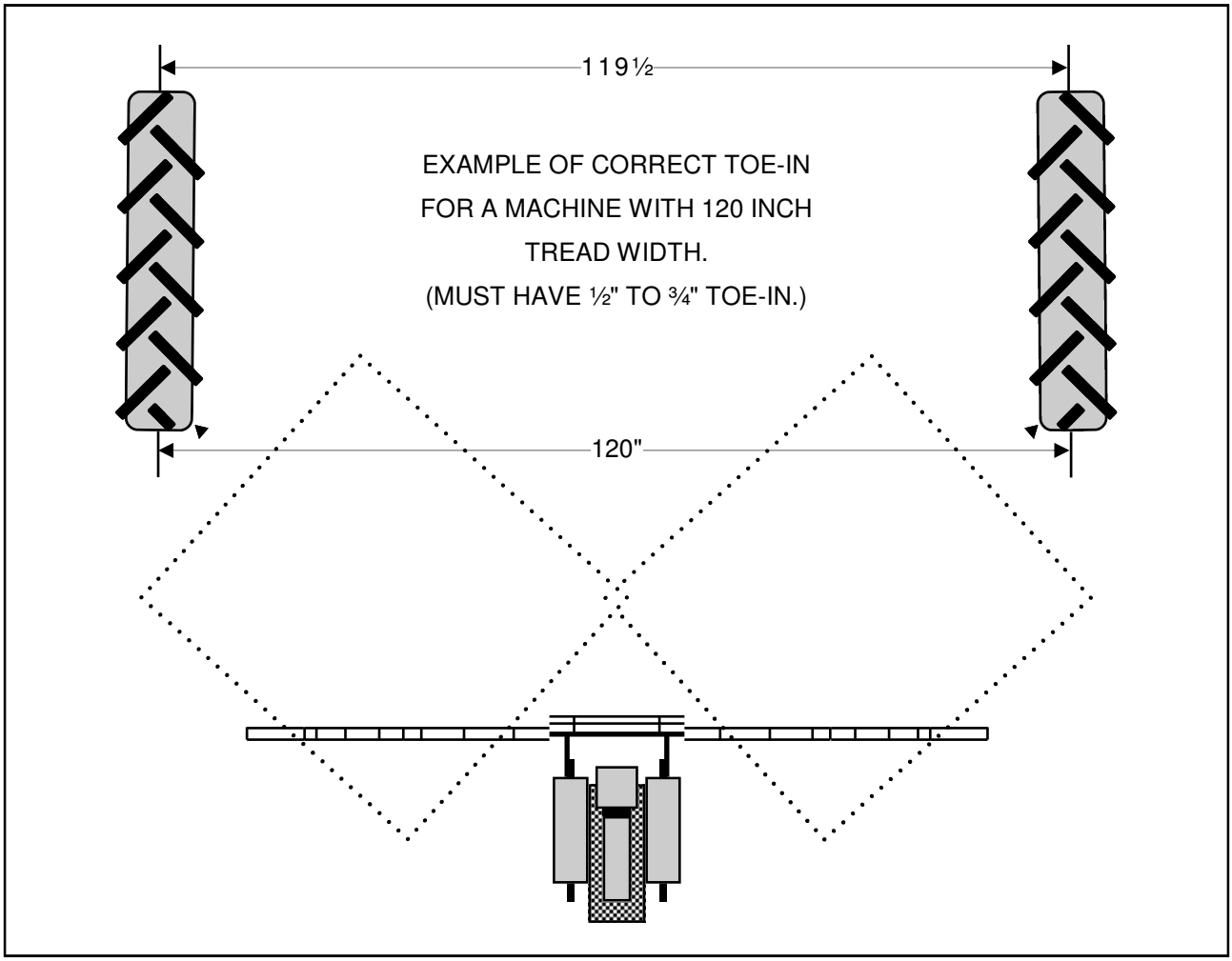


FIG 78-1

VI. SERVICE AND MAINTENANCE

TOE-IN ADJUSTMENT

FIG 79-1

To adjust the toe-in of the front tires follow these instructions for both front steering cylinders carefully:

1. Remove cotter pin (fig. 79-2, item 5), castle nut (fig. 8.54, item 3), and lock washer (fig. 79-2, item 4).
2. Loosen lock collar bolt and nut (fig. 79-2, item 2).
3. Lightly tap swivel assembly (fig. 79-2, item 1) out of steering arm.
4. Move left and right tires evenly until difference in dimension “A” and “B” (fig. 79-3) are within specified range.

NOTE:

Dimension “A” should be ½" to ¾" less than dimension “B.” For more information regarding toe-in, see page 97.

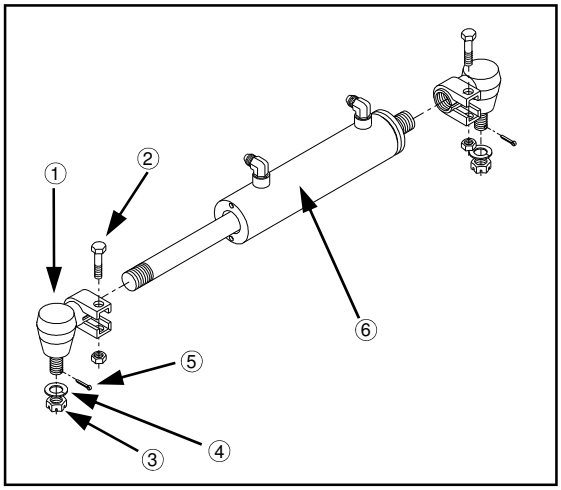


FIG 79-2

5. Screw swivel assembly in or out on steering cylinder (fig 79-2, item 6) until the treaded part lines up with steering arm.
6. Insert swivel assembly into steering arm.
7. Install lock washer and castle nut and tighten.
8. Install cotter pin.
9. Tighten lock collar bolt and nut.

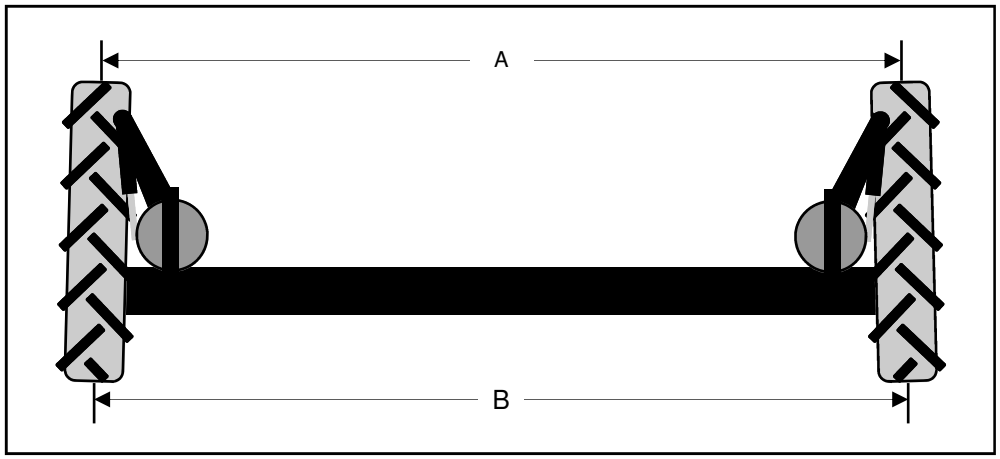


FIG 79-3

FIG 80-1

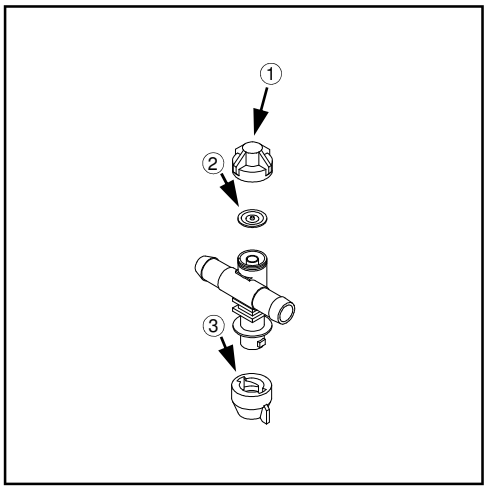


FIG 80-2

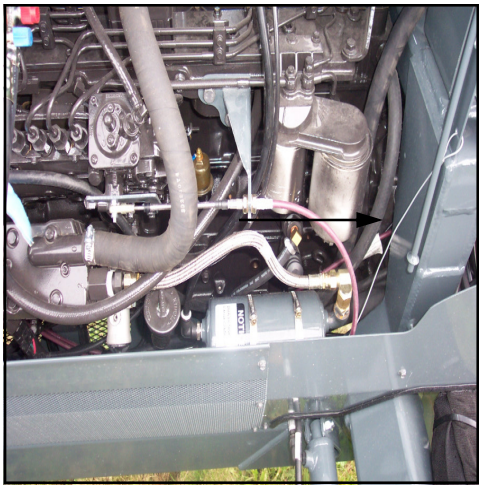


FIG 80-3

SPRAY SYSTEM

Solution Pump

REBUILDING - Refer to the solution pump handbook accompanying this operator's manual.

Line strainer

See page 82 for more information.

Spray Tips

At the beginning of each season, or as required, remove a random sample of spray tip caps (fig. 80-2, item 3) and inspect the nozzle tips. If they are plugged or worn, clean or replace them.

Nozzle Diaphragms

At the beginning of each spray season, remove nozzle body cap (fig. 80-2, item 1) and inspect the diaphragm for wear or fit (fig. 80-2, item 2). Replace if necessary. Refer to accompanying manual containing nozzle information.

Storage

See storage section on cold weather storage of spray system.

VI. SERVICE AND MAINTENANCE

FIG 80-1

FIG 801-2

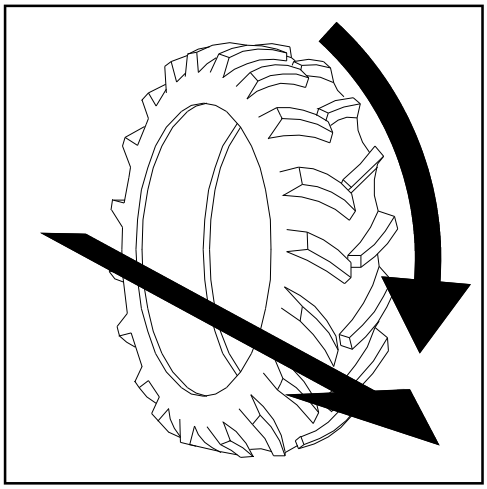


FIG 81-3

TIRES

Air Pressure

Check tire pressure once a week or every 50 hours of operation (fig. 80-1). Never inflate a tire more than the recommended maximum air pressure. Use an air line with a locking air chuck and stand behind tire tread while filling (fig. 80-2).

NOTE:

Tire pressure will depend on load quantity and type in solution tanks. Refer to page 21 for tire specifications.

⚠WARNING

When inflating tire use extension hose with in-line air gauge and clip-on air chuck, which allow operator to stand clear of tire side wall explosion trajectory.

Wheel Bolts

See page on wheel bolt torque specifications and torquing pattern.

Mounting

If you do not have proper mounting equipment, let your local qualified tire sales/service dealer mount the tire for you. Tire should be mounted on rim according to figure 81-3 for best traction and tread cleaning action.

Toe-In

See pages service and maintenance for information regarding toe-in measurement and adjustment.

VI. SERVICE AND MAINTENANCE

DAILY INSPECTION

Inspection Point	Action (if necessary)
Check	
Engine oil level	Add oil
Radiator coolant level	Add antifreeze solution
Coolant overflow reservoir level	Add antifreeze solution
Engine drive belt	Replace belt
Filter Minder®	Replace air filter element
Hydraulic reservoir oil level	Add hydraulic oil
Neutral setting of hydrostatic pumps	Adjust setting
Solution line strainer	Remove and clean
Visual inspection of leg mounting bolts	Tighten
Battery	Clean and/or tighten
Radiator grille screens	Remove and clean
Look for loose or missing items such as shields	Tighten or replace
Look for any fluid leaks pooled on machine or ground	Determine cause and correct
Grease	
Upper and lower leg bearings	
Drain	
Air tank	
Fuel/water separator	

VII. STORAGE

A. Preparing the sprayer for storage.

1. Perform daily level checks, lubrication, and bolt and linkage inspections as required in this manual in section eight on maintenance.
2. Every other season, drain the coolant from the engine and radiator. Probe the drain holes during draining to ensure they are not clogged by sludge, scale, or other deposits. Fill the cooling system to the top with a 50/50 water/antifreeze mixture. Run engine to operating temperature and re-check level.

NOTE:

If antifreeze is added, make sure the engine is then run to operating temperature to assure proper mixing of solution.

3. Add a fuel stabilizer to the fuel and fill fuel tank.
4. Run the engine until it is at operating temperature, then drain the engine oil. Refill with fresh oil of recommended weight and install a new lubricating oil filter element.
5. With the engine at normal operating temperature, cycle all hydraulic functions including the steering.
6. Release tension on all belts. For more detailed information, consult the manufacturer's handbook that accompanies this manual.
7. Use plastic bags and water-resistant adhesive tape to seal the air intake opening, all exhaust manifold openings, engine oil filler cap, hydraulic oil tank breather cap, and fuel tank caps.
8. Disconnect and remove battery or batteries. Completely clean and charge the battery. Coat the terminals with petroleum jelly and store battery in cool, dry place.
9. Thoroughly clean the sprayer. Touch up any painted surfaces that are scratched or chipped. For touch-up paint recommendations contact the Hagie Manufacturing Customer Support Department.
10. Replace worn or missing decals. See pages 5-10 for proper location of warning decals and their corresponding part number. Warning decals and all other Hagie decals are available through the Hagie Manufacturing Customer Support Department.

NOTE:

For replacement decals contact:
Hagie Manufacturing Company
Box 273, Clarion, IA 50525
Ph. 1-800-247-4885

VII. STORAGE

11. Use a multi-purpose grease to coat exposed hydraulic cylinder rods to prevent rusting which could result in cylinder damage.
12. To winterize the spray system, it is recommended that you use an environmentally-safe type antifreeze and water mixture that will give you adequate protection to minus 30 degrees below zero. Drain any remaining solution in the system and run the antifreeze mixture through the spray system until it comes out all boom openings. Repeat the above process with both the foam marker and rinse systems.
13. If the sprayer must be stored outside, cover it with a waterproof cover.

B. Removing the sprayer from storage.

1. Inspect the condition, and test the air pressure, of all tires. Please service section for information regarding proper tire maintenance.
2. Carefully unseal all openings that were sealed in the storage process.
3. Clean and reinstall the battery. Be sure to attach the battery cables to the proper terminals.
4. Tighten all belts. Inspect and replace any worn belts.
5. Check engine oil, hydraulic oil, and engine coolant levels; add, if necessary. A mixture of 50/50 antifreeze and water will cool adequately in summer as well as protect in winter.

NOTE:
Protective compounds such as grease can harden under exposure to weather conditions.

6. Completely clean the sprayer.
7. Review maintenance section and perform all needed services as instructed.
8. For starting instructions, see the operating information section.

NOTE:
See Warranty concerning **improper storage**.

VIII. TROUBLE SHOOTING

A. ENGINE

CAUTION

Start engine from operator's seat only. When running engine in a building, be sure there is adequate ventilation.

PROBLEM	POSSIBLE CAUSE	SUGGESTED REMEDY
Engine won't crank	Dead battery	Recharge or replace battery
	Poor battery connections	Clean and tighten
	Neutral safety switch (located in the Sauer/Sundstrand pump)	Adjust and/or replace if needed
	Starter or starter relay	Test; rebuild or replace
Engine won't start	Out of fuel	Fill fuel tank
	Clogged fuel filters	Replace fuel filters
	Cold weather	Refer to engine manual for cold weather starting information
	Low starter speed	Check starter and battery

VIII. TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE	SUGGESTED REMEDY
Engine overheats	Engine overloaded	Reduce load
	Dirty radiator core or dirty grill screens	Remove all foreign material and clean all items
	Faulty radiator cap	Replace cap
	Loose or faulty fan belt	Tighten or replace fan belt
	Faulty thermostat	Replace thermostat
	Low coolant level	Refill to proper level with recommended coolant
Engine misfires: runs uneven, low power	Water in fuel	Drain, flush, replace filter, fill system
	Dirty air cleaner element	Replace element
	Poor grade of fuel	Drain system; change to good grade
	Fuel tank vent clogged	Open fuel tank vent in cap
	Clogged fuel filter	Replace fuel filter
Engine knocks	Low oil level in crankcase	Add oil to full mark
	Cold engine	Allow proper warm-up period; refer to engine owner's handbook

NOTE:

For additional engine information, consult,
Engine manufacturer's manual.

VIII. TROUBLE SHOOTING

B. SPRAY SYSTEM

⚠WARNING

CHEMICALS ARE DANGEROUS

Read The Chemical manufacturer's labels to avoid injury or damage.

PROBLEM	POSSIBLE CAUSE	SUGGESTED REMEDY
Solution pump will not prime	Low water level in pump	If solution tanks are empty, fill through front quick-fill to prime the pump; solution pump is normally self-priming once filled
	Air leak in suction line	Inspect and tighten all fittings on suction line
	Solution valves turned off	Turn solution valves to open position, allowing air to leave the system
Erratic reading on pressure gauge	Orifice in back of gauge clogged	Remove gauge; clean orifice; re-install
	Faulty gauge	Replace gauge
	Air leak in suction line	Inspect and tighten all fittings in suction line
	Glycerin leaking from gauge	Replace gauge

VIII. TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE	SUGGESTED REMEDY
Solution pump not producing normal pressure	Clogged line strainer screen	Remove screen; clean thoroughly; tighten strainer cap to avoid air leak
	Air leak in suction flow to pump	Inspect and tighten all fittings on suction line
	Restricted solution flow to pump	Main solution tank shut-off valve or valves not completely open
	Suction hose collapsed	Obstruction at inlet end of hose, causing high vacuum on hose
	Faulty hydraulic pump	Replace hydraulic pump
	Faulty hydraulic motor on solution pump	Replace motor
	Internal restriction of diaphragm such as build up of chemical	Disassemble; inspect; clean; reassemble
Malfunction of electric solution valve	Blown fuse	Replace fuse
	Faulty ground	Clean and tighten ground
	Dirty contact terminals	Clean contact terminals
	Separation in wire	Check continuity and replace wire
	Faulty switch	Replace switch
	Short in solenoid coil	Replace valve
	Bad valve	Replace valve

NOTE:

If your unit is equipped with a high-pressure system, call the Hagie Manufacturing Customer Support Department for possible causes and suggested remedies.

VIII. TROUBLE SHOOTING

C. HYDROSTATIC SYSTEM

⚠ CAUTION

DO NOT GO NEAR LEAKS. High pressure oil easily punctures skin causing injury, gangrene, or death. If injured, seek emergency medical help. Immediate surgery is required to remove oil. Do not use finger or skin to check for leaks. Lower load or relieve hydraulic pressure before loosening fittings.

PROBLEM	POSSIBLE CAUSE	SUGGESTED REMEDY
Machine won't move in either direction	Engine speed too low	Set engine at operating RPM before trying to move machine
	Oil level in reservoir low	Fill reservoir to proper level w/ approved oil; see section on Service and Maintenance
	Control linkage	Repair or replace
	Clogged filter	Replace filter
	Hydrostatic pump not turning	Check drive coupling
	Faulty hydrostatic pump	Replace pump
	Air leak in suction line	Inspect and tighten all fittings on suction line
	Low charge pressure	See section under charge pressure
Machine will move in only one direction	Faulty high pressure relief valve	Switch relief valves from side to side; If problem reverses, replace multi-function valve (Call Hagie Customer Support and refer to parts manual)

VIII. TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE	SUGGESTED REMEDY
Hydrostatic system responding slowly	Engine speed too low	Set engine at operating RPM before trying to move machine
	Oil level in reservoir low	Fill reservoir to proper level with approved oil; see section on Service and Maintenance
	Cold oil	Allow for adequate warm-up period
	Plugged filter	Check and replace filter
	Partially restricted suction line	Inspect for collapsed suction hose
	Internal damage	Replace hydrostatic pump or motor
Noisy hydrostatic system	Cold oil	Allow for adequate warm-up period
	Low engine speed	Increase engine speed
	Oil level in reservoir low	Fill reservoir to proper level with approved oil; see section on Service and Maintenance
	Air in system	Inspect and tighten all fittings on suction line
	Internal damage to pump	Replace pump
External oil leaks	Loose or faulty fittings	Tighten or replace
	Damaged O-ring	Inspect; if damaged replace
	Faulty hose	Replace hose

VIII. TROUBLE SHOOTING

D. HYDRAULIC SYSTEM

CAUTION

DO NOT GO NEAR LEAKS. High pressure oil easily punctures skin causing injury, gangrene, or death. If injured, seek emergency medical help. Immediate surgery is required to remove oil. Do not use finger or skin to check for leaks. Lower load or relieve hydraulic pressure before loosening fittings.

PROBLEM	POSSIBLE CAUSE	SUGGESTED REMEDY
Entire hydraulic system fails to function	Oil level in reservoir low	Fill reservoir to proper level with approved oil; see section on Service and Maintenance
	Oil not reaching pump	Prime the pump by removing suction hose from reservoir; hold removed end higher than pump; hand feed two quarts approved oil through suction hose by bumping engine w/starter (careful not to start engine); re-install hose; tighten all fittings
	Faulty hydraulic pump	Replace hydraulic pump
Noisy hydraulic pump	Collapsed suction hose caused by cold oil	Allow for adequate warm-up period
	Oil level in reservoir low	Fill reservoir to proper level with approved oil; see section on Service and Maintenance
	Air leak in suction line	Inspect and tighten all fittings on suction hose

VIII. TROUBLE SHOOTING

E. ELECTRICAL

⚠CAUTION

Batteries contain sulfuric acid. Avoid contact with skin, eyes, or clothing. Do not inhale fumes or ingest liquid. Batteries contain gases which can explode. Keep sparks and flame away while servicing.

NOTE:

Disconnect battery when servicing any part of electrical system to prevent system damage.

PROBLEM	POSSIBLE CAUSE	SUGGESTED REMEDY
Entire electrical system is dead	Dead battery	Charge or replace
	Poor battery connection	Clean and tighten
	Low charging rate	Tighten alternator belt
	No charging rate	Replace alternator
All gauges on instrument panel not working	Blown fuse	Replace fuse
	Poor ground	Clean and tighten ground
Tachometer/MPH Indicator not working	Blown fuse	Replace fuse
	Loose connections at sensor/ alternator	Tighten or replace connectors
	Faulty sensor	Replace sensor
Light system does not function	Blown fuse	Replace fuse
	Poor ground	Clean and tighten ground
	Burned-out bulb	Replace bulb
	Separation or short in wire	Check continuity and replace wire
	Faulty switch	Replace switch

NOTES

IX. LIMITED WARRANTY

Hagie Manufacturing Company Product Warranty 12.01.08

Hagie Manufacturing Company warrants each new Hagie (including Vammas by Hagie) product to be free under normal use and service from defects in workmanship and materials for a period of lesser of: two (2) years or 1000 hours from the date of delivery on all Agricultural Products and two (2) years or 2000 hours on all Vammas By Hagie Snow Removal Equipment (SRE). Hagie Manufacturing Company makes this warranty from the original delivery date and is transferable to a purchaser from the original purchaser of this equipment, given there is remaining time left under the year and hour warranty standard stated above. This warranty shall be fulfilled by repairing or replacing free of charge any part that shows evidence of defect or improper workmanship, provided the part is returned to Hagie Manufacturing Company within thirty (30) days of the date that such defect or improper workmanship is discovered, or should have been discovered. Labor to repair said items will be covered by standard labor time rates. Freight charges of defective parts are not covered by this warranty and are the responsibility of the purchaser. No other express warranty is given and no affirmation of Hagie Manufacturing Company, by words or action, shall constitute a warranty.

Hagie Manufacturing Company limits its warranty to only those products manufactured by Hagie Manufacturing Company (including Vammas by Hagie) and does not warrant any part or component not manufactured by Hagie Manufacturing Company (including Vammas by Hagie), such as parts or components being subject to their manufacturer's warranties, if any. Excluded from this warranty are parts subjected to accident, alteration, or negligent use or repair. This warranty does not cover normal maintenance such as engine tune ups, adjustments, inspections, nor any consumables such as tires, rubber products, solution system valves, wear parts, wiper blades, etc.

Hagie Manufacturing Company shall not be responsible for repairs or replacements which are necessitated, in whole or in part; by the use of parts not manufactured by or obtainable from Hagie Manufacturing Company nor for service performed by someone other than Hagie authorized personnel, unless authorized by Hagie Manufacturing Company. Customer acknowledges that it is not relying on Hagie Manufacturing Company's skill or judgment to select finish goods for any purpose and that there are no warranties which are not contained in this agreement.

In no event shall Hagie Manufacturing Company's tort, contract, or warranty liability exceed the purchase price of the product. The foregoing limitation will not apply to claims for personal injury caused solely by Hagie Manufacturing Company's negligence.

Hagie Manufacturing Company shall not be liable for damages, including special, incidental or consequential damages or injuries (damage and repairs of equipment itself, loss of profits, rental or substitute equipment, loss of good will, etc.) arising out of or in connection with performance of the equipment or its use by customer, and Hagie Manufacturing Company shall not be liable for any special, incidental or consequential damages arising out of or in connection with Hagie Manufacturing Company's failure to perform its obligation hereunder. HAGIE MANUFACTURING COMPANY'S ENTIRE LIABILITY AND THE CUSTOMER'S EXCLUSIVE REMEDY SHALL BE REPAIR OR REPLACEMENT OF PARTS COVERED UNDER THIS WARRANTY. THIS WARRANTY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

NOTES