67/67XL Sprayer

Service Manual

SQ-044V1 1/05

THIS SAFETY ALERT SYMBOL INDICATES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE THAT FOLLOWS AND BE ALERT TO THE POSSIBILITY OF DEATH OR SERIOUS INJURY.

M171C

If Safety Decals on this machine use the words **Danger, Warning or Caution,** which are defined as follows:

- **DANGER:** Indicates an immediate hazardous situation that, if not avoided, will result in death or serious injury. The color associated with Danger is RED.
- **WARNING:** Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. The color associated with Warning is ORANGE.
- **CAUTION:** Indicates an potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. The color associated with Caution is YELLOW.

If Safety Decals on this machine are ISO two panel Pictorial, decals are defined as follows:

- The first panel indicates the nature of the hazard.
- The second panel indicates the appropriate avoidance of the hazard.
- Background color is YELLOW.
- Prohibition symbols such as  and  if used, are RED.

WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY. BEFORE USING THIS MACHINE, MAKE CERTAIN THAT EVERY OPERATOR:

- Is instructed in safe and proper use of the machine.
- Reads and understands the Manual(s) pertaining to the machine.
- Reads and understands ALL Safety Decals on the machine.
- Clears the area of other persons.
- Learns and practices safe use of machine controls in a safe, clear area before operating this machine on a job site.

It is your responsibility to observe pertinent laws and regulations and follow CNH America LLC instructions on machine operation and maintenance.

SQ-044V1 Issued January, 2005

Contents

INTRODUCTION

Contents

INTRODUCTION

Legal advice (- A.10.A.10)

67, 67XL

All repair and maintenance works listed in this manual must be carried out only by qualified dealership personnel, strictly complying with the instructions given; and using, whenever possible, the special tools.
Anyone who carries out the above operations without complying with the procedures shall be responsible for the subsequent damages.The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional, or local dealers, reject any responsibility for damages due to the anomalous behavior of parts and/or components not approved by the manufacturer himself, including those use for the servicing or repair of the product manufactured or marketed by the manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the manufacturer in case of damages due to an anomalous behavior or parts and/or components not approved by the manufacturer.
The information in this manual is up-to-date at the date of the publication. It is the policy of the manufacturer for continuous improvement. Some information could not be updated due to modifications of a technical or commercial type, as well as the suit the law regulations of different countries.
In cast of disagreement, refer to your Sales and Service Networks.

Foreword (- A.10.A.40)

67, 67XL

ASIST linked to Technical Information

This manual has been produced by a new technical information system which is part of ASIST. This new system is designed to deliver technical information electronically through ASIST, also on CDROM and in paper manuals. A coding system called ICE has been developed to link the technical information to ASIST and to other Product Support functions e.g. Warranty.

Technical information is written to support the maintenance and service of the functions or systems on a customers machine. When a customer has a concern on his machine it is usually because a function or system on his machine is not working at all, is not working efficiently, or is not responding correctly to his commands. When you refer to the technical information in this manual to resolve that customers concern, you will find all the information classified using the new ICE coding, according to the functions or systems on that machine. Once you have located the technical information for that function or system then you will find all the mechanical, electrical or hydraulic devices, components, assemblies and sub-assemblies for that function or system. You will also find all the types of information that have been written for that function or system, the technical data (specifications), the functional data (how it works), the diagnostic data (fault codes and troubleshooting) and the service data (remove, install adjust, etc.).

By integrating this new ICE coding into technical information and ASIST, you will be able to search and retrieve just the right piece of technical information you need to resolve that customers concern on his machine. This is made possible by attaching 3 categories to each piece of technical information during the authoring process.

The first category is the Location, the second category is the Information Type and the third category is the Product:

- LOCATION - is the component or function on the machine, that the piece of technical information is going to describe e.g. Fuel tank.
- INFORMATION TYPE - is the piece of technical information that has been written for a particular component or function on the machine e.g. Capacity would be a type of Technical Data that would describe the amount of fuel held by the Fuel tank.
- PRODUCT - is the model that the piece of technical information is written for.

Every piece of technical information will have those 3 categories attached to it. You will be able to use any combination of those categories to find the right piece of technical information you need to resolve that customers concern on his machine.

That information could be:

- the description of how to remove the cylinder head
- a table of specifications for a hydraulic pump
- a fault code
- a troubleshooting table
- a special tool

How to Use this Manual

This manual is divided into Sections. Each Section is then divided into Chapters. Contents pages are included at the beginning of the manual, then inside every Section and inside every Chapter. An alphabetical Index is included at the end of a Chapter. Page number references are included for every piece of technical information listed in the Chapter Contents or Chapter Index.

Each Chapter is divided into four Information types:

- Technical Data (specifications) for all the mechanical, electrical or hydraulic devices, components and, assemblies.
- Functional Data (how it works) for all the mechanical, electrical or hydraulic devices, components and assemblies.

- Diagnostic Data (fault codes, electrical and hydraulic troubleshooting) for all the mechanical, electrical or hydraulic devices, components and assemblies.
- Service data (remove disassembly, assemble, install) for all the mechanical, electrical or hydraulic devices, components and assemblies.

Sections

Sections are grouped according to the main functions or a systems on the machine. Each Section is identified by a letter A, B, C etc. The amount of Sections included in the manual will depend on the type and function of the machine that the manual is written for. Each Section has a Contents page listed in alphabetic/numeric order. This table illustrates which Sections could be included in a manual for a particular product.

	SECTION										
	A - Distribution Systems										
		B - Power Production									
			C - Power Train								
				D - Travelling							
					E - Body and Structure						
						F - Frame Positioning					
							G - Tool Positioning				
								H - Working Arm			
									J - Tools and Couplers		
										K - Crop Processing	
											L - Field Processing
PRODUCT											
Tractors	X	X	X	X	X	X		X	X		
Vehicles with working arms: backhoes, excavators, skid steers, ...	X	X	X	X	X	X	X	X	X		
Combines, forage harvesters, balers, ...	X	X	X	X	X	X			X	X	
Seeding, planting, floating, spraying equipment, ...	X	X	X	X	X	X	X		X		X
Mounted equipment and tools, ...					X	X	X		X		

SECTION	LETTER	DESCRIPTION
DISTRIBUTION SYSTEMS	A	This Section covers the main systems that interact with most of the functions of the product. It includes the central parts of the hydraulic, electrical, electronic, pneumatic, lighting and grease lubrication systems. The components that are dedicated to a specific function are listed in the Chapter where all the technical information for that function is included.
POWER PRODUCTION	B	This Section covers all the functions related to the production of power to move the machine and to drive various devices. In the case of a pulled-type machine, this Section covers the power take-off function where power is provided from the towing machine.
POWER TRAIN	C	This Section covers all the functions related to the transmission of power from the engine to the axles and to internal or external devices. This Section also covers the power take-off function where power is provided to the pull-type machine and additional Process Drive functions.
TRAVELLING	D	This Section covers all the functions related to moving the machine, including tracks, wheels, steering and braking. It covers all the axles both driven axles and non-driven axles, including any axle suspension.
BODY AND STRUCTURE	E	This Section covers all the main functions and systems related to the structure and the body of the machine, including the frame, the shields, the operators cab and the platform. The functions related to the positioning of the machine frame are included in Section F, Frame Positioning.

SECTION	LETTER	DESCRIPTION
FRAME POSITIONING	F	This Section covers all the main functions and systems related to positioning of the machine frame or to positioning the attachment on the supporting machine frame.
TOOL POSITIONING	G	This Section covers all the functions related to the final and/or automatic positioning of the tool once the tool is positioned using the Working Arm or the machine frame.
WORKING ARM	H	This Section covers all the functions related to the articulated or single arms mounted on the front or rear of the machine. A working arm can have various tools and quick couplers mounted on to it. The tools and quick couplers are included in Section J, Tools and Couplers.
TOOLS AND COUPLERS	J	This Section covers all the functions related to the specific tools that mount on the front, rear or beside the machine. The tools described here can be mounted with the positioning systems (lifting, side shift, swing) listed in Section G Tool Positioning. This Section covers all the quick coupling systems, located between the tool and the positioning system. The tools used for field preparation, soil preparation and treatment, planting and seeding are included.
CROP PROCESSING	K	This Section covers all the functions related to crop processing.
FIELD PROCESSING	L	This Section covers all the field processing functions of the machine.

This manual contains these sections.

Contents

Your manual contains these Sections. The contents of each Section are explained over the following pages.

Section Contents

SECTION A, DISTRIBUTION SYSTEMS

Contents

DISTRIBUTION SYSTEMS - A

This Section covers the main systems that interact with most of the functions of the product. It includes the central parts of the hydraulic, electrical, electronic, pneumatic, lighting and grease lubrication systems. The components that are dedicated to a specific function are listed in the Chapter where all the technical information for that function is included.

SECTION B, POWER PRODUCTION

Contents

POWER PRODUCTION - B

This section covers all the functions related to the production of power to move the machine and to drive various devices. In the case of a pulled-type machine, this Section covers the power take-off function where power is provided from the towing machine

SECTION D, TRAVELLING

Contents

This Section covers all the functions related to moving the machine, including tracks, wheels, steering and braking. It covers all the axles both driven axles and non-driven axles, including any axle suspension.

SECTION F, FRAME POSITIONING

Contents

This Section covers all the main functions and systems related to the positioning of the machine frame or to positioning the attachment on the supporting machine frame.

SECTION H, WORKING ARM

Contents

This Section covers all the functions related to the articulated or single arms mounted on the front or rear of the machine. A working arm can have various tools and quick couplers mounted on to it.

SECTION L, FIELD PROCESSING

Contents

This Section covers all the field processing functions of the machine.

Chapters

Each Chapter is identified by a letter and number combination e.g. Spraying L.20.A. The first letter is identical to the Section letter i.e. Chapter L.10.a is inside Section L, Field Processing. The Chapter Contents lists all the "Technical Data" (specifications), "Functional Data" (how it works), "Service Data" (remove, install adjust, etc..) and "Diagnostic Data" (fault codes and troubleshooting) that have been written in that Chapter for that function or system on the machine.

Contents

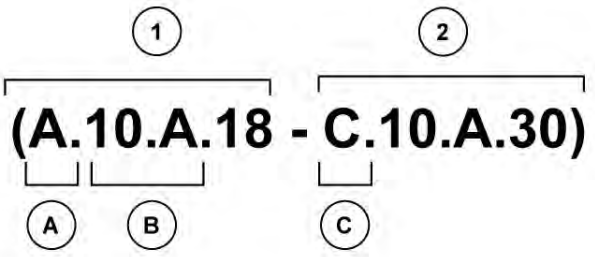
The Chapter Index lists in alphabetical order all the types of information (called Information Units) that have been written in that Chapter for that function or system on the machine.

Contents

Information Units and Information Search

Each chapter is composed of information units. Each information unit has the ICE code shown in parentheses which indicates the function and the type of information written in that information unit. Each information unit has a page reference within that Chapter. The information units provide a quick and easy way to find just the right piece of technical information you are looking for.

example information unit	Stack valve - Sectional View (A.10.A.18 - C.10.A.30)				
Information Unit ICE code	A	10.A	18	C	10.A.30
ICE code classification	Distribution systems	Primary hydraulic power	Stack valve	Functional data	Sectional view



CRIL03J033E01 1

Navigate to the correct information unit you are searching for by identifying the function and information type from the ICE code.

- **(1)** Function and **(2)** Information type.
- **(A)** corresponds to the sections of the repair manual.
  (B) corresponds to the chapters of the repair manual.
  (C) corresponds to the type of information listed in the chapter contents, Technical data, Functional Data, Diagnostic or Service.
  (A) and **(B)** are also shown in the page numbering on the page footer.
  THE REST OF THE CODING IS NOT LISTED IN ALPHA-NUMERIC ORDER IN THIS MANUAL.
- You will find a table of contents at the beginning and end of each section and chapter.
  You will find an alphabetical index at the end of each chapter.
- By referring to **(A)**, **(B)** and **(C)** of the coding, you can follow the contents or index (page numbers) and quickly find the information you are looking for.

Page Header and Footer

The page header will contain the following references:

- Section and Chapter description

The page footer will contain the following references.

704039S 2

Page Footer Information

Printed references found at the base of each page then equate to

- The publication number for that Manual, Section or Chapter.(SQ-044V1)
- Revision number of the publication (1)
- Publication date (10/09/2004)
- Chapter reference (n/a)
- Page reference (6)

Safety rules (- A.50.A.10)

67, 67XL

0960012c 1

The safety-alert symbol is used to denote possible danger and care should be taken to prevent bodily injury. This symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! This symbol appears with text reading "Danger!", " Caution!", or "Warning!". These words indicate three levels of possible hazards, which are described below.
DANGER! - Indicates an immediate hazardous situation which if not avoided, will result in death or serious injury. The color associated with Danger is RED.
WARNING! - Indicates a potentially hazardous situation that if not avoided, could result in death or serious injury. The color associated with Warning is ORANGE.
CAUTION! - 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. The color associated with Caution is YELLOW.
A CAREFUL OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT.

⚠ CAUTION ⚠

M870 - Use rubber gloves, protective eye wear and protective clothing when cleaning or working with components covered with active chemical.

⚠ CAUTION ⚠

M871 - Shut down the machine, remove key, be sure all moving parts have stopped and all pressure in the systems is relieved before cleaning, adjusting or lubricating the equipment.

⚠ CAUTION ⚠

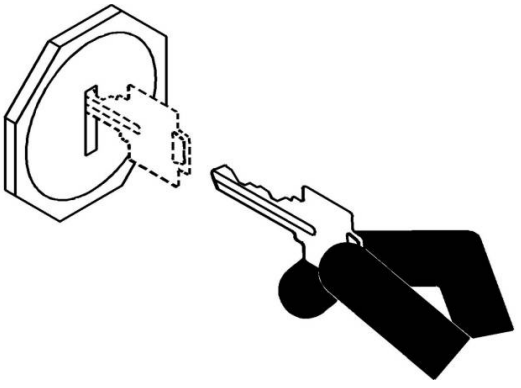
M880 - Always be certain that all pressure in the hydraulic circuits is relieved before servicing or disconnecting the hydraulics.

GENERAL SAFETY PRACTICES

- REVIEW this manual before each season of use.
- NEVER allow anyone unfamiliar, untrained, or complacent to operate the implement.
- USE EXTREME CARE when cleaning, filling, or adjusting the implement.
- MAINTAIN YOUR IMPLEMENT in proper working condition. Unauthorized modifications to the machine may impair function and/or safety and affect machine life.
- KEEP CHILDREN AWAY from chemicals and equipment.
- PARK ON LEVEL GROUND and block adequately.
- AVOID moving machines.

098001M1 2

- DISENGAGE POWER AND SHUT DOWN the tractor engine (remove the key from the tractor ignition) and be certain that all moving parts have stopped, and all pressure in the system is relieved before cleaning, adjusting, or lubricating the equipment.



192169C 3

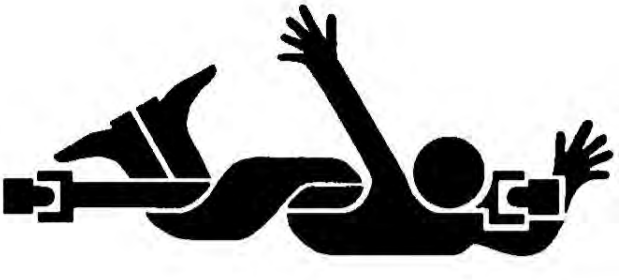
- KNOW the operator's manual well.
- KEEP service area clean.

098002M1 4

- DO NOT enter tank unless another person is present.

196149S 5

- DO NOT enter tight areas.
- BE CERTAIN machine is tagged 'Out of Order' or work area is supervised.
- DO NOT work around rotating equipment. Loose clothing, rings, watches, etc. may get caught and cause serious injury.

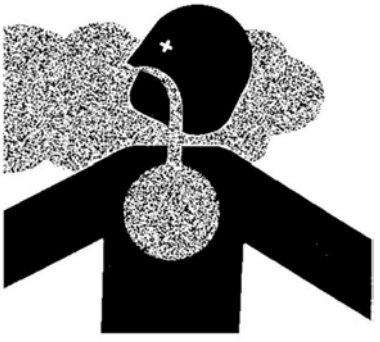


097001M1 6

- BE CERTAIN all moving parts have stopped before servicing.

098004M1 7

- AVOID toxic vapors. Breathe clean air.



0960039m1 8

- DO NOT permit smoking.

196150M1 9

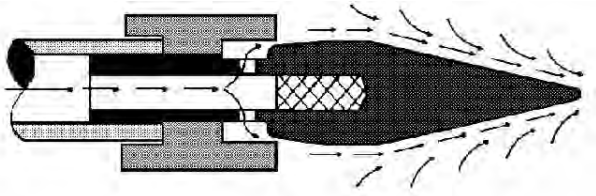
- WEAR protective clothing.

192078M1 10

- AIR AND AIR HOSES
  COMPRESSOR HOSES may move unexpectedly when suddenly disconnected.

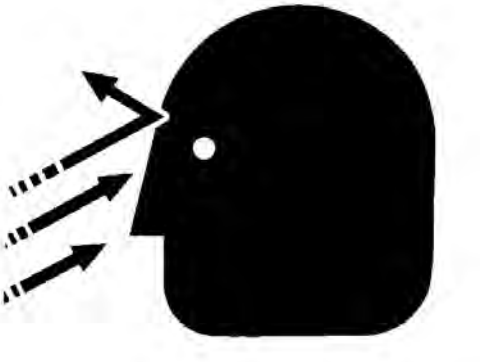
098005M1 11

- USE PROPER air nozzles. Never use compressed air to clean off clothes or otherwise direct it toward yourself.



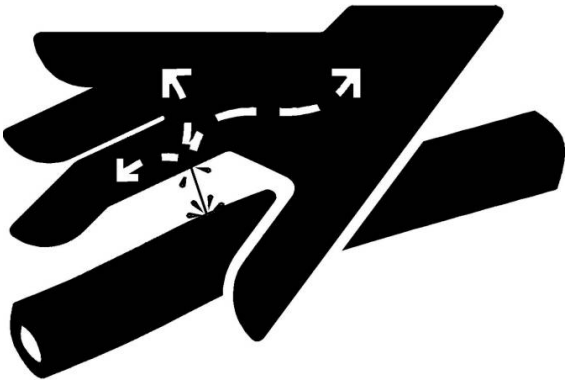
098006M1 12

- AVOID getting chemicals into eyes. Use eye protection.



098007M1 13

- HYDRAULICS AND HYDRAULIC LEAKS
  AVOID high-pressure fluids.
- ESCAPING HYDRAULIC FLUID IS A SERIOUS HAZARD. Escaping hydraulic fluid that is under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting the hydraulic lines. Check/tighten all connections BEFORE applying pressure.



000002C 14

- BEWARE excessive hydraulic pressure. Explosive structural failure can result.
- BEWARE air locks in cylinders. Large cylinder displacements can occur without hydraulic oil flow.
- SHIELDS
  REPAIR any damaged shields.
- KEEP all shields in place.
- BE EXTRA CAUTIOUS when repairing or servicing without protective shields.

098008M1 15

- ELECTRICAL
  REMOVE the ground wire to avoid arcing contacts.
- REMOVE the ground wire when welding.

098009M1 16

- TIRES
  USE A CAGE if possible when setting tires on rims.
- AVOID excessive air pressure.
- DO NOT OVER-INFLATE tires. NEVER lean over a tire while inflating it.

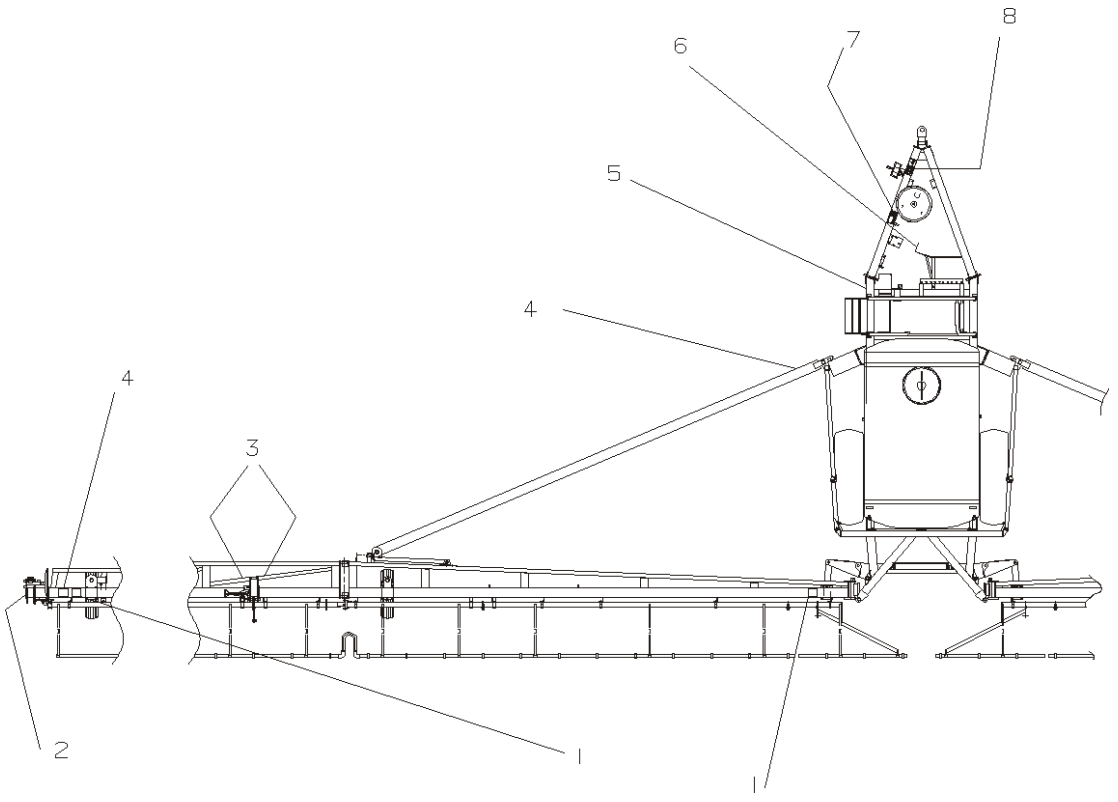
960041M1 17

⚠ **WARNING** ⚠

M169B - Do not remove, install or make repairs to a tire on a rim. Take the tire and rim to a tire shop where persons with special training and special safety tools are available. If the tire is not in correct position on the rim, or if too full of air, the tire bead can loosen on one side and cause air to leak at high speed and with large force. Because the air leak can thrust the tire in any direction, and with much force, you will be in danger of injury.

Decals (- A.50.A.30)

67, 67XL

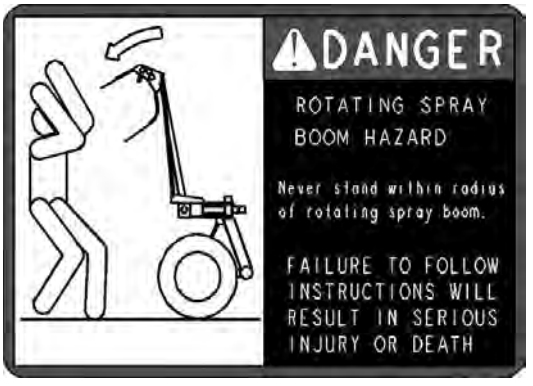


704010C 1

Safety Decal Locations - Wheeled Boom Sprayer

Refer to Decal Descriptions

1. Danger - Rotating Spray Boom Hazard



SQ78025 2

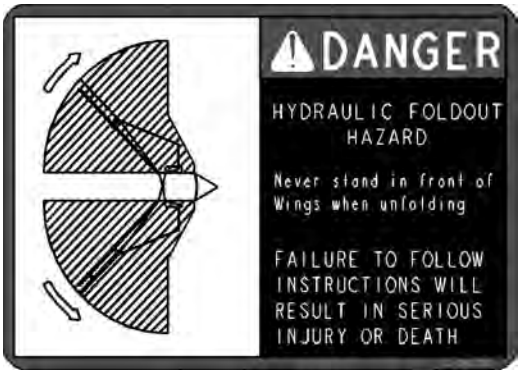
2. Danger - Falling & Raising Disc Stand Clear

SP92028 3

3. Caution - Engage Transport Locks

SQ78027 4

4. Danger - Hydraulic Foldout Hazard



SQ78026 5

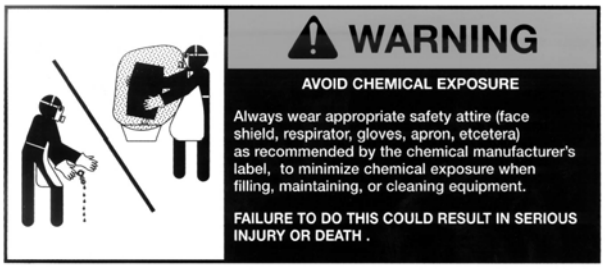
5. Caution - Operation and Service

GD50072 6

6. Caution - Keep Tank Lid Closed

SQ78028 7

7. Warning - Avoid Chemical Exposure



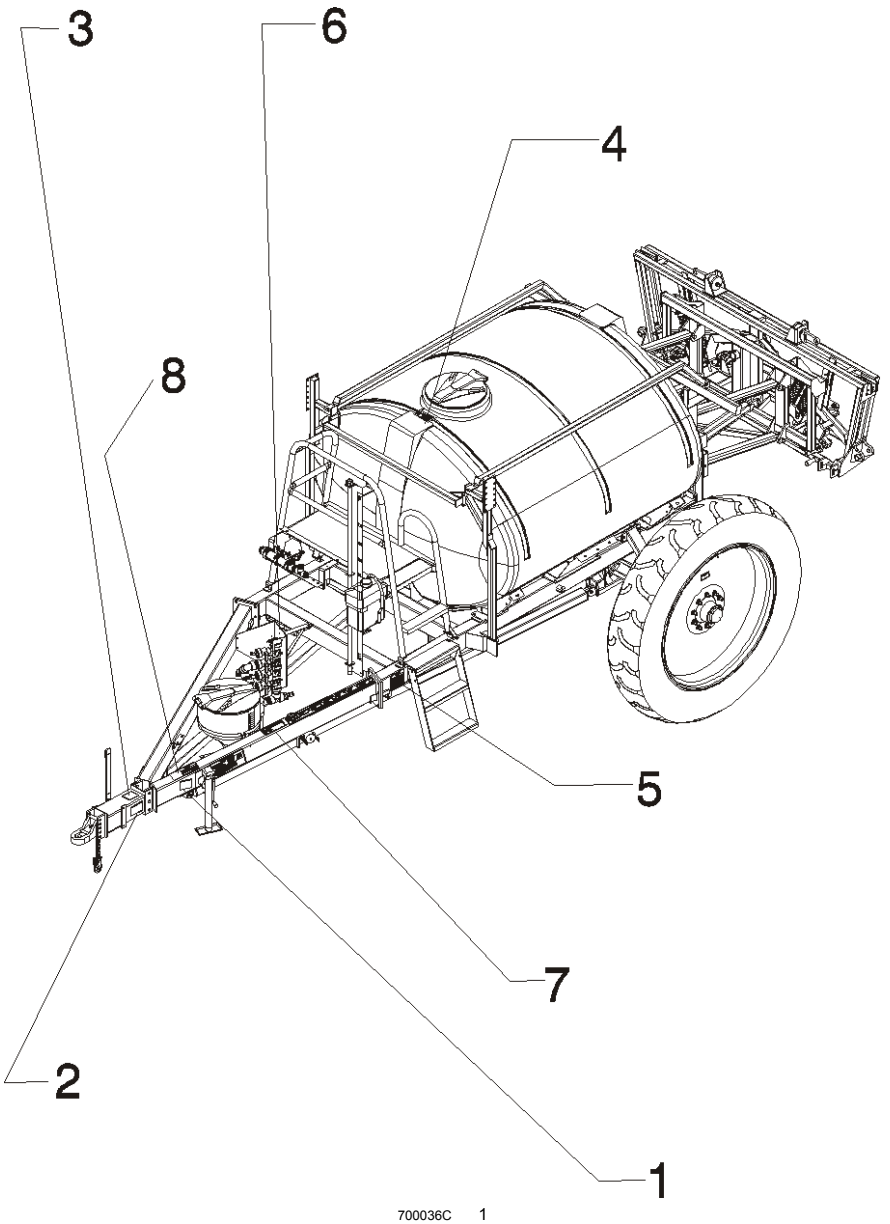
SP92030 8

8. Caution - Escaping Fluid Hazard

GD50077 9

Decals (- A.50.A.30)

67, 67XL



700036C 1

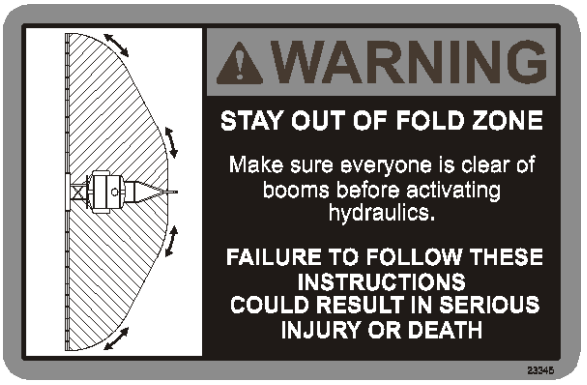
Safety Decal Locations

Refer to Decal Descriptions

1. Danger - Hitch Upending Hazard

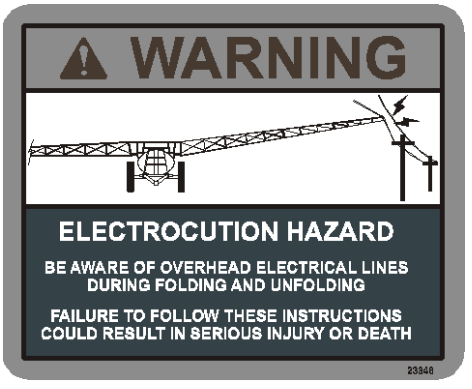
23347 2

2. Warning - Stay Out of Fold Zone



23345 3

3. Warning - Electrocution Hazard



23346 4

4. Danger - Never Enter Sprayer Tank

SQ78032 5

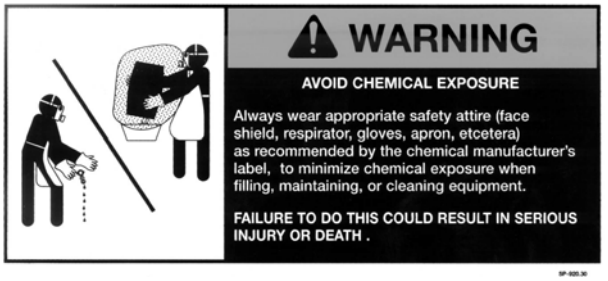
5. Caution - Operation and Service

GD50072 6

6. Caution - Keep Tank Lid Closed

SQ78028 7

7. Warning - Avoid Chemical Exposure



SP92030 8

8. Caution - Escaping Fluid Hazard

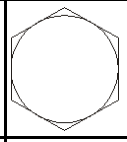
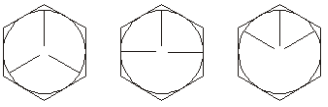
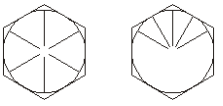
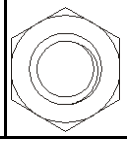
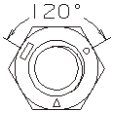
GD50077 9

Torque (- A.90.A.10)

67, 67XL

BOLT TORQUE INFORMATION

1. Fasteners should be replaced with the same or higher grade fasteners. If higher grade fasteners are used, these should only be tightened to the strength of the original.
2. Make sure the fasteners threads are clean and that thread engagement is started. This will prevent them from failing when being tightened.
3. Tighten plastic insert or crimped steel-type lock nuts to approximately **50 %** of the dry torque, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.
4. The L9 (Alloy) fasteners torque values are for a bolt, nut, and two washers. When using L9 (Alloy) fasteners, do not use the values in this table for tapped holes.

GRADE							
	1 or 2	5	5.1	5.2	8	8.2	L9 (Alloy)
SAE Markings for Bolts and Cap Screws							
	2	5			8		L9 (Alloy)
SAE Markings for Hex Nuts							

	GRADE 2 *				GRADE 5, 5.1 or 5.2				GRADE 8 or 8.2				GRADE L9 (Alloy)			
	Dry **		Lubricated **		Dry**		Lubricated **		Dry**		Lubricated **		Head		Nut	
SIZE	Nm	lbf/ft	Nm	lbf/ft	Nm	lbf/ft	Nm	lbf/ft	Nm	lbf/ft	Nm	lbf/ft	Nm	lbf/ft	Nm	lbf/ft
1/4 UNF	7.5	5.5	5.7	4.2	10.8	8	8.5	6.3	16.3	12	12.2	9	13.6	10	14.9	11
1/4 UNC	8.5	6.3	6.4	4.7	13.6	10	9.8	7.2	19	14	13.6	10	16.3	12	17.6	13
5/16 UNF	15	11	11	8	23	17	18	13	33	24	24	18	26	19	28	21
5/16 UNC	16	12	12	9	26	19	19	14	37	27	27	20	27	20	31	23
3/8 UNF	27	20	20	15	41	30	31	23	61	45	47	35	41	30	45	33
3/8 UNC	31	23	23	17	47	35	34	25	68	50	47	35	47	35	52	38
7/16 UNF	43	32	33	24	68	50	47	35	95	70	68	50	75	55	81	60
7/16 UNC	49	36	37	27	75	55	54	40	108	80	81	60	81	60	88	65
1/2 UNF	68	50	47	35	102	75	75	55	149	110	108	80	115	85	129	95
1/2 UNC	75	55	54	40	115	85	88	65	163	120	122	90	129	95	142	105
9/16 UNF	95	70	75	55	149	110	108	80	203	150	149	110	163	120	190	140
9/16 UNC	108	80	81	60	163	120	122	90	231	170	176	130	183	135	203	150
5/8 UNF	136	100	102	75	203	150	149	110	285	210	217	160	231	170	251	185

	GRADE 2 *				GRADE 5, 5.1 or 5.2				GRADE 8 or 8.2				GRADE L9 (Alloy)			
	Dry **		Lubricated **		Dry**		Lubricated **		Dry**		Lubricated **		Head		Nut	
SIZE	Nm	lbf/ft	Nm	lbf/ft	Nm	lbf/ft	Nm	lbf/ft	Nm	lbf/ft	Nm	lbf/ft	Nm	lbf/ft	Nm	lbf/ft
5/8 UNC	149	110	115	85	231	170	176	130	325	240	244	180	258	190	278	205
3/4 UNF	237	175	176	130	353	260	271	200	515	380	380	280	359	265	393	290
3/4 UNC	271	200	190	140	407	300	298	220	570	420	420	310	447	330	481	355
7/8 UNF	231	170	170	125	583	430	434	320	814	600	610	450	644	475	685	505
7/8 UNC	244	180	190	140	637	470	475	350	909	670	678	500	705	520	793	585
1 UNF	339	250	258	190	868	640	651	480	1234	910	922	680	746	550	1051	775
1 UNC	380	280	285	210	976	720	732	540	1383	1020	1031	760	949	700	1220	900
1-1/8 UNF	475	350	366	270	1071	790	800	590	1749	1290	1315	970	1390	1025	1559	1150
1-1/8 UNC	542	400	407	300	1207	890	909	670	1953	1440	1464	1080	1559	1150	1797	1325
1-1/4 UNF	678	500	515	380	1519	1120	1139	840	2468	1820	1844	1360	1898	1400	2170	1600
1-1/4 UNC	746	550	570	420	1681	1240	1261	930	2726	2010	2048	1510	2170	1600	2373	1750
1-1/2 UNF	1180	870	881	650	2644	1950	1980	1460	4285	3160	3214	2370	3932	2900	4407	3250
1-1/2 UNC	1329	980	990	730	2983	2200	2224	1640	4827	3560	3621	2670	4475	3300	4949	3650

IMPORTANT: *DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically. Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.*

NOTES

- *Grade 2 applies for hex caps (not hex bolts) up to **152 mm** (**6 in**) long. Grade 1 applies for hex cap screws over **152 mm** (**6 in**) long, and for all other types of bolts and screws of any length.
- **"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

Basic instructions (- A.90.A.05)

67, 67XL

Suspended Boom Sprayer Service Safety

⚠ **DANGER** ⚠

M916 - NEVER disconnect the sprayer in field position. Serious injury or death will result due to hitch upending because of negative hitch weight.

When servicing the sprayer in field position, make sure that the cylinder service locks are installed.

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Basic instructions (- A.90.A.05)

67, 67XL

HOW TO MEASURE VOLTAGES IN THE ELECTRONICS SYSTEM

When asked to measure a voltage, the voltage being measured is always at one point with respect to (relative to) the voltage at another point.

Example: To measure the voltage at point A with respect to point B, place one meter probe (typically red in color, and connected to the meter connector labeled “V“). Place the other meter probe (typically black in color, and connected to the meter connector labeled “COM“).

If the units of voltage are specified as “volts dc”, be sure your meter is set to “dc”. If the units of voltage are specified as “volts ac”, be sure your meter is set to “ac”.

North American automotive electrical systems often use the chassis (metal frame) of the automobile as the return path (often referred to as ground) for electrical current. The electronics system does not use the chassis for a return path, and no voltage measurements should be made with respect to the chassis. All components in the electronics system should be considered to be electrically isolated from the chassis, although at the tractor the electronics system return is connected to the battery negative terminal which is in turn connected to the tractor chassis.

ELECTRICAL ISOLATION

Two points are electrically isolated when the resistance between them is “infinite” (very large, greater than **10,000,000 ohms**). To verify two points are electrically isolated.

1. Set your meter to measure resistance (usually labeled with the ohm symbol).
2. Hold the two probes apart from each other in the air. The meter must indicate infinite resistance (usually indicated by the infinity symbol or on digital multimeters, “++++” or “0L” for overload).
3. Hold the two probes together. The meter must indicate a very low resistance, less than **1.0 ohms**. The resistance measured will vary depending on what scale the meter is set to.
4. Place one probe on one point and the other probe on the other point. It does not matter which probe is placed on which point when measuring resistance. The meter must indicate infinite resistance as it did in 2 above for the two points to be electrically isolated.

ELECTRICAL CONTINUITY

Two points have electrical continuity when the resistance between them is very small, less than **0.1 ohms** . To verify two points have electrical continuity

1. Set your meter to measure resistance (usually labeled with the ohm symbo).
2. Since we are expecting to measure a resistance of **0 ohms**, set the scale to the lowest available.
3. Hold the two probes apart from each other in the air. The meter must indicate infinite resistance (usually indicated by the infinity symbol or on digital multimeters, “++++” or “0L” for overload).
4. Hold the two probes together. The meter must indicate a very low resistance, less than **1.0 ohms**. Record or memorize this resistance. This is the probe resistance.
5. Place one probe on one point and the other probe on the other point. It does not matter which probe is placed on which point when measuring resistance. Subtract the probe resistance measured in 4 above from the meter reading. If the meter reading minus the probe resistance is less than **0.1 ohms**, the two points have electrical continuity.

RESISTANCE

To measure the resistance between two points.

1. Set your meter to measure resistance (usually labeled with the ohm symbol).
2. Hold the two probes apart from each other in the air. The meter must indicate infinite resistance (usually indicated by the infinity symbol or on digital multimeters, “++++” or “0L” for overload).

3. Hold the two probes together. The meter must indicate a very low resistance, less than **1.0 ohms**. The resistance measured will vary depending on what scale the meter is set to
4. If the expected resistance is less than **20.0 ohms** ohms, go to 6.
5. Place one probe on one point and the other probe on the other point. It does not matter which probe is placed on which point when measuring resistance. Read the resistance indicated in the meter
6. Since we are expecting to measure a resistance less than **20.0 ohms**, set the meter to an appropriate scale, likely the lowest available.
7. Hold the two probes together. The meter must indicate a very low resistance, less than **1.0 ohms**. Record or memorize this resistance. This is the probe resistance.
8. Place one probe on one point and the other probe on the other point. It does not matter which probe is placed on which point when measuring resistance. Subtract the probe resistance measured in 7 above from the meter reading. The meter reading minus the probe resistance is the resistance between the two points.

Conversion factors (- A.92.A.21)

67, 67XL

Conversion Chart

Original Unit	Multiplied By	Conversion Factor	=	New Unit
ac	x	0.405	=	**ha**
bar	x	100.00	=	**kPa**
bar	x	14.5	=	**psi**
Bu	x	35.239	=	**L**
cm	x	0.39	=	**in**
°C	(1.8 * **°C**) + 32		=	**°F**
ft	x	0.31	=	**m**
ft³	x	0.03	=	**m³**
°F	(**°F** - 32) * 0.556)		=	**°C**
ha	x	2.471	=	**ac**
Hp	x	1.746	=	**kW**
UK fl oz	x	0.96	=	**US fl oz**
UK fl oz	x	28.413	=	**mL**
UK fl oz	x	0.006	=	**UK gal**
UK gal / ac	x	11.234	=	**L / ha**
UK gpm	x	4.546	=	**L/min**
UK gal	x	160	=	**UK fl oz**
UK gal	x	1.201	=	**US gal**
UK gal	x	4.546	=	**L**
UK gal / ac	x	1.201	=	**US gal / ac**
in	x	25.4	=	**mm**
in	x	2.54	=	**cm**
kg	x	2.210	=	**lb**
kg/ha	x	0.892	=	**lbs/ac**
km/h	x	0.621	=	**mph**
km	x	0.621	=	**miles**
kPa	x	0.145	=	**psi**
kPa	x	0.010	=	**bar**
kW	x	1.358	=	**Hp**
L	x	0.028	=	**Bu**
L / ha	x	0.107	=	**US gal / ac**
L / ha	x	0.089	=	**UK gal / ac**
L	x	0.264	=	**US gal**
L/min	x	0.220	=	**UK gpm**
L	x	0.220	=	**UK gal**
L/min	x	0.26	=	**US gpm**
lb	x	0.454	=	**kg**
lb ft	x	1.356	=	**Nm**
lb in	x	0.133	=	**Nm**
lbs/ac	x	1.121	=	**kg/ha**
m	x	3.281	=	**ft**
m³	x	35.34	=	**ft³**
miles	x	1.609	=	**km**
mL	x	0.035	=	**UK fl oz**
mL	x	0.034	=	**US fl oz**
mm	x	0.039	=	**in**
mph	x	1.609	=	**km/h**
Nm	x	8.851	=	**lb in**
Nm	x	0.738	=	**lb ft**
psi	x	0.069	=	**bar**
psi	x	6.895	=	**kPa**

Original Unit	Multiplied By	Conversion Factor	=	New Unit
US gpm	x	3.785	=	**L/min**
US fl oz	x	1.04	=	**UK fl oz**
US gal / ac	x	0.833	=	**UK gal / ac**
US fl oz	x	0.008	=	**US gal**
US gal / ac	x	9.356	=	**L / ha**
US gal	x	128	=	**US fl oz**
US fl oz	x	29.57	=	**mL**
US gal	x	0.83	=	**UK gal**
US gal	x	3.79	=	**L**

Abbreviation (- A.92.A.20)

67, 67XL

Units of Measure

SYMBOL	UNIT
ac	Acres
Bu	Bushel
cm	Centimeters
m³	Cubic Meters
ft³	Cubic Feet
°F	Degrees Fahrenheit
°C	Degrees Celcius
ft	Feet
oz	Fluid ounces
UK gpm, **US gpm**	Gallons/minute
gal/ac	Gallons per acre
UK gal, **US gal**	Gallons
ha	Hectares
Hp	Horsepower
in	Inch
kg/ha	Kilograms per hectare
kg	Kilograms
km	Kilometer
km/h	Kilometers per hour
kN	Kilonewtons
kPa	Kilopascal
kW	Kilowatt
L/ha	Liters per hectare
L/min	Liters/minute
L	Liter
m	Meters
mph	Miles per hour
mm	Millimeters
Nm	Newton Meters
lb in	Pound force inches
lb ft	Pound force feet
psi	Pounds per square inch
lb	Pounds
lbs/ac	Pounds per acre
amps	Amperes

ELECTRONIC SYSTEM ABBREVIATIONS

ABBREVIATION	DEFINITION
485	Standard for communication interface between electronic units.
AUX	Auxiliary
CAL	Calibrate
CAN	Controller area network
CAN L	Low voltage level signal for CAN communications.
CAN H	High voltage level signal for CAN communications.
DTM Series	Model of deustch connector
ECU BAT	ECU power connection, same as ECU PWR
ECU	Electronic control unit
EEPROM	Electrically erasable programmable read only memory
GND	Ground (electrical)
IC	Integrated circuit

ABBREVIATION	DEFINITION
LCD	Liquid crystal display
LED	Light emitting diode
M_CLUTCH	Master clutch
M_CLUTCH_GND	Master clutch ground
NC	Not connected
NR	Not required
NV MEMORY	Non volatile memory
OPT BIN	Optical bin (sensor)
PC	Personal computer
PWR	Power
RAM	Random access memory
ROM	Read only memory
RS232	Standard for communication signal interface between computers and electronic units or communication systems
RTN	Power return connection; may not be at the same voltage as ground (GND)
RX	Receive
SEN	Sensor
SW	Switch
SW12V	Switched 12 volts
SW12V_GND	Switched 12 volt ground
TBC	Terminating bias circuit
TX	Transmit
Ubin	Ultrasonic bin (sensor)
VR	Variable rate

General specification (- A.92.A.10)

67, 67XL

Agitators

MODEL	AGITATOR
Model 67	four horizontal jet type
Model 67XL	four horizontal jet type

Spraybooms

2.5* cm (**1 in**) schedule 80 Polypropylene pipe **2.5* cm** (**1 in**) schedule 40 Stainless steel pipe* Approximate metric equivalent

Controls

VALVE	SIZE and TYPE
Agitation Valve	**2.5* cm** (**1 in**) NPT quarter turn ball valve
Induction Tank Supply Valve	**2.5* cm** (**1 in**) NPT quarter turn ball valve
Supply Valve	**3.8* cm** (**1 1/2 in**) NPT quarter turn ball valve
Induction Tank Suction Valve	**3.8* cm** (**1 1/2 in**) NPT quarter turn ball valve
Venturi Supply Valve	**2.5* cm** (**1 in**) NPT quarter turn ball valve
Water Transfer Valve	**5.0* cm** (**2 in**) NPT quarter turn ball valve

* Approximate metric equivalent

Filter (Line)

3.8* cm (**1 1/2 in**) NPT , 80 mesh strainer* Approximate metric equivalent

Fittings

GFP (glass filled polypropylene)

Hoses

HOSE	SIZE
Supply	**5.0* cm** (**2 in**)
Agitation	**2.5* cm** (**1 in**)
To Spray Boom	**2.5* cm** (**1 in**)

* Approximate metric equivalent

Nozzles

COMPONENT	TYPE
Nozzle Assemblies	Split eyelet diaphragm check type
	Swivel nozzle-split eyelet diaphragm check type
Nozzle Caps	Quick-connect color coded
Nozzle Tips	A wide range of **80 °** or **110 °** flat fan spray tips are available in TeeJet Visiflo stainless steel or Combo-Jet stainless steel.

Electric Ball Valves

COMPONENT	DESCRIPTION
Power Requirement	**12 volts** dc, **1 amps**
Operating Range	**0 - 1034 kPa** (**0 - 150 psi**
Inlet Port	**5.0* cm** (**2 in**) FLANGE
Outlet Port	**2.5* cm** (**1 in**) NFPT

* Approximate metric equivalent

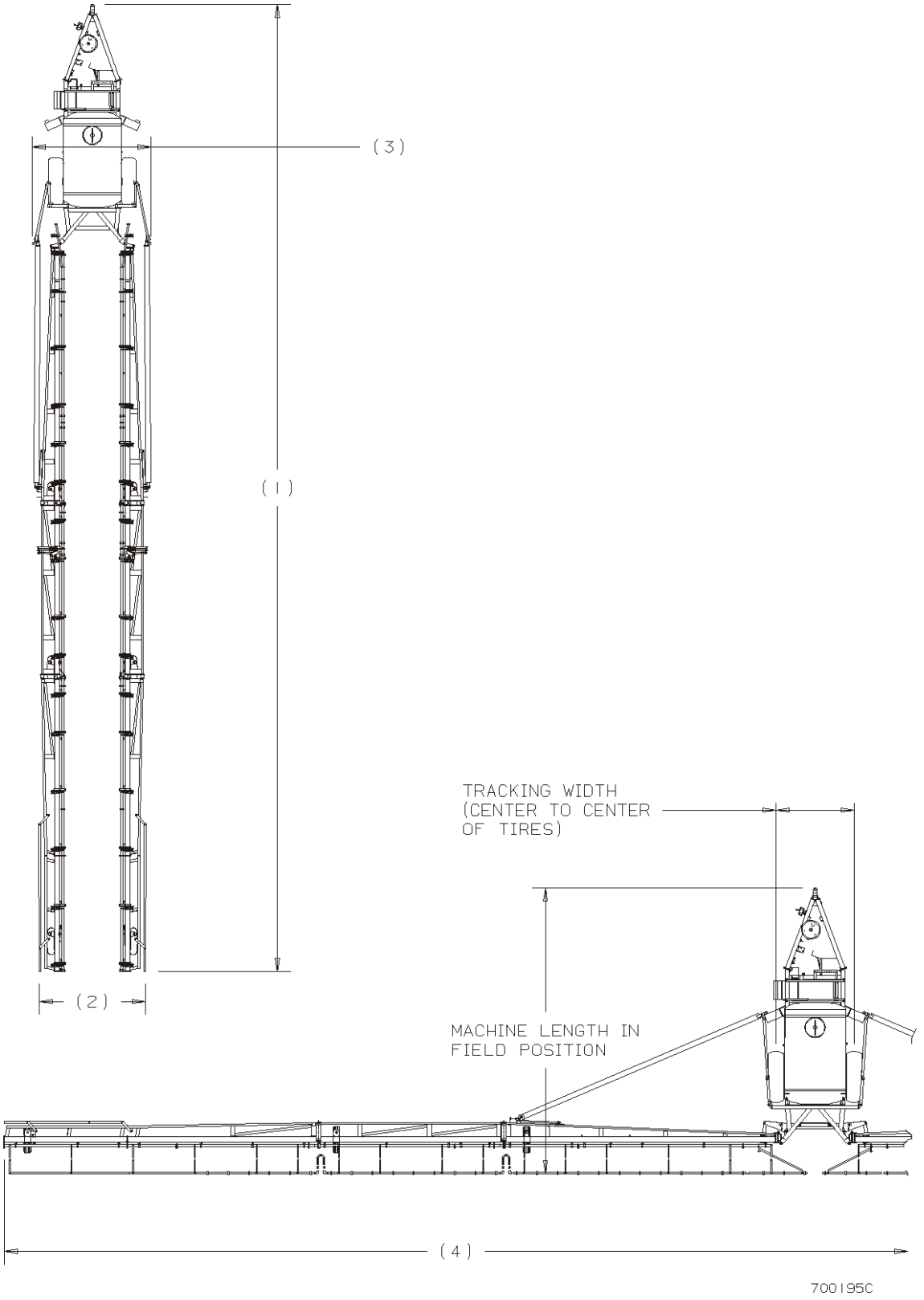
Tanks

TANK	DESCRIPTION
Model 67 Main Tank	**3860 L** (**1020 US gal**) (**850 UK gal**) polyethylene tank
Model 67XL Main Tank	**5680 L** (**1500 US gal**) (**1250 UK gal**) polyethylene tank
Strainer Basket	50 mesh strainer basket
Chemical Induction Tank	**46 L** (**12 US gal**) (**10 UK gal**) polyethylene tank
Fresh Water Tank	**430 L** (**115 US gal**) (**95 UK gal**) polyethylene tank

Dimension (- A.92.A.30)

67, 67XL

Wheeled Boom Dimensions



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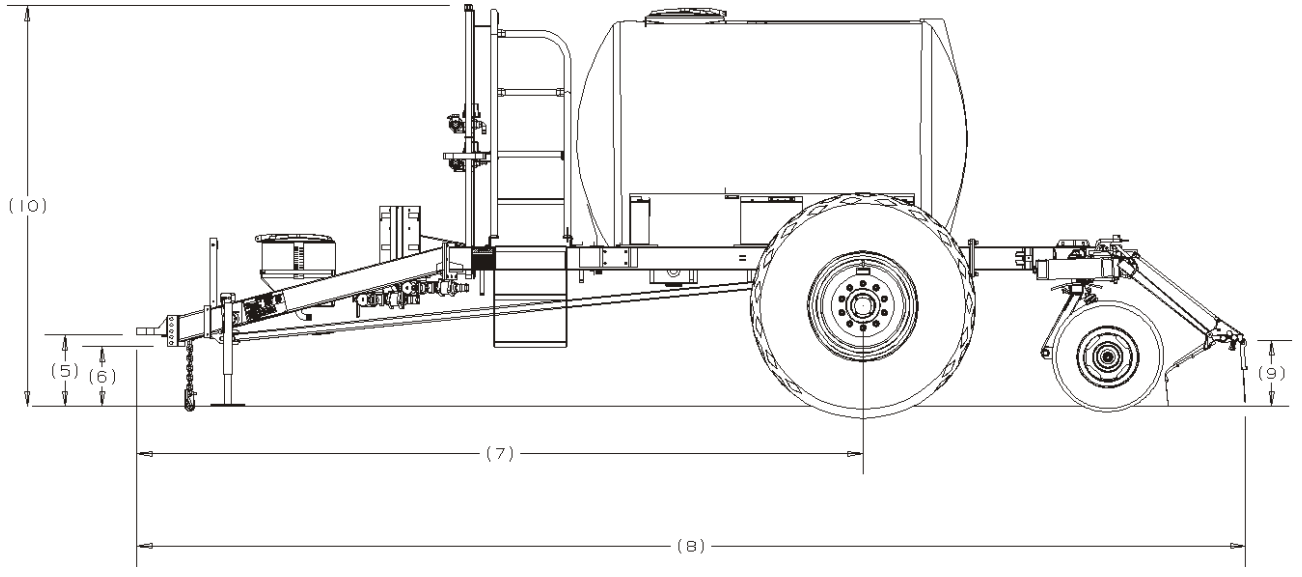
Typical Machine Dimensions - Wheeled Boom Top View

Machine Dimensions	Transport Position			Field Position
Boom Width	Length (1)	Boom Width (2)	Fold Arm Width (3)	Machine Width (4)
15.24 m	13.23 m	2.9 m	3.0 m	15.70 m
50 ft	43 ft 5 in	9 ft 6 in	9 ft 10 in	51 ft 4 in
16.46 m	13.71 m	2.9 m	3.0 m	16.66 m
54 ft	45 ft 1 in	9 ft 6 in	9 ft 10 in	54 ft 8 in
18.29 m	14.76 m	2.9 m	3.0 m	18.69 m
60 ft	48 ft 6 in	9 ft 6 in	9 ft 10 in	61 ft 4 in
19.51 m	15.27 m	2.9 m	3.0 m	19.71 m
64 ft	50 ft 1 in	9 ft 6 in	9 ft 10 in	64 ft 8 in
21.34 m	16.28 m	2.9 m	3.0 m	21.74 m
70 ft	53 ft 5 in	9 ft 6 in	9 ft 10 in	71 ft in
24.38 m	17.81 m	3.05 m	3.4 m	24.79 m
80 ft	58 ft 5 in	10 ft 0 in	11 ft 2 in	81 ft 4 in
25.60 m	18.31 m	3.05 m	3.4 m	25.81 m
84 ft	60 ft 1 in	10 ft 0 in	11 ft 2 in	84 ft 8 in
27.43 m	19.33 m	3.05 m	3.4 m	27.84 m
90 ft	63 ft 5 in	10 ft 0 in	11 ft 2 in	91 ft 4 in
28.65 m	19.84 m	3.05 m	3.4 m	28.85 m
94 ft	64 ft 1 in	10 ft 0 in	11 ft 2 in	94 ft 8 in
30.48 m	20.85 m	3.05 m	3.4 m	30.89 m
100 ft	68 ft 5 in	10 ft 0 in	11 ft 2 in	101 ft 4 in
31.70 m	21.36 m	3.05 m	3.4 m	31.9 m
104 ft	70 ft 1 in	10 ft 0 in	11 ft 2 in	104 ft 8 in
33.53 m	22.38 m	3.05 m	3.4 m	33.93 m
110 ft	73 ft 5 in	10 ft 0 in	11 ft 2 in	111 ft 4 in
34.75 m	22.89 m	3.05 m	3.4 m	34.95 m
114 ft	75 ft 1 in	10 ft 0 in	11 ft 2 in	114 ft 8 in
36.58 m	23.90 m	3.05 m	3.4 m	36.98 m
120 ft	78 ft 5 in	10 ft 0 in	11 ft 2 in	121 ft 4 in
37.80 m	24.40 m	3.05 m	3.4 m	38.00 m
124 ft	80 ft 1 in	10 ft 0 in	11 ft 2 in	124 ft 8 in
39.62 m	25.43 m	3.05 m	3.4 m	40.03 m
130 ft	83.5 ft in	10 ft 0 in	11 ft 2 in	131 ft 4 in
40.84 m	25.93 m	3.05 m	3.4 m	46.13 m
134 ft	85 ft 1 in	10 ft 0 in	11 ft 2 in	134 ft 8 in



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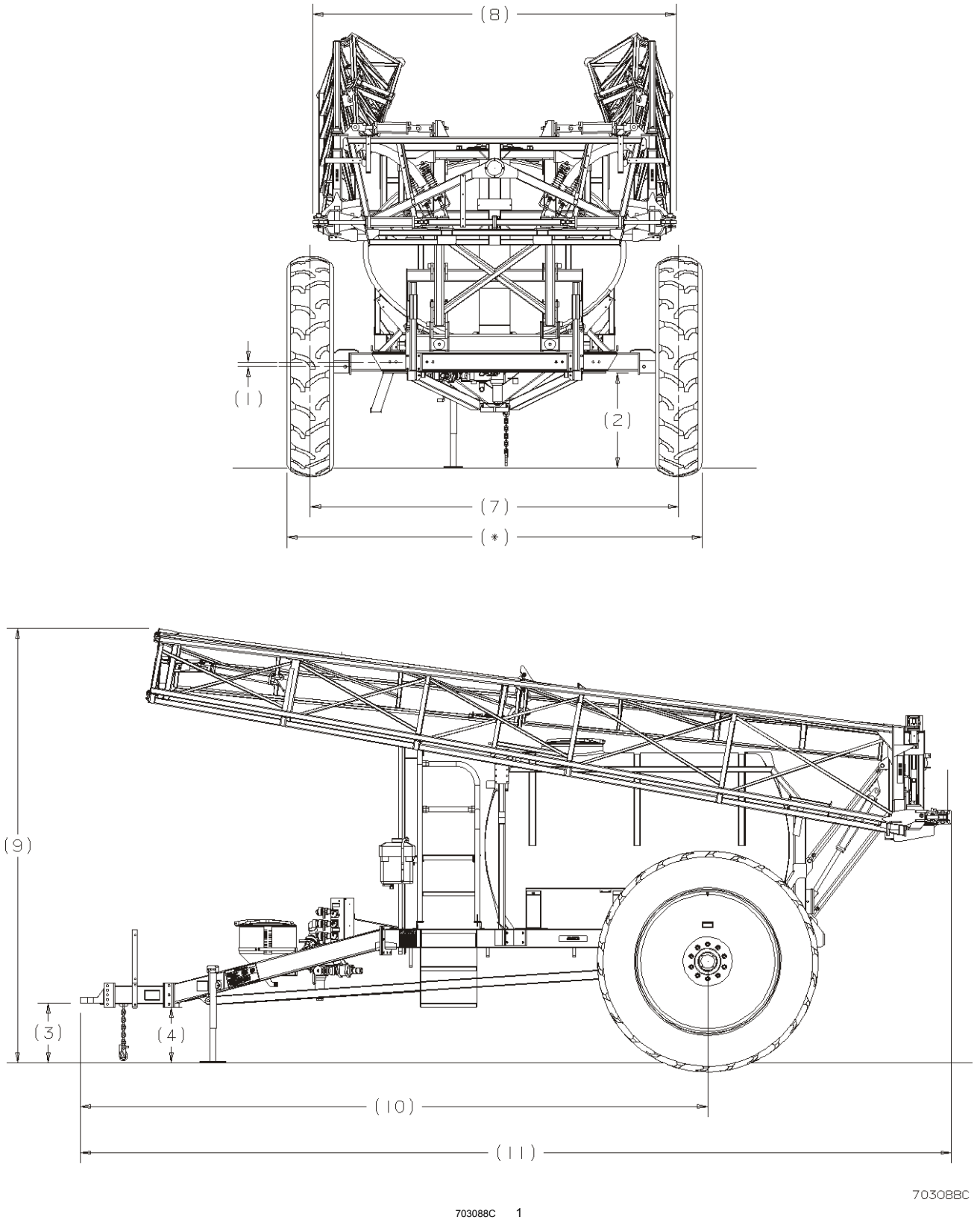
Typical Machine Dimension - Wheeled Boom Side View

MACHINE DIMENSION	MEASUREMENT
Hitch Range **(5)**	**36 - 53 cm** (**14 - 21 in**)
Axle to Hitch Pin **(7)**	**461.0 cm** (**181 1/2 in**)
Clearance **(6)**	**38.4 cm** (**15.1 in**)
Field Length **(8)**	**7.06 m** (**23 ft 2 in**)
Spray Range Field **(9)**	**38.1 - 119.4 cm** (**15 - 47 in**)
Machine Height **(10)**	**2.7 m** (**8 ft 6 in**)

Dimension (- A.92.A.30)

67, 67XL

Suspended Boom Dimensions



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Typical Machine Dimensions - Suspended Boom Transport Position

	Boom Width			
Machine Dimensions	**18.29 m (60 ft)**	**21.34 m (70 ft)**	**24.38 m (80 ft)**	**27.43 m (90 ft)**
Boom Width **(8)**	**299.7 cm**	**299.7 cm**	**299.7 cm**	**299.7 cm**
	118 in	**118 in**	**118 in**	**118 in**
With Windscreen	**325.1 cm**	**325.1 cm**	**325.1 cm**	**325.1 cm**
	128 in	**128 in**	**128 in**	**128 in**
Boom Height **(9)***	**331.5 cm**	**331.5 cm**	**350.5 cm**	**350.5 cm**
	130.5 in	**130.5 in**	**138 in**	**138 in**
Axle to Hitch Pin	**461.0 cm**	**461.0 cm**	**511.8 cm**	**511.8 cm**
(1)	**181.5 in**	**181.5 in**	**201.5 in**	**201.5 in**
Overall length	**667.6 cm**	**667.6 cm**	**718.4 cm**	**718.4 cm**
(11)	**262.8 in**	**262.8 in**	**282.8 in**	**282.8 in**

*Boom height will change with axle selection, tire pressure, options, etc.

6 800 kg (15 000 lb) Axles

Tire Size	Axle Offset (1)	Clearance	Hitch Range (3)	Clearance (4)	Boom Clearance	
					Minimum (5)	Maximum (6)
18.4-26 R3 AWT	**15.2 cm**	**71.1 cm**	**36 - 53cm**	**38.4 cm**	**50.3 cm**	**185.2 cm**
	6 in	**28 in**	**14 - 21 in**	**15.1 in**	**20 in**	**73 in**
18.4-26 R1 Lug	**15.2 cm**	**73.7 cm**	**38 - 56 cm**	**41.0 cm**	**52.8 cm**	**187.7 cm**
	6 in	**29 in**	**12 - 22 in**	**16.1 in**	**21 in**	**74 in**
14.9-38 R1 Lug	**15.2 cm**	**7837 cm**	**43 - 61 cm**	**46.0 cm**	**58.4 cm**	**193.0 cm**
	6 in	**31 in**	**17 - 24 in**	**18.1 in**	**23 in**	**76 in**
14.9R46 Lug	**15.2 cm**	**88.9 cm**	**50 - 71 cm**	**56.2 cm**	**68.6 cm**	**203.2 cm**
	6 in	**35 in**	**21 - 28 in**	**22.1 in**	**27 in**	**80 in**
14.9-38 R1 Lug	**7.6 cm**	**71.1 cm**	**36 - 53 cm**	**38.4 cm**	**50.3 cm**	**185.2 cm**
	3 in	**28 in**	**14 - 21 in**	**15.1 in**	**20 in**	**73 in**
14.9R46 Lug	**7.6 cm**	**83.8 cm**	**48 - 66 cm**	**51.1 cm**	**63.0 cm**	**197.9 cm**
	3 in	**33 in**	**19 - 26 in**	**20.1 in**	**25 in**	**78 in**
14.9R46 Lug	**3.8 cm**	**7837 cm**	**43 - 61 cm**	**46.0 cm**	**57.9 cm**	**192.8 cm**
	1.5 in	**31 in**	**17 - 24 in**	**18.1 in**	**23 in**	**76 in**

*Total width of the sprayer in transport position is the tracking width plus the width of the tires.

9 090 kg (20 000lb) Axles

Tire Size	Axle Offset (1)	Clearance	Hitch Range (3)	Clearance (4)	Boom Clearance	
					Minimum (5)	Maximum (6)
18.4-26 R3 Model 67	**15.2 cm**	**71.1 cm**	**36 - 53 cm**	**38.4 cm**	**50.3 cm**	**185.2 cm**
	6 in	**28 in**	**14 - 21 in**	**15.1 in**	**20 in**	**73 in**
18.4-26 R3 Model 67XL	**15.2 cm**	**71.1 cm**	**36 - 53 cm**	**38.4 cm**	**50.3 cm**	**185.2 cm**
	6 in	**28 in**	**14 - 21 in**	**15.1 in**	**20 in**	**73 in**
14.9R46 Model 67	**15.2 cm**	**88.9 cm**	**50 - 71 cm**	**56.2 cm**	**68.6 cm**	**203.2 cm**
	6 in	**35 in**	**21 - 28 in**	**22.1 in**	**27 in**	**80 in**
14.9R46 Model 67XL	**15.2 cm**	**88.9 cm**	**50 - 71 cm**	**56.2 cm**	**68.6 cm**	**203.2 cm**
	6 in	**35 in**	**21 - 28 in**	**22.1 in**	**27 in**	**80 in**
14.9R46 Lug	**3.8 cm**	**78.7 cm**	**43 - 61 cm**	**46.0 cm**	**57.9 cm**	**192.8 cm**
	1.5 in	**3.1 in**	**17 - 24 in**	**18.1 in**	**23 in**	**76 in**
16.5-16.1 Walkbeam	**35.6 cm**	**71.1 cm**	**36 - 53 cm**	**38.4 cm**	**50.3 cm**	**185.2 cm**
	14 in	**28 in**	**14 - 21 in**	**15.1 in**	**20 in**	**73 in**

*Total width of the sprayer in transport position is the tracking width plus the width of the tires.