



Angle Broom

For

Skid Steer Loaders

Operator's Manual
Set-Up Assembly
Maintenance
Parts Information



Read this Manual Before Use

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REFERENCE INFORMATION

Write the serial number for your attachment in the spaces below. Always refer to this serial number when calling for service or parts.

Serial Number.....

YOUR ATTACHMENT DEALER

ADDRESS:

PHONE:

CONTACT:

NOTE: *Erskine Attachments LLC reserves the right to make improvements in design or changes in specifications at any time without notice and without incurring any obligations to install them on units previously sold.*

SAFETY

DO NOT use or perform maintenance on this machine until this manual has been read and understood. In addition, read the Operation and Maintenance Manual(s) pertaining to the attachment and the attachment carrier (“Loader”).

The user is responsible for inspecting the machine daily, and for having parts repaired or replaced when continued use of the machine would cause damage, excessive wear to other parts or make the machine unsafe for continued operation.

If an operating procedure, tool device, maintenance or work method not specifically recommended is used, you must satisfy yourself that it is safe for you and others. You must also ensure that the attachment will not be damaged or made unsafe by the procedures you choose.

Erskine Attachments LLC cannot anticipate every possible circumstance that might involve potential hazard. The safety messages found in this manual and on the machine are therefore not all inclusive.

The signal words **CAUTION**, **WARNING**, or **DANGER** are used to indicate hazards.

⚠ CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

⚠ WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ DANGER Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

The word **IMPORTANT** is used in the text when immediate damage will occur due to improper technique or operation.

The word **NOTE** is used to convey information that is out of context with the manual text; special information such as specifications, techniques, reference information, and other information of a supplementary nature.

Improper operation can cause serious injury or death.

Pre-operation

- This machine is designed for small debris and snow removal only. **NEVER** use this machine for any other purpose.
- Read the operator's manual for the "Skid Steer Loader." **NEVER** allow untrained people to operate.
- Operating instructions must be given to everyone before operating this attachment and at least once a year thereafter in accordance with OSHA regulations.
- **NEVER** exceed the maximum recommended input power or speed specifications for the attachment. Over-powering or over-speeding the attachment may cause personal injury and/or machine damage.
- Keep all shields, guards, and covers in place.
- Do not modify equipment or add attachments that are not approved by Erskine Attachments LLC.
- Use adequate safety warning lights and devices as required by local regulations. Obey all local laws and regulations regarding machine operation on public property.

Operation

- Always wear eye protection that meets ANSI z87.1 standard or use with a loader enclosure that provides similar protection.
- Hydraulic connections may be hot after use. Use gloves if connecting or disconnecting after use.
- Check and be sure all operating controls are in neutral before starting the engine.
- Keep people away from loader, attachment and discharge when in use. This attachment sends objects flying and has rotating parts. **NEVER** direct discharge toward people – rocks and debris can be thrown.
- Depending on how this attachment is used, dust can be created. Prolonged exposure to dust can cause chronic and acute health problems. A NIOSH-approved respirator may be required.

Operation (continued)

- **NEVER** operate near embankments or terrain that is so steep that rollover could occur.
- Always stay in the operator position when using the attachment.
- Before leaving the operators position, disengage hydraulic drive, lower the attachment to rest flat on the ground, stop engine, set park brake, and wait for all motion to stop.
- **NEVER** place hands in the discharge area or clear debris while engine is running.

Avoid High Pressure Fluids Hazard



- Escaping fluid under pressure can penetrate the skin causing serious injury.
- Avoid the hazard by relieving the pressure before disconnecting hydraulic lines.
- Use a piece of paper or cardboard, NOT BODY PARTS, to check for suspected leaks. Wear protective gloves and safety glasses or goggles when servicing or performing maintenance on hydraulic systems.
- If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

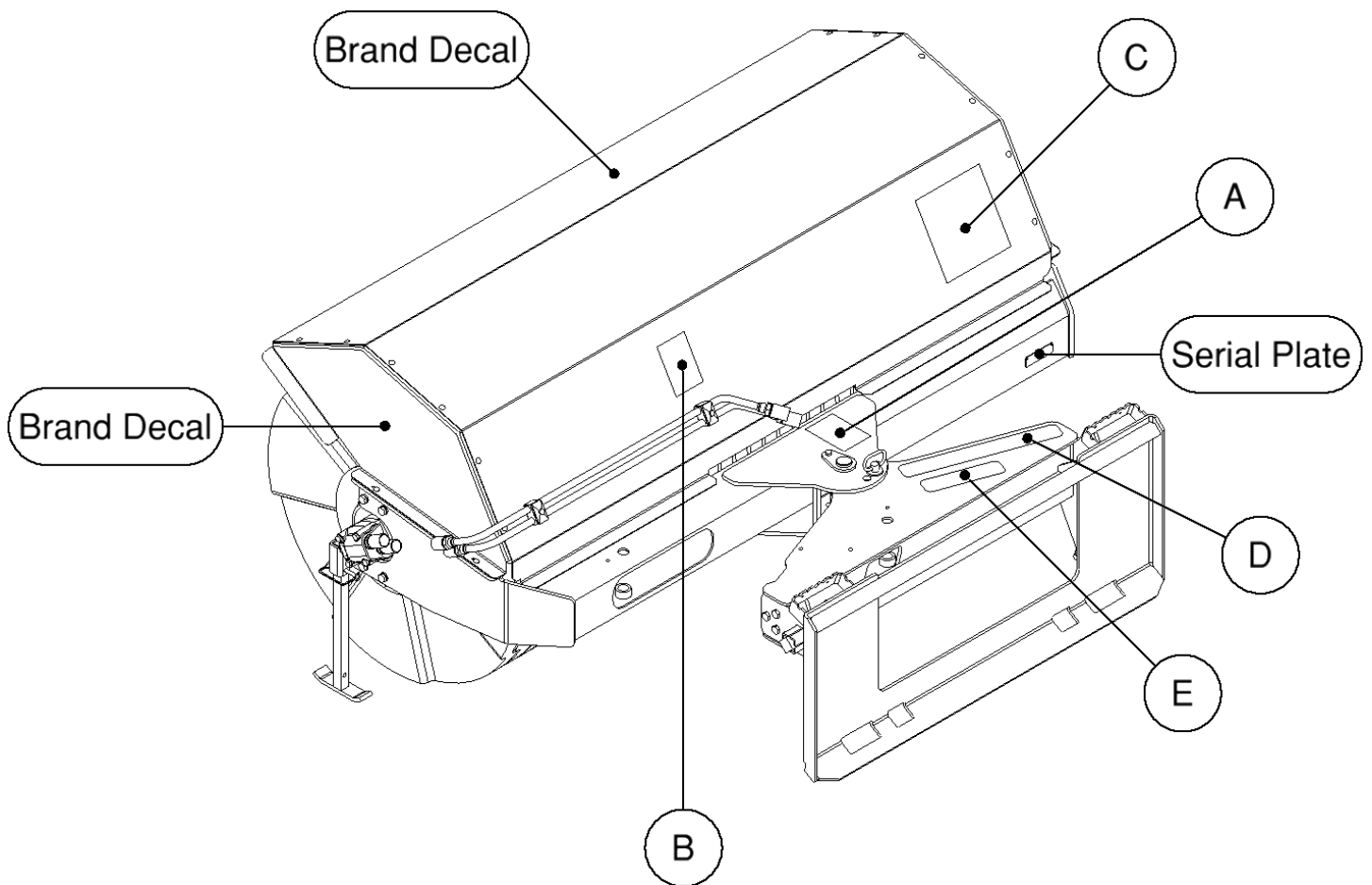
Maintenance

- **NEVER** make adjustments, lubricate, clean, or perform any service on the machine while it is in operation.
- Make sure the attachment is serviced on a daily basis. Improper maintenance can cause serious injury or death in addition to damage to the attachment and/or your equipment.

SERIAL NUMBER AND SAFETY DECAL LOCATIONS

Serial Number Location:

It is important to refer to the serial number of the attachment when making repairs or ordering parts. Early or later models (identification made by serial number) may use different parts, or it may be necessary to use different procedures in doing a specific operation.



SERIAL NUMBER AND SAFETY DECAL LOCATIONS

(A)



Part number: 203234

Location: On top of pivot frame

Quantity: 1

(B)



Part number: 200001

Location: On back of hood near tubelines

Quantity: 1

(C)



Part number: 316078

Location: On back of hood, RH side

Quantity: 1

(D)

Part number: 202153 (Anti-skid tape 2x16)

Location: On pivot frame, right side

Quantity: 1

(E)

Part number: 202152 (Anti-skid tape 2x8)

Location: On pivot frame, right side

Quantity: 1

Brand Decals

Location: On front of hood (Large)

On each endplate (Small)

Quantity: 1 (Large)

2 (Small)

Safety Decals Locations:

The locations of the safety decals are shown. If these decals are missing, damaged, or painted over they must be replaced. Call Erskine Attachments LLC (218-435-4045) for replacement decals.

USER'S MOUNTING INSTRUCTIONS

After the initial set-up assembly is completed use the following procedure to mount the attachment to the loader for user operation. Coupler wedges or pins must extend through the holes in the attachment.

⚠ WARNING Levers must be fully down and locked. Failure to secure wedges or pins can allow the attachment to come off and cause injury or death.



1. Use the step, safety treads, and grab handles to get on and off the loader and attachment.

2. Sitting in the operator's seat, lower seat bar (if so equipped) and fasten the seat belt.



3. Drive the loader to the rear of the attachment. Put the loader quick attach coupler into the attachment mounting bracket.

4. Tilt the loader coupler backward a small amount until it is fully engaged in the attachment mounting bracket.



5. Stop the engine and engage the park brake.

6. Secure the coupler locking mechanism that attaches the attachment to the loader.

USER'S MOUNTING INSTRUCTIONS

7. Connect the hydraulic quick couplers from the attachment to the loader.

IMPORTANT: Wipe the ends of the hydraulic quick couplers (both lead and loader) with a rag to remove any possible contamination. Contamination can cause hydraulic components to fail and is not covered under warranty.

IMPORTANT: Make sure the quick couplers are fully engaged. If the quick couplers do not fully engage, check to see that the couplers are the same size and brand. Do not force the quick couplers together.

NOTE: See the loader's operator's manual for auxiliary hydraulic specifications and connection instructions.

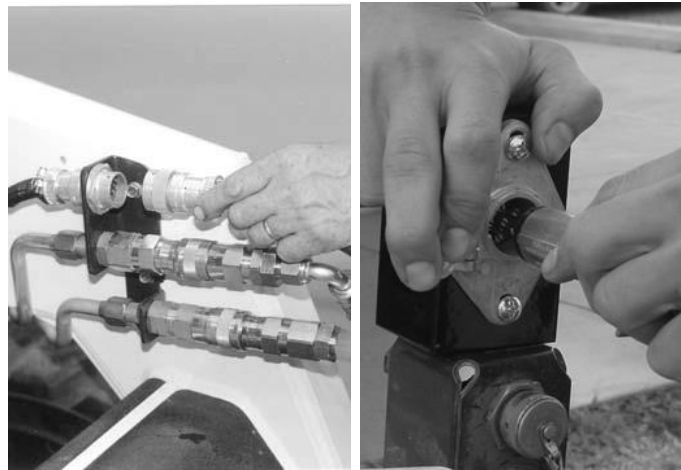
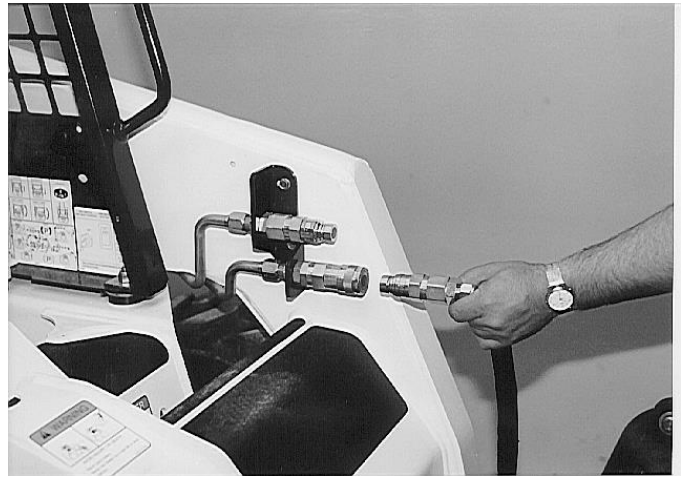
NOTE: Attachment is shipped with 12FJX (1-1/16" Female JIC Swivel) fittings on the ends of the lead hoses.

8. Connect the attachment wire harness to the loader's wire harness receptacle. (Disregard if pistol grip controller is supplied with the attachment.)
9. Make sure the hoses are properly routed to fit your specific loader. If the hoses are not routed correctly, hoses may get pinched or rub on tires. Be sure to check the hose routing through the full range of intended motion of the attachment before operating it.

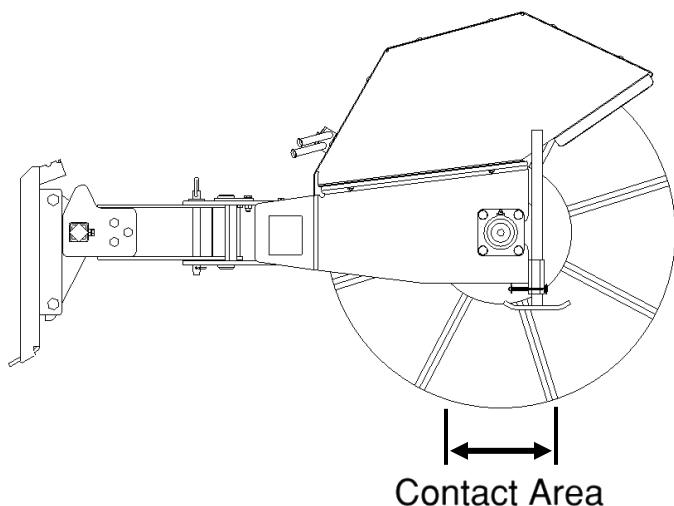
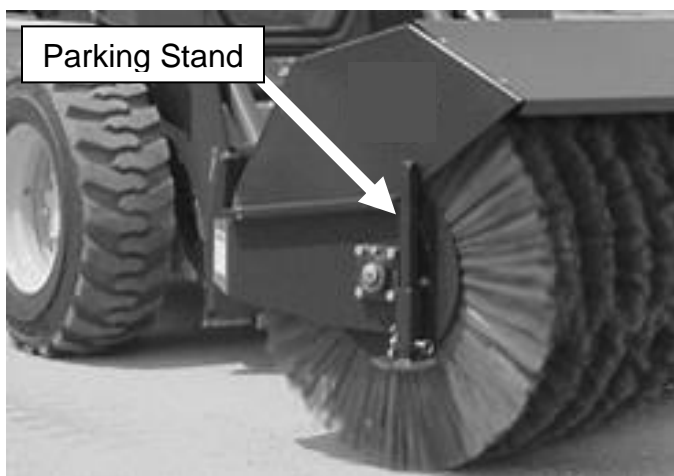
More than one routing may be acceptable depending on the loader. Pick the routing that best suits your loader.

IMPORTANT: Proper hose routing is the responsibility of the owner and/or operator. Pinched or stretched hoses are not covered under warranty.

Mounting is now complete and you are ready to use the attachment. Use reverse order of above instructions to dismount the attachment from the loader.



OPERATING INSTRUCTIONS



IMPORTANT: Before operation, make sure the parking stands have been secured in the operating position.

1. With the operator in the seat of the loader, the seatbelt fastened, and the seat bar lowered (if so equipped), start the engine.
2. With the loader arms fully lowered, position the attachment flat on the ground. Engage the auxiliary hydraulics in continuous flow mode to start the bristle rotation, and drive the loader forward to sweep.

NOTE: Broom rotation should always be such that the material is swept away from the operator.

3. The torsion suspension will keep the down pressure on the broom consistent, which allows the broom to float. If more or less down pressure is required, pressure can be adjusted by tilting the attachment forward or back.

IMPORTANT: Excessive down pressure will cause premature bristle wear or breakage.

NOTE: The down pressure on the broom determines the broom contact area on the surface, or the length of bristle contact with the surface. Use the correct down pressure for the situation.

For dirt and debris removal, a 2.0 to 4.0 inch contact area is recommended. This allows the bristle tips to dig, break up, and throw material.

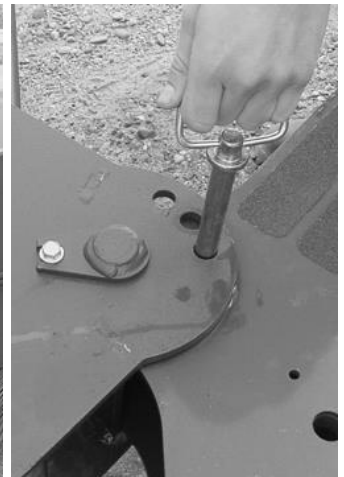
For snow removal, a 4.0 to 6.0 inch contact area is recommended.

OPERATING INSTRUCTIONS

Manual Angling of the Attachment

⚠ WARNING Avoid manually adjusting the broom angle while parked on sloped surfaces. Removing the angle pin while parked on sloped surfaces can cause the broom to move on its own due to gravity. If it is necessary to adjust the angle on a sloped surface, approach the angle pin from the uphill side.

1. Park the loader and attachment on a flat, level surface.
2. With the loader arms fully lowered, tilt the attachment back until the broom bristles are slightly off the ground.
3. Disengage the hydraulic drive, stop the engine, engage the park brake, and wait for all motion to stop.
4. Remove the clip pin and angle pin from the pivot frame.
5. Manually push or pull on one end of the broom to change the angle as desired.
6. Reinstall the pin and clip pin in the pivot frame.



Hydraulic Angling of the Attachment

1. With the operator in the seat of the loader, the seatbelt fastened, and the seat bar lowered (if so equipped), start the engine.
2. Engage the auxiliary hydraulics in continuous flow mode to start the bristle rotation.
3. Use the pistol grip controller or the loader's attachment control system (if equipped) to activate the valve on the attachment and angle the broom to the left or right as desired.

NOTE: See loader's operator's manual for instructions on operating the attachment control system.



ROUTINE MAINTENANCE

⚠ WARNING Lower the attachment to rest on the parking stands, shut down the engine, relieve the hydraulic pressure to the attachment, set the park brake, and wait for all motion to stop before leaving the operator's seat to perform service of any kind.

It is the operator's responsibility to make daily inspections of the loader and attachment for damage, loose bolts, fluid leaks, or anything else that could cause a potential service or safety problem. Preventive maintenance is the easiest and least expensive type of maintenance.

IMPORTANT: Bolts and set screws can loosen after initial usage. After the first hour of operation check all bolts and set screws.

LUBRICATION

Lubrication Legend



Multipurpose spray lube



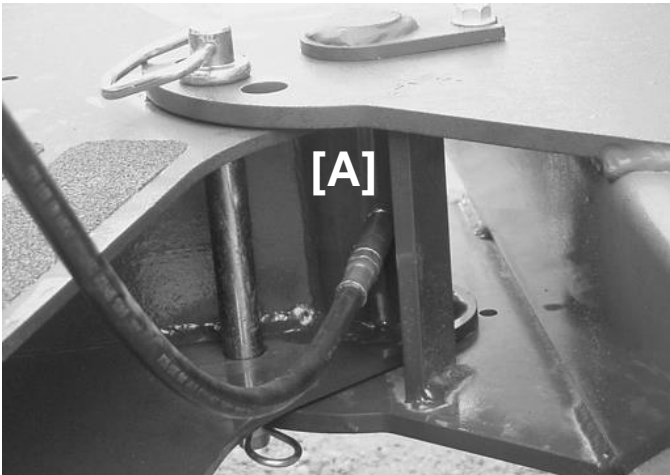
No. 2 Lithium base gun grease



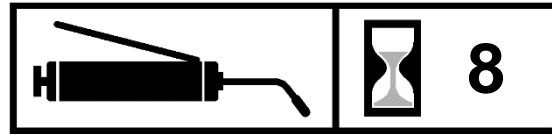
Clean engine oil



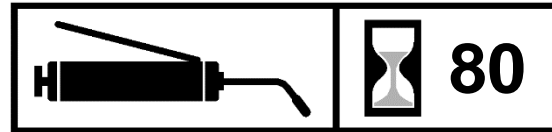
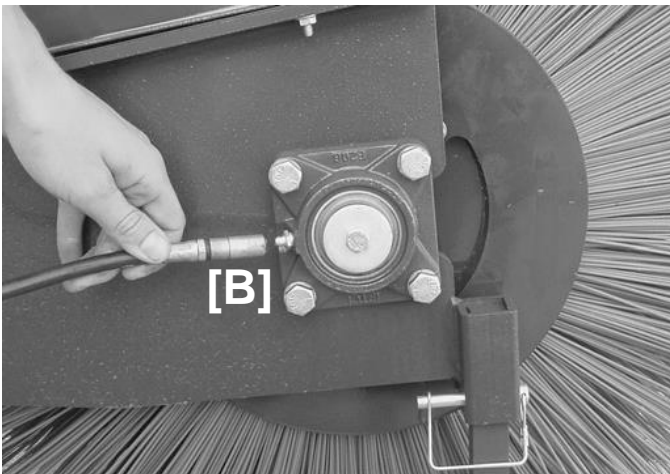
Intervals at which lubrication is required



Use No. 2 lithium base gun grease when lubricating all attachment grease fittings.



Grease the pivot bushing zerk [A] every **8 hours** of operation.



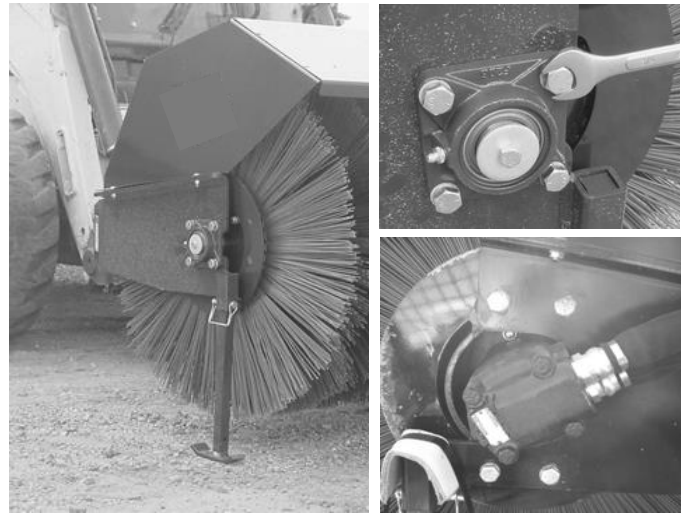
Grease the bearing mount zerk [B] every **80 hours** of operation.

IMPORTANT: Do not over-grease bearing. Only add **two pumps** of grease every greasing interval.

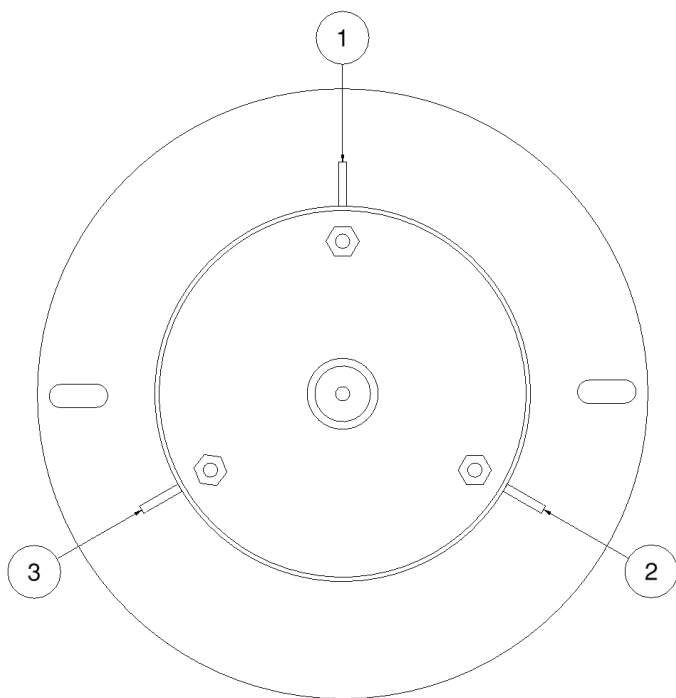
ROUTINE MAINTENANCE

Replacing Brush Sections

1. Use the snapper pins to lock both parking stands in the parking position.
2. Lower the attachment to rest on the parking stands.
3. Remove the four bearing mount bolts and nuts.
4. Remove the four motor mount bolts and nuts.
5. Carefully remove the brush head assembly by sliding the brush head forward and out of the frame, then sliding the motor assembly out of the end of the brush arbor.
6. Remove the three bolts holding the brush retainer to the brush arbor.
7. Remove the old brush sections by sliding them off of the arbor.



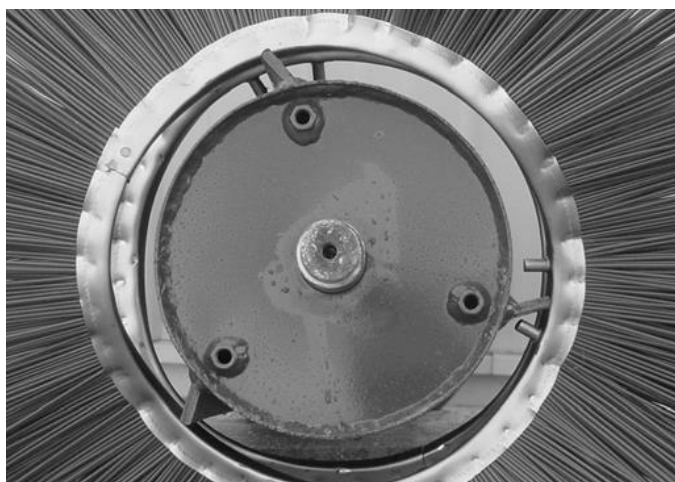
ROUTINE MAINTENANCE



8. Number the ribs on the arbor as 1, 2, and 3.
9. Slide the first “wavy” brush section on so that the pins are around rib 1.
10. Slide the second “wavy” brush section on so that the pins are around rib 2.
- NOTE:** Every other brush section will need to be flipped so that the high spots of the bristle “waves” on the neighboring sections hit each other.
11. Slide the third “wavy” brush section on so that the pins are around rib 3.
12. Continue this pattern until all brush sections are installed.

NOTE: The brush stack does not need to be flush with the end of the arbor. It may be higher or lower depending on how each brush section is formed. If the stack is high, compress it when reinstalling the brush retainer. If the stack is low, it will spread out when the arbor is laid down. If the stack is excessively high, remove one or more sections to get it close to the proper height.

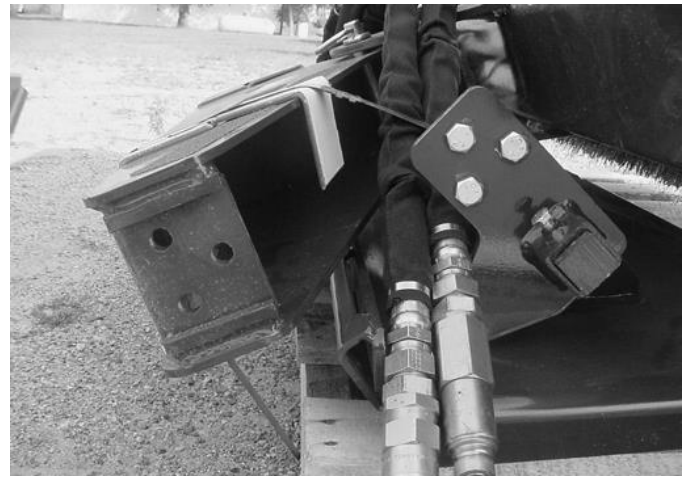
13. Reinstall the brush retainer and three bolts.
14. Slide the motor assembly into the end of the arbor, aligning the hex drive with the hole in the end of the arbor.
15. Slide the brush head assembly back into the frame.
16. Reinstall the four motor mount bolts and nuts.
17. Reinstall the four bearing mount bolts and nuts.
18. Tighten all hardware to the proper torque(s). Refer to “Bolt Torque Information” on page 25 of this manual.



SET-UP ASSEMBLY

Set-Up from Shipping

1. Remove the straps holding the attachment to the pallet.
2. Remove the six bolts and nuts attached to the torsion frame.



3. Position the torsion frame so that the holes are aligned with the holes in the sides of the pivot frame.

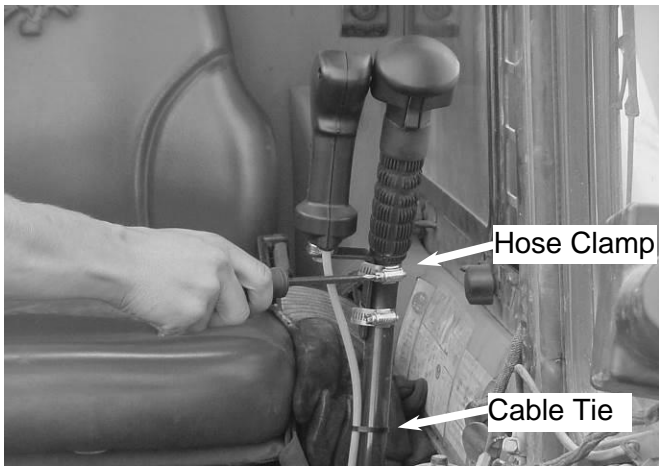
NOTE: Blocks may be needed to raise up the pivot frame. Use a hoist when lifting the pivot frame.



4. Install the six bolts connecting the torsion frame to the pivot frame.
5. Tighten the six bolts and nuts to the proper torque. Refer to "Bolt Torque Information" on page 25 of this manual.



SET-UP ASSEMBLY



Wire Harness Installation

NOTE: If the loader is equipped with an attachment control package, the appropriate harness should be installed from the factory.

If the attachment was ordered with the pistol grip control harness, follow these instructions:

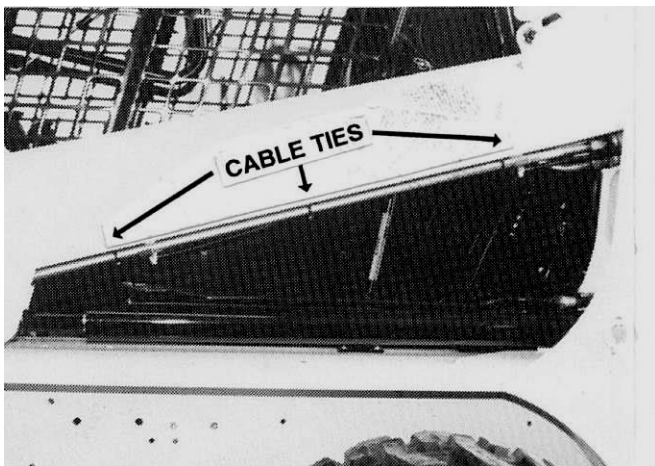
1. Install the control handle on either steering lever, whichever you prefer, with hose clamps.

NOTE: The control handle bracket can be positioned several different ways. We recommend it be positioned as shown.

2. Put a cable tie around the wiring harness and the steering lever.
3. Install the wiring harness receptacle bracket on either the loader arm or near the hydraulic quick couplers.

NOTE: It may be necessary to make an adapter bracket in order to attach the wire harness to the loader.

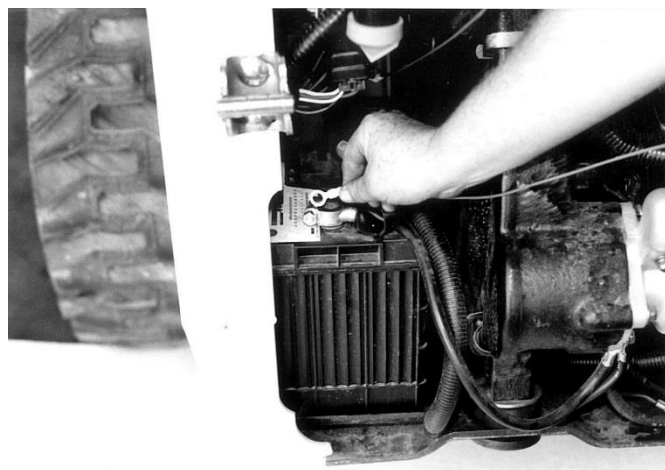
4. Route the wiring harness back along the tube lines on the loader arms and fasten with cable ties.
5. Open the rear door. Pull the excess wiring harness into the engine compartment.
6. Raise the operator cab. (See loader's operator's manual for the correct procedure.)



SET-UP ASSEMBLY

7. Connect the red fused wire to the positive battery terminal or to a suitable accessory wire with a minimum rating of 5 amps. Route the wiring along the loader main frame toward the front of the loader.

Connect the black wire from the harness to a frame ground.



8. Fasten the control handle wiring harness connector to the main wiring harness connector.

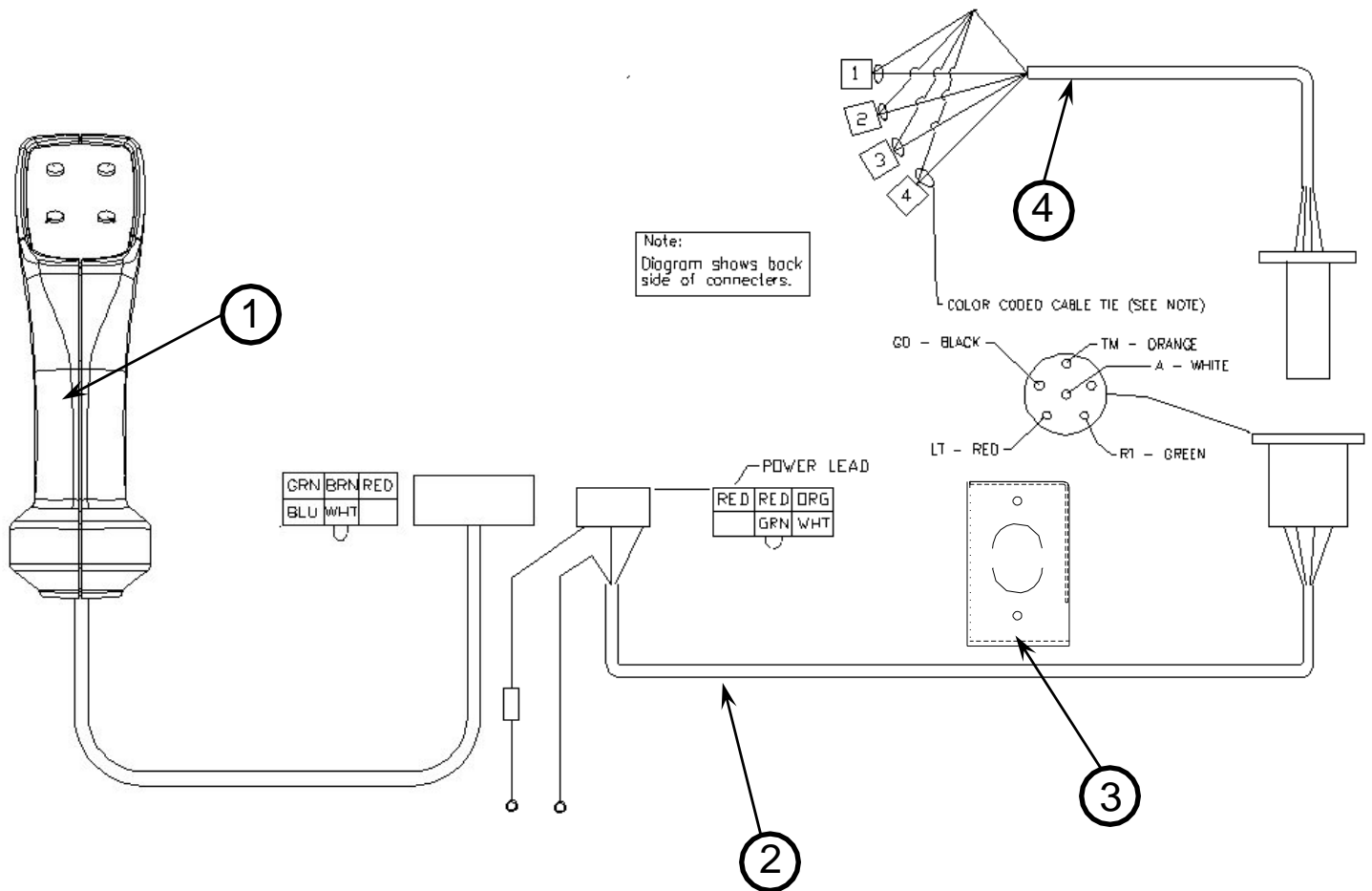
IMPORTANT: Secure the wiring harness in place with plastic cable ties, making sure it is clear of extra hot areas or any moving parts on the engine or loader. Pinched, stretched, or melted wire harnesses are not covered under warranty.

9. Lower the cab. (See loader's operator's manual for the correct procedure.)

NOTE: Be sure the control handle wiring harness is properly positioned as the cab is lowered.



WIRE HARNESS PARTS INFORMATION



REF.	PART NO.	DESCRIPTION	QTY.
	315128	COMPLETE HARNESS – generic (shown)	1
1	315110	PISTOL GRIP – handle assembly w/ harness	1
2	315126	LOADER HARNESS – assembly	1
3	202489	RECEPTACLE BRACKET – loader harness	1
4	315127	ATTACHMENT HARNESS – assembly	1

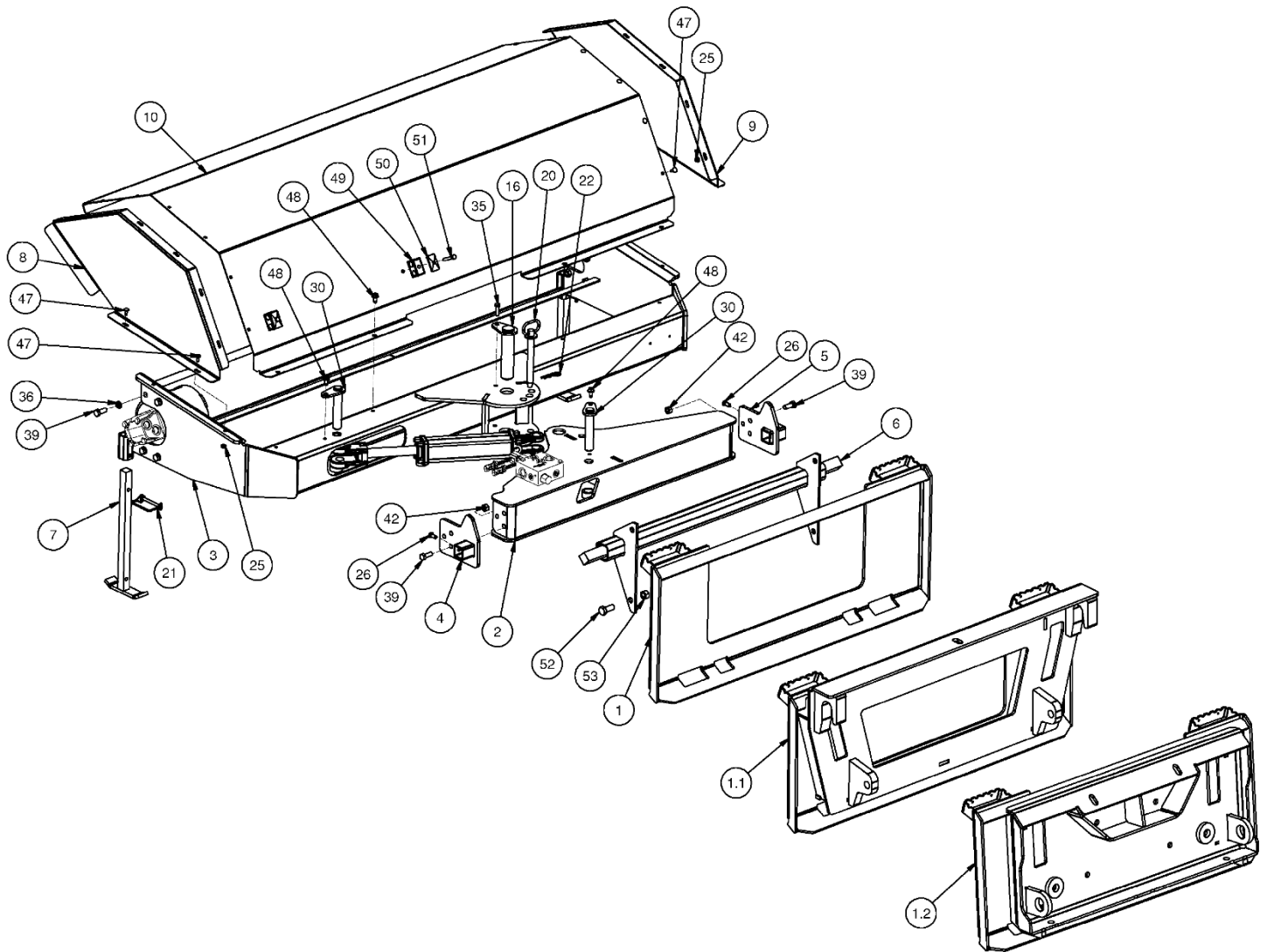
Optional Harnesses (not shown)

PART NO.	DESCRIPTION
315090	14-PIN UNIVERSAL – for Bobcat® Loaders
315152	14-PIN UNIVERSAL – for Case® Loaders
320084	14-PIN UNIVERSAL – for John Deere® Loaders
200008	8-PIN – for Caterpillar® Loaders
315153	8-PIN – for ASV® Loaders
315339	8-PIN – for Caterpillar® B-Series High-Flow Loaders

PARTS INFORMATION

ITEM	QTY	PART NO.	DESCRIPTION	STOCK NO.
1	1	316001	MOUNT PLATE AB W/A	(NEW STYLE S/N BREAK 1045640)
1.1	1	422100	MOUNT PLATE AB EURO W/A	FOR EURO MOUNT ONLY
1.2	1	422183	MOUNT PLATE AB MULTIHOG W/A	FOR MULTIHOG MOUNT ONLY
2	1	316002	FRAME PIVOT AB W/A	
3	1	316065	FRAME MAIN AB 68 W/A	
	1	316003	FRAME MAIN AB 84 W/A	
	1	316127	FRAME MAIN AB 96 W/A	
4	1	316006	BRACKET MOUNTING LH W/A	
5	1	316063	BRACKET MOUNTING RH W/A	
6	1	316016	SPRING TORSION ASSY	
7	2	316061	JACKSTAND W/A	
8	1	316046	SHIELD SIDE LH PAINTED	
9	1	316047	SHIELD SIDE RH PAINTED	
10	1	316068	SHIELD BROOM 68 PAINTED	
	1	316049	SHIELD BROOM 84 PAINTED	
	1	316122	SHIELD BROOM 96 PAINTED	
16	1	316045	PIN 1.5 X 6.25 W/A	
20	1	320235	PIN HITCH 3/4 X 6	MANUAL ANGLING
21	2	300581	PIN SNAPPER 5/16 X 3	
22	1	200064	PIN CLIP #11 1/8 X 2 5/8	MANUAL ANGLING
25	16	37337	NUT FLG TOP-LOCK	1/4 NC
26	2	13103	BOLT HEX	3/8 X 3/4 NC GR 5
30	2	316026	PIN 1 X 5 W/A	HYDRAULIC ANGLING
35	1	13107	BOLT HEX	3/8 X 1 1/4 NC GR 5
36	8	33626	WASHER LOCK	1/2"
39	10	13207	BOLT HEX	1/2 X 1 1/4 NC GR 5
42	8	37214	NUT REV LOCK	1/2 NC
47	16	21801	BOLT CARRIAGE	1/4 X 3/4 NC GR 5
48	**	32467	BOLT FLG THRD RLNG 3/8 X 3/4 NC GR5	** (6) 68" (8) 84" (8) 96"
49	2	316055	CLAMP TUBELINE 5/8	
50	2	316094	CLAMP TUBELINE TOP PLATE 5/8	
51	2	13061	BOLT HEX	5/16 X 2 NC GR 5
52	4	13309	BOLT HEX	5/8 X 1-1/2 NC GR 5
53	4	37216	NUT REV LOCK	5/8 NC

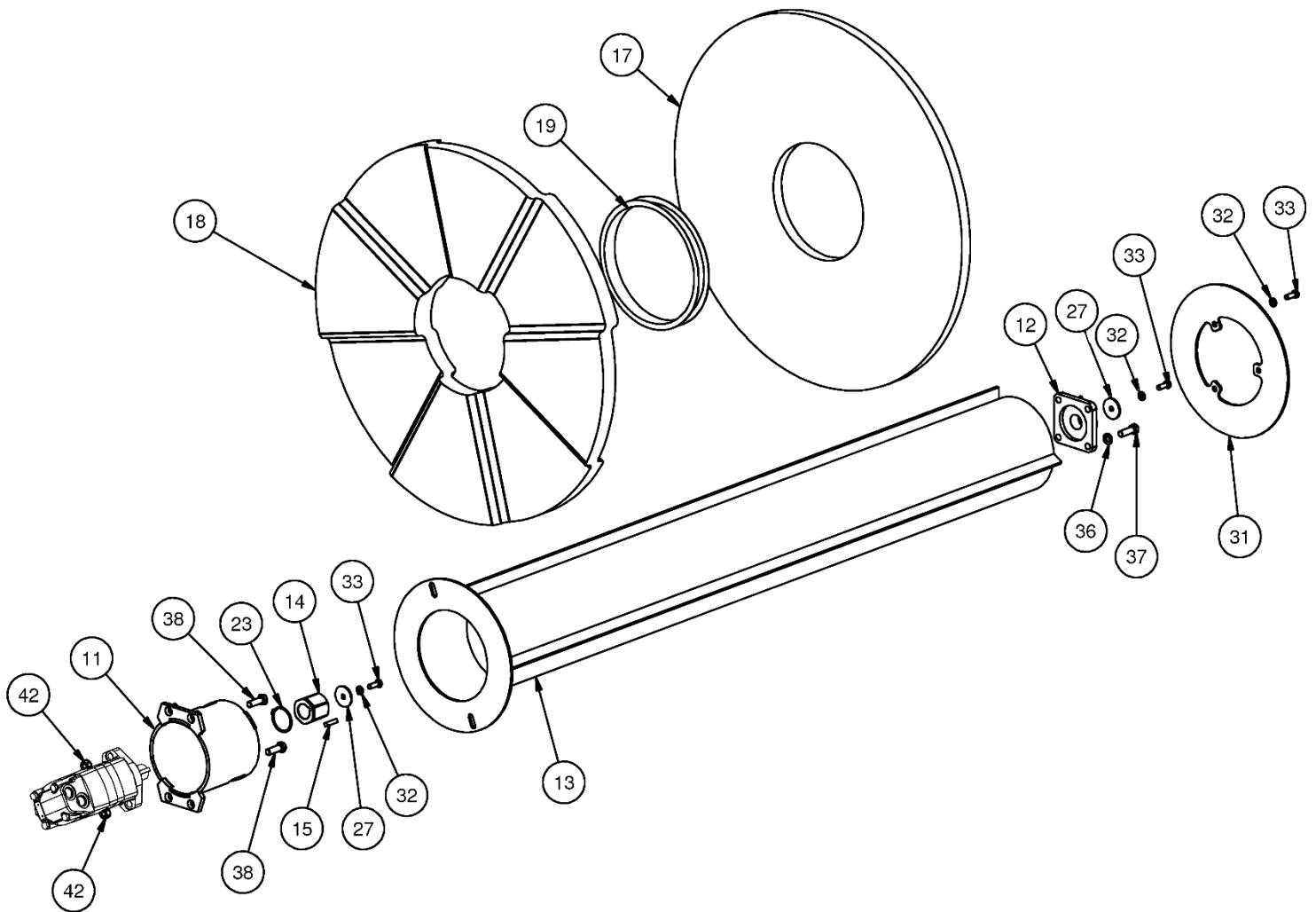
PARTS INFORMATION



PARTS INFORMATION

ITEM	QTY	PART NO.	DESCRIPTION	STOCK NO.
		316083	PKG WAFER 68 POLY	35 CONV
		316084	PKG WAFER 68 POLY/STEEL	35 CONV
		316085	PKG WAFER 68 STEEL	35 CONV
		316086	PKG WAFER 84 POLY	44 CONV
		316087	PKG WAFER 84 POLY/STEEL	43 CONV
		316088	PKG WAFER 84 STEEL	44 CONV
		316129	PKG WAFER 96 POLY	50 CONV
		316130	PKG WAFER 96 POLY/STEEL	49 CONV
		316131	PKG WAFER 96 STEEL	50 CONV
11	1	316005	MOUNT MOTOR AB W/A PNT	
12	1	316011	BRG 1-1/4 SM 4-B FLG	
13	1	316066	ARBOR AB 68 W/A	
	1	316004	ARBOR AB 84 W/A	
	1	316128	ARBOR AB 96 W/A	
14	1	316032	DRIVE BLOCK HEX 1.25" BORE	SNAP RING INCLUDED
15	1	300419	KEY 5/16 X 1-1/4	
17	2	316091	WAFER AB STR STEEL 32	OBSOLETE NO LONGER USED
	2	316089	WAFER AB STR POLY/STEEL 32	
	2	316041	WAFER AB STR POLY 32	
18	**	316092	WAFER AB CONV STEEL 32	(35) 68" (44) 84" (50) 96"
	**	316092	WAFER AB CONV STEEL 32(IN POLY/STEEL PKG)	(17) 68" (21) 84" (24) 96"
	**	316090	WAFER AB CONV POLY/STEEL 32	OBSOLETE NO LONGER USED
	**	316042	WAFER AB CONV POLY 32	(35) 68" (44) 84" (50) 96"
	**	316042	WAFER AB CONV POLY 32 (IN POLY/STEEL PKG)	(18) 68" (22) 84" (25) 96"
19		316072	WAFER AB SPACER (INCLUDED WITH FLAT WAFER)	OBSOLETE NO LONGER USED
23	1	313333	RING SNAP EXT 2 X .063	
25	16	37337	NUT FLG TOP-LOCK	1/4 NC
26	2	13103	BOLT HEX	3/8 X 3/4 NC GR 5
27	2	202830	WASHER LARGE 3/8 X 1 3/4	
31	1	316050	PLATE WAFER KEEPER PAINTED	
32	5	103880	WASHER LOCK	3/8"
33	5	103116	BOLT HEX	3/8 X 1 NC GR 5
36	8	33626	WASHER LOCK	1/2"
37	4	13209	BOLT HEX	1/2 X 1-1/2 NC GR 5
38	2	13210	BOLT HEX	1/2 X 1-3/4 NC GR 5
42	8	37214	NUT REV LOCK	1/2 NC

PARTS INFORMATION

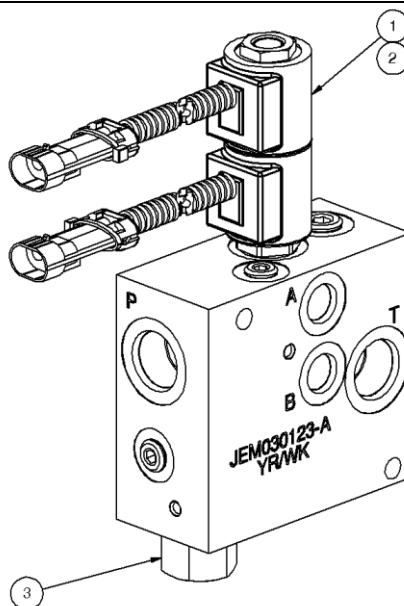


PARTS INFORMATION

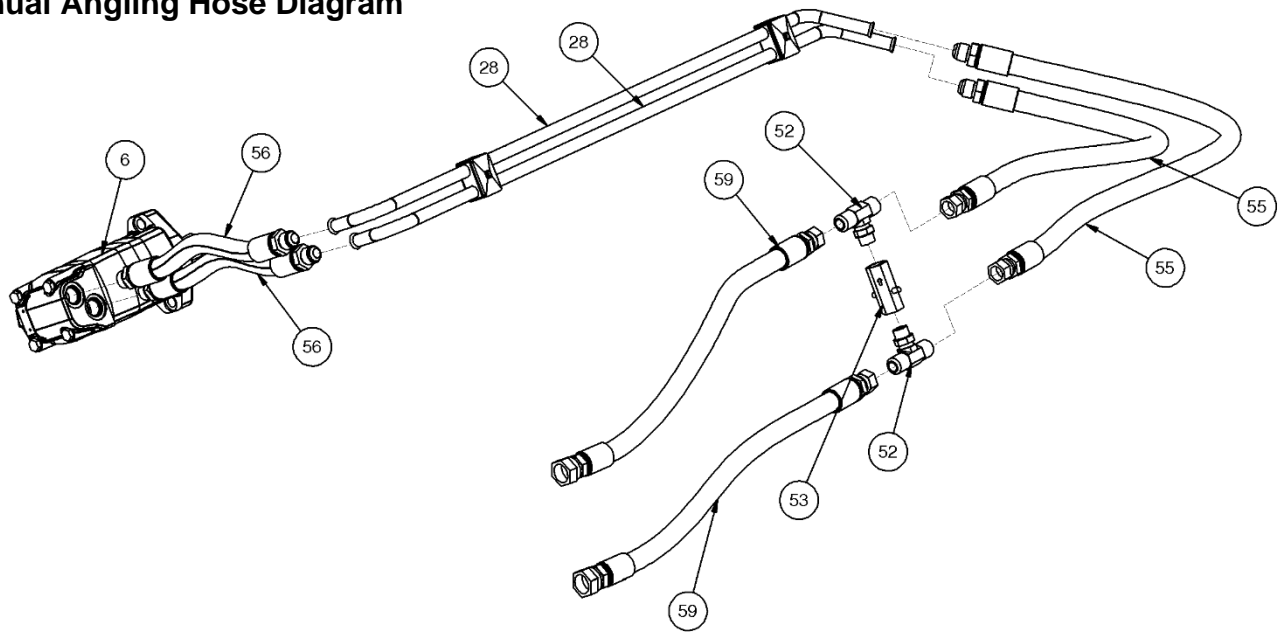
ITEM	QTY	PART NO.	DESCRIPTION	STOCK NO.
6	1	103396	MOTOR HYD 24 CID 2K STD	
28	2	316062	TUBELINE ANGLE BROOM 68	
	2	316053	TUBELINE ANGLE BROOM 84	
	2	316125	TUBELINE ANGLE BROOM 96	
29	1	330921	CYLINDER 2 X 8 WELDED C-C	REPLACED 201228
	1	201228	CYLINDER 2 X 8 20.25 C-C	REPLACED BY 330921
	1	312033	CYLINDER 3 X 8 20.25 C-C	OLD STYLE ONLY
38	2	13063	BOLT HEX	5/16 X 2 1/2 NC GR 5
		13071	BOLT HEX 5/16" X 4-1/2" NC GR 5	REVERSIBLE PKG ONLY
40	2	37211	NUT REV LOCK	5/16 NC
41	3	201852	ADPT STR 10MB-10MJ	
43	1	320144	ADPT ELB 10MB-10MJ-90	
44	2	311673	ADPT STR 6MB-6MJ	
45	1	201925	ADPT STR 8MB-6MJ	
46	1	320089	ADPT ELB 8MB-6MJ-90	
52	2	200061	ADPT TEE 10MJ-10MJ-8MB	
53	1	200062	VALVE CHECK SAE 8 FM/FM	
54	1	316054	VALVE ASSM ANGLE BROOM	
	1	316132	VALVE ASSM ANGLE BROOM REVERSIBLE	REVERSIBLE PKG ONLY
55	2	316080	HOSE 5/8 X 26 10FJX-10MJ	TUBELINE TO VALVE/TEE
56	2	316081	HOSE 5/8 X 13.5 10MB-10MJ	TUBELINE TO MOTOR
57	1	316099	HOSE 1/4 X 24 6FJX-6FJX	VALVE TO CYL ROD
58	1	316100	HOSE 1/4 X 36 6FJX-6FJX	VALVE TO CYL BASE
59	2	316101	HOSE 5/8 X 64 10FJX-12FJX	LEAD

VALVE PARTS INFORMATION

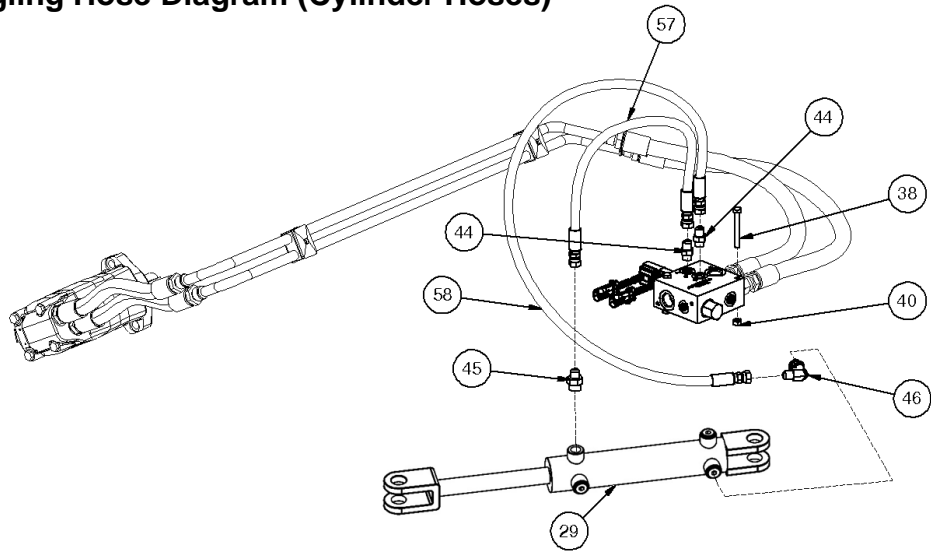
ITEM	QTY	PART NO.	DESCRIPTION	STOCK NO.
1	1	200042	VALVE DIRECTIONAL	
2	2	300796	COIL VALVE 12V ECOIL #8	REPLACED D-COILS
	2	320096	COIL VALVE DIR 12V DC - METPAC	REPLACED BY E-COIL
3	1	316118	LOGIC ELEMENT	



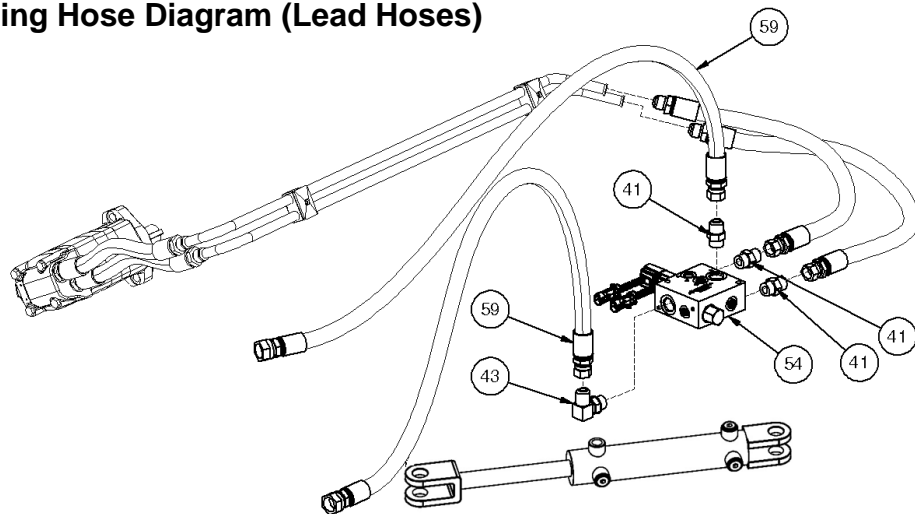
Manual Angling Hose Diagram



Hydraulic Angling Hose Diagram (Cylinder Hoses)

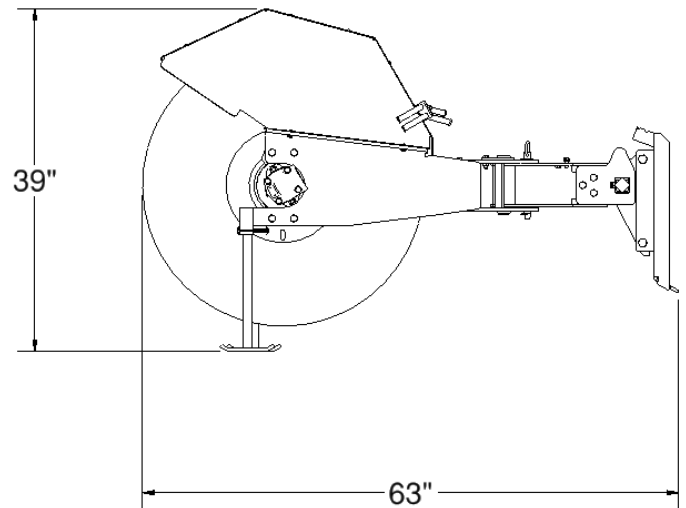
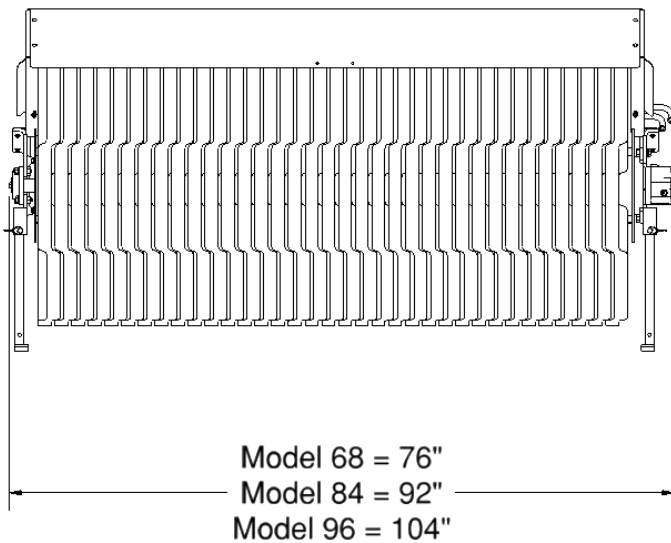


Hydraulic Angling Hose Diagram (Lead Hoses)



GENERAL SPECIFICATIONS

Model	68	84	96
Working Width – Straight	68"	84"	96"
Working Width – Fully Angled	63" @ 25°	77" @ 25°	89" @ 25°
Broom Angling	25° manual / opt. hyd.		
Drive System	Hyd. motor direct drive		
Flow Range	10 – 26 GPM		
Bristle Section Diameter	32"		
Bristle Sections (Number)	35	44	50
Bristle Material (Standard)	Polypropylene		
Operating Weight	715 lbs.	775 lbs.	835 lbs.



All dimensions are in INCHES.

BOLT TORQUE INFORMATION

Torque-Tension Relationships for SAE J429 Grade Bolts

Nominal Thread Size	SAE J429 Grade 2			SAE J429 Grade 5			SAE J429 Grade 8		
	Clamp Load (lbs)	Tightening Torque		Clamp Load (lbs)	Tightening Torque		Clamp Load (lbs)	Tightening Torque	
		K = .15	K = .20		K = .15	K = .20		K = .15	K = .20
Unified Coarse Thread Series									
1/4-20	1,300	49 in-lbs	65 in-lbs	2,000	75 in-lbs	100 in-lbs	2,850	107 in-lbs	143 in-lbs
5/16-18	2,150	101	134	3,350	157	210	4700	220	305
3/8-16	3,200	15 ft-lbs	20 ft-lbs	4,950	23 ft-lbs	31 ft-lbs	6,950	32.5 ft-lbs	44 ft-lbs
7/16-14	4,400	24	30	6,800	37	50	9,600	53	70
1/2-13	5,850	36.5	49	9,050	57	75	12,800	80	107
9/16-12	7,500	53	70	11,600	82	109	16,400	115	154
5/8-11	9,300	73	97	14,500	113	151	20,300	159	211
3/4-10	13,800	129	173	21,300	200	266	30,100	282	376
7/8-9	11,425	125	166	29,435	321	430	41,550	454	606
1-8	15,000	187.5	250	38,600	482.5	640	54,540	680	900
Unified Fine Thread Series									
1/4-28	1,500	55 in-lbs	75 in-lbs	2,300	85 in-lbs	115 in-lbs	3,250	120 in-lbs	163 in-lbs
5/16-24	2,400	112	150	3,700	173	230	5,200	245	325
3/8-24	3,600	17 ft-lbs	22.5 ft-lbs	5,600	26 ft-lbs	35 ft-lbs	7,900	37 ft-lbs	50 ft-lbs
7/16-20	4,900	27	36	7,550	42	55	10,700	59	78
1/2-20	6,600	41	55	10,200	64	85	14,400	90	120
9/16-18	8,400	59	79	13,000	92	122	18,300	129	172
5/8-18	10,600	83	110	16,300	128	170	23,000	180	240
3/4-16	15,400	144	193	23,800	223	298	33,600	315	420
7/8-14	12,610	138	184	32,480	355	473	45,855	500	668
1-12	16,410	205	273	42,270	528	704	59,670	745	995

Clamp load estimated as 75% of proof load for specified bolts.

Torque values for 1/4 and 5/16 inch series are in inch-pounds. All other torque values are in foot-pounds.

Torque values calculated from formula $T = KDF$

where: $K=0.15$ for "lubricated" conditions

$K=0.20$ for "dry" conditions

[illegible]

LIMITED WARRANTY

Erskine Attachments LLC warrants each new machine manufactured by us to be free from defects in material and workmanship for a period of twenty-four (24) months from date of delivery to the original purchaser.

Our obligation under this warranty is to replace free of charge, at our factory or authorized dealership, any part proven defective within the stated warranty time limit.

All parts must be returned freight prepaid and adequately packaged to prevent damage in transit.

This warranty does not cover:

1. New products which have been operated in excess of rated capacities or negligence
2. Misuse, abuse, accidents or damage due to improperly routed hoses
3. Machines which have been altered, modified or repaired in any manner not authorized by our company
4. Previously owned equipment
5. Any ground engaging tools in which natural wear is involved, i.e. tooth tips, cutting teeth, etc
6. Normal maintenance
7. Fork tines
8. Hydraulic motors that have been disassembled in any manor

In no event will the Sales Representative, Dealership, Erskine Attachments LLC, or any other company affiliated with it or them be liable for incidental or consequential damages or injuries, including but not limited to the loss of profit, rental or substitute equipment or other commercial loss. Purchaser's sole and exclusive remedy being as provided here in above.

Erskine Attachments LLC must receive immediate notification of defect and no allowance will be made for repairs without our consent or approval.

This warranty is in lieu of all other warranties, express or implied by law or otherwise, and there is no warranty of merchantability or fitness purpose.

No agent, employee, or representative of Erskine Attachments LLC has any authority to bind Erskine Attachments LLC to any warranty except as specifically set forth herein. Any of these limitations excluded by local law shall be deemed deleted from this warranty; all other terms apply.

This warranty may not be enlarged or modified in any manner except in writing signed by an executive officer of Erskine Attachments LLC to improve its products whenever it is possible and practical to do so. Erskine Attachments LLC reserves the right to make changes and or add improvements at any time without incurring any obligation to make such changes or add such improvements to products previously sold.

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Erskine Attachments LLC

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