



Installation Instructions for RA108CR, RA110CR, RA210CR, and RA212CR Hay Rake Kits

Before Getting Started

Before you begin installation of your hay rake kits, read these instructions carefully and check that all parts and tools in kit are accounted for. All hand and specialty tools for installation are provided at owner's expense. Please retain these installation instructions for future reference and parts ordering information.

These installation instructions contain information for assembling the kits listed below to the hay rake. Please read all instructions in your hay rake operator manual thoroughly before proceeding. Your operator manual includes information on safety, operation, adjustment, troubleshooting, and maintenance for this attachment.

General Information

The following kits are available for this machine. Refer to the detailed of parts on page 4 to inventory parts received.

Safety Light Kits	Reference Number
LED	512-014A82

LED lighting for roading the rake. The kit consists of a harness, a lightning module, and four LED lamps.

Kicker Kits	Reference Number
Single	512-040A82
Dual (S/N D2491M-)	512-041A82
Dual (S/N D2492M+)	512-125A

Single or dual kicker wheel for moving crop.

Wing Extension Kits	Reference Number
Wings (S/N D3272M-)	512-067A82
Wings (S/N D3273M+)	512-129A

Only available for the RA108CR and RA210CR. The extension kit provides one additional rake wheel for each wing.

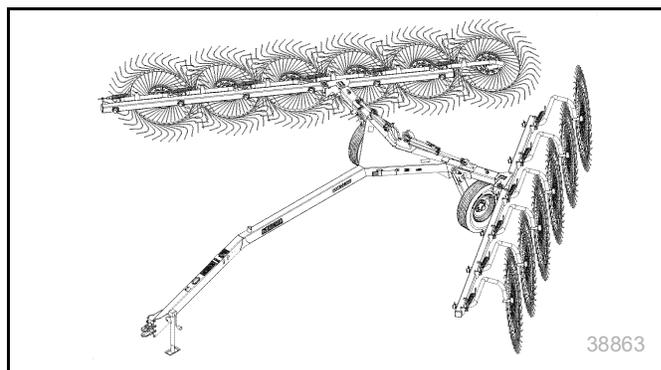
Wind Screen Kits	Reference Number
Eight Wheel	512-048A
Ten Wheel	512-049A
Twelve Wheel	512-050A

Screen to reduce the effect of wind on the crop during raking.

Tools Required

The following tools are required for installation:

- General hand tools.
- Fish tape



- A hoist or a fork lift with a capacity of at least 300 pounds (136 kg).
- Hydraulic power supply from a tractor to the wings.

Refer to page 24 for torque values chart for fasteners. Refer to page 25 for torque values for hydraulic fittings.

Further Assistance

For additional help with understanding these assembly instructions or for any other assembly or setup related questions, please contact our service department at the following address:

Kubota Tractor Corporation
1000 Kubota Drive
Grapevine, TX 76051

Or call us at (817) 756-1171 to speak over the phone with a service representative.

Copies of this machine's operator manual are available by mail or online. Please visit www.kubota.com and follow the product link for information on your machine, or use the QRC code below to view our publications store.



Kubota QRC

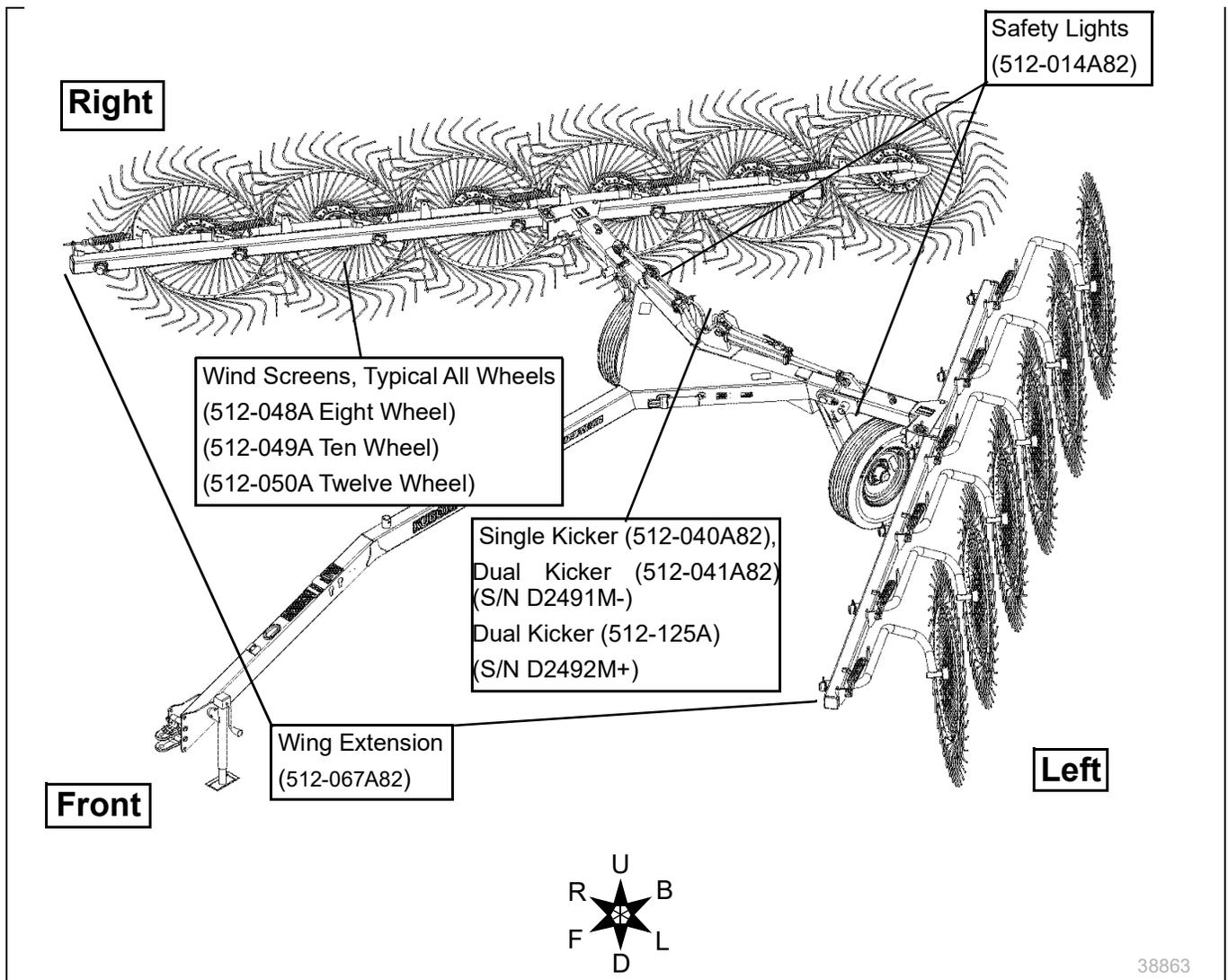
The QR Code (Quick Response) to the left will take you to the Kubota web page. Use your smart phone or tablet to scan the QR Code with an appropriate app to begin viewing.



Kubota Publications QRC

The QR Code (Quick Reference) to the left will take you to Kubota publications store. Search for your machine's associated manuals or refer to your operator manual for a complete list of publications.

Kit Installation Locations



⚠ WARNING

In order to avoid serious injury or death, for all installations below, follow all instructions carefully. Apply the tractor parking brake, stop the engine, and remove key. Disconnect the main electrical harness from the tractor before installation.

⚠ WARNING

Do not complete the kit installation while the hydraulic system is pressurized. Relieve all hydraulic pressure in system before installation. Attempting installation while the hydraulic system is pressurized can result in serious injury and even death.

⚠ WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

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Contents of Individual Kits

LED LIGHTING KIT (512-014A82)		
Part Number	Qty.	Description
512-050D82	2	BRACKET - LIGHT
802-004C	8	HHCS 1/4-20X3/4 GR5
833-696C	2	LIGHT, RED LAMP - LED
833-697C	2	LIGHT, AMBER LAMP LED
802-152C	8	HHCS 1/4-20X2 GR5
802-152C	8	HHCS 1/4-20X2 GR5
804-007C	8	WASHER FLAT 1/4 SAE PLT
803-007C	8	NUT LOCK 1/4-20 PLT
833-890C	1	CENTER LIGHT HARNESS
512-050D	2	BRACKET - LIGHT
802-370C	2	HHCS 1/4-20X1 3/4 GR5
816-874C	1	GROMMET 2ID X 3OD X .25GW
833-492C	1	7-PIN CONNECTOR HOLDER
833-694C	1	LIGHT HRNSS ENHANCE MODULE LED

WING EXTENSION KIT (512-067A82) (S/N D3272M-)		
Part Number	Qty.	Description
512-068B	1	EXTENSION KIT BOLT BAG
512-053H82	1	WING EXTENSION - RIGHT-HAND
512-052H82	1	WING EXTENSION - LEFT-HAND
802-044C	4	HHCS 1/2-13X4 GR5
804-016C	4	WASHER FLAT 1/2 SAE PLT
803-169C	4	NUT HEX FLG. LOCK 1/2-13 PLT.
837-135C	4	BUSHING 2.25OD X 2ID DELRIN
512-019S	1	RAKE ARM ASSY - RIGHT-HAND
512-018S	1	RAKE ARM ASSY - LEFT-HAND
816-883C	4	CAP - VINYL .375 X 1.0
195-354D	2	WASHER FLAT 2 ID X 2 5/8 X 16G
805-555C	2	PIN - WIRE LOCK 3/8 X 3
837-139C	2	PLUG - 2 INCH ROUND
807-367C		SPRING EXT 20D .25W 10.75" LG
842-409C	2	CLOSED EYE BOLT 3/8-16X6
803-014C	4	NUT HEX 3/8-16 PLT
804-012C	4	WASHER FLAT 3/8 SAE PLT

WIND SCREEN KIT - EIGHT RAKE WHEELS (512-048A82)		
Part Number	Qty.	Description
837-140C	8	837-104C WIND SCREEN
800-502C	48	CABLE TIE

WIND SCREEN KIT - TEN RAKE WHEELS (512-049A82)		
Part Number	Qty.	Description
837-140C	10	837-104C WIND SCREEN
800-502C	60	CABLE TIE

WIND SCREEN KIT - TWELVE RAKE WHEELS (512-050A82)		
Part Number	Qty.	Description
837-140C	12	837-104C WIND SCREEN
800-502C	72	CABLE TIE

WING EXTENSION KIT (512-129A) (S/N D3273M+)		
Part Number	Qty.	Description
512-018S	1	RAKE ARM ASSY - LEFT
512-019S	1	RAKE ARM ASSY - RIGHT
512-072MK	1	KUBOTA KIT INSTALLATION MANUAL
512-115H	1	WING EXTENSION - LEFT
512-116H	1	WING EXTENSION - RIGHT
512-130B	1	RAKE WHEEL ADDITION BOLT BAG
807-367C	2	SPRING EXT 20D .25W 10.75" LG
813-340C	1	RAKE WHEEL CRATE
891-660C	1	RAKE WHEEL - 55 INCH LEFT
891-661C	1	RAKE WHEEL - 55 INCH RIGHT

DUAL KICKER KIT (512-041A82) (S/N D2491M-)		
Part Number	Qty.	Description
512-042H82	1	MOUNTING PLATE - DUAL KICKER
811-061C	2	TE 9/16MJIC 9/16MJIC 9/16FJIC
817-084C	3	PARALLEL ARM PIVOT BUSHING
512-057S82	1	KICKER WHEEL ARM ASSY - DUAL
512-042H82	1	KICKER LIFT - DUAL KICKER
805-228C	1	PIN CLVS .75X3.94 USBL
804-025C	1	WASHER FLAT 3/4 SAE PLT
805-109C	1	PIN COTTER 1/8 X 1 1/4 PLT
842-409C	1	CLOSED EYE BOLT 3/8-16X6
804-012C	4	WASHER FLAT 3/8 SAE PLT
803-014C	4	NUT HEX 3/8-16 PLT
807-367C	2	SPRING EXT 20D .25W 10.75" LG
564-100D	1	ORIFICE PLATE 3/64 3/4
810-961C	1	CYL 2X4X1.12
811-171C	4	EL 3/4MORB 9/16MJIC
512-045H82	1	KICKER LIFT - DUAL KICKER
851-924C	1	VALVE 90 DEG BALL SHUTOFF 9/16
811-065C	1	EL 9/16MJIC 9/16MORB
851-997C	1	EL 9/16MORB 9/16FJIC
811-061C	1	TE 9/16MJIC 9/16MJIC 9/16FJIC
861-001C	1	HH1/4R2 20.5 9/16FJIC
861-002C	1	HH1/4R2 16.5 9/16 FJIC90 9/16
512-052D82	1	BRACKET - SMV W/ KICKER
802-004C	2	HHCS 1/4-20X3/4 GR5
891-695C	1	DUAL- RAKE WHEEL 36 INCH RH
891-694C	1	DUAL - RAKE WHEEL 36 INCH LH
803-209C	12	NUT FLANGE LOCK 3/8-16 PLT

DUAL KICKER KIT (512-125A) (S/N D2492M+)		
Part Number	Qty.	Description
512-098H	1	MOUNTING PLATE - DUAL KICKER
811-061C	2	TE 9/16MJIC 9/16MJIC 9/16FJIC
817-084C	3	PARALLEL ARM PIVOT BUSHING
512-102H	1	KICKER LIFT - DUAL KICKER
805-228C	1	PIN CLVS .75X3.94 USBL
804-025C	1	WASHER FLAT 3/4 SAE PLT
805-109C	1	PIN COTTER 1/8 X 1 1/4 PLT
842-409C	1	CLOSED EYE BOLT 3/8-16X6
804-012C	4	WASHER FLAT 3/8 SAE PLT
803-014C	4	NUT HEX 3/8-16 PLT
807-367C	2	SPRING EXT 20D .25W 10.75" LG
564-100D	1	ORIFICE PLATE 3/64 3/4
810-961C	1	CYL 2X4X1.12
811-171C	4	EL 3/4MORB 9/16MJIC
851-924C	1	VALVE 90 DEG BALL SHUTOFF 9/16
811-065C	1	EL 9/16MJIC 9/16MORB
851-997C	1	EL 9/16MORB 9/16FJIC
811-061C	1	TE 9/16MJIC 9/16MJIC 9/16FJIC
861-001C	1	HH1/4R2 20.5 9/16FJIC
861-002C	1	HH1/4R2 16.5 9/16 FJIC90 9/16
512-052D	1	BRACKET - SMV W/ KICKER
802-004C	2	HHCS 1/4-20X3/4 GR5
891-695C	1	DUAL- RAKE WHEEL 36 INCH RH
512-038H	1	KICKER WHEEL ARM - DUAL
512-051V	2	HUB AND CUP ASSY - 6 BOLT
803-053C	2	NUT HEX SLOTTED 3/4-16
804-025C	2	WASHER FLAT 3/4 SAE PLT
805-045C	2	PIN COTTER 5/32 X 1 1/4 LG
816-882C	2	SEAL - 1.983X1.25X.25
822-030C	4	BRG CONE 1.001D L44643
837-139C	1	PLUG 2 -INCH ROUND
890-614C	2	GREASE CAP #1505
802-470C	1	HSRCS 1/4-20X3/4 GR5
803-004C	1	NUT HEX SS 1/4-20
804-007C	2	WASHER FLAT 1/4 SAE PLT
804-025C	1	WASHER FLAT 3/4 SAE PLT
805-142C	1	PIN CLVS .75X3.94 USBL
836-097C	1	SPRING COMP RUBBER 1.31 LONG
891-694C	1	DUAL - RAKE WHEEL 36 INCH LH
803-209C	12	NUT FLANGE LOCK 3/8-16 PLT

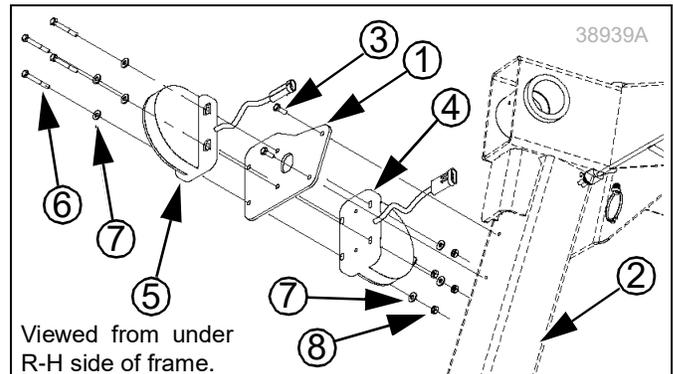
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SINGLE KICKER KIT (512-040A82)		
Part Number	Qty.	Description
512-046H82	1	MOUNTING PLATE -SINGLE KICKER
811-061C	2	TE 9/16MJIC 9/16MJIC 9/16FJIC
817-084C	3	PARALLEL ARM PIVOT BUSHING
512-063S82	1	KICKER WHEEL ARM ASSY - SINGLE
512-044H82	1	KICKER LIFT - SINGLE KIT
805-228C	1	PIN CLVS .75X3.94 USBL
804-025C	1	WASHER FLAT 3/4 SAE PLT
805-109C	1	PIN COTTER 1/8 X 1 1/4 PLT
842-409C	1	CLOSED EYE BOLT 3/8-16X6
804-012C	4	WASHER FLAT 3/8 SAE PLT
803-014C	4	NUT HEX 3/8-16 PLT
807-367C	2	SPRING EXT 20D .25W 10.75" LG
564-100D	1	ORIFICE PLATE 3/64 3/4
810-961C	1	CYL 2X4X1.12
811-171C	4	EL 3/4MORB 9/16MJIC
512-044H82	1	KICKER LIFT - SINGLE KICKER
851-924C	1	VALVE 90 DEG BALL SHUTOFF 9/16
811-065C	1	EL 9/16MJIC 9/16MORB
851-997C	1	EL 9/16MORB 9/16FJIC
811-061C	1	TE 9/16MJIC 9/16MJIC 9/16FJIC
861-001C	1	HH1/4R2 20.5 9/16FJIC
861-002C	1	HH1/4R2 16.5 9/16 FJIC90 9/16
512-052D82	1	BRACKET - SMV W/ KICKER
802-004C	2	HHCS 1/4-20X3/4 GR5
891-661C	1	SINGLE KICKER - RAKE WHEEL 55 INCH RIGHT-HAND
803-209C	12	NUT FLANGE LOCK 3/8-16 PLT

LED Lighting Kit (512-014A82)

LED Lights

1. Fasten the right-hand light bracket (1) to the outside of the right-hand wheel strut (2). Note the orientation of the light bracket. Use two 1/4-20x3/4 cap screws (3).
2. Fasten a red lamp (4) and an amber lamp (5) to the right-hand light bracket lighting brackets. The amber lamps must be on the outside of the lighting bracket. Use 1/4-20x2 cap screws (6), 1/4 flat washers (7), and 1/4-20 lock nuts (8).
3. Repeat the procedure to install the lamps on the left-hand side of the rake.

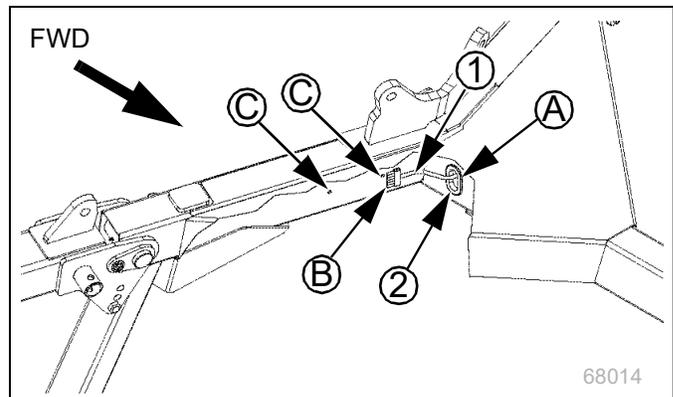


WARNING

In order to avoid serious injury or death, for all installations below, follow all instructions carefully. Apply the tractor parking brake, stop the engine, and remove key. Disconnect the main electrical harness from the tractor before installation.

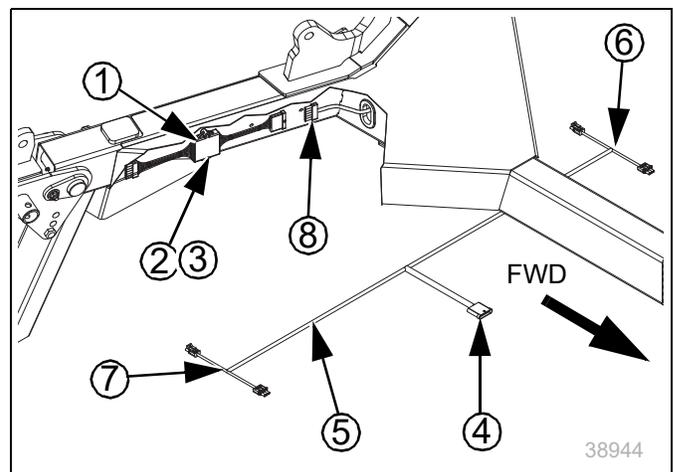
Grommet

1. Insert a fish tape through the opening (A) at the rear of the tongue. Push the fish tape forward through tongue.
2. Pull the fish tape out of the hole in the front of the tongue where the hydraulic hoses exit the tongue.
3. Connect the long harness (1) to the fish tape. The flat connector (B) on the long harness goes to the rear.
4. Pull the long harness out through the hole in the rear of the tongue.
5. Install the grommet (2) in the opening in the frame.
6. Install the eight push mount cable ties (not shown) in the mounting holes on the mainframe. There are six mounting holes on the bottom of the mainframe. There are two mounting holes (C) between the grommet and the lighting module.



Lighting Module Harness

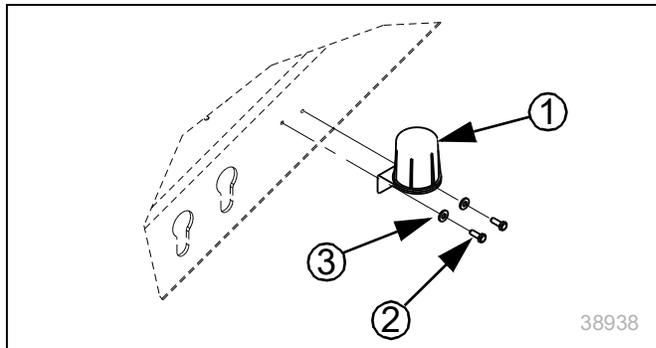
1. Fasten the lighting module harness (1) to the frame. Use 1/4-20x1 3/4 cap screws (2) and 1/4 flat washers (3).
2. Connect the large connector (4) of the center wiring harness to the lighting module harness.
3. Connect the connectors on the short leg (6) of the center wiring harness to the left-hand lamps.
4. Connect the connectors on the long leg (7) of the center wiring harness to the right-hand lamps.
5. Connect large connector (8) on the long harness to the lighting module harness.



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7-Pin Connector Holder

1. Fasten the 7-pin connector holder (1) to the front of the tongue. Use two sets of 1/4-20x3/4 cap screws (2) and 1/4 washers (3).
2. Connect the 7-pin connector on the lead harness to the 7-pin connector holder.
3. Use the eight push mount cable ties to fasten the cables to the mainframe.



Kicker Kits

Single Kicker Kit (512-040A82)

Dual Kicker Kit (512-041A82) (S/N D2491M-)

Bulkhead and Kicker Mounting Plates

1. Lower the wings.
2. Park the tractor and the rake on a solid, level surface.
3. Apply the tractor parking brake, turn off the tractor engine, and remove the key from the tractor.
4. Release all hydraulic pressure.
5. Disconnect the hydraulic hoses from the tractor.
6. Loosen the hydraulic hose clamp at front of the tongue.
7. At the rear of the rake, remove SMV mounting bracket (1) along with the SMV placard (not shown).
8. There are two bulkhead tee fittings (2) in the bulkhead plate (3) at the rear of the frame. Remove the two right-hand wing cylinder hoses (4) from the bulkhead tee fittings. Remove the two left-hand wing cylinder hoses (5) from the bulkhead tee fittings. Fasten identification tags to the hoses for identification at installation. Label the hoses for top and bottom.

 Clean all connections before disconnecting to prevent contamination. Place caps and plugs on all hoses and fittings.

9. Remove two tongue hoses from the bulkhead tee fittings. Fasten identification tags to the hoses for identification at installation. Label the hoses as per top and bottom.

10. Remove the bulkhead plate. Keep the hardware.

11. Remove and keep the two bulkhead tee fittings from the bulkhead plate. Discard the bulkhead plate (3).

12. Attach the bulkhead tee fittings (1), removed earlier, to the new single kicker mounting plate (2).

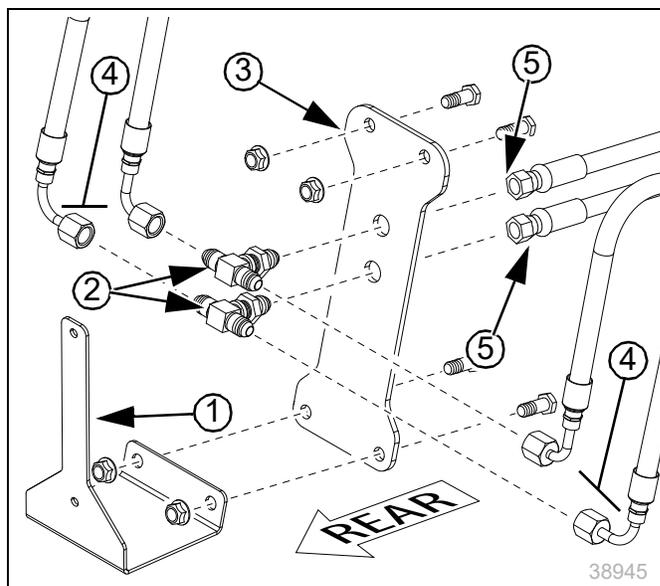
 The kicker mounting plate replaces the bulkhead plate. Rotate the bulkhead tee fittings horizontally and tighten securely.

13. Connect the tongue hoses (3) to the bulkhead tee fittings. Tighten the connections.

 Tighten the hydraulic connections to values found on “**Fittings Torque Values**” on page 25.

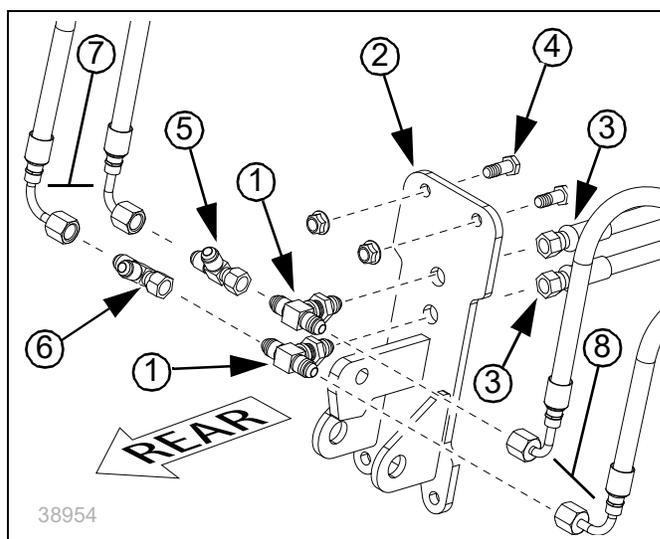
14. Fasten kicker mounting plate onto frame using hardware (4) removed earlier.

15. Attach new tee fittings (5) on left-hand side of bulkhead tees. Rotate the branch on the top tee fitting to approximately 60° above horizontal. Rotate the branch on the bottom tee fitting to approximately 45° above horizontal. Tighten the connections.



WARNING

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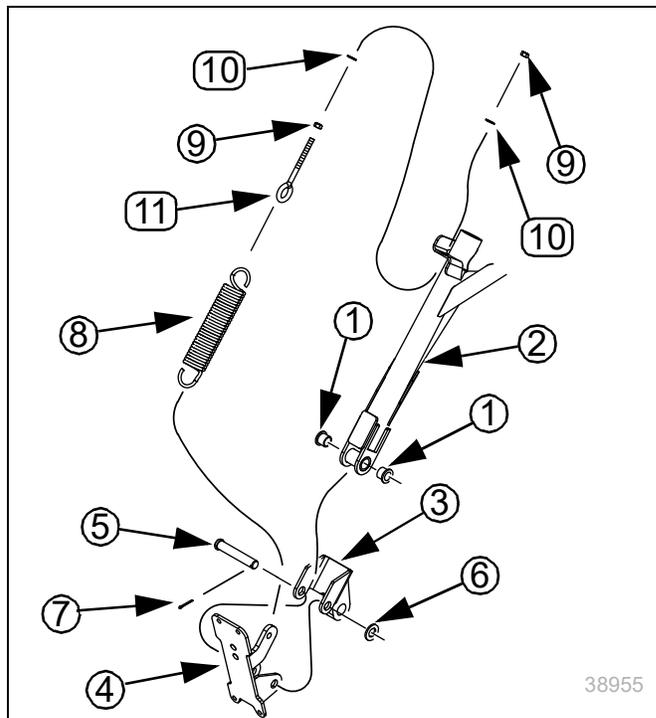


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16. Connect the hoses (6) from the left-hand wing cylinder to the left-hand side of the new tee fittings. Tighten the hoses.
17. Connect the hoses (7) from the right-hand wing cylinder to bulkhead tees. Tighten the hoses.

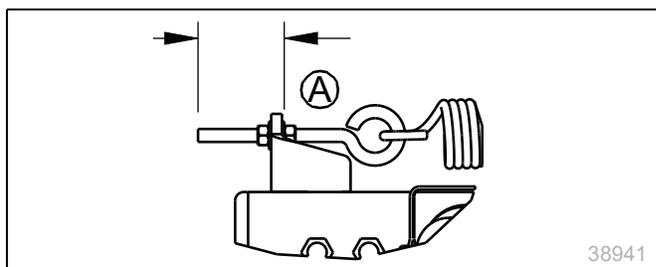
Kicker Arm

1. Install the two pivot bushings (1) in the kicker arm (2).
2. Slide the kicker arm (2) into the kicker lift (3).
3. Slide the assembly onto the kicker mounting plate (4).
4. Align kicker lift (3) and kicker mounting plate (4), and install the clevis pin (5).
5. Secure the clevis pin (5) with the washer (6) and cotter pin (7).
6. Hook one end of the spring (8) into the hole on the kicker mounting plate (4).
7. Install a nut (9) and then a flat washer (10) onto the eye bolt (11).
8. Hook the remaining end of the flotation spring (8) through the loop in the eyebolt (11).
9. Insert the eye bolt through the hole in the kicker arm and install the remaining flat washer (10) and nut (9).



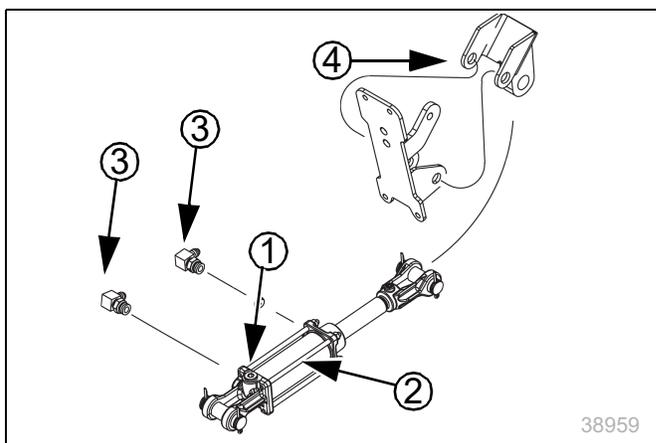
Eyebolt Distance

1. Measure the distance (A) from the end of the eyebolt to the outer face of the inner jam nut. Adjust the nuts so the distance is 2.5 in (63.5 mm).
2. Tighten the nuts on the eyebolt without changing the adjustment.



Kicker Lift Cylinder

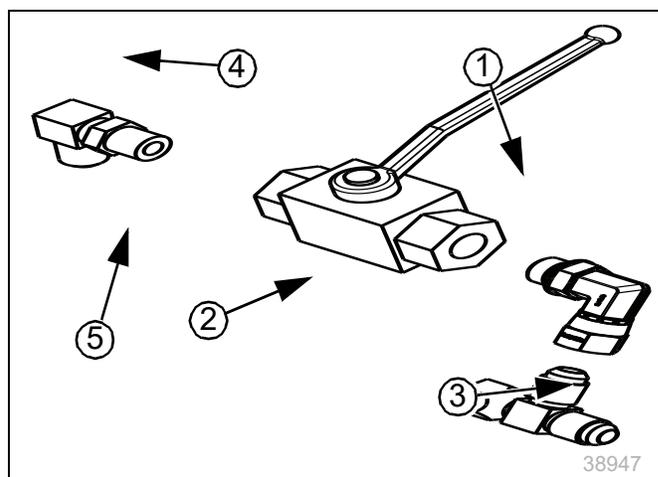
1. Install the orifice (1) in the rod end of the kicker lift cylinder (2). The slot in the orifice must be away from the kicker lift cylinder.
2. Install the elbows (3) on the kicker lift cylinder. Orient both elbows toward the cylinder rod. The elbow at the base end must be pointed slightly down.
3. Attach the base end of the kicker lift cylinder to the lug on the rake frame. The elbows must be toward the center of the rake. Use the clevis pin and keeper supplied with the cylinder.
4. Attach the rod end of the kicker lift cylinder to the lug on the kicker lift (4). Use the clevis pin and keeper supplied with the cylinder.



Kicker Lockout Valve

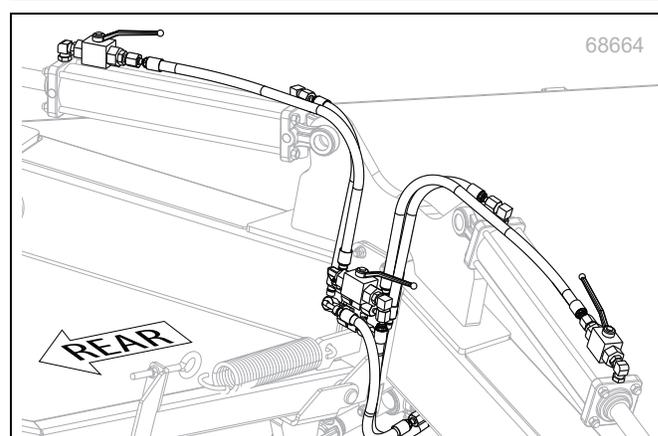
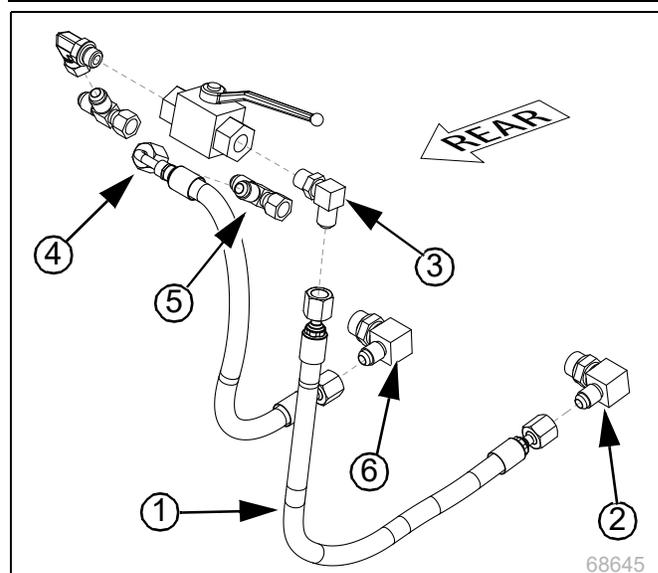
1. Turn the handle (1) of the kicker lockout valve (2) to the closed position as shown. When installed, the handle will be facing rear of the rake.
2. Install the kicker lockout valve on the male to male elbow (3).
3. Install the male to female elbow (4) in the left-hand end of the kicker lockout valve.
4. Attach the female end of the elbow (4) to the top fitting on the new tee fitting (5). The kicker lockout valve will be oriented to the right, or above the bulkhead tee fitting.

 The lockout valve will not operate correctly unless installed as instructed.



5. Find the hose (1) in the kit that has a straight fitting on both ends. Loosely connect one end of the hose to the elbow (2) in the base end of the kicker cylinder. Connect the other end of the hose to the elbow (3) on the kicker lockout valve.
6. Find the other hose in the kit. Loosely connect the elbow end of the hose (4) to the bottom tee fitting (5). Attach the straight end of the hose to the elbow (6) in the rod end of the kicker lift cylinder.
7. Adjust elbows and tee fittings as required so that hoses are not rubbing any sharp edges.
8. Make sure all connections are tight.

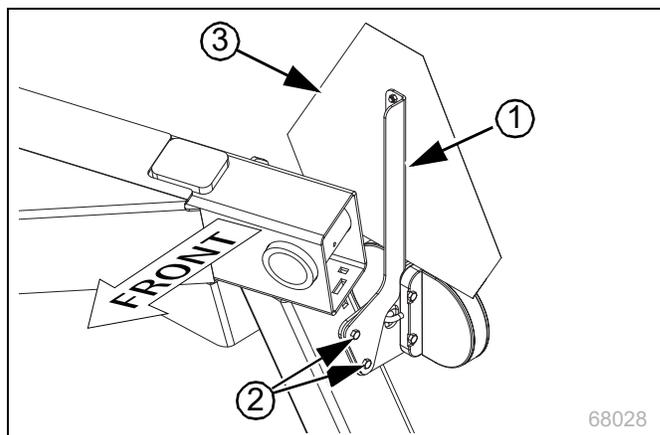
 The hydraulics, once you've completed the installation steps, should have hoses and valved positioned in the manner illustrated.



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SMV Bracket

1. Install new SMV bracket (1) at two holes (2) on left-hand transport wheel strut.
 If taillights are present, taillight brackets use the same mounting holes.
2. Move the SMV sign from the old SMV bracket to the new SMV bracket. Discard the old SMV bracket.



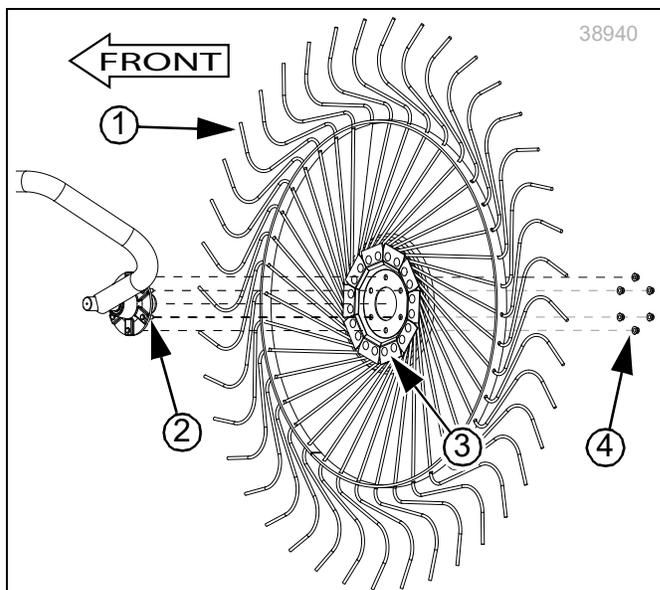
Rake Wheels

1. Install rake wheel (1) on hub's stubs (2). The side of the rake wheel with the series of small plates (3) must be toward the hub.
2. Install the flange lock nuts (4) on the wheel studs and tighten to 35 N m (26 lb ft).
3. Adjust hoses at hitch end of tongue to length required, and tighten hose clamp at the front of the tongue.
4. Connect hoses to a hydraulic remote valve on tractor.
5. Fill the hydraulic oil reservoir on the tractor, add fluid slowly and re-check level after a few minutes to ensure the hydraulic system has sufficient hydraulic fluid.

WARNING

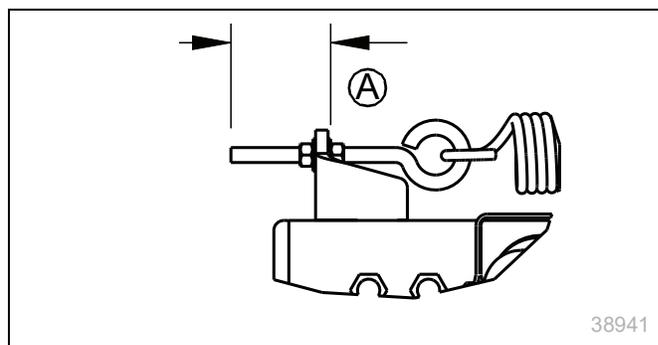
Use a piece of cardboard to check for hydraulic fluid leaks.

6. Fold and unfold the wings and kicker. Check for smooth hydraulic movements and ensure there is enough clearance. Ensure all fittings have been correctly made and there is not any hydraulic fluid leaks. Release hydraulic pressure before making any adjustments, if necessary. If no leaks, proceed.
7. Close the kicker lockout valve with the kicker in the raised position and verify that the kicker does not move when the rake wings are unfolded.
8. Open the kicker lockout valve and lower the kicker.
9. Apply the tractor parking brake, turn off the tractor engine, and remove the key from ignition.



Down Pressure

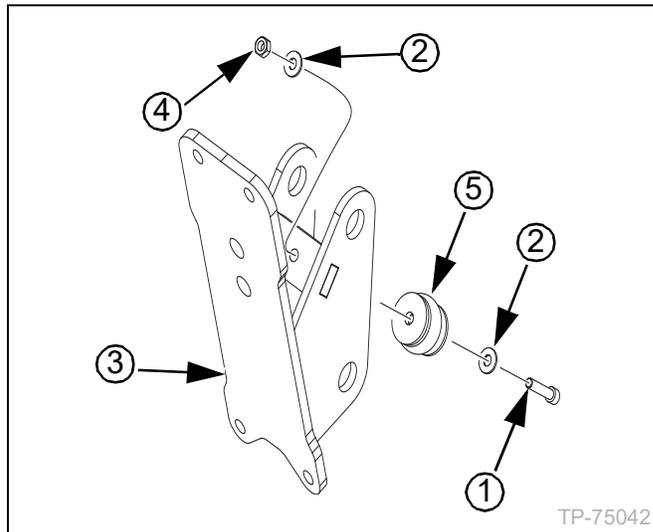
1. Check the down pressure on the kicker wheel(s).
If adjustment is necessary, measure the distance (A) from the end of the eyebolt to the outer face of the inner jam nut. The initial distance should be 2.5 in (63.5 mm).
 Increase distance (A) to increase the flotation pressure. Decrease distance (A) to decrease the flotation pressure.
2. Tighten the jam nuts.



Dual Kicker Kit (512-125A) (S/N D2492M+)

Rubber Stop

1. Secure the rubber stop (5) on kicker mounting plate (3) using bolt (1), washers (2), and a nut (4).

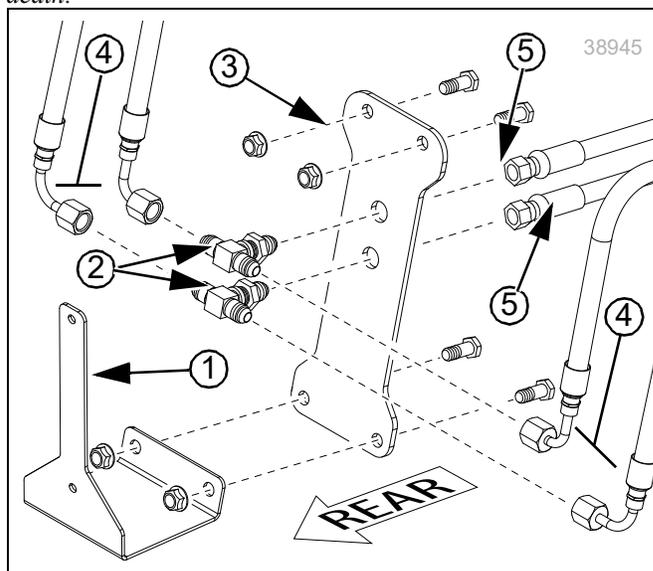


Bulkhead Plate and Kicker Mounting Plate

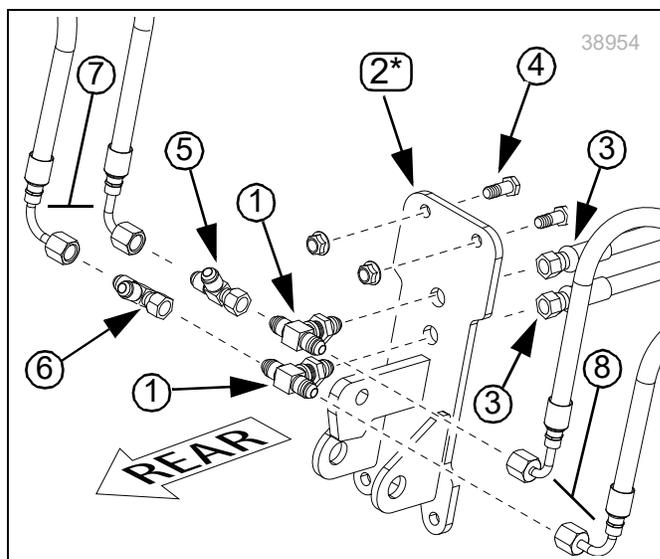
1. Lower the wings.
2. Park the tractor and the rake on a solid, level surface.
3. Apply the tractor parking brake, turn off the tractor engine, and remove the key from the tractor.
4. Release all hydraulic pressure.
5. Disconnect the hydraulic hoses from the tractor.
6. Loosen the hydraulic hose clamp at front of the tongue.
7. At the rear of the rake, remove SMV mounting bracket (1) along with the SMV placard (not shown).
8. There are two bulkhead tee fittings (2) in the bulkhead plate (3) at the rear of the frame. Remove the two right-hand wing cylinder hoses (4) from the bulkhead tee fittings. Remove the two left-hand wing cylinder hoses (5) from the bulkhead tee fittings. Fasten identification tags to the hoses for identification at installation. Label the hoses for top and bottom.
8. Clean all connections before disconnecting to prevent contamination. Place caps and plugs on all hoses and fittings.
9. Remove two tongue hoses from the bulkhead tee fittings. Fasten identification tags to the hoses for identification at installation. Label the hoses as per top and bottom.
10. Remove the bulkhead plate. Keep the hardware.
11. Remove and keep the two bulkhead tee fittings from the bulkhead plate. Discard the bulkhead plate (3).

WARNING

Do not complete the kit installation while the hydraulic system is pressurized. Relieve all hydraulic pressure in system before installation. Attempting installation while the hydraulic system is pressurized can result in serious injury and even death.



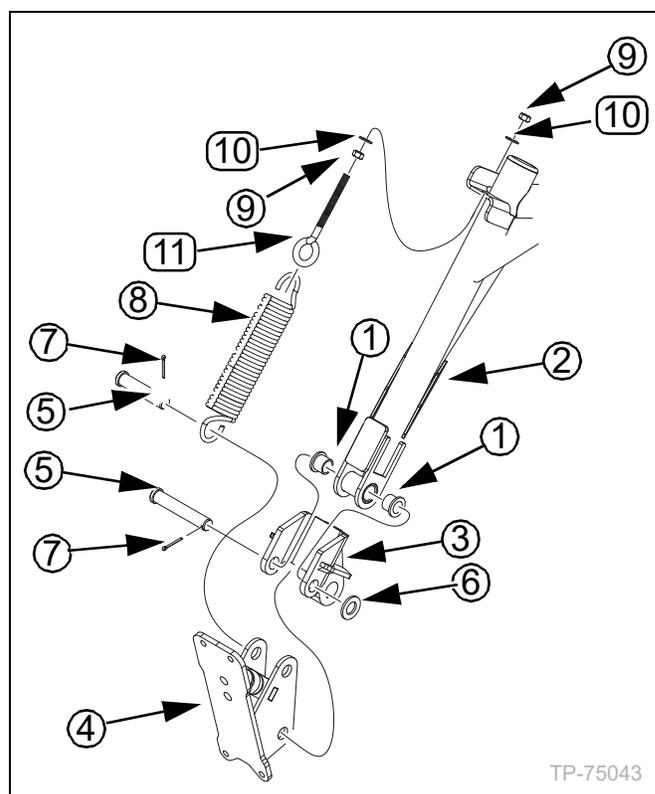
12. Attach the bulkhead tee fittings (1), removed earlier, to the new single kicker mounting plate (2).
-  The kicker mounting plate replaces the bulkhead plate. Rotate the bulkhead tee fittings horizontally and tighten securely.
13. Connect the tongue hoses (3) to the bulkhead tee fittings. Tighten the connections.
-  Tighten the hydraulic connections to values found on “**Fittings Torque Values**” on page 25.
14. Fasten kicker mounting plate onto frame using hardware (4) removed earlier.
15. Attach new tee fittings (5) on left-hand side of bulkhead tees. Rotate the branch on the top tee fitting to approximately 60° above horizontal. Rotate the branch on the bottom tee fitting to approximately 45° above horizontal. Tighten the connections.
16. Connect the hoses (6) from the left-hand wing cylinder to the left-hand side of the new tee fittings. Tighten the hoses.
17. Connect the hoses (7) from the right-hand wing cylinder to bulkhead tees. Tighten the hoses.



*Kicker plate shown is for a similar kit, however the connections are the same.

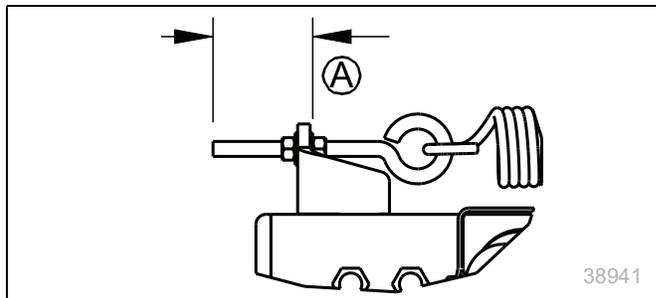
Kicker Arm

1. Install the two pivot bushings (1) in the kicker arm (2).
2. Slide the kicker arm (2) into the kicker lift (3).
3. Slide the assembly onto the kicker mounting plate (4).
4. Align kicker lift (3) and kicker mounting plate (4), and install the clevis pin (5) and cotter pin (7).
5. Secure the clevis pin (5) with the washer (6) and cotter pin (7).
6. Hook one end of the spring (8) into the hole on the kicker mounting plate (4).
7. Install a nut (9) and then a flat washer (10) onto the eye bolt (11)
8. Hook the remaining end of the flotation spring through the loop in the eye bolt.
9. Insert the eye bolt through the hole in the kicker arm and install the remaining flat washer (10) and nut (9).



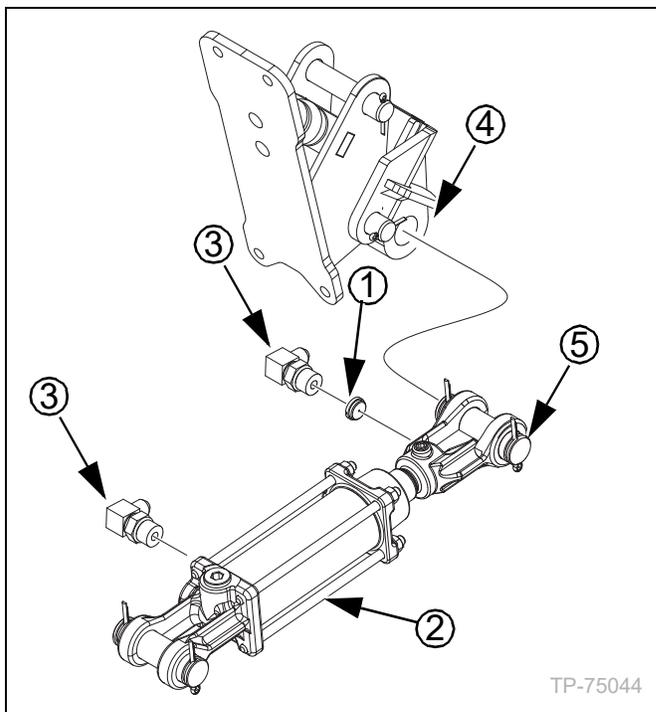
Eyebolt Distance

1. Measure the distance (A) from the end of the eyebolt to the outer face of the inner jam nut. Adjust the nuts so the distance is 2.5 in (63.5 mm).
2. Tighten the nuts on the eyebolt without changing the adjustment.



Kicker Lift Cylinder

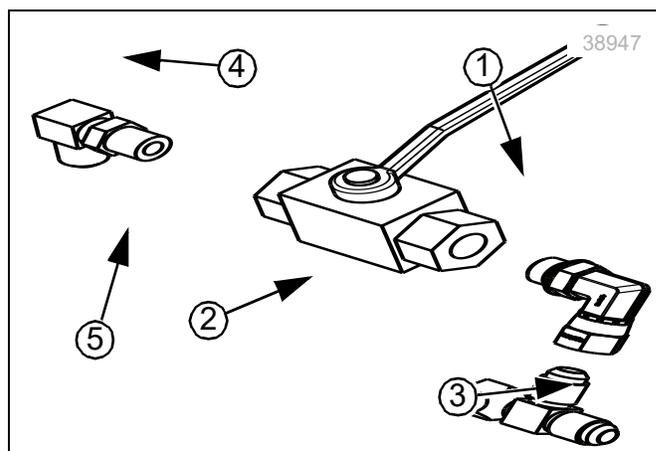
1. Install the orifice (1) in the rod end of the kicker lift cylinder (2). The slot in the orifice must be away from the kicker lift cylinder.
2. Install the elbows (3) on the kicker lift cylinder. Orient both elbows toward the cylinder rod. The elbow at the base end must be pointed slightly down.
3. Attach the base end of the kicker lift cylinder to the lug on the bottom of the rake frame. The elbows must be toward the center of the rake. Use the clevis pin and keeper supplied with the cylinder.
4. Attach the rod end of the kicker lift cylinder to the lug on the kicker lift (4). Use the clevis pin and cotter pin (5) supplied with the cylinder.



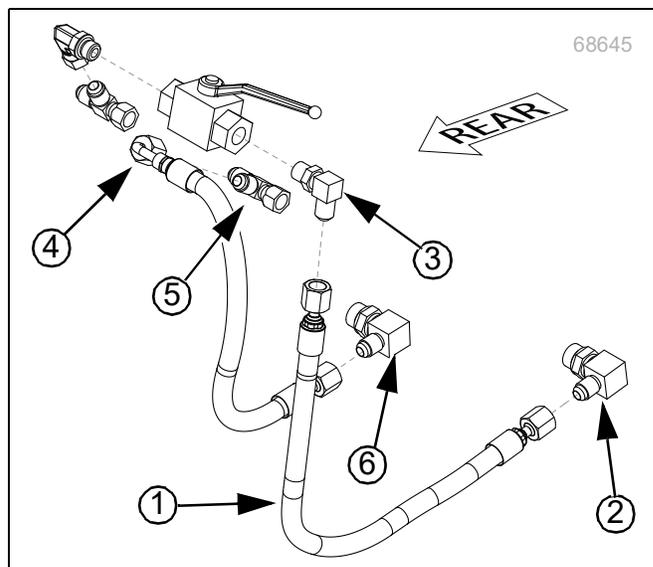
Kicker Lockout Valve

1. Turn the handle (1) of the kicker lockout valve (2) to the closed position as shown. When installed, the handle will be facing rear of the rake.
2. Install the kicker lockout valve on the male to male elbow (3).
3. Install the male to female elbow (4) in the left-hand end of the kicker lockout valve.
4. Attach the female end of the elbow (4) to the top fitting on the new tee fitting (5). The kicker lockout valve will be oriented to the right, or above the bulkhead tee fitting.

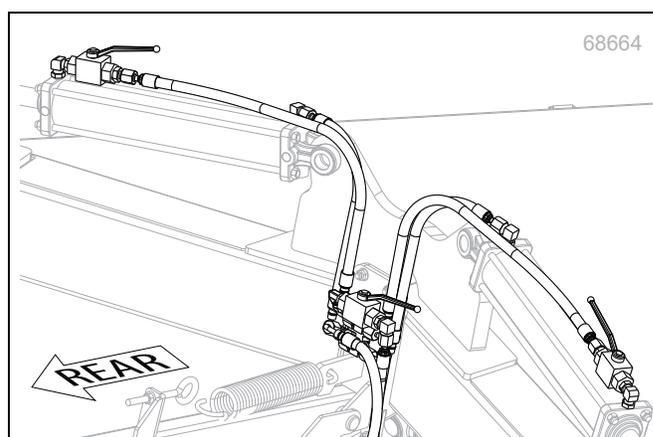
 The lockout valve will not operate correctly unless installed as instructed.



5. Find the hose (1) in the kit that has a straight fitting on both ends. Loosely connect one end of the hose to the elbow (2) in the base end of the kicker cylinder. Connect the other end of the hose to the elbow (3) on the kicker lockout valve.
6. Find the other hose in the kit. Loosely connect the elbow end of the hose (4) to the bottom tee fitting (5). Attach the straight end of the hose to the elbow (6) in the rod end of the kicker lift cylinder.
7. Adjust elbows and tee fittings as required so that hoses are not rubbing any sharp edges.
8. Make sure all connections are tight.

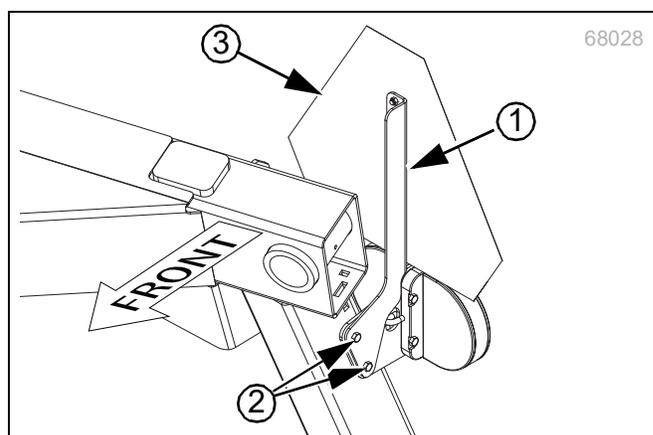


 The hydraulics, once you've completed the installation steps, should have hoses and valved positioned in the manner illustrated.



SMV Bracket

1. Install new SMV bracket (1) at two holes (2) on left-hand transport wheel strut.
-  If taillights are present, taillight brackets use the same mounting holes.
2. Move the SMV sign from the old SMV bracket to the new SMV bracket. Discard the old SMV bracket.



RA108CR - RA212CR Hay Rake

Rake Wheels

1. Install rake wheel (1) on hub's stubs (2). The side of the rake wheel with the series of small plates (3) must be toward the hub.
2. Install the flange lock nuts (4) on the wheel studs and tighten to 35 N m (26 lb ft).
3. Adjust hoses at hitch end of tongue to length required, and tighten hose clamp at the front of the tongue.
4. Connect hoses to a hydraulic remote valve on tractor.
5. Fill the hydraulic oil reservoir on the tractor, add fluid slowly and re-check level after a few minutes to ensure the hydraulic system has sufficient hydraulic fluid.

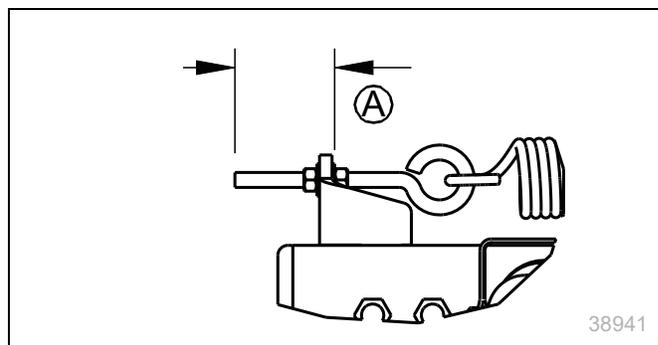
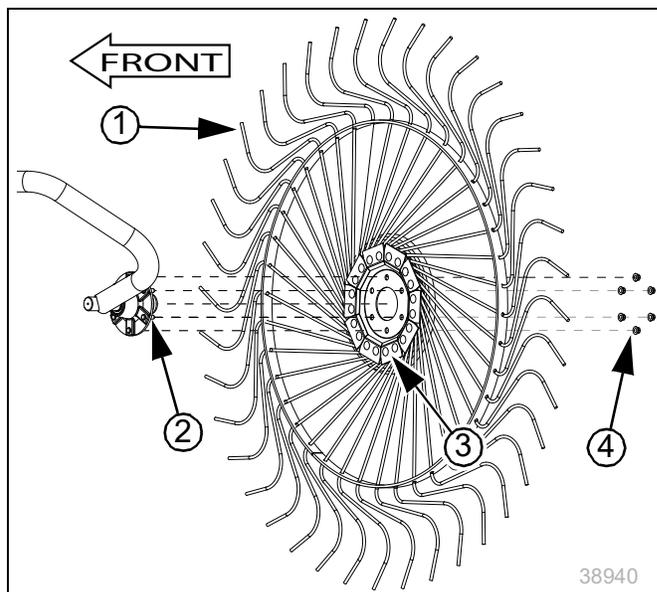
WARNING

Use a piece of cardboard to check for hydraulic fluid leaks.

6. Fold and unfold the wings and kicker. Check for smooth hydraulic movements and ensure there is enough clearance. Ensure all fittings have been correctly made and there is not any hydraulic fluid leaks. Release hydraulic pressure before making any adjustments, if necessary. If no leaks, proceed.
7. Close the kicker lockout valve with the kicker in the raised position and verify that the kicker does not move when the rake wings are unfolded.
8. Open the kicker lockout valve and lower the kicker.
9. Apply the tractor parking brake, turn off the tractor engine, and remove the key from ignition.

Down Pressure

1. Check the down pressure on the kicker wheel(s). If adjustment is necessary, measure the distance (A) from the end of the eyebolt to the outer face of the inner jam nut. The initial distance should be 2.5 in (63.5 mm).
 Increase distance (A) to increase the flotation pressure. Decrease distance (A) to decrease the flotation pressure.
2. Tighten the jam nuts.



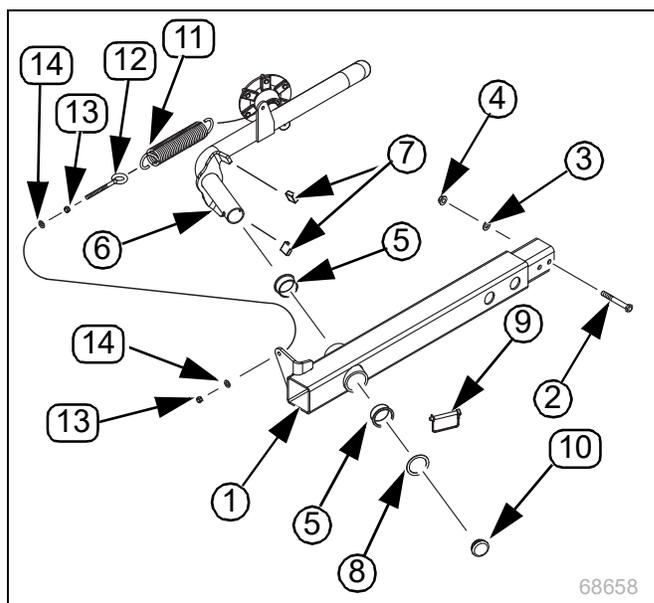
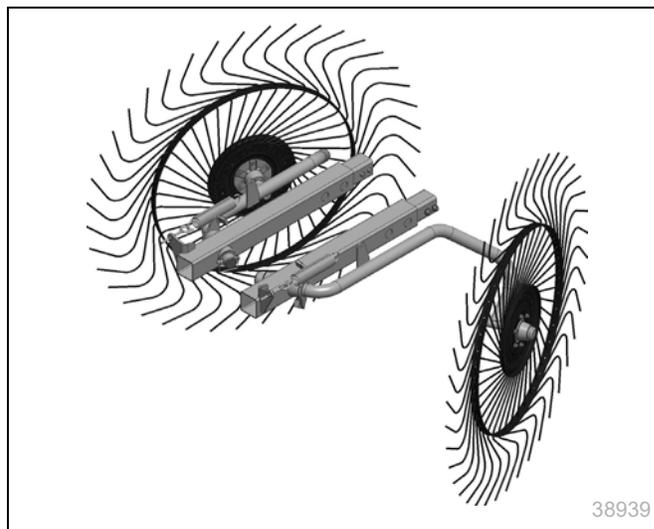
Wing Extension Kit (512-067A82) (S/N D3272M-)

RA108CR and RA210CR only.

Wing extensions are available to add an additional rake wheel to both wing arms. The rake wheels may be shipped separate from the other components of the wing extension kit.

Wing Extension

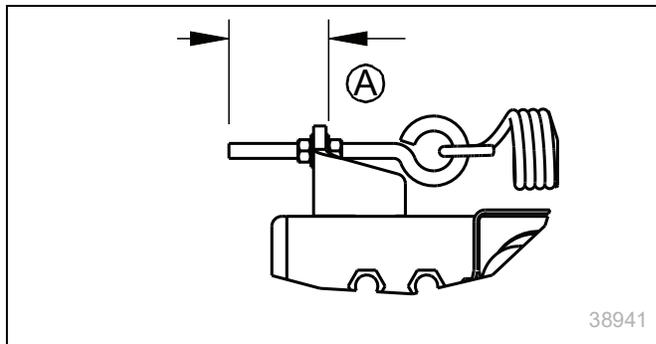
1. Park the rake on a solid level surface.
2. Lower the wings.
3. Apply the tractor parking brake, turn the tractor engine off, and remove the key.
4. A bag of hardware is located inside of one of the extension tubes. Remove the bag.
5. Find the right-hand extension tube (1). Compare both wing extension tubes to the right-hand wing to determine which is the right-hand extension tube. Determine the correct orientation for installing the right-hand extension tube.
6. Remove the square plug (not shown) from the end of the extension tube, and insert the small end of the right-hand wing extension tube into the wing tube.
7. Align the holes in the right-hand wing extension tube and the wing tube. Install, but do not tighten, the bolts (2), flat washers (3), and nuts (4) from the bag of hardware.
8. Hold the right-hand wing tube in alignment lengthwise with the wing tube. Tighten the hardware to 103 N m (76 lb-ft). See **“Hydraulic Connectors and Torque”** on page 25.
9. Install the square plug (not shown) removed earlier in the end of the extension tube.
10. Install the two bushings (5) in the right-hand extension tube.
11. Compare the two rake arms to the rake arms on the right-hand wing tube to determine which is the right-hand rake arm assembly (6).
12. Install a square cap (7) on both of the ears on the inner end of the right-hand rake arm assembly.
13. Install the inner end of the right-hand rake arm assembly into the right-hand extension tube.
14. Install flat washer (8), wire lock pin (9) and plug (10).
15. Connect one end of a spring (11) to the ear on the right-hand rake arm.
16. Connect the eyebolt (12) to the other end of the spring. Install a 3/8-16 nut (13) and then a flat washer (14) on the eyebolt.
17. Insert the eyebolt through the ear on the right-hand extension tube. Install a flat washer (14) and then 3/8-16 nut (13) on the eyebolt.



RA108CR - RA212CR Hay Rake

Eyebolt Distance

1. Measure the distance (A) from the end of the eyebolt to the outer face of the inner jam nut. The initial distance should be 2.5 in (63.5 mm).
2. Tighten jam nuts.

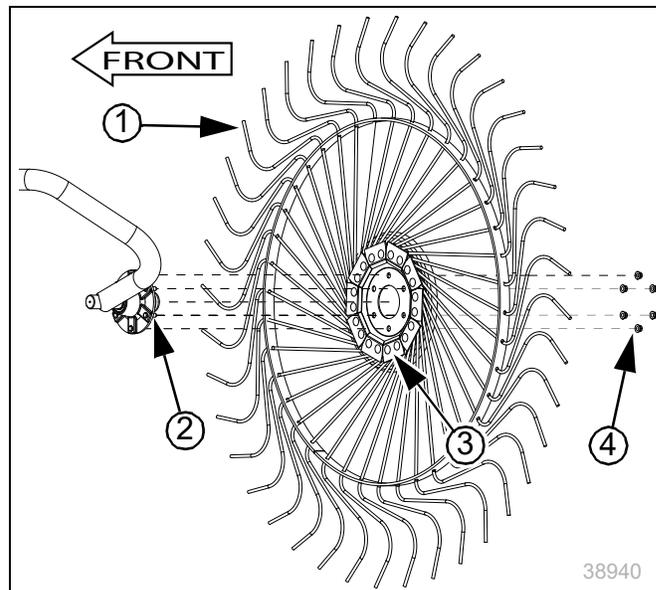


Rake Wheels

1. The rake wheels are marked for left-hand and right-hand installation.

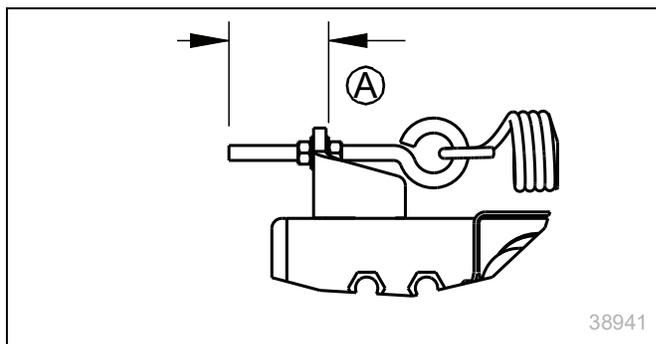
 Wheel tines that face towards the front of the machine must have tine ends (1) pointing upwards. If the ends point downwards, flip the wheel around and mount to hub so metal plates (3) face inwards.

2. Install a right-hand rake wheel (1) on the wheel studs on a right-hand hub (2). The side of the rake wheel with the series of small plates (3) must be toward the hub.
3. Install the flange lock nuts (4) onto the wheel studs. Tighten the flange lock nuts to 35 N m (26 lb ft).
4. Repeat the procedure to install the left-hand wing extension.



Down Pressure

1. Check the down pressure on the rake wheel(s). If adjustment is necessary, measure the distance (A) from the end of the eyebolt to the outer face of the inner jam nut. The initial distance should be 2.5 in (63.5 mm).
 - a. Increase distance (A) to increase the flotation pressure.
 - b. Decrease distance (A) to decrease the flotation pressure.



Tighten the jam nuts without changing the adjustment.

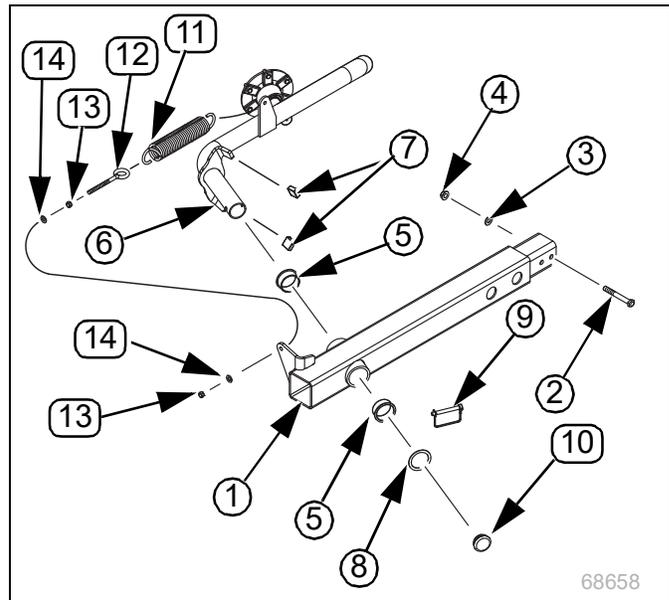
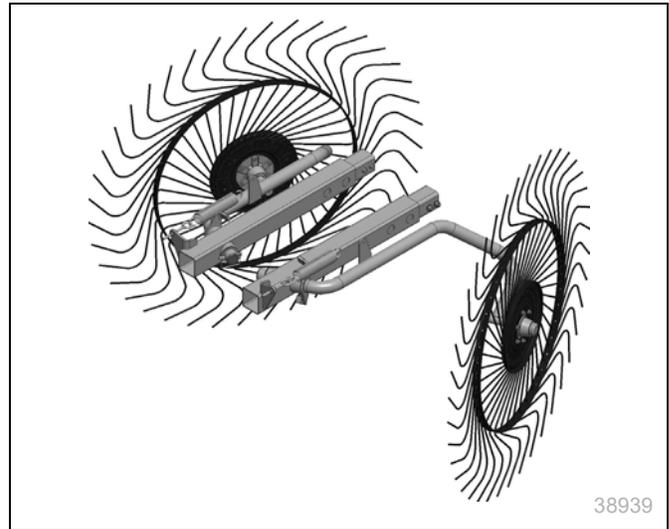
Wing Extension Kit (512-129A) (S/N D3273M+)

RA108CR and RA210CR only.

Wing extensions are available to add an additional rake wheel to both wing arms. The rake wheels may be shipped separate from the other components of the wing extension kit.

Wing Extension

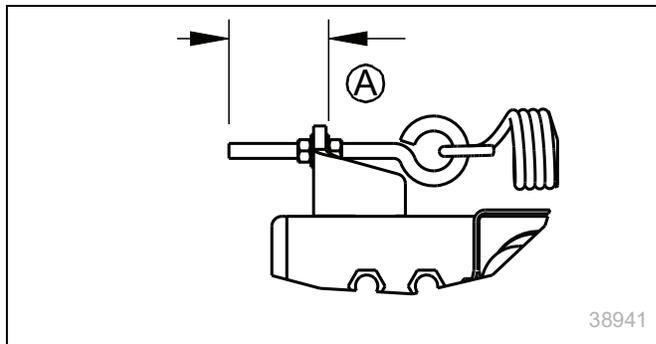
1. Park the rake on a solid level surface.
2. Lower the wings.
3. Apply the tractor parking brake, turn the tractor engine off, and remove the key.
4. A bag of hardware is located inside of one of the extension tubes. Remove the bag.
5. Find the right-hand extension tube (1). Compare both wing extension tubes to the right-hand wing to determine which is the right-hand extension tube. Determine the correct orientation for installing the right-hand extension tube.
6. Remove the square plug (not shown) from the end of the extension tube, and insert the small end of the right-hand wing extension tube into the wing tube.
7. Align the holes in the right-hand wing extension tube and the wing tube. Install, but do not tighten, the bolts (2), flat washers (3), and nuts (4) from the bag of hardware.
8. Hold the right-hand wing tube in alignment lengthwise with the wing tube. Tighten the hardware to 103 N m (76 lb-ft). See "**Hydraulic Connectors and Torque**" on page 25.
9. Install the square plug (not shown) removed earlier in the end of the extension tube.
10. Install the two bushings (5) in the right-hand extension tube.
11. Compare the two rake arms to the rake arms on the right-hand wing tube to determine which is the right-hand rake arm assembly (6).
12. Install a square cap (7) on both of the ears on the inner end of the right-hand rake arm assembly.
13. Install the inner end of the right-hand rake arm assembly into the right-hand extension tube.
14. Install flat washer (8), wire lock pin (9) and plug (10).
15. Connect one end of a spring (11) to the ear on the right-hand rake arm.
16. Connect the eyebolt (12) to the other end of the spring. Install a 1/2-13 nut (13) and then a flat washer (14) on the eyebolt.
17. Insert the eyebolt through the ear on the right-hand extension tube. Install a flat washer (14) and then 1/2-13 nut (13) on the eyebolt.



RA108CR - RA212CR Hay Rake

Eyebolt Distance

1. Measure the distance (A) from the end of the eyebolt to the outer face of the inner jam nut. The initial distance should be 2.5 in (63.5 mm).
2. Tighten jam nuts.

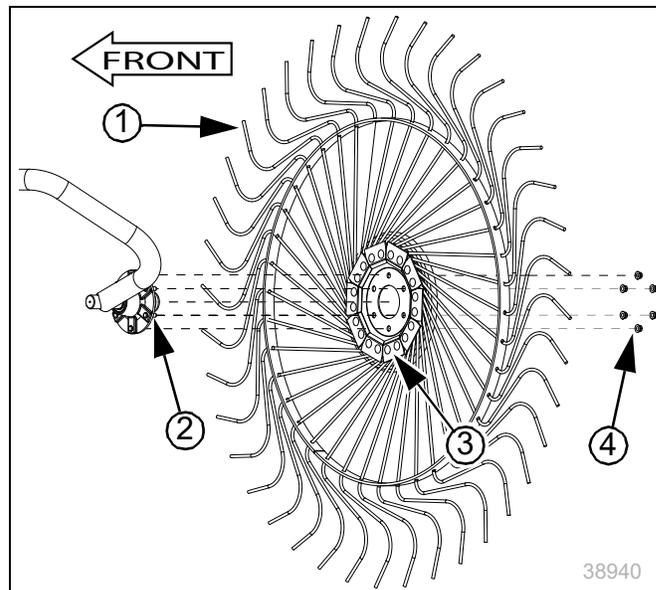


Rake Wheels

1. The rake wheels are marked for left-hand and right-hand installation.

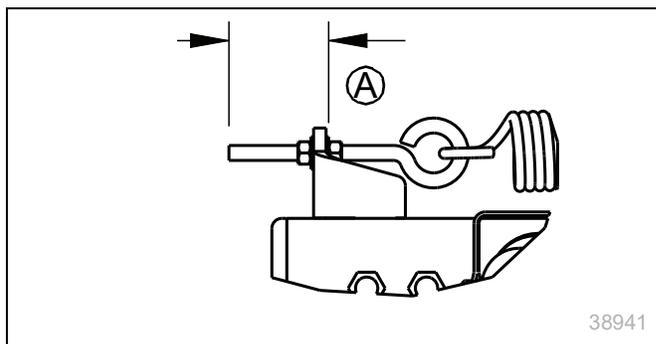
 Wheel tines that face towards the front of the machine must have tine ends (1) pointing upwards. If the ends point downwards, flip the wheel around and mount to hub so metal plates (3) face inwards.

2. Install a right-hand rake wheel (1) on the wheel studs on a right-hand hub (2). The side of the rake wheel with the series of small plates (3) must be toward the hub.
3. Install the flange lock nuts (4) onto the wheel studs. Tighten the flange lock nuts to 35 N m (26 lb ft).
4. Repeat the procedure to install the left-hand wing extension.



Down Pressure

1. Check the down pressure on the rake wheel(s). If adjustment is necessary, measure the distance (A) from the end of the eyebolt to the outer face of the inner jam nut. The initial distance should be 2.5 in (63.5 mm).
 - a. Increase distance (A) to increase the flotation pressure.
 - b. Decrease distance (A) to decrease the flotation pressure.
 - c. Tighten the jam nuts without changing the adjustment.



Wind Screen Kits

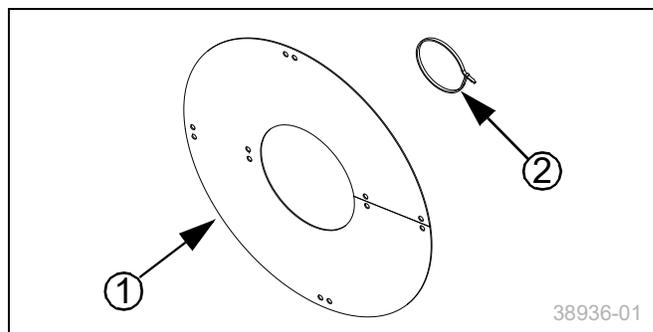
Eight Wheel Wind Screen Kit (512-048A82)

Ten Wheel Wind Screen Kit (512-049A82)

Twelve Wheel Wind Screen Kit (512-050A82)

The wind screens (1) are used to reduce the effect of wind on the crop during raking. The kit includes cable ties (2) for attaching the wind screens to the rake wheels. To install the wind screens, do the following:

1. Park the rake on a solid level surface.
2. Lower the wings.
3. Apply the tractor parking brake. Stop the tractor engine and take the key with you to prevent unauthorized starting.
4. Place wind screen on the side of the rake wheel closest to the rake frame. Use the slot in the wind screen to go around the rake arm.
5. Center the wind screen on the rake wheel.
6. There are six pairs of holes in each wind screen. Use the cable ties to fasten the windscreens to the rake wheel at each pair of holes.
7. Repeat the steps for each wind screen.



Torque Values Chart

Bolt Size	Bolt Head Identification					
						
	Grade 2		Grade 5		Grade 8	
in-tpi ^a	N-m ^b	ft-lb ^d	N-m	ft-lb	N-m	ft-lb
1/4-20	7.4	5.6	11	8	16	12
1/4-28	8.5	6	13	10	18	14
5/16-18	15	11	24	17	33	25
5/16-24	17	13	26	19	37	27
3/8-16	27	20	42	31	59	44
3/8-24	31	22	47	35	67	49
7/16-14	43	32	67	49	95	70
7/16-20	49	36	75	55	105	78
1/2-13	66	49	105	76	145	105
1/2-20	75	55	115	85	165	120
9/16-12	95	70	150	110	210	155
9/16-18	105	79	165	120	235	170
5/8-11	130	97	205	150	285	210
5/8-18	150	110	230	170	325	240
3/4-10	235	170	360	265	510	375
3/4-16	260	190	405	295	570	420
7/8-9	225	165	585	430	820	605
7/8-14	250	185	640	475	905	670
1-8	340	250	875	645	1230	910
1-12	370	275	955	705	1350	995
1 1/8-7	480	355	1080	795	1750	1290
1 1/8-12	540	395	1210	890	1960	1440
1 1/4-7	680	500	1520	1120	2460	1820
1 1/4-12	750	555	1680	1240	2730	2010
1 3/8-6	890	655	1990	1470	3230	2380
1 3/8-12	1010	745	2270	1670	3680	2710
1 1/2-6	1180	870	2640	1950	4290	3160
1 1/2-12	1330	980	2970	2190	4820	3560

Bolt Size	Bolt Head Identification					
						
	Class 5.8		Class 8.8		Class 10.9	
mm x pitch ^c	N-m	ft-lb	N-m	ft-lb	N-m	ft-lb
M 5 X 0.8	4	3	6	5	9	7
M 6 X 1	7	5	11	8	15	11
M 8 X 1.25	17	12	26	19	36	27
M 8 X 1	18	13	28	21	39	29
M10 X 1.5	33	24	52	39	72	53
M10 X 0.75	39	29	61	45	85	62
M12 X 1.75	58	42	91	67	125	93
M12 X 1.5	60	44	95	70	130	97
M12 X 1	90	66	105	77	145	105
M14 X 2	92	68	145	105	200	150
M14 X 1.5	99	73	155	115	215	160
M16 X 2	145	105	225	165	315	230
M16 X 1.5	155	115	240	180	335	245
M18 X 2.5	195	145	310	230	405	300
M18 X 1.5	220	165	350	260	485	355
M20 X 2.5	280	205	440	325	610	450
M20 X 1.5	310	230	650	480	900	665
M24 X 3	480	355	760	560	1050	780
M24 X 2	525	390	830	610	1150	845
M30 X 3.5	960	705	1510	1120	2100	1550
M30 X 2	1060	785	1680	1240	2320	1710
M36 X 3.5	1730	1270	2650	1950	3660	2700
M36 X 2	1880	1380	2960	2190	4100	3220

- a. in-tpi = nominal thread diameter in inches-threads per inch
- b. N·m = newton-meters
- c. mm x pitch = nominal thread diameter in mm x thread pitch
- d. ft-lb = foot pounds

Torque tolerance + 0%, -15% of torquing values. Unless otherwise specified use torque values listed above.

25199

Hydraulic Connectors and Torque

Leave any protective caps in place until immediately prior to making a connection.

NPT - National Pipe Thread

Note tapered threads, no cone/flare, and no O-ring.

- ① Apply liquid pipe sealant for hydraulic applications. Do not use tape sealant, which can clog a filter and/or plug an orifice.

JIC - Joint Industry Conference (SAE J514)

- ② Note straight threads ④ and the 37° cone ⑤ on "M" fittings (or 37° flare on "F" fittings).

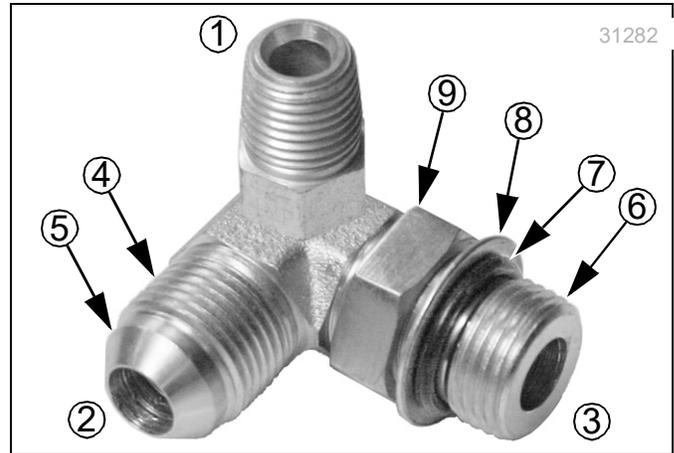
Use no sealants (tape or liquid) on JIC fittings.

ORB - O-Ring Boss (SAE J514)

Note straight threads ⑥ and elastomer O-Ring ⑦.

Prior to installation, to prevent abrasion during tightening, lubricate O-Ring with clean hydraulic fluid. Use no sealants (tape or liquid) on ORB fittings.

- ③ ORB fittings that need orientation, such as the ell depicted, also have a washer ⑧ and jam nut ⑨ ("adjustable thread port stud"). Back jam nut away from washer. Thread fitting into receptacle until O-Ring contacts seat. Unscrew fitting to desired orientation. Tighten jam nut to torque specification.

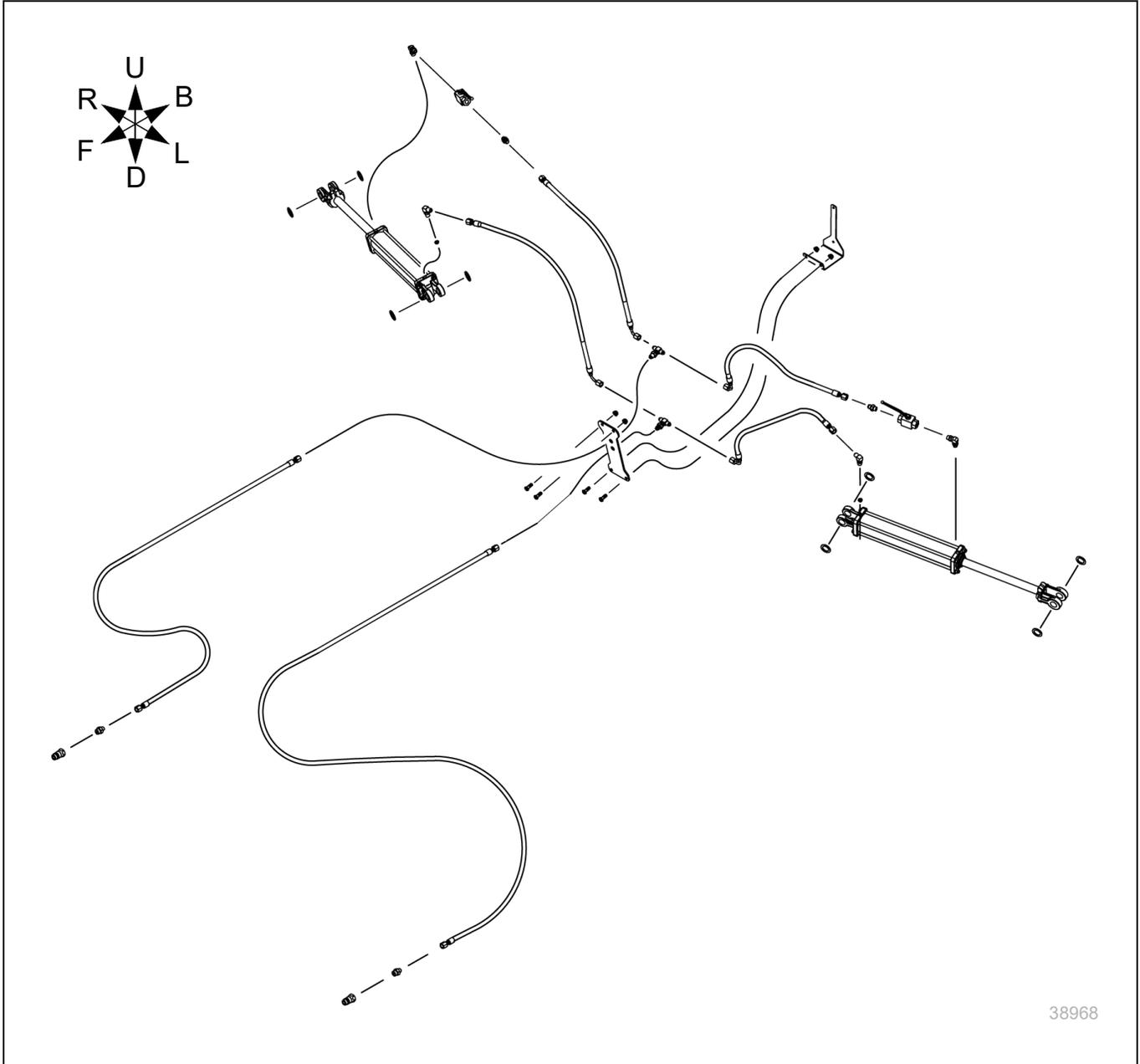


Fittings Torque Values

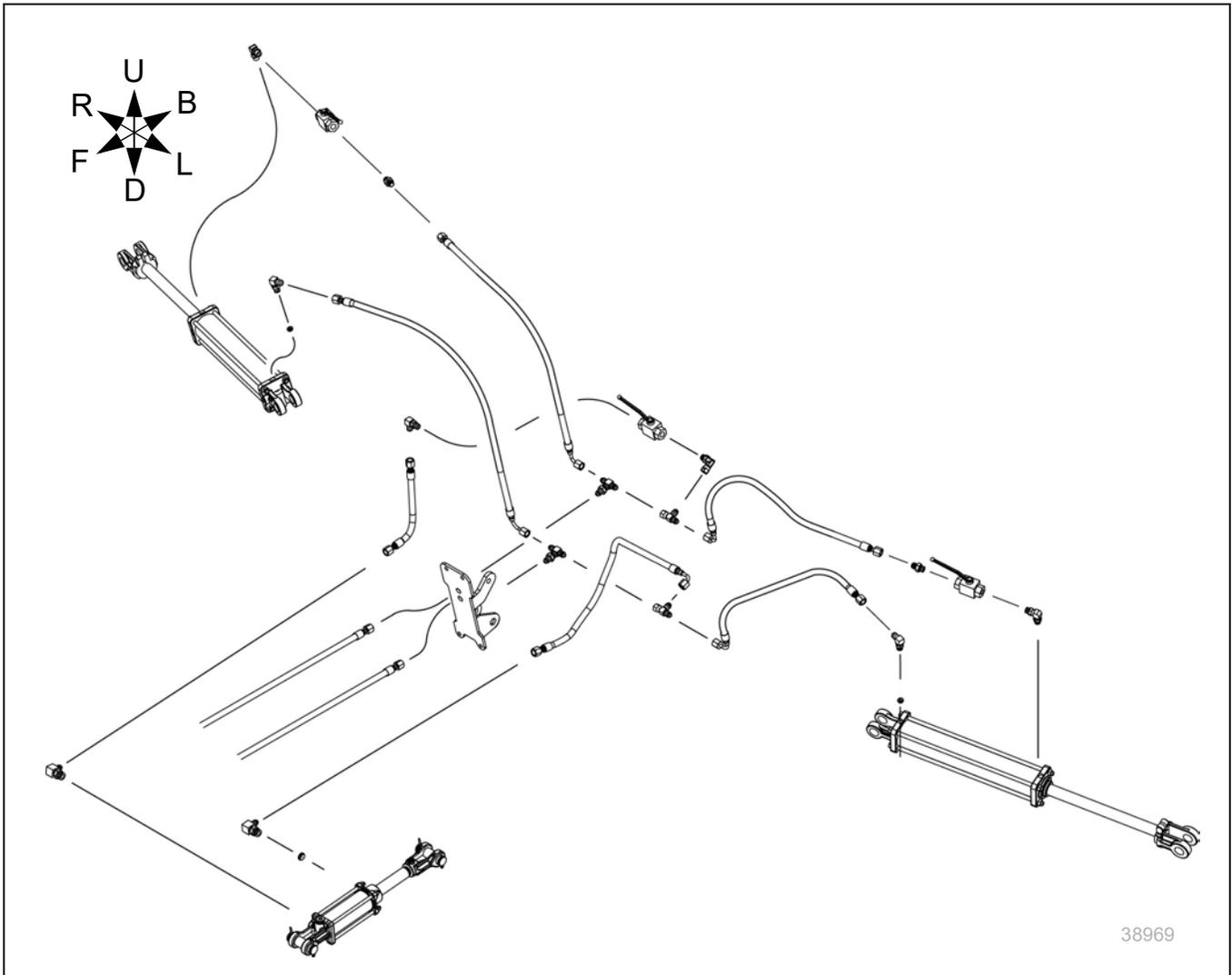
Fitting Call Size	N-m	Ft-Lbs
1/4 NPT	1.5-3.0 turns past finger tight	
9/16 JIC	24 to 27	18 to 20
9/16 ORB w/jam nut	16 to 22	12 to 16
9/16 ORB straight	24 to 32	18 to 24
3/4 JIC	37 to 53	27 to 39
3/4 ORB w/jam nut	27-41	20-30
3/4 ORB straight	37-58	-

Hydraulic Diagrams

Without Optional Kicker



With Optional Kicker



KUBOTA Corporation is...

Since its inception in 1890, KUBOTA Corporation has grown to rank as one of the major firms in Japan. To achieve this status, the company has through the years diversified the range of its products and services to a remarkable extent. 30 plants and 35000 employees produce over 1000 different items, large and small.

All of these products services, however, are unified by one central commitment: KUBOTA makes products that are basic national necessities. Products which are indispensable. Products which are intended to help individuals and nations fulfill the potential inherent in their environment. KUBOTA is the world's basic necessities giant.

These necessities includes water supply, food from the soil and sea, industrial development, architecture and construction, and transportation. Thousands of people depend on KUBOTA's know-how, technology, experience, and customer service. Our promise is that you, too, can depend on KUBOTA.



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