1017L ASSEMBLY INSTRUCTIONS

DARF
HAY RAKES

PROUDLY MANUFACTURED BY:

NIKKEL
IRON WORKS, CORP.

SHAFTER, CA 93263

WWW.NIKKELIRONWORKS.COM

THIS MANUAL INCLUDES ASSEMBLY INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY & THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH…..

*****Be sure to read your Owners Manual prior to assembly!!*****

ALL INSTRUCTIONS REFER TO RAKE FACING THE DIRECTION OF TRAVEL AS VIEWED FROM THE DRIVERS POSITION, SITTING IN SEAT FACING FORWARD. DRIVERS RIGHT IS CONSIDERED RIGHT SIDE OF RAKE.

The (KD) DARF 1017L Rake will arrive at your dealership packaged as follows:

1 carton containing: Fasse valve and control panel (if equipped), hydraulic cylinders, rake teeth & bolts, 102 poly-shield pieces, poly-shield fasteners, assembly bolts, nuts & pins, top links, pins, hydraulic hoses, walking beam axles and ground wheels, rake wheel cranks and springs.

2 leg struts with rake frame hinge installed.

1 main overhead frame w/ hydraulic hoses and cylinders installed. Attached to overhead, in the Owner's Manual Canister, you will find the Owner's manual, Assembly manual, and Parts & Instruction manual – including warranty registration card.

2 rake wheel frames.

2 shipping stands of rake wheels.

1 tongue assembly, consisting of 2 side frames & 1 center tongue member.

This configuration applies to a single (Knock Down) Rake.

Carton contents may vary when multiple, or partially assembled rakes are purchased.

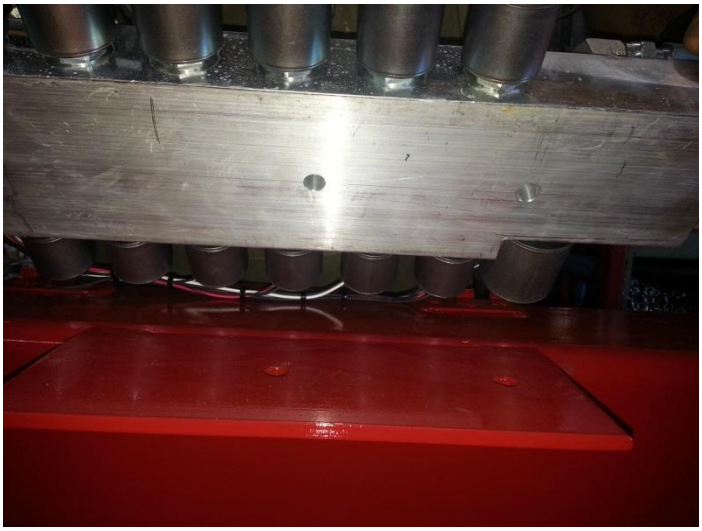
For your safety, be sure all chains, stands and tools are in proper working order.

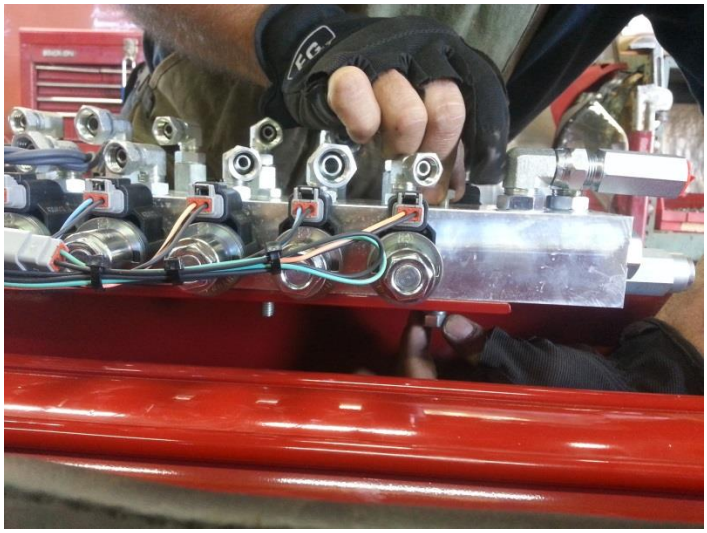
The assembly of the DARF rake will be much safer and faster if the correct method is used.

*The photographs and illustrations provided in this manual are for your reference to make the assembly process easily understood. You may have overhead cranes or other lifting equipment available.

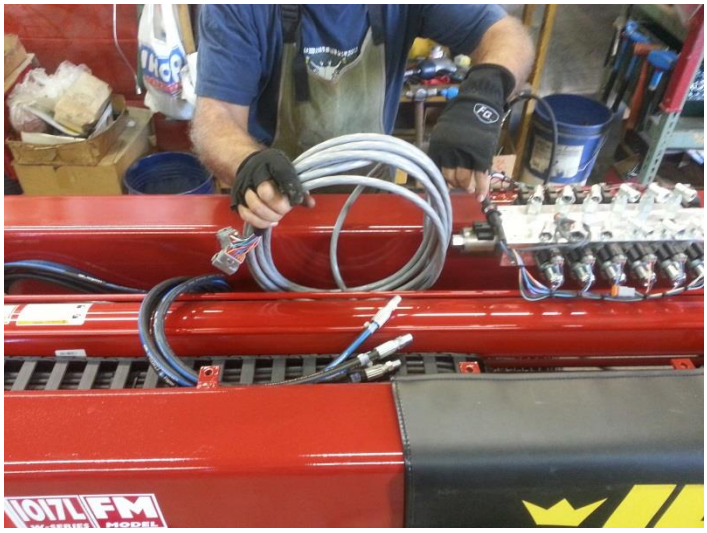
In any case, SAFETY is *your* responsibility.

Connect hydraulic hoses from E-Track, as shown.





Fasten Valve Block to the top of the overhead. Align the pre-drilled holes in the block and mounting plate, and secure with the provided bolts and nuts.

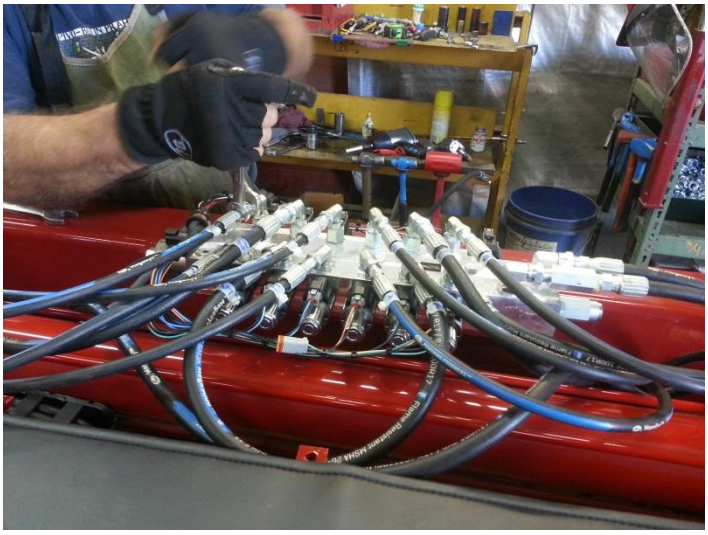


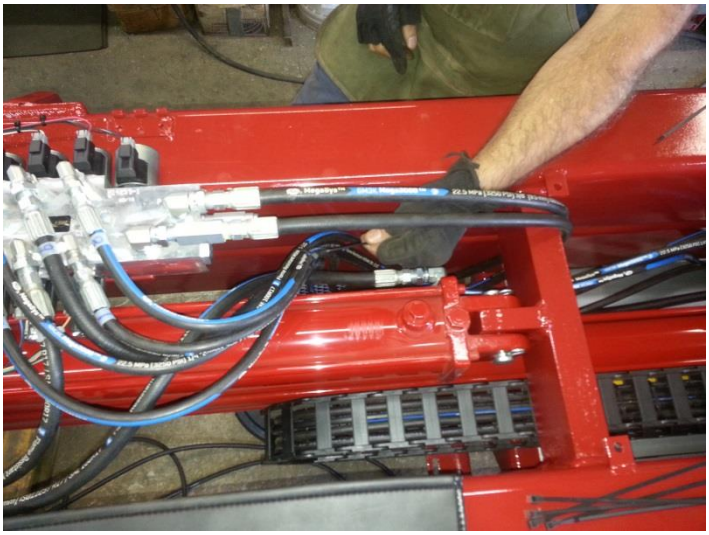
Remove zip ties from the electrical cable attached to the valve. Unroll the cable and allow it to drop between overhead sections. This cable will eventually follow the tongue to the hitch.

Feed cable through overhead, as shown, and secure the cable in position using the provided hose clamp.

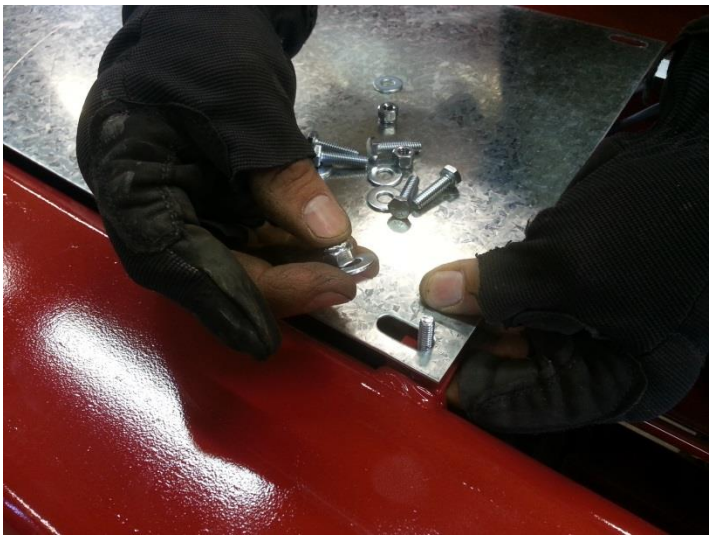
Now, locate the power cable for the optional working lights. This cable will be attached to the valve, so the working lights can be controlled via the monitor. Uncoil the cable and follow the same path as the large electrical cable.

Locate the feed and return hose in the lower section of E-Track. Secure them to the underside of the overhead, as shown. Then, connect each hose to its appropriate valve receptacle.



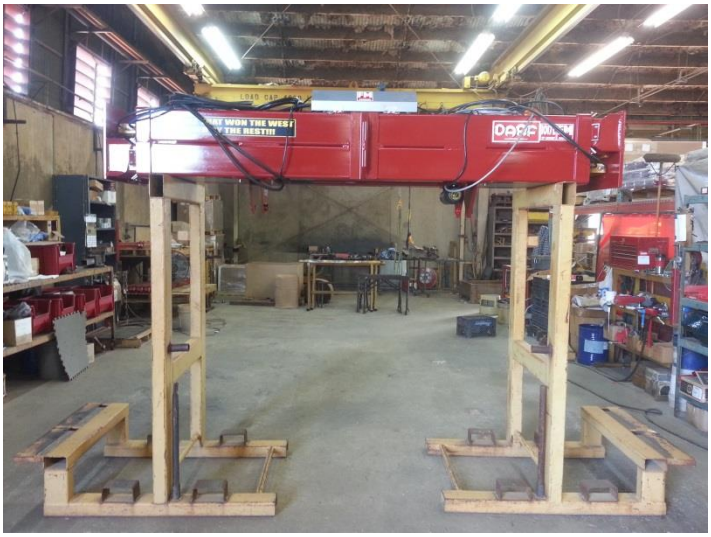


You may now connect all remaining hydraulic hoses to the valve. Each hose is numbered and should be attached to its respective port.

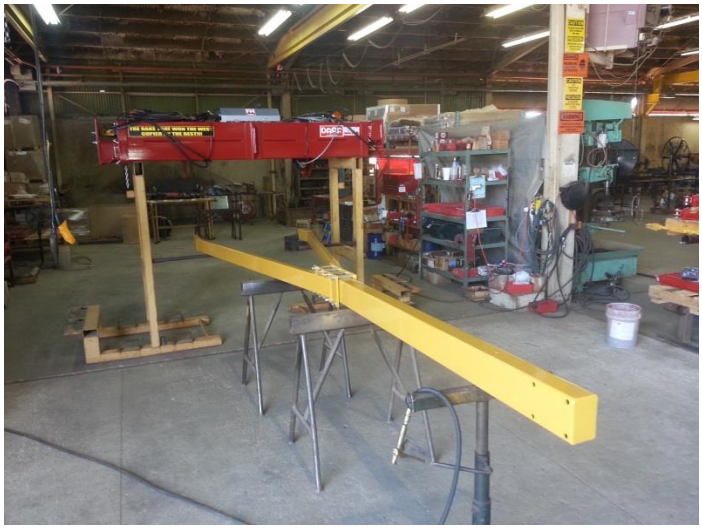


Once all hoses have been attached, and checked for a secure connection, you may attach the galvanized plates and valve cover, as shown. Use ¼” cap screws, flat washers, and lock washers. Use cotter pins as hinge pins.

Now, position the safety lights, as shown, and connect to power source. This concludes the valve/ overhead assembly.



It is now time to assemble your rake. First, lift and support the main overhead frame, as shown, or with whatever adequate stands you have.



Support the tongue sections, as shown or in a similar fashion. Bolt the upper tongue sections to the lower tongue section using eight ⅝”x6” (CSNC20x96) bolts, ⅝” lock washers (LW10SP), and nuts (NUT10NC). Position the plates of the upper sections on either side of the lower section at the rearmost position. The mounting plates of each upper section should rest against the backer plate of the lower section.

Once the tongue is assembled, raise each upper section and secure to the overhead using the provided top link pin (P774) and lynch pin (P791).

It is now time to attach your hitch. Use the ⅝”x5½” cap screws (CSNC10X88),⅝” lock washers (LW10SP), and nuts (NUT10NC) to secure the hitch of your choosing (ball hitch 91799B shown).

Attach the jack (82471) to the receptacle on the left side of the hitch section, using the provided link pin and cotter pin.

Raise the jack until the hitch is 16½” from the ground. This will allow for easy leveling of your rake, as this is a standard tractor or truck hitch height. Once at the correct height, proceed to attach the tongue cross member (9107A). Slide the tongue cross member as far forward as the upper tongue sections allow, and secure with ½”x3¼”leg x 5½” U-Bolts (9032) and ½” lock nuts (NUT08NCLK).

Attach the ratchet jack (SL1541) to the front-center of the overhead main frame using link pin and hairpin clips, as shown.

Unscrew either end of the ratchet jack similar amounts, until the front end reaches the tongue cross member. Attach with pins.

Attach the provided handle to the ratchet jack, as shown. Use the ratchet jack to level the Leg Struts. This can be used to level your machine in the field, as well.

Fasten the hose holders (91798A & 91798B) to the lower tongue section, as shown, and feed all hoses and cables through.

Once the hoses have been fed through the hose holders, use the provided hose clamps (MIN-E28) to fasten the feed and return hoses to the inside of the right-side upper tongue section.

Once the right side has been completed, as pictured above, fasten the electrical hitch cable to the inside of the left side upper tongue section, as shown.

It is now time to attach the leg struts. Safely hoist each strut into position and secure with the ¾”x2½” bolts *6ea outer* (CSNC12X40), ¾”x3” *4ea inner*(CSNC12X48), lock washers (LW12SP) and nuts (NUT12NC). Be sure that the nuts are on the outside of the mounting plate, and the head of the bolt on the inside. Once in place, attach the walking beam, as shown, using ⅝”x2” cap screws, nuts, and lock washers. **Do not tighten completely until tires are positioned (*see below*).**

Now that the walking beams are attached, you may install the hubs using ½”x3” socket head (SOCKHD08X48) cap screws and lock nuts (NUT08NCLK). The front hub is to be fed through the outside, while the rear hub from the inside. Be sure the nuts are on the top of the walking beam, rather than the bottom. This allows for easier visual inspection. Once the hubs are secure, attach your transport wheels/ tires. **Tires should be set toe-in to +/- ⅛”. Now, you may tighten Walking Beam mounting bolts.**

Lift and attach Raking Frames to Leg Struts, as shown. The front locator lug of each Raking Frame should be positioned against the front of the mounting plate. Each Raking Frame is to sit on the support shelf, and be held with four ⅝”x4½” U-Bolts (9028-8) and eight lock washers (LW10SP), and nuts (NUT10NC). **Do not tighten until after the next step.**

Install Rake Frame Adjustable Braces (9099), and use them to level each Raking Frame. These are secured using ½”x2” cap screws (CSNC08X32), lock washers (LW08SP), and nuts (NUT08NC).

You may now tighten the Raking Frame U-Bolts.

Install Leg Strut Bracket (9173) with two ½”x6¼”leg U-Bolts (9029), 4 lock washers (LW08SP), and nuts (NUT08NC). The bottom U-Bolt should be just above the locator lug on the Leg Strut. Straighten the Raking Frame completely, so it is square with the Leg Strut. Fully extend the 3”x 8” Cylinder, manually **(do this over a receptacle, as fluid will come out of the port)**. Attach the Port End of the cylinder to the Leg Strut Bracket with pin (**A542**) and cotter pins. Use the Rod End cylinder clevis to locate where to position the Raking Frame Single Tab Bracket (922990), and secure with ½”X3¼”leg U-Bolts (9027), lock washers (LW08SP), and nuts (NUT08NC). Fasten cylinder to this bracket with pin (**A542**) and cotter pins.

TRANSPORT SAFETY BLOCK MUST BE IN PLACE, OVER CYLINDER ROD, BEFORE TRANSPORTING RAKE!!

BE SURE TO REMOVE TRANSPORT SAFETY BLOCK AND PLACE IN HOLDER BEFORE OPENING RAKE!!

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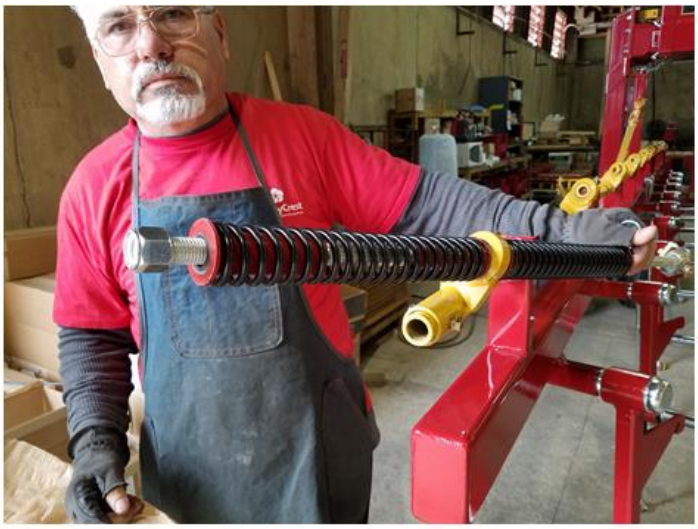
If you're rake is not fully hydraulic, attach the Leg Strut Adjustment Bracket (922996) to the Leg Strut, and the 5 Hole Adjustment Bracket (92206) to the Raking Frame. Screw the Manual Adjust Threaded End (9171) into the open end of the Manual Adjustment Tube (9172) and secure each end to the Brackets using the 3⅝" Top Link Pins (P772) and Lynch Pins (P791), as shown below.

Install all Bearing Cranks at this time. Secure to Crank Box using heavy washer (95045), ¾" internal lock washer (95044), and hex nut (NUT12NC). Also, mount the Lift Tube Hydraulic Cylinders on the rear of each Raking Frame, using the 1" Cylinder Pins (A542) and cotter pins. Connect hoses to 90° pipe fittings (HMBFP9064).

Slide the Lift Tube through the support sections [Left-side 9 holes (91790), Right-side 10 holes (91791)] starting at the front of the rake. While inserting the Lift Tube remember to install the Dur-Adjust Spring and Rod Mounting Brackets (SR600L/R) as shown (Red brackets on left Lift Tube, Yellow on the right). Secure to Lift Tube with *Be sure to put a mounting bracket on before you start!*

Insert the end of the Lift Tube into the Hydraulic Clevis Socket and fasten using ⅜”x2” cap screws (CSNC06X32) and nuts (NUT06NCLK).

Secure Dur-Adjust Mounting Brackets (SR600L/R) to the lift tube’s pre-drilled holes using ⅜”x2” cap screws (CSNC06X32) and flanged nuts (NUT06FLCLK); *nuts on the inner side*. Now it is time to install the Dur-Adjust Spring and Rod. Start by sliding one Spring Slide with Bushing (SR700), flanged end first, over the threaded end of the Rod. This will be followed by one spring (92221), which should slide over the first SR700. Follow this by another SR700, flanged-end out. Slide the threaded end of the rod through the ball joint in the mounted SR600L/R.



Now repeat the SR700/92221/SR700 configuration, as done in the previous steps, and finish with the ¾” NC Nylon Insert Locknut (NUT12NCNYL). Follow this procedure for all 17 Dur-Adjust Spring and Rods.

DARF POLY SHIELD

INSTALLATION INSTRUCTIONS

UNPACK SHIELDS FROM SHIPPING BOX

OVERLAP PIE SHAPED SECTIONS TO FORM FLAT JOINT

USE (1) PLASTIC FASTENER IN MIDDLE HOLE ON JOINT.

ASSEMBLE (6) SECTIONS TO FORM ROUND SHIELD.

POSITION ON RAKE WHEEL

USE CLAMPS TO HOLD ASSEMBLED SHIELD TO WHEEL FRAME

FASTEN TO RAKE WHEEL USING STD. FASTENERS IN TOP AND BOTTOM HOLES ON JOINT. FASTEN OUTSIDE EDGES USING (1) SHORT FASTENER, (2) FLAT WASHERS, AND (1) NUT.

RAKE WHEEL ASSEMBLY

RIGHT →

WHEELS MOUNTED ON RAKE FRAMES THAT WILL BE ON THE RIGHT OF RAKE TO BE ASSEMBLED AS FOLLOWS:

1. Poly-shields mount on flat side of wheel only, use long fastener screws in holes toward center of wheel. Short screws are for holes on outer edge of shield. Use large washer under head of screw and next to shield. Clip hooks over wheel spoke in rear of shield.

2. Mount teeth so tines face clockwise direction.

3. Use #92133 nut & bolt.

← **LEFT**

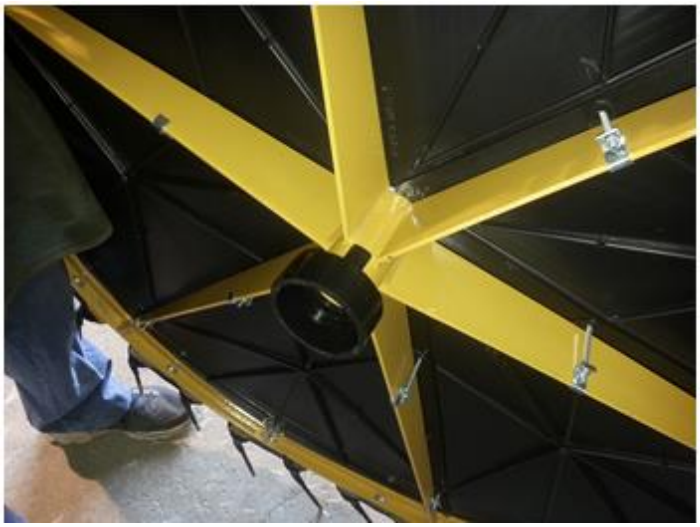
WHEELS MOUNTED ON RAKE FRAMES THAT WILL BE ON THE LEFT OF RAKE TO BE ASSEMBLED AS FOLLOWS:

1. Shields – Same process as above.

2. Mount teeth so tines face counter-clockwise direction.

3. Use #92133 nut & bolt.

You can build a stand like the one seen above, or clamp an 1½" shaft in a vise to hold the wheel during assembly.

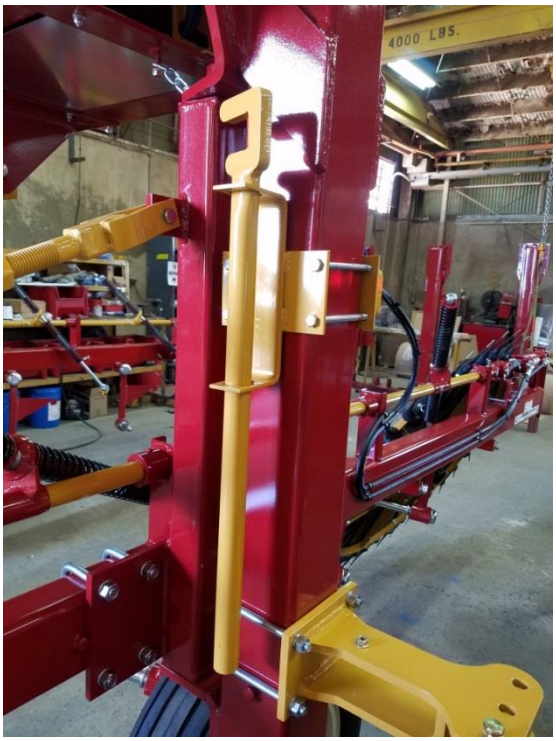


Once you have assembled your rake wheels, add the Anti-Wrap Shields (92114AWS) to the back of each wheel's hub. Each wheel should now be put onto its spindle. Lift the crank toward the rear of the rake and slide the wheel hub over the spindle, as shown.

Now secure the wheel to the spindle, using the retainer washer (95045), the ¾" internal lock washer (95044), and the ¾" hex nut (NUT12NC). Once the wheel is secure, locate the Wheel Adjust Lever (9229930) and place it on the crank, as shown.

Remove the nut and clip from the Mounting Clip Bundle, found on the ball-joint end of that wheel's Dur-Adjust Spring and Rod setup. While pulling back on the Wheel Adjust Lever to lift the crank and wheel, slide the bolt through the slot in the crank and secure using the clip and nut, as shown. While manually compressing the Dur-Adjust spring, move the cotter pin to the 3rd hole.

Using a 1-1/16" socket driver, or wrench, tighten the bolt on the threaded end of the rod until 1½" of threads are visible.

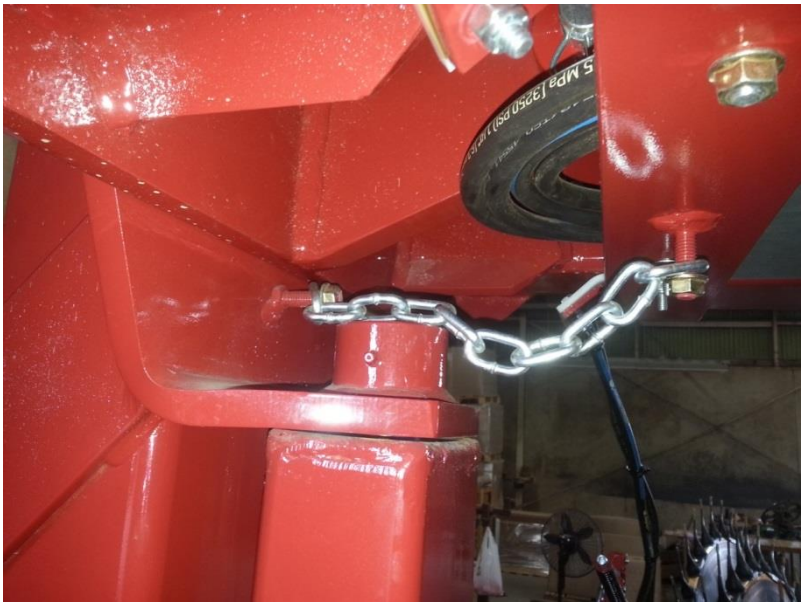


Finally, attach your Jack Stowage Bracket Bundle (901200) on the left Leg Strut, as shown. This will be used to stow your Jack (82471) and Wheel Adjust Lever (9229930) when not in use.

Rake Assembly is now complete.

BE SURE TO REVIEW PDI BEFORE CUSTOMER DELIVERY!!

<u>SAFETY</u>



If transporting the rake before it has been fully primed with hydraulic fluid, **ALWAYS** connect your Transport Safety Chains, which secures the Leg Strut to the Overhead Mainframe and prevents the Overhead from opening in transit.

*****Towing safety chains are always recommended, and may be required by law.*****

FASSE SET UP / START UP INSTRUCTIONS

THE CORRECT START-UP IS THE RESPONSIBILITY OF THE DEALER AND/OR OPERATOR !!

PLEASE FOLLOW THESE INSTRUCTIONS

1. Mount control box on tractor in a location easily accessible for the operator.
   Attach **RED** wire to positive battery lead ---------- Attach **Black** wire to negative lead.
   Connect Control Cable from rake to Control Box cable with threaded coupler.
   12-Volt DC Negative Ground Only. Consult Factory for Positive Ground option.

2. Install correct tips on the 2 hydraulic hoses routed down the tongue. Locate hydraulic hose from the "P" port on the valve. Insert into one of the remote valve couplings. **DO NOT INSERT RETURN LINE AT THIS TIME.** Operate the control valve to determine which position it must be in to supply oil to the pressure hose. You may have a detent that allows the valve to remain in this position, or you may have to tie the valve handle with a bracket, wire or twine. Return the valve to neutral and install the **return hose in the return coupler.**

3. Remove the 1" pins on the rod end of the Frame Angle Cylinders, as well as the angle iron cylinder safety stop. Swing cylinders out to clear rake frame tab.

4. **With the tractor moving** operate the Tractor valve control handle to supply oil to the pressure hose.

5. You will likely see the overhead frame begin to move as a rule the right side frame will extend first, then the left side frame. **Until the air is purged from the system this may take place without using the white "Frame switch in the center of the control panel.**

6. **Until the system is fully purged, it is possible that any one or all of the 6 functions may cause the cylinders to extend or retract with the control switches in the neutral position.**

7. Operate the 4 remaining switches until the air is completely purged. Extend the rake frame cylinders fully and re-insert the 1" pins.

8. Check the tractor transmission/hydraulic oil level before completing the start-up. About 4-5 gallons may be required to replenish the system.

9. On occasion it is necessary to extend and retract the overhead frame 2-3 times in order that the hoses take a "set" so they will fold as intended.

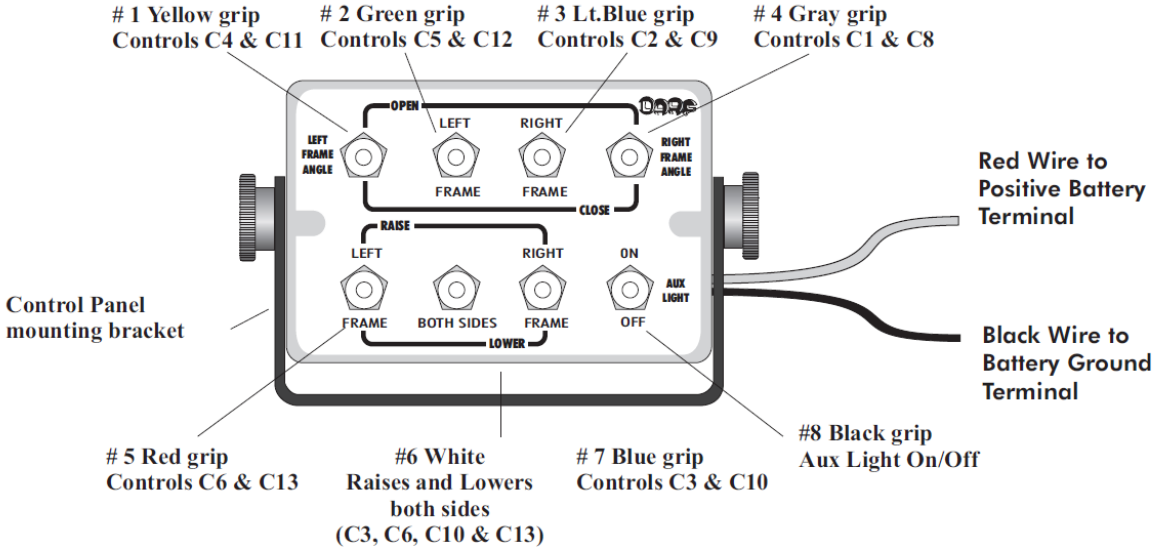
10. **REMEMBER !! The rake must be moving at anytime you extend or retract the overhead frame.**

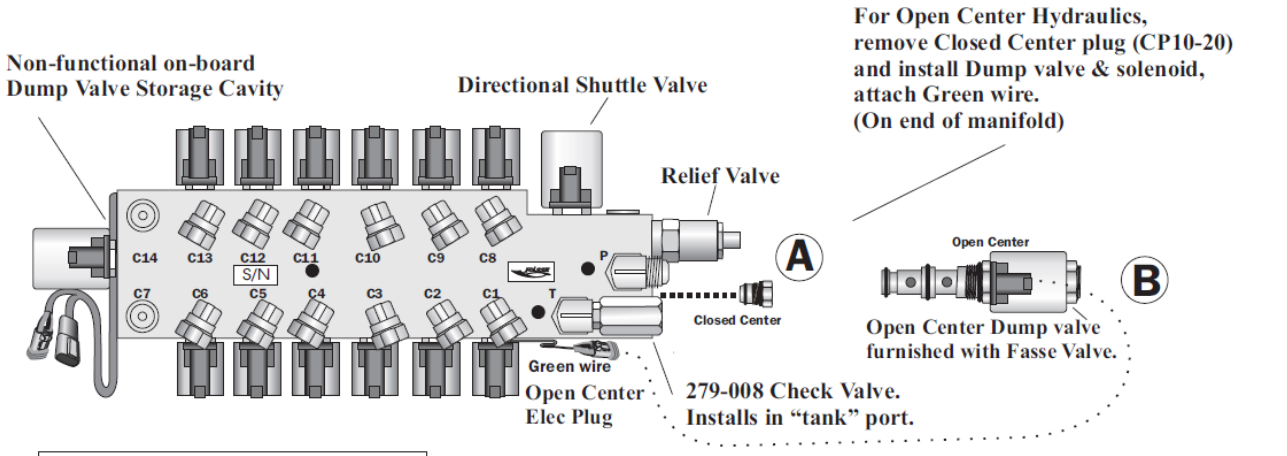
PURGING THE OVERHEAD FRAME REPHASING CYLINDERS

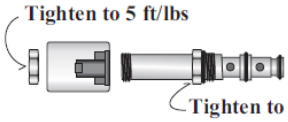
To properly purge the air from the system, cylinders should be fully extended to the rephasing mode. (You will note that one side will extend first until the cylinders are fully purged) Hold the cylinders in the fully extended mode for approximately 30 seconds, retract the cylinders until the air is purged from the system. Make sure tractor RPM is moderate so the hydraulic pump is at its full capacity. During initial startup the seals may need a few cycles to seat themselves for a good seal.

PATIENCE is the key and air is the worst enemy. NEVER loosen a fitting to bleed off the system. **This can be dangerous!**

1. Note: The Fasse Valve for the Darf Rake is assembled for CLOSED CENTER HYDRAULICS. See below for installation of the Open Center Dump Valve supplied with the Fasse Valve.
2. Use the accompanying instructions for Fasse Start-up and reference.
3. If the hydraulics are erratic during start-up, AIR is likely the cause. Be sure to thoroughly purge the complete system.



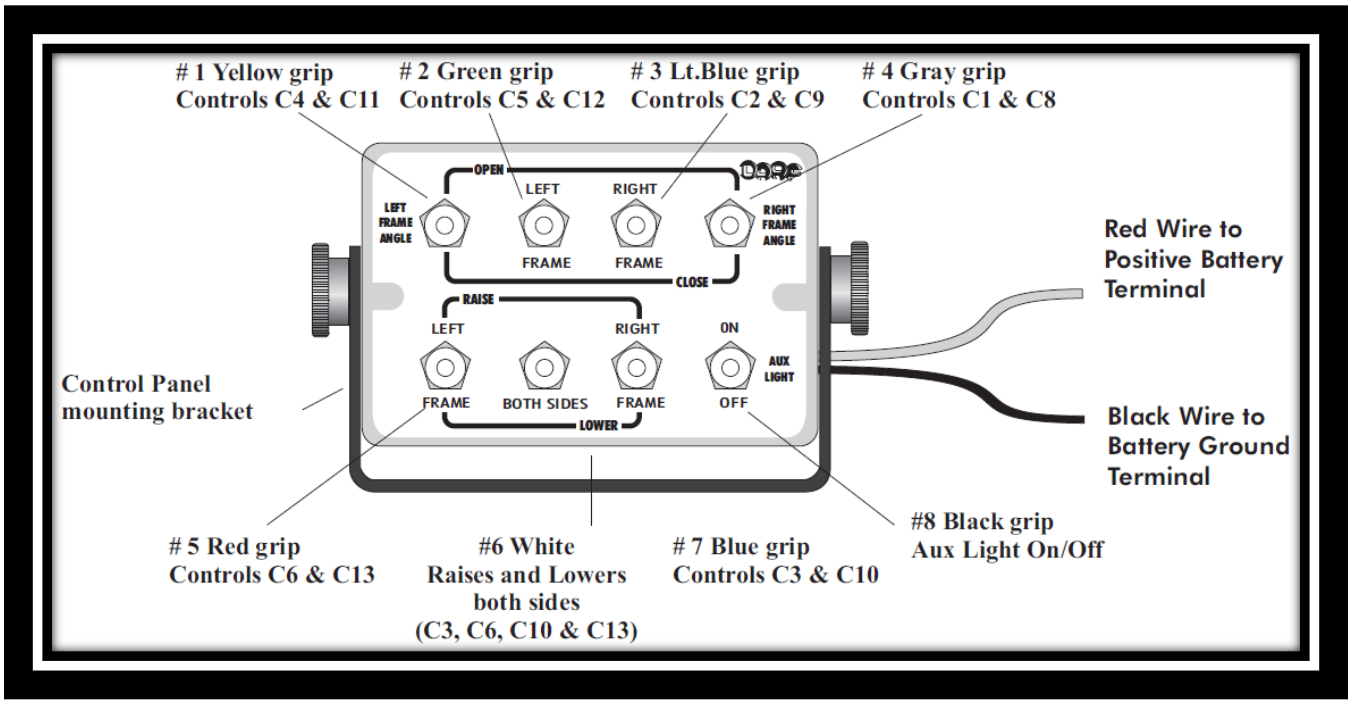




FÄSSE
HYDRAULIC MULTIPLIERS

NOTE: The cavity plug (A) and the Open Center Dump valve & solenoid (B) actually swap places when creating an open center valve body.

Product:	Fasse Set-up/Start-up Instructions	700-0806-4006	Nikkel Iron Works, Inc. P.O. Box 1597 Shafter, CA 93263
Drawing No.:	Ddxxxxxx		
Date:	8/7/2013		
Notes:	8 Function control box. Beginning with 2014 production changes		
Scale:	4		



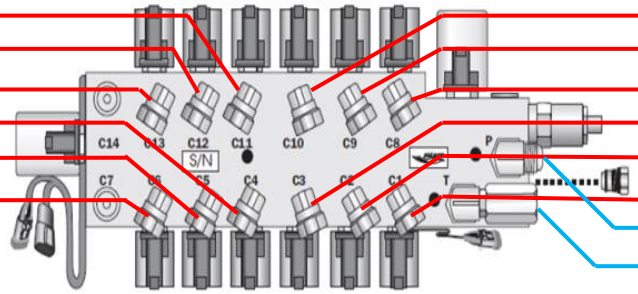
The FASSE Control Panel (Monitor) is to be mounted on the operator platform or cab. This is a 12-colt system.

WHEN UNHOOKING FROM THE RAKE, BE SURE TO DISCONNECT THE POWER CABLE CONNECTION!!

IT IS THE DEALER'S/CUSTOMER'S RESPONSIBILITY TO PROPERLY MOUNT AND INSTALL THE CONTROL PANEL (MONITOR)

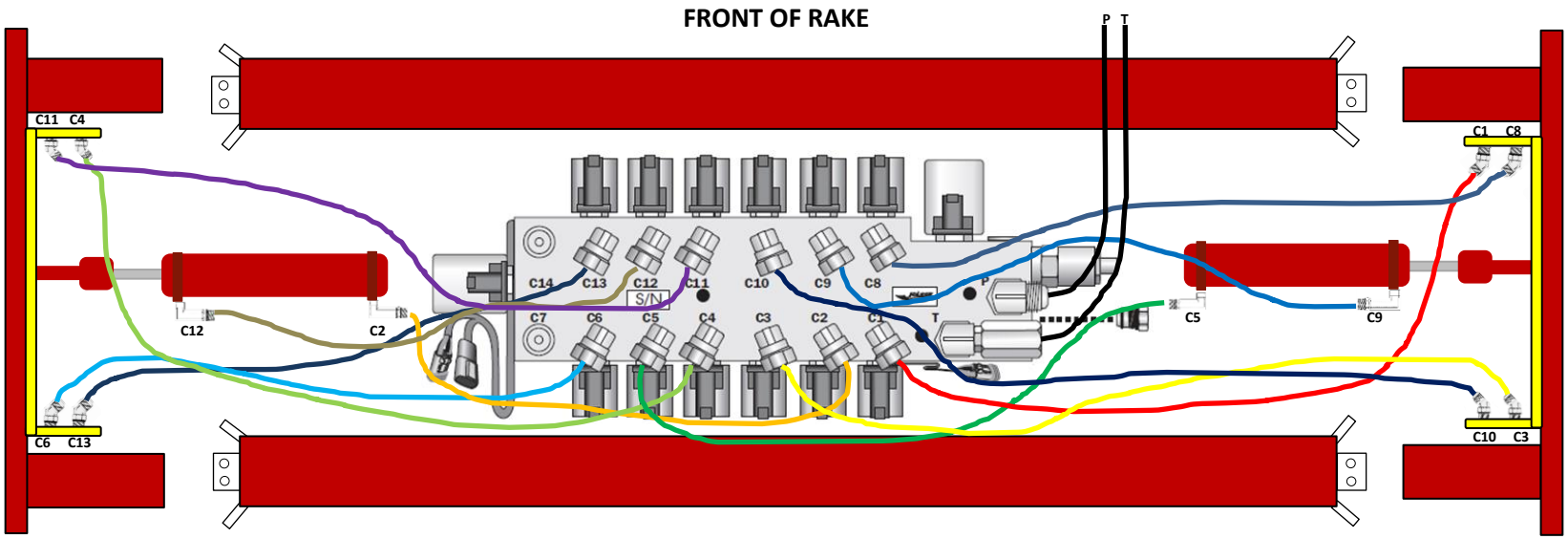
CONNECT HOSES TO FASSE VALVE AS TAGGED

C11 Open Left Rake Frame Angle Cyl. Piston Port
C12 Close Left Overhead Cyl. Rod End Port
C13 Close Left Rake Wheel Lift Cyl. Rod End Port
C4 Close Left Rake Frame Angle Cyl. Rod End Port
C5 Open Left Overhead Cyl. Piston Port
C6 Open Left Rake Wheel Lift Cyl. Piston Port



C10 - Close Right Rake Wheel Lift Cyl. Rod End Port
C9 - Close Right Overhead Cyl. Rod End Port
C8 - Open Right Rake Frame Angle Cyl. Piston Port
C3 - Open Right Rake Wheel Lift Cyl. Piston Port
C2 - Open Right Overhead Cyl. Piston Port
C1 - Close Right Rake Frame Angle Cyl. Rod End Port
P - Pressure Port
T – Return (Tank) Port, (Check Valve 279-008)

Note: It may be necessary to loosen locknuts on elbows to align hoses



OPERATING INSTRUCTIONS

Use with FASSE Valve instructions

** Maintain tire pressure: 15 PSI front and rear.
** Adjust spring tension to allow crop to rotate raking wheels.
** Do not allow raking wheels to contact the ground.
** Install suitable hose couplers on the 1/2" hoses from the valve. Insert in tractor couplers. Lock tractor remote handle in position so oil is entering at the correct valve "in" port. If your tractor is closed center, install the closed center adapter furnished with the rake valve.
** Install FASSE control switch panel on the tractor in a convenient location.
** Attach control cable from rake to control panel cable. Be sure the connectors are clean and free of corrosion.
** Remove the two dealer installed safety transport chains-03PCCHAIN08

TO OPEN FROM TRANSPORT POSITION TO RAKING POSITION

1. Operate the switches indicated on the control panel decal to raise the raking wheels to the "up" position.

2. Operate the FASSE valve to open the overhead frame, WHILE MOVING. Pull forward slowly until the main frame is fully open, then close about 4" to 6".

3. Using the switches indicated on the control panel decal, open the raking wheel frames to the required angle.

4. Level raking frames to the ground by adjusting the main frame to draw bar ratchet jack. If necessary, additional leveling of the rake frames can be accomplished with the adjustable frame braces.

5. Operate the switches indicated on the control panel decal to lower the raking wheels.

6. Check hydraulic fluid in your tractor. You will likely need to add approx. 4-5 gallons for initial startup.

7. Adjust the raking wheel crop contact (spring tension) by using the supplied rake crank handle and position chain in crank slot so the raking wheel will move the crop with minimum or no ground contact. Replace handle in storage bracket.

Field setup DVDs are available through your local dealer

YOU ARE NOW READY TO RAKE

TO CLOSE TO TRANSPORT POSITION FROM RAKING POSITION

1. Operate the switches indicated on the control panel decal to raise the raking wheels to the "up" position.
2. Return raking frames to straight position.
3. Operate the FASSE valve to close the overhead frame WHILE MOVING. Pull forward slowly until the main frame is fully closed.
4. Place Safety Block on frame angle cylinder piston rod.
5. Connect Transport Safety Chains and Tow Chains.

YOU ARE NOW READY TO TRANSPORT

DRIVE CAUTIOUSLY. GIVE ONCOMING AND PASSING TRAFFIC AMPLE ROOM.

FASSE VALVE TROUBLESHOOTING

- Whatever the reason, the problem should be defined in terms of flow, pressure, or direction. Think through the components and identify the elements that may be contributing to the problem. Try to avoid jumping to incorrect or illogical conclusions, leading to improper actions.
- Continuing to operate a hydraulic system when the fluid is over temperature will almost always cause damage. Temperatures above 180°F will damage seals. Shut down the system as quickly as you can, to identify and remedy the issue, to prevent damage.
- Air can exist in a hydraulic system in either a dissolved or entrained (free) state. Air is compressed at 20,000 times the rate of the oil in which it is present. The typical symptoms of air in your system are spongy movement, or actuators that do not immediately shut off when de energized.
- Don't overlook the possibility of any issue being caused by the electrical system, rather than hydraulics.
- Tractor flow should be 4-6GPM.

THE BASICS

- Hydraulic pumps create flow, not pressure.
- Resistance to flow creates pressure.
- Flow determines actuator speed.
- Pressure determines actuator force.
- Fluid under pressure always takes the path of least resistance.
- When fluid moves from an area of high pressure to an area of low pressure (pressure drop or delta P) without performing useful work, heat is generated.