INSTALLATION & OWNER'S MANUAL

ARTILLIAN 120R SINGLE POINT HYDRAULIC DIVERTER KIT P/N: HDK-120RSP-PTL

An electrically operated hydraulic valve system to divert hydraulic fluid from the loader dump/curl circuit to a forward auxiliary connection for loader attachments, requiring momentary hydraulic power, such as the Artillian Grapple, Hydraulic Plow, etc.

This kit details the installation of an Artillian **HDK-120RSP-PTL Hydraulic Diverter Kit** onto a John Deere 120R Loader with the **John Deere Single Point Hydraulic Connector** installed.

Approximate Installation Time
Experienced Dealer Technician – 2 Hours
Average Dealer Technician – 4 Hours
Do-It-Yourself – 6 Hours

Approximate Product Specifications
Weight: 12.0 lbs.
Max. Pressure: 3,000 PSI

Register your new product quickly online at **Artillian.com/product-registration/**

Artillian encourages all customers to register their Artillian products. However, failure to do so will not diminish right to warranty. Curtis Industries does not sell or share your information with anyone else.

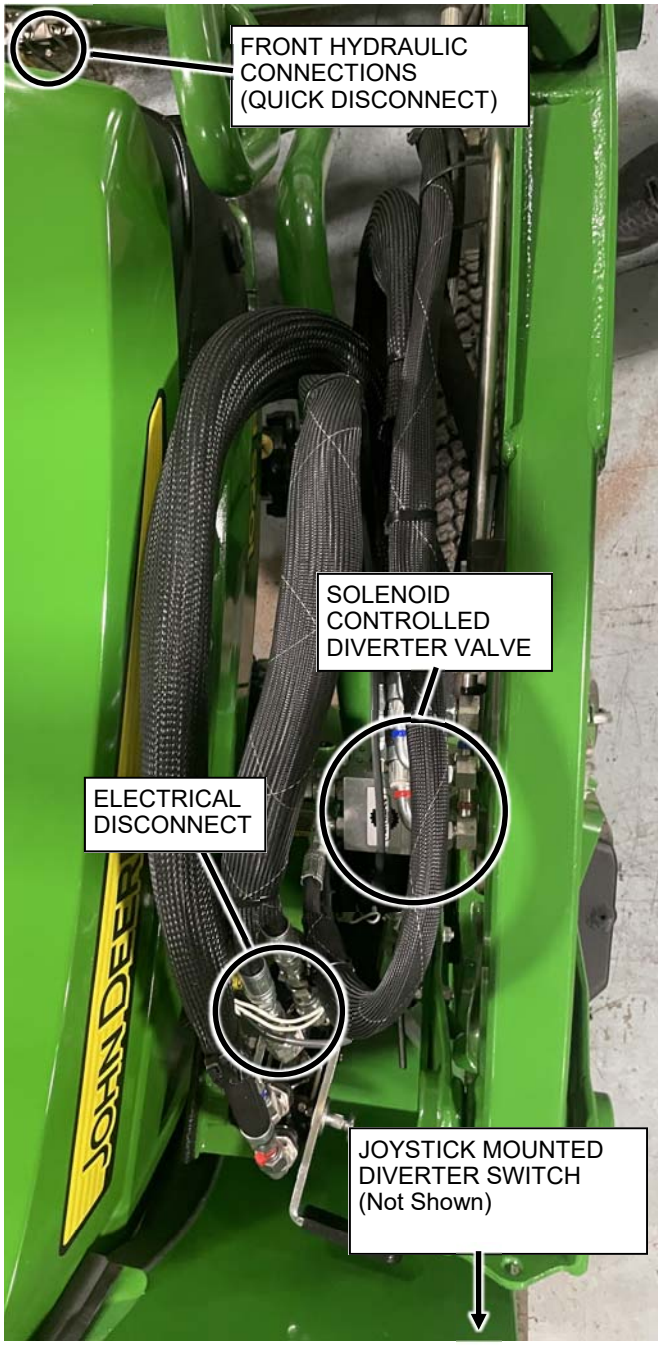
Download a digital copy of your installation instructions online at **Artillian.com/literature/**

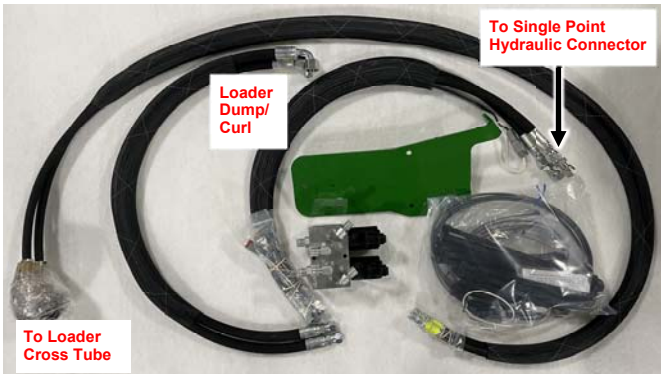
Artillian strives to continuously improve our products, technical documentation, etc. Therefore, the installation manual for this product may have been updated after your product was packaged. The latest revision of the installation manual can always be found at the website above.

The contents of this envelope are the property of the owner. Leave with the owner when installation is complete.

Rev. A, 09/14/2023

Installation Overview





Summary

- Relocate factory bucket level indicator
- Remove single point dump/curl hoses from loader
- Install Artillian hydraulic diverter valve
- Install new hydraulic hoses on loader
- Install the joystick switch & wiring harnesses
- Connect to a 12V power source

Tools Required

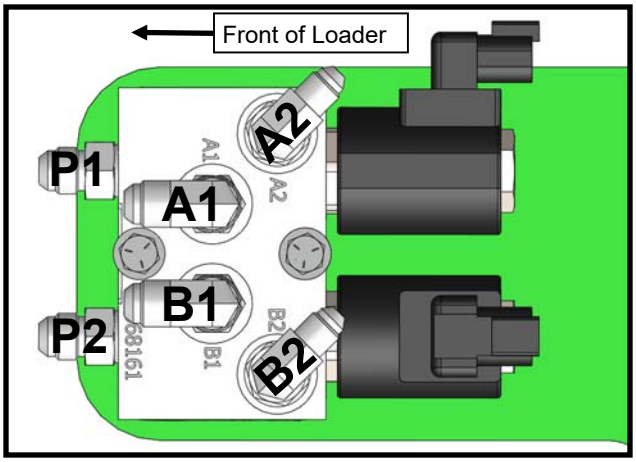
Open-end wrench assortment, 5/16” thru 1”
Adjustable wrenches (optional)
SAE socket set (optional)
Flat screwdriver
Pliers
Cut-off pliers
Absorbent rags and/or drain pan
Electrical wiring tools (for pigtail kits)
Electrical Tape

Valve Specifications

Maximum Valve Flow: 10 GPM
Maximum Pressure: 3000 PSI
Solenoid Voltage: 12 VDC
System Current Draw: 4 Amps Max

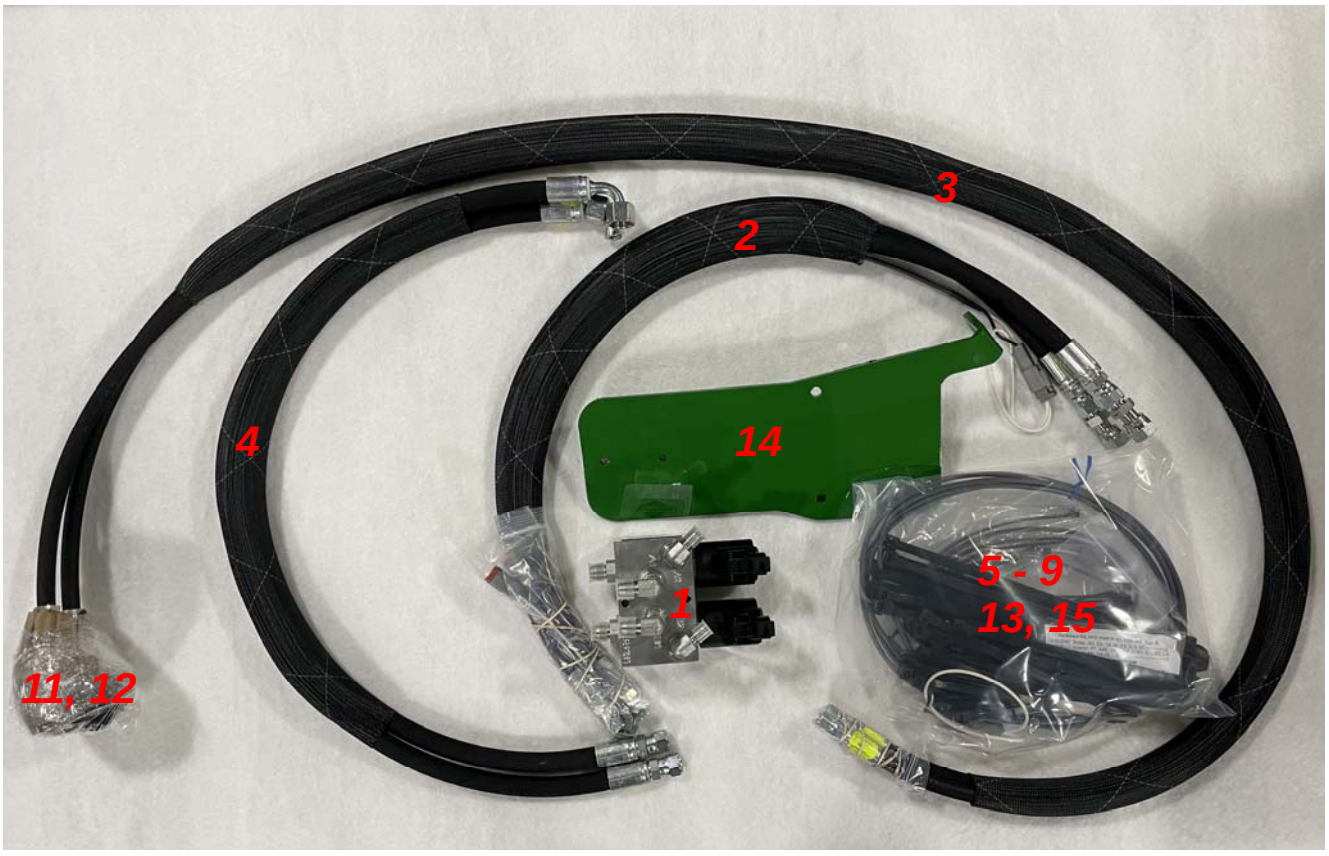
Hydraulic Connections

Valve Port P1- Single Point Black Cap
Valve Port P2- Single Point Yellow Cap
Valve Port A1- Loader “Curl” hard line
Valve Port B1- Loader “Dump” hard line
Valve Port A2- Loader front QD manifold (Black Plug)
Valve Port B2- Loader front QD manifold (Yellow plug)



Contents

1- Hydraulic Diverter Valve
2- First Gang of 2 Hoses with Solenoid Wire Harness
3- Second Gang of 2 Hoses with Front Manifold
4- Third Gang of 2 Hoses for loader Dump/Curl hard lines
5- Intermediate Wire Harness
6- 16” (or longer) cable tie, 1
7- 11” cable ties, 11
8- 8” cable ties, 18
9- 4” cable ties, 11
10- Electrical Tape (not included)
11- John Deere QD dust plug, yellow
12- John Deere QD dust plug, silver or black
13- Actuator Switch Harness & Power Cable, with pigtail leads or aux power plug (depending on kit)
14- Mounting bracket
15- Hardware kit



Relocate Bucket Level Indicator

Tools Required:
5/16” Wrench
11/16” Wrench
1” Wrench
Adjustable Wrench (Optional)

Note: If your 120R does not have a Bucket level Indicator, or if it is already on the operator’s left side of the loader, skip this step.

1. With the loader settled on the ground, remove any cable ties obstructing the fasteners at points A thru C on Fig. 7.

Note: Bucket does not need to be in fully dumped position. Image shown in this position for clarity.

2. Using an 11/16” wrench, unscrew the nut and rod support at point A and set aside for later.
3. Using a 1” wrench, unscrew the loader pin flange nut at point B and remove the bucket level indicator.
4. Using a 5/16” wrench, loosen the hex head cap screw at point C and rotate the bent rod 180° in order to attach the Level Indicator on the operator’s left side of the loader and retighten screw.
5. Secure the Level Indicator on the operator’s left side of the loader at the same points of removal and tighten nuts with respective wrenches.

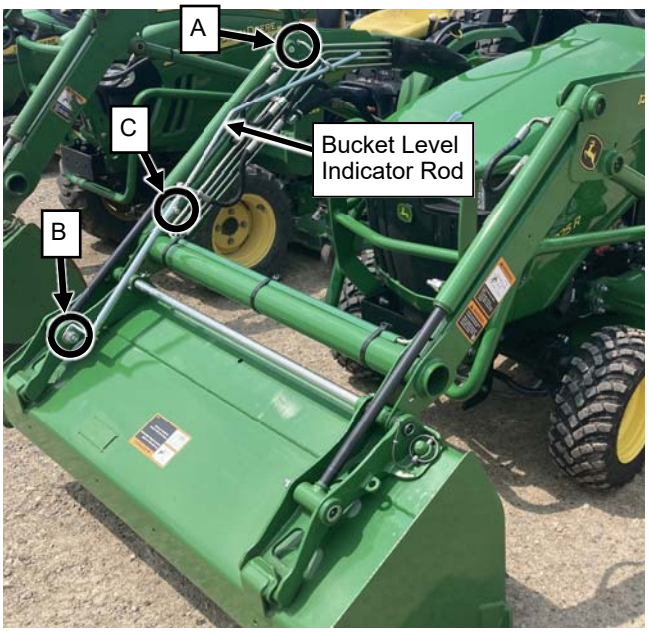


Fig. 1 (Disconnect Bucket Level Indicator)

Remove Loader Dump/Curl Hoses

Tools Required:
11/16” Wrench
13/16” Wrench
7/8” Wrenches
Adjustable Wrench (Optional)

1. Turn off tractor. Settle loader to the ground. Actuate all hydraulic controls to relieve hydraulic pressure throughout the system.
2. Cut and remove the cable ties at both ends of the protective webbing on the loader hoses. Before cutting, note the position of the ends of the webbing.
3. Locate the dump / curl cylinder hose connections from the loader hard lines. These should be the connections marked with black and yellow zip ties. See Fig. 2
4. Place an absorbent rag and/or basin beneath the hose connections to catch hydraulic fluid. Some will escape!
5. Using a 7/8” wrench on both the hard line hex and the swivel fitting hex, carefully and slowly separate these connections. **DO NOT BEND, TWIST, OR OTHERWISE DEFORM THE ALUMINUM HARD LINES.** Once separated, you may want to bag the ends to contain leaking fluid.
6. Disconnect the opposite ends of these hoses at the single point hydraulic connector on the tractor. These should be the hoses with the yellow and black zip ties. Hold the 45° fitting body with an 11/16” wrench and loosen the swivel fitting on the hose with a 13/16” wrench. See Fig. 3
7. Slide the two hoses out of the protective webbing. These hoses will not be reused. They can be stored away for possible future use.
8. Install new 8” cable ties at each end of the hose protective webbing around the two remaining hoses. Be sure the hose webbing is back in its original location. **DO NOT** include the two open hard line ends that feed the dump/curl cylinders.

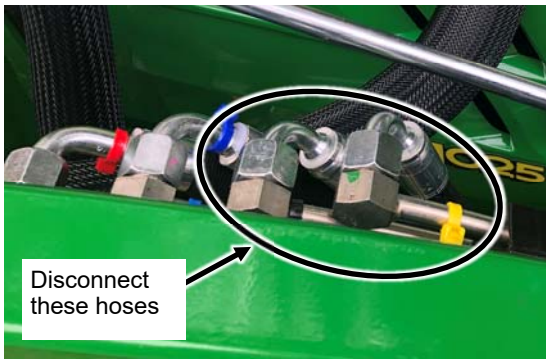


Fig. 2 (Remove Dump/Curl Hoses from Hardlines)

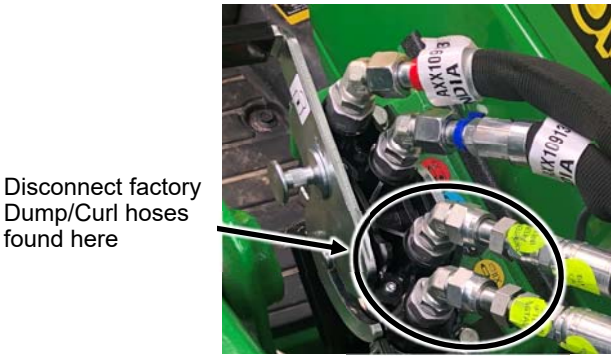


Fig. 3 (Disconnect Dump/Curl Hoses from Single Point Hydraulic Connector)

Install Hydraulic Diverter Valve

Tools Required:
7/16” Wrenches

1. Install the Diverter Valve onto the mounting bracket using the two 1/4-20 X 3.5” long screws, nuts, and washers from the hardware kit. See Fig. 1.
2. Remove the angled single point holder bracket from the loader mast and install the hydraulic diverter valve mounting bracket in its place, reusing the factory hardware. See Fig. 2.a

*Note: The two black solenoids should face the **REAR** of the tractor. Tighten until snug.*

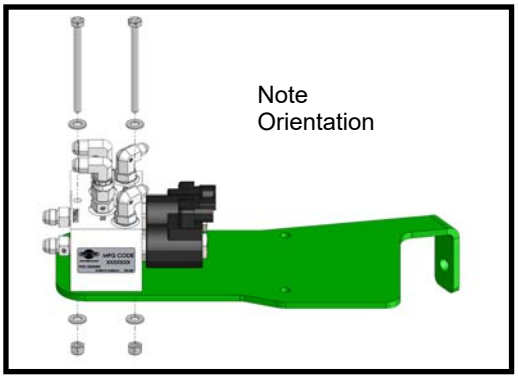


Fig. 1 (Diverter Valve onto Mounting Bracket)

Install First Gang of 2 Hoses

Tools Required:
11/16” Wrench

1. Connect the straight swivel fittings of the ***Gang of 2 Hoses with Solenoid Wire Harness*** to the P1 and P2 ports on the diverter valve. See Fig. 2.a. Leave fittings loose so hoses can be manipulated easily.

Connect the longer hose to the P1 port and the shorter hose to the P2 port.

2. Route the hoses up and around towards the single point hydraulic connector. See Fig. 2.b

You may need to twist the individual hoses inside the protective webbing in order to get the proper curvature. Sliding the webbing to the valve end or removing it temporarily may aid in achieving the right curve.

3. Connect the P1 hose labeled “**BLK CAP**” to the 3rd port on the single point hydraulic connector. Connect the P2 hose labeled “**YLW CAP**” to the 4th port on the single point hydraulic connector. Tighten all fittings. **DO NOT OVER TIGHTEN** See Fig. 3
4. Route the **Solenoid Wire Harness** plugs beneath the valve and insert the two electrical connectors into the two solenoids on the diverter valve until the locking tabs engage. The opposite end of the harness should be resting near the single point connector at this time.

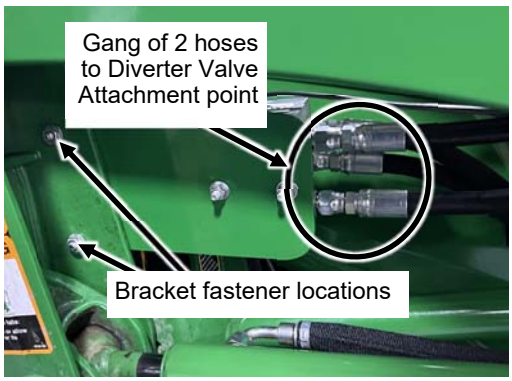


Fig. 2.a (Attach First Gang of Hoses to Valve)

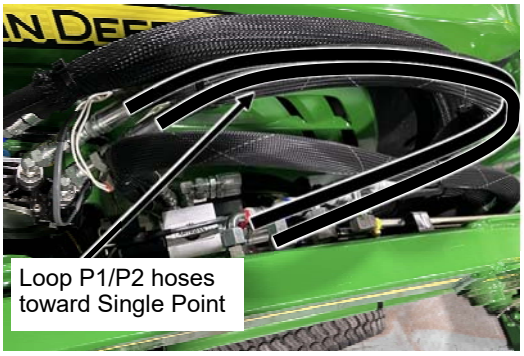


Fig. 2.b (Loop P1/P2 Hoses toward Single Point)

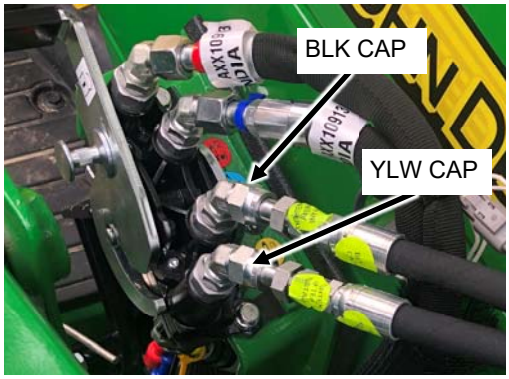


Fig. 3 (Attach P1/P2 Hoses to Single Point)

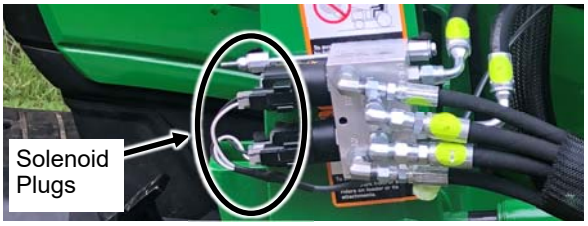


Fig. 4 (Attach Wire Harness Plugs to Solenoids)

Note: Image above shown for clarity of solenoid valves. HDK Valve and fitting orientation will differ from this image.

Install Second and Third Gang of 2 Hoses

Tools Required:

Flat Head Screwdriver or 5/16” Socket
9/16” Wrench, 11/16” Wrench, 7/8” Wrenches

*Locate the **Second Gang of 2 Hoses with Front Manifold**.*

1. Open the band clamp of the front manifold enough to pass it around the loader front cross tube with the two hoses directed toward the side of the loader with the diverter valve. Set the manifold on top of the protective cover of the loader cross tube. See Fig. 1
2. Insert the tail of the mounting clamp into the screw housing. Take up excess length, but leave it very loose.
3. Route the hoses up the loader arm, avoiding any pinch points. See Fig. 3
4. Using a few 8” cable ties, secure the two ¼” hydraulic hoses to one or more of the hydraulic hard lines to keep the hoses in the desired path.

LEAVE THE CABLE TIES LOOSE SO THE HOSES ARE FREE TO SLIDE UP OR DOWN.

Route the hoses so that they will not get bound or pinched by any of the moving parts on the loader arm.

5. Pass the hoses to the operator’s right side of the ***First Gang of 2 Hoses***, loop downward, and connect the hose swivel fittings to their labeled locations on the 45 degree elbow fittings on the diverter valve. **DO NOT OVERTIGHTEN.**

*Locate the **Third Gang of 2 Hoses**.*

6. Connect the 3/8” elbow fittings to the dump/curl hard lines, according to the labels on the hoses. See Fig. 6.
7. Route the hoses to the operator’s right side and beneath the ***First Gang of 2 Hoses*** and connect to their labeled locations on the diverter valve. **DO NOT OVERTIGHTEN**

DO NOT ROUTE 2ND OR 3RD GANG OF HOSES THROUGH THE LOOP MADE BY THE FIRST GANG OF 2 HOSES. *Doing so will restrict movement of the hoses during loader operation and may cause damage to the hoses, fittings, or loader hard lines.*

Fig. 1 (Front Manifold Location)

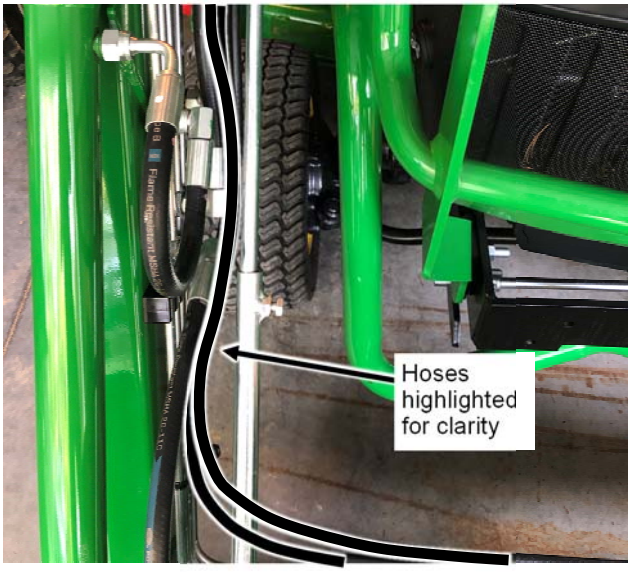


Fig. 3 (Route Gang of 2 Hoses up Loader)

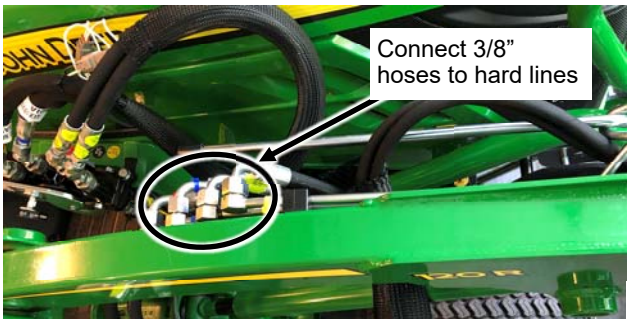


Fig. 6 (Connect Hoses to Dump/Curl Hard Lines)

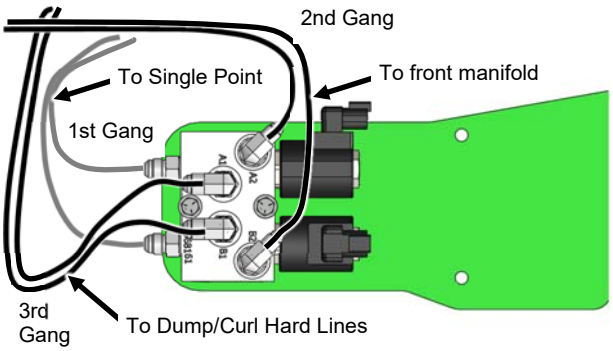


Fig. 7 (Connect Hoses to Diverter Valve)

Leak Check & Adjustment

Now is a good time to clean everything, start the engine, and check your connections. Make sure that there are no leaks on any of the hydraulic connections.

Slowly run the loader through all of its functions, raise and lower, curl and dump, while observing the hose movement. Lift your loader all the way up and observe the new hoses to make sure nothing is being stretched, kinked, rubbed.

When dumping and curling the loader, observe the moving parts attached to the loader arms. Be sure nothing is pinching the new hoses going to the ***Front QD Manifold***.

If any of the hoses are being stretched or kinked, loosen the fittings and reorient until the hoses are no longer being stretched or kinked. It may be necessary to disconnect the fittings from one end or the other and twist the hose so that the natural curve of the hose promotes hose movement without kinking.

Check your hydraulic fluid and replace as necessary. Tighten all cable ties, except those attaching the long hoses along the length of the loader, as these need to allow for hose movement. Tighten the QD manifold band clamp, and install additional cable ties, as desired.

Electrical Connection

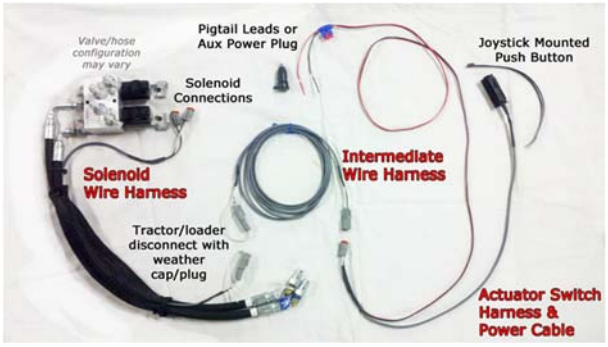


Image for reference only - actual product may vary

Note: The Artillian Ball Knob Switch Upgrade Kit (sold separately) is highly recommended, as it significantly improves the user experience when operating a grapple or plow.

Mount the included switch to your loader joystick per your discretion. Suggested guidelines are provided below.

Attach configuration 1 to the joystick using two cable ties thru the provided openings near the ends of the plastic housing (see below left). If your joystick has a bend close to the knob, such that the plastic switch housing will not fit, depress the 4 tabs on the plastic housing to open it, exposing the rubber switch inside. Discard the plastic housing and mount the rubber switch (configuration 2) with two cable ties located close together as shown below and to the right.

Configuration 1
Plastic Housing/Switch Assembly

Configuration 2
Rubber Switch w/o Plastic Housing

Install the Joystick Switch and Switch Cable

1. Note where build-up might be needed to support the switch housing. Using electrical tape, wrap around the joystick base to build up the diameter.
2. Insert a large cable tie through the slot on the side of the switch, from the switch side with the head facing the switch. Feed the cable tie through the slot on the other side of the switch to form a loop in the cable tie.

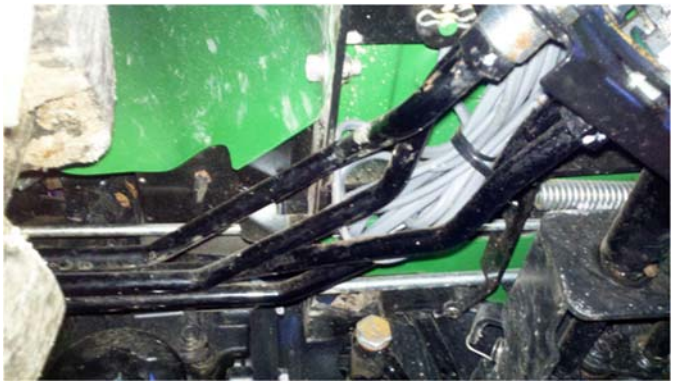
NOTE: A small screwdriver may be needed to start the tip of the cable tie through the slot.

1. Place the switch over the tractor joystick, orient as desired then pull the cable tie loop tight until the switch won't fall but may still be rotated. Do not trim ties!
2. Feed wire harness through opening at the base of the joystick.
3. Sit on the tractor seat and orient the switch to the desired position for your comfort. Tighten the cable tie until the switch is difficult to move on the joystick. Trim the excess from the cable tie.
4. Using the 4" cable ties provided, secure the switch cable to the joystick shaft all the way to the bottom of the joystick shaft. Tighten and trim the cable ties once satisfied with fit.

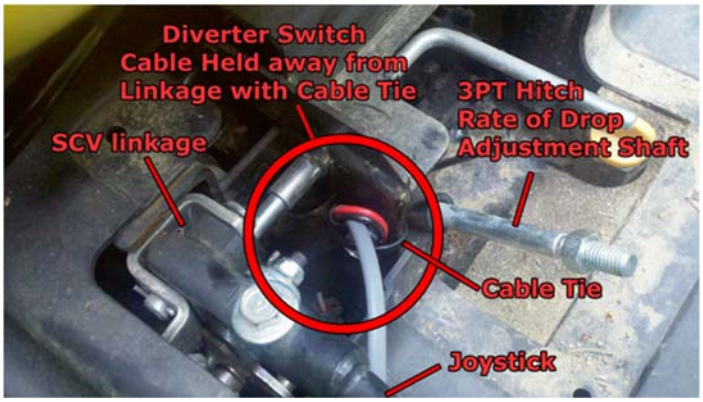
Diverter Valve Switch Install
(Actual Loader Joystick
May Vary from Image)

Install the Intermediate Cable and Connect to a 12V Power Source

Note: Remaining electrical routings are up to the installer's discretion. Here are a few points to mention:



1. The Intermediate Cable is used to connect the Switch Cable to the Solenoid Cable. It should be routed under the tractor operator station. Once the connection is made, any excess cable can be bundled up and fastened in a safe place under the floorboard using cable ties.
2. You may need to remove some of the covers from the operator station to determine the best path for the wiring.
3. It is critical to remember that wires must not encounter any moving parts. While performing the installation, it may be helpful to have someone actuate pedals and levers to observe what interferences may exist.
4. Use cable ties to help keep wires away from any moving parts, such as the SCV linkage, as shown below.
5. The diverter valve solenoids require 4 amps of electrical current at 12VDC. The power wire is protected by a 10 amp fuse. If your kit has an aux power plug, an 8 amp barrel fuse is in the plug.
6. If your diverter kit has the optional auxilliary power plug, wherever the Switch Cable passes through the tractor body, the power wire should branch off and be routed externally to the auxiliary power port on your tractor.



System Operation

The loader dump/curl circuit functions normally when the joystick push button is not depressed. Dumping and curling your loader should behave exactly the same as before the diverter system was installed. If they are not behaving normally, the A1 / B1 hoses are either swapped at the diverter valve or swapped at the loader hard lines.

When the joystick push button is depressed, instead of fluid traveling to the loader dump/curl cylinders, the electric solenoids will redirect the fluid to the ***Front QD Manifold***. Something needs to be attached to the Front QD Manifold for the diverter system to demonstrate functionality. Otherwise, the tractor hydraulics will simply "dead head" and open the tractor's internal pressure relief valve.

When an attachment is connected to the Front QD Manifold and you **BOTH**, A) Press the joystick push button, **AND**, B) move the joystick to the left or right, fluid will be diverted to the Front QD Manifold and to your attachment **WHILE YOU CONTINUE** to press the button. If you release the joystick push button at any time, fluid flow will return to the normal dump/curl functionality.

When using your tractor with the diverter valve, it is best to NOT engage the joystick push button WHILE fluid is moving through the valve. It is best to either curl/dump your loader OR divert to the Front QD Manifold.

Troubleshooting

Some tractors have a regenerative flow circuit on the dump function of the loader control valve (sometimes referred to as “fast dump”). This is usually actuated by moving the joystick to the far right position.

By design, the jaws on the Artillian Grapple are opened by pressing the hydraulic diverter kit button while moving the joystick to the right (corresponding with the dump function of the loader). However, if the joystick is moved to the far right regenerative flow circuit, this will result in the Grapple jaws closing. Some users may not realize that their tractor has a regenerative flow circuit and interpret this behavior as a malfunction of either the Grapple or hydraulic diverter valve. This is not the case. Due to the nature of a regenerative flow circuit, this is expected behavior.

If this functionality is observed, the user should take note of how far they are able to move the joystick to the right before the Grapple jaws change from opening to closing, and then limit their joystick input when opening the Grapple. An alternative solution is to switch the Grapple hoses at the quick disconnect manifold. This, of course, will invert the functionality of the Grapple. Moving the joystick to the left will now cause the Grapple jaws to open, while moving it to the right will cause the jaws to close. This will, however, allow the user to move the joystick to the far right position, without exhibiting the behavior described above.

Small dirt particles and debris can cause the hydraulic valves to stick and not function properly. Below are the steps to troubleshoot this problem. The whole process should take around 10 minutes or less.

1. Disconnect the power connector from one of the valves and press the joystick button (with tractor key in “ON” position if wired to OEM fuse block). You should hear an audible click.
2. Repeat for the opposite valve. No sound could mean the valve is stuck.
3. Once the malfunctioning valve is identified, remove the valve from the valve block. 7/8” and 1” wrenches required. You may want to reinstall the solenoid onto the valve and energize while it is out of the valve block to confirm malfunction.
4. Manually depress the plunger by inserting a fine point sharpie marker (or equivalent) into the end of the valve. Observe the orifice moving from the far groove to the near groove.



5. Depress the plunger several times. If it is sticking, gritty, or stuck, spray the internal components of the valve with WD40 and/or compressed air to dislodge the debris.
6. Clean the valve, then lubricate with fresh hydraulic oil.
7. Reinstall the solenoid onto the valve and energize to confirm functionality.
8. Reinstall into the valve block and test for functionality. Repeat on the other valve if required.

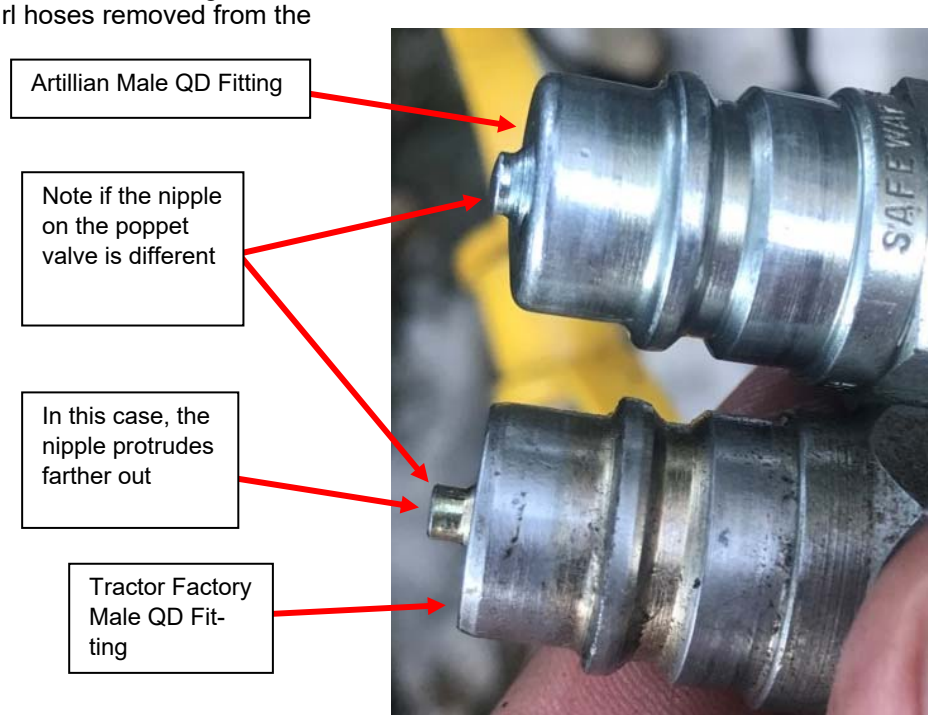
Continued on next page.

Troubleshooting Continued

The male quick disconnect (QD) fittings on the Artillian Hydraulic Diverter Kit P1 & P2 hoses may not engage properly with some OEM female quick disconnect fittings. This could allow fluid to flow into the hydraulic hoses, but not return to the tank on the tractor. Symptoms may include:

- Grapple (or other attachment) opening / closing for a short period of time and then “locking up”
- Grapple not functioning at all
- Tractor dump / curl operation working for a short period of time and then “locking up”
- Tractor dump / curl operation not functioning at all

1. Compare the male QD fittings from the Artillian HDK P1 & P2 hoses with the male QD fittings on the original dump / curl hoses removed from the tractor.



2. If the nipple on the tractor factory QD fitting poppet valve protrudes farther out than it does on the Artillian QD fitting, then the Artillian HDK kit may not function properly.
3. Remove the male QD fittings from the Artillian P1 & P2 hoses and from the tractor factory dump / curl hoses.
4. Replace the male QD fittings on the Artillian P1 & P2 hoses with the male QD fittings removed from the tractor factory dump / curl hoses. Reattach the P1 & P2 hoses to the appropriate female QD fittings on the tractor.
5. The grapple (or other attachment) and the tractor dump curl functions should now be working properly.

HDK-120RSP-PTL HYDRAULIC DIVERTER KIT SERVICE PARTS

PART NUMBER	DESCRIPTION
8SV-DVRK-H120	DIVERTER VALVE REBUILD KIT
9SV-HYD-00031	HYDRAULIC DIVERTER VALVE ASSEMBLY, W/ ACTUATOR
9SV-HYD-00061	HYDRAULIC SOLENOID VALVE ACTUATOR ASSEMBLY
8SV-HYA-00107	2 HOSE ASSEMBLY W/ SOLENOID WIRE HARNESS
8SV-HYA-00110	3/8” HOSE ASSEMBLY, 36” LONG
8SV-HYA-00111	3/8” HOSE ASSEMBLY, 35” LONG
8SV-WH-00059	WIRE HARNESS, HYDRAULIC DVTR, W/ 2 CONN END
8SV-HYA-00108	2 HOSE ASSEMBLY W/ FRONT MANIFOLD
8SV-HYA-00112	3/8” HOSE ASSEMBLY, 36.75” LONG
8SV-HYA-00113	3/8” HOSE ASSEMBLY, 38.75” LONG
8SV-HYA-00109	2 HOSE ASSEMBLY W/ FRONT MANIFOLD
8SV-HYA-00007	1/4” HOSE ASSEMBLY, 78” LONG, A2 BLACK
8SV-HYA-00008	1/4” HOSE ASSEMBLY, 80” LONG, B2 YELLOW
8SV-HYA-00013	TUBE CLAMP ASSEMBLY
9SV-WH-00061	WIRE HARNESS, HYD DIVERTER, SWITCH & PTL
9SV-WH-00083	WIRE HARNESS, HYD DIVERTER, W/ 1 CONNECTOR & DUST CAP
8SV-113-00395	MOUNTING BRACKET ASSEMBLY, HDK, JD120RSP

Warranty

Artillian, LLC warrants to the original purchaser that this product will be free from defects in material and workmanship for a period of **90 days** from the date possession taken by the original purchaser for use with Artillian hydraulic products and used as intended and under normal service and conditions for personal use. If not purchased for use with Artillian hydraulic products (e.g. Grapple, Plow Adapter, etc.) the warranty period is limited to **30 days**.

Finishes (coatings, labels, & decals) are not inclusive. Artillian, LLC reserves the right to inspect items claimed to be defective in material or workmanship. Artillian LLC’s obligation under this warranty is limited to repair or replacement with a nearest similar part.

This Warranty will not apply to any part or product which in Artillian LLC’s judgment shall have been misused or damaged by accident, abuse, misapplication, fire, negligence, or lack of normal maintenance or care, or which has been altered or repaired in a way which adversely affects its performance or reliability, or which has been used for a purpose for which the product is not designed.

Artillian, LLC’s obligations under this warranty, to the extent allowed by law, is in lieu of all warranties, implied or expressed, including implied warranties of merchantability and fitness for a particular purpose and any liability for incidental and consequential damages with respect to the sale or use of the product warranted. In any event, liability on behalf of Artillian LLC is limited to the original purchase price.