

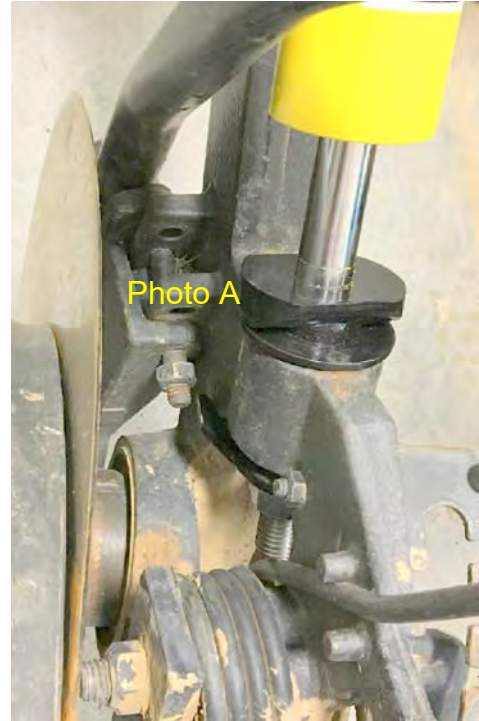
INSTALLATION & ADJUSTMENT  
of  
**Exapta®s UniForce™**  
**hydraulic downforce system**  
for JD 750, 1560, 1590 box drills  
(See different instructions for air drills.)

**Installing the cylinders:**

1) Remove the big coil spring on each opener: Lower the openers until they're touching the ground or shop floor, then put circuit in float. Note: On 60/90-series, only remove the first nut from OEM spring's rod (the second nut pre-loads the spring; no need to mess with it). Knock out roll-pin (roll-pin punch provided). Coil spring & rod/clevis apparatus lift out.

2) The lower end of cylinder's rod slides into the cast bushing, and **seat it with several whacks with a rubber mallet** on a solid surface (adding a drop of red Loctite may be prudent; provided) (Note: turning the bushing on the rod by hand often allows it to go easily; if the bushing won't go into position, use fine emory cloth to clean any paint or rust from the bushing's hole).

3) Set the cylinder + bushing into the large flat washer, then into the hole in the cast opener (see photo A).



4) From the bottom side of opener casting, the notched plate slides over the cylinder rod, and on the 60/90s the notched plate's ears go forward over the opener arm (see photo A), while on 50-series they go rearward. *On 60/90s: Position the angled ear of the plate behind/below the nut on the boot attachment bolt.* Secure with a 3/4" flange locknut, *being sure the prongs on the end of bushing mate into the notches of the plate as you tighten.* Tighten nut sufficiently that the notched plate sucks up tight against the lower end of bushing (Note: the bushing is longer than the hole in the shank).

5) Insert pin into top yoke of cylinder, and secure with roll pin (new pin provided for 50-series).

## Installing the header hoses:

1) Install the 90° fittings into each cylinder's port; **this is tapered pipe-thread and must have Teflon tape (provided). Use 2 full wraps of tape.** Tighten fitting so it's pointed the correct direction: *on the rear rank these should mostly be angled towards the center of the drill (10 o'clock on RH side; 2 o'clock on LH -- see Photo B) except when 2 cylinders are close together and then they should aim towards each other – see Photo C* (this angling is so that when the rockshaft is raised, the drop hoses won't rub on the steel pipe that supports the plastic seed tubes; the rear header hose will be zip-tied to the rockshaft at a later step). On the front rank, the 90°s will generally point forward/up, except for the ends that face inward (see Photo D).



Photo B



Photo C



Photo D

Reversing (loosening) a fitting with Teflon tape often causes it to leak. These fittings need to be quite tight to avoid leaks.

2) Install drop hoses (the ½" x 10.5" hoses from cylinder to the header hose that runs along the rockshaft) on rear rank only. On the front rank, use T-fittings (M-F-M) threaded directly onto the 90°s coming out of cylinder (see Photo D). These are all **flared [JIC] fittings that don't need Teflon tape**; also note that flared fittings should thread on easily for a good long way before you need a wrench—if not, you are cross-threaded.

3) Find the header hoses of the appropriate lengths to go between each drop hose on the rear rank. There's a longer hose to span where the rockshaft supports & torque cylinders are. Also install



one T-fitting (M-M-F) in the middle for 'feeder' hose (1/2") coming from the UniForce manifold/valve block. Where openers are close together, there will be no header hose on the rear rank, and you install another T (M-M-F) (see Photo C).

4) On the front rank, header hoses will typically be slightly longer (~2") than distance between cylinders (see Photo D), and where openers are somewhat close together, use the 31" length and make a loop, orienting the loop upward to prevent stalks from catching on it – see Photo E). On the front rank of 7.5" drills, where a pair of openers are very close together, one of that pair will need an 8" drop hose to move the T-fitting away from the other, and the header hoses on each side of that drop hose will be longer.



5) Tighten all fittings. *When tightening the header hose on the rear rank, pay attention to the orientation of the T-fittings going to the drop hoses, trying to aim them so that the drop hoses won't be rubbing on the steel pipe, and the header hose can be zip-tied flat on the rockshaft).*

## Installing the valve block, etc:



**Photo K. Line-body valve block installed on box drill. Yours should have a 90-degree fitting on the outboard side to reduce the loop of hose needed.**

For single box drills (not a pair pulled together on a hitch), you'll have a line-body valve block (see photo):

1) Attach line-body valve block to its pedestal (with port # engraving up), and secure that to the 4x6 frame tube with the square U-bolt provided. Mount this near the center of the drill or slightly L of centerline. See Photo K.

1) Install gauge behind the port with '1' engraved near it (the gauge's threads need Teflon tape) by using T fitting and reducers. Behind the T for the gauge is another T that goes into two 'feeder' hoses, one for each rank.

2) Route the 165" hoses along the tongue, and secure with large zip-ties. Install the high-flow (5/8" body) quick-couplers (provided) and adaptors on the tractor end of the hoses. Tighten fittings.

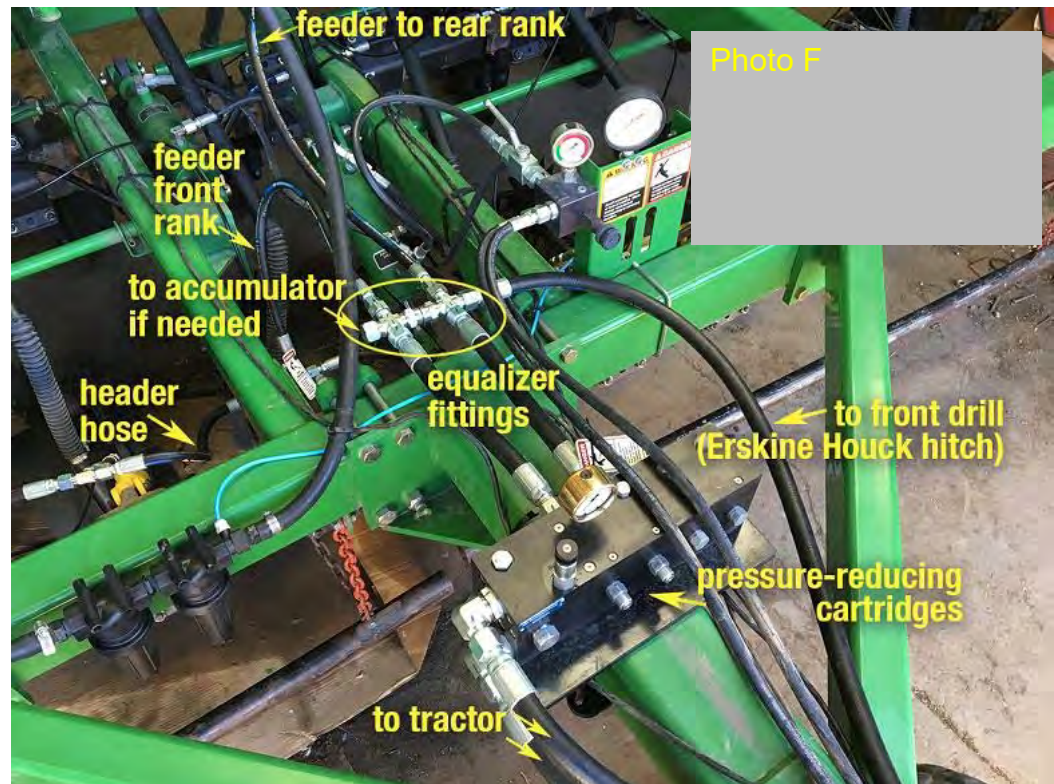
4A) If the tractor has a spare remote, the preferred setup is to run UniForce separately on that remote. The #2 & #3 ports of the UniForce valve block go to tractor (*Port #2 is pressure*). Tighten fittings.

4B) If no extra remote is available, Uniforce can run on the same circuit as the OEM rockshaft (there are some minor complications, such as the pressure going to maximum [whatever the tractor's output, usually 2700

– 3000 psi] when the rockshaft is raised, which isn't a concern except for creating more leaks and additional safety hazard, but also that the in-cab adjustment option cannot be used). Remove the OEM rockshaft hoses from the OEM valve block, leaving behind all reducers and fittings in that valve block. Using the extra T-fittings and pair of 44" hoses, connect the UniForce valve block to the OEM valve block: *Port #2 of the UniForce valve block goes to the port of the OEM valve block marked 'V2'; Port #3 of the UniForce valve block goes to the port of the OEM block marked 'VI'* Tighten fittings.

For a pair of box drills pulled together on a swinging hitch, you should have a large manifold (see photo):

1) Locate the bracket to hold the manifold onto the frame, and attach it to the underside of the manifold with 4 screws (use blue Loctite, provided). Set the bracket's legs (bolts) over the frame at the front-center of the drill (see photo) (For Erskine Houck Hitches, put the manifold on the rear drill when in transport; for JD hitches, manifold goes on the front drill). Locate the bars that clamp the bracket into position, slide them over the bracket's stud bolts, and then flange locknuts—do not tighten yet.



2) There will be at least 2 cartridges installed (the 2 rear ports closest to the gauge), and 2 rear ports used for the short feeder hoses. There will be fittings to connect the 2 short feeder hoses (3/4") to each other approx 20" downstream (rearward) of the UniForce valve block (if an accumulator is used, it plumbs into this location as well). See Photo F.

Using the UniForce manifold's 1" ports on RH side ('RH' when facing direction of travel), install the 90° reducers aimed forward, then attach to the 3/4" hoses going to the tractor – these are spliced with quick couplers so that the rear drill can be unhooked from the front.

3A) If the tractor has a spare remote, the preferred setup is to run UniForce separately on that remote. The LH ports (3/4") of the UniForce manifold should have plugs in them.

3B) If no extra remote is available, UniForce can run on the same circuit as the OEM rockshaft rockshaft (there are some minor complications, such as the pressure going to maximum [whatever the tractor's output, usually 2700 – 3000 psi] when the rockshaft is raised, which isn't a concern except for creating more leaks and additional safety hazard, but also that the in-cab adjustment option cannot be used). Remove the OEM rockshaft hoses from the OEM valve block, leaving behind all reducers and fittings in that valve block. Using the LH ports (3/4") of the UniForce manifold, install the reducer fittings, and then connect to the OEM valve block using a pair of 1/2" x 31" hoses. The upper port of the UniForce manifold goes to the port of the OEM valve block marked 'V2'; lower port of the UniForce manifold goes to the port of the OEM block marked 'V1' (usually this results in the hoses crossing each other to make an 'x'). Tighten fittings.



4) Route hoses along hitch. Two of the 3/4" hoses go from the tractor to the manifold, and one 3/4" hose goes from the equalizer fittings (behind the manifold) to the other drill, routed again along the hitch. Install quick couplers (provided) in these hoses so the drills can be separated if needed. Tighten fittings.

5) If accumulators are being used: assemble & mount them on frame (see photo); connect them to the fittings that equalize the feeder hoses just behind the valve block (*don't* use the port on the valve block) and to where the 3/4" hose to the other drill reduces to the 1/2" feeder hoses for each rank. The accumulator should arrive pre-charged, unless the system was shipped by air. Pre-charge on accumulator should be 400 psi. Tighten fittings.

6) Tighten the flange locknuts that hold the UniForce valve block's bracket onto the frame.

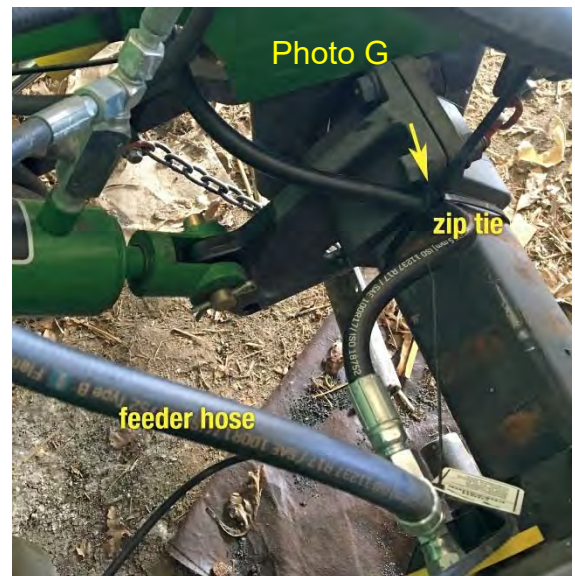
7) if the in-cab pressure adjustment option is used, install it—see separate instructions.



### Securing the header hoses:

1) Using the 0.5"-wide zip-ties, secure the *rear* header hose to the rockshaft. Also secure the front header hose where it goes past the cylinders that torque the rockshaft (see Photo G).

2) Attach warning tags to header hose. **These are an important reminder to not crack any fittings open until the pressure gauge reads zero.** *The UniForce system remains pressurized when openers are in the 'up' position.* Remove pressure by moving the remote's switch or lever into 'Float.' **Don't assume you'll always remember this—install the tags.** Also, someone else might be operating the drill, and try to repair something.



### Prepare the system

Get all the air out of the lines! The easiest way is to set the tractor's flow for the UniForce circuit to 5% (aka "0.5") so it's just a trickle. Put blocks under all the openers, so that when you rotate the rockshaft into the 'down' position, the UniForce cylinders are completely collapsed. Remove the plug (or hose) from the upper LH port on the manifold—remove it completely. Note: the pressurized hose should be the one going into the top port on RH side of UniForce manifold; if not, reverse the hoses at the tractor remote. After activating the circuit for 45 seconds or so, oil should start coming out this port (it won't geyser out, due to the low flow). Shut off the circuit, reinstall the plug & tighten it.

Next, loosen some fittings (several turns) on the uphill end of each header hose. Activate the circuit again, and let it go until the oil is no longer foamy, and a steady stream (not sputtering). Shut off the circuit, and tighten all fittings. You will need to add hydraulic oil to the tractor during or after this process.

Remove the blocks, and cycle the rockshaft up and down a couple times with the UniForce circuit activated. The openers should all rest at the end of their stroke, whether or not the opener (UF) circuit has pressure on it. If openers are suspended in the air, this weird occurrence is due to air remaining (try to purge it). Keep working at getting the air out until all this ceases.

If you followed this procedure, most of the air should be out of the system, but some always remains trapped, especially when the oil is warm. Operating the drill over a sharp change in elevation with all the openers powered up—good examples would be the lip of a waterway, or the edge of a crowned dirt or gravel road (terraces aren't sufficient), or a modest gully. The more times you go over that jump in terrain with the system powered up, the sooner you'll get the last bit of air out of the system for top performance. Also, letting the oil cool down completely (overnight) allows the remaining air bubbles to migrate upward where they can be more easily purged when oil resumes flowing.

It's probably a good idea to change hydraulic filters on your tractor after running UniForce for an hour or so—there's always some bits of Teflon tape, hose shavings, etc., and the number of fittings and hoses is large.

### Operation & adjustment

1) Adjust the knob for *the rockshaft pressure to 2000+*: it cannot lift the drill frame by itself anymore. You want the rockshaft rolled over completely so that it's sloped downward at the rear by 15 – 20 degrees – it should remain in this position at all times during operation. Running the rockshaft at 2000+ helps it to quickly overcome the resistance from the opener circuit (which remains pressurized with openers up) when lowering the openers to begin the pass.

2) Adjust the knob for the opener pressure (the UniForce system) until you are maintaining a reasonably uniform depth of cut. Running more than necessary, however, will cause sidewall compaction. Common range is 800 – 1400.

3) If you're drilling in steep terraces and the pressure on the opener circuit drops unacceptably after the opener rank has passed over the terrace peak, this means that hydraulic flow is too low which can be remedied by: 1) *increasing the flow setting for that remote on the tractor (we prefer setting it at max flow)*; 2) using a tractor with greater hydraulic capacity, 3) installing Exapta's accumulator for the UniForce system, 4) teeing two remotes together (especially useful on older tractors).

4) Keep pressure on the cylinder circuit during transport, to prevent openers from bouncing and damaging the cast bushing.