

Exapta⁷s UniForce^J

hydraulic downforce system

for JD 750, 1560, 1590 & Pro-series openers on box drills

(See different instructions for air drills.)

Installing the cylinders:

Step 1: Remove coil spring & rod on each opener.

- Lower the openers until they're touching the ground, then put circuit in Float.
- Remove nut and knock out roll-pin (keep pin & roll-pin). Remove coil spring & rod

Step 2: Install fittings into each cylinder's port

- Tighten all fittings (90/45 degree fittings should point primarily up)
- Use schematics as a reference when to use 90/45 degree fittings. (Hint: if cylinder is directly/slightly under the frame, use a 90 or 45)

Step 3: Assemble cast bushing onto each cylinder

- Remove wrapping off cylinder rod.
- Put one drop of Loctite (provided) on cylinder lip.
- Slide cast bushing onto cylinder. **Seat it with several hits using a rubber mallet.**



Photo A

Step 4: Slide cylinder into cast opener hole. (See photo A & AA)

- Slide large flat washer onto cast bushing
- Set cylinder + bushing + large flat washer into hole in cast opener.
- Slide notched plate over the cylinder rod (ears pointed forward/down). *Position the ear of plate behind nut on boot attachment bolt.*

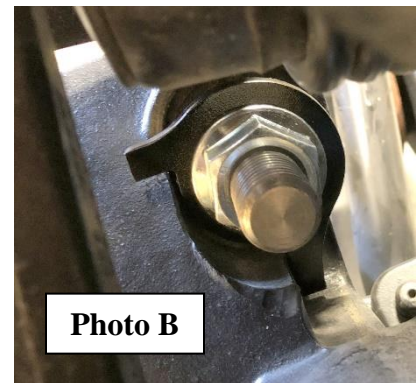


Photo B

Note: For 90-series openers: (see photo A). On Pro-series openers: (see Photo B) for orientation of notched plate.

Step 5: Secure notched plate with 3/4" flange locknut.

IMPORTANT: *prongs on the end of bushing must mate into notches of plate as you tighten.* Tighten nut sufficiently.

Step 6: Insert pin into top clevis of cylinder. Secure with roll-pin.

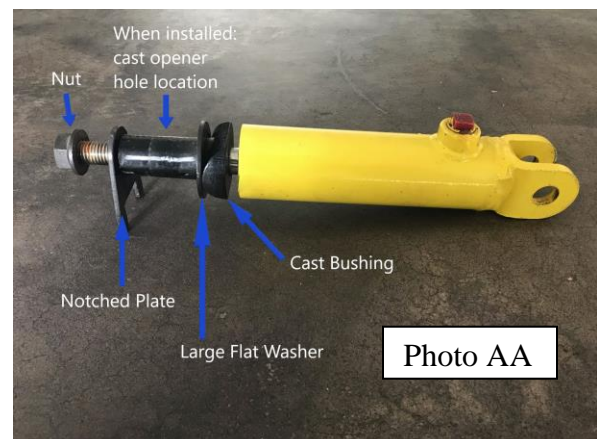


Photo AA

Installing header hoses:

1) Tighten fittings in the following orientations: On rear rank, all are pointed forward/up (Photo B). On front rank, the 90's point forward/up, except for the ends which face inward (see Photo C). Reversing (loosening) a fitting with Teflon tape often causes it to leak (remove & re-tape). These fittings need to be quite tight to avoid leaks.

2) On rear rank only, install drop hoses (the 1/2" x 10.5" hoses from cylinder to the header hose that runs along rockshaft). Drop hoses go above the steel tube that supports the plastic seed tubes. *On front rank, there are no drop hoses*; instead, use T-fittings (M-F-M) directly onto the 90's coming out of cylinder (see Photo C). 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 (see hose schematic). There are longer hoses to span where the rockshaft's supports & torque cylinders are, and some 90s to help with this (see schematic & Photo D). Also install one T-fitting (M-M-F) in the middle for 'feeder' hose (1/2") coming from the UniForce manifold/valve block.



Photo B



Photo C



Photo E

4) On the front rank, header hoses will typically be slightly longer (~2") than distance between cylinders (see Photo C), and where openers are somewhat close together, use the length specified 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 (see hose schematic).

5) Tighten all fittings. When tightening, pay attention to if it causes a hose to rub against something by twisting the hose.

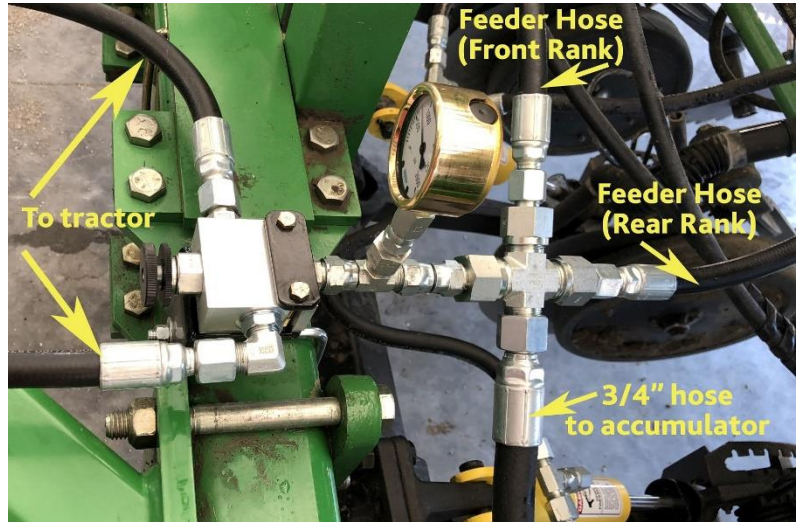


Installing the valve block, etc:

For single box drills (*not a pair pulled together on a hitch—see next page for those*), you'll have a line-body valve block (see photo to right):

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 but slightly L of centerline. See photo.

2) Install gauge behind the port with '1' engraved near it (the gauge's threads need Teflon tape) by using tee-fitting and reducers. Behind the tee for the gauge is another tee* that goes into two 'feeder' hoses, one for each rank.
*If an accumulator is used, this will be a cross (4-way) instead of a tee.



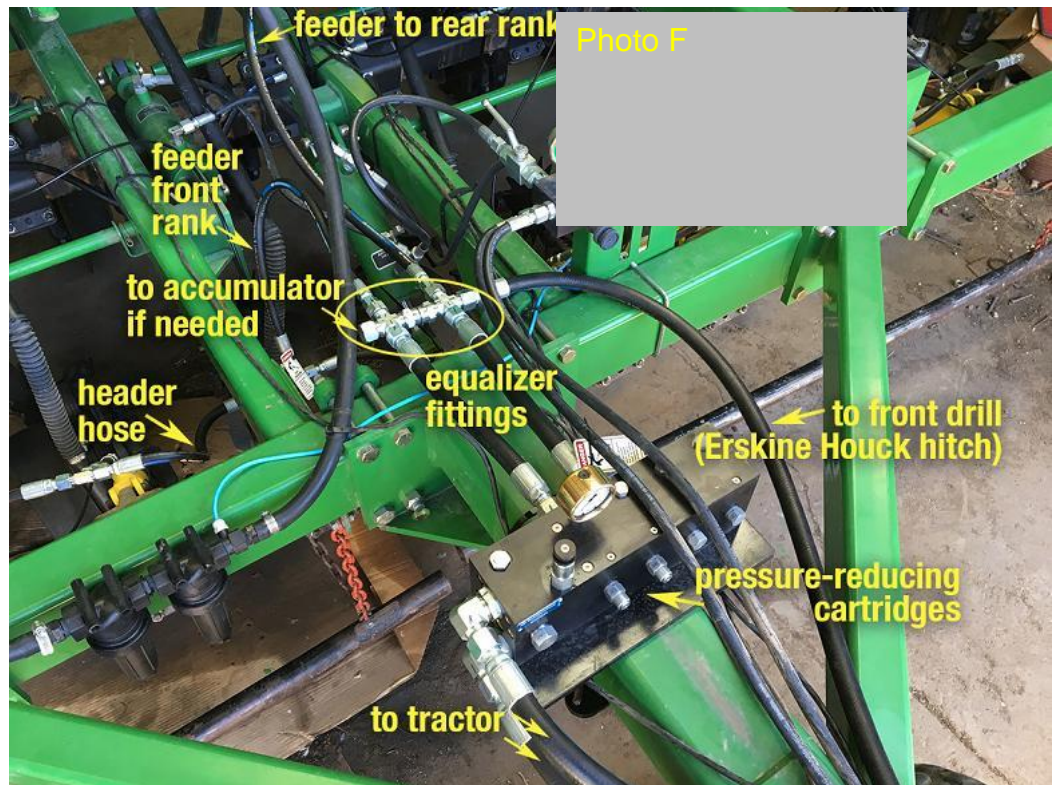
3) Route the 165" hoses along the tongue, and secure with large zip-ties. Install the high-flow (5/8" body) quick-couplers (provided) and adaptors on the tractor end of the hoses. Tighten fittings.

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 tee-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 'V1'* Tighten fittings.

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

1) Locate the bracket to hold the manifold onto the frame, and attach it to the underside of the manifold with 4 counter-sunk 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 2 cartridges installed (in the 2 front ports below/near gauge), and 2 corresponding rear ports used for 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 manifold (if an accumulator is used, it plumbs into this location as well). See Photo F.

3) Using the UniForce manifold's 1" ports on RH side (RH when facing the direction of travel) (these are engraved 'P1' & 'T1') screw in the 90° elbows, and then to the 3/4" hoses that go to the tractor—on Houck Hitches, these are spliced with quick couplers so that the rear drill can be unhooked from the front. (see separate instruction sheet for protecting hoses on Houck Hitches.) Route hoses along Houck 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. At tractor, hoses use the high-flow (5/8" body) male quick-coupler tips (provided) + adaptors (provided). Tighten all fittings.

4A) If the tractor has a spare remote, the preferred setup is to run UniForce separately on that remote. The LH ports (3/4") ('P2' & 'T2') of the UniForce manifold should have plugs in them.

4B) If no extra remote is available, UniForce can run on the same circuit as the OEM rockshaft. (There are some minor complications when running both systems on the same circuit, such as the pressure going to maximum [whatever the tractor's output, usually 2700 – 3000 psi] when rockshaft is raised, which isn't a concern except for creating more leaks and additional safety hazard; also our 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") ('P2' & 'T2') of the UniForce manifold, install the reducer fittings, and then connect to the OEM valve blocks using pairs of 1/2" hoses. *The upper port of the UniForce manifold ('P2') goes to the port of the OEM valve block marked 'V2'; lower port ('T2') 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 all 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 accumulators 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.

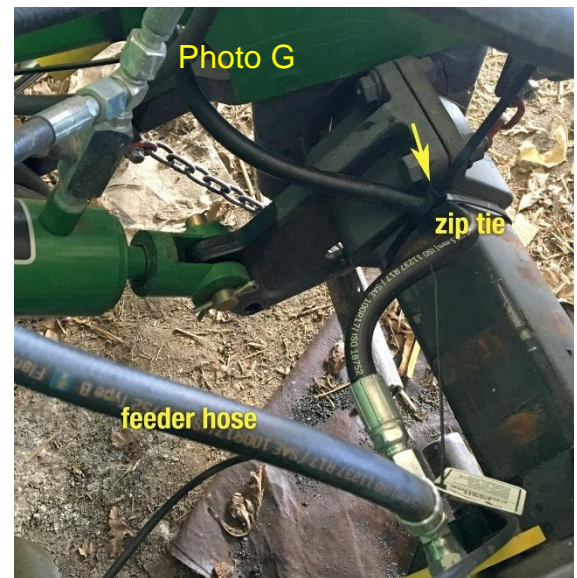
7) if Exapta's in-cab pressure adjustment option is used, install it—see separate instructions.



Securing the header hoses:

1) Using 0.5"-wide zip-tie, secure the front header hose where it goes past the cylinders that torque the rockshaft (see Photo G). Secure any other longer hoses to keep them from rubbing on frame, or dropping into the path of stalks, etc.

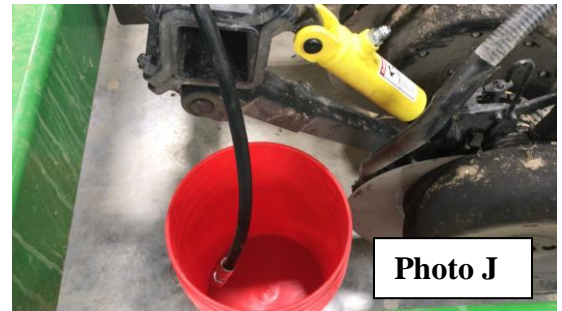
2) Attach warning tags to header hose. These are an important reminder to not crack any fittings open until the pressure gauge reads zero. *The UniForce system remains pressurized when openers are in the 'up' position.* Remove pressure by moving the remote's switch or lever into 'Float.' Don't assume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



Prepare the system: *Purge all air out of the system*

Step 1: Set tractor's flow for UniForce circuit to 5%. Rotate rockshaft into 'down' position, the UniForce cylinders must be collapsed as far as possible.

Step 2: Place two 5-gallon buckets at each outside end of wings. Undo the drop hose from the cylinder and let it drop into the bucket. (See Photo J)



Step 3: Activate circuit. *Note: the pressurized hose should be the one going into port '2' of UniForce valve block; if not, reverse hoses at tractor SCV remote.* After several minutes, oil will start pouring into the buckets (it won't geyser out, due to the low flow). It will be foamy/bubbly. **You will need to add hydraulic oil to the tractor during or after this process.**

Step 4: When the oil on one end is no longer foamy, and is a steady stream (not sputtering), shut off circuit. Re-secure drop hose onto cylinder.

Repeat Step 3 and 4 for the other end.

Once air is purged and both drop hoses reinstalled, pressure will now be building in the system.

For Step 5 and 6: Use caution when tightening leaky fittings. If you need to change a fitting, or undo to reroute a hose after the system is charged with oil and pressurized, use extreme caution!

All hydraulic pressure must be released first!

This can be dangerous, even deadly, if not done correctly.

Step 5: Activate circuit. Turn knob on Line-body Valve clockwise to build pressure up-to 800 psi – check for leaks. Increase to 1200 psi – check for leaks. By now the openers should be trying to raise the frame. Increase to 1800 psi – check for leaks. Increase to 2000 psi – check for leaks. The UF cylinders should be extended & transport ties should be off the ground.

Step 6: Cycle rockshaft up and down a couple times with UniForce circuit activated and increase tractor's flow circuit. *This will also expose all fittings that aren't properly tightened.* The openers should all rest at 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 air out until all this ceases.

Operation & adjustment

Step 1: Adjust the knob for *the rockshaft pressure to 2200+*: 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 2200 – 3000 helps it to quickly overcome the resistance from the opener circuit (which remains pressurized when rockshaft is raised) when lowering the openers to begin the pass.

Step 2: Adjust knob for 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 – 1600.

Step 3: If you're drilling in steep terraces and the pressure on 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,

Step 4: Keep UniForce system pressurized at all times – including turnaround passes, transport and folding to prevent openers from bouncing and causing damage to themselves, or other structures.