

# Jinma 284 Splitting & Clutch Replacement

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## Tools and Parts Required

1. Special Tools
  - a. Clutch alignment tool
    - i. Purchase from source of new clutch
    - ii. Make one, matching IDs of pilot bearing, PTO disk, and Main disk
  - b. Clutch gap tool
    - i. Make tool to check 0.95" gap between fingers and throw-out bearing face
      1. Standard gap gauge is too hard to use through clutch inspection port
      2. A piece of wire 0.95"
      3. A short piece of common 0.95 commercial line trimmer line taped to a stiff wire works very well
  - c. Splitting alignment tool
    - i. Make one to mount on rear bell housing, and index to a point on engine for reassembling tractor halves and setting rough alignment on shaft
    - ii. A piece of angle 12-14" long works well with holes drilled to bolt in FEL support bracket mounting holes on bottom of rear bell housing
  - d. Jack guide
    - i. A plywood or OSB sheet [~ 2x4ft] to guide the floor jack supporting the rear of the tractor
    - ii. Will guide the jack [with rear wheels locked so they do not rotate] straight back, and ensure that the rear half of the tractor will reassemble back to the same position when pushing it back into the front half
    - iii. 2x4s or 2x3s screwed to plywood which will guide the jack wheels and prevent it from moving laterally when splitting the tractor
  - e. Elevation stick
    - i. Something to indicate the elevation of the bottom of the bell housing to the ground
    - ii. A piece of ½" PVC pipe works well, cut precisely to the proper elevation
    - iii. Elevation to be determined when both tractor halves are supported right before separation
  - f. Dry Moly Lube [ Dry Film Molybdenum Disulphide Lubricant spray]
    - i. To provide a dry lubricant for the throw-out bearing and disks on the splined shaft
2. Standard Tools
  - a. Jack
    - i. Transmission jack or floor jack
    - ii. To keep jack moving straight back when pulling back section, prevent "steering" wheels from turning
      1. Loosen the movable wheels, and wedge a large washer or other item between the stationary mount and rotating piece, then tighten with them
      2. Aligned with the stationary wheels so that the jack rolls straight going forward or backward
    - iii. Strap to strap the jack to the rear 4wd gear box to prevent it from slipping off or shifting when moving rear section of tractor
    - iv. Separate bottle jack to make any required minor elevation adjustments of engine end when separated and aligning for reassembly of halves
  - b. Supports
    - i. Jack stands and/or wood cribbing [including some thin shim materials] to support engine half of tractor during separation, and for secondary safety support for jack on rear half during separation
  - c. Small inspection mirror or endoscope to check spline alignment
  - d. Torque wrench [fairly low torque on all bolts for this procedure]
  - e. Gear puller, steering wheel puller, or pry bars may be required if pulling off flywheel
  - f. Metric wrenches and sockets [ratcheting box wrenches and wobble socket extension very helpful]
  - g. Misc: Loctite, gasket tack, gasket sealer, anti-seize, cable ties, straps, gap gauge, plugs to temporarily plug fittings, small sandwich plastic bags for parts and fittings, Scotchbrite pads, surfacing pads, cleaning rags and brushes

- i. You will need a good plug for the disconnected hydraulic fluid feed line from the reservoir that goes to the hydraulic pump inlet, since fluid will continue to leak from this fitting, which is lower than the reservoir
  - 1. Tapered plug ~9/16" tapering slightly larger [I used a tapered brass plug]
- h. Grease
  - i. Tacky grease to hold loose ball bearings, such as Lucas Tacky n Red #2

## Splitting

**This procedure will split the two halves of the tractor at the clutch bell housing, exposing the clutch and flywheel. With all tools available, including jack guide, straps and bungee cords, cribbing materials, and alignment tool, it will take about 2 hours to separate. Level ground is critical for separation, and more importantly, for proper alignment during reassembly.**

*This is a general guide, and some tractors may be slightly different, requiring adaptation of the procedure.*

**READ THE WHOLE PROCEDURE BEFORE STARTING!!**

*It's the small things that keep it from turning into a 2-4 day project instead of a 1-day project.*

1. Hood
  - a. Raise hood and strap in lifted position
  - b. Remove lift gas spring at bottom
2. Remove battery negative cable
3. Remove FEL [Front End Loader] /clutch cover support brackets on both sides
  - a. Front wheels chocked
  - b. Bucket flat on ground
4. Remove FEL bracket support bottom plate
  - a. Mark which way it came off, as all the bolt holes are not necessarily symmetrical
5. Remove 4wd drive shaft
  - a. Loosen clamp on small diameter side of the rubber coupler
  - b. Tap aluminum shaft cover loose on both ends and slide together
  - c. Push rear coupler forward to remove from shaft
    - i. Ensure 6 coupling balls remain in coupler and recover any that fall out
  - d. Pull shaft out from engine-side shaft coupler
    - i. This coupler is pinned to the front-wheel side of the shaft, so the driveline will pull out of this coupler leaving the coupler on the tractor
    - ii. Remove 6 coupling balls in coupler and recover any that fall out
      1. Bag bearing balls for cleaning and re-installation
    - iii. Bag couplers on shaft and shaft ends on tractor
6. Fuel line
  - a. CLOSE fuel bowl shut-off valve
  - b. Disconnect hose at tractor or aux fuel filter
  - c. Bag both ends
7. Fuel return line
  - a. Remove fitting on tank
  - b. Bag line and plug fitting on tank [to prevent leakage, fuel level below return port level]
8. Uncouple oil pressure gauge feed line [aux mechanical pressure gauge if installed]
  - a. Bag line and plug fittings
9. Uncouple glow plug wire
  - a. Add connector and sleeve wires for easier maintenance later
10. Uncouple tach probe wire
11. Uncouple oil pressure sensor wire
  - a. Add connector and sleeve wires for easier maintenance later
  - b. No connection on blue wire
12. Uncouple throttle and "kill cable"
  - a. For SAFETY, hold kill lever in kill position with wire or bungee
13. Disconnect compression release lever at engine
  - a. Hold linkage out of way with wire or bungee

14. Steering hydraulic lines
  - a. Loosen clamp on engine holding the tubing, just before the transition to the cylinder hoses
  - b. Remove lines at steering valve [hold stationary side of fitting with wrench while removing nut]
  - c. Bag and cap lines and valve fittings
  - d. Ensure o-rings on fittings on valve stay in place [recover and replace if they have fallen off]
15. Remove fuse block
  - a. Bag and bungee up to hood with all connectors and wires in place
  - b. Ensure that it is not hanging where it can catch on hood bracket during reassembly
16. Remove 2 bolts holding dash to engine bracket near hood hinges
17. Disconnect right-engine wiring harness
  - a. Starter – 2 wires
  - b. Alternator – 4 wires
    - i. 1 – white [TOP]
    - ii. 2 – black
    - iii. 3 – green
    - iv. 4 – purple [Bottom, large lug]
  - c. Temperature sensor
  - d. Hold harness up and out of the way of engine, next to fuse block
18. Disconnect FEL hydraulic quick-connect [the one that goes with the rear section]
19. Disconnect hydraulic pump inlet tubing at pump
  - a. DO NOT LOOSEN until you have a plug ~9/16" tapering to slightly larger
  - b. Plug tubing end and bag [tap in a firm plug to keep from leaking, which it will, since it goes directly back to the hydraulic oil reservoir; check later to make sure it isn't leaking]
  - c. Strap or bungee line to pull out of way of clutch housing during separation
  - d. Bag pump inlet
20. Block engine under oil pan
  - a. Do not jack higher than blocking is firm
  - b. Ensure front wheels are chocked
21. Place floor jack guide under tractor rear
  - a. Block floor jack rear wheels to keep from "steering" [loosen and tighten with washer wedging it]
  - b. Plywood ~2x4ft with side boards attached to the plywood to guide the jack back straight, with the guide boards set to just the width of the jack wheels [if the floor jack wheels in the front are narrower than the smaller steering wheels, space the guides to accommodate, so that the front wheel section is set to the proper width when the tractor is together, and maintains that width back as far as the wider rear wheels will allow. Even if the front wheels aren't guided all the way back during separation, then can be directed back into the guide for reassembly and will then position the rear section correctly for realignment.]
  - c. Center the guide rails under the tractor and evenly between rear wheels so that it moves straight back and stays in alignment with front half of tractor
22. Roll floorjack under tractor rear in guide
  - a. Adjust jack guide so that it is in proper position with jack at end of guide and under lifting point
    - i. Re-center guide between rear wheels so that proper alignment with front is maintained
    - ii. Mark plywood position on ground in case it shifts for any reason while moving the rear section
  - b. Do not remove jack lever handle, just letting it drop down under tractor. There is enough room to use lever to jack tractor in small strokes, and you will need it for reassembly to make small height adjustments
  - c. Support under 4wd shaft housing [a small piece of thin soft wood between the jack and the housing may help to cradle the housing]
  - d. Strap jack to gear box to prevent slipping or shifting
  - e. Lift ONLY enough to firm and maintain elevation with front half [you are not trying to lift the rear at all, just keep it lined up with the front as they slide apart, otherwise the shaft will either lift or drop as it pulls away from the front half, making reassembly harder]
23. Install homemade alignment guide to FEL bracket support holes on bottom of bell housing
  - a. Align to some reference point on the front engine or front-half of the clutch housing as a guide point for reassembly
24. Cut elevation tool to precisely mark elevation of bell housing from ground BEFORE separation
25. Remove bell housing bolts [ratcheting box wrench easiest for some bolts, wobble extension for others]
26. Ensure front supporting cribbing blocks are tight, and rear jack is properly tensioned to maintain elevation
27. Pull rear of tractor straight back
  - a. Ensure jack is staying in guide

- b. May require come-along to break free attached in center to stationary object to pull straight
    - i. DO NOT pull laterally or try to rotate one rear wheel at a time to break it loose
    - ii. A come-along or large ratcheting strap will allow an even pull from the center in small increments, and help keep everything in alignment; once broken loose, it should roll easily when hand-pulled from the center
  - c. Ensure nothing is catching between tractor halves
  - d. Separate ~ 18-24", keeping jack in jack guide and ensuring nothing is moving laterally
28. Chock rear wheels
29. Place jack-stand next to jack for safety, but DO NOT adjust jack height

## Clutch and Flywheel

These steps will involve replacing the clutch and flywheel.

1. Remove throw-out bearing return spring
  - a. Unclip from bearing assembly, but leave attached to tractor
2. Remove throw-out bearing assembly
  - a. Cover and protect exposed shaft
  - b. Press off old bearing and press on new bearing on if replacing bearing, using proper supports and press pins to prevent damage to bearing
3. Remove clutch assembly from flywheel [6 bolts – remove in pattern, relieving spring pressure]
  - a. If replacing complete clutch assembly, following step not applicable
    - i. Disassemble clutch pack
      1. Remove cotter pins on inner pivot pins on 3 fingers
      2. Remove and save pivot pin, and fold finger back
      3. Remove assembly
      4. Remove PTO adjustment bolts
        - a. Jamb nut, adjustment nut, and spring
        - b. Retain all parts
      5. Remove pressure plate and main disk
      6. Inspect and clean
      7. Surface pressure plate surfaces with surfacing disk [Scotchbrite wheels]
    - ii. Reassemble clutch pack
      1. Ensure Bellville spring washers are assembled in correct direction and in recessed holding area
      2. Spray new disk splines with Dry Moly Lube before reassembly [DO NOT spray lube on any clutch or pressure plate surfaces!]
      3. Ensure splined hub of disks' longer section points towards fingers [towards the back of the tractor, and away from the flywheel]
      4. Center main disk before tightening bolts, and ensure spring washers have not slipped and are centered and in their recessed holding areas
      5. Spray pivot pins with dry moly before reassembly, along with finger tips that contact throw-out bearing
    - iii. If replacing complete clutch pack, follow above reassembly steps that apply
4. Remove flywheel if desired
  - a. Heavy, so best to strap to engine to hold it during removal [using bolts that would hold clutch pack to flywheel, or under recessed areas]
  - b. Puller or proper pry bars may be required, due to alignment pins sticking
  - c. Inspect clutch housing-to-engine bolts for tightness, and engine seal for leaks, making replacements or repairs as needed
  - d. Replace pilot bearing
    - i. OEM bearing is a single shielded bearing, and OEM bearing leaked grease out of the back side
    - ii. replace with double-shielded bearing 6203-ZZ
  - e. Re-install flywheel
    - i. Strap helps to hold in place and position it
    - ii. Place a small amount of anti-seize on alignment pins, after ensuring that they are clean and holes in flywheels are clean

- iii. Use torque wrench to torque all bolts, including clutch housing to engine
  1. Use Loctite on bolts [does not affect torque specifications]
  2. Use standard torque specifications for graded metric bolts [using thread diameter, NOT the head diameter!]
5. Replace clutch pack
  - a. MUST USE clutch alignment tool, whether purchased, or custom made
  - b. Place PTO disk on alignment tool [longer part of disk hub pointing away from the flywheel]
  - c. Insert alignment tool with disk into the pilot bearing in the flywheel
  - d. Slide clutch pack onto clutch alignment tool and into 3 slots in the flywheel
    - i. Hold in place with a bolt or two, but do not tighten bolt(s) yet
  - e. Ensure that clutch alignment tool is firmly seated so that clutch and disks do not wobble, and it is centered square to the flywheel
  - f. Ensure that neither of the Bellville spring washers have slipped out of place
    - i. When moving the clutch pack to vertical position to mount, spring washers can slip out of place, and will prevent clutch from disengaging!!!
    - ii. Carefully inspect interior of clutch pack to see if edge of spring washer is showing, either in the front, and also look through the holes in the disk to ensure that the rear washer has not slipped and showing
    - iii. You can run your finger on the inside of the clutch pack, and you should not feel anything loose hanging past the recessed area on the pressure plate that holds the washer in place.
    - iv. If the washer is showing, push it back into proper position before proceeding!
  - g. Tighten the clutch pack to the flywheel
    - i. Use Loctite on bolts
    - ii. Alternate bolt tightening pattern, and pull in clutch pack to flywheel evenly with the attachment bolts [you are also loading-up the spring, so you want pull it in evenly]
    - iii. After they are tight, torque the bolts to 18.8 ft/lbs
    - iv. CAUTION! Again check that spring washer is not showing
    - v. Remove clutch alignment tool
    - vi. Visually inspect to ensure all looks straight, spring washers are not showing, and everything looks ready for reassembly
  - h. Mark the 3 clutch adjustment points on the edge, so that they can be seen from clutch adjustment port on the side after tractor is back together
    - i. Use paint marker, permanent marker, punch, or number stamps
  - i. Adjust PTO clutch adjustment bolts
    - i. Set to 0.35" from bottom of adjustment nut to pressure plate [gap between pressure plate and nut, with 0.35" gap gauge just snug in gap when inserted fully to bolt under nut]
    - ii. Secure with jam nut while holding adjustment nut in position, then recheck
    - iii. Recheck all 3 gaps after completing all 3 adjustments
6. Inspect and polish shaft end [on rear half of tractor] that inserts into pilot bearing, and clean and inspect splines
7. Inspect gear box shaft seal to ensure not leaking and needing replacement
8. Spray the shaft with dry moly lube, including end, splines, and slide area for throw-out bearing, and yoke fingers
9. Spray throw-out bearing finger contact area, yoke contact tabs, and shaft slide with dry moly lube
10. Install throw-out bearing assembly
  - a. Reinstall pull-back spring
  - b. Ensure smooth operation with clutch pedal
11. If desired, a TINY amount of anti-seize or lube can be placed on the end of the shaft that enters the pilot bearing and the very leading edge of the splines where they will enter the splines on the clutch disks during reassembly
  - a. Use an old toothbrush or similar tool to remove any excess lube from the splines
  - b. You only want a tiny amount of lube to guide the shaft and splines into position during reassembly
  - c. In the clutch area, dry lube is preferred for the throw-out bearing and the splines that the clutch disks will slide on, since dry lube will not attract dirt, clutch dust, or other contaminants
12. Bell housing gasket
  - a. Attach gasket to rear half of bell housing using proper gasket-holding compound, such as Permatex High-Tack
  - b. Do not use gasket sealer on front half of gasket

# Reassembly of the Tractor

These steps will bring the two halves of the tractor back together, while inserting the drive shaft back into the clutch pack. Depending upon how well the halves are aligned, reassembly will probably take about four hours. Proper alignment is CRITICAL when bringing the two tractor sections together, and the main clutch disk is easily damaged if proper alignment is not obtained before bringing the sections together.

1. Ensure that front wheel chocks are in place and tight
2. Ensure that the jack guide plywood is in the proper position as indicated by the marks that you placed on the ground before the tractor was split
3. Use elevation stick that was made before separation to determine that engine is still at same elevation
  - a. Wood blocking may have compressed during time tractor was separated
  - b. If elevation is low, jack up engine to proper elevation and shim blocking to maintain proper height
4. Ensure all tractor parts are still clear of areas that could interfere during reassembly of two halves
5. Carefully push tractor from center rear to move forward
  - a. Ensure that tractor is out of gear, brake is OFF, jack-stand removed, rear-wheel front chocks are removed, and path is clear of tools or debris
  - b. Ensure that jack is smoothly moving in guide and guide is not moving on ground
  - c. A large 2x4 or pipe may be helpful to slowly inch forward by wedging it on jack guide and tractor towing bracket in center of tractor
    - i. Keep wheel chocks available to chock rear tires as you move forward
  - d. If 2<sup>nd</sup> person is available, have them ensure nothing is hitting, and stop at point shaft end is ready to enter clutch pack [you can also place rear wheel chock in position to stop it before shafts goes into clutch-pack]
6. CRITICAL!!! Check alignment
  - a. Visually inspect that shaft end is entering center of clutch pack
  - b. Check alignment indicator that you attached to rear half is lining up with front half position from before separation
  - c. Use elevation tool to ensure elevations on both halves are still correct height from ground
    - i. Make adjusts as required so that elevations are precisely the same as before separation
7. Inch rear half forward
  - a. Recheck that shaft is properly lining up with clutch center line
  - b. Feel shaft end alignment with hand
  - c. During the alignment step, an inspection mirror, inspection snake camera, or USB endoscope camera will be helpful
8. Slowly push forward an inch at a time, inspecting alignment with each movement
  - a. Ensure that PTO is in gear
  - b. Push forward while turning PTO shaft
    - i. As soon as PTO shaft splines start to make contact with splines on PTO clutch disk, you will feel the splines starting to mesh as you turn the rear PTO shaft
    - ii. Bump the tractor forward just until the splines start to mesh and then the PTO shaft will no longer turn by hand, then stop
9. Alignment check
  - a. Check shaft at clutch visually and with your hand
    - i. You can feel and see [with mirror or inspection camera] if shaft is properly lining up with clutch disk [even gap all the way around]
    - ii. Ensure that splines on main drive shaft are aligned to enter splines on main clutch disk
      1. Rotate flywheel slightly to align the main drive splines
  - b. Check alignment indicator tool that it is properly aligning with pre-separation point on engine
  - c. Check elevation height on both halves
  - d. Check separation gap between bell housing and engine clutch cover
    - i. Must be even on all sides
  - e. Make elevation adjustments as required, and if there was lateral slippage, the jack alignment plywood may need to be slightly “thumped” to ensure alignment is back straight
  - f. Repeat these steps while SLOWLY moving tractor forward into clutch disks
10. CAUTION !!
  - a. Even after the splines on the PTO disk and clutch are meshed, and the rear of the tractor is sliding into the clutch, the splines on the main disk MUST be properly aligned to properly mesh and slide into the clutch and pilot bearing

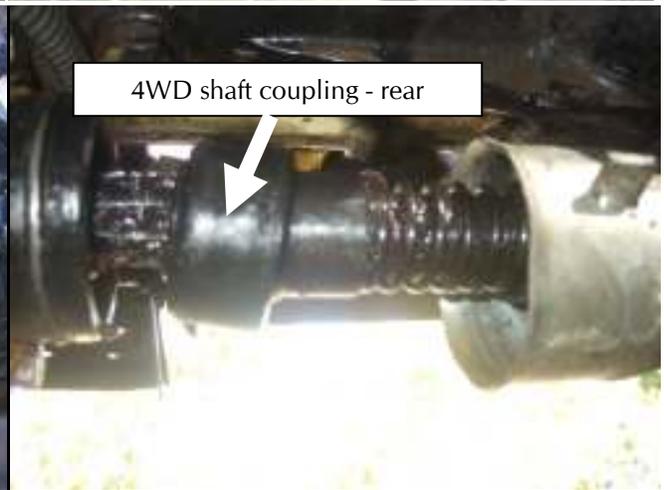
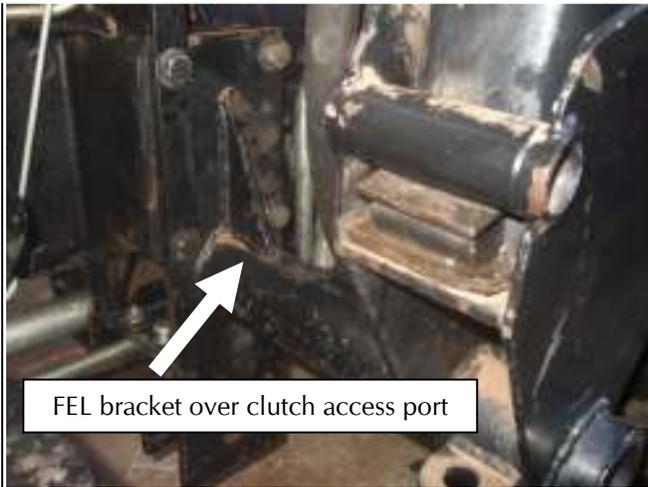
- b. Double and triple check visually and with your hand to ensure proper alignment with every attempt to wiggle rear of tractor into position, making VERY SLIGHT adjustments in height or lateral positioning to get the tractor to smoothly slide into position
  - c. If the shaft is not properly meshed with the main disk, or alignment is off slightly, the edge of the shaft can catch on the edge of the clutch disk splined hub and bend the disk hub
    - i. If the disk hub is bent out of position, the disk will wobble and not release, requiring removal of clutch
      - 1. If the disk hub becomes bent, it can be straightened, but it is a time consuming process to ensure that the hub is once again perfectly at right angles to the clutch disk
11. Halves mated
- a. When the alignment is perfect, the two tractor halves will slide together fairly easily and the bell housing surface will be mated with the engine surface
  - b. There may be a slight “pop” as the shaft is seated in the pilot bearing, and then it easily slides in the last ½”
12. Clutch check and adjustment
- a. Replace 2 to 4 of the bell housing bolts to secure the halves together
  - b. Through the side inspection port on the left, view the throw-out bearing and the fingers
    - i. You will need to rotate the flywheel with a pry bar to be able to see the finger gap
      - 1. Ensure that the engine kill lever is still in the kill position
    - ii. Adjust the clutch pedal adjustment so that the turnbuckle has just a few threads showing in the yoke area
      - 1. Adjust by removing the pin, loosen the jam nut, then rotate the yoke section to proper length, then re-inserting pin and cotter pin
      - 2. Verify proper movement of throw-out bearing when depressing the clutch pedal
      - 3. NOTE: if the clutch pedal does not properly move the bearing, a common problem with this tractor is a bad or loose roll-pin that connects the clutch pedal lever to the shaft that moves the bearing
        - a. If it is loose, replace the roll pin
        - b. A high quality roll pin or dowel pin should be used, and Loctite in place
    - iii. Use a gap tool to check the gap between the finger and the throw-out bearing surface
      - 1. Make sure fingers are not loose and firmly back against the spring pressure when measuring
      - 2. Gap between fingers and bearing surface should be ~0.95”
        - a. 0.95 wire tool should just be just “snug” between finger and bearing
      - 3. Adjust clutch adjustment bolts on clutch to get proper gap, then recheck after doing all 3, rotating flywheel to each of 3 marked positions for check and adjustment
  - c. Hold down clutch pedal
    - i. A 2<sup>nd</sup> person depresses, or strap the clutch pedal in fully depressed position, up against the stop [a ratcheting strap works well]
    - ii. From inspection port, view main clutch disk
      - 1. Edge of clutch disk is visible at each of the 3 finger pivot points
    - iii. A gap of ~1/16” should be evident between edge of clutch disk and pressure plate, indicating that the pressure plates have moved apart from each other when the clutch pedal was depressed
    - iv. Using a small screwdriver or pointed tool, the clutch disk should freely move in the gap between the pressure plates
      - 1. Check all 3 positions
      - 2. If clutch disk itself won’t move, and gap moves from one side to the other between the 3 positions, it probably means that:
        - a. disk hub has been bent during assembly and the disk has a wobble and will not release in use; if so, start over and repair clutch disk [see #10 CAUTION]
        - b. Bellville spring washer has slipped and the pressure plate has been cocked during reassembly; if so, it has probably also bent the main clutch disk hub
      - 3. If clutch disk is free to move between the two pressure plates, then proceed
13. Replace all bell housing bolts, using Loctite
14. Remove engine-half blocking and rear-half jack supports
15. Replace 4wd driveshaft

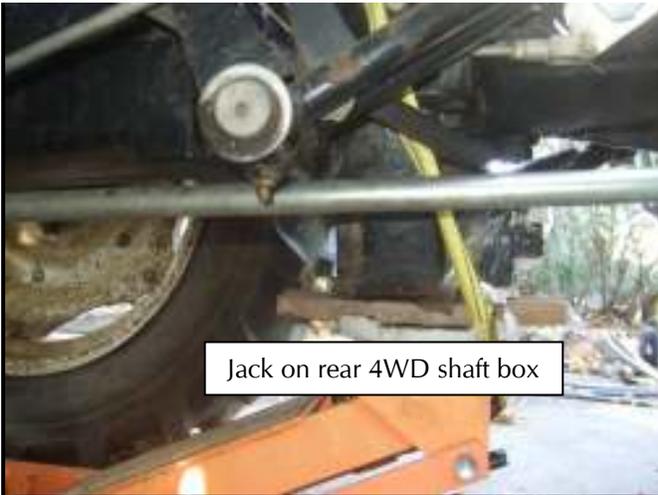
- a. Clean ball-bearing couplers on drive-shaft and on engine-side of tractor
  - b. Clean and inspect the [12] 8mm ball bearings
    - i. Replace if worn or damaged
    - ii. McMaster Carr part# 9292K45 \$3.37 per pack of 25
  - c. Clean and inspect shaft ends
  - d. Spray shafts with dry moly lube
  - e. Repack couplers with sticky grease and carefully seat [6] ball bearings in the grease in the grooves of each couple
    - i. Such as Lucas Red n' Tacky #2 grease
  - f. Carefully, so that the bearings do not drop out, insert engine-end driveshaft into the coupler, ensuring that the grooves on the shaft line up with where the ball bearings are set in the coupler
  - g. Compress the spring-loaded coupler on the drive shaft that goes on the rear side, and line it up with the shaft end, turning it so that the grooves and ball bearings in the coupler line up, then slide into coupler, and ensure it seats completely on both ends
  - h. Rotate shaft to ensure that it rotates smoothly
  - i. Slide driveshaft aluminum cover into the two housings on each end
    - i. There are o-rings to seal each end
    - ii. Tap the shaft on or in to the o-ring to secure it, tapping on the tabs on the shaft cover
    - iii. Tighten the hose clamp on the rubber seal between the two cover halves, which will secure the cover into position
16. Replace the hydraulic lines going to the power steering valve
- a. Ensure that the o-rings on the valve fittings stay in place when making up the fittings
  - b. Install and fully tighten the bottom left fitting first, then the top right fitting
  - c. Replace the hold-down clamp on the engine that holds the lines
17. Replace the hydraulic line to the hydraulic pump suction
18. Re-connect FEL quick-connect
- a. TIP: place cable tie around quick connect to prevent disconnection collar from inadvertently sliding back and coming loose, then blowing the seal in your hydraulic pump when it dead-heads
19. Replace the fuel lines
- a. Fuel feed line
  - b. Fuel return line to the tank
  - c. Turn ON the valve on the fuel bowl under the tank
20. Replace the 2 bolts that secure the dash to the engine bracket
21. Replace the fuse block bracket to the engine block
22. Replace the wiring
- a. Starter [2 wires]
  - b. Alternator [4 wires - (top to bottom) white/ black/green/ purple]
  - c. Coolant temp sensor
  - d. Tach probe
  - e. Oil pressure sensor
  - f. Glow Plugs
  - g. Oil pressure feed line [for aux mechanical oil gauge if installed]
23. Replace the linkages
- a. Decompression lever
  - b. Throttle
  - c. Kill cable
    - i. Ensure end of kill cable doesn't interfere with lever movement
24. Replace battery negative cable
25. Replace hood lift
26. Replace the FEL side brackets
- a. A bead of set-up RTV around the clutch inspection area will help seal the bell housing from dust
    - i. Do not apply wet gasket sealer at time of installation, as the brackets need to drop for removal, and if "glued in place" with gasket sealer, will make it difficult for removal later; if you want to seal the area, do it a day before reassembly, and flatten it with a putty knife or saran wrap so that it dries in a flat area and won't catch on the bracket when installing
  - b. Lift into place and hang on FEL arm while inserting bolts
  - c. DO NOT fully tighten bolts
27. Install the bottom bracket that support the FEL side brackets
- a. DO NOT fully tighten any of the bolts until ALL the bolts are in place, as the bolt alignment is tight
  - b. Tighten all bolts, including FEL bracket bolts
28. Final inspection

- a. Double check all bolts tightened and everything back to normal
- b. Cable-tie hoses and wire bundles as necessary, using some type of sleeve at any rub points
- c. Check hydraulic fluid level from any losses

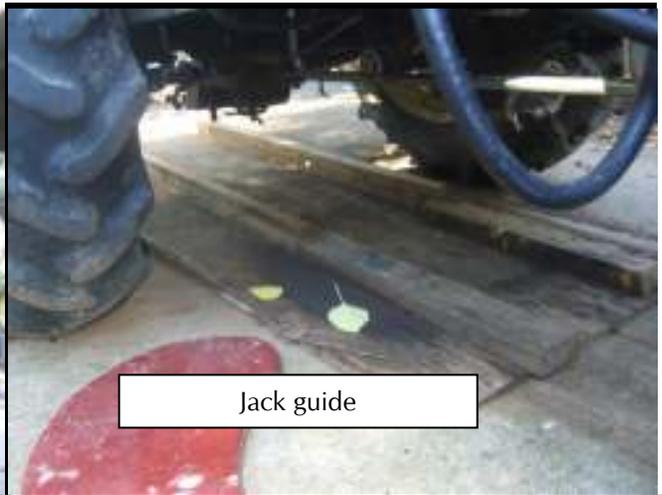
30Nov16 Jim E. Schlaegel Simply Manna Mushroom Farm, Sacramento, CA [qualsite@gmail.com](mailto:qualsite@gmail.com)

Photos

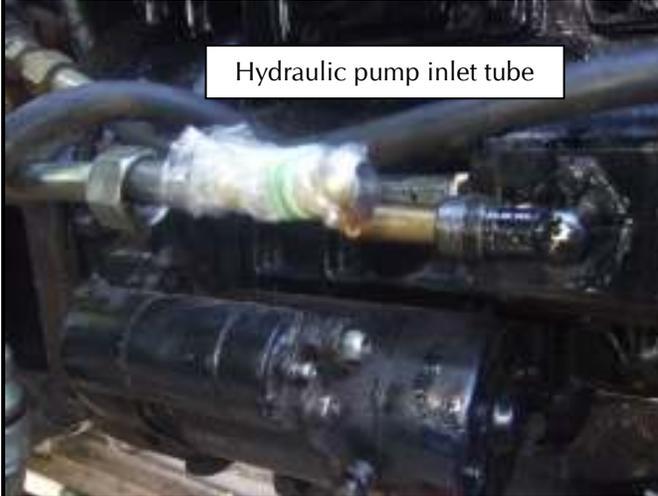




Jack on rear 4WD shaft box



Jack guide



Hydraulic pump inlet tube



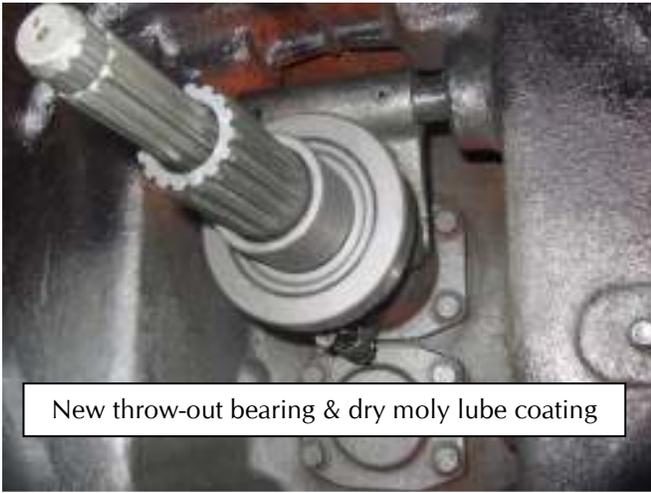
Front tractor blocking support



Clutch – as found



Throw-out bearing “as found”



New throw-out bearing & dry moly lube coating



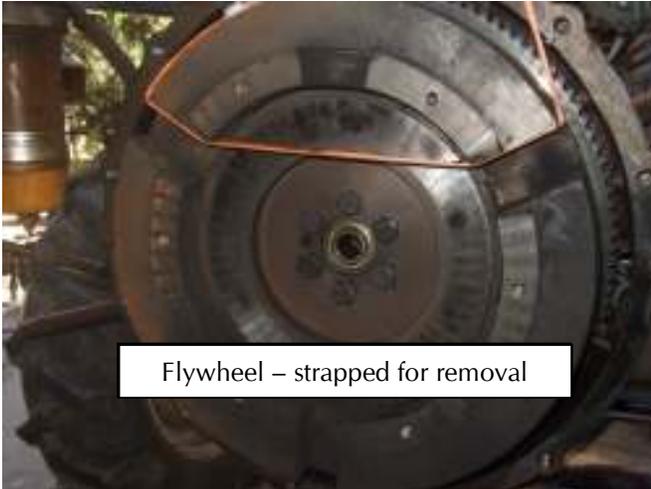
Clutch pack "as found"



Cracked pressure plate "as found"



Slipped spring washer



Flywheel – strapped for removal



Spring washer in proper position



PTO adjustment nut, spring, and jam nut



Spring washer



Slipped spring washer