

INSTALLATION OF R-450 HYDRAULIC KIT FOR PTO APPLICATIONS
1999-PRESENT FORD F-450/F-550 ALL MODELS
2008-PRESENT RAM 4500/5550 CHASSIS CAB

INSTALLATION SAFETY PRECAUTIONS

If any installation problems are encountered, please call G&B Specialties, Inc. for technical assistance before continuing with the installation process.



- Failure to heed to any of the following warnings could result in severe bodily injury and/or equipment damage.
- Read and understand this manual completely before attempting installation or operation of the equipment.
- Installation/Operation instructions provided below only address the Rafna railgear equipment. Applicable railway company procedures and policies must be adhered to.
- Before performing any work under the vehicle or railgear, ensure the engine is turned off and the parking brake is set.
- When routing hydraulic hoses, ensure that the hoses do not contact any sharp edges or hot surfaces.
- When routing electrical wires, ensure that the wires do not contact any sharp edges or hot surfaces.
- All wire connections are to be soldered and heat shrink sealed to prevent future corrosion related problems.
- All wires must be covered with protective cable loom.
- Railway company rules governing rail travel must always be observed.
- Ensure all body parts and loose clothing are clear of any moving parts of the railgear. Be aware of all pinch points.
- Note that if the railgear is part way retracted or extended, opening the manifold directional valve manual over-rides may cause the railgear to drop suddenly causing personal injury. Ensure all body parts are clear of the railgear if it should suddenly drop.
- When operating the railgear using the emergency hand pump, ensure that the correct manual valve over-ride is open for the desired railgear (front or rear) and desired direction of operation (raise or lower).

- Do not use the emergency hand pump to raise and lower the railgear on a routine basis. If the hydraulic pump or manifold should fail, have it repaired as soon as possible.
- If the emergency hand pump has been used to raise or lower the railgear, ensure the manifold directional valve manual over-rides are in the closed and locked position before starting road or rail travel.
- Ensure the hydraulic pump has been de-energized before starting road or rail travel.

INSTALLATION OF HYDRAULIC KIT FOR PTO APPLICATIONS

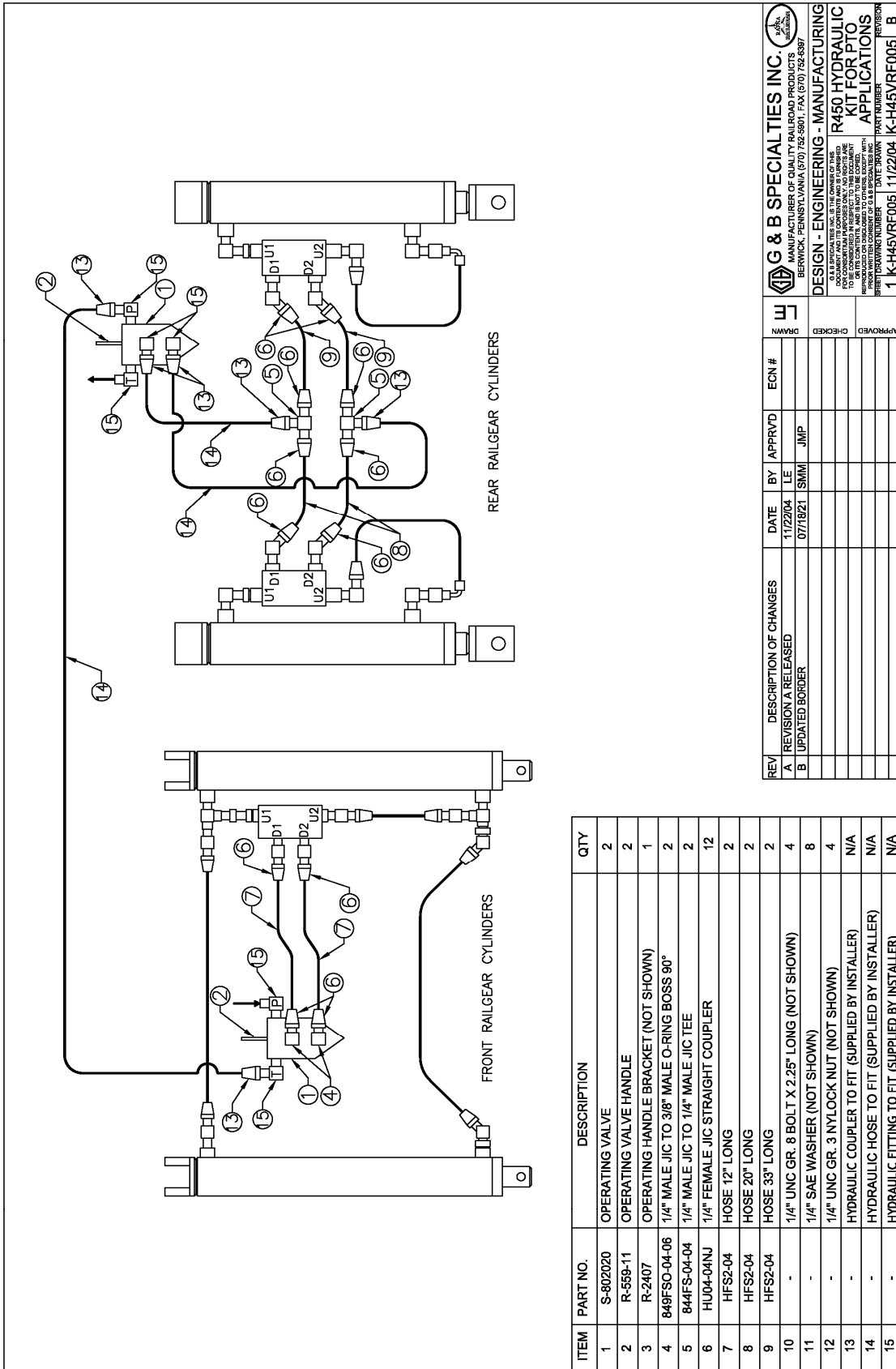
The following procedure details the installation of the hydraulic kit. The hardware required for this installation is listed in Table 1.

Table 1: R-450 Hydraulic Kit for PTO (K-H45VRF005)

Part Number	Description	Qty
S-802020	Operating Valve	2
R-559-11	Operating Valve Handle	2
R-1013	Operating Valve Mounting Plate	2
R-2407	Operating Valve Bracket	1
R-32230	Hydraulic Fitting, 1/4 Male JIC x 1/2 Male ORB	4
R-32231	Hydraulic Fitting, 1/4 JIC Male x 1/4 JIC Female Swivel 90°	4
H-990KIT-003	1/4" Male JIC to 3/8" Male O-Ring Boss 90° (Pre-Installed in Front Operating Valve, Only)	2
	1/4" Male JIC to 1/4" Male JIC Tee	2
	Hydraulic Hose with Fittings, 12" Long	2
	Hydraulic Hose with Fittings, 20" Long	2
	Hydraulic Hose with Fittings, 33" Long	2
R-990KIT-027	1/4" UNC Gr. 8 Bolt x 2 1/4" Long	4
	1/4" SAE Washer	8
	1/4" UNC Nylock Nut	4
Not Supplied	Hydraulic Hoses, Couplers and Fittings	As Req'd

1. The vehicle's PTO pump should be selected to supply 3-5 gallons per minutes (GPM) of oil at 2000 PSI at the front and rear railgear operating valves. A main relief valve should be installed just after the PTO pump to protect it. For vehicles operating more than just the railgear from the PTO pump, the railgear's hydraulic system should be on a separate circuit dedicated to the railgear. A relief valve should be installed on the railgear hydraulic circuit.
2. The front railgear operating valve is supplied with two 90° fittings installed in the work ports and the rear operating valve is supplied without fittings. Fasten the front railgear operating valve to the mounting holes provided on the railgear upper cross frame using two 1/4" x 2 1/4" long bolts, four 1/4" washers and two 1/4" nuts. Torque the 1/4" fasteners to 12 ft-lbs dry. Do not over torque.
3. Choose a suitable location on the vehicle to mount the rear railgear operating valve using the supplied weld-on operating valve bracket (R-2407). Ensure that there will be sufficient room for the operator to stand safely out of the way of moving parts. The operating valve should be installed near the rear railgear within reach of the railgear lock cable handle. Weld the operating valve bracket in place.
4. Fasten the operating valve to the operating valve bracket using two 1/4" x 2 1/4" long bolts, four 1/4" washers and two 1/4" nuts. Torque the 1/4" fasteners to 12 ft-lbs dry. Do not over torque.
5. Connect one 12" long hose between the upper work port of the front railgear operating valve and the 'D1' port of the front railgear double P.O. check valve.

6. Connect one 12” long hose between the lower work port of the front railgear operating valve and the ‘D2’ port of the front railgear double P.O. check valve.
7. Connect one 33” long hose to the ‘D1’ port of the rear railgear right-hand side single P.O. check valve.
8. Connect one 33” long hose to the ‘D2’ port of the rear railgear right-hand side single P.O. check valve.
9. Connect a 1/4” male JIC to 1/4” male JIC tee fitting to the end of each of the 33” long hoses.
10. Connect one 20” long hose between the ‘D1’ port of the rear railgear left-hand side single P.O. check valve and the tee fitting on the 33” long hose connected to the ‘D1’ port of the rear railgear right-hand side single P.O. check valve.
11. Connect one 20” long hose between the ‘D2’ port of the rear railgear left-hand side single P.O. check valve and the tee fitting on the 33” long hose connected to the ‘D2’ port of the rear railgear right-hand side single P.O. check valve.
12. Install appropriate fittings in the upper and lower work ports of the rear railgear operating valve, as shown below.
13. Fabricate and connect an appropriate hydraulic hose to reach from the tee fitting located between the ‘D1’ ports of the rear railgear check valves to the upper work port of the rear railgear operating valve.
14. Fabricate and connect an appropriate hydraulic hose to reach from the tee fitting located between the ‘D2’ ports of the rear railgear check valves to the lower work port of the rear railgear operating valve.
15. Install appropriate fittings in the ‘P’ (pressure) and ‘T’ (tank) ports of the front and rear railgear operating valves.
16. Fabricate and connect an appropriate hydraulic hose to reach from the railgear hydraulic system pressure line to the front railgear operating valve ‘P’ port.
17. Fabricate and connect an appropriate hydraulic hose to reach from the front railgear operating valve ‘T’ port to the rear railgear operating valve ‘P’ port.
18. Fabricate and connect an appropriate hydraulic hose to reach from the rear railgear operating valve ‘T’ port to the vehicle’s hydraulic return line.
19. Ensure that none of the hoses contact any sharp edges or hot surfaces. Secure these hoses in place with tie-wraps. Ensure that there is enough slack in the hoses for the railgear to function.
20. Adjust the operating valve relief valve pressure as per the procedure in the Operation, Service and Parts section of this manual. **Test the operation of the controls. Refer to the operation procedure in the Railgear Kit and Hydraulic Kit Operation, Service and Parts manuals.**



OPERATION OF R-450 HYDRAULIC KIT FOR PTO APPLICATIONS
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OPERATION SAFETY PRECAUTIONS

If any operating, service or parts problems are encountered, please call G&B Specialties, Inc. for technical assistance.



- Failure to heed to any of the following warnings could result in severe bodily injury and/or equipment damage.
- Read and understand this manual completely before attempting operation of the railgear equipped vehicle.
- Operating instructions provided below only address the Rafna railgear equipment. Applicable railway company procedures and policies must be adhered to.
- Railway Company rules governing rail travel must be observed at all times.
- Before performing any work under the vehicle or railgear, ensure the engine is turned off and the parking brake is set.
- Ensure all body parts and loose clothing are clear of any moving parts of the railgear. Be aware of all pinch points.
- Note that if the railgear is part way retracted or extended, opening the manifold directional valve manual over-rides may cause the railgear to drop suddenly causing personal injury. Ensure all body parts are clear of the railgear if it should suddenly drop.
- When operating the railgear using the emergency hand pump, ensure that the correct manual valve over-ride is open for the desired railgear (front or rear) and desired direction of operation (raise or lower).
- Do not use the emergency hand pump to raise and lower the railgear on a routine basis. If the hydraulic pump or manifold should fail, have it repaired as soon as possible.
- If the emergency hand pump has been used to raise or lower the railgear, ensure the manifold directional valve manual over-rides are in the closed and locked position before starting road or rail travel.
- Ensure the hydraulic pump has been de-energized before starting road or rail travel.

OPERATION OF HYDRAULIC KIT (PTO)

With the hydraulic kit installed on this vehicle, it may be operated as normal.

Never operate the vehicle if the Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rating Front or Rear (GAWR), or the wheel or tire load ratings are exceeded.

Refer to the Railgear Kit Operation, Service and Parts manual for information on the mechanical operation, service, and parts of the railgear.

Location and Operation of the Railgear Hydraulic System Controls:

1. The PTO must be engaged following the manufacturer's instructions. The railgear should not move until the operating valve is actuated.
2. Each railgear is equipped with an operating valve. The direction of motion (up or down) of the railgear is selected by actuating the operating valve handle. The railgear should move only in the selected direction.
3. To stop the movement of the railgear, bring the handle on the respective railgear operating valve to the center position.
4. Disengage the PTO following the manufacturer's instructions.

SERVICE OF HYDRAULIC KIT

The hydraulic kit must be serviced regularly to avoid damage to the equipment. Table 1 provides the Recommended Service Schedule and table 2 provides Standard Fastener Torque Values.

The recommended oil for the railgear hydraulic system is **DEXRON III** or equivalent. In extremely cold weather areas/seasons, **ESSO Unavis J13** or equivalent may be used.

Table 1: Recommended Service Schedule

Service Required	Initial 100 km (62 Miles) of road and/or rail use	Daily	Weekly	Monthly
Inspect hydraulic kit fasteners (re-torque if required)		✓	✓	✓
Inspect all hydraulic fittings and hoses for leaks and wear		✓	✓	✓
Check oil in hydraulic reservoir (fill with railgear raised if req'd)				✓
Check emergency hand pump and manifold over-ride operation				✓

Table 2: Standard Fastener Torque Values

Fastener Size	Fastener Torque Value (ft-lbs) Dry
1" UNC Gr. 8 Fasteners	250
¾" UNC Gr. 8 Fasteners	175
⅝" UNC Gr. 8 Fasteners	150
½" UNC Gr. 8 Fasteners	100
⅜" UNC Gr. 8 Fasteners	40
¼" UNC Gr. 8 Fasteners	12

HYDRAULIC SYSTEM RELIEF VALVE SETTING

The following procedure details how to adjust the railgear pressure relief valve settings. One relief valve is located on each operating valve and there may be one or more additional relief valves in the railgear hydraulic system. An adjustment of the relief valve settings should be carried out at installation and/or if ever there appears to be inadequate hydraulic pressure to operate the railgear.

1. Locate the hydraulic hose that connects the front railgear operating valve to the railgear hydraulic system pressure line. Release the pressure in the railgear hydraulic system and disconnect this hose from the front railgear operating valve.
2. Install a combination test gauge (up to 3000 PSI) and shutoff valve between the disconnected hydraulic hose and the front operating valve. The pressure gauge will indicate the relief valve setting, while the shutoff valve will enable a false load to be put on the hydraulic pump. Ensure that the shutoff valve is installed between the test gauge and front operating valve.
3. Engage the PTO.
4. Close the shutoff valve to enable the railgear hydraulic system relief valve to start releasing pressure. The pressure reading on the test gauge should indicate 2000 PSI. If this reading is incorrect, adjust the railgear hydraulic system relief valve accordingly.
5. Once the correct pressure on the railgear hydraulic system relief valve is obtained, open the shutoff valve.
6. Proceed to adjust each operating valve relief valve setting as follows:
 - a) Have an assistant watch the test gauge pressure reading while adjusting the relief valve settings.
 - b) Ensure the shutoff valve has been completely opened.
 - c) With the railgear fully raised in road position, select “UP” on the operating valve. Hold in this position until the hydraulic oil passes over the relief valve and a reading is taken on the test gauge.
 - d) The pressure should be 1800 PSI on the front and rear operating valves. Adjust the relief valve setting accordingly.
 - e) Proceed to adjust the second operating valve relief valve setting.
7. Release the pressure in the railgear hydraulic system and remove the test gauge and shutoff valve.
8. Reconnect and tighten all hydraulic hoses.

PARTS OF HYDRAULIC KIT FOR PTO APPLICATIONS
