Parts & Service Manual
Excavator Railgear

April 2018

SERIAL NUMBER (FRONT) ________________________________

SERIAL NUMBER (REAR) ________________________________

NOTE:
Please refer to the serial numbers when ordering parts or inquiring about warranty items.
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ENGAGING THE RAIL (w/TRUCK HYDRAULICS)

GETTING ON THE RAIL

Lower rear guide-wheels first:
- At the track crossing, drive past the track, then back the vehicle onto the rails.
- Engage the truck’s parking brake to prevent the truck from rolling.
- If the railgear has brakes, turn brake switch on.
- Engage the PTO or 12Volt electrical hydraulic pump.
- **Remove the safety pin-off pins (one each side).**
- Push / Pull valve handle to lower wheels to engage rail.
- When both wheels are fully down and properly engaging rail, replace safety pin-off pins.

Lower front guide-wheels:
- If necessary drive the truck into position to line up the front guide-wheels with the rail.
- Engage the PTO or 12Volt electrical hydraulic pump.
- **Remove the safety pin-off pins (one each side)** and stow in provided storage tubes.
- Check and make sure that the front guide-wheels line up with the rail, then engage wheels.
- **NOTE:** The front guide-wheel assembly is an over-center design and does not require safety pin-off pins engaged in the rail mode.

On the tracks:
- Do not exceed 30 MPH while on the track. All railroad speed rules should be observed.
- Be aware that some high rail gear is insulated, and will not operate the crossing gate circuits.
- Reduce speed at all crossings, curves, branch lines, switches and frogs.
- Traction is reduced on the track. Tire damage may result from spinning wheels on track.
- Braking distance is increased on the track. Do not slide tires or guide-wheels on the tracks.
- **Do not exceed the maximum rated capacity of the equipment.**
- On newer trucks with Anti-Lock braking systems, the amber ‘ABS’ dash light may remain on with the front wheels elevated. This will not effect rear truck braking or rail wheel braking.

GETTING OFF THE RAIL:

Removing truck from track:
- Engage the PTO and the truck parking brakes.
- Leave the truck running and the transmission in neutral gear.
- Lift both sets of railgear (there is no preference for removal order).
- **Engage the safety pin-off pins in highway position.**
- Disengage the switch that controls the railgear brakes (if applicable).
- Disengage the PTO before moving the truck.
- If the amber ‘ABS’ dash light remains on during rail operation, the truck engine must be turned off and restarted after returning to highway operation. This will clear the ‘ABS’ after a few seconds. If the amber light remains on during road operation, the truck's brake system may have an active fault and should be checked out. Please refer to the truck’s operation manual.
ENGAGING THE RAIL (w/MONARCH POWER UNIT)

GETTING ON THE RAIL

Lower rear guide-wheels first:
- At the track crossing, drive past the track, then back the vehicle onto the rails.
- Engage the parking brake to prevent the truck from rolling.
- Connect the electrical power for the rail gear hydraulic system. (The pump and electrical connector are located in the passenger side tool box on the lower half of the excavator.)
- Remove the safety pin-off pins (one each side). Note: In order to remove the pins, you may have to take the weight off the pins by slightly raising the rail gear (push button and pull valve handle briefly).
- Push the electrical button near the control valve to run the hydraulic pump while pushing the valve handle to lower the gear to engage rail.
- When both wheels are fully down and properly engaging rail, replace safety pin-off pins.

Lower front guide-wheels:
- If necessary drive the truck into position to line up the front guide-wheels with the rail.
- Remove the safety pin-off pins (one each side). Note: In order to remove the pins, you may have to take the weight off the pins by slightly raising the rail gear (push button and pull valve handle briefly).
- Push the electrical button near the control valve to run the hydraulic pump while pushing the valve handle to lower the gear to engage rail.
- Check and make sure that the front guide-wheels line up with the rail, then engage wheels.
- When both wheels are fully down and properly engaging rail, replace safety pin-off pins.
- Disconnect the electrical connection for the rail gear hydraulic pump and stow in the tool box.

On the tracks:
- Do not exceed 30 MPH while on the track. All railroad speed rules should be observed.
- Be aware that some high rail gear is insulated, and will not operate the crossing gate circuits.
- Reduce speed at all crossings, curves, branch lines, switches and frogs.
- Traction is reduced on the track. Tire damage may result from spinning wheels on track.
- Braking distance is increased on the track. Do not slide tires or guide-wheels on the tracks.
- Do not exceed the maximum rated capacity of the equipment.
- On newer trucks with Anti-Lock braking systems, the amber ‘ABS’ dash light may remain on with the front wheels elevated. This will not effect rear truck braking or rail wheel braking.

GETTING OFF THE RAIL:

Removing truck from track:
- Engage the truck parking brakes.
- Connect the electrical power for the rail gear hydraulic system.
- Remove the safety pin-offs from the “on rail” position.
- Lift both sets of railgear (there is no preference for removal order).
- Engage the safety pin-off pins in highway position.
- Disengage the switch that controls the railgear brakes (if applicable).
- Disconnect the electrical power for the rail gear hydraulic system.
- If the amber ‘ABS’ dash light remains on during rail operation, the truck engine must be turned off and restarted after returning to highway operation. This will clear the ‘ABS’ after a few seconds. If the amber light remains on during road operation, the truck’s brake system may have an active fault and should be checked out. Please refer to the truck’s operation manual.
ROUTINE MAINTENANCE

INSPECTION AND MAINTENANCE

Daily:

• Visually inspect for hydraulic fluid leaks.
• Check and make sure that all threaded fasteners are secured. **NOTE:** all hex nuts are either nylon insert or slotted hex nuts with cotter pins.
• Check and make sure all tie straps that secure hoses from moving parts and exhaust systems are in place. Replace if cracked or worn.
• Inspect wheel flanges for excessive wear, primarily noting difference in wear between wheels on the same axle or diagonally. If abnormal pattern is noted, check railgear alignment (see alignment procedure).

Weekly:

• Grease and lubricate all grease fittings on front and rear railgear and guidewheel assemblies. **NOTE:** there are six (6) locations on front assemblies and fourteen (14) locations on rear assemblies.
• Check level of hydraulic oil and all other fluids.
• Check air pressure in tires and inflate to proper inflation pressure (if necessary).

Bi-annually:

• Remove the hubcaps from the railwheels and inspect for deterioration or loss of wheel bearing grease. Unless there is a problem, the cavity may be topped off with the recommended grease without removing and/or re-packing the bearings.
• Clean the hubcap and mating surfaces and apply a bead of silicone gasket and re-attach securely.
• Clean the strainer / filter in the hydraulic power unit tank.
• Inspect wheel flanges for excessive wear. If abnormal pattern is noted, check railgear alignment (see alignment procedure).
• Rail test for proper traction and braking. If abnormal, adjust properly (see traction procedure).

LUBRICATION SPECIFICATION

Wheel bearings / Grease Fittings:

• **Factory Standard:** Citgo Syndurance Premium Synthetic 460 #2
• **Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)

**Hydraulic oil:** Unax RX-46 hydraulic oil (or equal)
INSTALLATION of FRICTION DRIVE GUIDEWHEELS

APPLICATION: (Genie S-65 Manlift – ie.)

Pre-Installation:
- Review all supplied information before proceeding with the installation.
- Refer to the DMF RW1630 Installation Manual or call Diversified Metal Fabricators (404/875-1512) with any questions or concerns.

Carrier Modifications:
- Check that all tires are inflated to the manufacturer’s recommended pressure.
- Install the tire wheel spacers, if needed or required.

Installing The Guidewheel Assemblies:
- On a firm level surface, check that the bottom of the Genie S-65 carrier frame has 15” Ground Clearance.
- Refer to main assembly Drawing 83300. The guidewheel assembly that has the articulation pin in the center of the guidewheel axle (assy. 83350) is to be mounted on the steering end of the carrier. The guidewheel assembly without articulation (assy. 83310) is to be mounted on the non-steering end of the carrier.
- Refer to Drawing 83300. The vertical mounting plate for each guidewheel assembly is designed to mount to the end of the carrier frame, between the towing lugs. The bottom edge of each vertical mounting plate is designed to mount even with the bottom edge of the frame and at 15” Ground Clearance. The railgear must be mounted with the bottom edge of the vertical mounting plate at 15” off the ground. Cutouts have been provided in the vertical mounting plates to clear the pinheads on each end of the frame for carrier articulation and lockout cylinder pins. Check that these pinheads are centered in the provided cutouts.
- Each guidewheel unit may be mounted to the end of the carrier frame by either bolting-on or welding-on. Each vertical plate has ten (10) 11/16” dia. holes drilled in it. These holes may be used for plug welding (using E-7018 stick) or match drilled for 5/8” dia. Grade 8 hex head cap screws (bolts). You may gain access to the majority of the holes by removing the upper cylinder mounting pins and swinging the cylinders down out of the way (Refer to Drawings 83310 and 83350).

Hydraulic Connection:
- Connect the hydraulics per Drawing 83380. The axle “limit” valves are to be mounted to the angles (drawing 83384) and located so that the valves are “tripped” when the axles are in the rail position. Mount one limit valve on each assembly and plumb in series per the drawing. One possible location for the limit valves is above the stop adjustment angle near the main pivot. This is roughly the area indicated by items 3 and 4 on Drawings 83310 and 83350.
- The majority of the hydraulic schematic concerns the interlock feature. This feature prevents the upper manifold functions from operating if the guidewheels are in the rail position. This is accomplished by “dumping” hydraulic pressure on the upper function manifold by opening a solenoid bypass valve plumbed between the pressure and tank ports of the upper manifold. None of the lower carrier functions are affected; but, the operator will not be able to swing, extend or raise the platform until the carrier tires are set on the ground.
- Hydraulic pressure for raising and lowering the guidewheels is to be manually diverted from the carrier lower function manifold and each guidewheel axle moved into position using the manual directional valve located at each end of the vehicle.
INSTALLATION of FRICTION DRIVE GUIDEWHEELS
(Continued)

Tire Pressure Adjustment and Alignment of the Guidewheels:
• Once the guidewheels are under hydraulic power and attached to the carrier the travel stops may be
adjusted. With the guidewheels in the highway position, measure the tire deflection. Tire deflection is
the difference between the unloaded tire radius and the loaded tire radius.
• This is how far we want the friction hubs to press into the tire when the guidewheels are in the rail
position. On Drawings 83310 and 83350, items 3 and 4 are the stop adjusting bolts. The adjusting
bolt head will contact the brace plate on each pivot arm and prevent further rotation of the axle
assembly. Loosen the jamb nut and screw the bolt in or out to set the desired amount of carrier tire
deflection when the guidewheels rotate into the rail position. When this adjustment has been made,
re-secure the jamb nut. Although our “target” is to deflect the carrier tire by the original deflection
amount, what we want to achieve may require less deflection than that. Ultimately, the goal is to
propel the vehicle down the rail without the tire slipping on the drive hub (this requirement is for
Propulsion and Braking).
• This adjustment will also be used to accommodate tire wear (to some degree).
• The adjustment bolts will also be used to align the guidewheel equipment. The adjustment bolts can
be used to crank one wheel in or out to achieve these dimensions:
  ▪ Measuring down each side of the machine (the distance from one railwheel to the opposite-
end railwheel) the left-side dimension should be within 1/8” of the right-side dimension.
  ▪ Measuring diagonally (i.e. Right front to Left rear), the dimensions should be within ¼” of
each other.

Final Points:
• Paint equipment as required.
• Install operating legends and warning plaques.
• Check that all fasteners are secure.
• Check that all hoses and wires are secured, clear of moving components, and have slack where
required.
• Rail test the vehicle to be certain that it is:
  • Tracking straight and not “flanging”
  • Has proper tire to drive hub contact pressure to generate braking force.
  • Properly interlocked to disable operator functions other than travel when in the rail mode.

Friction Drive Railwheel Operation:
• CAUTION: Read and understand operator’s manual before use.
• CAUTION: Keep hands and feet clear of moving parts.

Engaging Railwheels:
• Align vehicle parallel with rails and straighten tires.
• Shift Diverter Valve to “Railwheels”.
• Remove manual Pin/Off Pins from upper holes.
• Operate Railwheel Cylinders at Valves. Actuate front and rear Railwheels “IN” until fully extended.
• Replace manual Pin/Off Pins in lower holes.
• Safe operating speeds on track are governed by conditions and work equipment rules. Maximum
speeds of this equipment is twenty miles per hour.
• Tire pressure should be maintained at the tire manufacturer’s recommended levels.
• Shift Transmission into reverse to go forward.
• Use throttle and brake pedals to control vehicle speed in the normal manner.
  NOTE: All upper functions are disabled by interlock when Railwheels are in the “Rail” position.
• Tires must be on the ground to work machine.

Retracting Railwheels:
• Reverse sequence of operation foe engaging Railwheels shown above.
**ALIGNMENT PROCEDURE**

A) STEPS 1) and 2) must be completed in listed order and are assumed to be within specifications and should only be addressed, if after alignment of the railgear, excessive flanging occurs.

1) Frame should be square, to within 1/8" maximum, on the diagonal.

2) Rear drive axle should be square to frame within 1-1/8" maximum on the diagonal to achieve 0° thrust angle. This should be checked by a qualified alignment shop.

B) The following procedure applies to shop or field inspection.

1) Check air pressure in all tires. Tires should be inflated to the minimum rating of the wheel or tire.

2) Place vehicle on straight and level track, or 3" channel to simulate rail. Lower the railgear to the rail so that it is parallel to the rail and diagonal measurements can be made. (Note: these measurements can be made from any convenient location, as long as it stays consistent from side to side.)

3) If diagonal measurement is out of tolerance, adjustment of the railgear must be made. The procedure for this is as follows (for D-1 & D-2 only):

   - Place shim material between the stop block on the pivot arm (see dwg below) & where it comes into contact with the long arm. The location for the shim is most accessible from behind the front Railgear axle (example: shim on left side, it will push left axle forward). Once proper shimming has been obtained, weld the shim into place on the pivot arm. Max. allowable 1/4" - Contact DMF if outside the maximum range.

**RAIL WHEEL LOAD ADJUSTMENT PROCEDURE**

Tire traction varies w/l every truck based on several factors such as weight & tire design. It can also vary on the same truck as equipment is added or deleted.

Thus, we recommend performing the traction adjustments after all equipment is installed or removed.

Since every truck differs, there is no exact procedure. However, we have found the following two methods to be a good guide. The true test is how the vehicle performs on rail.

**METHOD #1**

Note: Method #1 is a visual procedure of the tire capping on rail.

1) Grind off the welds on the (2) four hole mounting plates at the rear mounting bracket.

2) Loosen the (8) rear bracket mounting bolts.

3) Lower the railgear supporting the railgear with a floor jack or with the unit itself.

4) Remove or add spacer shim material located between the bottom of the truck frame and the shelf on the rear mounting bracket. Add shim to decrease traction and remove shim to increase traction (ref. side dwg. for illustration of proper tire capping).

5) Raise Railgear once again to contact the bottom of the truck frame.

6) Re-tighten the rear mounting bracket bolts to 154 ftlbs. torque and re-weld the mounting plates, and shims to the bracket (per rear install detail in section 5.1). If multiple spacers are used, remember to weld spacers to one another.

**METHOD #2**

Note: Method #2 distributes the vehicles rear axle(s) weight(s) equally over all rear axles, including the Railgear.

1) If truck scales are available, weigh the vehicle's rear axle (if tandem, weigh both)

2) With front and rear Railgear in the rail position, add or remove shims until rear Railgear axle weight is distributed equally between rear truck axle & Railgear. If truck has tandem axle, the weight should be equally distributed over all 3 axles (tandem & railgear axle - 1/3, 1/3, 1/3).

3) Once weight is equally distributed, then raise Railgear to the highway position.

4) Re-tighten the rear mounting bracket bolts to 154 ftlbs. torque and re-weld the mounting plates, and shims to the bracket (per rear install detail in section 5.1). If have multiple spacers, remember to weld spacers to one another.
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<td>1</td>
<td>RV-1630 WHEEL &amp; AXLE REAR ASSEMBLY</td>
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<td>82623</td>
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<td>LOWER CYLINDER HOSE ASSEMBLY</td>
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<td></td>
<td>SET SCREW</td>
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<td>810730</td>
<td>1</td>
<td>SWITCH, PUSH BUTTON (SWITCH-3)</td>
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<td>VALVE ASSEMBLY (G recession SP-4-HP)</td>
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<td>CYLINDER ROD PIN, REAR</td>
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**Diagram Notes:**

- Rail Position
- Highway Position

**Drawing Details:**

- Title: DAЕWOO WHEEL AND AXLE REAR ASSY.
- RV-1630 ASSEMBLY
- Drawn By: [Signature]
- Appd By: [Signature]
- Date: 08/12/02
- Drawing Number: EX01239
- Revision: [Blank]

**Diagram Elements:**

- Excavator label
- Various numbered parts with associated notes
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<td>LOCK WASHER (L/W 3/8'')</td>
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<td>83315</td>
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<td>PIVOT ARM WELDMENT (NON-ARTICULATING)</td>
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**Diagram Description**

- Item 1: Main Weldment
- Item 2: Friction Drive Axle Assy, Non-Articulating
- Item 3: Hex Head Cap Screw (HHC3 1''-12 x 4'' ALL THD, Gr. B)
- Item 4: Hex Nut (HN 1''-12 Gr.B)
- Item 5: Lower Hose Assy
- Item 6: Upper Hose Assy
- Item 7: Upper Pin Assy
- Item 8: Pivot Pin Assy
- Item 9: Slotted Hex Nut (Slhn 1'-0'')
STANDARD RAIL WHEELS

ALL WHEELS INCLUDE BEARING RACES INSTALLED.
INSULATED WHEELS INCLUDE INSULATOR AND BEARING RACES INSTALLED
BEARINGS, NUTS, WASHERS & ALL OTHER HARDWARE ARE EXTRA.

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<td>(REF.)</td>
<td>CASTING For 1630 WHEEL w/INTERNAL ELECTRIC BRAKES</td>
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<td>B00049</td>
<td>(REF.)</td>
<td>CASTING For 1630 WHEEL w/EXTERNAL AIR BRAKES</td>
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<td>B20491</td>
<td>(REF.)</td>
<td>CASTING For 1630 (2) PIECE WHEEL FLANGE</td>
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<td>(REF.)</td>
<td>CASTING For 1630 (2) PIECE WHEEL HUB</td>
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Excavator Page #15
NOTE:
DMF P/N 240425 - SEAL KIT
(SEAL KIT INCLUDES ITEM #s 4,5,6,7,8 & 9)
NOTE:
DMF P/N 240355 - SEAL KIT
(SEAL KIT INCLUDES ITEM #’s 4,5,6,7,8 & 9)

ITEM | PART NO. | QTY | DESCRIPTION
--- | --- | --- | ---
1 | 240301 | 1 | PISTON; 3-1/2"
2 | 240302 | 1 | GLAND; 3-1/2"
3 | 240103 | 1 | NUT, NUTLOCK; 1"-14
4 | 240304 | 2 | SEAL, PISTON; 3120-2875
5 | 240105 | 1 | SEAL, ROD; 3730-2000
6 | 240106 | 1 | WIPER, ROD; 959-21
7 | 240107 | 1 | D-RING, PISTON; 2-EL4
8 | 240208 | 1 | D-RING, GLAND; 2-338
9 | 240209 | 1 | D-RING, GLAND BACK-UP; 8-338
10 | 240360 | 1 | BARREL ASSEMBLY; 3-1/2"
11 | 240370 | 1 | ROD ASSEMBLY; 2"
12 | 240123 | 1 | GREASE FITTING 1/8" NPT

17-3/4" (CLOSED)
25-3/4" (OPEN)
NOTE:
DMF P/N 240355 - SEAL KIT
(SEAL KIT INCLUDES ITEM #'s 4,5,6,7,8 & 9)
EXISTING STEERING CIRCUIT

EXTRACTED TEXT:

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<th>ITEM</th>
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<td>HYD. HOSES, REAR LOWER 29° (qty.2) (#04 w/#04 JIC SWIVEL)</td>
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NOTES:
PRESSURE AND RETURN LINE 1/2" (-08) SAE 100 R1 HYDRAULIC HOSE w/08 JIC FEMALE SWIVEL ON EACH END.

CYLINDER BLIND END
CYLINDER ROD END
FROM FRONT VALVE (INLET)
TO HYD. TANK

REV DATE DESCRIPTION BY APP

GRADALL G3WD HYDRAULIC SCHEMATIC

DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512

DRAWN BY: TSH APPD BY: 
DATE: 12/14/98 DRAWING NUMBER: EX1662
1  M326  1  MONARCH M326 W/ 08110 24V MOTOR
2  082900  1  HYDRAULIC TANK ASSEMBLY
3  ITEM  1  FILTER, SUCTION (VICKERS DFSS-10-P-25M-10)
4  5  810202  1  VALVE, FRONT CONTROL (GRENEN SP-4-HP)
6  8240400  1  HYDRAULIC CYLINDER ASSY., FRONT PASSENGER'S SIDE
7  8240415  1  HYDRAULIC CYLINDER ASSY., FRONT DRIVER'S SIDE
8  8240250  2  HYDRAULIC CYLINDER ASSY., REAR
9  810222  1  VALVE, REAR CONTROL (GRENEN SP-4-HP)
10  810214  1  GRENEN VALVE REPLACEMENT HANDLE w/LINK KIT
11  810217  1  GRENEN VALVE REPLACEMENT HANDLE (ONLY)
12  810630  1  HYD. HOSES, FRONT 38' (qty.4) (#04 w/#04 JIC SWIVEL)
13  82617  1  HYD. HOSES, REAR UPPER 21' (qty.2) (#04 w/#04 JIC SWIVEL)
14  82629  1  HYD. HOSES, REAR LOWER 29' (qty.2) (#04 w/#04 JIC SWIVEL)

NOTES: PRESSURE AND RETURN LINE 1/2" (-08) SAE100R1 HYDRAULIC HOSE w/#08 JIC FEMALE SWIVEL ON EACH END.

CYLINDER BLIND END
CYLINDER ROD END

FROM FRONT VALVE (INLET)

TO HYD. TANK

REV DATE DESCRIPTION BY APP

DAEWOO EXCAVATOR HYDRAULIC SCHEMATIC

DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512

DRAWN BY: APPD BY: DATE: DRAWING NUMBER: REV:

SEW 08/14/02 EX1665 #
NOTES:
PRESSURE AND RETURN LINE 1/2" (-08) SAE100R1 HYDRAULIC HOSE w/08 JIC FEMALE SWIVEL ON EACH END.

TANK

FROM MONARCH POWER UNIT (INLET)

CYLINDER BLIND END

CYLINDER ROD END

TO HYD. TANK
GENIE FUNCTION PUMP

GENIE GENERATOR DIVERTER

TANK (UPPER TURRET)

PORT #9 (TOP)

PORT #9 (TOP ROW)

PORT #7 (SECOND ROW DOWN)

PORT #3 (THIRD ROW UP)

GENIE HYDRAULIC SWIVEL

130 PSI PRESSURE DROP

GENIE LEVELING VALVE (LOWER)

RAILWHEEL AXLE

1

5

2

3

4

18703

1

PILOT DIVERTER HYDRAFORCE (PDL2-40-10T-N-110)

0.2 GPM

GENIE FUNCTION MANIFOLD (UPPER TURRET)

18943

1

NEEDLE VALVE PARKER (F400S)

10208

1

MANUAL VALVE ENERGY (CV2001/2)

810232

1

MANUAL DIVERTER GRESCH (S-75)

83382

2

LIMIT VALVE DELTROL (PDV 30S)

83383

1

FLOW CONTROL (3/4")

TSH

REVISED FOR ALL HYD CIRCUIT

HYD-SEE GENIE MANUAL 34476

PAGE 6-16
### Table

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### NOTE #1

SEE PAGE # 28 FOR AIR BRAKE CONTROL SYSTEM ASSEMBLY

### NOTE #2
SEE PAGE # 27 FOR AIR BRAKE DETAILS
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NOTE: B19000 (REF.) RW-1650 REAR AIR BRAKE INSTALLATION KIT (COMPLETE)
INSPECTION AND MAINTENANCE OF D.M.F. GUIDE WHEEL SYSTEM

DAILY:
- Visually inspect rail gear for hydraulic leaks, loose fasteners, and excessive wear.
- Spin all four wheels noting any bearing noise or resistance.
- Check level of hydraulic oil.
- Compare left and right wheels for wear (particularly diagonal flanges).

WEEKLY:
- Grease all fittings on rail.
- Six (6) on front assembly.
- Fourteen (14) on rear assembly.
- Inspect the bearing grease every 2000 miles or 6 months (whichever comes first).
- Inspect bearings and grease cavity by removing hubcaps. Unless bearing problem is suspected, the bearings do not need to be removed or repacked. If repacking is required, the grease cavity should be only 80% filled with suitable grease. Replace hubcaps using a bead of form-A-gasket (or equal).

ANNUALLY:
- Change hydraulic filter element.

DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512 ATLANTA, GA 800114

OPERATION OF D.M.F. GUIDE WHEEL SYSTEM

TO PLACE VEHICLE ON RAIL:
1. Drive vehicle over crossing, centering it over tracks.
2. Drive centered over tracks, remove front and rear safety pins.
3. Lower rear wheels first.
   A. If rear is not completely centered within 90°, rear rail wheels will center truck on rail.
   B. With rear wheels fully extended and properly seated on rail, install safety pin into lower hole on both sides.
4. Center front rail wheels over rail.
   A. If front is not completely centered over rail, maneuver truck so that it is.
   B. Front vehicle must be straight ahead.
5. Lower front rail wheels until cylinders are fully retracted.
   A. Front rail wheels incorporate overcenter design and do not require safety pins in rail position.
   B. Double check all safety pins are in proper location.
   C. Double check steering wheel lock if equipped.

TO REMOVE VEHICLE FROM RAIL:
1. Drive vehicle over road crossing.
2. Either front or rear wheels may be activated first.
3. Front rail wheels.
   A. Retract front rail wheels completely.
   B. Once retracted, install safety pins.
4. Rear rail wheels.
   A. Remove safety pins.
   B. Fully retract rear safety pins.
   C. Re-install rear safety pins.

REPLACE SAFETY PINS IN PROPER LOCATION.

SAFETY INSTRUCTIONS:
- Lock front wheels straight ahead for on-rail travel.

RELIEF VALVE SETTINGS:
- 2000 psi on 1500 psi, front.
- DO NOT exceed: 2500 psi, front valve.
- DO NOT exceed: 2000 psi, rear valve.
- DO NOT bottom-out reliefs, if adjusted.

HI-RAIL VEHICLE COMPLETION BY: ______

WITH APPLICATION OF HI-RAIL AND FINISHED BODY, THIS VEHICLE HAS POUNDS OF AVAILABLE PAYLOAD.

DATE OF COMPLETION OF HI-RAIL EQUIPPED VEHICLE: ______

CAUTION: THIS AUTOMOBILE VEHICLE HAS SPECIAL DESIGN AND EQUIPMENT FEATURES FOR OFF-HIGHWAY USE. IT HANDLES DIFFERENTLY FROM AN ordinary passenger car under normal conditions which may occur on streets, highways, and off-roads.

RENTALS AND LOCATIONS OF AVAILABLE VEHICLES MAY ALSO AFFECT THE HANDLING OF THIS VEHICLE. DRIVING WITH CARE AND SAFE PRACTICES AT ALL TIMES.

FOR PRECAUTIONS, READ THE VEHICLE OWNER'S GUIDE AND HI-RAIL OPERATING SERVICES AND PARTS MANUAL.

DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512 ATLANTA, GA 800114

REV DATE DESCRIPTION APP

DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512

DRAWN BY: KLC

APP'D BY: EX1652A

DATE: 10/12/98

REV: #
Diversified Metal Fabricators (DMF) products are designed to provide the utmost service and reliability. Competent workman, guided by stringent quality standards, manufacture the products from high-grade material. DMF warrants products of its manufacturer to be free of defects in material and workmanship, under normal use and service, for a period of ONE CALENDAR YEAR. DMF’s obligation under this warranty is limited to repairing or replacing at its factory, or other location designated by us, any part or parts thereof which shall, within 30 DAYS of the date of failure or notice of defect, be returned, and which upon examination shall appear to DMF’s satisfaction to have been defective. Such repair or replacement does not include the cost of installing the new part or any other expenses incident thereto; however, the outbound direct ground freight on the part will be prepaid to locations within the continental United States and Canada. DMF shall not be liable for other loss, damage, or expense directly or indirectly arising from the use of its products.

Ordinary wear and tear, abuse, misuse, neglect, or alteration is not covered by this warranty. DMF assumes no liability for expenses or repairs made outside its factory except by written consent. Warranty is null and void if instructions and operating procedures specifically referring to warranty coverage are not followed.

Equipment or parts not manufactured by this company, but which are furnished in connection with DMF products are covered directly and solely by the warranty of the manufacturer supplying them.

This warranty is in lieu of other warranties, expressed or implied, including any implied warranties of merchantability or fitness for a particular purpose and any liability for special or consequential damages.
Mounting Instructions for Bulkhead Guide Wheel Railgear

**Monarch Power Unit & Reservoir**
- Locate a section of the main body where the Monarch power unit and 5 gallon hydraulic fluid tank can be mounted. It should be along the side of the excavator that has the batteries. A toolbox or other enclosure makes an excellent location for the pump. Mount power unit and tank to excavator frame.

**Electrical**
- Take one section of electrical jumper system and mount the quick disconnect to underside of the top (rotating) section of the excavator. It should be near where the power unit is located.
- Run cable into battery box and connect lugs to batteries (Monarch power unit is 24V)
- The other half of the jumper should be wired to the Monarch power unit.
- To raise or lower rear railgear, make the electrical connection between the batteries in the upper section and the power unit. At all other times the jumper should remain disconnected.

**Mount Rear Railgear Assembly**
- Prior to mounting any railgear ensure that all inner tires are of the same make and model and are inflated to recommended pressure.
- Obtain two 20’ sections of 3” wide channel (or four sections at least 4’ long) and place on shop floor 56.5” apart in order to mimic rail during installation. Drive excavator up onto the 3” channel so that inner tires are up on channel and outboard tires are not.
- Weld on scab plates. Plates are welded to the outrigger box and form a flat surface to which the railgear can be welded. The plates should fit between the lips at the bottom and top of the outrigger box and should be thick enough that an even plane is formed with the plate and outer face of the lip. Plates should be about 8” wide and spaced so that they extend approximately 1” beyond the outer side edges of the railgear’s back plate (outside edge of scab plates about 44”).
- Make sure pivot pin and adjustment boss are centered in the vertical adjustment slot and TACK weld the boss to the keystock located along the side.
- TACK weld the back plate of the rail gear onto scab plates above the track (channel) at the height shown on the drawing on the following page. NOTE: At this point only tack the unit into place. If you have to make an adjustment after the next step, there will be far less weld to remove.
- Mount valve and connect hydraulics to railgear and lower rail wheels to track (3” channel). Verify that the inner tires of the excavator still have the appropriate cap over the “rail” (channel).
- Align the rear railgear to the machine as shown on drawing M1630115.

**Mount Front Railgear Assembly**
- Mount rear Railgear first.
- Remove bulldozer blade from front swing arms.
- Pin Railgear assembly in same location as blade, reusing the same pins.
- With excavator on track or 3” channel, lower REAR railgear.
- Lower front railgear to rail and just begin to take weight off of the front tires.
- Inspect the cap formed between all four inner tires and the rail (or 3” channel) to ensure that they are all relatively uniform. Adjust height of front railgear as necessary to achieve proper tire cap.
- Once proper tire – rail contact has been established, attach the 4”x9” stop shims to the front railgear where the lower arms meets the gear, or paint a mark to indicate the correct swing arm position.
- Align the front railgear to the machine as shown on drawing M1630115. Adjust the brake alignment as needed and then tack weld the axle tube in place.

**Rail Test & Final Weld-Out**
- Test drive the machine on rail going forward and backward as well as testing the braking distance. Adjust weight settings and alignment as needed.
- Once the alignment procedure and rail test is complete, fully weld the back plate of the gear to the outrigger box and scab plates.
- Weld the adjustment bosses to the keystock guides and fully weld keystock guides to the cylinder side plate.
- If the back of mounting plate extends above the top of the outrigger box then triangular gussets should be added. They should be welded between the top of the outrigger box and the backing plate located directly behind the hydraulic cylinders.
- Fully weld the front axle tube to the front swing arms.
**NOTE:** ADD 2" TO HEIGHT IF FRONT MACHINE TIRES WILL BE LIFTED IN THE AIR DURING USE ON RAIL, EXAMPLE: GRADALL XL-4100

TRACK (OR 3" CHANNEL IN SHOP)