

## INSTALLATION OF HYDRAULIC KIT WIRELESS REMOTE CONTROL W/ STANDARD PUMP/MANIFOLD LOCATION

### INSTALLATION SAFETY PRECAUTIONS

If any installation problems are encountered, please call G&B Specialties 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**

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

**Table 1: Hydraulic Kit Installation Parts**

Part Number	Description	Qty
R-048R	Hydraulic Pump and Manifold	1
R-32924	Wireless Control System Complete	1
R-2965	Rear Pump Mounting Bracket	1
R-2965D	Shim Plate (Pump)	1
CO-106	Dash Switch	1
CO-071	10 Amp Circuit Breaker	1
CO-130G	"Railgear Pump" Decal	1
CO-130N	"Front Gear Up" Decal	1
CO-130O	"Rear Gear Up" Decal	1
CO-130P	"Front Gear Down" Decal	1
CO-130Q	"Rear Gear Down" Decal	1
R-32145B	Dual P.O. Check Valve Assy	2
S-001032	Railgear Operation Decal	2
849FSO-04-04	1/4" Male O-Ring Boss to 1/4" Male JIC 90°	7
849FSO-04-06	3/8" Male O-Ring Boss to 1/4" Male JIC 90°	3
848FSO-04-06	3/8" Male O-Ring Boss to 1/4" Male JIC	2
HFS2-04	Hose 23" Long	2
HFS2-04	Hose 33" Long	2
HFS2-04	Hose 360" Long	2
HU04-04NJ	1/4" Female JIC Straight Coupler (On Hoses)	12
R-990KIT-011	1/4" UNC Gr. 8 Bolt x 1" Long	3
	1/4" SAE Washer	3
	1/4" Lock Washer	3
	5/16" UNC Gr. 8 Bolt x 0.75" Long	4
	5/16" SAE Washer	4
	5/16" Lock Washer	4
Not Supplied	2 & 14 Gauge Wire, Terminals, Loom, Etc.	As Req'd

1. The pump is shipped with a manifold, a hand pump handle, a solenoid, and a rubber terminal boot.
2. Locate and install the solenoid in a convenient location under the hood near the vehicle's battery using installer supplied hardware. Ensure that the solenoid's body is electrically grounded.
3. Install all hydraulic fittings and adapters as shown on hydraulic schematic.
4. Position the rear pump mounting bracket against the right side rear mounting plate as shown. Clamp it in place. Position the pump on top of the rear pump mounting bracket as shown with the tank towards the right side of the vehicle. Ensure the pump will not interfere with any part of the vehicle or railgear components. The hand pump handle receiver can be turned to point downwards to ease hand pump handle use.

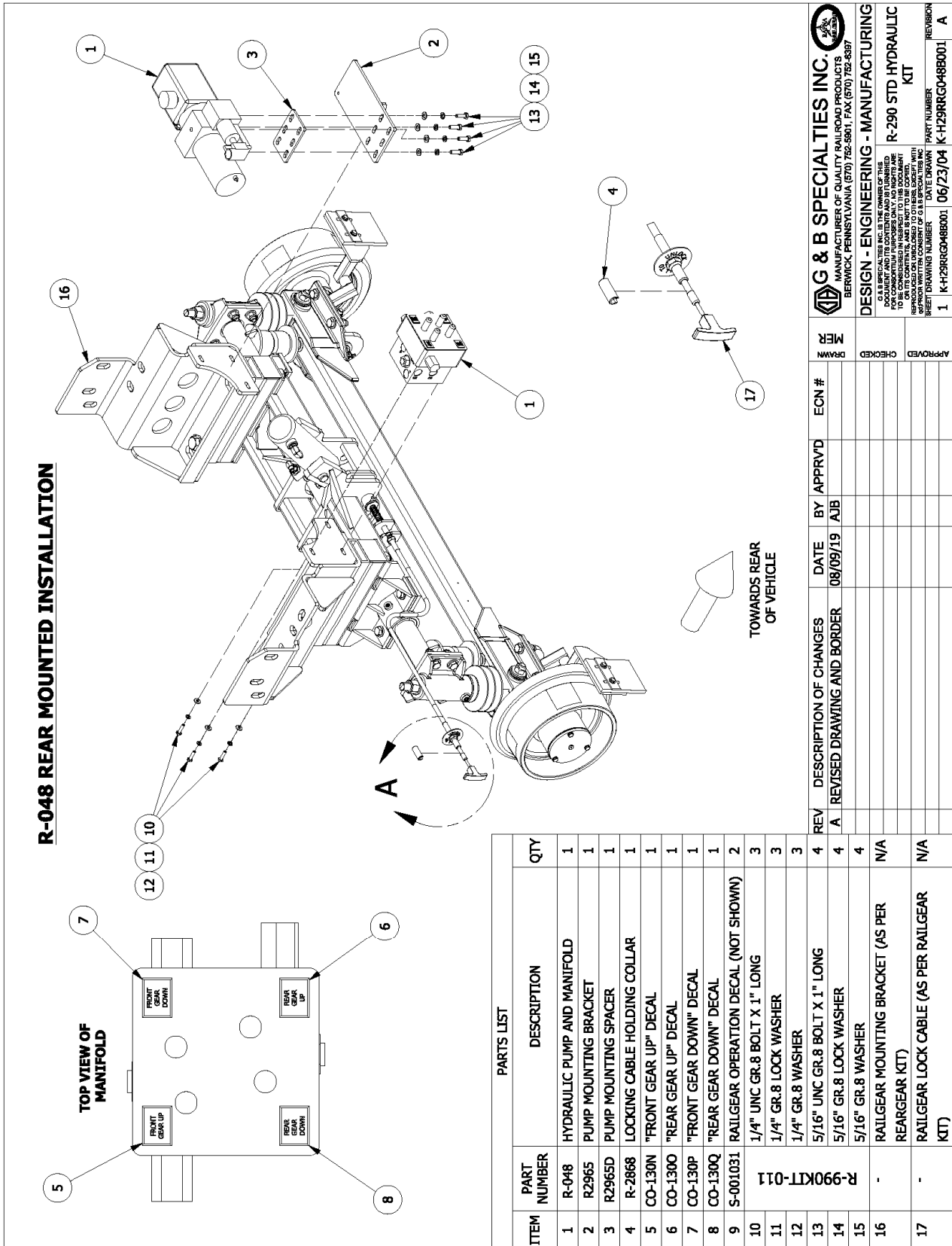
5. Once the rear pump mounting bracket position is verified, remove the pump and weld the rear pump mounting bracket to the right side rear mounting plate all around.
6. Reposition and fasten the pump on top of the rear pump mounting bracket with four  $5/16"$  x  $3/4"$  long bolts, four  $5/16"$  lock washers and four  $5/16"$  washers.
7. Position the manifold on the left rear mounting plate as shown with the P and T ports facing upwards. Fasten the manifold to the left rear mounting plate with three  $1/4"$  x 1" long bolts, three  $1/4"$  lock washers and three  $1/4"$  washers.
8. There are four directional valve manual over-rides on the face of the manifold. The decal plates can be installed on the face of the manifold as shown. Stick the decal plates next to the respective over-rides such that they are properly oriented.
9. Connect one 23" long hydraulic hose between the C1 port on the manifold and D2 port on the rear railgear cylinder P.O check valve.
10. Connect one 23" long hydraulic hose between the C2 port on the manifold and D1 port on the rear railgear cylinder P.O check valve.
11. Connect one 33" long hydraulic hose between the P port on the manifold and the P port on the pump.
12. Connect one 33" long hydraulic hose between the T port on the manifold and the T port on the pump.
13. Connect one 360" long hydraulic hose to the C3 port on the manifold and mark the other end of this hose as "D2 or Blind".
14. Connect one 360" long hydraulic hose to the C4 port on the manifold and mark the other end of this hose as "D1 or Rod".
15. Route the two 360" long hydraulic hoses to the front of the vehicle along the left side of the frame and secure in place with tie-wraps. Where necessary, fasten the hose to the frame with installer supplied hose clips and hardware.
16. Connect the end of the 360" long hydraulic hose marked "D2 or Blind" to the D2 port on the front railgear cylinder P.O check valve.
17. Connect the end of the 360" long hydraulic hose marked "D1 or Rod" to the D1 port on the front railgear cylinder P.O. check valve.
18. Ensure that none of the hoses contact any sharp edges or hot surfaces. Tie-wrap all hoses securely leaving enough slack for the railgear to function.
19. Install the dash switch and "Railgear Pump" decal in a convenient location on the dash.
20. The pump manifold has one wire harness containing four wires connected to it:
  - a) One 20' wire harness to be connected to the wireless control box.

21. Mount the wireless control box in a suitable location. Inside the cab is recommended.
  - a) The control box should be mounted in an easily accessible location as it may be necessary to access the 12-pin connector on the control box for diagnostic purposes.
  - b) The control box should be mounted in such a way as to be protected from damage.
  - c) If possible, it is recommended that the control box be mounted in a central location.
  - d) If the control box is mounted outside of the cab it must be mounted with the 12-pin connector mounted down to avoid water and debris from accumulating in the connector.
22. Using suitable 14 gauge wire, cable loom, connectors, solder and heat shrink tubing:
  - a) Make all electrical connections to the in-cab power switch as required.
  - b) Make all electrical connections from the wireless control box harness to the manifold and pump as required.
  - c) Ensure the manifold is properly grounded to the vehicle chassis by connecting a wire from the manifold to a suitable ground location on the vehicle. The railgear may not be properly grounded due to paint on the mounting plates or tar on the frame.
23. Using suitable 2 gauge wire, cable loom, connectors, solder and heat shrink tubing:
  - a) Connect one wire from the vehicle's battery to the power terminal on the railgear pump solenoid.
  - b) Connect another wire from the load terminal on the solenoid to the power terminal on the pump motor. Use the supplied rubber boot to protect the pump power terminal from shorting out.
  - c) Ensure the pump motor base is properly grounded to the vehicle chassis by connecting a wire from the pump motor base to a suitable ground location on the vehicle. The railgear may not be properly grounded due to paint on the mounting plates or tar on the frame.
24. Route the 20' wire harness from the manifold to the wireless control box. Cut to length as required and make all connections as show on the electrical schematic. All connections are to be soldered and protected with heat shrink tubing. Any wires not used from the wireless control box harness are to be terminated and protected to avoid shorting of the wireless control box.
25. Affix the supplied railgear operation decals in a suitable location adjacent to the front and rear railgear units.
26. Ensure all wires and terminals are soldered, heat shrink sealed, enclosed in protective cable loom and secured with tie-wraps.
27. Ensure all holes in the firewall are sealed and protected with a grommet.

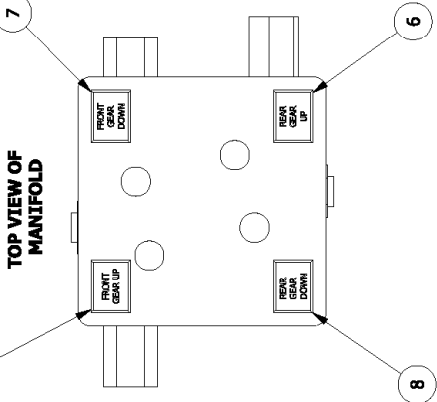
28. Fill the hydraulic system and bleed the air out:
- Fill the pump tank with DEXRON III (or equivalent) hydraulic fluid.
  - Operate the front railgear up and down briefly to circulate the fluid and bleed the system of air (refer to the Railgear Kit and Hydraulic Kit Operation, Service, and Parts manuals for operation instructions).
  - Refill the pump tank and repeat the above step until all air is removed from the front hydraulic system.
  - Operate the rear railgear up and down briefly to circulate the fluid and bleed the system of air (refer to the Railgear Kit and Hydraulic Kit Operation, Service, and Parts manuals for operation instructions).
  - Refill the pump tank and repeat the above step until all air is removed from the rear hydraulic system.
  - With both front and rear railgear locked in the road position, fill the pump tank to the full line.
29. Follow the Hydraulic System Relief Valve Setting procedure detailed in the Hydraulic Kit Service section of this manual.
30. Test the operation of the controls and directional valve manual over-rides. Refer to the operation procedure in the Railgear Kit manual and Hydraulic Kit Operation section of this manual.
31. Locate and store the hand pump handle and the locking cable holding collar in a secure location in the vehicle cab.

**\*Ensure that the thermal overload wires are properly spliced/connected as shown\***

**\*It is recommended that a 200 amp fuse be installed to isolate the hydraulic pump from the vehicle electrical system as shown\***



**R-048 REAR MOUNTED INSTALLATION**



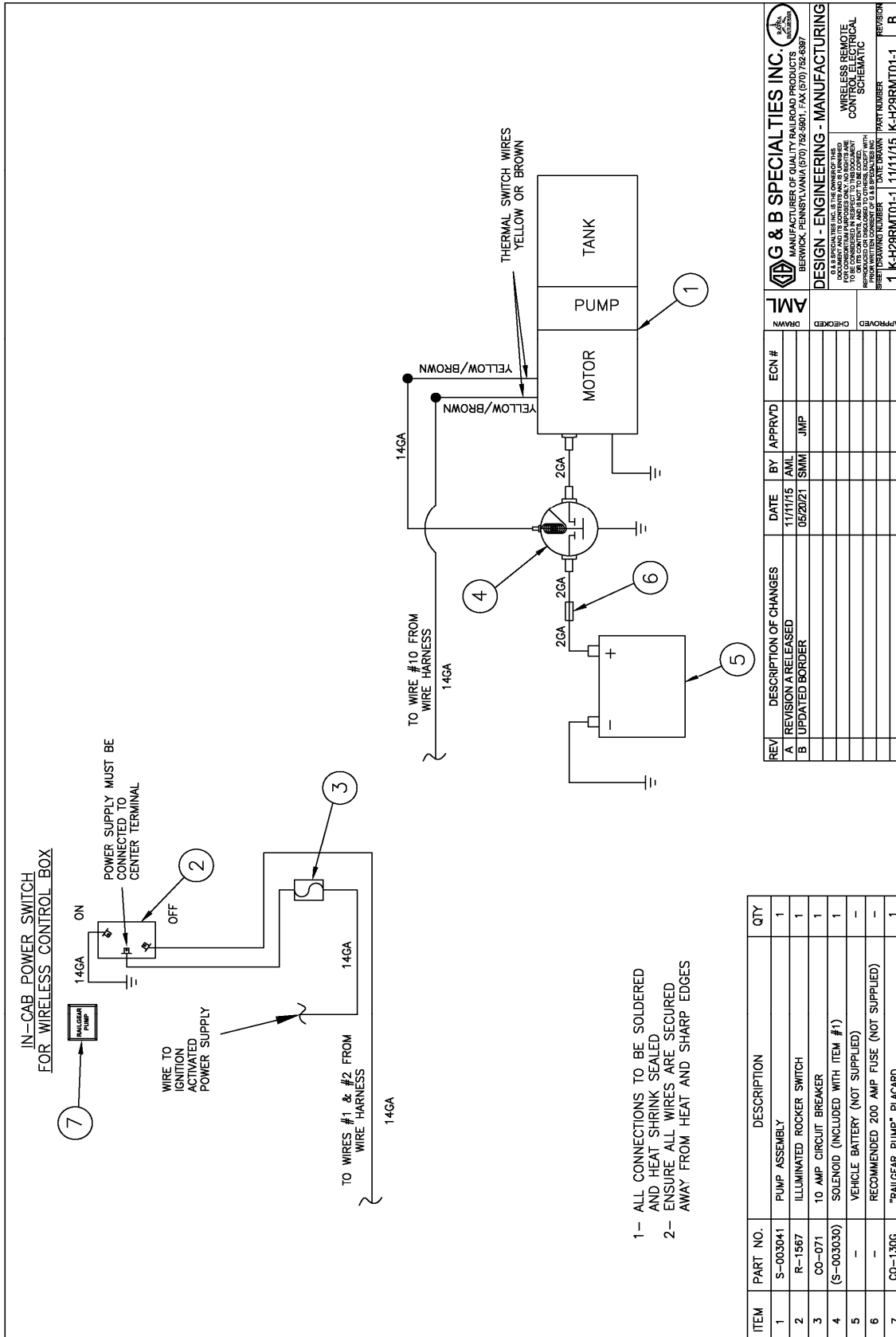
ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-048	HYDRAULIC PUMP AND MANIFOLD	1
2	R2965	PUMP MOUNTING BRACKET	1
3	R2965D	PUMP MOUNTING SPACER	1
4	R-2868	LOCKING CABLE HOLDING COLLAR	1
5	CO-1300	"FRONT GEAR UP" DECAL	1
6	CO-1300	"REAR GEAR UP" DECAL	1
7	CO-130P	"FRONT GEAR DOWN" DECAL	1
8	CO-130Q	"REAR GEAR DOWN" DECAL	1
9	S-001031	RAILGEAR OPERATION DECAL (NOT SHOWN)	2
10		1/4" UNC GR.8 BOLT X 1" LONG	3
11		1/4" GR.8 LOCK WASHER	3
12		1/4" GR.8 WASHER	3
13		5/16" UNC GR.8 BOLT X 1" LONG	4
14		5/16" GR.8 LOCK WASHER	4
15		5/16" GR.8 WASHER	4
16		RAILGEAR MOUNTING BRACKET (AS PER REARGEAR KIT)	N/A
17		RAILGEAR LOCK CABLE (AS PER RAILGEAR KIT)	N/A

REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	DRWN	CHECKED	APPROVED
A	REVISED DRAWING AND BORDER	08/09/19	AJB					

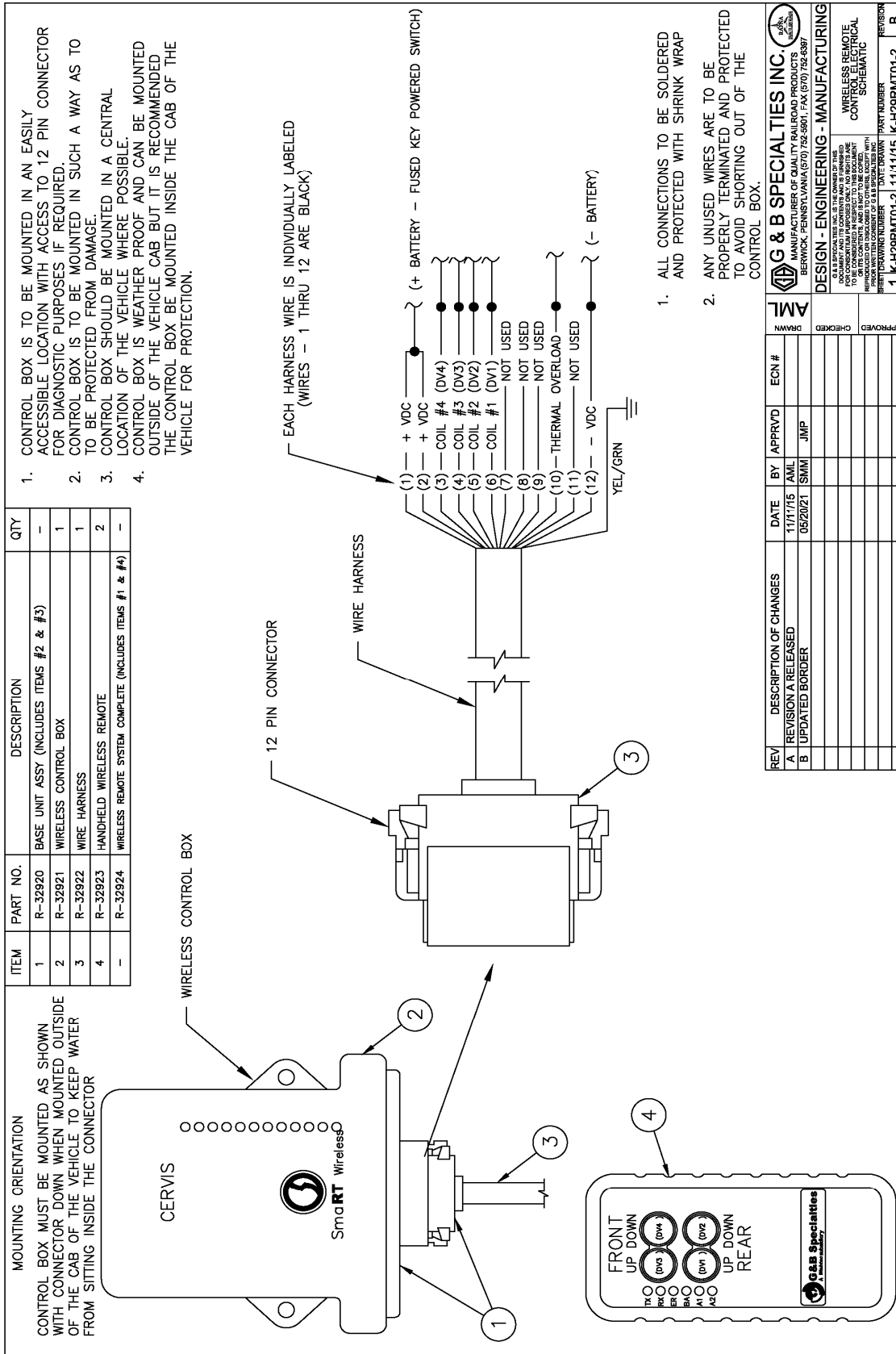
**G & B SPECIALTIES INC.**  
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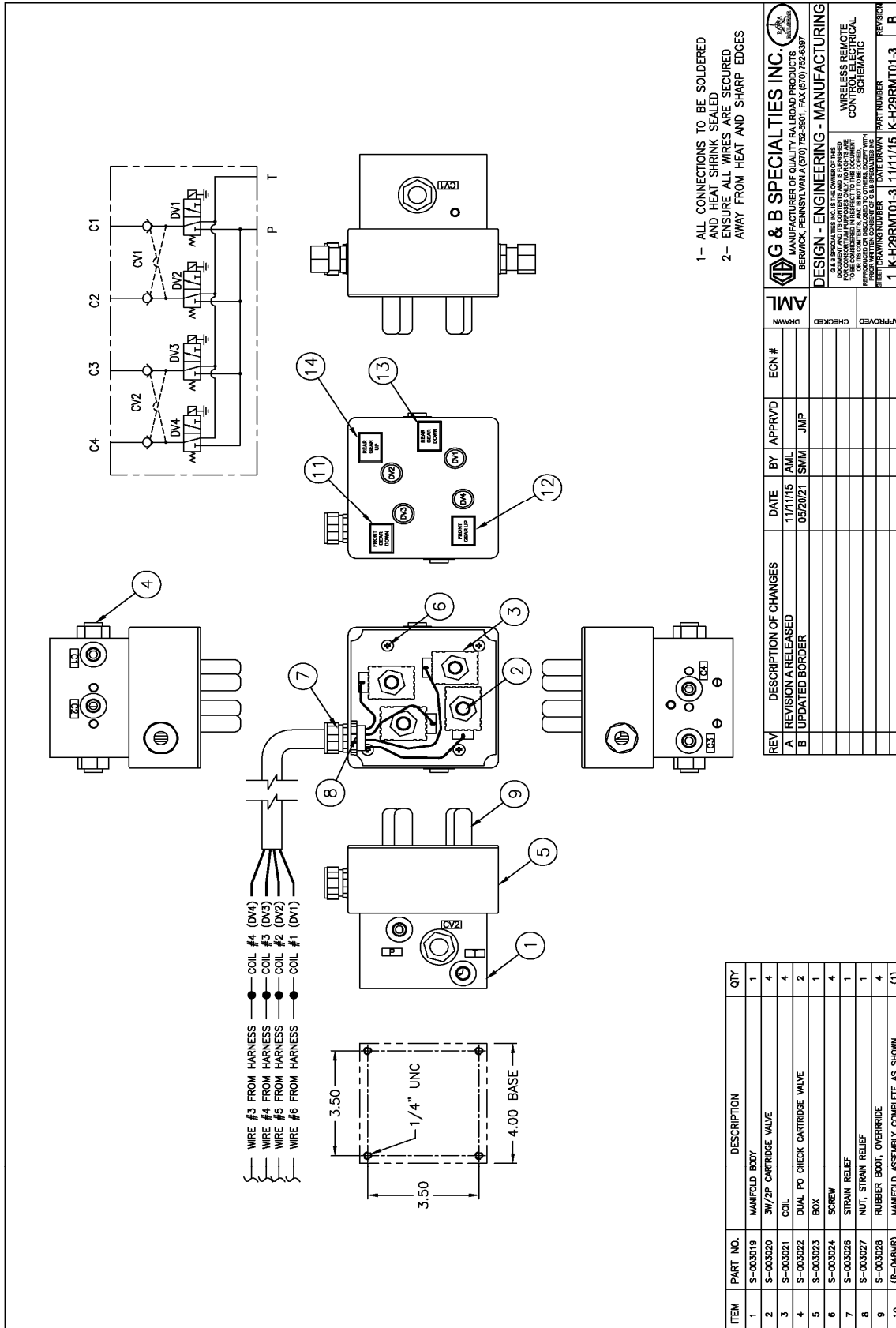
**DESIGN - ENGINEERING - MANUFACTURING**

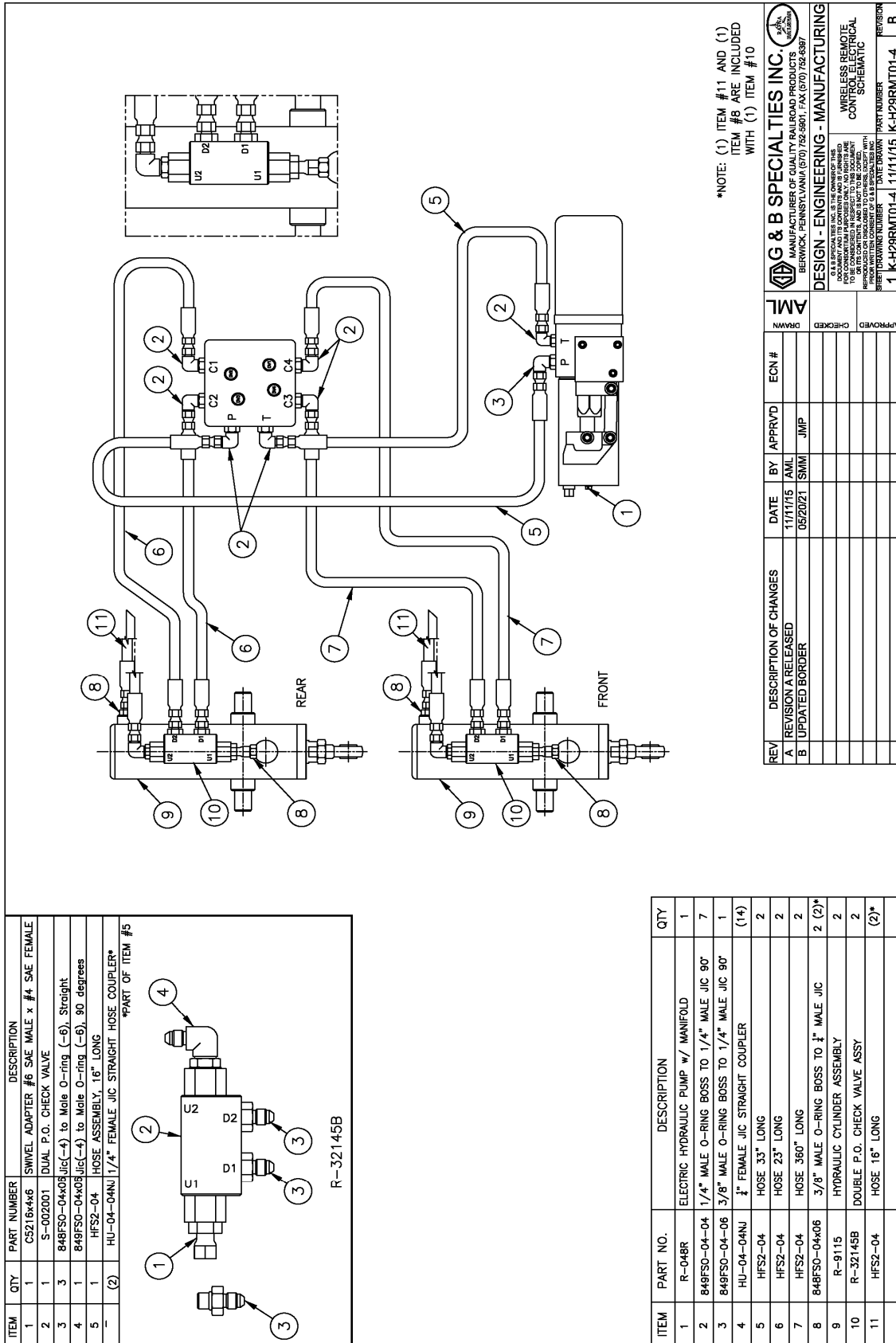
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS IN PARENTHESES INDICATE DIMENSIONS TO BE CONSIDERED IN RESPECT TO THIS DOCUMENT.  
DIMENSIONS IN PARENTHESES AND IN FOOTING COORDINATE WITH APPROVAL WRITING CONSIST OF G & B SPECIALTIES INC.  
PART NUMBER: R-290 STD HYDRAULIC KIT  
DATE UPDWN: 06/23/04  
PART NUMBER: K-H29RRGM048B001  
REVISION: A











ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	C8216x4x6	SWIVEL ADAPTER #6 SAE MALE x #4 SAE FEMALE
2	1	S-002001	DUAL P.O. CHECK VALVE
3	3	849FSO-04x08Jic(-4)	to Male O-ring (-6), Straight
4	1	849FSO-04x08Jic(-4)	to Male O-ring, (-6), 90 degrees
5	1	HFS2-04	HOSE ASSEMBLY, 16" LONG
(2)	(2)	HU-04-04NJ	1/4" FEMALE JIC STRAIGHT HOSE COUPLER*

\*PART OF ITEM #5

\*NOTE: (1) ITEM #11 AND (1) ITEM #8 ARE INCLUDED WITH (1) ITEM #10

REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	APPROVED	REVISION NUMBER
A	REVISION A RELEASED	11/17/15	JAML	JIMP		APPROVED	1 K-H29RMT01-4
B	UPDATED BORDER	05/20/21	SMM	JIMP		CHECKED	1 K-H29RMT01-4

DATE DRAWN: 11/17/15  
PART NUMBER: K-H29RMT01-4  
REVISION: B

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WIRELESS REMOTE CONTROL ELECTRICAL SCHEMATIC

ITEM	PART NO.	DESCRIPTION	QTY
1	S-003001	BREATHER	1
2	S-003002	SUCTION ELBOW	1
3	S-003003	MOTOR	1
4	S-003004	M254 MINI PUMP	1
5	S-003005	PLASTIC RESERVOIR	1
6	S-003006	1/8" PIPE PLUG (NOT SHOWN - TANK PLUG)	1
7	S-003007	SAE 06 O-RING PLUG	1
8	S-003008	HAND PUMP BODY	1
9	S-003009	HAND PUMP MOUNTING SCREW	3
10	S-003010	PUMP HANDLE	1
11	S-003011	RETURN TUBE	1
12	S-003012	RESERVOIR CLAMP	1
13	S-003013	BALL	1
14	S-003014	BALL FOLLOWER	1
15	S-003015	SPRING	1
16	S-003016	SPRING RETAINER	1
17	S-003017	SAE 04 O-RING PLUG (NOT SHOWN)	1
18	S-003018	O-RING (NOT SHOWN - AT HAND PUMP MOUNT)	2
19	S-003030	SOLENOID (NOT SHOWN)	1
20	S-003031	TERMINAL BOOT (NOT SHOWN)	1
21	(S-003041)	PUMP ASSY COMPLETE AS SHOWN	(1)

REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	APPROVED
A	REVISION A RELEASED	11/11/15	AML	JMP		
B	UPDATED BORDER	06/20/21	SMW			

<b>G &amp; B SPECIALTIES INC.</b> MANUFACTURER OF QUALITY RAFFINO PRODUCTS BERWICK, PENNSYLVANIA (570) 752-5901, FAX (570) 752-6397		<b>DESIGN - ENGINEERING - MANUFACTURING</b> <small>THIS DRAWING AND THE CONTENTS AND INFORMATION HEREON ARE THE PROPERTY OF G&amp;B SPECIALTIES INC. AND ARE TO BE CONTROLLED IN ACCORDANCE WITH THE COMPANY'S POLICY ON CONTROLLED DOCUMENTS. ANY REPRODUCTION OR DISCLOSURE TO OTHERS WITHOUT THE EXPRESS WRITTEN PERMISSION OF G&amp;B SPECIALTIES INC. IS STRICTLY PROHIBITED.</small>
WIRELESS REMOTE CONTROL ELECTRICAL SCHEMATIC	PART NUMBER <b>1 K-H29RMT01-5</b>	REVISION <b>B</b>

## OPERATIONS & SERVICE OF HYDRAULIC KIT WIRELESS REMOTE CONTROL W/ STANDARD PUMP/MANIFOLD LOCATION

### OPERATION AND SERVICE 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 always be observed.
- 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

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

The railgear hydraulic system consists of a hydraulic pump and manifold, and a handheld wireless remote.

1. The railgear hydraulic pump must be energized prior to use by turning on the respective dash switch. At this point the dash switch light should come on but the pump should not run and the railgear should not move until a control button is depressed.
2. The direction of the front or rear railgear movement is selected by pushing the "Up" or "Down" button on the handheld wireless remote. At this point the pump should start and the railgear should move in the selected direction.
3. To stop the movement of the railgear, release the depressed button.
4. The pump must be de-energized after use by turning off the respective dash switch. At this point the pump should not be able to run and the control buttons should be in-active.
5. There are no other internal or exterior controls for the railgear other than the in-cab power switch, handheld wireless remote and the emergency hand pump.

## LOCATION AND OPERATION OF THE HYDRAULIC PUMP EMERGENCY HAND PUMP

If the railgear hydraulic system should fail such that the railgear does not respond to depressing the buttons on the front and / or rear control boxes, then the emergency hand pump system may be used to place the vehicle on rail or remove the vehicle from rail. Follow the standard operation procedure (as detailed in the Railgear Kit Operation, Service and Parts Manual) except substitute the following steps when the procedure requires raising or lowering of the railgear.

1. Remove the hand pump handle from storage and insert the handle into the hand pump located on the body of the hydraulic pump.

2. There are four manifold directional valves, one for each railgear function: "Front Gear Up", "Front Gear Down", "Rear Gear Up", and "Rear Gear Down". The manual over-rides for these valves are located on the manifold under rubber boots. Only open one manifold directional valve over-ride at a time. To manually open a manifold directional valve over-ride, remove the rubber boot, push in and twist the knob allowing the knob to extend. To manually close a manifold directional valve over-ride, push the knob in, twist the knob to lock it in place and replace the rubber boot.
3. Select and open the manual over-ride for the respective railgear and desired direction of movement.
4. Remove the locking cable holding collar from storage. It can be slipped in between the locking cable handle and the locking cable bulkhead fitting to hold the locking cable in the disengaged position.
5. Pump the emergency hand pump handle to move the railgear. It will require 50 to 100 full strokes to fully raise or lower each railgear.
6. Close the manual over-ride. Ensure all manifold directional valve manual over-rides are closed and locked in position. Replace all the rubber boots.
7. Remove and store the locking cable holding collar and the hand pump handle.
8. Ensure the railgear lock pins are fully engaged as required by the procedure.

## SERVICE OF HYDRAULIC KIT

The hydraulic kit must be serviced regularly to avoid damage to the equipment.

The recommended oil for the railgear hydraulic system is **DEXRON III** or equivalent. In extremely cold weather areas/seasons, Tellus S4 VX32 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				✓

## HYDRAULIC SYSTEM RELIEF VALVE SETTING

This system is equipped with one relief valve located on the railgear pump body next to the emergency hand pump. This relief valve protects the entire hydraulic system from over pressurization. The relief valve will require adjustment at installation and if ever there appears to be inadequate hydraulic pressure to operate the railgear.

1. Disconnect the hydraulic hose from the "P" port of the pump.
2. Install a hydraulic pressure gauge (up to 3000 PSI) between the disconnected hydraulic hose and the pump port. The pressure gauge will indicate the relief valve setting when the pump is loaded.
3. Following the procedure in the Railgear Kit Operation, Service and Parts manual, raise the front railgear completely and continue to raise the railgear so that the hydraulic cylinder creates a load on the pump by trying to "dead-head". The pressure reading on the pressure gauge should climb to 1800 PSI.
4. If the pressure is not correct, release the railgear controls and adjust the relief valve on the pump accordingly. Loosen the lock nut and turn the setscrew in to increase the pressure or out to decrease the pressure. Re-check the pressure.
5. Once the correct pressure on the pump relief valve is obtained, ensure the lock nut on the relief valve is tightened. Release the pressure in the system and remove the pressure gauge. Re-connect all hydraulic hoses.
6. Ensure the railgear is properly raised as per the Railgear Kit Operation, Service and Parts manual.



**ELECTRICAL SYSTEM TROUBLESHOOTING**

The following basic test can be performed to check the integrity of the railgear electrical system.

Should the railgear pump fail to operate, first check the fuse or the circuit breaker and all wiring for shorts. Then the following test can be performed to verify the integrity of the pump motor and pump solenoid.

1. Pump motor test:
  - a) Connect one end of a 2 gauge shunt wire to the pump motor power terminal and touch the other end to the battery positive terminal.
  - b) The pump motor should run upon touching the shunt wire.
  - c) If the pump does not run, the pump is not properly grounded or the pump motor is defective.
  - d) If the pump motor runs, test for a defective solenoid.
2. Solenoid test:
  - a) Connect one end of a 14 gauge shunt wire to the switching terminal on the solenoid and touch the other end to the battery positive terminal. If the pump does not operate the solenoid is not properly grounded or it is defective. If the pump operates, the problem lies with the fuse/circuit breaker, wiring and/or switches.

Should the pump start running immediately following turning on the respective dash switch, the following tests can be performed to help locate the problem.

1. Disconnect the wire from the switching terminal on the solenoid. If the pump continues to run, then the solenoid is defective.
2. Check all wiring and switches for shorts and / or loose terminals.

**\*For troubleshooting of the wireless control systems please refer to corresponding manuals for either the wireless control box or the handheld wireless remote\***