



A.R.M. (USA), INC
1506 Fernwood Rd.
Wintersville, OH 43953
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Bulletin No: SA20250422
Release Date: April 22, 2025
Effective Date: Immediate
Supersedes: N/A
Completion Date: 30 Days From Issue
Page: 1 of 7

SAFETY ALERT

Manufacturer: A.R.M. (USA), Inc. Model(s): VG100, VG200, VG300, VG400, VGPK100
Ride Name: Vertigo Affected Production Dates: ALL

AFFECTED SERIAL NUMBERS

ABSTRACT OF ISSUE

Lift Winch Caliper Brake - Risk of Brake Failure

REASON FOR RELEASE

A.R.M. has been notified of a Winch Caliper Brake Friction Lining (Brake Pad) coming loose from its shoe. This condition creates risk of the Friction Lining coming detached from the shoe, and a complete loss of Caliper Brake Function. Failed operation of the Winch Caliper can lead to personal injury or death. The entire Winch Caliper Brake system must be thoroughly inspected before next operation and weekly inspections resumed thereafter, as provided below.

ACTION TO BE TAKEN

CEASE RIDE OPERATION

An immediate and overall inspection of the Winch Caliper Brake and its operational function must be performed. Specific instructions for inspection and testing are provided on the following pages.

DETAIL OF ISSUE

Corrosion has been discovered on a friction lining steel backing plate, causing a loss of retention of the Brake Friction Lining by the retention magnet. This condition creates risk of the Friction Lining coming detached from the shoe, and a complete loss of Caliper Brake Function. Weekly inspection and maintenance are required, as stated in the Ride Manual. Faulty conditions can lead to Failed Caliper Brake Performance. The entire Winch Caliper Brake system must be thoroughly inspected and any necessary maintenance or repairs completed *before* resuming operation. A weekly inspection is mandatory after compliance of this safety alert is met. Conditions such as corrosion, failed friction lining retention magnet, lack of lubrication, mis-adjustment, worn friction linings, contaminated friction lining surfaces, contaminated brake disc surfaces, hydraulic fluid leaks from the brake thruster, hydraulic fluid leaks from the thrusters' hose, hydraulic valve, or connections, as well as over tightened caliper mounting bolts are priority concerns. Reduced or failed operation of the hydraulically operated, spring applied caliper brake can lead to personal injury or death.



MOBILE:

VG101-07-01-09
VG102-07-01-10
VG103-05-21-11
VG104-04-01-12
VG105-08-01-12
VG106
VG107
VG108
VG109
VG110
VG111

VG201-01-30-10
VG202-03-13-10
VG203-05-01-10
VG204-06-10-10
VG205-08-15-10
VG206-08-15-10
VG207-01-29-11
VG208-07-20-11
VG209-01-05-12
VG210
VG211
VG212
VG213
VG214
VG215
VG216
VG217

VG301-03-05-11
VG302-10-01-11
VG303-01-05-12
VG304
VG305

VG401
VG402
VG403
VG404
VG405
VG406
VG407
VG408
VG409
VG410
VG411
VG412
VG413

PARK FIXED SITE

VGPK101
VGPK102
VGPK103
VGPK104

NOTICE

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STEP 1: WINCH CALIPER BRAKE INSPECTION NON-OPERATIONAL AND POWER REMOVED

Reference Figures 1 through 3 on Pages 4-5 of this document for Caliper Brake Component Identification

1. Perform an overall inspection of the Winch Caliper Brake for signs of corrosion, wear and physical damage. Photograph and document all findings.
2. Remove the friction linings. Inspect the friction linings for corrosion, contamination, wear and physical damage. Corrosion, Dirt, Debris and Grease are contamination examples and are priority concerns. Any contamination must be remedied by cleaning and or parts replacement.

Note: Any Corrosion of the Friction Linings Steel Back Plate compromises retention to the shoe component.
If corrosion is found, replacement of the friction lining is mandatory. Re-lining of the Friction Linings is prohibited, this part must be replaced with an OEM product.

3. Remove the brake shoes. Inspect the brake shoes, pivot pin, retaining clip, friction linings, and retaining magnet for signs of corrosion, wear and physical damage.
 - a. Confirm the magnet is clean and well housed in the shoe.
 - b. Confirm retention of the friction lining to the brake shoe.
 - c. Confirm brake shoe pivot points are unrestricted and pivoting freely.

Note: Any corrosion, wear, physical damage or lack of retention of the retention magnet to the housing or its ability to retain the friction lining mandates replacement of the brake shoe.

4. Inspect the brake caliper mounting bolts. Ensure each of the 3 mounting bolts are not overtightened. This may be done by loosening each mounting bolt individually and re-torquing. Correct mounting bolt torque is 85 Nm (62 ft. lbs.) It is recommended to torque stripe each mounting bolt for future inspections.

Note: Mounting bolts that are tightened beyond specified torque limit will produce excessive clamp load on the caliper arms, resulting in restricted movement and improper brake performance.

5. Inspect the hydraulic thrusters securing ring nuts for signs of corrosion, wear and physical damage. Confirm both ring nuts are secure and are tightened.
6. Inspect the hydraulic thrusters for signs of leaking hydraulic fluid. Leaks can occur at any joint of the thrusters' cylinder housing, rod seal, bleeder port or silencer. The silencer is located in the center of the cylinders end plate.
7. Inspect the complete hydraulic operational circuit for signs of leaks, wear or physical damage. Inspection to include the hydraulic brake valve, its electrical connections, all hydraulic hoses, fittings and connections, and the emergency release pump.

Note: Any failed inspection requires mandatory repair and/or replacement of components.

8. Inspect the caliper arm balance springs, their connections and condition.
9. Ensure the bell housing is free of contamination and debris.

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STEP 2: CALIPER BRAKE OPERATIONAL TESTING ELECTRICAL POWER ON - VEHICLE HOME RESTING ON STOP BUMPERS

Reference Figures 1 through 3 on Pages 4-5 of this document for Caliper Brake Component Identification

2 Maintenance personnel are required for testing.

1. Turn on main electrical power.
2. Rotate the hydraulic system diverter valves to "Ride Operation".
3. Select Ride Program Switch to "Maintenance". This switch is located in the main electrical cabinet. When selected to "Maintenance", the rides rotational function is disabled.
4. Turn on the hydraulic pump from the operators panel.
5. Maintenance Personnel 1, Activate the Manual Actuator on the Caliper Brake Hydraulic Valve by pressing in and holding to apply constant hydraulic pressure to the Brake Thruster. The Hydraulic Valve is located on the tower baseplate, opposite of the Caliper Brake.

Note: When activating the Manual Actuator, the vehicle may fully settle onto the stop rubber bumpers, resulting in loose wire ropes on the winch drum. Care must be taken to tension the wire ropes prior to resuming operation.

Reference Figures 4 & 5 on Page 6 of this document for Hydraulic Valve Component Identification

Caution: Extreme caution must be taken by all personnel during this test. All personnel must stay clear of moving components, such as the winch motor, caliper brake and winch drum. As stated in #3 of this step, the Ride program Switch must be selected to "maintenance" which prevents the tower from rotating. Although, high awareness must be kept of any potentially moving component.

6. While maintenance personnel 1 is pressing and holding the Hydraulic Brake Valves Manual Actuator, maintenance personnel 2 is to inspect and confirm the following. Note: Cycling the Manual Actuator multiple times during testing may be necessary.
 - a. Confirm a minimum hydraulic pressure of 50 bar (725 psi) is being applied to the Brake Thruster.
 - b. Inspect the hydraulic thruster and complete hydraulic circuit for signs of fluid leaks.

Note: Any Hydraulic Fluid Leaks from the Thruster unit mandates replacement of the Thruster.

- c. During initiation of the Caliper Arms opening, inspect the brake caliper arms to confirm free and equal movement of each arm as the hydraulic thruster rod retracts. Repetitive operation will be necessary. Each caliper arm must have unrestricted movement around their respective pivot points. Restriction of either caliper arms movement will result in reduced braking capacity and potential physical harm to patrons, operators and others. If movement is restricted in either Caliper Arm, disassembly, inspection, cleaning, lubricating, or parts replacement will be necessary.
 - d. With the Caliper Arms open confirm friction lining clearance to brake disc is approximately 1 mm (.039 inches). As wear occurs to the friction lining, an adjustment to maintain this clearance **must** be done. Make any necessary adjustments to achieve a 1 mm (.039 inch) gap.
 - e. Release the Manual Actuator
7. Once all items in #6 are confirmed and any adjustments or repairs made, operation by means of the "Jog Up / FWD" function **must** be made. During the Jog Up test, visually monitor the Caliper Brake Function. Upon stopping the Jog Up test, confirm the Caliper Brake maintains control of the suspended load, without slip.

Note: Upward vehicle travel must be limited until conformation of the brake controlling the suspended load is confirmed.

Note: A Brake Slip condition will cause a Brake Slip Fault of the A/C Winch Inverter. This condition is considered a "Hard Fault" condition and can only be reset by removing power, letting the A/C Inverter shutdown, then restoring power. If this happens during operation, immediately cease operation and perform this inspection procedure before returning ride to public operation.

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STEP 3: CALIPER BRAKE EMERGENCY RELEASE TEST

Reference Figures 1 through 3 on Pages 4-5 of this document for Caliper Brake Component Identification

Step 3 only permitted after Steps 1 & 2 are completed

1. Select the rides hydraulic system to "Ride Operation".
2. From the main electrical cabinet, select the Ride Cycle to "Maintenance".
3. From the operators panel, turn on the hydraulic pump.
4. Confirm winch wire ropes are in the respective grooves and tensioned.
5. Jog Forward / Up, lifting the vehicle to approximately 10 feet above the home position.
6. Using the Emergency hydraulic hand pump, slowly pump the handle to build pressure to the brake thruster. Once pressure begins to build, the brake thruster will allow temporary opening of the caliper with every pump, allowing the brake disk to rotate in a slip fashion, and allowing the vehicle to be lowered.
 - a. Confirm the vehicle descends in a slow controlled manor.

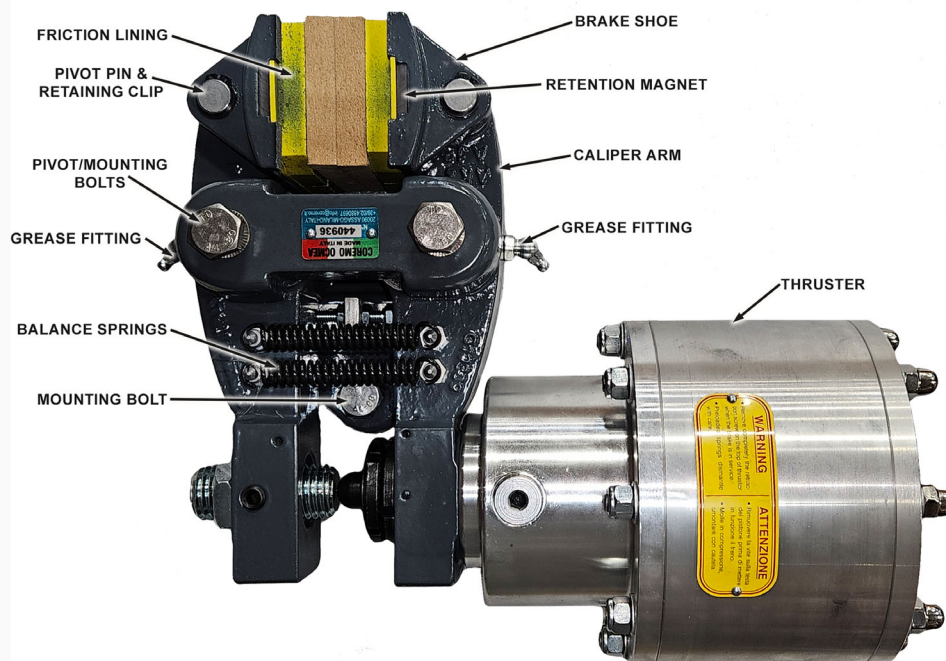
Note: When hand pumping stops, the thruster loses hydraulic pressure, setting the caliper brake and stopping the vehicles travel.

7. Once this test is completed, rotate the diverter valve to the "Ride Operation" position, and return the vehicle to the home position using the "Jog Down/Rev" function.

Caution: Always be aware to detect full opening of the caliper caused by a faulty high pressure setting from the hand pump pressure relief valve. Should this occur, quickly rotate the brakes diverter valve to "Ride Operation". This will release hydraulic pressure from the Thruster. Should this condition occur; an adjustment of the hand pump relief valve will be necessary. Contact A.R.M. for further service support.

7. Once this test is completed, rotate the diverter valve to the "Ride Operation" position.

FIGURE 1: CALIPER BRAKE COMPONENT IDENTIFICATION TOP VIEW



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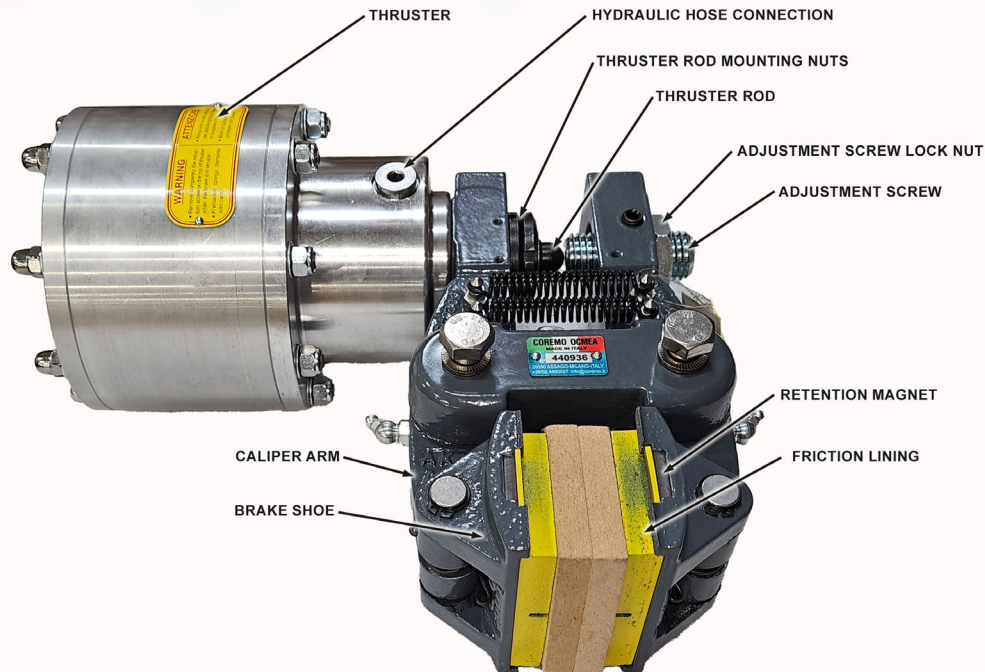
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**FIGURE 2: CALIPER BRAKE COMPONENT IDENTIFICATION
FRONT VIEW**



**FIGURE 3: CALIPER BRAKE COMPONENT IDENTIFICATION
SIDE VIEW**



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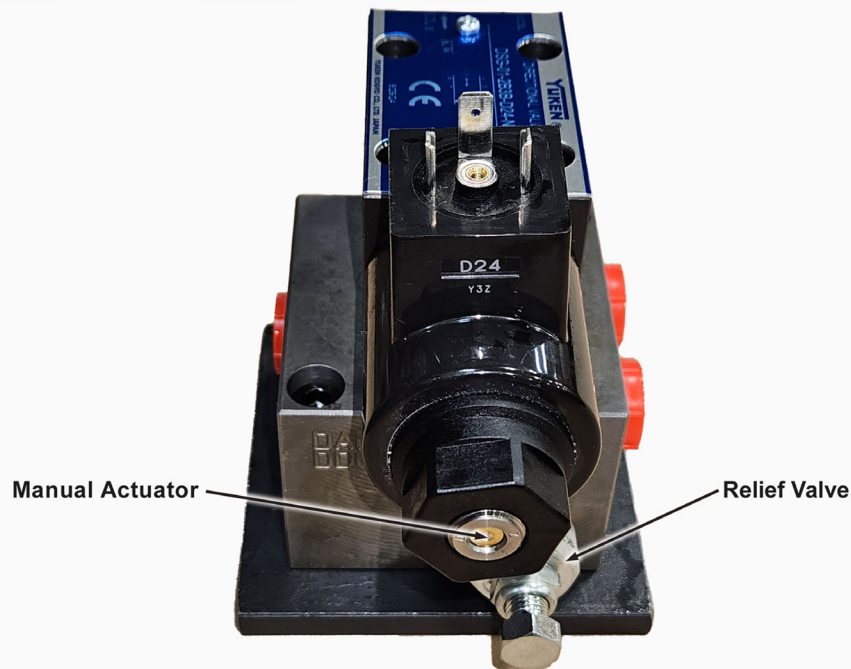
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**FIGURE 4: HYDRAULIC VALVE COMPONENT IDENTIFICATION
TOP VIEW**



Solenoid Coil

**FIGURE 5: HYDRAULIC VALVE COMPONENT IDENTIFICATION
FRONT VIEW**



Manual Actuator

Relief Valve

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CERTIFICATION OF COMPLIANCE

Inspection Checklist – Mark each item with a check mark confirming its completion and compliance

Non-Operational

Overall Inspection of Caliper Brake for signs of contamination, corrosion wear and physical damage.

- ☐ Friction Linings are free of contamination, corrosion, wear and physical damage.
- ☐ Brake Shoes, Retention Magnets, Pivot Pins and springs are free of contamination, corrosion, wear and physical damage.
- ☐ Caliper Mounting Bolts are torqued to 62 ft lbs. +/- 0 ft lbs.
- ☐ Caliper Thruster Mounting Hardware is tight and intact.
- ☐ Hydraulic Circuit and Caliper Thruster are free of any hydraulic leaks.
- ☐ Caliper Arm Balance Springs are intact and free of contamination, corrosion, physical damage.
- ☐ Bell Housing is free from contamination and debris

Operational

- ☐ Inspection to confirm both Caliper Arms are moving freely with activation of the Thruster
- ☐ Inspection to confirm clearance between the Friction Lining and Brake Disc (1 mm [.039 inch])
- ☐ Inspection to confirm Brake Shoe's pivot freely
- ☐ Operation of the Caliper Emergency Release System has been inspected, tested, and confirmed as per the criteria listed in STEP 3.

Ride Serial Number

Inspector Printed Name

Date of Inspection

Inspector Signature*

**By providing my signature, I am confirming all inspections, testing, and maintenance criteria has been followed, certifying compliance of Safety Alert SA20250422.*

Once the Certification is complete, please email the completed form to armbulletin@armrides.com. Or, via US Postal Service to:

ATTN: ARM Bulletin
1506 Fernwood Road
Wintersville, Ohio 43953

The completed form must also be retained as proof of compliance, and to be shared with any requesting inspection body.