

**SEMITRAILER, CARGO, CONTAINER SIDE LOADER
MEDIUM GRADE REPAIR**

This instruction is authorised for use by command of the Chief of Army. It provides direction, mandatory controls and procedures for the operation, maintenance and support of equipment. Personnel are to carry out any action required by this instruction in accordance with [EMEI General A 001](#).

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GENERAL

Introduction

1. This EMEI details all Medium Grade Repair procedures for the Semitrailer, Cargo, Container Side Loader (MHE-CSL).
2. It is important that dirt and other foreign material is not allowed to enter exposed components during any repairs, the ingress of dirt into any system can cause immediate or premature failure. All exposed openings including hose tubes, metal lines and flanges should be closed using plastic plugs or covers. Do not use cloth or paper as plugs or covers as these materials can enter and contaminate systems.
3. Prior to disconnecting electrical connectors, hoses and fittings, remove clamps and ties as required. This is to prevent unnecessary stress and damage to parts.
4. Discard all used gaskets, seals, cotter pins, tab washers, key washers, lock washers, and any fastenings that should not be re-used based on their application.
5. Use only those oils and lubricants specified in [EMEI Vehicle H 529](#) – Servicing Instruction.

Associated Publications

6. Reference may be necessary to the latest issue of the following documents:
 - a. [EMEI Vehicle H 520](#) – Semitrailer, Cargo, Container Side Loader – Data Summary;
 - b. [EMEI Vehicle H 523](#) – Semitrailer, Cargo, Container Side Loader – Light Grade Repair;
 - c. [EMEI Vehicle H 523-1](#) – Semitrailer, Cargo, Container Side Loader – AQIS Decontamination;
 - d. [EMEI Vehicle H 526](#) – Semitrailer, Cargo, Container Side Loader – Authority for Use;
 - e. [EMEI Vehicle H 526-1](#) – Semitrailer, Cargo, Container Side Loader – Suspension Bushing Replacement;
 - f. [EMEI Vehicle H 526-2](#) – Semitrailer, Cargo, Container Side Loader – Suspension Installation;
 - g. [EMEI Vehicle H 526-3](#) – Semitrailer, Cargo, Container Side Loader – Suspension System Maintenance;
 - h. [EMEI Vehicle H 526-4](#) – Semitrailer, Cargo, Container Side Loader – Suspension Alignment Procedure;
 - i. [EMEI Vehicle H 526-5](#) – Semitrailer, Cargo, Container Side Loader – Suspension Torque Specifications;
 - j. [EMEI Vehicle H 526-6](#) – Semitrailer, Cargo, Container Side Loader – York Axle Service Manual;
 - k. [EMEI Vehicle H 526-7](#) – Semitrailer, Cargo, Container Side Loader – Meritor Axle and Brake Service Manual;
 - l. [EMEI Vehicle H 526-8](#) – Semitrailer, Cargo, Container Side Loader – Kubota Workshop Manual;
 - m. [EMEI Vehicle H 526-9](#) – Semitrailer, Cargo, Container Side Loader – Hetric Operating Instructions;
 - n. [EMEI Vehicle H 526-10](#) – Semitrailer, Cargo, Container Side Loader – Hydraulic Parts Storage;
 - o. [EMEI Vehicle H 526-11](#) – Semitrailer, Cargo, Container Side Loader – Crane Module Grease Points;
 - p. [EMEI Vehicle H 526-12](#) – Semitrailer, Cargo, Container Side Loader – Leg Tilt Housing Removal and Bearing Replacement;
 - q. [EMEI Vehicle H 526-13](#) – Semitrailer, Cargo, Container Side Loader – Leg Extension Cylinder Removal and Replacement;
 - r. [EMEI Vehicle H 526-14](#) – Semitrailer, Cargo, Container Side Loader – Danfoss Control Valve Coil Settings;
 - s. [EMEI Vehicle H 526-15](#) – Semitrailer, Cargo, Container Side Loader – Hydraulic Pump Replacement;
 - t. [EMEI Vehicle H 526-16](#) – Semitrailer, Cargo, Container Side Loader – Hydraulic Oil Replacement;

- u. [EMEI Vehicle H 526-17](#) – Semitrailer, Cargo, Container Side Loader – Arm Bearings and Pins Replacement;
- v. [EMEI Vehicle H 526-18](#) – Semitrailer, Cargo, Container Side Loader – Lifting Lug Wear Limits;
- w. [EMEI Vehicle H 526-19](#) – Semitrailer, Cargo, Container Side Loader – Crane Pin Names;
- x. [EMEI Vehicle H 526-20](#) – Semitrailer, Cargo, Container Side Loader – Top Arm Removal;
- y. [EMEI Vehicle H 526-21](#) – Semitrailer, Cargo, Container Side Loader – Remove and Replace G Pin;
- z. [EMEI Vehicle H 526-22](#) – Semitrailer, Cargo, Container Side Loader – Remove Top Arm Cylinder;
- aa. [EMEI Vehicle H 526-23](#) – Semitrailer, Cargo, Container Side Loader – Remove Bottom Arm;
- bb. [EMEI Vehicle H 526-24](#) – Semitrailer, Cargo, Container Side Loader – Remove and Replace Stabiliser Extension Cylinder;
- cc. [EMEI Vehicle H 526-25](#) – Semitrailer, Cargo, Container Side Loader – Remove Stabiliser Housing;
- dd. [EMEI Vehicle H 526-26](#) – Semitrailer, Cargo, Container Side Loader – Replacing Bearings;
- ee. [EMEI Vehicle H 526-27](#) – Semitrailer, Cargo, Container Side Loader – Wear Pad Replacement;
- ff. [EMEI Vehicle H 526-28](#) – Semitrailer, Cargo, Container Side Loader – Top Arm Installation;
- gg. [EMEI Vehicle H 526-29](#) – Semitrailer, Cargo, Container Side Loader – Replace Stabiliser Foot;
- hh. [EMEI Vehicle H 526-30](#) – Semitrailer, Cargo, Container Side Loader – Replace Crane Assembly;
- ii. [EMEI Vehicle H 526-31](#) – Semitrailer, Cargo, Container Side Loader – Replace Lifting Arm and Stabiliser Leg Pivot Pin;
- jj. [EMEI Vehicle H 526-32](#) – Semitrailer, Cargo, Container Side Loader – Replace Traverse Cylinder;
- kk. [EMEI Vehicle H 526-33](#) – Semitrailer, Cargo, Container Side Loader – Replace Stabiliser Tilt Cylinder;
- ll. [EMEI Vehicle H 526-34](#) – Semitrailer, Cargo, Container Side Loader – Replace Bottom Arm Cylinder;
- mm. [EMEI Vehicle H 526-35](#) – Semitrailer, Cargo, Container Side Loader – Updating LCD Display Pages;
- nn. [EMEI Vehicle H 526-36](#) – Semitrailer, Cargo, Container Side Loader – Updating Front and Rear ECU Programs;
- oo. [EMEI Vehicle H 526-37](#) – Semitrailer, Cargo, Container Side Loader – Calibrating SMARTlift™ Angle Sensors;
- pp. [EMEI Vehicle H 526-38](#) – Semitrailer, Cargo, Container Side Loader – Hetric Frequency Setup;
- qq. [EMEI Vehicle H 526-39](#) – Semitrailer, Cargo, Container Side Loader – Software Updating Procedure;
- rr. [EMEI Vehicle H 526-40](#) – Semitrailer, Cargo, Container Side Loader – SMARTlift™ Troubleshooting;
- ss. [EMEI Vehicle H 526-41](#) – Semitrailer, Cargo, Container Side Loader – SMARTlift™ Crane Synchronisation Procedure;
- tt. [EMEI Vehicle H 526-42](#) – Semitrailer, Cargo, Container Side Loader – Starting SMARTlift™ with a Discharged ECU Battery;
- uu. [EMEI Vehicle H 526-43](#) – Semitrailer, Cargo, Container Side Loader – Cold Weather Operation of SMARTlift™ Display;
- vv. [EMEI Vehicle H 526-44](#) – Semitrailer, Cargo, Container Side Loader – SMARTlift™ Load Test Procedure;
- ww. [EMEI Vehicle H 529](#) – Semitrailer, Cargo, Container Side Loader – Servicing Instruction;
- xx. [EMEI Misc Equip O 008](#) – Lifting Tackle Components – Inspection for Useability;
- yy. [EMEI Misc Equip O 391](#) – Flat Synthetic Webbing Slings – Operator Instructions;

- zz. [EMEI Misc Equip O 392](#) – Flat Synthetic Webbing Slings – General Description;
- aaa. [EMEI Vehicle D 108](#) – Recovery Equipment – Inspection for Useability;
- bbb. [EMEI Workshop D 701](#) – Painting of Army Equipment – Repair Policy for Equipment Painted in Polyurethane Paint;
- ccc. [DEF\(AUST\)206F](#) – Petroleum, Oils and Lubricants Handbook;
- ddd. [Material Safety Data Sheets](#) (MSDS) – Product Information Sheets; and
- eee. [Technical Regulation of ADF Materiel Manual – Land](#) (TRAMM-L).

Safety

WARNING

PUP contains poly-functional isocyanates that are toxic in low concentrations and are respiratory system and skin irritants. Personnel, handling, mixing, spraying or repairing PUP must wear suitable protective equipment, use suitable facilities, and adopt appropriate safety procedures.

PUP is most hazardous as a liquid, dry PUP is less hazardous but must be treated as industrial waste. Fine, dry PUP particles generated by sanding or grinding are eye and lung irritants.

7. The MHE-CSL is painted with polyurethane paint (PUP). If the MHE-CSL requires repairs that necessitate the removal of painted surfaces then refer to [EMEI Workshop D 701](#).

WARNING

The MHE-CSL operating under load produces noise levels approaching 85 dB(A), all personnel must wear appropriate hearing protection.

8. The MHE-CSL operates at approximately 85 dB(A) when under load. Operators and maintenance staff will need to be aware of this hazard and shall wear approved hearing protection when operating the equipment.

WARNING

Operation of the MHE-CSL requires hydraulic oil under extreme pressures. Oil escaping from the system under pressure is dangerous and can cause serious injury.

9. The MHE-CSL systems require hydraulic oil under pressure for operation. The system oil pressure may reach 280 bar and all hydraulic pressure is to be relieved from the system prior to conducting any maintenance or repairs.

WARNING

The MHE-CSL is a crane system capable of lifting 36 000 kg. Operators and maintenance staff are to be aware of the dangers of operating this equipment, and be fully conversant with the safe operating zones.

10. The MHE-CSL crane modules are capable of lifting 36 000 kg. Operators and maintenance staff are to be aware of the safe operating zones when operating the load handling system. The safe operating zones are identified on a placard fixed to the rear of the trailer on the right-hand side.

Special Tools

11. The special tools listed in Table 1 are required to complete the Medium Grade Repairs listed in this EMEI.

WARNING

When inspecting and using lifting tackle the appropriate personal protective equipment is to be used.

- 12.** In accordance with [EMEI Misc Equip O 008](#) the Crane Arm Lifting Rig Kit NSN 2330-66-158-4285 is to be visually inspected for general deterioration and deformation by the operator prior to any use. The kit is also subject to six-monthly Technical Inspections, with the exception of flat synthetic webbing slings, which are to be technically inspected every three months. All inspections are to be conducted by a competent person.
- 13.** Flat synthetic webbing slings are described in [EMEI Misc Equip O 392](#) – General Description, and the use of flat synthetic webbing slings is described in [EMEI Misc Equip O 391](#) – Operator Instructions.
- 14.** The inspection of shackles, and the destruction methods for any defective shackles or eyebolts is described in [EMEI Vehicle D 108](#) – Inspection for Useability.

Table 1 Special Tools

Serial	Part No	NSN	Description
1	S1-39358	2330-66-158-4285	Crane Arm Lifting Rig Kit
2	S-24736	TBA	Narrow bushing tool, suspension
3	S-21307	TBA	Standard bushing tool, suspension
4	EL-34366	4920-98-207-3104	Software downloading tool

SUSPENSION

Remove and Replace the Suspension Bushings

- 15.** Remove and replace the suspension bushings in accordance with [EMEI Vehicle H 526-1](#).

Remove and Install the Axle Assembly

- 16.** Remove and install the axle assembly in accordance with [EMEI Vehicle H 526-2](#) pages 4 to 12.

Remove and Install the Suspension Assembly

- 17.** Remove and install the suspension assembly in accordance with [EMEI Vehicle H 526-2](#) pages 13 to 18.

Remove and Install the Axle Y Beam Sub-assembly

- 18.** Remove and install the axle Y beam sub-assembly in accordance with [EMEI Vehicle H 526-2](#) pages 19 and 20.

Suspension System Welding Procedures

- 19.** The suspension system approved welding procedures and standards are detailed in [EMEI Vehicle H 526-2](#) pages 21 to 29.

Remove and Install the Axle U-bolts

- 20.** Remove and install the axle U-bolts in accordance with [EMEI Vehicle H 526-2](#) page 30.

Axle Alignment

- 21.** Carry out axle alignment in accordance with [EMEI Vehicle H 526-2](#) pages 32 to 37.

Remove and Install the Slider System

- 22.** Remove and install the slider system in accordance with [EMEI Vehicle H 526-2](#) pages 38 to 45.

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Suspension System Torque Specifications

23. The suspension system torque specifications are detailed in [EMEI Vehicle H 526-2](#) page 57.

Adjust the Ride Height

24. Adjust the ride height in accordance with [EMEI Vehicle H 526-3](#) pages 8 and 9.

Remove and Replace an Air Spring

25. Remove and replace an air spring in accordance with [EMEI Vehicle H 526-3](#) page 9.

Carry Out Trailer Alignment

26. Carry out trailer alignment procedures to ensure all wheels are parallel to each other, and perpendicular to the trailer centreline in accordance with [EMEI Vehicle H 526-4](#).

Adjust the Wheel Bearings

27. Adjust the wheel bearings in accordance with [EMEI Vehicle H 526-6](#) page 3.

Remove and Replace the Wheel Studs

28. Remove and replace the wheel studs in accordance with [EMEI Vehicle H 526-6](#) page 5.

Remove and Replace the Wheel Bearing Cup

29. Remove and replace the wheel bearing cup in accordance with [EMEI Vehicle H 526-6](#) pages 5 and 6.

BRAKES

Remove and Replace the Brake Autoslack Adjusters

30. Remove and replace the brake autoslack adjusters in accordance with [EMEI Vehicle H 526-6](#) pages 7 and 8.

Remove and Replace the Brake Camshafts

31. Remove and replace the brake camshafts in accordance with [EMEI Vehicle H 526-7](#) pages 18 to 20.

Remove and Replace the Wheel Hub and Brake Drum

32. Remove and replace the wheel hub and brake drum in accordance with [EMEI Vehicle H 526-7](#) pages 34 to 37.

CRANE LIFTING MODULES

Remove and Replace the Leg Tilt Housing

33. Remove and replace the leg tilt housing in accordance with [EMEI Vehicle H 526-12](#).

Remove and Replace the Leg Extension Cylinder

34. Remove and replace the leg extension cylinder in accordance with [EMEI Vehicle H 526-13](#).

Remove and Replace the Hydraulic Pump

35. Remove and replace the hydraulic pump in accordance with [EMEI Vehicle H 526-14](#).

Remove and Replace the Hydraulic Drive Coupling

36. To remove the hydraulic pump drive coupling carry out the following steps:
- a. Loosen and remove the four retaining bolts securing the hydraulic pump to the flywheel housing.
 - b. Slide the hydraulic pump to the rear, away from the housing.
 - c. Loosen and remove the eight bolts securing the flywheel housing to the engine crankcase.

- d. Remove the flywheel housing.
 - e. Loosen and remove the bolts securing the drive coupling to the flywheel, and remove the coupling.
37. To install the hydraulic pump drive coupling carry out the following steps:
- a. Place the drive coupling into position on the flywheel and insert the bolts.
 - b. Tighten the bolts that secure the drive coupling to the flywheel to a torque setting of 50 N.m.
 - c. Place the flywheel housing into position and insert the eight retaining bolts and tighten them.
 - d. Slide the hydraulic pump into position aligning the input shaft with the coupling.
 - e. Insert the four hydraulic pump mounting bolts and tighten them to a torque setting of 40 N.m.

Remove and Replace the Directional Control Valve Assembly

38. To remove the hydraulic directional control valve assembly (Figure 1) carry out the following steps:
- a. Thoroughly clean the valve assembly and surrounding areas.
 - b. Tilt the stabiliser leg upwards, and raise the bottom arm to provide clear access to the valve.
 - c. Mark and remove the electrical plugs from the valve to ensure the plugs are refitted correctly during reassembly.
 - d. Mark and remove all hydraulic hoses from the valve to ensure the hoses are refitted correctly during reassembly.
 - e. Replace any broken or damaged electrical plugs, wiring, hydraulic hoses or fittings.
 - f. Remove the valve mounting bolts.
 - g. Carry out further cleaning of the valve assembly and replace any parts required.
 - h. If the complete valve assembly is being replaced, ensure all ports are clean and clear of obstructions prior to installation and renew the mounting bolts.
39. To install the hydraulic directional control valve assembly carry out the following steps:
- a. Mount the valve assembly onto the unit and securely tighten the mounting bolts.
 - b. Refit the hydraulic hoses.

NOTE

Ensure the hydraulic hose fittings are clean before fitting to the valve.

- c. Refit the electrical plugs.
- d. Start the engine and check the hydraulic system for leaks.
- e. Test all hydraulic functions to ensure electrical and hydraulic system integrity.
- f. Adjust the main relief valve setting in accordance with [EMEI Vehicle H 526-15](#).
- g. Ensure all hoses and wiring are secured and clear of any moving parts.



Figure 1 Directional Control Valve Assembly

Remove and Replace the Arm Bearings and Pins

40. Remove and replace the arm bearings and pins in accordance with [EMEI Vehicle H 526-17](#).

Remove and Replace the Top Arm

41. Prior to removing the top arm using the lifting kit provided in Block Scale 2406/33, ensure it is serviceable in accordance with the details specified in [Paragraphs 11 to 14](#) of this EMEI.
42. Remove and replace the top arm in accordance with [EMEI Vehicle H 526-20](#) and [EMEI Vehicle H 526-28](#).

Remove and Replace the G Pin

43. Remove and replace the G pin in accordance with [EMEI Vehicle H 526-21](#).

Remove and Replace the Top Arm Cylinder

44. Remove and replace the top arm cylinder in accordance with [EMEI Vehicle H 526-22](#).

Remove and Replace the Bottom Arm

45. Prior to removing the bottom arm using the lifting kit provided in Block Scale 2406/33, ensure it is serviceable in accordance with the details specified in [Paragraphs 11 to 14](#) of this EMEI.
46. Remove and replace the bottom arm in accordance with [EMEI Vehicle H 526-23](#).

Remove and Replace the Stabiliser Extension Cylinder

47. Remove and replace the stabiliser extension cylinder in accordance with [EMEI Vehicle H 526-24](#).

Remove and Replace the Stabiliser Housing

48. Remove and replace the stabiliser housing in accordance with [EMEI Vehicle H 526-25](#).

Remove and Replace the Arm Bearings

49. Remove and replace the arm bearings in accordance with [EMEI Vehicle H 526-26](#).

Remove and Replace the Wear Pads

50. Remove and replace the wear pads in accordance with [EMEI Vehicle H 526-27](#).

Remove and Replace the Crane Assembly

51. Remove and replace the crane assembly in accordance with [EMEI Vehicle H 526-30](#).

Remove and Replace the Lifting Arm and Stabiliser Leg Pivot Pins

52. Remove and replace the lifting arm and stabiliser leg pivot pins in accordance with [EMEI Vehicle H 526-31](#).

Remove and Replace the Traverse Cylinder

53. Remove and replace the traverse cylinder in accordance with [EMEI Vehicle H 526-32](#).

Remove and Replace the Stabiliser Tilt Cylinder

54. Remove and replace the stabiliser tilt cylinder in accordance with [EMEI Vehicle H 526-33](#).

Remove and Replace the Bottom Arm Cylinder

55. Remove and replace the bottom arm cylinder in accordance with [EMEI Vehicle H 526-34](#).

SMARTLIFT™ AND ELECTRICAL SYSTEMS

Update the Front and Rear ECU Programs

56. Update the front and rear ECU programs in accordance with [EMEI Vehicle H 526-36](#).

Update the SMARTlift™ Software

57. Update the SMARTlift™ software in accordance with [EMEI Vehicle H 526-39](#).

POWER PACK

Remove and Install the Power Pack

WARNING

Ensure that all residual hydraulic system oil pressure has been relieved before commencing the removal of the power pack.

58. To remove the power pack carry out the following steps:
- Disconnect the batteries at the isolation switches.
 - Disconnect and secure the hydraulic return line at the hydraulic tank.
 - Disconnect the hydraulic pressure line at the pressure filter outlet.
 - Remove the hydraulic return and load sense lines at the hydraulic manifold.
 - To prevent the unnecessary loss of hydraulic oil and contamination of the system. Ensure that all hydraulic lines and fittings are sealed with caps and plugs once disconnected.
 - Remove the left-hand rear tool box.
 - Disconnect all wiring at the electrical junction box. Ensure that the wires are labelled for correct reconnection during installation.
 - Disconnect the positive and negative battery cables at the rear of the battery box.
 - Disconnect the air lines that control the air solenoid.
 - Using a forklift truck from the hydraulic/fuel tank side, support the frame of the power pack.

- k.** Remove the eight bolts that secure the power pack frame to the chassis frame.
 - l.** Lower the power pack straight down until the power pack clears the chassis rails.
 - m.** Remove the power pack from the trailer and place it in a suitable area.
- 59.** To install the power pack carry out the above tasks in reverse order. Ensure that the eight mounting bolts are tightened to 190 N.m and that all fluid levels are correct before starting and testing the power pack.

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END

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