

**TRAILER, LIGHTWEIGHT, CARGO, 750 KG (HAULMARK), MC2  
TECHNICAL DESCRIPTION**

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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## INTRODUCTION

1. This EMEI contains the technical description of the Trailer, Lightweight, Cargo, 750 kg (Haulmark), MC2 illustrated in Figure 1.

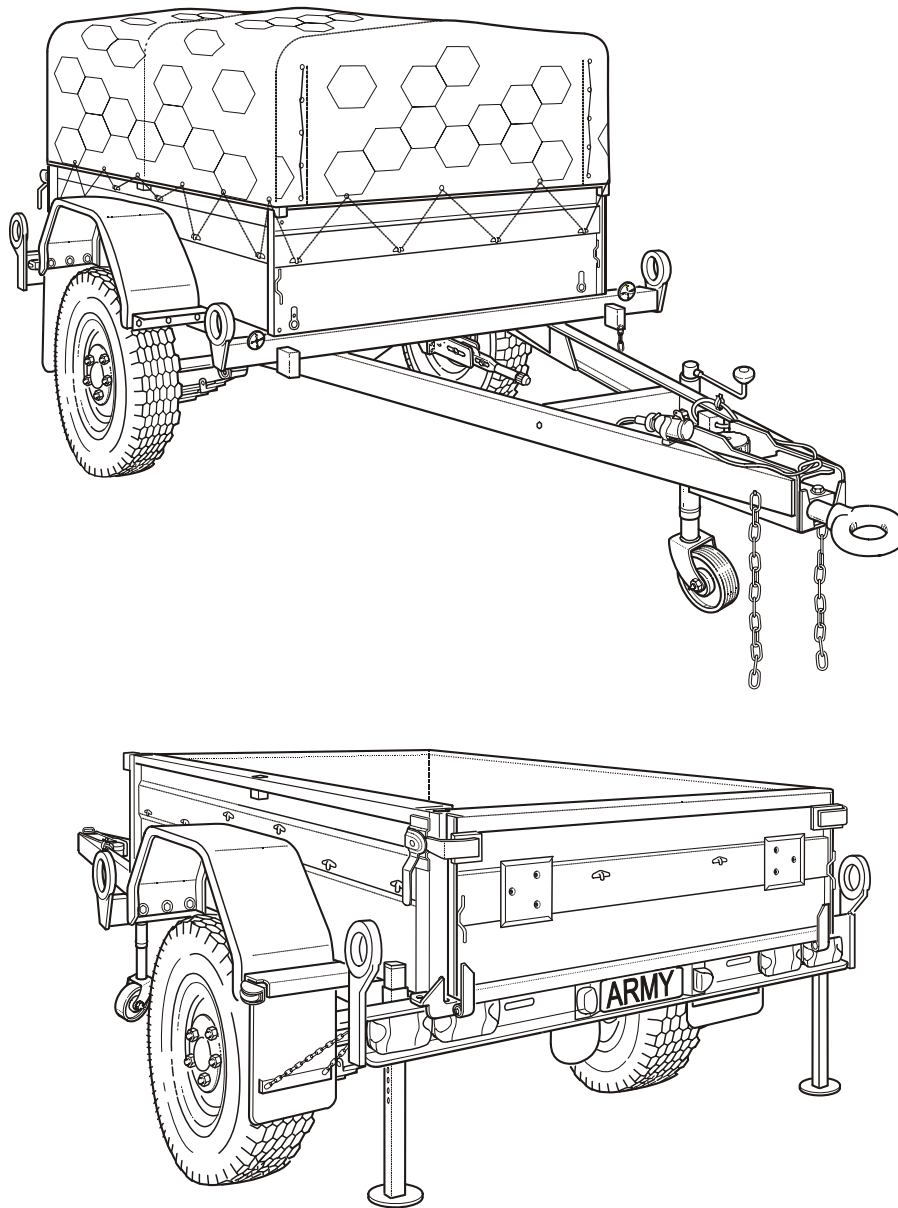


Figure 1 Trailer, Lightweight, Cargo, 750 Kg (Haulmark), MC2

### Associated Publications

2. Reference may be necessary to the latest issue of the following publications:
- a. EMEI [Vehicle H 090](#) – Data Summary;
  - b. EMEI [Vehicle H 093](#) – Light Grade Repair;
  - c. EMEI [Vehicle H 099](#) – Servicing Instruction;
  - d. Complete Equipment Schedule – SCES 012314/1;
  - e. Repair Parts Scale – 02254; and
  - f. User Handbook – NSN 7610-66-152-1370.

### ARRANGEMENT OF THE EQUIPMENT

3. The Trailer, Lightweight, Cargo, 750 kg (Haulmark), MC2 is a single axle trailer designed for towing behind the Truck, Light and Lightweight, MC2, (Land Rover) fleet of vehicles. It may also be towed by other vehicles with compatible towing equipment that have met the requirements of technical regulation.

4. The trailer is of all steel construction with an aluminium sheet floor and guards. It is designed to carry up to 750 kg of general cargo. The trailer can be fitted with a canopy arrangement to protect the equipment being transported.

### DETAILED TECHNICAL DESCRIPTION

#### Axle Assembly

5. **Axle.** The axle fitted to this trailer (Figure 2) is a tubular steel beam assembly manufactured by Engineered Transport Equipment. It is fitted with stub axles, bump stop seats and spring seats.

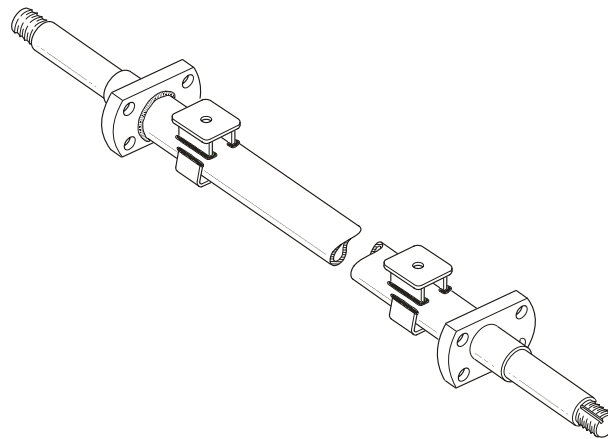


Figure 2 Axle Assembly

6. **Wheel Hubs.** The axle is fitted with 8-inch flange type wheel hubs (Figure 3) carried by tapered roller bearings. Each hub assembly is fitted with a disc brake and a parking brake assembly.

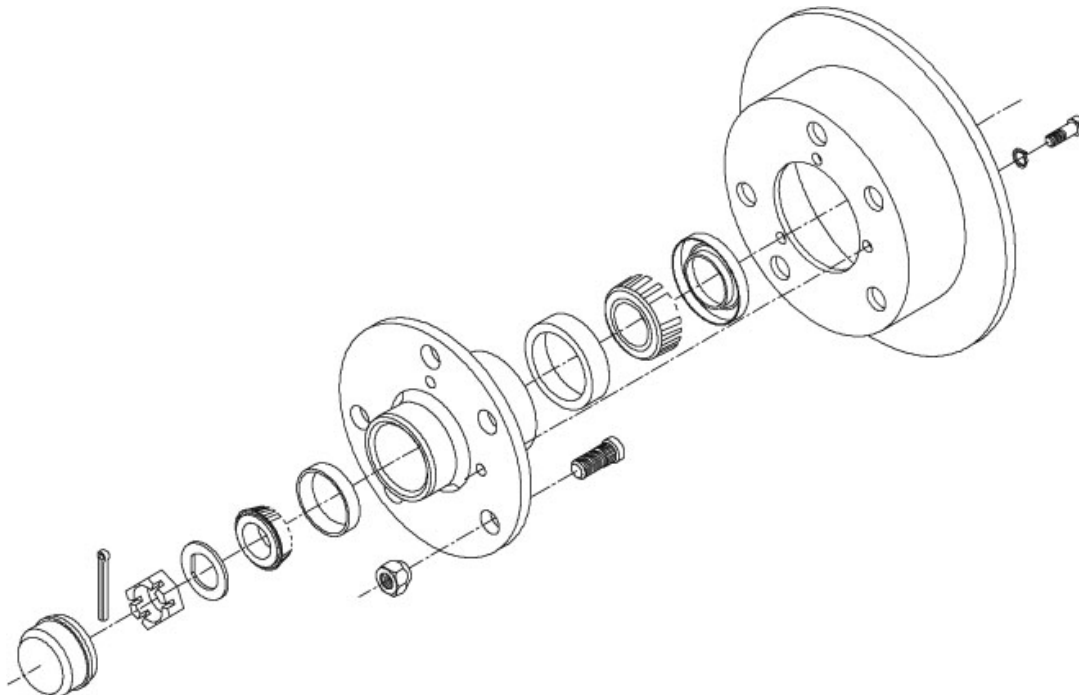


Figure 3 Wheel Hub Assembly – Exploded View

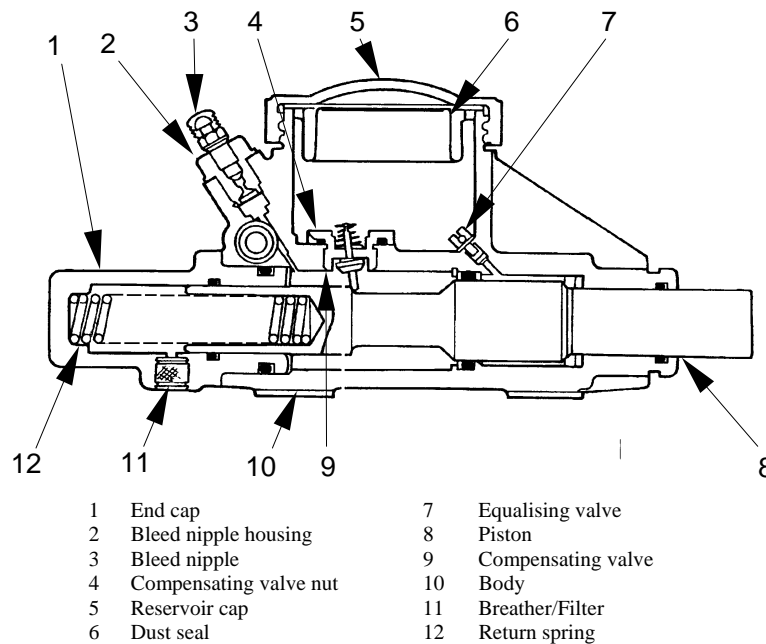
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**Brakes**

**7. General.** The foundation brakes consist of a 299 mm by 10.5 mm disc and a hydraulically operated calliper assembly fitted to each wheel. Brake application is achieved by a mechanical override system as the tow coupling shaft acts on the master cylinder. The brakes will only apply when the master cylinder electric solenoid is energised by the towing vehicle's brake light circuit.

**8.** The parking brakes consist of an adjustable, internal, expanding, single shoe and drum type brake activated by an over centre type lever situated centrally on the front crossmember.

**9. Master Cylinder.** The master cylinder is a Cebco model C500 (Figure 4). The master cylinder is fitted with an electric solenoid that locks the master cylinder out unless the towing vehicle's brake lights are activated. This lockout is incorporated to prevent undesirable brake applications.



**Figure 4 Brake Master Cylinder – Sectional View**

**10.** When the brakes are applied, brake fluid from the hydraulic override unit, fitted at the tow coupling, is forced into the brake circuit which causes the pistons to expand out from the callipers, pushing the pads toward each other and effectively clamping the brake discs between the pads. This action slows or stops (depending on the amount of brake application) the rotation of the brake discs, effectively slowing or stopping the trailer.

**11.** With the brakes in the released position, the return spring holds the brake piston against its stop in the rest position. At the rest position, the front piston flange tilts the override cylinder compensating valve stem in the override cylinder, opening the valve, and, in conjunction with an equalising valve, allows the pressure in the cylinder bore to be equalised. At the same time the override unit solenoid plunger closes the brake fluid outlet to the callipers preventing an inadvertent build up of pressure at the brake callipers.

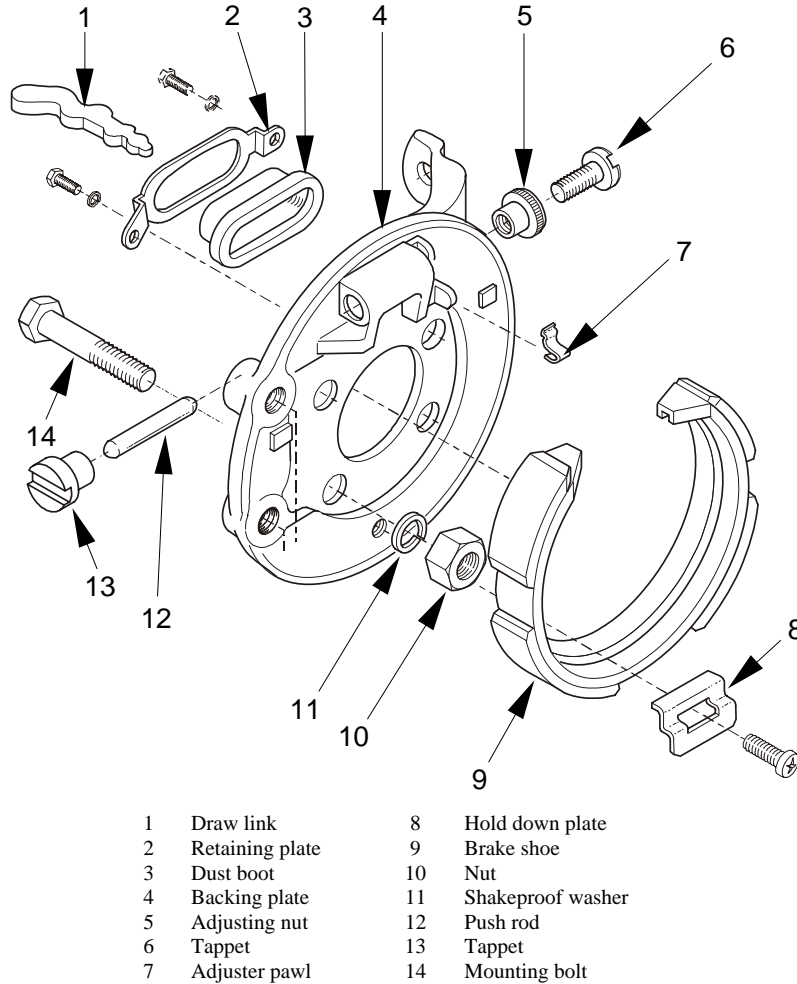
**12.** When the brakes are applied and the towing vehicle slows, the rearward movement of the towing eye shaft causes the brake piston to move rearward, against spring tension. This movement of the piston frees the compensating valve stem, allowing the valve to close and brake fluid to flow under pressure to the outlet. Simultaneously, the override unit solenoid is energised and opens the brake circuit allowing the build up of pressure at the callipers and the application of the trailer service brakes.

**13.** When the towing vehicle brakes are released, both the brake fluid pressure and the return spring pressure returns the piston to the released position, opening the compensating port and allowing fluid to vent into the fluid reservoir and pressure at the brake callipers to drop, thus releasing the trailer service brakes. The override solenoid closes the port to the callipers to prevent inadvertent application of the brakes.

**14.** The calibrated equalising port permits fluid to be present in the front shaft cavity, where it acts on the rear flange face of the piston shaft. The fluid provides a cushioning effect on the piston shaft as it returns to the rest position and eliminates 'hunting' or 'snatching' of the brakes.

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**15. Park Brake Assemblies.** The park brake assemblies (Figure 5), located at each wheel hub, are a 190 mm internal expanding single shoe and drum type. A brake shoe consists of a circular one-piece spring steel channel section with four strips of brake lining material, bonded at equidistant points around the outside of its circumference. Each shoe is held in position on the backing plate by a bracket at the bottom, and slots into the expander assembly at the top. The brake shoe backing plates are bolted to the axle flanges and the brake drums are incorporated with the service brake disc.



**Figure 5 Park Brake Assembly – Exploded View**

**16.** The park brake is mechanically operated by means of an over-centre lever, located at the trailer's front crossmember. The lever is connected to the draw link on each brake shoe expander assembly via two wire cables in outer protective casings.

**17.** When the park brake lever is applied, it pulls the inner cables of the cable assemblies, which pulls the draw links outward from the brake backing plates. As the draw link moves outwards, a rod at the end of the draw link causes the expander unit plungers to move outwards, thereby expanding the brake shoe until it contacts the drum.

**18.** When the park brake lever is released, the tension in the cables is relaxed and the draw link is free to move inwards towards the backing plate. The natural spring in the brake shoe permits it to return itself to the rest position, forcing the expander unit plungers and operating rod in, thus releasing the brake shoe from the drum.

**Suspension**

**19. Springs.** The springs fitted to the trailer are eight leaf, semi elliptic, hanging shackle type. They are fixed to the axle assembly by steel U-bolts. Each spring is free to move at one end and is connected to the frame hangers via a fixed shackle at the front and a swinging shackle at the rear. They are cushioned by polyurethane bushes at the shackle bolts. Lubrication points are provided at each shackle bolt position.

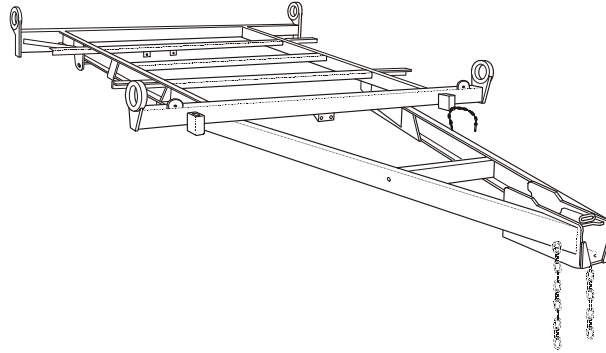
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**20. Bump Stop.** The suspension bump stops are bolted to the underside of the chassis rails above the axle. They are responsible for absorbing shock loads when the trailer suspension bottoms out on instances of maximum vertical lift.

### Frame and Cargo Tub

**21.** The trailer consists of a prefabricated steel frame and drawbar assembly and a cargo tub.

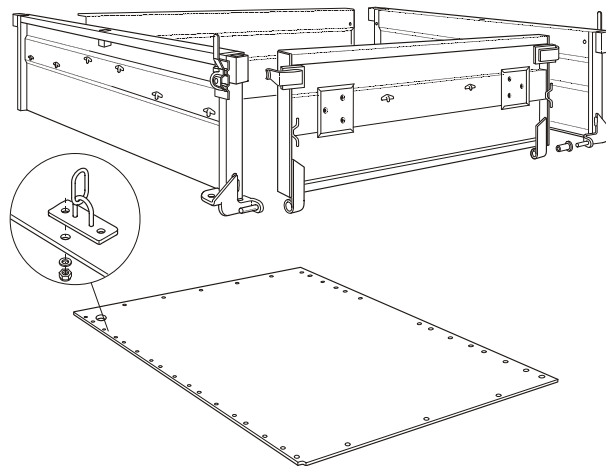
**22. Drawbar and Main Frame.** The drawbar and main frame runners (Figure 6) are prefabricated using zinc plated 4 mm steel channel sections. Frame crossmembers are constructed of RHS sections.



**Figure 6 Drawbar and Main Frame Assembly**

**23.** Two safety chains are welded to the front of the drawbar, adjacent to the tow coupling, to provide a connection to the towing vehicle. These chains are designed to be crossed when attached to the towing vehicle.

**24. Cargo Tub.** The trailer's cargo tub (Figure 7) is made of a 2.5 mm thick aluminium sheet floor and 1.2 mm pressed zinc annealed steel front and side panels. Six cargo lashing points are located on either side of the tray floor. The trailer is fitted with a drop-down, 1.2 mm pressed zinc annealed steel tailgate to facilitate loading. The tailgate can also be removed if required.



**Figure 7 Cargo Tub Components**

**25. Towing Lunette.** The tow lunette assembly is located at the front of the drawbar. The tow lunette steel forging has a centre ring of 76.2 mm diameter and an outside diameter of approximately 160 mm.

**26.** The tow lunette assembly is designed to move when the towing vehicle brakes are applied, so that the back of the tow ring shaft will contact the brake master cylinder piston, to engage the trailer braking system.

**27.** Two lubrication points are fitted to the coupling body to provide the ability to lubricate the lunette shaft.

**28. Tow Coupling.** A fold away tow coupling is fitted to the rear of the trailer to allow another unladen trailer to be coupled for manoeuvring within a transport yard only. The coupling is not designed for use on public roads. When not in use, the coupling is stowed under the trailer's rear crossmember.

**29. Support Stands.** Adjustable support stands are located at each rear corner of the trailer. These are lowered to the ground when the trailer is parked, to stabilise the trailer.

**30. Jockey Wheel.** The jockey wheel is located immediately behind the brake master cylinder on the front left-hand side of the drawbar. The height of the wheel can be adjusted by turning the handle on the top of the unit.

**31. Canopy and Bows.** The three canopy bows are fitted by slotting them into pockets in the face of the side panels. The canopy is fitted over the bows and lashed to the lashing hooks located on all side panels. When not in use, the canopy bows are stored in two pockets located on the front cross-member and secured with a pin and strap.

### Electrical System

**32.** The electrical system (Figure 8) is a 12 to 24-volt dc electrical system coupled to the towing vehicle's socket by a 12-pin NATO plug. All lighting connected to the electrical system is compatible with both 12-volt and 24-volt towing vehicles. The brake master cylinder has a solenoid fitted to lock out the trailer brakes unless the towing vehicle brake lights are activated.

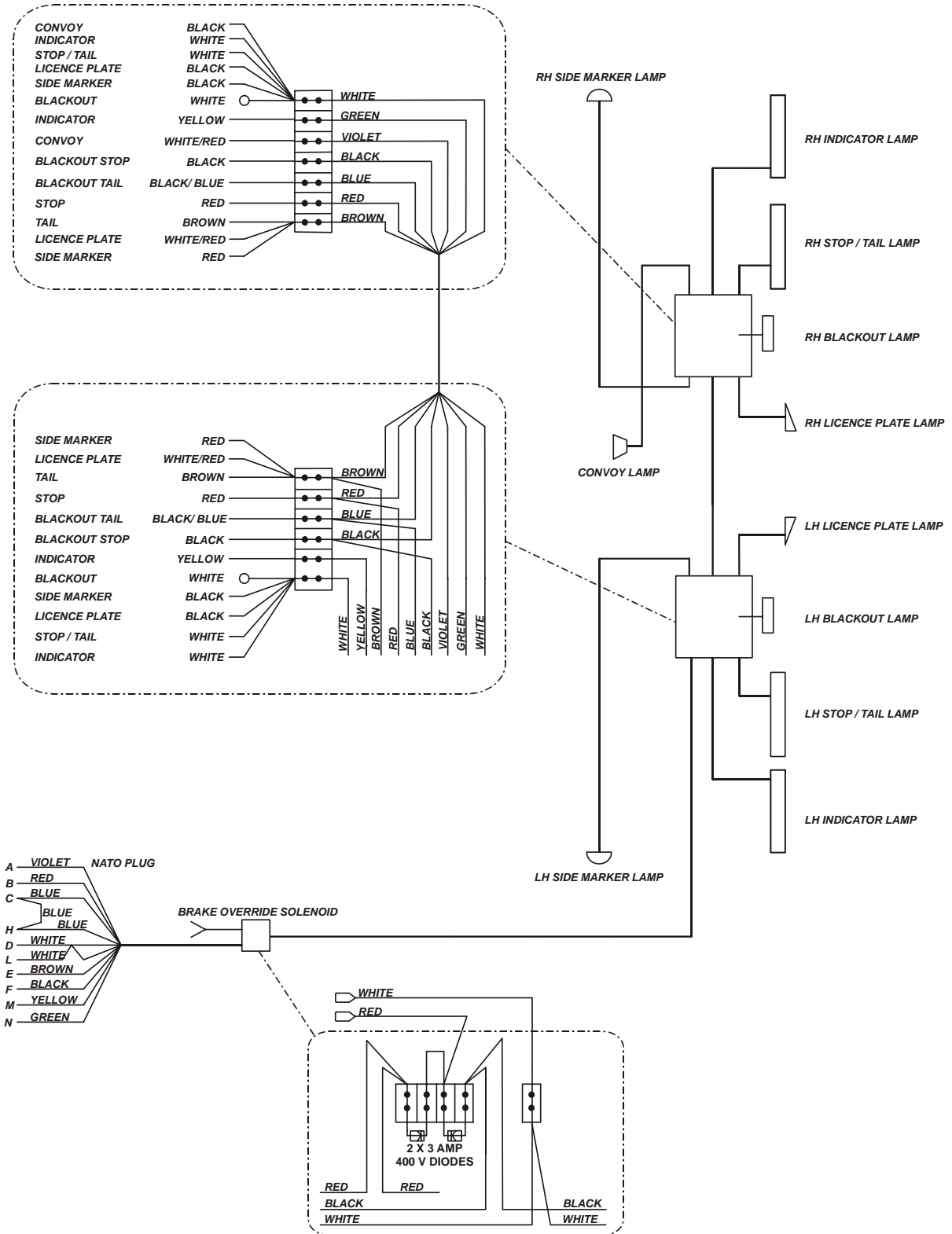
**33.** Two diodes are fitted in the trailer's forward junction box. These diodes are fitted to allow the brake override solenoid to be energised by power from either the normal stop light circuit or the blackout stop light circuit, whichever system is active. At the same time, they prevent power from flowing between circuits. This prevents the normal lights being activated under blackout conditions and conversely, prevents blackout lighting being activated under normal conditions.

**34.** The lamps fitted to the trailer are sealed, multi-voltage modules containing light emitting diodes (LED). The stop/tail lamp assemblies and the indicator lamps consist of 36 LEDs each. Compliance with regulations fails if 10 or more LEDs do not illuminate in a module. The stop light compliance fails if two LEDs fail to illuminate in the top or bottom row with the brakes applied. The marker, side and number plate lamps must have all LEDs operating.

**35. Extendable Marker Lights.** Marker lights that are fitted to the trailer are able to be extended when the trailer is being towed by the 6×6 Land Rover variants due to increased tow vehicle width. The lights are extended and retracted by removing the twin locking pin mechanism, relocating the arm, then refitting the twin locking pin mechanism.



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**Figure 8 Electrical Wiring Diagram**

**END**

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