Trailer Manual

Operation, Maintenance & Service Manual

2.0

STEELBRO

Container Handling Solutions

Service Facility Details

teelbro has branches and service agents in key locations throughout the world. For more information on the service facility closest to you, please contact your Steelbro distributor.

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Warranty Summary

This warranty statement is a summary of the full product warranty and does not constitute a full statement of the warranty terms and conditions.

The following warranty is given in lieu of and to the exclusion of any other guarantee, condition or warranty, either expressed or implied by statute or otherwise and whether regarding goods manufactured by ourselves or others. Provided the terms of payment are promptly complied with by you, we undertake to remedy with reasonable despatch, any original defects arising from faulty workmanship, in any goods manufactured by us, which under proper and normal conditions of use, are revealed within twelve (12) calendar months or one thousand (1000) hours of operation, whichever occurs soonest from the date of delivery, provided the defective item is returned to our Works, freight paid both ways, or in the case of the item not being returnable, then provided the expenses of travelling, transport, plant hire and accommodation are to your account.

Any goods supplied or work done in remedying such defects shall not extend our liability under this clause beyond the time stipulated above. At the expiration of such time, all further liability on our part shall cease. In the case of goods or material not of our manufacture, we shall endeavor to secure for you, the benefit of any guarantee given to us in respect thereof. In no case, shall we be liable for the cost of replacing and fitting of defective goods, and goods replaced shall become our property. No responsibility will be accepted for any defect, unless we first receive a written complaint, and we have been given first priority and ample opportunity to rectify the defect.

Liability for consequential damage or loss arising from defects, faulty materials, omissions, or negligence of workmanship, in any goods supplied by us is excluded.

Labour charges for work carried out under the terms of this warranty are to the purchaser's account.

Variations to the above are subject to Steelbro New Zealand Limited Management approval.

Claims under warranty will only be accepted if all conditions of warranty are satisfied.

Foreword

This Operators Manual deals with your new Steelbro Trailer. Take the time to read it through - it will be time well spent. The manual contains a short description of the Trailer together with instructions on its operation and maintenance. Generally this manual is provided along with other documentation, including manuals provided by third party manufacturers, parts lists, technical drawings and schematics and compliance certification, either in bound print format, in a folder, or on a data CD.

If you wish to ensure a long life for your Trailer, you should carefully carry out all the maintenance instructions. However, all servicing, apart from lubrication and minor repairs should wherever possible be entrusted to factory trained service facilities.

We reserve the right to introduce, without notice, changes in data and equipment and amendments to the instructions for maintenance and other servicing work.

In this document:

This symbol means that the instruction in the shaded area is essential to the safe operation of your Trailer and failure to follow the instruction is likely to lead to injury or damage to property

This symbol means that the instruction in the shaded area relates to safe or recommended practice and failure to follow the instruction could lead to damage or accident.

This symbol means that the information in the shaded area is useful and/or is something we wish to emphasise.

Owner and Operator Responsibilities

Regulation Compliance

It is the responsibility of the **OWNER** to ensure that use of the Trailer fully complies with all Local Authority, State and Government regulations covering lifting equipment, road use, health and safety in the country where the Sidelifter is being used.

Health and Safety Compliance

The **OWNER** must provide and maintain work environments, systems of work, and equipment that is, as far as practicable, safe and without risks to health.

The **OWNER** must ensure that only properly trained and approved operators use the Trailer. In some locations, the law requires an operator's Certificate of Competency. The **OWNER** must ensure that they comply in full with such requirements.

Operators must consistently demonstrate:

1. Healthy and safe work practices.
2. Medical and mental fitness for the task.
3. A sound knowledge of emergency procedures.
4. A sound knowledge of the contents and requirements of the **STEELBRO** Manuals.

If there is a hazard to health or safety that cannot be eliminated, the **OWNER** must immediately cease using the Trailer and contact **STEELBRO** for advice.

Maintenance and Servicing

The **OWNER** should realise that the reliability, safety, and longevity of the Sidelifter depends greatly on the standard of maintenance and servicing that it receives during its working life. The maintenance and servicing schedules set out in the **STEELBRO** Manuals must be met, and **ONLY** suitably qualified technicians should carry out this work.

Design and Modifications

Where **STEELBRO** notify that a modification is required, it is the responsibility of the **OWNER** to ensure that the modification is carried out in accordance with the instructions from **STEELBRO** and if requested, to withdraw the machine from service until the modification has been carried out.

The **OWNER** should withdraw the Sidelifter from use where any deficiencies are identified during inspection of the Sidelifter which may affect its safe operation, until the design or operational deficiency is rectified.

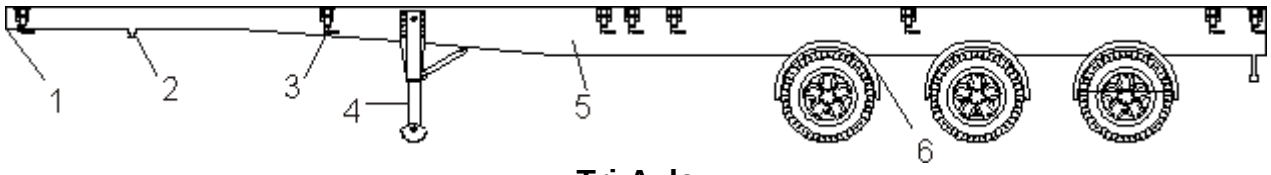
The **OWNER** should ensure that neither the Sidelifter nor any of its components are used beyond their design capacity. For crane design capacity refer to the Safe Working Load decal and for the chassis design capacity (when applicable) refer to the Chassis Plate decal. Print copies of both of these are included in the Manual.

Particular care should be taken to ensure that the emergency stop controls are always operational.

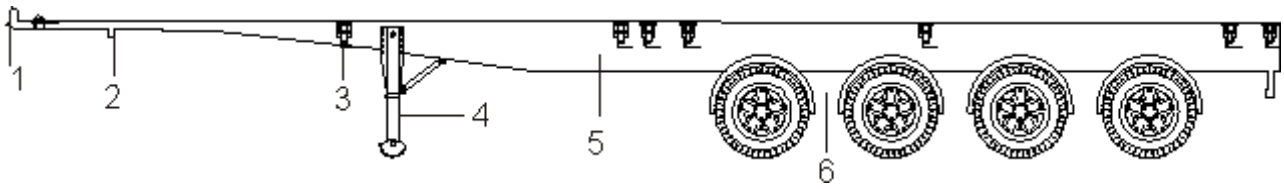
General Description

This Trailer has been built to the specifications agreed between you and your Steelbro agent.

Below are drawings of typical examples of tri- and quad-axle trailers with their main components marked.



Tri-Axle



Quad-Axle

1. Couplings
2. Fifth Wheel/ Kingpin
3. Twistlocks
4. Landing Legs
5. Chassis
6. Suspension and Axles

Taking Delivery

1. Examine Crusader, checking that specification is as ordered. Check too that all loose equipment, where called for, is correct.
2. See that lights, mudguards, bodywork etc. have not been damaged during delivery journey.
3. On semi trailer, inspect landing legs, winding up and down once or twice whilst coupled to tractor. On full trailer, inspect drawbar is type and length requested and that drawbar eye has not been damaged in transit.
4. Connect up brake hoses, see that couplings are sealing correctly. Listen for air leaks. Check brake operation.
5. Check axle oil level in hubs if Oil Filled Hubs fitted.
6. Connect up lighting cable and check all lights.
7. Check that all Transport certificates where necessary have been supplied and compliance plates are fitted and correct

On Delivery

1. Check the following torque settings: (Dry thread)
   a. Axle "U" bolt nuts — 200-270 lbft (28-37 kgm)
   b. Wheel nuts - 1" B.S.F. — 400 lbft (55 kgm)
   c. Suspension Radius rod fixing bolts — 200-270 lbft (28-37 kgm)
   d. Suspension Radius rod pinch bolts — 100 lbft (14 kgm)

1. Inflate tyres to correct pressure.
2. Check axle alignment after first 1000 kms of use.

Maintenance

Daily Inspection

Carry out this daily inspection in the interest of safety and to avoid expensive delays.

Brakes - Air Pressure Systems

1. Apply and release brakes once or twice, checking that all operating mechanism moves freely and that brakes release immediately.

   Check that linkage and camshaft movement is not excessive indicating that shoe adjustment is overdue. Air pressure should not drop abnormally when brakes are applied.

2. Vent reservoir by using drain cock to expel condensate.

Lights

Inspect switches and lights for broken brackets, fused bulbs, and cracked lenses.

Wheels and Tyres

1. Check tyre pressures.
2. Remove all objects trapped in tyre tread.
3. Ensure that tyres have no cuts or bulges.
4. Examine all road wheels for damage caused by "kerbing" or severe road shock.
5. Check that wheel stud nuts are properly seated and do not show signs of "running loose".
6. Check oil level in hubs.

After any removal and refitting of any wheel with ISO wheel nuts, ensure nuts are re-tightened within 50 to 100km of travel. Neglecting to do so could result in loss of a wheel.

Springs

Check springs for broken leaves.

Brake Hose and Lighting Connections

See that all hoses and cables are firmly connected and there is no damage caused by scuffing or scraping.

Weekly Inspection

1. Carry out daily inspection.
2. Grease all grease points with Shell Alvania E.P. Grease or equivalent.
3. Check twistlocks, if fitted, for damage.
4. Check over main chassis frame, suspension supports etc for cracks or damage.
5. Lubricate brake pivots, sliding parts.
6. Check brake adjustment.
7. Drain moisture from air reservoir. Leave drain tap open until all moisture drainage ceases.
8. Check tyre pressures.
9. If vehicle is a semi trailer grease trailer rub plate and kingpin using good quality hub grease.
10. If vehicle is a full trailer check Drawbar and steering bogey, for damage and/or loose connections.
11. Check tightness of wheel nuts.

After any removal and refitting of any wheel with ISO wheel nuts, ensure nuts are re-tightened within 50 to 100km of travel. Neglecting to do so could result in loss of a wheel.

Monthly Inspection

1. Carry out Daily Inspection.
2. Carry out Weekly Inspection.
3. Examine all hoses for signs of wear, chaffing or fretting near the connections.
4. Pressure Steam clean chassis - note: DO NOT USE STEAM CLEANER NEAR HYDRAULIC CYLINDER CHROMED SHAFTS.
5. Examine all components for signs of stress, cracking or damage.
6. Check tightness of "U" bolt nuts - torque setting 200-270 lb/ft (28-37 kg.m).SEE NOTE BELOW.
7. Check tightness of suspension radius rod fixing bolts - torque setting 200-270 lb/ft (28-37 kg.m).

8. Check tightness of suspension radius rod pinch bolts - torque setting 90-100 lb/ft. (12-14kg.m).
9. Grease suspension slipper spring ends only using good quality hub grease.
10. Ensure brake lines and electrical wiring are free from corrosion.
11. Check confined areas e.g. earth lead junctions and head- board area etc. for signs of corrosion.

When checking "U" bolt nuts for correct torque setting, ensure that the nuts are not rust welded to the spring pad thus giving a false security indication. If in doubt, slacken the nuts slightly then tighten to torque figures quoted above.

Six Monthly Inspection

1. Carry out daily inspection.
2. Carry out weekly inspection.
3. Carry out monthly inspection.
4. If vehicle is semi trailer lubricate landing legs. If vehicle is full trailer lubricate the steering turntable
5. Check and tighten if necessary turntable bolts.
6. Remove, clean, inspect, lubricate and adjust wheel hub bearings.
7. Check axle alignment. Jack up chassis to take weight off suspension.
8. Check
   a) For slackness in Suspension Rocker Bushes.
   b) For slackness in Suspension Radius Rod Bushes.
   c) For wear in spring wear areas on suspension brackets and rockers.
   d) For side wear on suspension brackets.
9. After repairing or replacing any suspension component and after inspection is completed recheck axle alignment.
10. Electrical - check interior of switch and junction boxes for signs of leakage, dust or water.
11. Check tightness of wiring terminals.
12. After vehicle has travelled 50,000 miles (80,000 km) Overhaul brake system as detailed under BRAKE SERVICING.

Lubrication - General

For the sake of efficiency and operating economy, a film of lubricant should always be present between working surfaces. Lack of lubricant produces rapid wear. But excess lubricant forced by high pressure equipment is wasteful and may damage seals, allowing oil or grease to get into parts that should not be lubricated, with detrimental effect.

Exposed fittings are subject to washing action by rain, and road spray, contamination by road dirt, and the possibility of being broken or lost. It is very important that these fittings are examined regularly, and if there is evidence of lack of lubricant, clean off and relubricate. Any grease fittings found broken or damaged should be replaced immediately.

The lubrication service is a good opportunity for a general examination of trailers in particular. Any lack of grease, excessive rusting, broken or damaged parts should be noted and reported to your Transport Manager.

Greasing should be continued until the clean lubricant is forced out of the fittings, showing that fresh clean grease has forced out the dirty grease in reaching all the working parts.

Where assemblies are fitted with seals, greasing at high pressure may damage the seals; in such cases, care must be taken not to lubricate excessively. The use of good quality oils and greases is most strongly recommended. Poor quality, low-priced lubricant may cause considerable damage as very often it lacks essential qualities.

Lubrication Intervals

These intervals are given as a general guide. Servicing periods will depend to a large extent on the nature of payloads and mileage covered. It is a great help to fit a wheel hub mileage recorder - a hub odometer makes it easy to establish lubrication and service intervals, and also to record performance of tyres, lengths of journeys etc in calculating transport charges. The recorder will also help in preventing neglect of the trailer.

Component	Type of Lubrication	Weekly	6 Monthly
Fifth Wheel Coupling	Grease:		
Brake Pivots and Sliding Parts	Oil:		
Full Trailer Ball race Turntable	Grease:		
Semi Trailer Landing Legs	Grease & Oil:		
Wheel Hub Bearings	Grease:		
Wheel Hub Bearings	Oil:		

Maintenance and Bearing Adjustment on Oil Filled Hub Axles

Periodic inspection and regular replacement of lubricant is important to obtaining maximum bearing life. Always inspect bearings for damage prior to installation. When installing wheel bearings it is important to ensure both the inside of the wheel hub and bearings are clean. We recommend that seals be replaced when wheels are removed. Extreme care should be taken when reinstalling wheels to prevent damage to the seals.

Oil Lubrication

Oil should be changed at least every 100,000 miles (162,000 kilometres), or once a year, and whenever the seals or brakes are replaced. Oil level should be inspected every 1000 miles (1600 kilometres). Always allow a few minutes, after adding oil or after vehicle operation, for the oil to settle when establishing the required oil level.

Topping up Oil Filled Hubs

There are two methods of topping up oil filled hubs and either method can be used depending on which is the most convenient. If the axle is only low in oil level, it is probably more convenient to use method 1 below, however if the hub has been drained and requires a complete refill method 2 may be quicker and easier.

1. Remove rubber bung in end of see through hubcap and bring oil level up to level indicator mark on hubcap end by filling through bunghole with an oilcan.
2. Rotate wheel until socket screw on side of hubcap is at the top. Remove socket screw from hubcap and top up oil through this hole. Total oil capacity per hub (each end) is 500ml.

Suggested Oil Properties

Condition	Gear oil	Engine Oil
Performance level API GL-5		
Normally preferred	SAE 90	SAE 50
Extreme cold environment	SAE 75W,SAE80W	SAE 30,SAE 40
Extreme warm environment	SAE 140	

Do not mix motor oil with EP gear oil, due to possible compatibility problems. Axles are filled with Castrol Multitrax 80W/140 when supplied on STEELBRO Products ex factory.

Failure to correctly lubricate bearings - and to maintain proper lubrication - could cause bearing and axle spindle damage, which could result in the wheel locking up or coming off during vehicle operation.

Axle Alignment

Incentive

To obtain the maximum mileage from tyres and eliminate side tracking and poor vehicle control, tractor and trailer axles must be maintained parallel to each other.

Various adjustment methods are employed, the most popular being slipper type springs with either radius rods, or adjusters fitted beneath the springs.

Suspension mounting brackets are located precisely on the main rails or frame, in relation to the KingPin, and this accuracy must be maintained if replacing parts. An 1/8" (3mm) deviation must be considered as the maximum tolerance.

Preparation

Park the empty trailer on level ground.

Shunt the trailer forward and backward a little so that the unit comes to rest with the brakes in the "off" position and the suspension levelled. Uncouple tractor from trailer.

Apparent axle misalignment is sometimes due to the trailer standing on uneven ground, causing a self-steering effect or, alternatively, the trailer may be at rest immediately following a turn. This temporary condition would be corrected on "moving off".

We suggest that the above factors are noted before adjusting axle alignment.

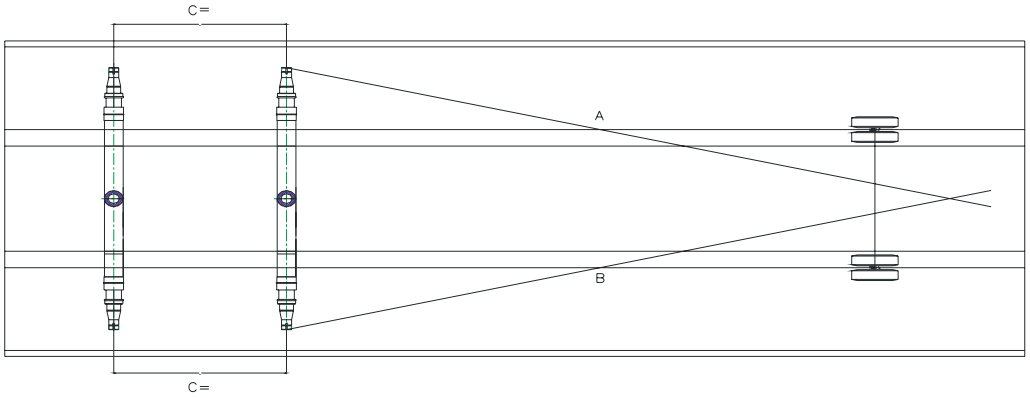
Any axle found with cracks should NOT be repaired but replaced, immediately. Repair welding can be detrimental to the structural integrity of the axle beam, where the benefit of the original tube heat treatment may be nullified by the welding.

Checking

Always examine mechanical parts and repair or replace worn parts prior to making an axle alignment check, i.e. radius rod bushes, rubber and steel springs and spring "U" bolts.

Check axle alignment by measuring from the kingpin centre to each end centre of the trailer axle (fig 1). The distances (A) and (B) must be within 1/16" (1.5mm) of each other. On multi-axle vehicles, the rear axles should be parallel to the leading axle (C) being within 1/8" (3mm).

Where obstructions prevent the tape measure being in a straight line, it will be necessary to transfer the measurements to floor level using two plumb lines.



Recheck all measurements after adjustment.

To check for matched height, park loaded trailer on a level surface and measure from ground (or wheel hubs) to the under side of each side rail. These measurements should be equal, but a discrepancy of up to 1/2" (12.7mm) is acceptable. Should the difference be greater than this, a weak spring is the possible cause. In such cases, springs should be replaced by new components, in order to obtain matched heights.

Toe-in, Toe-out

Trailer axles are manufactured to + 1/16" (1.5mm) Toe. When checking Toe, maximum TOE-IN must not exceed 3/16" (4.5mm) and maximum TOE-OUT must not exceed 1/16" (1.5mm).

Camber

Unless otherwise specified by the customer trailer axle beams are straight - no camber. If however the axle is cambered, the top dead centre of the axle will have a small die mark on each end of the axle close to the inboard side of the brake spider. Cambered axles must be installed with the die marks at the top.

Fault Finding for Trailer Brakes

The trailer braking system is completely dependent on the satisfactory functioning of the tractor system, both for the air pressure supply and the control. Therefore it is advisable to ensure that the tractor system is working correctly before condemning the trailer braking system

Brakes Inefficient

- Brakes need adjustment, relining or lubrication.
- Brake valve output pressure, on tractor vehicle, below normal.
- Defective relay emergency valve, giving low delivery pressures.
- Low air pressure in tractor and / or trailer system.

Brakes Apply Slowly

- Brakes need adjustment, or lubricating.
- Brake valve output, on tractor vehicle below normal.
- Low air pressure in tractor and / or trailer system.
- Damaged airline or hose, restricting airflow.
- Excessive leakage when brakes applied.

Brakes Release Slowly

- Brakes need correct adjustment.
- Brakes or linkage binding, or requiring lubrication.
- Exhaust port or relay emergency, or quick release valves obstructed.
- Restricted hose, or damaged airline.

Brakes Not Functioning

- Cut-out cock on "service" line closed.
- Service line coupling disconnected, or excessive leakage in line.
- Shut off cock on "emergency" line closed and no pressure in trailer reservoir. "Emergency" line coupling disconnected, or excessive leakage.
- Obstructed airline or hose.
- Leakage in brake operating units, or air lines.

Brakes Do Not Release

- "Emergency" line coupling disconnected, or excessive leakage.
- Handbrake valve in applied position.
- Relay emergency valve in emergency position.
- Cut-out cocks closed.
- Obstructed air line or hose.
- Brake assemblies binding.

Brakes Grab

- Grease or oil on brake linings.
- Brake assemblies or linkage binding.
- Defective relay emergency valve, or brake valve.

Uneven Braking

- Brakes need adjustment, relining or lubricating.
- Grease, or oil, on brake linings.
- Brake assembly damaged, or springs broken.
- Return spring broken in brake operating unit.
- Defecting diaphragm, or seal, in brake operating unit.

Air Leakage with Brakes Released

- Relay emergency valve leaking.
- Leaking airline, or hose.

Air Leakage with Brakes Fully Applied

- Relay emergency valve, or tractor brake valve, leaking.
- Leaking airline or hose.
- Defective diaphragm, or seal, in brake operating unit.

Excessive Oil and Water Present in System

- Reservoirs, on tractor and trailer, not being drained often enough.
- Air compressor, on tractor, passing excessive oil.

Notes on Tractor/Semi Trailer Operation

Coupling and Uncoupling

Periodically check that coupling jaws or hook locks are free, working easily and are well lubricated. If the main plate is covered with road dirt and grit, clean off with solvent and re-lubricate with a good quality grease (hub grease is ideal). Regularly inspect tractors and trailers for damage to couplers, kingpins and pick-up plates, caused by violent impact. We recommend this, as it is the practice of some drivers to back up to trailers too fast, when coupling.

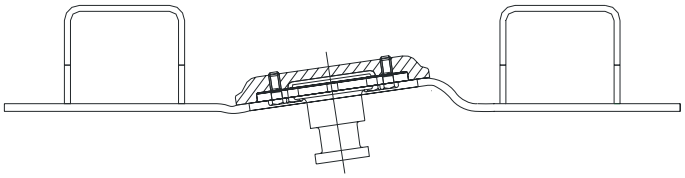
Undetected damage resulting from this careless and dangerous habit can endanger life and goods.

Experience Counts

Everyone connected with articulation is familiar with the sound of a tractor being coupled to a trailer - but it is difficult to draw a line between the firm, positive "clunk" and an impact between tractor and trailer severe enough to cause damage.

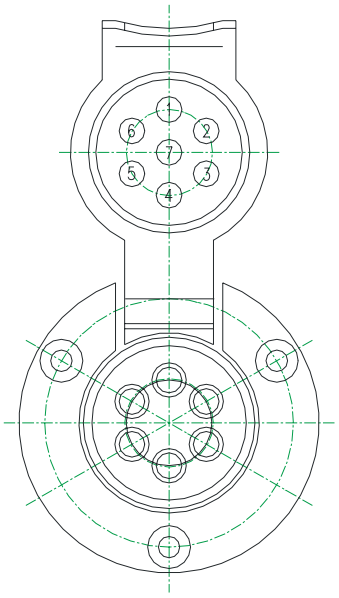
Chief Cause of Trouble

Coupling heights of loaded trailers when parked will vary due to many operating factors, such as difficult road or yard surfaces. Fleet surveys have shown that most damage is caused by attempting to couple up units that are unsuited in terms of coupling heights. Many of the older tractors have rear springs with a high deflection rate, and when uncoupling a loaded trailer, the landing gear is wound down at the loaded height. As the tractor moves away from the trailer, the tractor springs rise to the unladen position. Thus, when recoupling, the tractor springs have to be forced down to permit the fifth wheel to pass under the trailer plate. This action requires considerable effort, but if the driver uses too much power an excessively violent coupling takes place. Damage is often caused to the trailer plate in this way and periodic checks should be made to ensure that the plate is not distorted and that the kingpin is square to the face of the trailer pick - up plate. Damage can also be caused to the coupler throat, and spreading of the hook jaws, if the trailer is too high for the tractor unit. The surfaces of the trailer pick up plate and fifth wheel coupler should be in contact to obtain correct connection



Typical damage and misalignment of kingpin caused by an excessively violent coupling of tractor and trailer:

Simple Checking Devices For Semi Trailers



	Contact No.	Circuit	Circuit conductor Colour
7 Pin Connector	1	Left – hand	Yellow
	2	Reversing signal	Black
	3	Earth return	White
	4	Right – hand turn	Green
	5	Service brakes	Blue
	6	Stop lamps	Red
	7	Rear lamps clearance & side marker lamps	Brown

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