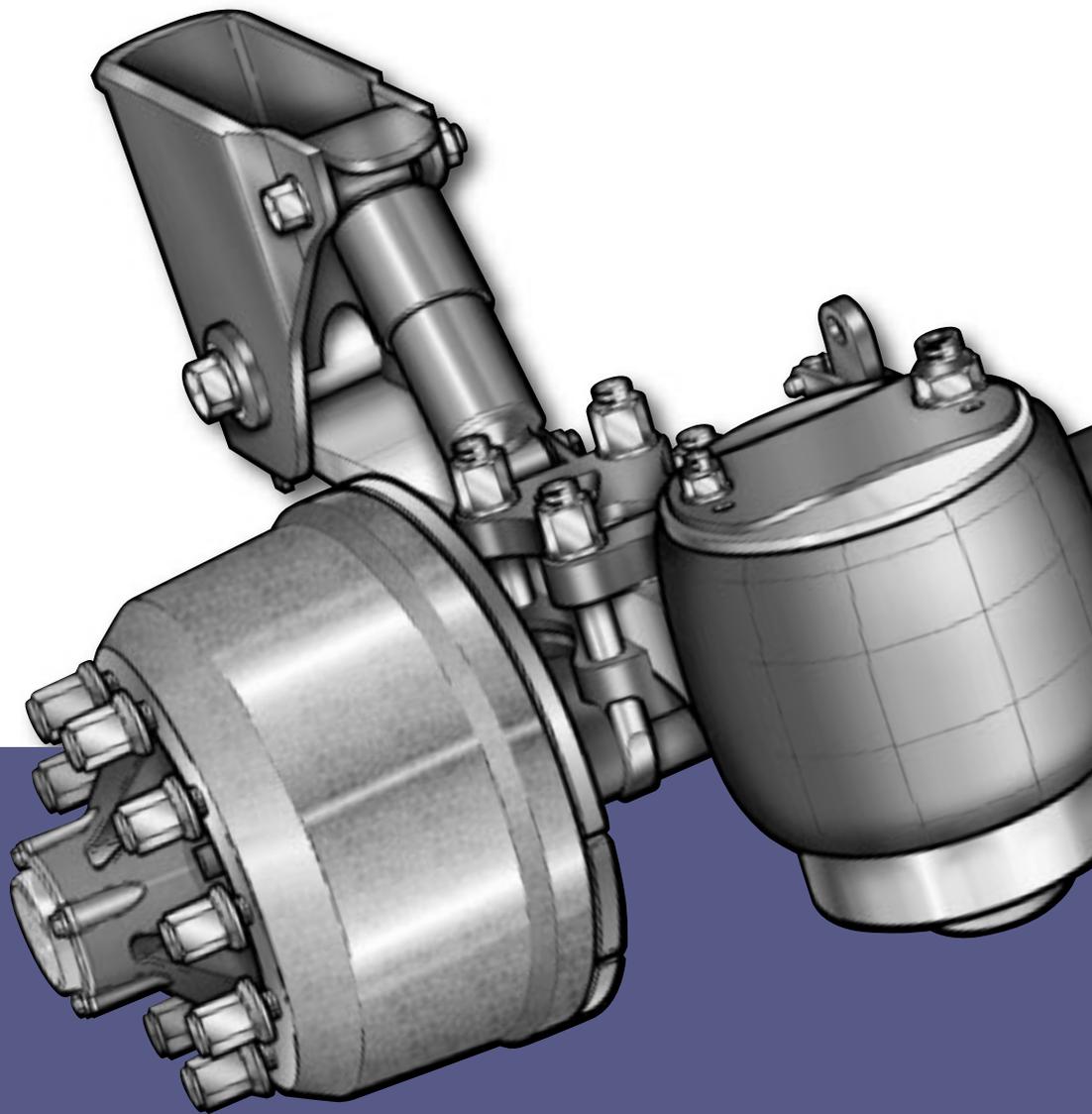




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Meritor Air Suspension Service Manual

Flexlite XL9000, Flexair FL9000 & FL11000



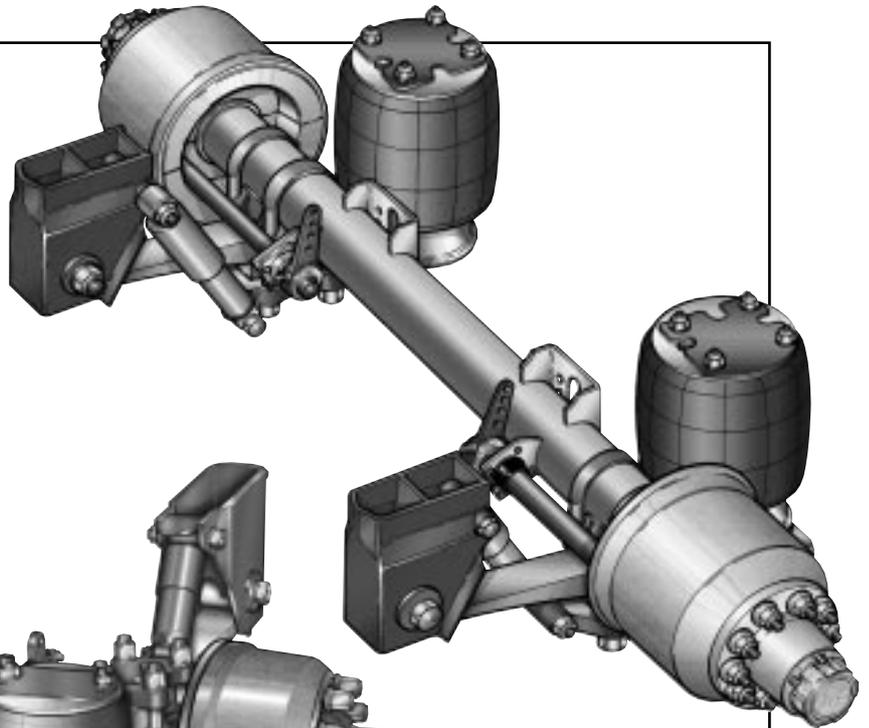
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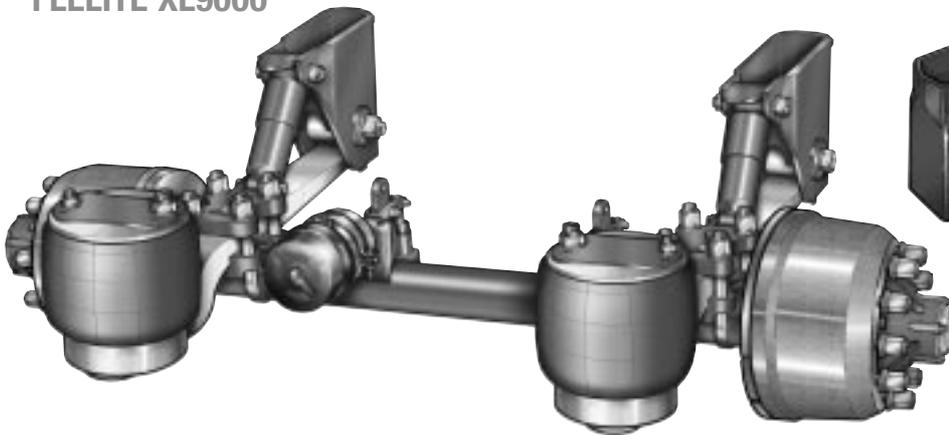
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Air Suspension Service

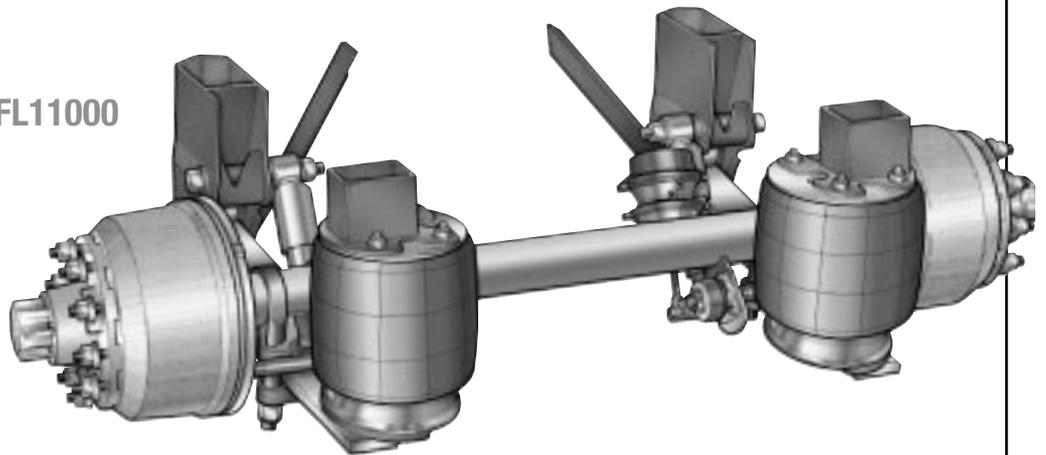
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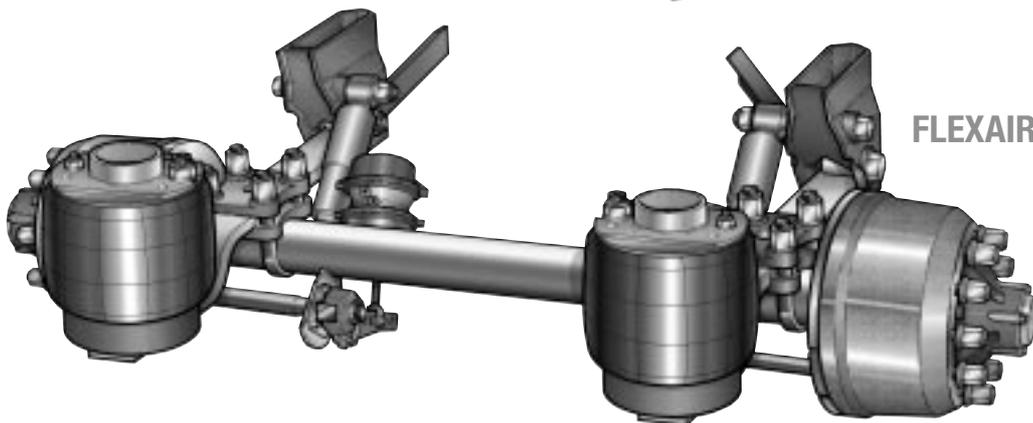
FLELITE XL9000



FLEXAIR FL11000



FLEXAIR FL9000



Air Suspension Service

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Air Suspension Service

Meritor HVS Suspension Warranty

1. MECHANICAL, FLEXAIR AND INDAIR SUSPENSIONS
24 MONTHS PARTS AND LABOUR

2. FLEXAIR AND FLEXLITE UNITS ASSEMBLED WITH
AXLE BY MERITOR H.V.S.
36 MONTHS PARTS AND LABOUR

For full warranty terms and conditions see 'Meritor Warranty Terms and Conditions' Publication No 4.84.1

Unless otherwise stated, Aftermarket components are warranted for 1 year, parts only, mechanical failure only.

Warranty Procedure

Should any MERITOR equipment fitted to your trailer become unserviceable within the warranty period, contact the trailer manufacturer or MERITOR Service Department who will advise on the appropriate action.

A comprehensive network of original parts distributors and service stations operate throughout Europe; this is supported internationally with agents strategically placed around the world.

MERITOR H.V.S. reserve the right to make changes in specifications shown herein or add improvements at any time without notice or obligation.

PARTS SHOWN ARE MADE FROM DRAWINGS IN WHICH COPYRIGHT SUBSISTS. THE MAKING OF COPIES OF ANY OF THESE PARTS IS PROHIBITED.

Patents and applications of MERITOR H.V.S. Ltd that are specifically relevant to air suspension systems:

Indair ride height adjustment, GB Patent No. 2165500. **Shock absorbers as restraints**, GB Patent No. 2165501. **Indair suspension**, GB Patent No. 2165195, CA Patent No. 1232302, DE Patent No. 3437393, NZ Patent No. 209838, US Patent No. 4593930. **Deflation of air suspension**, GB Patent No. 2184405. **Compact Indair**, GB Patent No. 2194761. **Load distribution on air suspended vehicles**, GB Patent No. 2239222, EPO (BE, DE, DK, ES, FR, IT, NL) appn. 90314050, AU Patent No. 646005, IE appn. 4530/90, NZ appn. 236519, PT appn. 96354, ZA Patent No. 90/10241. **Suspensions for vehicles (long stroke)**, EPO (AT, BE, DE, DK, FR, GB, IT, NL, SE) Patent No. 472309. **Vehicle tracking adjustment**, GB Patent No. 2257670. **Loading/unloading of air suspended vehicles**, EPO (BE, DE, ES, FR, GB, IT, NL) appn. 92307639. **Axle lift**, GB appn. 9404557, PCT, EPO (AT, BE, CH+LI, DE, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, AU, LA, NZ, US) appn. PCT/GB94/458.

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The high quality assurance management systems applied by MERITOR are endorsed with the awarding of ISO 9001, Lloyd's Register Quality Assurance.



Air Suspension Service

SECTION 1

Introduction

Meritor air suspensions are specifically designed to suit the MERITOR range of axles. Modern technology and stringent testing have been used to ensure the perfect match.

The basic design of these units is of the flexible link (trailing arm) type.

The axle is mounted to flexible trailing arms using a cast steel seat design. The arms are then mounted via rubber bushes, to a pair of hanger brackets which are then welded to the chassis.

At the rear of each trailing arm an airspring is located and the top of the airspring fitted to the chassis.

Principle of Operation

During normal running in a straight line, striking bumps, potholes etc., superb ride characteristics are obtained due to the airsprings providing a very low vertical suspension stiffness at the wheel. This ensures very little shock is transmitted to the chassis/payload, thus minimising structural damage or problems with goods.

During cornering manoeuvres, the axle tube acts as an anti-roll bar and links each trailing arm. The majority of the compliance in roll comes from the flexing of the trailing arms. Thus their design is a very careful mix of strength and stiffness.

Careful design of the damper characteristics and positioning ensures a high degree of damping required to gain the best possible performance from an air suspension.

Modern dynamic analysis methods and testing were used to determine such characteristics and positions.

Ancillary Equipment

1. SUSPENSION PIPING SYSTEMS

Pipework is available as complete pre-assembled kits for quick and easy fitting. These are available in different versions depending on the bogie specification, e.g. tandem, triaxle etc.

2. AXLE LIFT FACILITY

Axle lift facilities are available that will fit all suspension models. They are capable of being retrofitted and in some cases not requiring any welding.

3. AIRSPRING DUMP FACILITY

MERITOR recommends that all air suspended trailers without raise/lower valves are fitted with this facility and a kit is available from MERITOR.

When an air suspended trailer deflates, it can roll forward causing bending and possible collapse of the landing legs. This is caused by wheel rotation as the axle travels up.

A good solution to this problem is to fit rocking type landing legs.

4. RAISE/LOWER FEATURE

With air suspensions it is possible to raise or lower the chassis to facilitate loading at different dock heights.

MERITOR offers the Levelride II system to facilitate this requirement.

This is an MERITOR patented system that is a raise/lower device but with an automatic reset facility triggered by application of the brakes.

Upon the first brake application after using the raise/lower system, an electrical signal is sent to the levelride unit that automatically resets the trailer to its normal ride height. This system eliminates unnecessary damage to the suspension that can occur if the trailer is driven in the raised or lowered position.

5. AUTO DROP

When a lift axle is fitted, it is possible to fit a Meritor ELMS system that enables the lift axle to automatically drop to its unlifted position when the axle load exceeds a predetermined level.

6. ANTI-VACUUM SYSTEM

A requirement by Ferry companies is that air suspension systems are exhausted before trailers are loaded aboard ship. Consequently there is risk that during loading, the rubber side walls of the airspring can become trapped between the internal rubber bump stop and piston and become damaged.

This can be avoided by using an anti-vacuum system available from MERITOR. A special quick release valve is fitted to each side of the suspension which allows air into the system from atmosphere when the airspring pressure falls below atmospheric pressure, thus preventing the sidewalls from collapsing.

Meritor Patents

All MERITOR designs are registered, and copyright exists on all drawings. In some instances, these designs are covered by one or more patents. The following patents apply to the designs shown in this manual:-

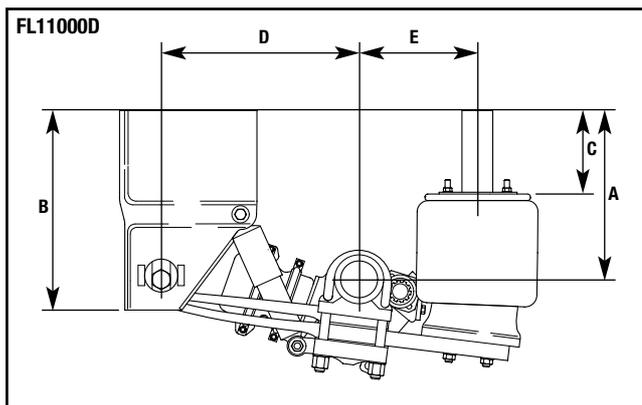
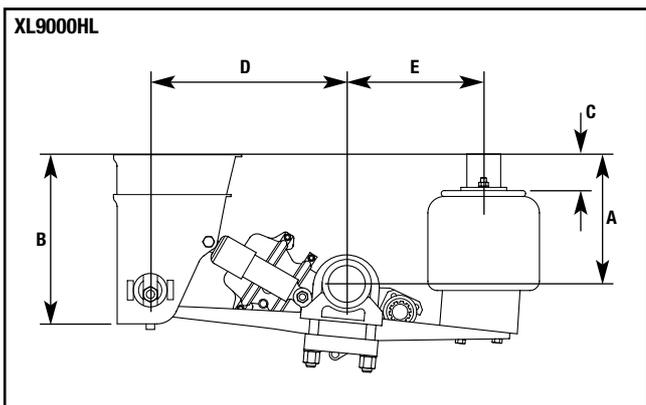
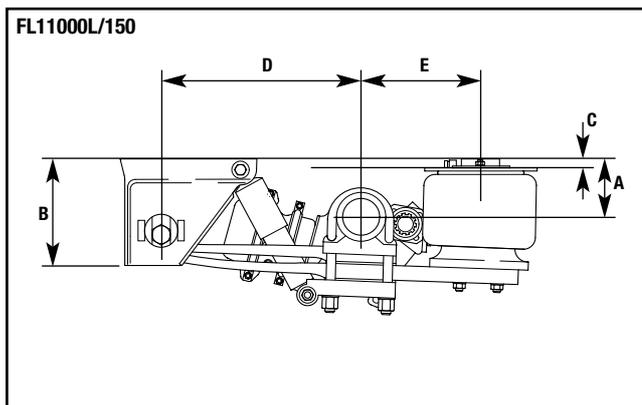
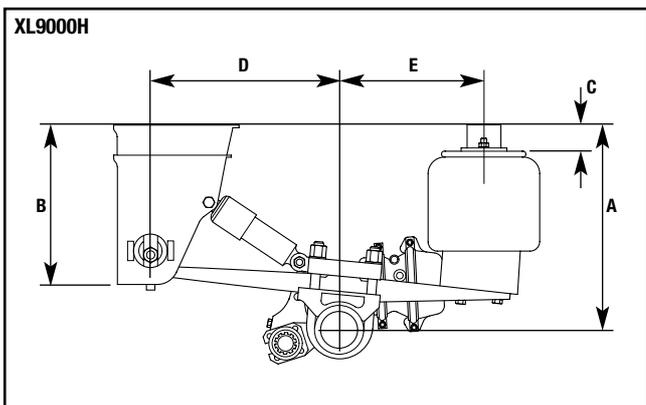
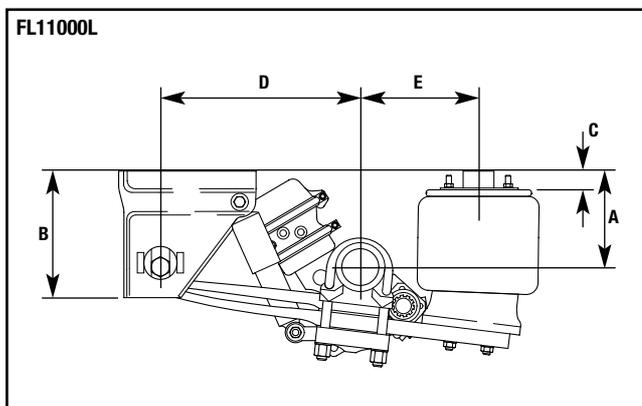
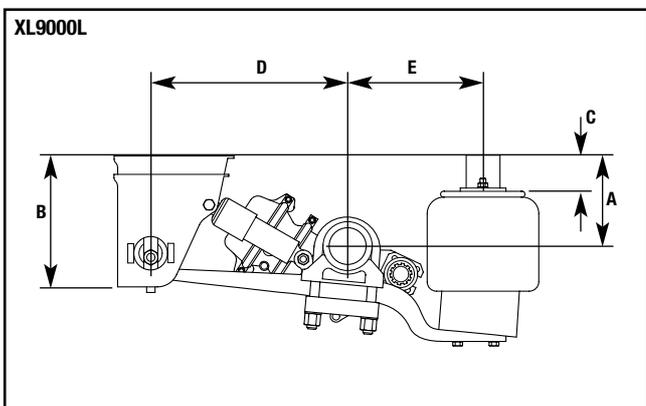
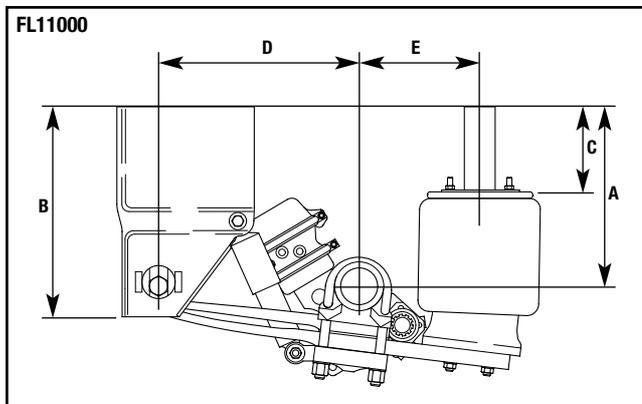
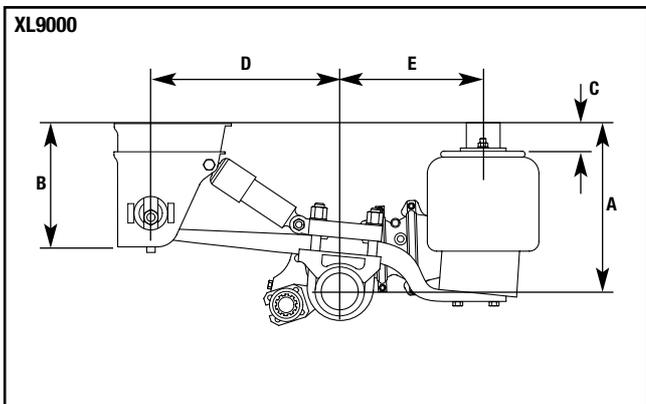
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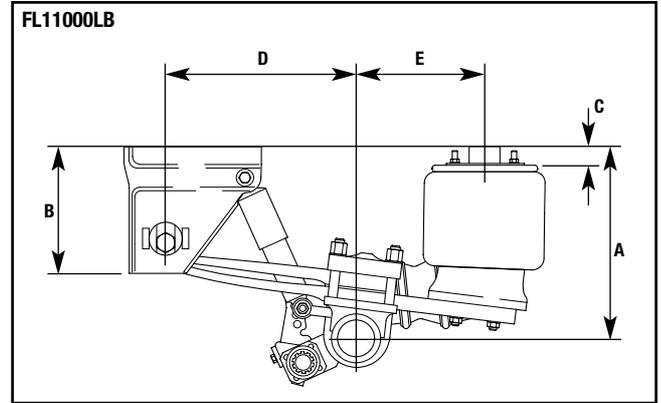
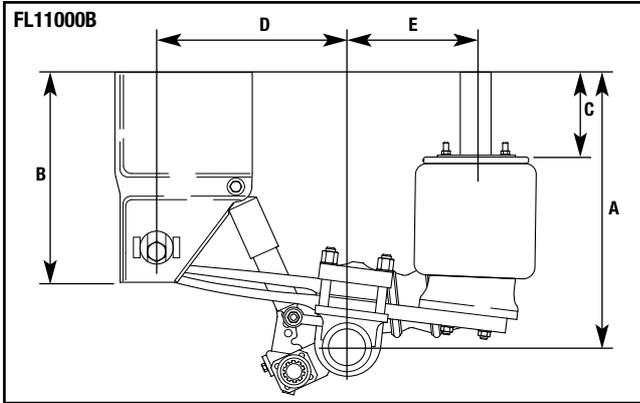
Air Suspension Service

A = RIDE HEIGHT B = FRAME BRACKET HEIGHT C = AIRSPRING PEDESTAL HEIGHT D = PIVOT TO AXLE CENTRE LINE E = AXLE CENTRE TO AIRSPRING CENTRE LINE



Air Suspension Service

A = RIDE HEIGHT B = FRAME BRACKET HEIGHT C = AIRSPRING PEDESTAL HEIGHT D = PIVOT TO AXLE CENTRE LINE E = AXLE CENTRE TO AIRSPRING CENTRE LINE



IMPORTANT SUSPENSION PARAMETERS

A. RIDE HEIGHT

This is the distance from the centre of the axle to the underside of the chassis.

B. FRAME BRACKET HEIGHT

C. AIRSPRING PEDESTAL HEIGHT

D. PIVOT TO AXLE CENTRE LINE

This is the distance from the pivot centre in the frame bracket to the centre of the axle tube.*

E. AXLE CENTRE TO AIRSPRING CENTRE LINE

This is the distance from the axle tube centre to the centre of the airspring pedestal.*

* Both dimension 'D' and 'E' must be measured when the axle is in the ride height position and dimension 'A' is set.

NOTE:

Refer to MERITOR installation drawings CD for allowable options and recommendations.



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Air Suspension Service

Flexair FL9000 Range Summary

OPTION	FL9000	FL9000L	FL9000NB	FL9000H
Ride Height	375-550mm	200-375mm	310-425mm	500-550mm
Capacity	9000 kg	9000 kg	9000 kg	9000 kg
Frame Centres (min-max)	1150-1400mm	1150-1400mm	1150-1400mm	1150-1400mm
Airspring Offset	30mm	30mm	30mm	30mm
Axle Travel (up/down)	100/110mm	100/95mm	80-90/110mm	100/110mm
Off road suitable	Yes	Yes	No	Yes
Suitable for drum	Yes	Yes	Yes	Yes
Suitable for disc	Yes*	No	Yes	Yes
Recommended axle lift	Cradle/Dual Side Lift	Cradle/Dual Side Lift	Cradle	Cradle/Dual Side Lift
Pivot Eye Tracking (o=option s=standard)	o	o	o	o

OPTION	FL9000HL	FL9000HLL	FL9000i	FL9000M
Ride Height	275-375mm	300-425	375-425mm	228-453mm
Capacity	9000 kg	9000 kg	9000 kg	9000 kg
Frame Centres (min-max)	1150-1400mm	1150-1400mm	1150-1300mm	900-1200mm
Airspring Offset	30mm	0-30mm	30mm	0-95mm
Axle Travel (up/down)	100/110mm	85/205mm	100/110mm	65-230mm
Off road suitable	Yes	No	Yes	Yes
Suitable for drum	Yes	Yes	Yes	Yes
Suitable for disc	Yes*	Yes	Yes	No
Recommended axle lift	Cradle/Dual Side Lift	TBA	Not available	Dual Side Lift
Pivot Eye Tracking (o=option s=standard)	o	o	o	o

Flexlite XL9000 Range Summary

OPTION	XL9000	XL9000L	XL9000H	XL9000HL
Ride Height	375-450mm	200-250mm**	475-550mm	250-350mm
Capacity	9000 kg	9000 kg	9000 kg	9000 kg
Frame Centres (min-max)	1150-1400mm**	1150-1400mm**	1150-1400mm**	1150-1400mm**
Airspring Offset	30mm	30mm	30mm	30mm
Axle Travel (up/down)	100/100mm	100/100mm	100/100mm	100/100mm
Off road suitable	No	No	No	No
Suitable for drum	Yes	Yes	Yes	Yes
Suitable for disc	Yes	No	Yes	No
Recommended axle lift	Centre	Centre	Centre	Centre
Pivot Eye Tracking (o=option s=standard)	s	s	s	s

Air Suspension Service

Flexair FL11000 Range Summary

OPTION	FL11000	FL11000L	FL11000-150	FL11000D
Ride Height	250-475mm	200-250mm	150mm	225-450mm
Capacity	11000 kg	11000 kg	9000 kg	11000 kg
Frame Centres (min-max)	900-1200mm	900-1200mm	900-1200mm	900-1200mm
Airspring Offset	0-95mm	0-95mm	0-95mm	0-95mm
Axle Travel (up/down)	110/110mm	110/110mm	65/110mm	70/200mm
Off road suitable	Yes	Yes	No	Yes
Suitable for drum	Yes	Yes	Yes	Yes
Suitable for disc	Yes*	No	No	Yes
Recommended axle lift	Dual Side Lift	Dual Side Lift	N/A	Dual Side Lift
Pivot Eye Tracking (o=option s=standard)	o	o	o	o

OPTION	FL11000B	FL11000LB
Ride Height	500-725mm	225-450mm
Capacity	11000 kg	11000 kg
Frame Centres (min-max)	900-1200mm	900-1200mm
Airspring Offset	0-95mm	0-95mm
Axle Travel (up/down)	95/100mm	95/100mm
Off road suitable	Yes	Yes
Suitable for drum	Yes	Yes
Suitable for disc	Yes	Yes
Recommended axle lift	Dual Side Lift	Dual Side Lift
Pivot Eye Tracking (o=option s=standard)	o	o

* Ride height restrictions apply

** Can be reduced with restriction

Contact Meritor HVS for details

Air Suspension Service

SECTION 2

Re-aligning and Re-fitting of Suspensions

This section provides details of how to re-align suspensions if their settings are changed due to other work. It also discusses how to re-fit a suspension should the case arise.

RE-ALIGNMENT (TRACKING)

All Flexair models are available when new with an optional, patented pivot eye tracking facility. This device once used during the trailer build is welded up and cannot be used for re-tracking.

Flexlite models feature as standard, a pivot eye tracking facility, which is re-usable (non-welded).

If no tracking device is fitted the facility at the spring seat must be used:-

The facility at the seat allows 8mm of movement by loosening the “U” bolts.

To carry out this operation proceed as follows:

1. With the trailer unladen and no air in the system, support the chassis on stands.
2. Remove the wheels.
3. If the “U” bolts (9) are not loose, unfasten them enough to enable the axle to slide on the trailing arm and slide it as far rearward as possible.
4. Using a tape measure, place one end on the side of the hub flange and measure to the king pin. Rotate the hub forward and backwards to ensure that the measurement is the maximum possible.
5. Slide the axle on each trailing arm until the measurements from each hub to the kingpin (DR & DL) are equal to within $\pm 2\text{mm}$ as shown in Fig. 1.
6. When correct, remove each “U” bolt nut (17) and washer (18) shown in fig. 3 and clean the bolt thread to remove dirt in turn.

Fit a new nut and washer.

Repeat the operation with all nuts. Tighten all nuts in a diagonal sequence:-

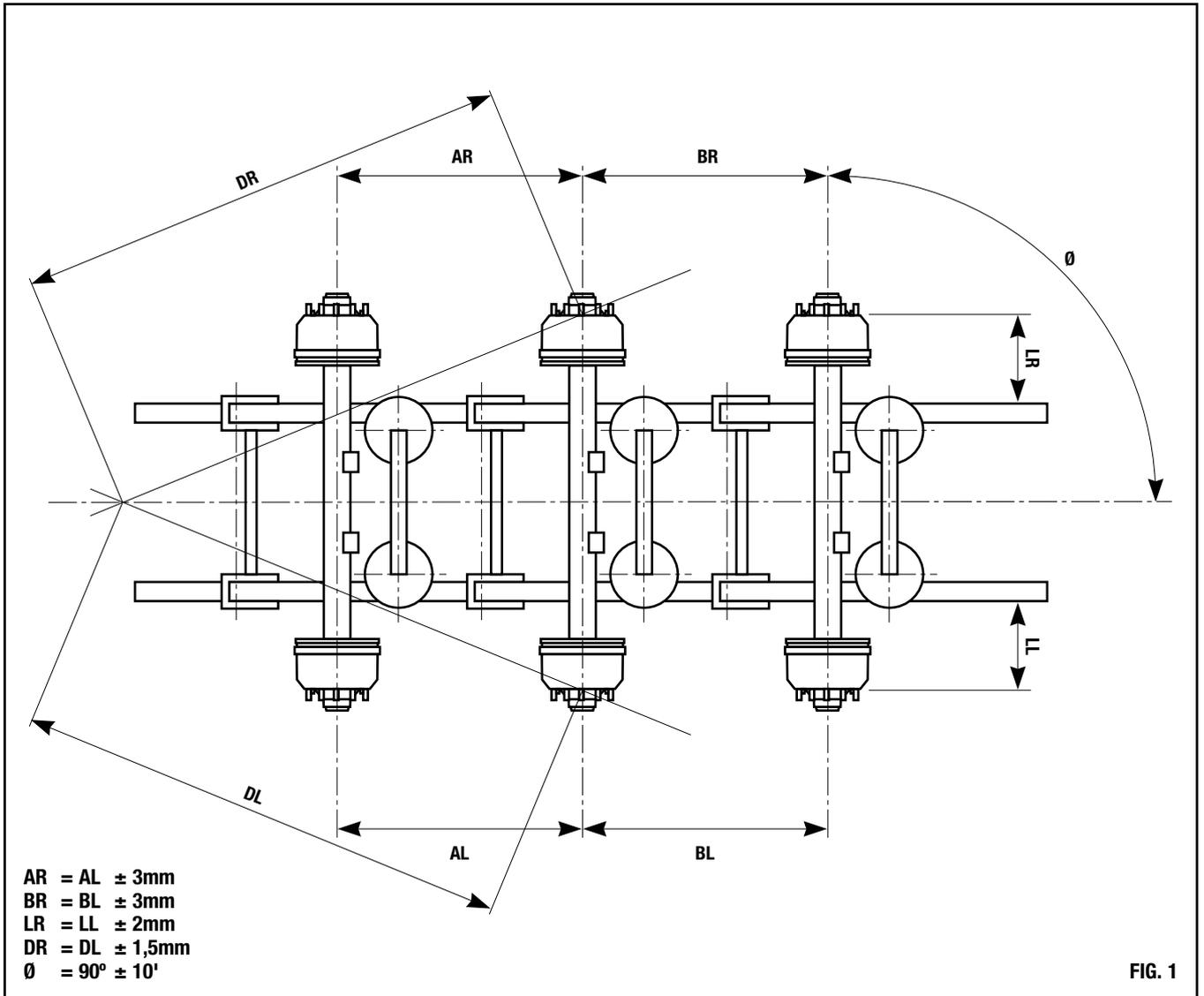
With new “U” bolts see table on page 29.

If existing “U” bolts are used re-torque Flexair and Flexlite to 425 lbf ft (575 Nm).

7. Replace wheels and remove supports from chassis.

If a drawbar unit is being worked upon, the procedure is the same except the tracking measurements are to a different point.

Air Suspension Service



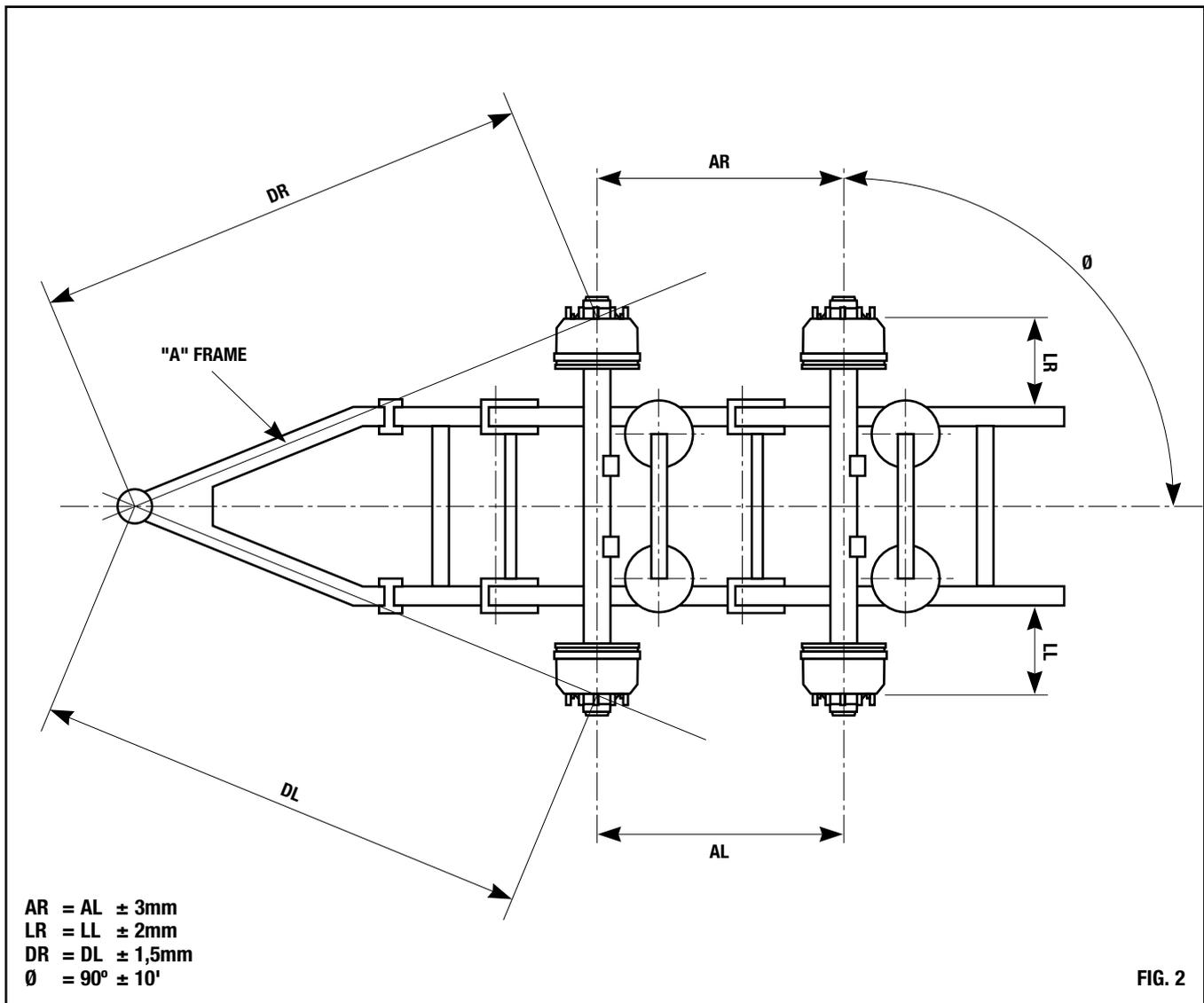
With a standard semi-trailer the measurements are to the kingpin. With a drawbar trailer they should be to the "A" frame towing eye.

Before the measurements are made, the "A" frame eye must be in its central position to the chassis as shown in Fig. 2.



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Air Suspension Service



RE-FITTING OF SUSPENSIONS

It is recommended that if any doubt exists on the correct method of fitting/removal of the frame brackets and pedestals of a suspension, advice should be obtained from the MERITOR Engineering. A CD of installation drawings is available from Meritor.

Air Suspension Service

FLEXAIR 9000

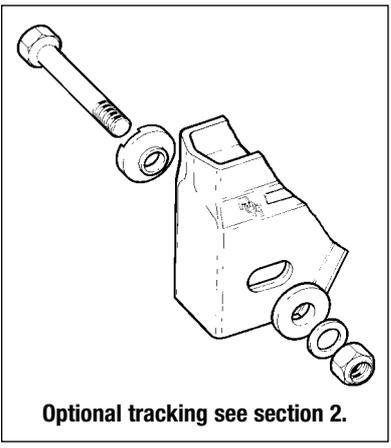
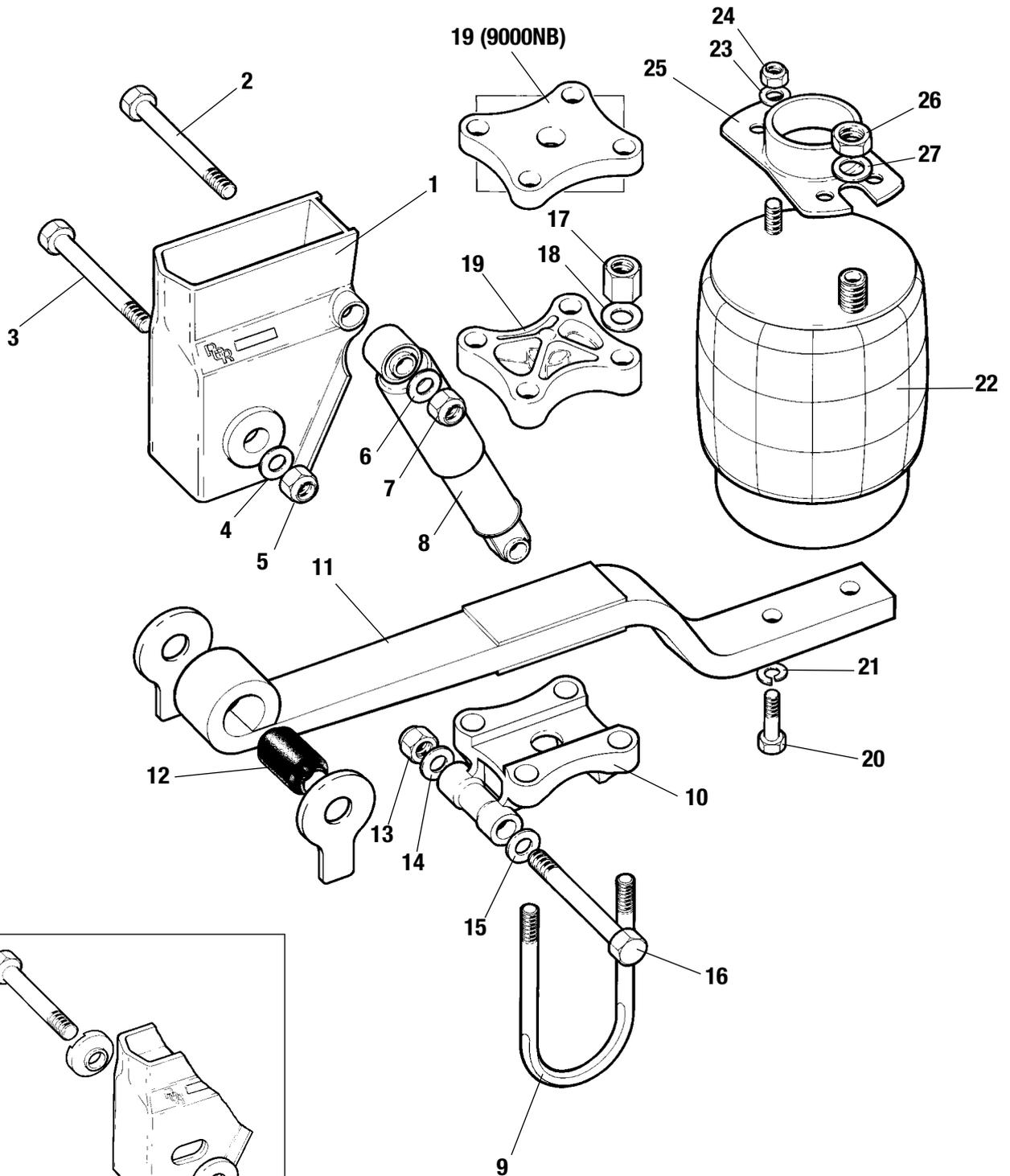


FIG. 3



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Air Suspension Service

FLEXAIR 9000L

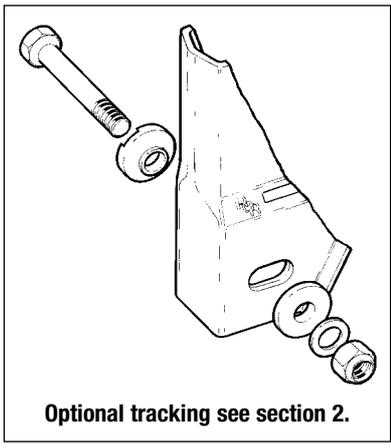
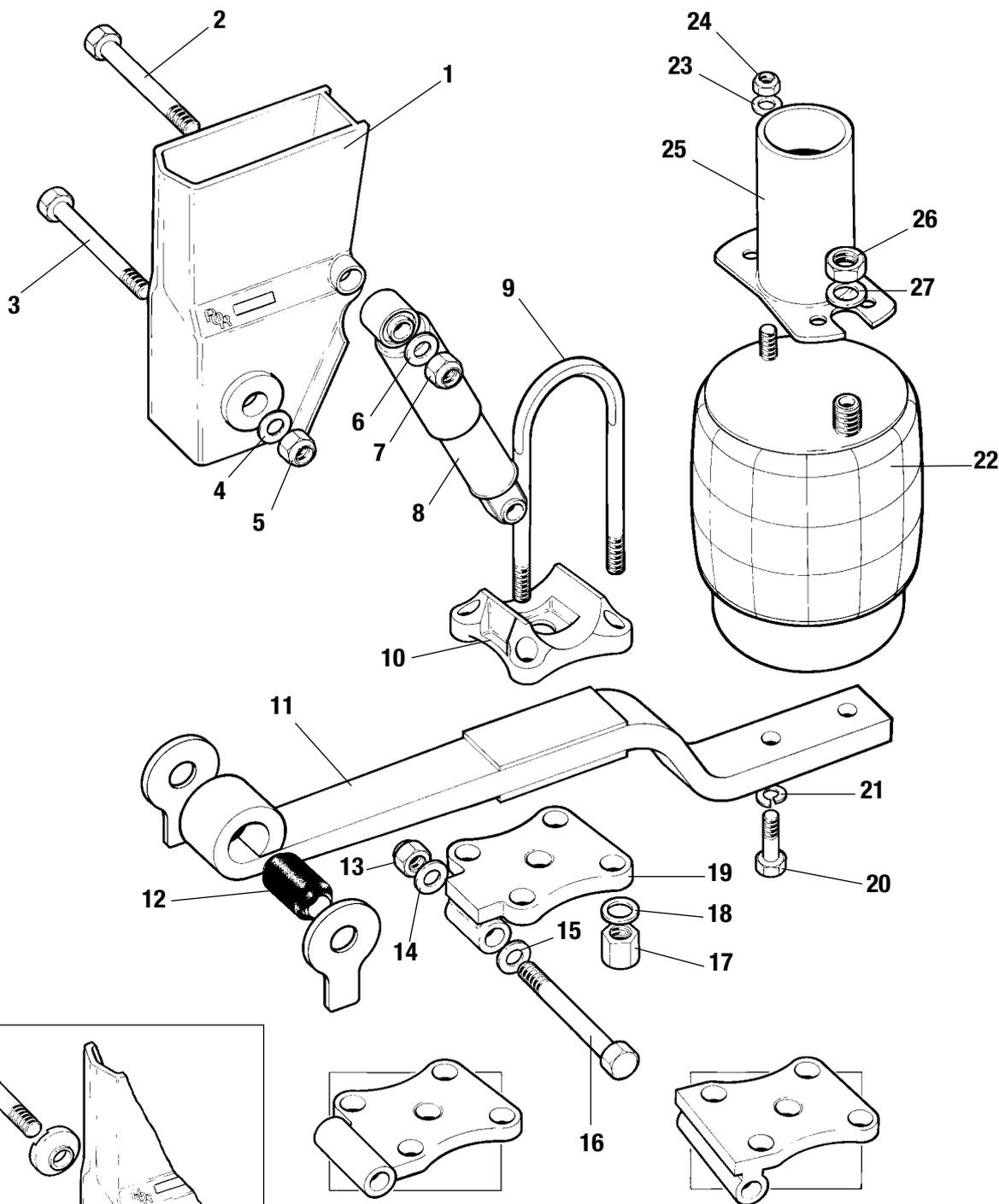


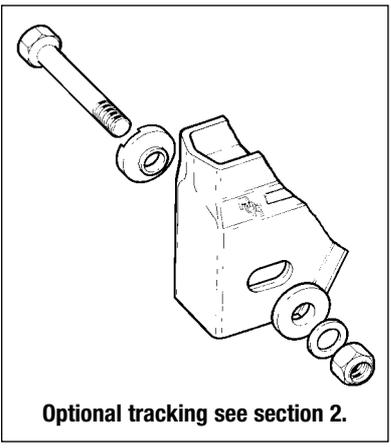
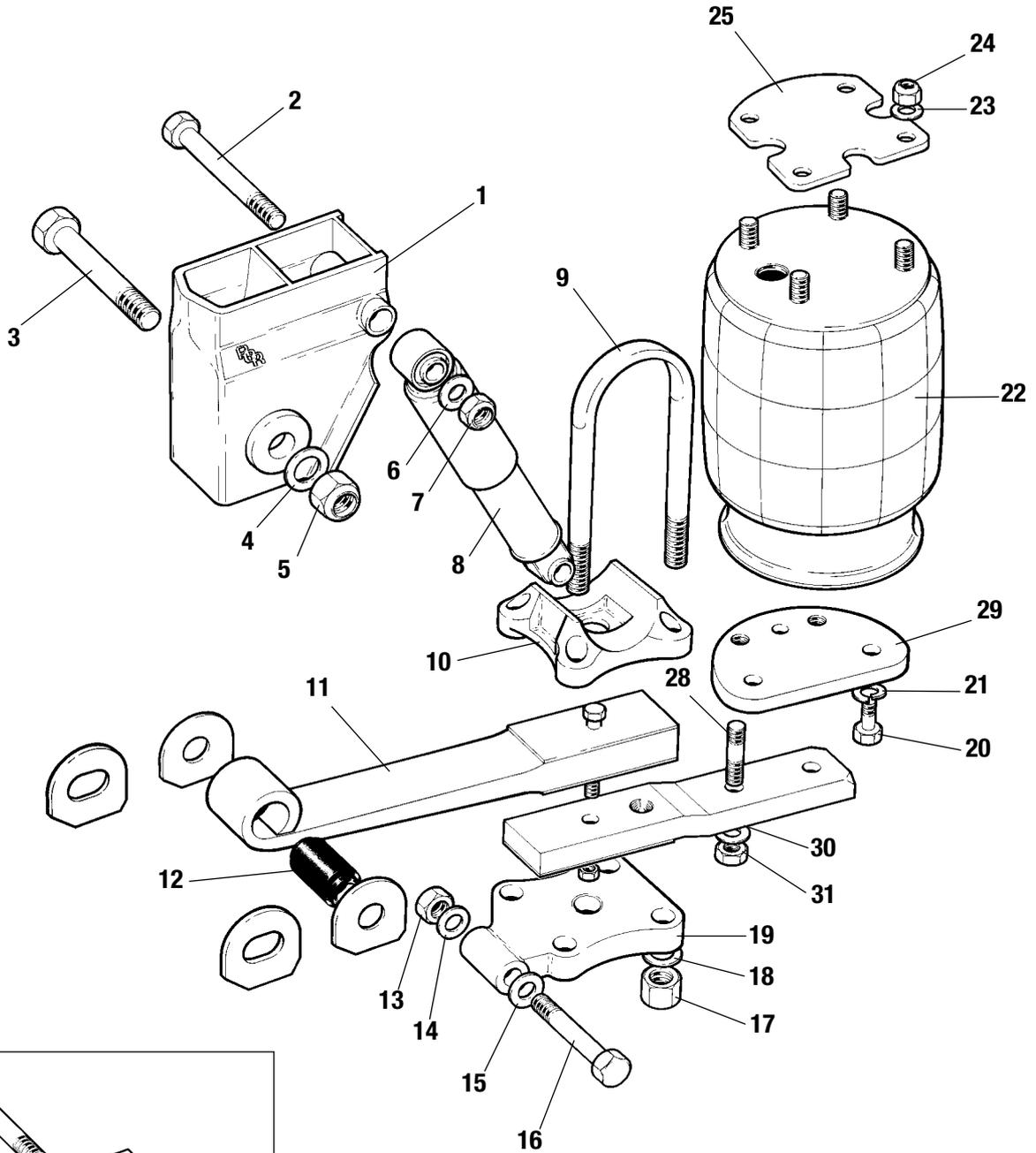
FIG. 4



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Air Suspension Service

FLEXAIR 9000M



Optional tracking see section 2.

FIG.5



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Air Suspension Service

FLEXLITE XL9000

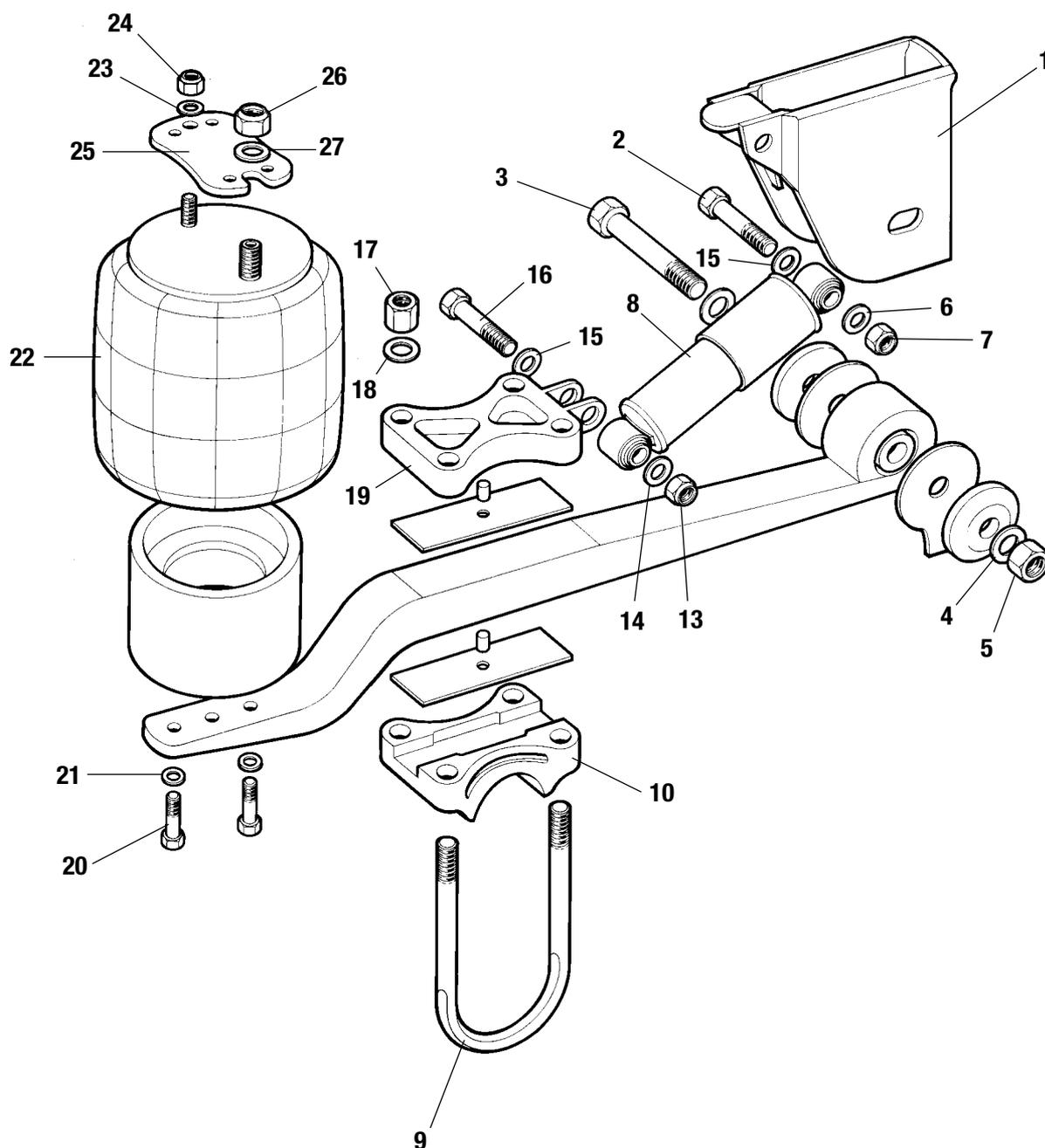


FIG. 6

Air Suspension Service

FLEXAIR 11000

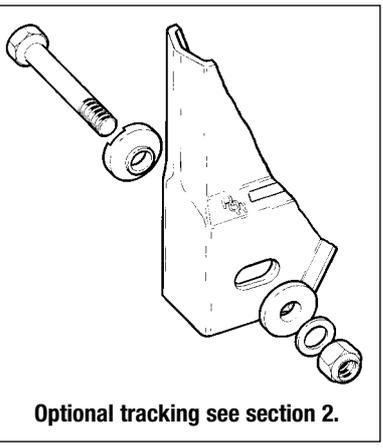
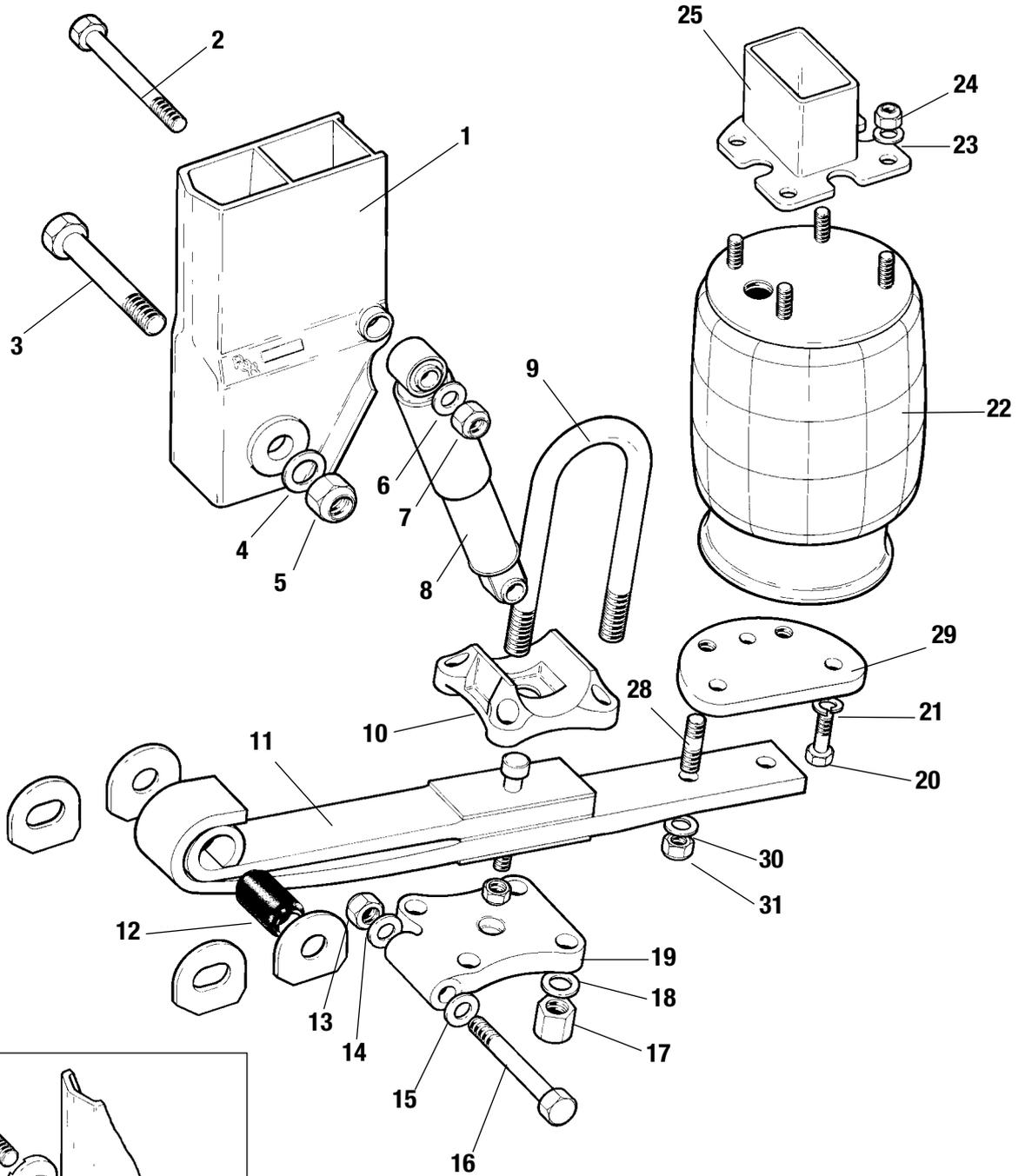


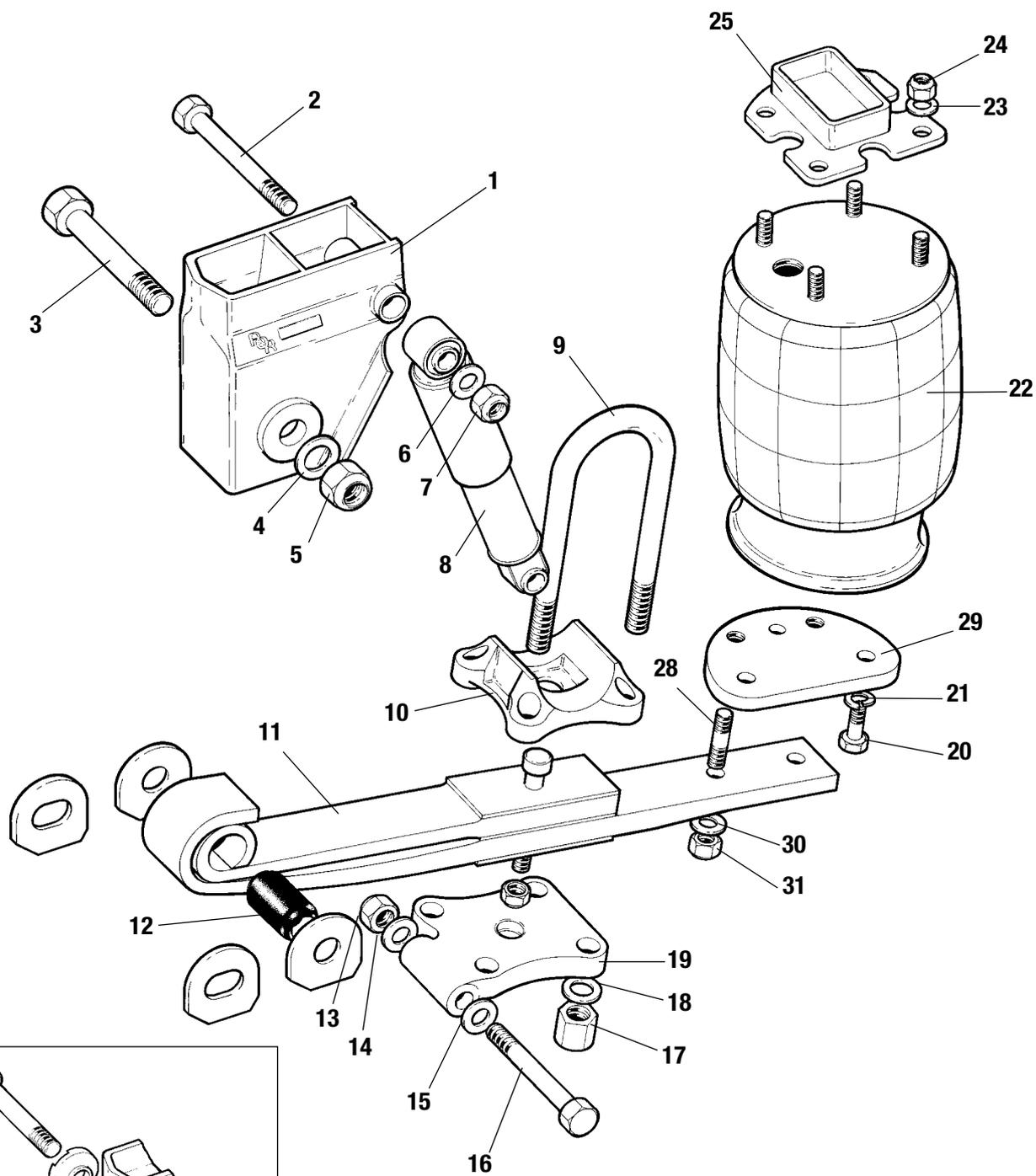
FIG. 7



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Air Suspension Service

FLEXAIR 11000L



Optional tracking see section 2.

FIG. 8

Air Suspension Service

SECTION 3

General Maintenance

(Ref. Figs. 3, 4, 5, 6, 7 & 8)

Removal and Refitting of Airsprings

REMOVAL

1. Ensure no air is in system.
2. Jack-up chassis and support on stands.

Flexair 9000, 9000L and Flexlite

3. Using a 27mm spanner remove the M22 air inlet pipe and the securing nut (26) and washer (27) from the top of the airspring.
4. Using a 19mm spanner remove the M12 nut (24) and washer (23) from the top of the airspring and the two M12 bolts (20) and washers (21) securing the airspring piston to the trailing arm.
5. Remove the complete airspring by compressing it slightly if required.

Flexair 11000 and 11000L

6. Using a 27mm spanner remove the M22 air inlet pipe from the top of the airspring.
7. Using a 19mm spanner remove the four M12 nuts (24) and washers (23) from the top of the airspring.
8. Using a 24mm socket remove the two M16 nuts (31) and washers (30) securing the airspring and offset plate (29) to the trailing arm and remove the airspring by compressing it slightly if required.
9. Using a 19mm socket, remove the four M12 bolts (20) and washers (21) securing the offset plate (29) to the airspring piston.

REPLACEMENT

Flexair 9000, 9000L and Flexlite

1. With the airspring compressed, fit in position on the airspring pedestal and fit the M22 nut (26) and washer (27) and new M12 nut (24) and washer (23) and nip tight.
2. Pull the piston down and align the two required holes with the holes in the trailing arms. Fit the two M12 bolts (20) and washers (21) and nip up.
3. Torque the top M12 nut and four bottom M12 bolts to 50 lbf ft (70 Nm) and the M22 nut to 45 lbf ft (60 Nm).

Flexair 11000, 11000L and 9000M

4. Using a 19mm socket, bolt the lower airspring support plate (29) to the airspring piston using the four M12 bolts (20) and washers (21) located with the bolt heads in the counter bores in the offset plate. Torque up to 50 lbf ft (70 Nm).
5. Ensure the offset plate is rotated to give the desired air inlet position on the top of the airspring.
6. With the airspring compressed fit the airspring studs in position in the airspring pedestal. Fit four new M12 nuts (24) and washers (23) and nip tight.
7. Pull the piston/offset plate down and fit the two M16 studs (28) through the holes in the trailing arm. Fit the two new nuts (31) and washers (30) and nip tight.
8. Torque the M12 top nuts to 50 lbf ft (70 Nm).
9. Torque the M16 bottom nuts to 135 lbf ft (180 Nm).
10. Lower chassis off support stands.

NOTE: USE ONLY MERITOR GENUINE SPARE PARTS.

Air Suspension Service

SECTION 4

Removal and Replacement of Dampers – Flexair Models

REMOVAL

1. With the trailer in its normal ride height (unladen) using a 36mm socket and ring spanner, remove the nuts (7 & 13) and washers (6 & 14) from the top and bottom damper bolts.
2. Withdraw both the upper and lower mounting bolts (2 & 16) and remove the damper (8).

REPLACEMENT

1. Locate the top eye of the damper and fit the mounting bolt with a flat washer under the head of the bolt and behind the nut. Ensure the bolt head is inboard. Fit a new nut and washer.
2. Rotate the damper and slowly pull it to extend its length until the lower eye aligns with the mounting holes in the axle seat.

Fit the lower mounting bolt, flat washers and new nut. Ensure the bolt head is inboard.

3. Using a 36mm socket and ring spanner torque the two nuts to 370 lbf ft (500 Nm).

Removal and Replacement of Dampers – Flexlite Models

REMOVAL

1. With the trailer in its normal ride height (unladen) using a 24mm socket and ring spanner, remove the nuts (7 & 13) and washers (6 & 14) from the top and bottom damper bolts.
2. Withdraw both the upper and lower mounting bolts (2 & 16) with their washers (15) and remove the damper (8).

REPLACEMENT

1. Locate the top eye of the damper and fit the mounting bolt with a flat washer under the head of the bolt and behind the nut. Ensure the bolt head is inboard. Fit a new nut and washer.
2. Rotate the damper and slowly pull it to extend its length until the lower eye aligns with the mounting holes in the axle seat.

Fit the lower mounting bolt, flat washers and new nut. Ensure the bolt head is inboard.

3. Using a 24mm socket and ring spanner torque the two nuts to 220 lbf ft (300 Nm).

Air Suspension Service

SECTION 5

Removal and Replacement of Axle

There are a number of ways of removing the axle depending on how much of the suspension is to be dismantled. The following procedure however, is recommended assuming the suspension is to be left in place.

REMOVAL

1. Ensure no air is left in the system.
2. If spring brakes are fitted they should be released and constrained using a caging tool.
3. **DRUM BRAKE TRAILERS** – Remove the split pins and clevis pins securing the brake chambers to the slack adjuster levers.
3. **DISC BRAKE TRAILERS** – Remove brake pipes, leaving the chamber attached to the caliper.
4. If the axle is used to locate the bottom of the arm, with the suspension height control valve, remove the eye coupling on the levelling valve arm from the pin on the axle.
5. Jack up the trailer and support it under the chassis to take the weight of the axle to be removed.
6. Support the axle to be removed on stands such that a pump trolley or similar device can be slid between them to lower the axle once it is unbolted from the suspension.
7. Remove the wheels from the axle.
8. Using a 36mm spanner and socket, remove the nut (13) and washer (14) from the lower damper bolt (16) and withdraw the bolt. Slacken the top damper bolt nut (7) and pivot the damper upwards to clear the axle and secure it to the chassis.
9. Remove the airspring as detailed in Section 3.
10. Ensuring the axle supports are safe and using a 36mm socket remove the four “U” bolt nuts (17) and washers (18) from each side of the suspension, remove the “U” bolt plate (19) and withdraw the “U” bolts (9).

For single axle trailers and rear axles of tandems and triaxles proceed as follows:

11. Using a 46mm spanner and socket, slacken the two main pivot bolt nuts (5) just enough to allow the trailing arms to easily pivot. Swing the arms off the axle leaving it supported on the stands.
12. Slide trolley jacks as required under the axle, jack them up to take the weight off the stands. Remove the stands and lower the jacks. Pull the axle clear backwards over/under the arms and clear of the trailer.

For the front axle of a tandem and the centre or front axle on a triaxle trailer proceed as follows:

13. Using a 46mm spanner and socket, remove the two main pivot nuts (5) and washers (4) and remove the bolts (3). Ensure the arms are supported to prevent them dropping. The arms can now be removed.
14. Slide trolley jacks as required under the axle and take the axle weight. Remove the axle stands and slide the axle out sideways.

REPLACEMENT

If the original axle is not to be refitted, the replacement must be supplied and approved by MERITOR. The use of axles previously used on other suspensions is prohibited. If in doubt contact the MERITOR Engineering Applications Department for detailed recommendations.

1. Lift axle onto trolley jacks and rotate to ensure it is correctly orientated.
2. For single axle trailers and rear axles of tandems and triaxles slide the axle into position over/ under the rear of the suspension unit.

For the front axle of a tandem and the centre or front axle on a triaxle trailer:

3. Slide the axle sideways into position and place the trailing arms eye ends in position in the frame brackets (1).
4. Align the holes in the trailing arm bushes (12), apply a thin coat of general purpose grease to the shank of the pivot bolts (3) ENSURE NO GREASE IS ON THREADS. Fit the bolts and new washers (4) and nuts (5) and tighten such that the arms can easily pivot.

Continue for all models as follows:

5. Position axle stands under the axle at a workable height and lower the axle onto them ensuring the trailing arm (11) is above/below as required.
6. Ensure the mating faces on the trailing arm (11), seat (10) and “U” bolt plate (19) are clean and undamaged.
7. Lift/lower the trailing arm to the axle and locate into the spring seats.
8. Fit the “U” bolts (9), top plates (19), and new “U” bolt nuts (17) and washers (18) and nip up.
9. Refit the airspring piston to the trailing arm as described in section 3.
10. Re-track the suspension as detailed in section 2.
11. Torque up the “U” bolts using a 36mm socket in a diagonal sequence:-

With new “U” bolts see table on page 29.

If existing “U” bolts are used re-torque Flexair and Flexlite to 425 lbf ft (575 Nm).

IT IS IMPORTANT THEY ARE TORQUED UP EVENLY.

12. Lower/raise the axle and trailing arm until the hole in the lower damper bush is aligned with the location hole in the seat/“U” bolt plate. If the old damper bolts (16) are being re-used ensure they are clean (especially the threads) and undamaged and apply a thin coat of general purpose grease to the shank of the damper bolts, ENSURE NO GREASE IS ON THREADS. Re-fit the bolts.
13. Fit new nuts (13) and washers (14) and nip up.
14. Lower/raise the axle and arms until the axle is in the ride height position (see section 1). IT IS VERY IMPORTANT THAT THE DAMPER AND PIVOT BOLTS ARE ONLY FULLY TIGHTENED WHEN THE AXLE IS IN THE RIDE HEIGHT POSITION. Torque up the top and bottom damper bolts using a 36mm spanner and socket and the pivot bolts using a 46mm spanner and socket – Refer to torque tables on Page 29.



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15. **DRUM BRAKE TRAILERS** – Refit the brake chambers on the air chamber brackets and secure using the original nuts if undamaged. Ideally new nuts and washers should be used. Ensure nuts and washers are clean.

15. **DISC BRAKE TRAILERS** – Reconnect the brake pipes.

16. Refit the clevis and split pins in the slack adjuster levers and remove spring cages if spring brakes are fitted. Check the brake adjustment as detailed in the MERITOR axle service manual.

17. Refit the road wheels and lower trailer chassis and axle off their support stands.

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SECTION 6

Removal and Replacement of Trailing Arms – Flexair and Flexlite Models

REMOVAL

1. Ensure no air is in the system.
2. Jack up the trailer chassis and place support stands in a suitably safe location.
3. Support the axle and remove the road wheel off the axle side from which the arm is to be removed. This allows access to the “U” bolts (9).
4. Using a 36mm (24mm for XL) spanner and socket, remove the nut (13) and washer (14) from the lower damper bolt nut (16) and withdraw the bolt. Slacken the top damper bolt nut (7) and pivot the damper upwards to clear the axle and secure it to the chassis.
5. Using a 36mm (24mm for XL) socket remove the four “U” bolt nuts (17) and washers (18) and withdraw the “U” bolts. Remove the “U” bolt plate (19).
6. Un-fasten the base of the airspring (22) as detailed in section 3.
7. Using a 46mm (30mm for XL) spanner and socket remove the pivot bolt nut (5) and washer (4) and withdraw the pivot bolt (3). Care must be taken to support the trailing arm (11) during this operation since it may immediately drop down from the frame bracket (1). The arm can now be removed.

REFITTING

1. Ensure that the inner faces of the frame bracket wear washers (28) are tacked to the frame bracket and are clean and undamaged. Apply a coating of grease to all faces and bores.
2. Check that the bore in the trailing arm bush (12) is clean and apply a thin coating of general purpose grease.
3. Place the trailing arm (11) in position under the frame bracket and lift the eye end into position and align the holes.
4. Ensure that pivot bolt (3) is clean and undamaged (especially if the original bolt is to be refitted) and apply a thin coat of grease to the shank. ENSURE NO GREASE IS LEFT ON THE THREADS.
5. Fit the bolts and new nuts (5) and washers (4) and tighten (not fully at this stage) such that the arms can still rotate easily.
6. Ensure that the mating faces between the spring seat (10), “U” bolt plate (19) and arm are clean and locate the arm in the seat ensuring spacer plates are in position.
7. Clean the “U” bolt threads (9) and ensure they are not damaged and fit the bolts, “U” bolt plates and new nuts (17) and washers (18). Nip the nuts up but do not fully tighten.
8. Refit the base of the airspring (22) as detailed in section 3.
9. Check that the lower damper bolt (16) is clean and un-damaged, apply a thin coat of general purpose grease. ENSURE NO GREASE IS LEFT ON THE THREADS. Align the bolt with the hole in the spring seat/“U” bolt plate and fit the bolt and a new nut (13) and washer (14).

10. Lift/lower the axle until it is in its ride height position (see section 1) and support.
11. Re-track the axle as detailed in section 2.
12. Tighten the “U” bolt nuts in a diagonal sequence – Refer to torque tables on Page 29.
13. Tighten the pivot bolt – Refer to the torque table on page 29.
14. Tighten the upper and lower damper bolts – Refer to the torque table on page 29.
15. Refit the wheel and lower the axle and trailer chassis off their support stands.



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SECTION 7

Replacement of Pivot Bushes (12)

1. Follow the procedure in section 6 to remove the trailing arm in question then proceed as follows:
2. Using MERITOR service tool part number 21215793 for Flexair Models or part number 21219080 for Flexlite Models remove the old bush.
3. Fit the new bush using the same service tool lubricating the rubber prior to fitting with soft soap or Applied Chemicals Ltd. EP pressing lubricant grade 1-630. Ensure when fitting the bush it is inserted centrally into the spring eye end.
4. Refit the trailing arm following the procedure in section 6.

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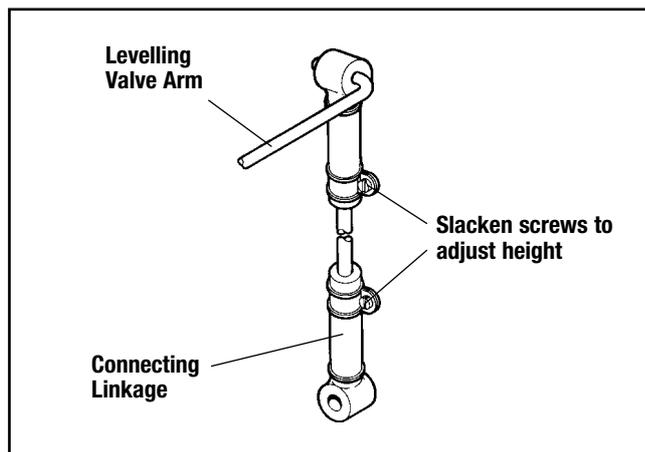
SECTION 8

Setting Suspension Height Control Valve

This is an area which is probably most unfamiliar to the trailer operator and the one which will cause most problems if the following parameters are not adhered to. Too high a ride height can cause more roll motion too low means that there will be loss of axle travel (contacting bump stop) during arduous use.

Parameters for setting ride height:

1. The trailer should be on level ground.
2. It should preferably be connected to the tractor unit to be used and in a straight line with the unit, or set at the correct kingpin height.
3. All the trailer brakes should be off.
4. There should be an air supply of at least 6.5 bar.
5. The trailer should preferably be unladen or the load evenly distributed laterally across the trailer.
6. If the trailer has been running it should be given at least 10 minutes to "settle down".
7. The valve should be set on increasing height as there is a "dead band" in the actuating stroke of the valve.
8. The ride height must be set on the axle which has the levelling valve.
9. If the trailer is fitted with a lift axle this should be in the down position.



The ride height is the distance between the centre line of the axle and underside of the frame. Subtracting 63.5mm, half the axle tube diameter, from the ride height gives a simple checking dimension from the underside of the frame to the top of the axle tube.

Once an initial setting of the ride height has been made it should be checked by measuring from the top of the axle tube to the underside of the trailer frame, and comparing with the nominal ride height less 63.5mm (tube radius). The nominal ride height is specified by the

trailer builder and is shown on the axle and suspension I/D plates.

If the ride height is found to require resetting the following procedure should be followed.

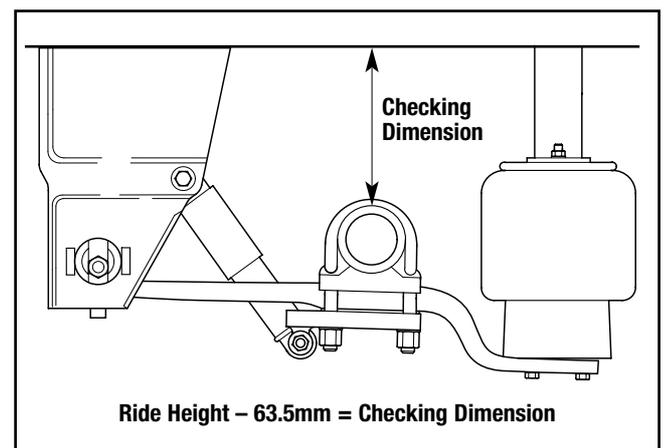
Lengthen or shorten the linkage rods which connect the levelling valve arm to the axle (giving a proportional increase or decrease in the ride height) by slackening the two cheesehead screws which pinch the rubber eye ends onto the drop bar and pulling the bar in or out of the rubber. If there is insufficient adjustment i.e. the bar is in danger of coming out of the rubber, then further adjustment can be gained by slackening the bolts holding the levelling valve to the bracket and repositioning the valve within the holes. Bending of the levelling valve actuating arm is not recommended.

If the ride height is found to be above the recommended setting, the height should first be dropped below the required setting and then increased back to the nominal ride height, thus avoiding the "dead band" in the actuating stroke of the valve. This can be done by shortening the linkage rod and bleeding air from the suspension by slackening the air pressure connection on top of the airsprings. This method also applies to situations where the ride has accidentally been taken above the recommended setting.

NOTE: Some care is needed when checking the ride height as a false reading may be obtained after tipping a load etc. The levelling valve emits and exhausts air very slowly, so time should be allowed for it to react once adjusted.

The valve emits air slightly faster than it exhausts. This is so that large volumes of air are not constantly bled off during normal suspension travel but still allowing a relatively quick reaction to an increase in load or when the trailer is being brought up to operating height from flat.

FL9000M: The FL9000M suspension runs at two ride heights (228mm and 253mm), refer to trailer builder for piping instructions.





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SECTION 9

Maintenance Schedule

BEFORE ENTERING SERVICE

IF THE OPERATOR IS IN ANY DOUBT ABOUT THE SAFETY OF THE VEHICLE HE SHOULD NOT OPERATE IT AND SEEK QUALIFIED ADVICE.

Check the suspension and brake systems operate correctly.

Check the suspension air system for leaks by charging the system with air and testing all joints and fittings using soapy water.

Ensure the suspension ride height is correctly set by referring to section 8.

If an axle lift system is fitted, operate the lift system to check it operates correctly and observe the extra lift cylinders attached to the levelling valve arms to ensure they function.

Carry out a visual inspection of all suspension and brake system pipe work to ensure no possibility of fouling or rubbing against each other or other components.

Check the brake system operates correctly.

Check the operation of all optional equipment fitted. If any doubt or problems arise refer to the appropriate service manual or seek qualified advice.

AFTER FIRST 1000 KM

Check all fastener torques according to the torque tables on Page 29.

Examine all valves and air hose joints for leaks or signs of pipework rubbing against the chassis or suspension components.

Check the suspension ride height as explained in section 8.

Inspect the dampers for evidence of oil leaks.

If an axle lift is fitted, check that it is functioning correctly.

Check the operation of all optional equipment and test for air leaks on air system equipment. Individual service manuals should be referred to if required.

AFTER FIRST 10000 KM AND SUBSEQUENT 10,000 KM INTERVALS

Inspect the dampers for evidence of oil leaks and inspect the damper bushes for signs of rubber extrusion or damage.

Check the airsprings for signs of leakage and examine the rubber bellows for signs of damage from road debris.

Check all pipe joints for signs of leakage and ensure that no valves are fouled with road dirt such that their operation may be impaired. This is especially relevant to the levelling valve. This is particularly important if the trailer has been operated in a harsh environment e.g. coal, dust, quarries etc.

If an axle lift is fitted, check it is operating correctly.

Check the operation of all optional equipment and test for air leaks on air system equipment. Individual service manuals should be referred to if required.

Examine tyres for uneven wear. If there is any present check the pivot bushes for damage and re-check the axle alignment as detailed in section 2.

If damage is found then the trailing arms should be removed as detailed in section 6 and replacement of the bush and possibly the wear plates is advised. Failure to do so may result in tyre wear or structural damage.

Check all fastener torques and tighten where required according to the values in the table in this section.

If an axle lift assembly is fitted ensure it is operating correctly. Check the extra lift cylinders are operating as the axle is being raised.

EVERY 100,000 KM

Check the dampers for oil leaks along their body. Lever between the damper eye ends (top and bottom) and close bracketry to ensure no excessive lateral movement exists indicating bush failure or loose bolts.

If the bushes are damaged they should be replaced.

Check the airsprings for air leaks and signs of damage especially to the rubber bellows. Details of replacing them can be found in section 3.

Uncouple the levelling valve arm/axle rubber joint and raise and lower the arm to check that the valve is passing air in and out of the suspension system.

Check the pressure protection valve by draining the brake and suspension air tanks and couple up an air pressure gauge to each tank. With an air supply of 6.5 bar, recharge the tanks. The brake tank pressure should reach 5 bar minimum before the suspension tank begins to charge.

Clean under the suspension inside the hanger brackets and around the trailing arm pivots. Check between the wear plates welded to the inside faces of the hanger brackets and the trailing arms for signs of excessive wear or damage to the rubber pivot bushes.

All torques must be within $\pm 5\%$ of stated values.

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Data, Tables and Charts

A. TABLE OF TORQUES ON FLEXAIR FASTENERS

NOTE: All suspensions to be at ride height before fastener torques are applied. (FL9000M suspension **must** be set at the maximum ride height before any torques are applied).

Fastener Description	Torque	
	Nm	lbf ft
Main pivot nuts (M30)	1100	810
Main pivot nuts (M24)	800	585
U bolts (and centre lift) (M24)	680	500
Damper bolts (M24)	500	370
Trailing arm centre bolts (M16)	230	170
Bottom airspring support plate studs (M16)	180	135
Top airspring fixing nuts (M12)	70	50
Airspring piston fixing bolts (M12)	70	50
Axle lift nut (M10)	36	27

B. TABLE OF TORQUES ON FLEXLITE FASTENERS

NOTE: All suspensions to be at ride height before fastener torques are applied.

Fastener Description	Torque	
	Nm	lbf ft
Main pivot nuts (M24)	800	585
U bolt nuts (M24)	800	585
Damper nuts (M16)	300	220
Bottom airspring screws (M12)	70	50
Top airspring fixing nuts (M22)	60	45
Top airspring fixing nuts (M12)	70	50



Air Suspension Service

SECTION 10

Flexair Fault Finding

This section is intended to give a guide to the trailer operator to enable him to assess problems. The range of problems and suggested causes and cures are by no means complete but are intended to provide a solution to the most commonly encountered difficulties.

NOTE: IF THE OPERATOR IS IN DOUBT ABOUT THE SAFETY OF THE VEHICLE HE SHOULD NOT OPERATE IT, AND SHOULD IMMEDIATELY SEEK QUALIFIED ADVICE FROM MERITOR.

How to use this section.

The faults are listed under five main headings, namely

1. BRAKING PROBLEMS
2. TYRE WEAR
3. EXCESSIVE ROLL
4. SUSPENSION AIR RELATED PROBLEMS
5. AXLE LIFT RELATED PROBLEMS

Listed under each of these headings are the likely specific problems, each followed by a check procedure which should highlight the cause of the problem. If the problem cannot be solved after working through the relevant check list, then further information should be obtained from MERITOR.

BRAKE FAULTS

If brakes are not functioning correctly:

- Check that there is at least 6.5 bar at coupling head
- Check slack adjusters are correctly adjusted
- Ensure all brake system valves are functioning correctly

IF PROBLEM PERSISTS SEE MERITOR AXLE AND BRAKE SERVICE MANUALS FOR FULL BRAKE SERVICE PROCEDURE.

TYRE WEAR

If tyre wear is excessive:

- Check axle alignment is correct
- Check wheels are parallel (i.e. zero camber and toe in/out)
- Inspect parabolic trailing arm pivot bushes for damage, and replace if necessary
- Check shock absorber for oil leaks
- Inspect shock absorber bushes for damage
- Ensure ride height is set correctly

EXCESSIVE ROLL

If trailer is rolling excessively:

- Check shock absorbers for oil leaks
- Inspect shock absorber bushes for damage
- Ensure U bolts are correctly torqued
- Ensure ride height is set correctly

- If vehicle is load sensed, check that a shuttle valve is fitted to prevent cross coupling. Fit if necessary

SUSPENSION AIR RELATED PROBLEMS

If suspension will not inflate:

- Check that the levelling valve is connected to the axle
- Ensure the brake air reservoir pressure is more than 6.5 bar
- Ensure the suspension air reservoir pressure is at least 6.5 bar
- Check the setting of the pressure protection valve and clean the air filter
- Check the axle load is not greater than the available pressure
- Check all pipework and fittings for leaks using soapy water
- Check the airsprings for leaks using soapy water
- Check levelling valve for leakage at the exhaust port, and if necessary replace valve

If suspension is deflating:

- Check all pipework and fittings for leaks using soapy water
- Check the airsprings for leaks using soapy water
- Check levelling valve for leakage at the exhaust port, and if necessary replace the valve

AXLE LIFT RELATED PROBLEMS

If lift will not operate:

- Work through check procedure for main suspension airsprings not inflating
- Check that the lift valve is correctly installed and piped. Replace valve if faulty

If main suspension airsprings fail to deflate when lift is operated:

- Check the Humphrey valve is correctly installed
- If main airspring pressure is lower than available pressure, replace Humphrey valves
- Work through check procedure for main suspension airsprings not inflating

If lift is insufficient:

- Check the extra lift cylinders are operating correctly
- Ensure trailer ride height is set correctly

For further information contact MERITOR.



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