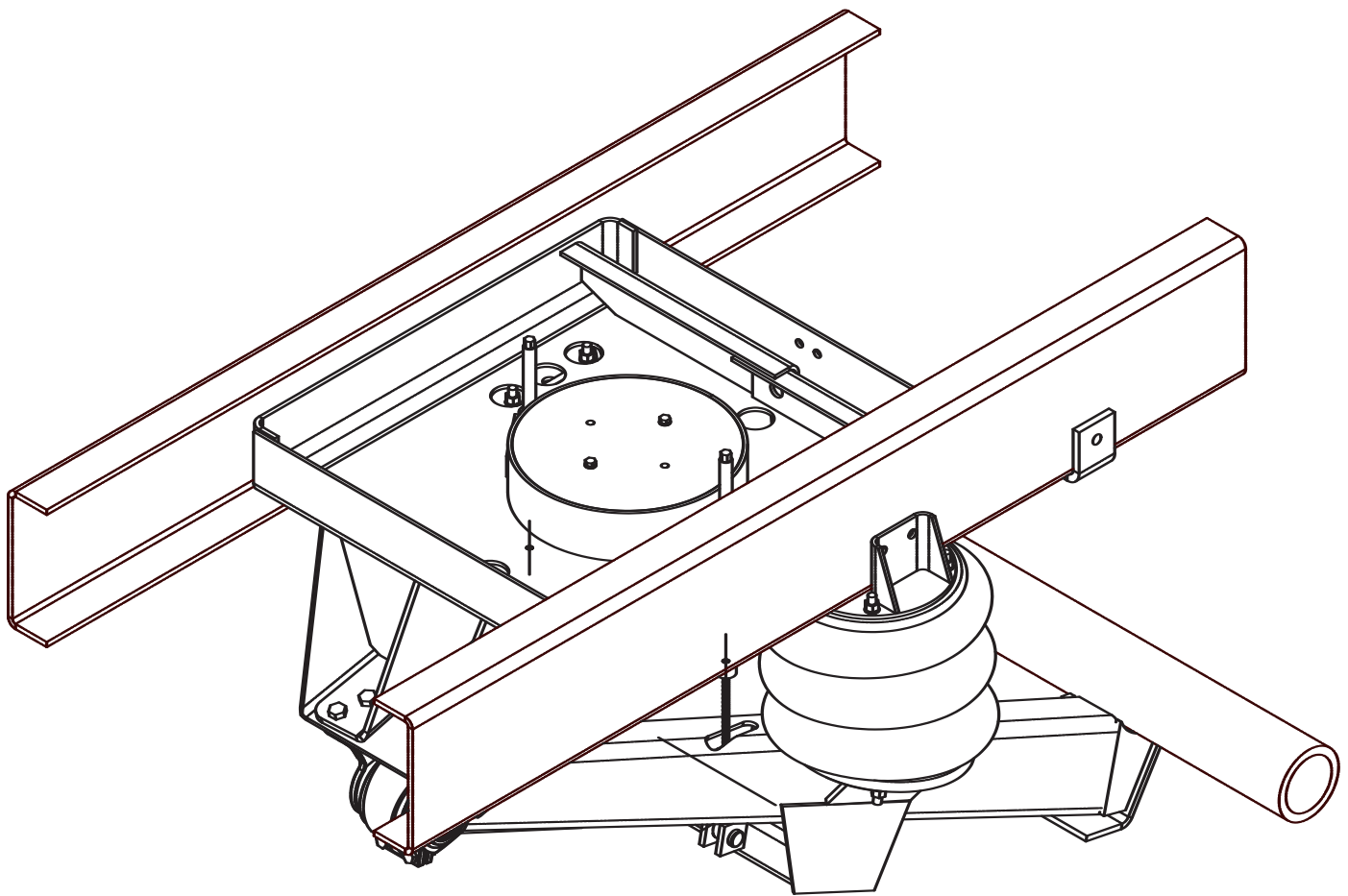




Watson Suspension Systems

DRAWBAR SERIES

Installation and Operation Manual
AL 1200-DB, AL 1600-DB, AL 1900-DB



972.547.6020 • 800.445.0736 • FAX: 972.542.0097
2060 COUCH DRIVE MCKINNEY, TEXAS 75069
www.WatsonSuspensions.com

AL Drawbar Series

Trailer Suspension
Subject: Installation and Operation
Literature Number: WC-I-1200



Revision: 1

Table of Contents

Topic	Page
Introduction	1
Installer Responsibility	1
Before You Begin	1
Safety Explanations	2
Warnings	2
Part List	4
Chart	5
Ride Height	5
Calculating Ride Height	6
Frame Height Requirements	6
Installation	7
Mounting the Suspension	7
Base Frame Adjustable Rail Supports	8
Upper Airspring Mounts	8
Drilling Operation	9
Outer and Center Load Airspring	9
Axle Stops	9
Air Controls	9
Torque Guidelines	11
Re-Torquing Guidelines	11
Air Pressure vs. Load Guide	12

AL Drawbar Series

Introduction

This publication is to acquaint and assist you in installing and operating the Watson & Chalin AL Drawbar Series product line and is intended for use only with this product line.

This manual includes installation and operating information on Watson & Chalin model numbers:

- AL-1200-DB
- AL-1600-DB
- AL-1900-DB

Watson & Chalin reserves the right to change its products or manuals at any time. Contact Watson & Chalin at 1.800.445.0736 for information on recent changes to products.

Defective or damaged components should be returned to Watson & Chalin with a pre-arranged Returned Goods Authorization (RGA) number through the Warranty Department. The damaged or defective component may then be replaced; when in compliance with warranty conditions.

Important

The entire manual must be read and understood before proceeding with installation or service of any components.

This manual should be used in conjunction with corresponding drawings that come with Watson & Chalin suspensions upon delivery.

Any changes to the vehicle frame must be approved by the vehicle manufacturer before the changes are done. Cutting or altering the vehicle's frame is normally not permitted by the manufacturer and affects the manufacturer's warranty coverage.

Installer Responsibility

The installer of the suspension system must:

- ensure that the vehicle functions properly with the increased weight of an additional axle.
- determine the correct location of the suspension to provide the proper load distribution as to not exceed the rated capacity of the components involved.
- ensure the installation of the correct brake system components to guarantee proper braking performance. The brake installation must comply with FMVSS121 specifications.
- ensure that proper clearance exists between the drive shaft and the auxiliary axle.

Before You Begin

Before you begin to install the Watson & Chalin suspension system, you must:


- Check your company specifications on suspension systems to be sure that the correct suspension system was chosen for the vehicle.
- Verify the frame width is within the allowable mounting range of the suspension and that the vehicle crossmembers are correctly positioned.

AL Drawbar Series

- Mark the location of the suspension side rails and check for interferences with existing components.

Safety Explanations

Watson & Chalin uses the following types of notes to warn against possible safety problems and to give information that helps to prevent damage to equipment.

 **Caution**

A caution indicates hazards or unsafe practices which could result in damage to machines or minor personal injury if the procedure is not followed exactly.

 **WARNING**

A WARNING INDICATES HAZARDS OR UNSAFE PRACTICES WHICH COULD RESULT IN SEVERE PERSONAL INJURY OR DEATH IF THE PROCEDURE IS NOT FOLLOWED EXACTLY.

Important

An important message which indicates that the procedure should be followed exactly.

All safety statements should be read carefully to prevent bodily injury, to assure that parts are assembled properly, and to retain the manufacturer's warranty. Failure to follow safety precautions in this manual can result in bodily injury, death or property damage.

Warnings

 **WARNING**

NO ALTERATION OF ANY WATSON & CHALIN SUSPENSION COMPONENTS IS PERMITTED WITHOUT PROPER AUTHORIZATION FROM QUALIFIED WATSON & CHALIN PERSONNEL.

 **WARNING**

NO WELDING OF ANY SUSPENSION COMPONENTS IS PERMITTED EXCEPT WHEN SPECIFIED BY WATSON & CHALIN.

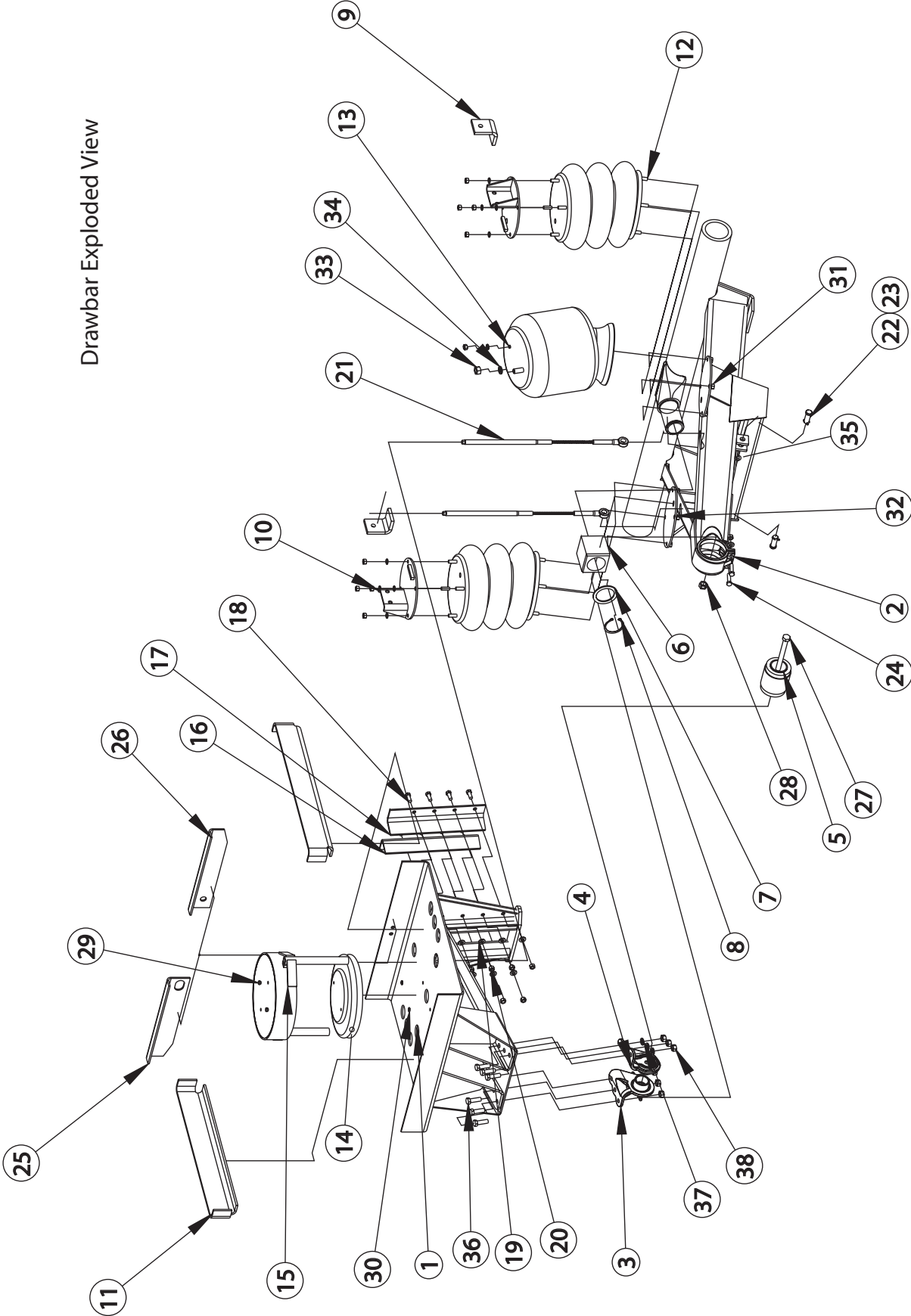
 **WARNING**

DO NOT ADD LUBRICATION TO ANY AIR CONTROL SYSTEMS AS IT CAN CAUSE DAMAGE.

 **WARNING**

A MINIMUM FRAME LENGTH OF 72" FROM THE REAR DRIVE AXLE CENTER LINE TO THE END OF THE FRAME IS REQUIRED. IF THE FRAME MUST BE EXTENDED TO ACCOMMODATE THE SUSPENSION, THE FRAME MUST BE REINFORCED. CONFIRM THAT ENOUGH FRAME LENGTH EXISTS PAST THE DRIVE AXLES TO INSTALL AUXILIARY UNIT.

Drawbar Exploded View



AL Drawbar Series

Part List

ITEM NO.	DESCRIPTION	QTY.	PART NO.
1	BASE FRAME ASSEMBLY	1	990242
2	AXLE/DRAW BAR ASSEMBLY	1	CHART
3	BUSHING CAP RH	1	10889
4	BUSHING CAP LH	1	10888
5	BUSHING	1	17701
6	TRAVEL BLOCK	1	10818
7	WASHER FLAT 4.00X3.03X.19	1	10892
8	SNAP RING EXTERNAL	1	10940
9	AXLE STOP	2	10877
10	UPPER BAG PLATE ASSEMBLY	2	10876
11	ADJ. RAIL SUPPORT	2	90959
12	AIRSPRING (3B14-455) LOAD	2	AS-0033
13	AIR SPRING	1	CHART
14	AIRSPRING (7443)	1	AS-0027
15	LIFT PAN ASSEMBLY	1	950005-01
16	REMOVABLE SUPPORT PLATE LH	1	90958-10
17	REMOVABLE SUPPORT PLATE RH	1	90958-20
18	CAPSCREW .50X1.25 UNF G8	8	17385
19	WASHER FLAT .50	10	10643
20	NUT LOCK .50 UNF GR C	10	10748
21	CABLE ASSEMBLY	2	10857
22	PIN .81 X 2.00	2	10897
23	COTTER PIN	2	11941
24	CAPSCREW .50X2.00 UNF G8	2	17723
25	BASE FRAME CROSSMEMBER	1	90960-10
26	BASE FRAME CROSSMEMBER	1	90961-10
27	CAPSCREW 3/4UNF X 7 GRADE 8	1	10899
28	NUT LOCK .75 UNF GR C	1	10028
29	CAPSCREW .38X1.25	4	10039
30	.38 LOCK WASHER	4	10041
31	NUT HEX .50 UNC	17	CHART
32	WASHER LOCK .50	21	CHART
33	NUT HEX .75 UNF GR8	1	CHART

AL Drawbar Series

ITEM NO.	DESCRIPTION	QTY.	PART NO.
34	WASHER LOCK .75	1	CHART
35	CAPSCREW .50X1.25 UNC	4	CHART
36	CAPSCREW .62X2.00 UNF GR8	6	10034
37	WASHER FLAT .62 HARDENED	6	10032
38	NUT LOCK .62 UNF GR C	6	10029

Chart

MODEL NUMBER	DRAWING NUMBER	CAPACITY	ITEM #2	ITEM #13		ITEM #31		ITEM #32		ITEM #33		ITEM #34		ITEM #35	
				Part #	Qty	Part #	Qty	Part #	Qty	Part #	Qty	Part #	Qty	Part #	Qty
AL1200ADB	110152-1	12,000#	10852	N/A	0	10030	16	10042	16	N/A	0	N/A	0	N/A	0
AL1600ADB	110152-2	16,000#	10852	AS0028	1	10030	17	10042	21	10025	1	10026	1	10174	4
AL1900ADB	110152-3	19,000#	10852-01	AS0013	1	10030	17	10042	21	10025	1	10026	1	10174	4

Ride Height

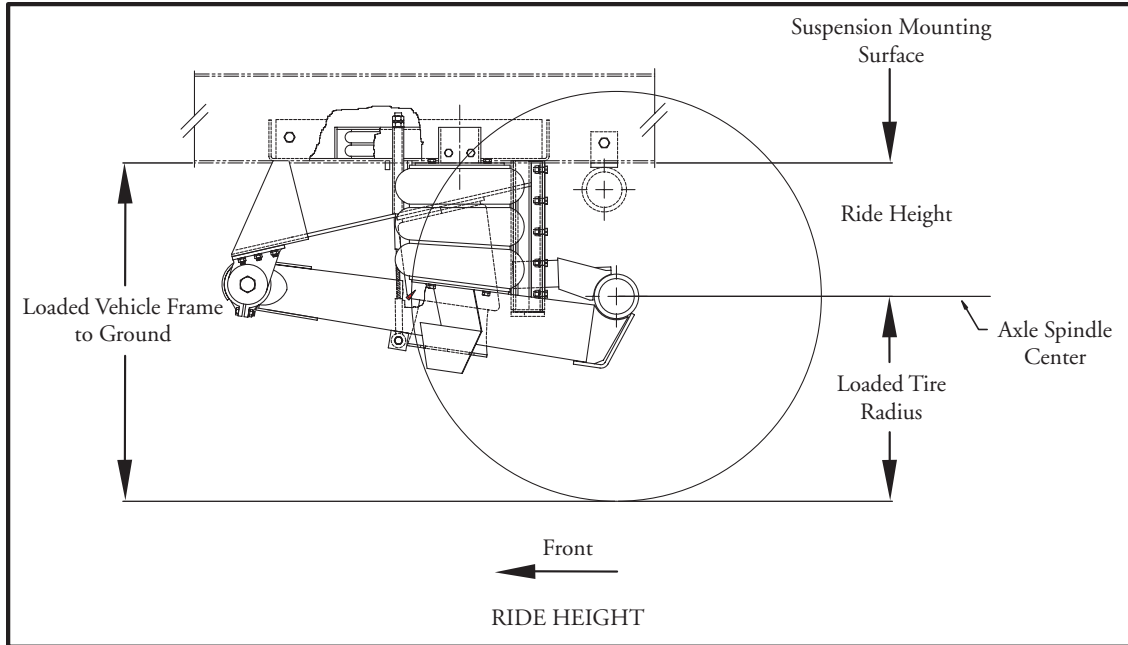
Ride height, also referred to as run height, is the distance between the suspension mounting surface, or the bottom of the vehicle frame, and the spindle center of the auxiliary liftable axle. It is one of the most important dimensions to obtain, and when set properly, allows for the optimum amount of lift that the axle can achieve.

Important

A correct installation requires that the suspension ride height be within the range specified on the corresponding drawing when the vehicle is in its loaded condition.

AL Drawbar Series

Figure 1: Ride Height



Calculating Ride Height

Proper ride height is calculated with the following equation:

Ground to Bottom of Vehicle Frame (loaded)			_____
Static Loaded Tire Radius	-		_____
Ride Height	=		_____

Note

If the dimension is still not within ride height specifications, contact Watson & Chalin.

Frame Height Requirements

The following are frame height requirements for the AL Drawbar Series and should be checked before installing the suspension.

Frame height must be measured from the bottom of the frame flange to the ground at the desired location of the air suspension axle center line. The suspension pivot must clear the differential housing by at least 1".

The following chart is based on the vehicle deflecting 1-1/2" + or - 1/2" when loaded and measured at the axle center line.

Frame Height	Tire Size Required
30-31"(28.5-29.5)	215/75R 17.5
31-32"(29.5-30.5)	225/70R 19.5

AL Drawbar Series

Frame Height	Tire Size Required
32-33"(30.5-31.5)	285/70R 19.5
33-34"(31.5-32.5)	255/70R 22.5
34-35"(32.5-33.5)	265/75R 22.5
35-36"(33.5-34.5)	295/75R 22.5 or 11R 22.5
36-37"(34.5-35.5)	315/80R 22.5 or 11R 24.5

Installation

The following instructions are for installing the components of the Watson & Chalin AL Drawbar suspension. All model numbers in the series are installed using the same instructions. Watson & Chalin assumes that the correct auxiliary suspension and axle were chosen based on the individual design criteria.

The suspension systems must be installed with the proper amount of tire-to-ground clearance to ensure trouble free operation of the vehicle. If there is too much ground clearance, the suspension will not carry its share of the load, straining the suspension components. When there is too little ground clearance or if the suspension is overloaded, the vehicle will bottom out while going over bumps and damage can be done to the suspension components or other components on the vehicle.

Any deviation from the installation instructions must be approved in writing by Watson & Chalin.

Note

Use these instructions in conjunction with air suspension assembly drawing packaged with this unit.

Mounting the Suspension

The following procedure describes how to obtain proper alignment of the suspension and axle. Proper alignment provides a low maintenance connection at the pivot point of the suspension. If the alignment is not done correctly, the bushing may wear prematurely or wear the axle track out, which also causes tire wear.

Before mounting the suspension, you must:

- Check that the proper suspension and axle was chosen based on your company's specifications.
- Ensure the chassis frame has the proper crossmember reinforcement in the area where the auxiliary axle hanger/rail is located.

Note

You must check frequently for suspension clearance problems when mounting the suspension.

AL Drawbar Series

To mount the suspension to the vehicle:

1. Place the vehicle on a level surface.
2. Mark the approximate location of the rear drive axle center line.
3. Measure back from the located center line on each side of the vehicle and mark the air suspension axle center line.
4. Measure forward from the suspension axle centerline 38.5" and mark the frame. This locates the base frame between the frame members.
5. Remove the rear crossmember from the vehicle.
6. Place the new suspension in the upright position with the pulling point facing toward the chassis.
7. Slide the suspension into the frame rails.
8. Locate at approximate desired axle spacing
9. Reattach the rear crossmember:
 - Bring the frame members back to the proper position
 - Clamp them together.
10. Adjust axle alignment to the desired axle spacing.
11. Adjust both sides of the air suspension axle to the rear drive axle centerline. Both should measure to within 1/8" of each other.
12. Center the suspension base frame by measuring from the outside face of the frame flange on both sides to the inside edge of the brake drum; adjust as necessary.
13. Use square down side of frame to check this dimension and to make sure the frame is square.
14. Clamp the base frame to the lower frame flanges on both sides.

Base Frame Adjustable Rail Supports

1. Insert adjustable base frame rail supports in to the suspension base frame on both sides
2. Check for rivets or clamps preventing flush mounting to the frame
3. Using a port-a-power or similar tool, force the rail supports flush with the frame for their full length on both sides.

Do not bulge the frame. Rail supports must be flush with base frame.

4. Weld rail supports to the base frame as seen in drawing number 110152.

Upper Airspring Mounts

1. Locate the upper air spring mounts as seen in drawing number 110152.
2. Bring the air spring mount up until the bottom plate is flush with the bottom frame flange.
3. Clamp the mount into place.



Holes in the air spring mount must line up with the holes in the base frame.

AL Drawbar Series

Drawbar Lift Inspection

1. Lower axle so that the Travel Block is down against lower suspension stop. (See figure 1).
2. Check adjusting nut clearance for 1/2" minimum clearance. This is to let suspension bottom unit out on travel block not the lift cables. (See nut clearance dim below in figure 2).

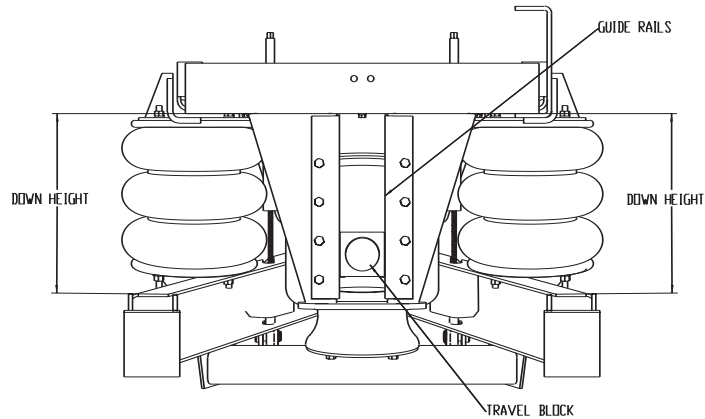


Figure 1 (Rear View)

Travel Block must be at bottom of Guide Rails. Down height must be equal on left & right side of axle when adjusting lift cables.

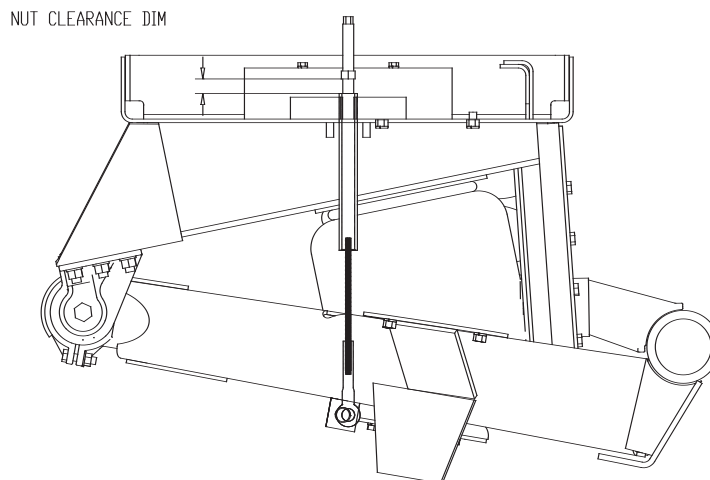


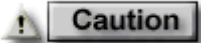
Figure 2 (Side View)

CAUTION: INSPECTION IS TO BE PERFORMED ONLY BY A PROFESSIONAL.

AL Drawbar Series

Drilling Operation

1. Drill a minimum of 7 holes for 5/8" diameter bolts; six(6) for the base frame and one(1) for the upper air spring mount.
2. Insert all bolts and secure with nuts.



Upper air spring mount bolts should be 1/2" longer than base frame bolts.

Outer and Center Load Airspring

Install according to drawing number 110152.

Axle Stops

Install according to drawing number 110152. Axle must bottom out on axle stops.

Air Controls

Air control kits are responsible for maintaining the proper ride height of a suspension.

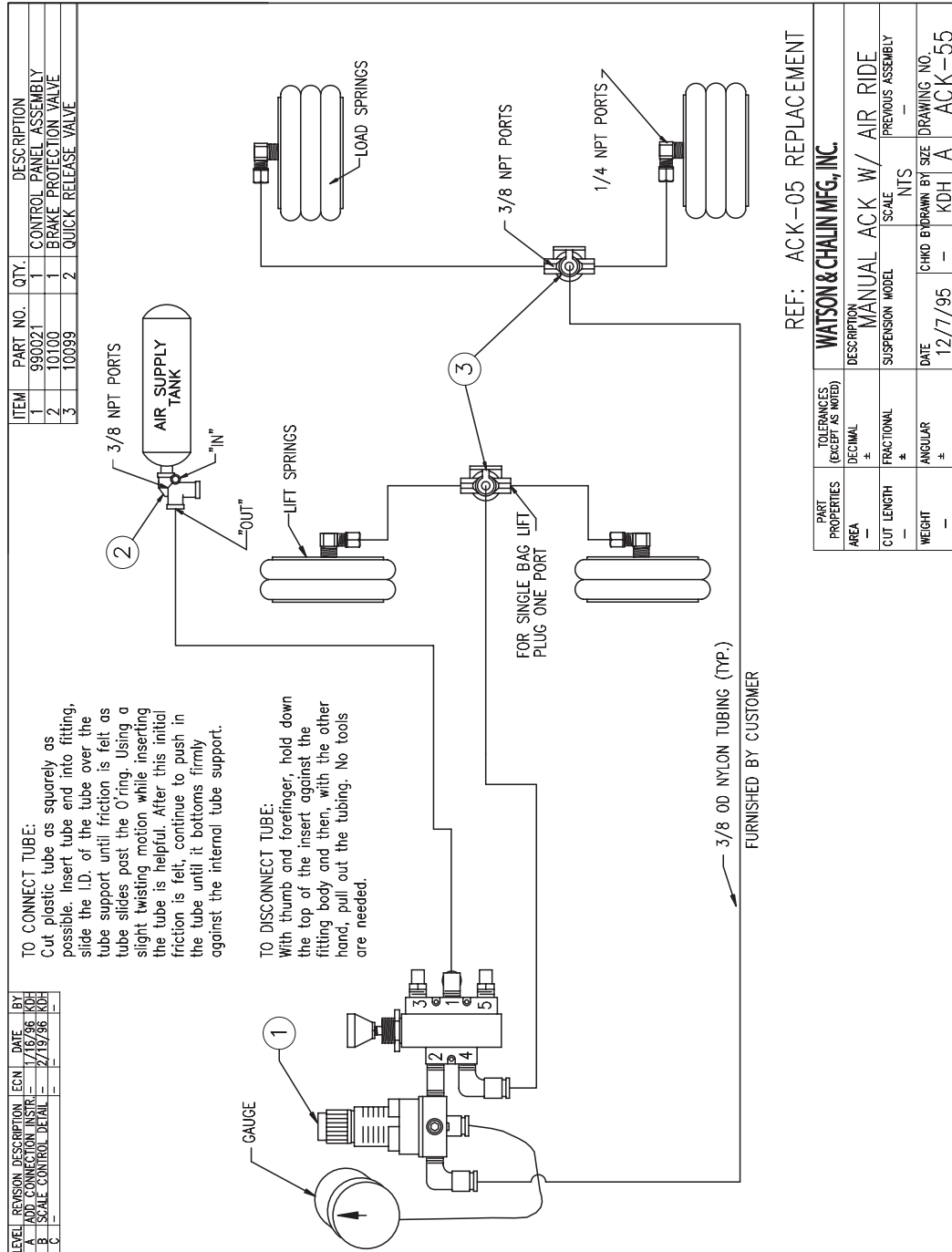
Watson & Chalin offers a variety of air control kits to suit the many needs of our customers. All air control kits include a leveling valve, brake protection valve, and optional brackets to attach the valve to the air spring. The ACK-55, seen in figure 2 is the most popular air control kit used with AL Drawbar Series.

The following notes are important when installing an air control kit:

- Do not add any lubrication to air controls as it can cause damage to components.
- All nylon fittings, tubing and the quick release valve for connecting air brakes must be supplied by the customer.
- All external exhaust ports must use a minimum of 6" drain tube.
- All air lines must be free of sharp bends that can restrict airflow.

AL Drawbar Series

Figure 2: ACK-55 Drawing



AL Drawbar Series

Torque Guidelines

Table 1 Torque Guidelines

The following table shows the proper torque requirements for all cap screws and bolts.

Cap screw/Bolt (UNF-Grade 8) Size	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"
Torque MIN ft*lbs.	25	50	150	300	500	700	900
Torque MAX ft*lbs.	35	75	200	350	550	800	1000

Table 2 Special Torque Requirements (for air springs)

The following table shows the proper torque requirements to use in special circumstances for the specific mounting hardware described.

Size	Description	Max Torque Requirement (ft*lbs.)
3/8"	UNC Blind Nuts	50
1/2"	UNC Bolt or Stud	25
3/4"	UNC Stud	55
3/4"	UNF Combo Stud	50

Table 3 Air Fitting Torque Requirements

The following table shows the proper torque requirements for the air fitting sizes listed.

Size	Max Torque Requirement (ft*lbs.)
1/4" NPTF	11
1/2" NPTF	23
3/4" NPTF	25

Re-Torquing Guidelines

All fasteners have been previously torqued, but should be re-torqued according to the following schedule.

- after 5 days
- after 30 days
- after 60 days
- every 6 months thereafter