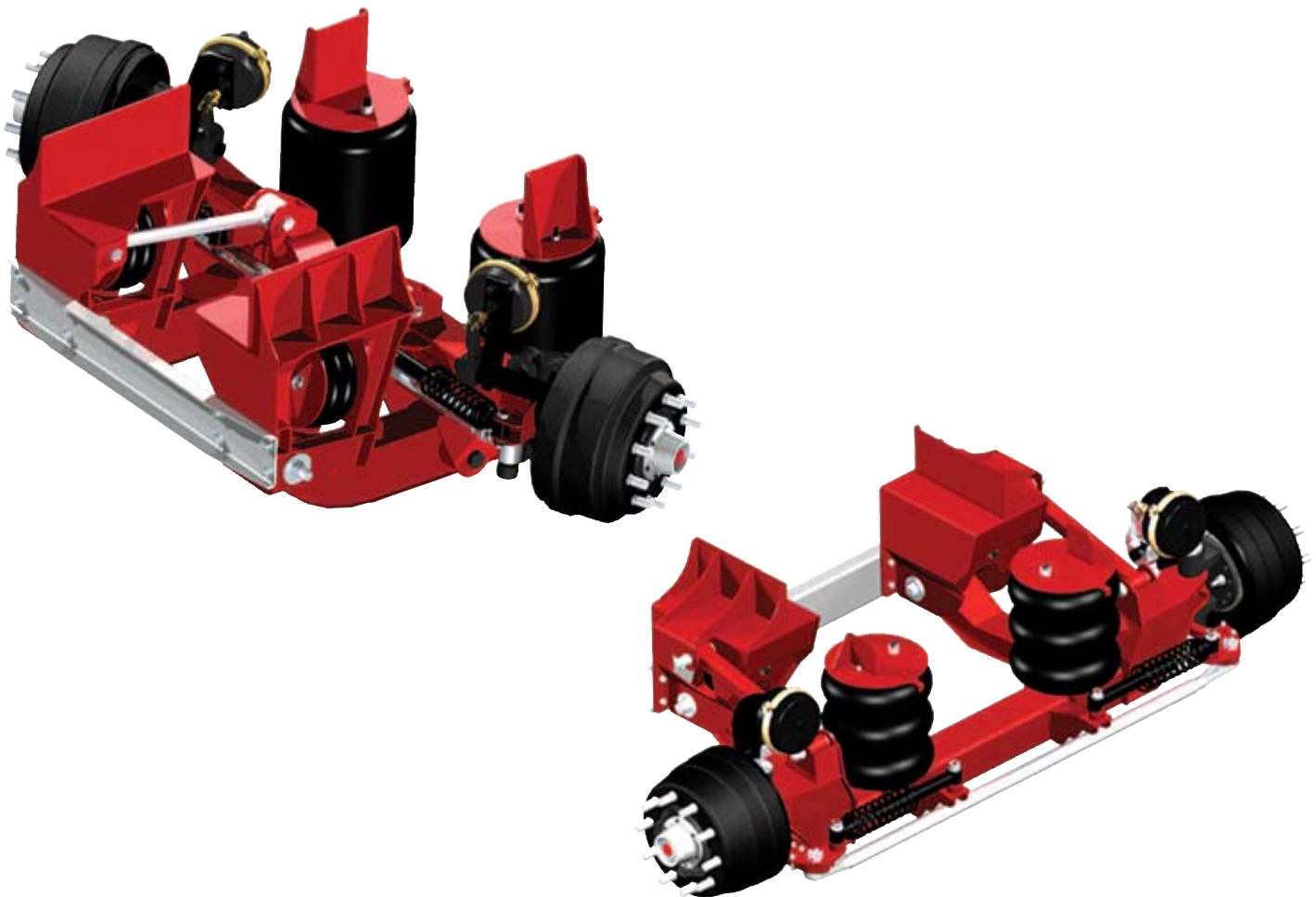




Watson Suspension Systems

TRU-TRACK SERIES

Steerable Axle Lift Suspension, Installation and Operation Manual



972.547.6020 • 800.445.0736 • FAX: 972.542.0097
725 E. UNIVERSITY ST. MCKINNEY, TEXAS 75069
www.WatsonSuspensions.com

SL Series

Steerable Axle Lift Suspension
Subject: Installation and Operation
Literature Number: WC-I-1000



Revision: 1

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SL Series

Introduction

This publication is to acquaint and assist you in installing and operating the Watson & Chalin Auxiliary Steerable Lifiable Air Ride Suspension Product Line and is intended for use only with this Product Line.

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

- RSL-1186
- SL-0851
- SL-1100
- SL-1153
- SL-1186
- SL-1187
- SL-1188
- SL-2089

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 components should be returned to Watson & Chalin with a pre-arranged Returned Goods Authorization (RGA) number through the Warranty Department. If the defect is in compliance with warranty conditions, the defective component may then be replaced.

If the part is damaged in shipment, please contact the freight company to file a claim. The freight company is responsible for any damage to components during shipment.

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.

The vehicle manufacturer must approve any changes to the vehicle frame 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 vehicle 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. Brake installation must comply with FMVSS121 specifications.
- Ensure that proper clearance exists between the drive shaft and the auxiliary axle.
- Suspension operates within run range

Before You Begin

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

- Check specifications on suspension systems to be sure that the correct suspension system was chosen for the vehicle.
- Verify the vehicle frame width is within the allowable mounting range of the suspension and that the vehicle crossmembers are correctly positioned.
- Mark the location of the suspension side rails and check for interferences with existing bracketry and components.
- Check for interference between the axle and drive shaft.
- suspension operates within the run range

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.

Important

An important message indicates a procedure that should be followed exactly.

WARNING

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

Warnings

WARNING

PROPER AXLE ATTACHMENT AND ALIGNMENT COLLAR WELDS ARE REQUIRED FOR SAFE OPERATION OF THE VEHICLE.

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.

SL Series

Identifying Your Model

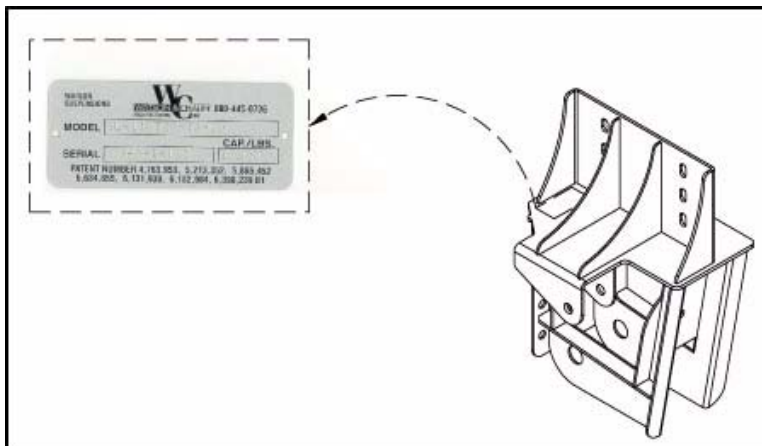
Important

It is important that you know what model number has been assigned to your assembly in case you ever need to contact Watson & Chalin.

Identification Plate

Each suspension assembly has an identification plate located on the left side rail assembly. This is on the driver's side of the vehicle. The plate includes the model number, serial number and capacity in pounds for the assembly. It is important to record the model and serial number for future reference.

Figure 1: Identification Plate



Parts Lists

The following section shows an exploded view of the SL-0851 which represents the SL-1186, SL-1187 and SL-1188. There are additional illustrations for the RSL-1186 and the SL-2089 models. Each SL series model also has a parts list that corresponds to the exploded view drawings and additional information in detailed tables that precede each parts list.

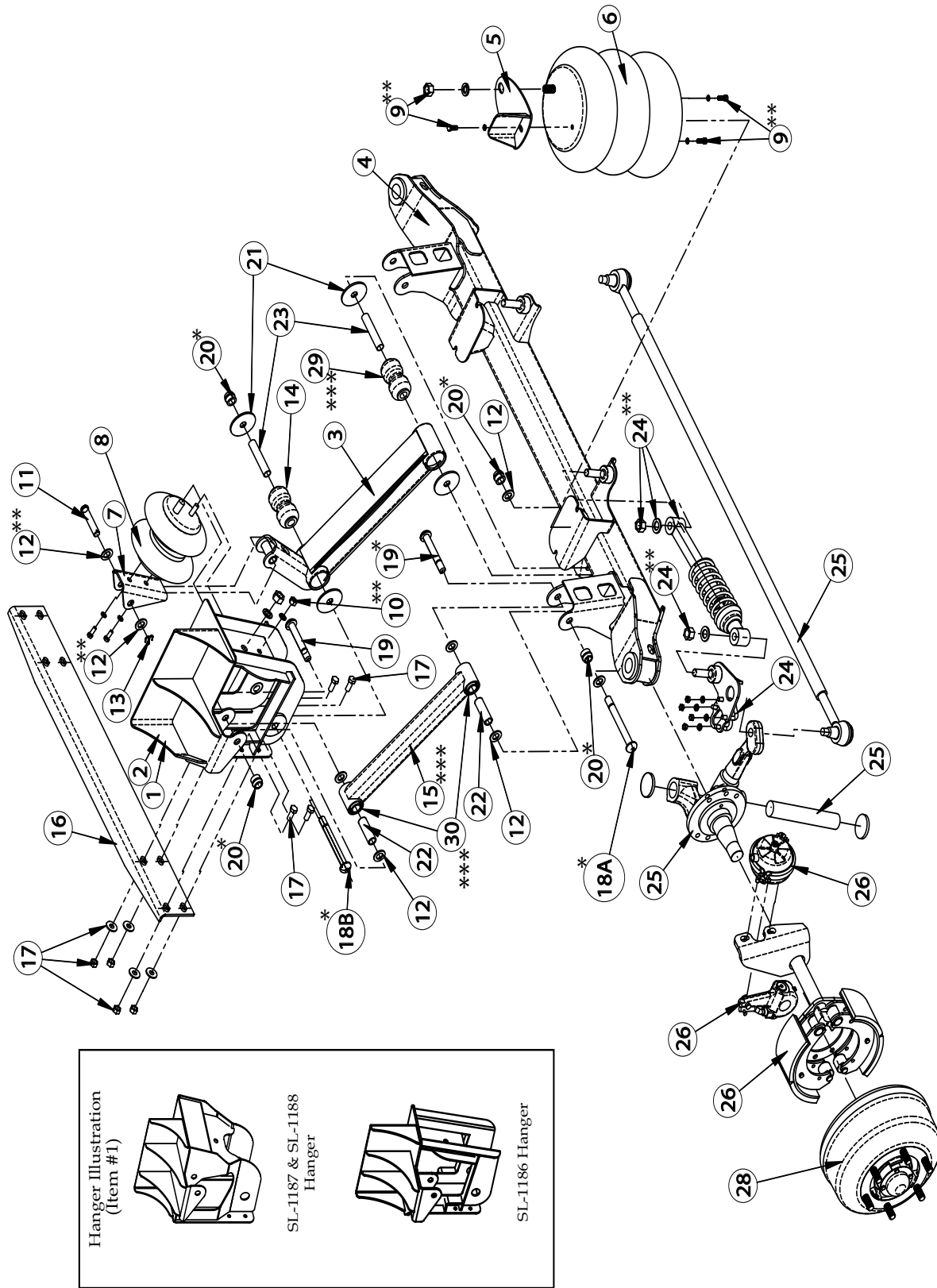
These parts lists and the corresponding tables are intended to help you identify parts and part numbers that may need to be replaced.

Note

Some part numbers need more explanation; therefore, references have been given as a link to lead you to more details. Click the link to jump to the information or go to the page that contains the referenced information.

The following figure shows the exploded parts diagram for an SL-0851 model only. For clarity, only the left hand parts are shown in the exploded view figure. Models SL-1186, SL-1187 and SL-1188 are similar to the SL-0851 assembly shown in figure 2 and therefore, do not have an individual exploded view diagram.

Figure 2: Exploded View-Model SL-0851, SL-1186, 1187, 11881



The right hand hanger is not shown, but corresponds to part #2 in the following tables.
 * Permanent fasteners shown are replaced with bolts and nuts.
 ** Special torque requirements as noted in Table 17 on page 29.
 ****Replacement arms ship with Bushings Installed.

SL-0851

Table 1 Parts List

Item Number	Description	Quantity	Part Number
1*	Hanger Side Rail Assembly L.H.	1	920369-10
2*	Hanger Side Rail Assembly R.H.	1	920369-20
3	Arm Assembly	2	Table 2 on page 6
4	Axle Assembly	1	Table 2 on page 6
5**	Upper Bag Plate Assembly	2	950182
6	Air Spring Load	2	AS0048
7	Lift Bag Plate	2	50155
8	Air Spring-Lift	2	AS0068
9	Load AirSpring Hardware Pack	1	16061-01
10	Lift Airspring Pack	1	16064
11	Pin	2	12972
12	Washer, flat 0.75 Hardened	16	10043
13	Cotter Pin	2	11941
14	Hanger Pivot Bushing	2	12931-01
15	Torque Rod Assembly	2	12954
16A	Crossmember	1	90848
16B	Optional Crossmember with Airtank Mount (not shown)	1	17959 8" tall 17872 10" option
17	Crossmember Pack	1	16000-02
18A	Cap Screw	2	10899
18B	Cap Screw	2	10899
19	Cap Screw	4	10033
20	Lock Nut	8	10028
21	Washer, flat	8	12927-02
22	Delrin Liner upper torque rod	4	90313-03
23	Delrin Liner lower arm	4	90517
24	Steer Stabilizer Kit	1	980120
25	Spindle Assembly Kit	1	18080
26	Brake Chamber Slack Adjuster LH	1	17815-10
27	Brake Chamber Slack Adjuster RH	1	17815-20
28	Hub and Drum Assembly	2	18255
29	Axle to Arm Bushing	2	12931-01
30***	Torque Rod Bushing	4	17012

**Upper Bag Plate" denotes upper bag plate without the coupler. 950XXX-1 and 950XXX-2 also have the brake line coupler built in.

***It is cheaper to replace the Axle to bushing arm than it is to replace the bushings alone.

Table 2 Parts List Details

This table shows the arm assembly and axle assembly part numbers for the SL-0851 model according to the available pedestal heights. The table also lists the number of weld dots that corresponds with each pedestal height. See “Weld Dots” on page 19 for more details. This table corresponds to part numbers 3 and 4 in Table 1 that can be seen in figure 2.

Pedestal Height	Weld Dots	Arm Assembly	Axle Assembly
1.75	2	930187-02	160042-02
2.75	3	930187-03	160042-03
3.75	4	930187-04	160042-04
4.75	5	930187-05	160042-05
5.75	6	930187-06	160042-06

Note

Weld dots are located on the top of the arm assembly.

SL-1186

Table 3 Parts List

Item Number	Description	Quantity	Part Number
1*	Hanger Side Rail Assembly L.H.	1	Table 4 on page 7
2*	Hanger Side Rail Assembly R.H.	1	Table 4 on page 7
3	Arm Assembly	2	Table 4 on page 7
4	Axle Assembly	1	Table 4 on page 7
5**	Upper Bag Plate Assembly	2	950182
6	Air Spring Load	2	AS0048
7	Lift Bag Plate	2	50133
8	Air Spring-Lift	2	AS0058
9	Load AirSpring Hardware Pack	1	16061-01
10	Lift Airspring Pack	1	16060
11	Pin	2	12972
12	Washer, flat 0.75 Hardened	4	10043
13	Cotter Pin	2	11941
14	Hanger Pivot Bushing	2	12931-01
15	Torque Rod Assembly	2	12954
16A	Crossmember	1	90413
16B	Optional Crossmember with Airtank Mount (not shown)	1	17131
17	Crossmember Pack	1	16000-02

Item Number	Description	Quantity	Part Number
18A	Cap Screw	2	17238-7
18B	Cap Screw	2	17238-9
19	Cap Screw	4	17238-5
20	Lock Nut	8	17922
21	Washer, flat	8	12927-01
22	Delrin Liner upper torque rod	4	17161-03
23	Delrin Liner lower arm	-	-
24	Steer Stabilizer Kit	1	980060
25	Spindle Assembly Kit	1	18040
26	Brake Chamber Slack Adjuster LH	1	17187-01
27	Brake Chamber Slack Adjuster RH	1	17187-02
29	Axle to Arm Bushing	2	12932-01
30	Torque Rod Replacement Bushing	4	17012

*Hanger part # based on 34' frame width. For other frame widths, please consult W&C factory
 ** "Upper Bag Plate" denotes upper bag plate without the coupler. 950XXX-1 and 950XXX-2 also have the brake line coupler built in.

Table 4 Parts List Details

This table shows the left hand and right hand hanger, arm assembly and axle assembly part numbers for the SL-1186 model according to the available pedestal heights. The table also lists the number of weld dots that corresponds with each pedestal height. See "Weld Dots" on page 19 for more details. This table corresponds to part numbers 1-4 in Table 3 that can be seen in figure 2

Pedestal Height	Weld Dots	Hanger Left	Hanger Right	Arm Assembly	Axle Assembly
1.00	2	920124-12	920124-22	14119-02	160020-01
2.00	0	920124-12	920124-22	14119	160020-02
3.00	4	920124-12	920124-22	14119-04	160020-03
4.00	1	920124-12	920124-22	14119-01	160020-04
5.00	5	920124-12	920124-22	14119-05	160020-05
6.00	3	920124-12	920124-22	14119-03	160020-06
7.00	5	920124-13	920124-23	14119-05	160020-07
8.00	3	920124-13	920124-23	14119-03	160020-08

SL-1187

Table 5 Parts List

Item Number	Description	Quantity	Part Number
1*	Hanger Side Rail Assembly L.H.	1	920180-1
2*	Hanger Side Rail Assembly R.H.	1	920180-2
3	Arm Assembly	2	Table 6 on page 9***
4	Axle Assembly 5"x5"	1	Table 6 on page 9
5**	Upper Bag Plate Assembly	2	950182
6	Air Spring Load	2	AS0048
7	Lift Bag Plate	2	50133
8	Air Spring-Lift	2	AS0058
9	Load AirSpring Hardware Pack	1	16061-01
10	Lift Airspring Pack	1	16060
11	Pin	2	12972
12	Washer, flat 0.75 Hardened	4	10043
13	Cotter Pin	2	11941
14	Hanger Pivot Bushing	2	12932-01
15	Torque Rod Assembly	2	12954
16A	Crossmember	1	90413-48
16B	Optional Crossmember with Airtank Mount (not shown)	1	17368
17	Crossmember Pack	1	16000-02
18A	Cap Screw	2	17238-7
18B	Cap Screw	2	17238-9
19	Cap Screw	4	17238-5
20	Lock Nut	8	17922
21	Washer, flat	8	12927-01
22	Delrin Liner upper torque rod	4	17161-03
23	Delrin Liner lower arm	-	-
24	Steer Stabilizer Kit	1	980060
25	Spindle Assembly Kit	1	18040
26	Brake Chamber Slack Adjuster LH	1	17187-01
27	Brake Chamber Slack Adjuster RH	1	17187-02
29	Axle to Arm Bushing	2	12931-01
30	Torque Rod Replacement Bushing	4	17012

*Hanger part # based on 34" frame width. For other frame widths, please consult W&C factory

** "Upper Bag Plate" denotes upper bag plate without the coupler. 950XXX-1 and 950XXX-2 also have the brake line coupler built in.

*** Arm Assemblies are handed for SL-1187. See Table 6 for handed part numbers.

Table 6 Parts List Details

This table shows the right hand and left hand hanger part numbers and the axle assembly part numbers for the SL-1187 model according to the available pedestal heights. The table also lists the number of weld dots that corresponds with each pedestal height. See “Weld Dots” on page 19 for more details. This table corresponds to part numbers 3 and 4 in Table 5 that can be seen in figure 2.

Pedestal Height	Weld Dots	Arm Assembly Left	Arm Assembly Right	Axle Assembly
1.00	1	930109-11	930109-21	160026-01
2.00	2	930109-12	930109-22	160026-02
3.00	3	930109-13	930109-23	160026-03
4.00	4	930109-14	930109-24	160026-04
5.00	5	930109-15	930109-25	160026-05
6.00	6	930109-16	930109-26	160026-06

SL-1188

Table 7 Parts List

Item Number	Description	Quantity	Part Number
1	Hanger Side Rail Assembly L.H.	1	920180-1
2	Hanger Side Rail Assembly R.H.	1	920180-2
3	Arm Assembly	2	Table 8 on page 10***
4	Axle Assembly 5"x4"	1	Table 8 on page 10
5**	Upper Bag Plate Assembly	2	950182
6	Air Spring Load	2	AS0048
7	Lift Bag Plate	2	50133
8	Air Spring-Lift	2	AS0058
9	Load AirSpring Hardware Pack	1	16061-01
10	Lift Airspring Pack	1	16060
11	Pin	2	12972
12	Washer, flat 0.75 Hardened	4	10043
13	Cotter Pin	2	11941
14	Hanger Pivot Bushing	2	12932-01
15	Torque Rod Assembly	2	12954
16A	Crossmember	1	90413-48
16B	Optional Crossmember with Airtank Mount (not shown)	1	17368
17	Crossmember Pack	1	16000-02
18A	Cap Screw	2	17238-7
18B	Cap Screw	2	17238-9

Item Number	Description	Quantity	Part Number
19	Cap Screw	4	17238-5
20	Lock Nut	8	17922
21	Washer, flat	8	12927-01
22	Delrin Liner upper torque rod	4	17161-03
23	Delrin Liner lower arm	-	-
24	Steer Stabilizer Kit	1	980060
25	Spindle Assembly Kit	1	18040
26	Brake Chamber Slack Adjuster LH	1	17187-01
27	Brake Chamber Slack Adjuster RH	1	17187-02
29	Axle to Arm Bushing	2	12931-01
30	Torque Rod Replacement Bushing	4	17012

* Arm Assemblies are handed for SL-1188. See Table 8 for handed part numbers.

Table 8 Parts List Details

This table shows the left hand and right hand hanger part numbers and the axle assembly part numbers for the SL-1188 model according to the available pedestal heights. The table also lists the number of weld dots that corresponds with each pedestal height. See “Weld Dots” on page 19 for more details. This table corresponds to item numbers 3 and 4 in Table 7 that can be seen in figure 2.

Pedestal Height	Weld Dots	Arm Assembly Left	Arm Assembly Right	Axle Assembly
1.00	1	930109-11	930109-21	160022-01
2.00	2	930109-12	930109-22	160022-02
3.00	3	930109-13	930109-23	160022-03
4.00	4	930109-14	930109-24	160022-04
5.00	5	930109-15	930109-25	160022-05
6.00	6	930109-16	930109-26	160022-06

Note

5x4 axle beam denotes SL1188.

RSL-1186

Table 9 Parts List

Item Number	Description	Quantity	Part Number
1	Hanger Side Rail Assembly L.H.	1	920283-10
2	Hanger Side Rail Assembly R.H.	1	920283-20
3	Arm Assembly	2	Table 10 on page 12

Item Number	Description	Quantity	Part Number
4	Axle Assembly 5"x5"	1	Table 10 on page 12
5*	Upper Bag Plate Assembly	2	950182
6	Air Spring Load	2	AS-0048-2G
7	Lift Bag Plate	2	50133
8	Air Spring-Lift	2	AS-0058
9	Load AirSpring Hardware Pack	1	16061-01
10	Lift Airspring Pack	1	16060
11	Pin	2	12972
12	Washer, flat 0.75 Hardened	4	10043
13	Cotter Pin	2	11941
14	Hanger Pivot Bushing	2	12931-01
15	Torque Rod Assembly	2	990134
16A	Crossmember	1	17191-02
16B	Optional Crossmember with Airtank Mount (not shown)	1	17131
17	Crossmember Pack	1	16000-02
18A	Cap Screw	2	17238-7
18B	Cap Screw	2	17238-9
19	Cap Screw	4	17238-5
20	Lock Nut	8	17922
21	Washer, flat	8	12927-01
22	Delrin Liner upper torque rod	4	17161-03
23	Delrin Liner lower arm	-	-
24	Steer Stabilizer Kit	1	980060
25	Spindle Assembly Kit	1	18040
26	Brake Chamber Slack Adjuster LH	1	17187-01
27	Brake Chamber Slack Adjuster RH	1	17187-02
28	Hub and Drum Assembly	2	See Table 14
29	Axle to Arm Bushing	2	12932-01
30	Torque Rod Replacement Bushing	4	17012

* "Upper Bag Plate" denotes upper bag plate without the coupler. 950XXX-1 and 950XXX-2 also have the brake line coupler built in.

Table 10 Parts List Details

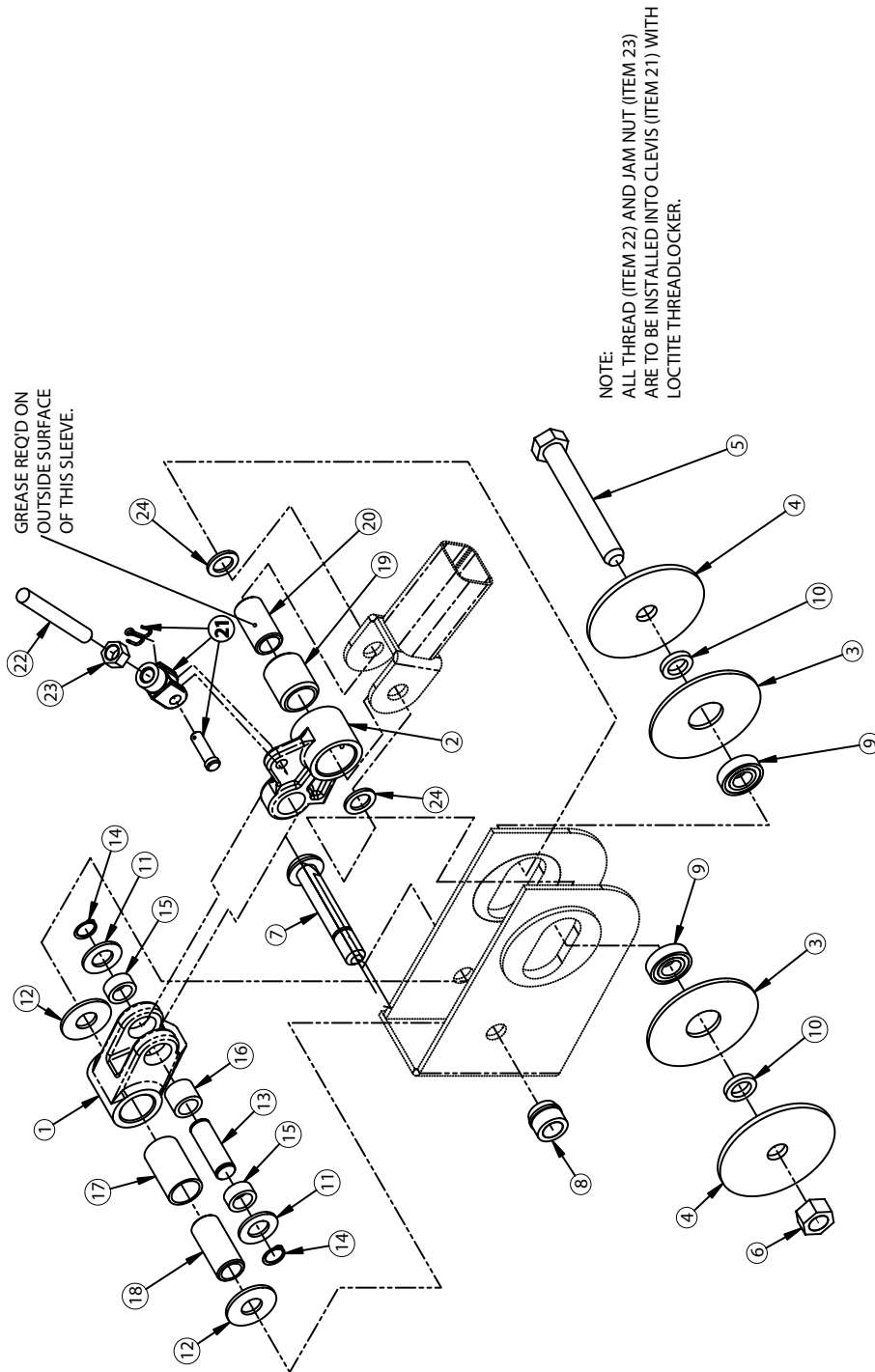
This table shows the arm assembly and axle assembly part numbers for the RSL-1186 for the available pedestal heights. The table also lists the number of weld dots that correspond with each pedestal height. See “Weld Dots” on page 19 for more details. This table corresponds to item numbers 3 and 4 in Table 9 and can be seen in figure 2

Pedestal Height	Weld Dots	Arm Assembly	Axle Assembly
1.00	2	14119-02	160020-01
2.00	0	14119	160020-02
3.00	4	14119-04	160020-03
4.00	1	14119-01	160020-04
5.00	5	14119-05	160020-05
6.00	3	14119-03	160020-06

RSL-1186 Linkage

The RSL-1186 model has the same core components as the model shown in figure 2, but has different linkage. Figure 3 shows the differences in the linkage that correspond to item numbers 1 and 15 from Table 9.

Figure 3: Linkage Exploded View-RSL-1186



SL Series

Table 11 Parts List

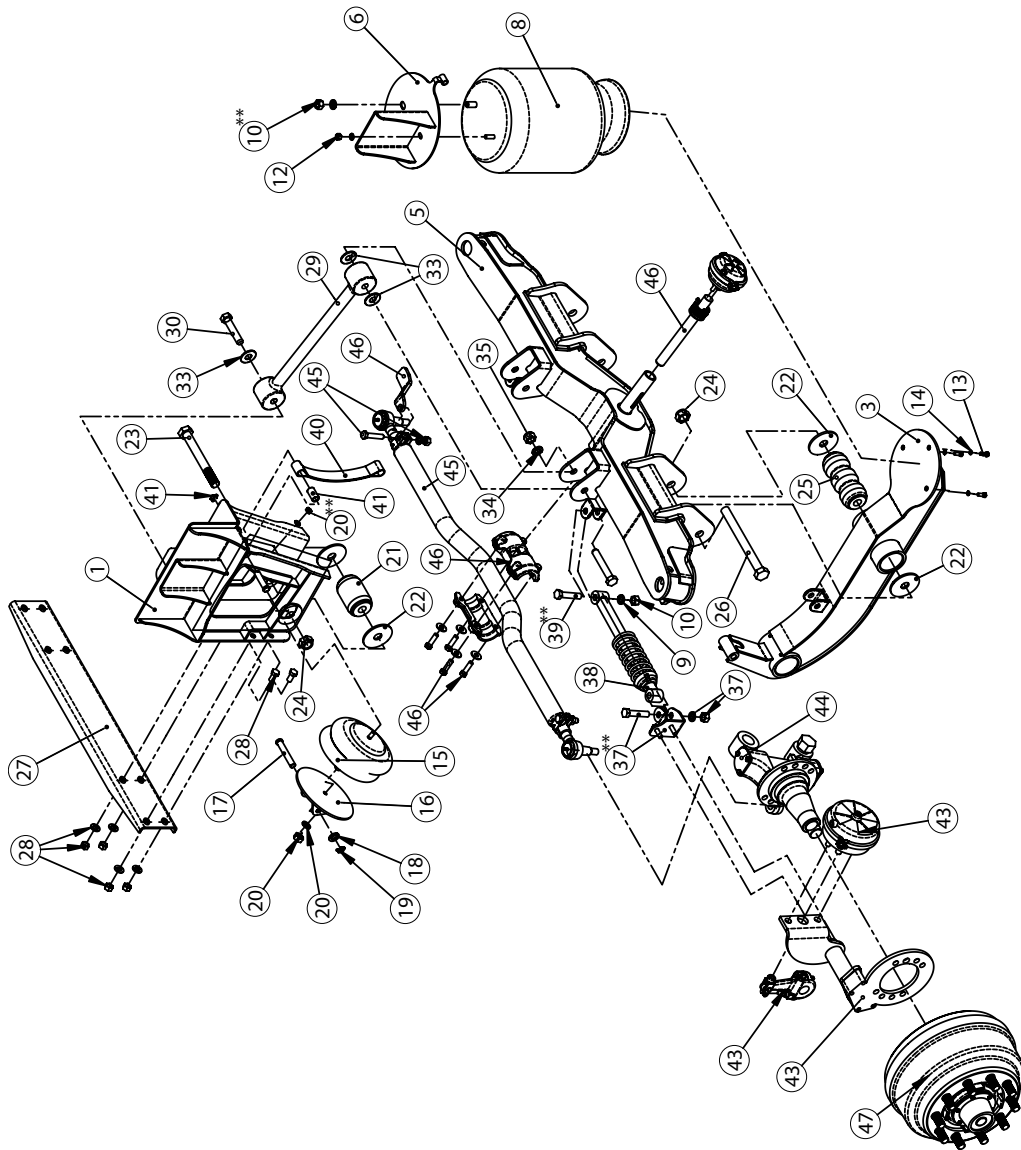
The following table describes the differences in the linkage for RSL-1186 as displayed in Figure 3 and includes the corresponding part numbers and quantities.

Item Number	Description	Quantity	Part Number
1	Forward Link Casting	2	90586
2	Rear Link Casting	2	90587
3	Slide Washer (UHMW)	4	90585
4	Slide Collar	4	90486
5	Cap Screw 0.87-14 x 6.50 CHMF	2	17800-03
6	Nut Lock 0.875 UNF	2	11457
7	Huck Fastener	2	17137-04
8	Huck Collar	2	17138
9	Bearing Roller Reverse ST	4	17407
10	Bearing Spacer Washer	8	17417
11	Washer Flat 0.88 Hardened	8	17416
12	Center Pivot Pin	2	90637
13	Snap Ring 7/8" External	4	17415
14	Center Pivot Liner UHMW	6	90638
15	Forward Link Liner	2	90489
16	Forward Link Inner Sleeve, 2.75" Long	4	90488
17	Rear Link Torque rod Bushing Liner	2	90498
18	Clevis Pin 0.62 90013	2	17365
19	All Thread Rod 0.62 UNF	2	17359
20	Jam Nut 0.62 UNF	2	17360
21	Grease Fitting	2	11448

SL-2089

Figure 4 shows the exploded parts diagram for an SL-2089 model. For clarity, only the left hand parts are shown. The corresponding table describes the SL-2089 model as seen in Figure 4 including the part numbers and quantities.

Figure 4: Exploded View-Model SL-2089



** Special torque requirements as noted in Table 17 on page Z9.

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Table 12 Parts List

Item Number	Description	Quantity	Part Number
1	Hanger Assembly L.H.	1	Table 13 on page 17
2	Hanger Assembly R.H.	1	Table 13 on page 17
3	Arm Assembly L.H.	1	930130-11
4	Arm Assembly R.H.	1	930130-21
5	Axle Assembly 5"x5"	1	160046
6	Upper Bag Plate Assembly L.H.	1	Table 13 on page 17
7	Upper Bag Plate Assembly R.H.	1	Table 13 on page 17
8	Air Spring 1R14-170	2	AS0047G
9	.75" Lock Washer	4	10026
10	.75" Hex Head Nut	4	10025
11	.50" Lock Washer	2	10042
12	Hex Nut 0.50" UNC	2	10030
13	Cap screw 3/8 x 1 UNC	6	10038
14	Lock Washer 0.38" ID x 0.63" OD	6	10041
15	Airspring (6886) Lift	2	AS-0058-1F
16	Lift Bag Plate Assembly	2	13220
17	Pin 0.75" x 4.75"	2	11940
18	Flat Washer	2	10043
19	Cotter Pin	2	11941
20	Lift Bag Hardware Pack	1	16060
21	Pivot Bushing	2	10050
22	Flat Washer 4.25 "ID x 1.15" OD	8	11222
23	Cap screw 1.12" x 9.75" UNF Grade 8	2	11225
24	1.125" Lock Nut UNF Grade 8	4	10023
25	Bushing, Axle Seat SL-1800	2	12789
26	Cap screw 1.12" x 12.0" UNF Grade 8	2	11602
27	Crossmember 33" Arm Centers	1	90016-01
28	Bolt-On Crossmember Pack	1	16000
29	Torque Arm	2	17975
30	Cap screw 0.87-14" x 4.50"	2	17800-01
31	Solid Bar, Square 0.50" x 2.00"	2	XB.50S
32	Cap screw 0.87-14" x 5.50"	2	17800-02
33	Washer 2.25" OD x 0.94" ID Torque Rod	6	17408
34	Lock Washer 0.88"	2	17010
35	Lock Nut 0.88 UNF Nylon	2	17922

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Item Number	Description	Quantity	Part Number
36	Outer Stabilizer Bracket L.H.	1	980118-10
37	Outer Stabilizer Bracket R.H.	1	980118-20
38	Shock Steering Stabilizer	2	11418
39	Cap Screw 3/4 x 3 1/2 UNF Grade 8	2	10035
40	Strap	2	Table 13 on page 17
41	Strap Hardware Pack	1	16003
42	Brake Assembly 16.5" x 6.0" R.H.	1	17400-21
43	Brake Assembly 16.5" x 6.0" L.H.	1	17400-11
44	Meritor 20k Spindle Kit	1	18076
45	Tie Rod Assembly	1	990167-01
46	Optional Lockout Kit	1	990217-03 (ordered separately)
47	Hub and Drum Assembly	2	See Table 15

Table 13 Parts List Details

This table shows the available right hand and left hand hanger, right hand and left hand upper bag plate assembly and strap part numbers for the SL-2089 model for each available hanger height. This table corresponds to item numbers 1, 2, 6, 7 and 40 in Table 12 and can be seen in figure 4.

Hanger Height**	Hanger Left	Hanger Right	Upper Bag Plate Assembly Left	Upper Bag Plate Assembly Right	Strap
14.25	920294-10	920294-20	950153-10	950153-20	17550-04
16.00	920328-10	920328-20	950166-10	950166-20	17021

**Hanger Height is measured from frame mounting surface to lower arm pivot

Arm Length Measurements

Some specially made SL series models have a version with a shorter arm. The arm measurement is shown in figure 5 and the measurements for the models that are available in short arm lengths are shown in Table 14. For more information on SSR models, contact Watson & Chalin.

Figure 5: Arm Length Measurement

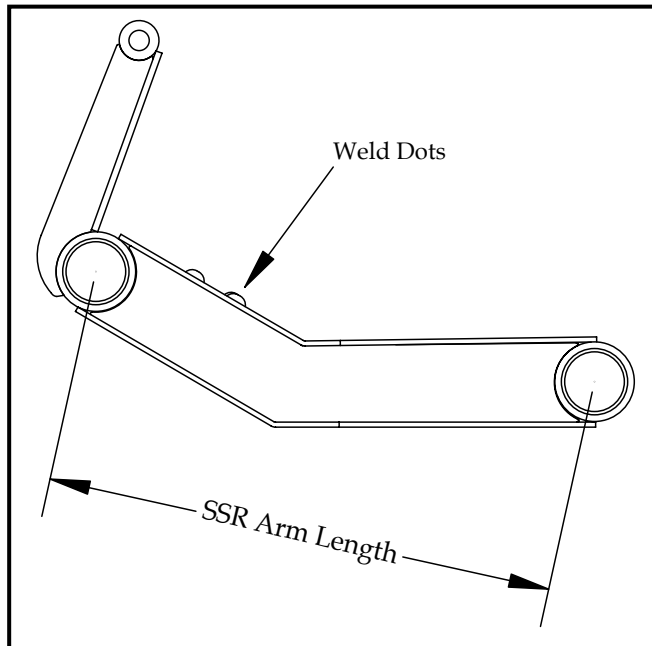


Table 14 Standard and Short Arm Lengths

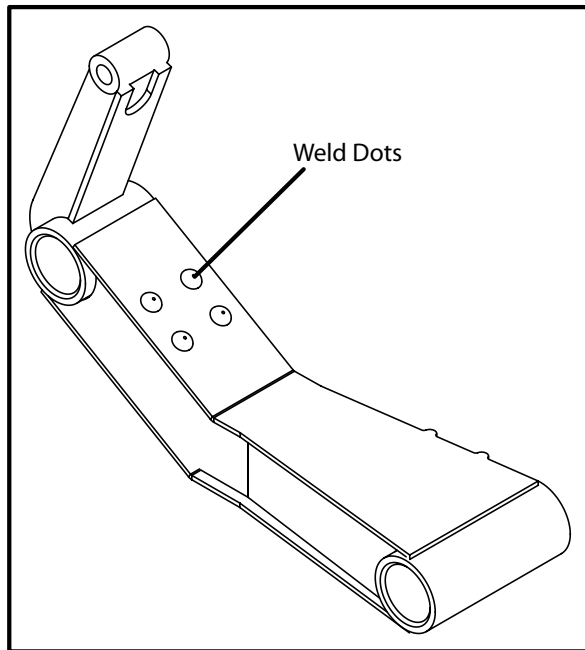
The following table gives the standard super short (SSR) arm length for each assembly according to the model number. Only these model numbers are available with a short arm.

Model Number	SSR Arm Length	SR Arm Length
RSL-1186 SSR	16.50"	19.25"
SL-1187 SSR	16.50"	19.25"
SL-1188 SSR	16.50"	19.25"

Weld Dots

Weld dots are used to identify the paddle angle and pedestal height of the suspension unit. If you know this information, you can find the correct part numbers for your specific suspension in case you need a replacement part.

Figure 6: Weld Dot Location



To identify the paddle angle of your suspension:

1. Locate one of the arms on the suspension unit.
2. Count and record the number of weld dots located on the top plate of the arm.
3. Locate the section in this Installation and Operation manual of the series for your unit (SL-0851, SL-1100, SL-1186, SL-1187, SL-1188, or RSL-1186).
4. In the Parts List Details table that corresponds with the series number, locate the column titled **Weld Dots**.
5. Find the row that has the same number of weld dots as your suspension unit.

This row has information, including the paddle angle and specific part numbers, related to your suspension.

Ride Height

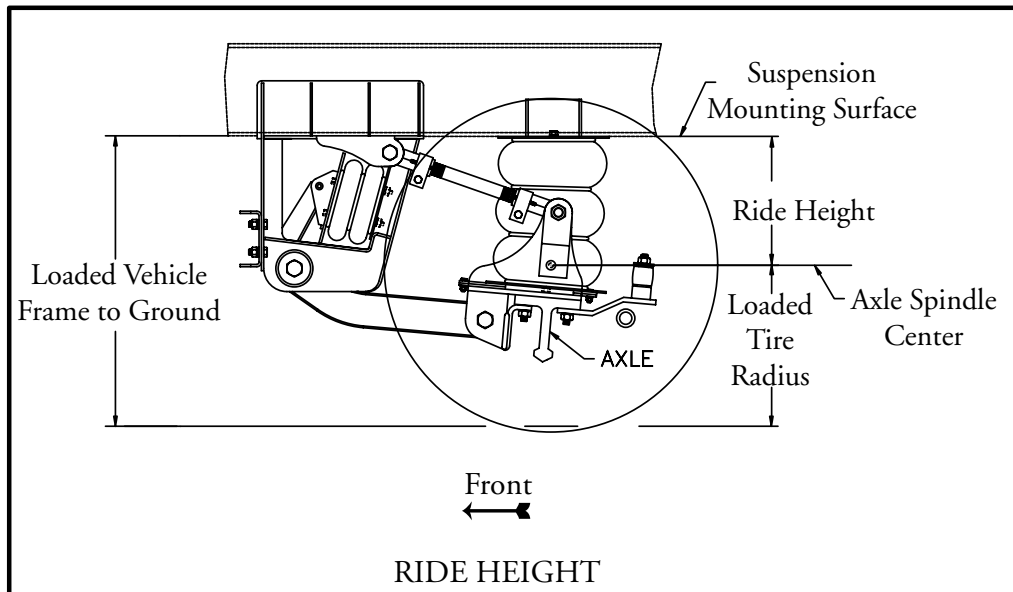
Ride height, also referred to as run height, is the distance between the suspension mounting surface, or the bottom of the vehicle frame and the spindle center of the auxiliary liftable axle in the lowered run position. It is one of the most important dimensions to obtain and when set properly, allows 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.

Watson & Chalin provides numerous different SL series suspension systems to accommodate different vehicle ride heights and capacities.

Figure 7: 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.

SL Series

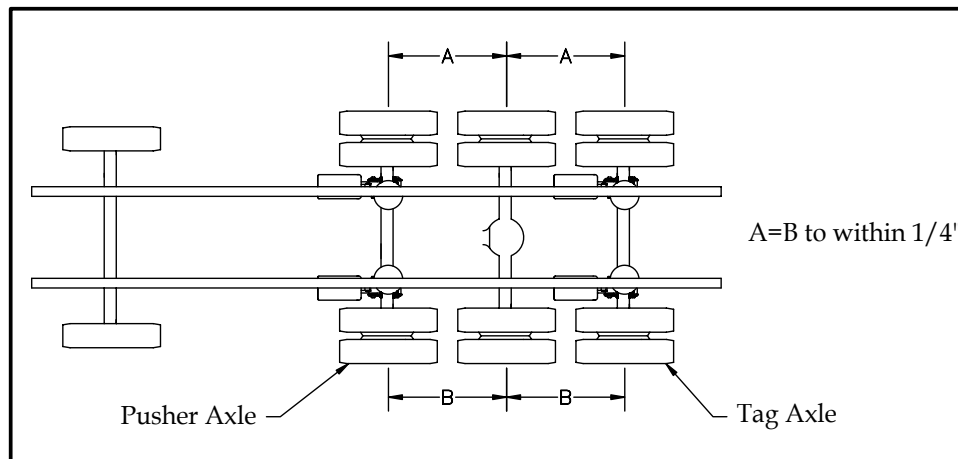
Installation

The following instructions are for installing the components of the Watson & Chalin SL Series Suspension systems. All model numbers in the series are installed using the same set of 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 other suspension components. When there is too little ground clearance or if the suspension is overloaded, the truck will bottom out while going over bumps and damage can be done to the suspension components or other components on the vehicle.

Watson & Chalin must approve any deviation from the installation instructions in writing.

Figure 8: Pusher and Tag Axle Alignment

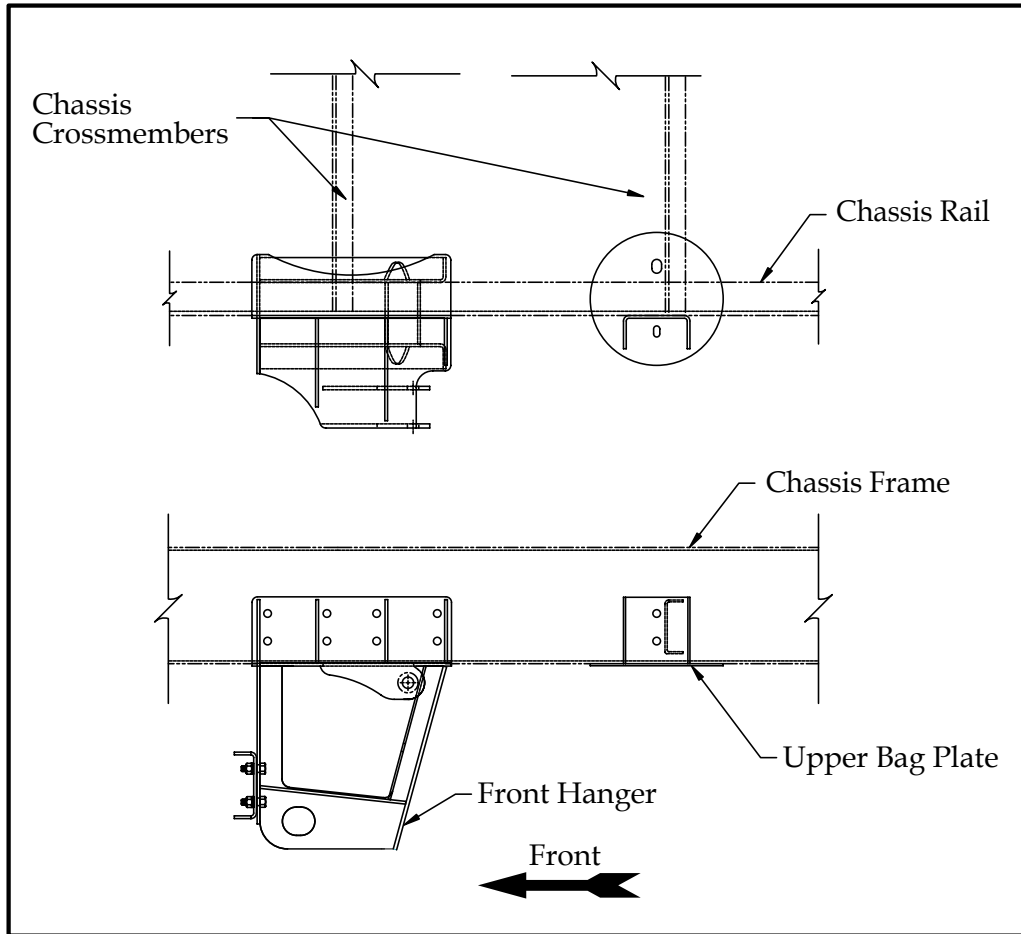


Mounting the Suspension

Before mounting the suspension, you must:

- Confirm 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 as seen in figure 9.
- If you had the vehicle frame predrilled for mounting the SL series axle prior to purchase, make sure to align to these bolt positions. Also remember to remove the associated bolts from the frame prior to axle alignment and installation.

Figure 9: Chassis Crossmember Reinforcement



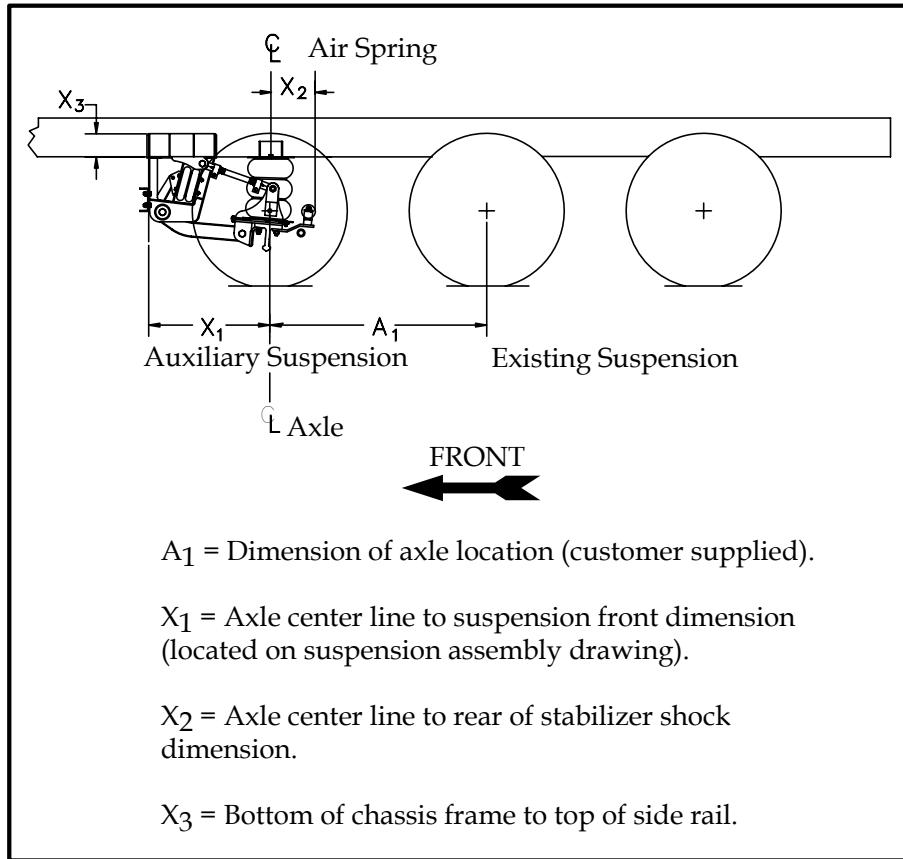
Note

Throughout the installation process you must check frequently for suspension clearance problems while mounting the suspension.

SL Series

To mount the suspension to the vehicle:

Figure 10: Suspension mounting



1. Place the vehicle on a level surface.
2. Mark the approximate location of the suspension side rail assemblies on the vehicle frame rails.
3. Check for interference with any existing brackets or mounting bolts.
4. Locate the auxiliary axle mounting position.
5. From the centerline of the axle at the wheel center, mark the location this axle measurement on the outside of the vehicle frame rail.
6. Raise the back end of the frame using either a lift, jack or driving the rears axles and tires onto a lift.
7. Raise the suspension into position using the marked axle, front hanger rail and upper bag plate center line as locators.

Note

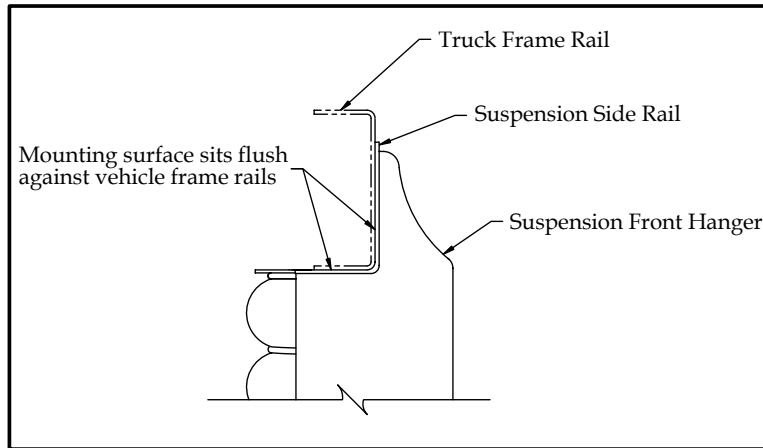
If while raising the SL series suspension into place, the hangers get stuck on the frame because they are too narrow. Loosen the bolts on one side of the crossmember. This will allow the hangers to separate enough to move into position. If you have a welded crossmember you will not be able to loosen in this way.

8. Using clamps, clamp the suspension rail to the truck frame rail.

Important

Both the side and bottom mounting surfaces must sit flush with the side and bottom of the vehicle frame rails or spacers, or the suspension warranty is invalid. See figure 11.

Figure 11: Frame Alignment



9. Mark the location of the mounting holes on the outside of both suspension frame rails.
10. Inspect vehicle frame rails for any items that may cause drilling obstructions.

! WARNING

WELDING, DRILLING OR BOLTING THROUGH THE BOTTOM FLANGE OF THE SUSPENSION FRAME OR VEHICLE RAILS VOIDS THE MANUFACTURERS WARRANTY.

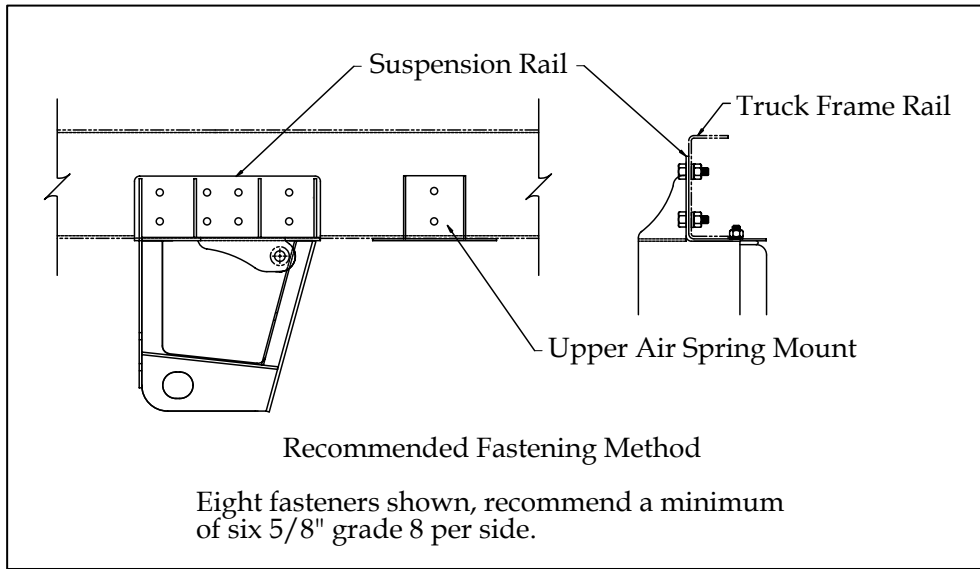
11. Drill two 21/32" diameter holes through the suspension rails and the vehicle frame rails.

Note

If you do not use 21/32 drill bits then use 7/8 or 3/4 for this drill and bolt size.

12. Fasten each suspension side rail to the truck frame using 5/8" SAE grade 8 UNF fine thread cap screw, flat washer and lock nut. Use at least 2 bolts per side.
13. Drill five remaining mounting holes per side rail.
14. Install the remaining bolts, washers and lock nuts and tighten cap screws to proper torque. See "Torque Requirements" on page 28 for details.
15. Drill a minimum of one 21/32" diameter holes through the upper airspring mounting brackets and chassis frame.
16. Fasten each bag plate assembly with 5/8" SAE grade 8 UNF fine thread cap screws, flat washers and lock nuts as seen in figure 12.

Figure 12: Recommended Fastening Method

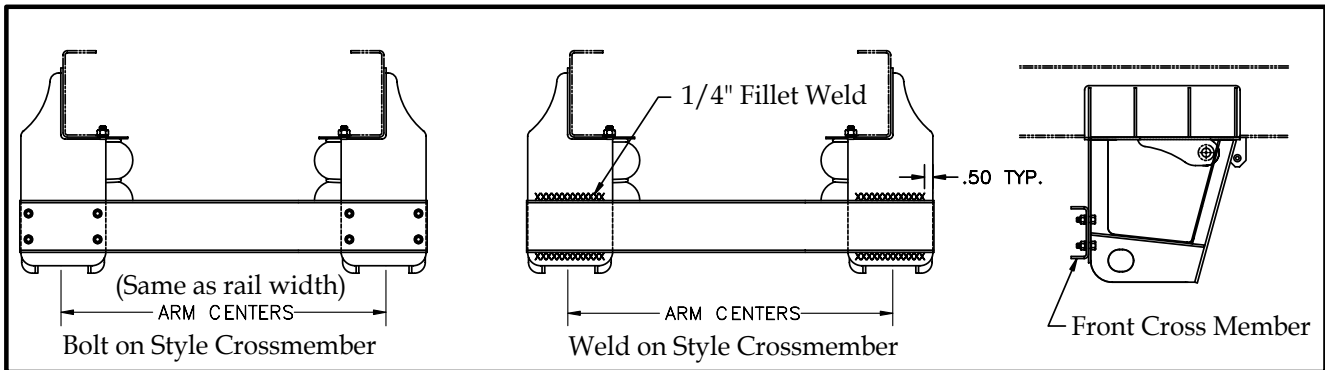


17. Check the front hanger for proper arm centers.
18. Align the cross member with side rail.

Note

Hangers must be parallel to one another to ensure proper operation.

Figure 13: Front Lower Crossmember



19. Do one of the following:
 - For bolt on crossmembers, bolt the crossmember to the side rail.

Note

Prior to welding on crossmembers the hangers must be securely installed.

- For weld on crossmembers, weld the crossmember to the side rail.

Note

Both of these procedures are seen in figure 13.

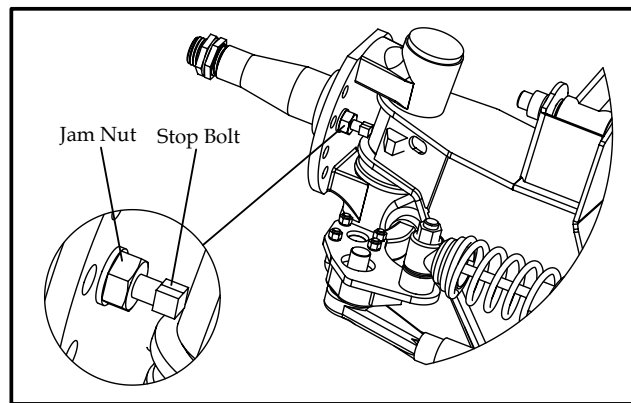
20. Remove the clamp from the vehicle frame rails.

Adjusting Maximum Turn Angle

This section is used to check and adjust, if necessary, the maximum turn angle of SL Series suspension systems in order to obtain proper clearance. To adjust the maximum turn angle:

1. Measure the current turn angle.
2. The maximum turn angle for SL Series models is normally set at 25°. Some suspensions may require less turn angle.
3. If the maximum turn angle needs to be adjusted, adjust the stop bolt until the correct maximum angle is obtained on both sides.
4. To obtain the maximum turn angle:
 - a. Loosen the stop bolt jam nut as seen in figure 14.

Figure 14: Stop Bolt Location



- b. Adjust the turn angle by adjusting the stop bolt in or out.
- c. Tighten the jam nut to 65-85 lbs./ft.

! WARNING

DO NOT TURN THE STOP BOLT SO MUCH THAT THE BOLT END PROTRUDES PAST THE BRAKE SPIDER AS THIS CAN CAUSE DAMAGE TO OTHER COMPONENTS.

SL Series

Adjusting Wheel Toe-In

Toe-in is the relationship of the distance between the front and rear of the tires or the amount at which the front wheels point inward. Toe-out is the amount at which the tires point outward. When the front distance is less than the rear distance, the wheels are toed-in. Most tire wear is caused by incorrect toe settings.

To adjust wheel toe-in:

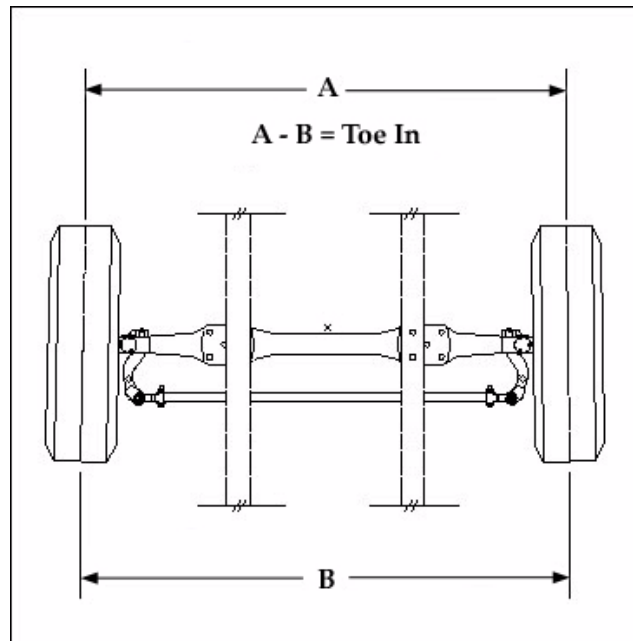
1. Place the vehicle on a level surface.
2. Lift the axle until tires are free to spin.
3. Use paint or chalk to mark the horizontal center of tires around the complete outer surface of the tire.
4. Place the pointers of a trammel bar on the marks of each tire and rotate the tires making sure a straight line has been marked.
5. Measure and record the distance at the back of the tires.
6. Measure and record the distance at the front of the tires.
7. Use the following calculation to determine the toe in measurement.

Distance between back tires (B)		_____
Distance between front tires (A)	-	_____
Toe-in Must be within + or - 1/32".	=	_____

Note

A positive result is considered toe-in and a negative result is considered toe-out.

Figure 15: Wheel Toe-In: Top Showing the Front



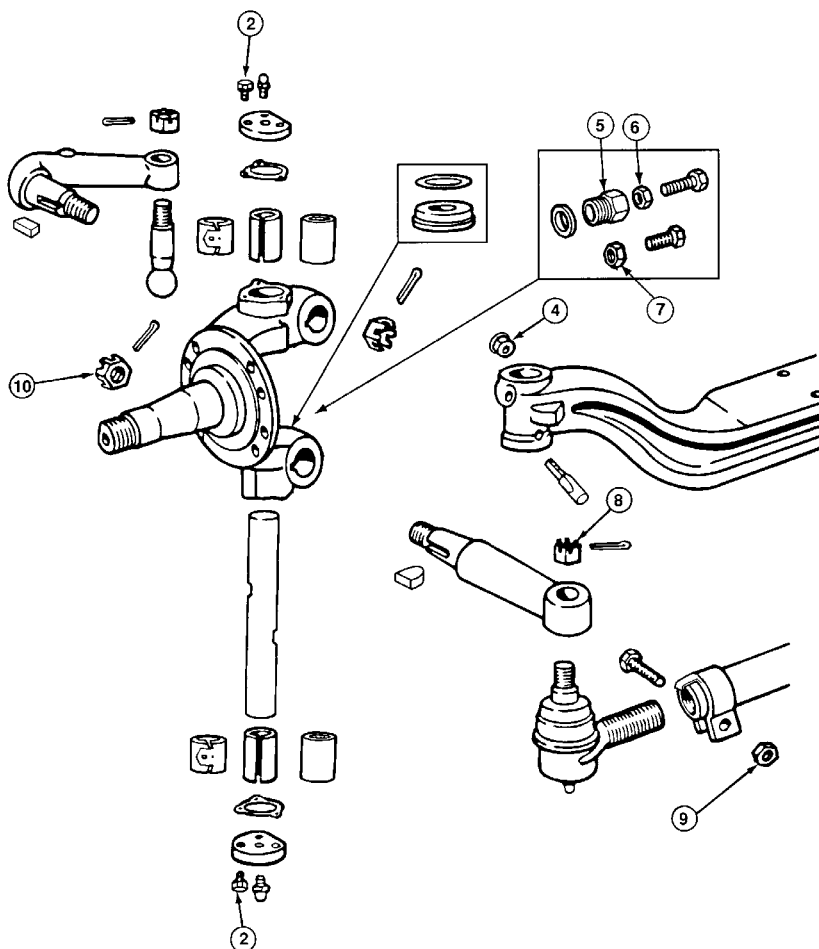
SL Series

8. If the toe-in measurement is not at the specified distance:
 - Loosen clamp bolts and nuts at each end of the tie rod.
 - Turn tie rod tube with a pipe wrench to adjust wheel toe-in.
 - Tighten clamp bolts to the proper torque.
9. Repeat step 1 through step 8 until correct toe-in is obtained.

Torque Requirements

Torque specifications listed in the following tables are applied to nuts, but not bolts. All torque requirements are for lubricated threads only. A lubricated thread is defined as a bolted connection that has some form of friction modifier or lubricant applied to the thread surfaces, which provides a lower torque requirement.

Figure 16: Front Axle Torque Illustration



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Table 15 Torque Guidelines

The following table shows the proper torque requirements for the cap screws and nuts described. Each type of cap screw and nut is shown in figure 16 according to the item number.

Item #	Description	Size	Torque Range (lb.-ft.)
2	Knuckle Cap screw	5/16"–18"	20–30
4	Draw Key Nut	7/16"–20"	30–45
5	3/4 Inch Stop Screw Adapter	–	65–115
6	1/2 Inch Stop Screw Lock/Jam Nut	–	50–75
7	3/4 Inch Stop Screw Lock/Jam Nut	–	65–85
8	Tie Rod Arm to Tie Rod End Nut	7/8"–14"	160–300
		1"–14"	250–450
		1 1/8"–12"	350–650
		1 1/4"–12"	500–675
9	Cross Tube Clamp Nut	5/8"–11"	40–60
10	Tie Rod Arm to Knuckle Nut	7/8"–14"	250–450
		1"–14"	390–725
		1 1/8"–12"	550–1025
		1 1/4"–12"	775–1450
		1 1/2"–12"	1350–2525

Table 16 Additional Torque Guidelines

The following table shows the proper torque requirements for all cap screws and bolts not specifically listed in Table 15.

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	800
Torque MAX ft*lbs.	35	75	200	350	550	800	1000

Table 17 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

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Table 18 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

Air Pressure vs. Load Guide

The following tables describe the proper air pressure settings and run heights for each SL series model number.

SL-0851 Series

The following settings are for model number SL-0851.

Load at Ground	Pressure(PSI)at Minimum Designed Ride Height	Pressure(PSI)at Maximum Designed Ride Height
2000	9	11
3000	17	21
4000	25	31
5000	34	41
6000	42	51
7000	50	60
8000	58	70

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RSL-1186, SL-1187, SL-1188 Series

The following pressure settings are for model numbers RSL-1186, SL-1187 and SL-1188.

Load at Ground	Pressure(PSI)at Minimum Designed Ride Height	Pressure(PSI)at Maximum Designed Ride Height
5000	26	38
6000	32	48
7000	39	57
8000	46	67
9000	52	77
10000	59	87
11000	66	97
12000	73	107
13000	79	110
14000	98	110*

*Can be achieved by using a lower ride height.

SL-2089 Series

The following settings are for model number SL-2089. Model number SL-2089 is intended to run at the designed run height only, not above or below.

Load at Ground	Pressure(PSI) Designed Run Height
6000	18
8000	26
10000	34
12000	42
14000	50
16000	58
18000	67
20000	75

SL Series

Troubleshooting

The following table is intended to help you find answers to specific questions you may have when installing a Watson & Chalin SL series suspension system.

Problem	Possible Cause	Remedy
Cannot get the desired load on the axle.	Improper air pressure to load bags.	Check air pressure at load airspring and increase or decrease air pressure at regulator valve.
	Improper installation of air control system.	Check the piping of the air system.
	Suspension mounted too high.	Install Larger Tires and consult the factory.
Cannot get proper air pressure.	Insufficient brake protection valve or vehicle compressor.	Check brake protection valve and replace if necessary and then check air compressor.
Cannot get the correct lift. Most units are designed to lift with 100-105 psi in lift airspring.	Improper air pressure in lift air bags.	Check system pressure, or air system piping.
	Interference with chassis drive line or components.	Inspect for interference and correct, if necessary.
	Improper installation.	Check components against installation instructions and drawings.
	Arm restricted during full lift.	Contact Watson & Chalin.
Pusher steering is the opposite direction than the vehicle.	Improper caster setting.	Most units are preset, consult Watson & Chalin for further information.
Axle has vertical hop.	Improper air pressure.	Increase the air pressure if allowable.
		Install a vertical shock kit.
Improper wear of the tires.	Improper toe-in setting.	Reset the toe-in. See "Adjusting Wheel Toe-In" on page 27
Worn king pin and king pin bushing.	Worn Bushing	See Meritor Maintenance procedures for Meritor axle FF-XX for SL-0851, FF-941 for SL-11XX, FL-941 for SL-2089.
	Incorrect lubricant, lubricant procedure, or frequency of maintenance.	Check the type of lubricant, lubrication procedures and scheduled frequency of required maintenance. See Meritor's suggested guidelines for this.

