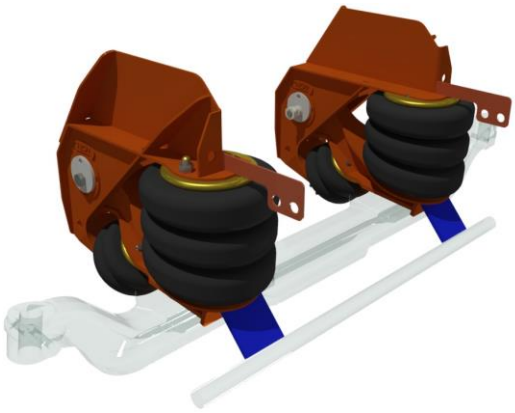
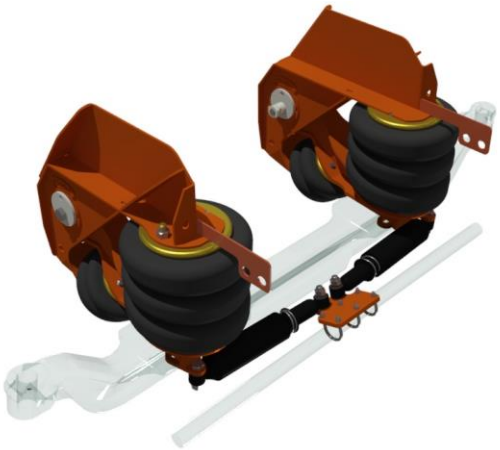
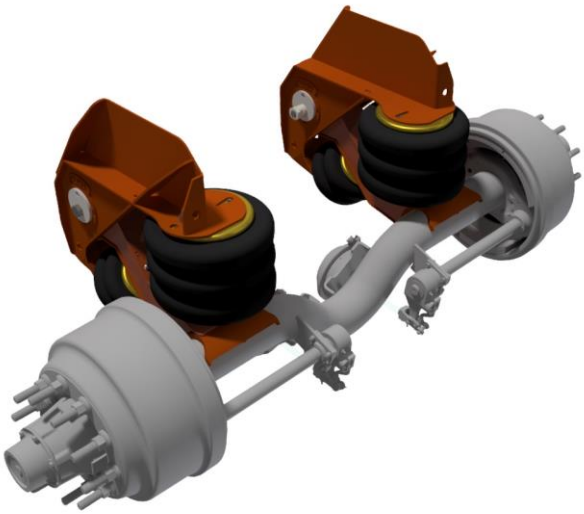
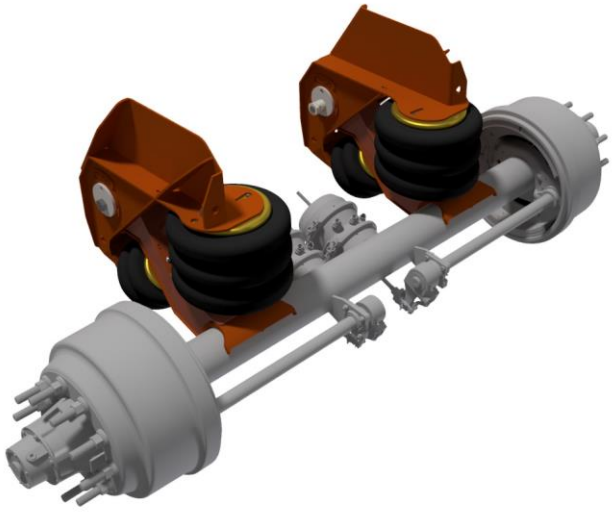
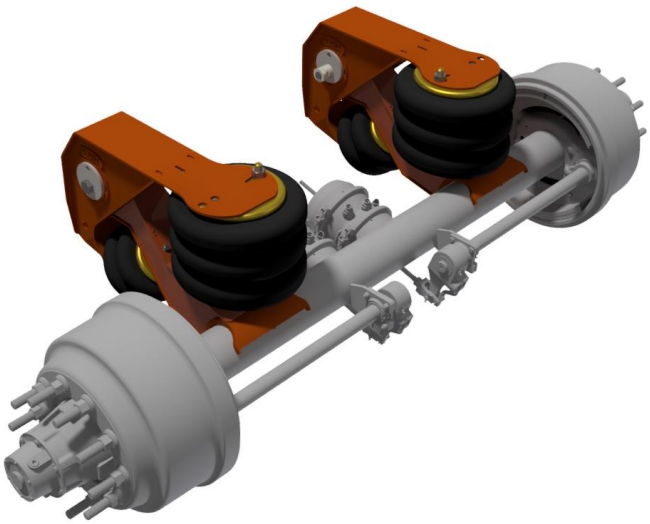
Installation & Service Manual











13K Model	Type	Axle Type
CX245i	Non-Steering	I-Beam
CX245is	Steering	I-Beam
CX245R	Non-Steering	5" Rd Bent
CX245R	Non-Steering	5" Rd Straight
CX245R-T	Non-Steering	5" Rd Straight

Publication # P170717 **Date 7/17/2017-Revision 0**

***Please note that it is important that the entire installation manual must be read thoroughly before proceeding with installation of a CX245 auxiliary axle.**

Suspension Identification:
Cush suspensions are identified by a 1”x2” metal tag on the hanger. On this tag is a Cush serial Number that is recorded at Cush to identify suspension unit, parts, and warranty date information.

Parts:
For best performance from your suspension system, only use official Cush replacement parts, contact your dealer. Replacement parts are shown in this manual or visit Cush store for more online information at www.cushcorp.com. Replacement parts are shown in parts explosion drawings at the back of this manual.

Sales, Service, and Warranty Information:
For any information on parts or questions with this product, please contact us and we will be glad to be of service to you.

Address :
Cush Corp.
1001 Falconcrest Ct.
Nixa, MO 65714

Phones, Fax and Email:
Phone: 417-724-1239
Toll Free: 877 R U ON AIR
Fax: 417-724-0126
Email: info@cushcorp.com
www.cushcorp.com

Installer Responsibilities & Pre-Checks

1. The total operation capacity of a suspension is given by the lowest load rating on any one component; including tires, wheels, brakes, and axles. Please refer to the manufacturers specs for these components to determine the maximum suspension system capacity. The CX245 series is rated 13,200 lbs. to the ground.

2. The installer is responsible for meeting all local, state, and federal law requirements for proper spacing of axles on the vehicle including the auxiliary suspension.

3. If the auxiliary lift suspension is improperly located on the frame of the vehicle it could result in unloading or overloading the primary suspension systems. The suspension installer is responsible to properly locate the position for mounting on the frame to meet proper load distribution specs.

4. Cush suspensions are designed to operate within certain guidelines and parameters. Operating the suspension outside the given designed parameters could result in improper performance or failure of the suspension and components.

5. The installer is responsible for meeting all air reservoir volume requirements. For more information consult the vehicle manufacturer or the Federal Motor Vehicle Safety Standards (FMVSS) 121 for more information and Cush Customer Bulletin #092809.

6. Altering the suspension and its components in any way is not permitted by Cush Corp. unless specifically approved on an official Cush Corp. document or drawing.

7. If modifications of the vehicle chassis are required please consult with the manufacturer to ensure modifications are permitted. Cush Corp can’t approve chassis modifications.

8. Installer to notify customer and make known that when lowering the auxiliary axle on an unloaded vehicle reduce the loading air pressure to 10 PSI or less to insure all primary suspension systems remain on the ground. Failure to do so may result in the vehicle rolling out of place if the other vehicle axles are unloaded and loss of traction of drive axle.

9. The installer is responsible for insuring proper clearance of the auxiliary axle, tires and air springs to the vehicle and the vehicle driveline.

10. The installer is responsible to calculate the auxiliary axle ride height per the frame to ground and tire choice. And confirm that the ride height is in the allowable area for the suspension per the charts in this manual or if vertical spacers are required.

11. For a truck unit in front of drive axle (Pusher), installer is responsible to calculate if there is drive line clearance.

Configuration

Cush’s CX245 suspensions are designed for versatility. They can be mounted up to multiple vehicle frame widths and applications on an axle-integrated unit. With this in mind, the suspension must be configured correctly to perform properly for the application at hand. The suspension installer should check that it is configured to meet the following parameters before you order your unit and again before you begin installation:

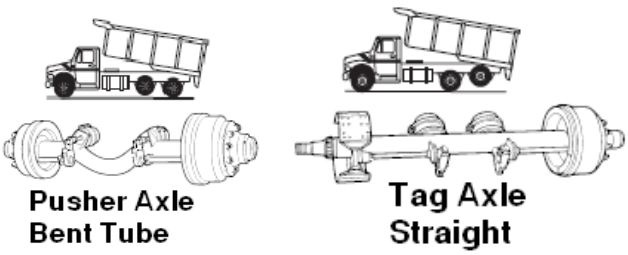
_____ **Suspension Capacity Requirement**-*confirm*
_____ **Tire Size**-*confirm choice*
_____ **Axle Lift Requirement**-*confirm*

_____ **Frame to Ground Height**-*measure*
_____ **Frame Width**-*measure*
_____ **Frame Length**-*measure*

_____ **Ride Height**-*calculate*
_____ **Vertical Frame Spacers**-*calculate*
_____ **Driveline Clearance**-*calculate*

Axles & Capacity

The CX245 model series has a suspension capacity of 13,200 Lbs. to the ground, but the ground load capacity may be limited by your axle or tire choice. You can use a standard 13K I-Beam steering axle or a 5” round straight (tag) or bent tube (pusher) axle. A higher capacity axle can be used but may be heavier than the 13K option.



Tire Size

On auxiliary lift axles the main variable that can affect the performance of the suspension is tire size. If the wrong tire size is selected you can push the suspension out of the ride height performance window. It is important to select your tire size up front so that the suspension ride height can be calculated for your vehicle. If you change tire size, you must recalculate your ride height to see that your suspension will perform or if you need to add vertical frame spacers because of the tire change.

The installer must also verify that the tire capacity is sufficient to match the loaded capacity to the ground. A tire with insufficient capacity may be overloaded by the auxiliary axle and cause vehicle damage or personal injury.

From tire Chart 1 and the installer tire choice the Static Loaded Tire Radius is needed by the installer to calculate and check the ride height of the new lift axle installation.

Chart1

Static Loaded Tire Radius

Wheel Size	Tire Size	Static Load Radius
17.5 [3]	215/75R17.5	14
	235/75R17.5	14.5
	9R17.5	15
	10R17.5	15.5
19.5 [2]	225/70R19.5	15
	245/70R19.5	15.5
	265/70R19.5	16
	285/70R19.5	16
	305/70R19.5	16.5
22.5 & 24.5 [1]	8R22.5	17
	255/70R22.5	17
	245/75R22.5	17
	235/80R22.5	17
	275/70R22.5	17.5
	9R22.5	18
	265/75R22.5	18
	255/80R22.5	18
	305/70R22.5	18.5
	10R22.5	19
	295/75R22.5	19
	275/80R22.5	19
	11R22.5	19.5
	295/80R22.5	19.5
	315/80R22.5	19.5
	285/75R24.5	19.5
	275/80R24.5	19.5
	385/65R22.5	19.5
	12R22.5	20
	365/80R20	20
	13R22.5	20.5
	11R24.5	20.5
	425/65R22.5	20.5
	12R24.5	21
	445/65R22.5	21
	13R24.5	21.5

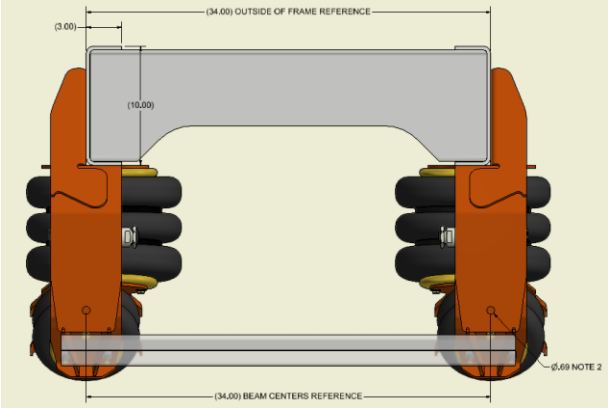
Footnotes:
1. Standard 16.5" Diameter Brake
2. Requires 15" or 12.25" Dia Brake
3. Requires 12.25" Diameter Brake

Frame to Ground Height Loaded (F2GL)

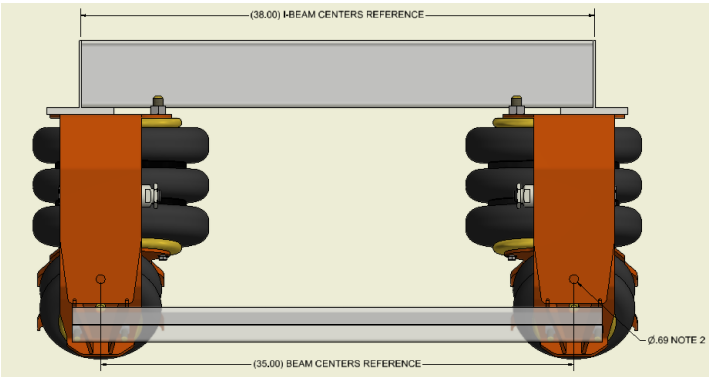
Confirm your vehicle configuration can accept a lift axle. The frame to ground height loaded (**F2GL**) must be measured at the location of the auxiliary axle to be placed when the truck is loaded on level ground. If you need to take the measurement without loading the vehicle, the loaded frame to ground measurement must be approximated so that the lift axle suspension operates within the designed ride height range for that model. Review the vehicle manufacturer’s guide or contact them if you must approximate the loaded F2GH.

Frame Width

The CX245 truck suspensions were designed to accommodate a variety of frame widths varying from 33.5” to 35” wide. The suspension for a round axle can be pre-welded together at customer or at Cush (Fully Integrated) if the exact frame width is known. Installer must check frame width and tire clearance.



The CX245 trailer suspensions were designed to weld up to a standard trailer I-Beam frame. The installer must confirm the unit will fit the trailer frame with the proper hanger spacing and track length of axle. The suspension frame hangers can be set in or out depending on single or dual tires and if a single tire is inset or outset. The frame hangers must be set so there is proper clearance between the tire and the suspension air springs of 1” min. The suspension for a round axle can be pre-welded together at customer or at Cush (Fully Integrated) if the exact frame width is known. The upper load air spring air port fitting is usually placed on the inside of the trailer frame.



Frame Length

The CXL-23 lift axle suspension was designed to be as compact as possible to allow room for other frame attachments or multiple lift axles, but you must measure that you have enough blank frame length in front of the proposed axle position to mount your model per the installation drawing. Some existing truck frame brackets may need to be moved or accommodated.

Ride Height (RH)

Installer is responsible to assure suspension to be set in the RH range to get proper axle lift and loading. Ride Height is measured from the center of the wheel/tire to the bottom of the frame. It is easily calculated by the following formula. On a straight round axle you can measure from the bottom of the frame to the center of the axle.

Ride height (RH) = Frame to Ground Height Loaded (F2GL)-Static Loaded Tire Radius (SLR)

The Frame to Ground Height Loaded must be measured at the location where the auxiliary suspension intends to be installed, when vehicle is loaded, to insure proper height measurement. The vehicle also needs to be loaded and on level ground for proper measurement.

The typical Static Loaded Tire Radius (SLR) can be found in tire section, ***Chart 1.***

Truck CX245i Chart compares the Frame to Ground Height and your tire selection to determine if a vertical spacer kit is needed per your suspension model.

The **CX245** Models are designed to accommodate the following ride heights:

- **CX245i** Fits 6.5"- 11.5" Ride Height (up to 13.5" RH with a spacer kit)
- **CX245R** Fits 12.5"- 17.5" Ride Height

Vertical Spacing

The **CX245** suspension hanger with a frame rail is designed to accommodate vertical spacers if needed. The **CX245** can be spaced vertically down from the frame 1" to 2" to support a taller suspension ride height on the frame. These spacers should be a Cush spacer kit to insure the optimum performance of the suspension, the suspension installer can use tubing of sufficient strength to space down. Spacers that are not a certified Cush part will void the warranty unless approved in writing from Cush Corp. You can use the ***Chart*** on the **RH Configuration Worksheet** to determine if spacers are required for your application ride height.

Cush auXiliary

CX245 “**Pony Axle**” 13K Lift Axles for Truck & Trailer

Ride Height Chart for CX245i models (i-beam axles), see model drawing.

MODEL: CX245i	No Hanger Down Spacers											Note a 1" Spacers		Note b 2" Spacers		RH not for this model								
Loaded Ride Height (RH) >	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0
3.5" Drop Axle & Up Lift >					4.5	5.0	5.5	6.0	6.5	7.0	7.5	7.0	7.5	7.0	7.5									
5.0" Drop Axle & Up Lift >		4.5	5.0	5.5	6.0	6.5	7.0a	7.5a	7.0b	7.5b														
5.6" Drop Axle & Up Lift >	4.6	5.1	5.6	6.1	6.6	7.1a	7.5a	7.1b	7.6b															
25.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0														
25.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0													
26.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0												
26.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0											
27.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0										
27.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0									
28.0		21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0								
28.5			21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0							
29.0				21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0						
29.5		T			21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0					
30.0			I			21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0				
30.5				R			21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0			
31.0					E			21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0		
31.5									21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0	
32.0							S			21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0
32.5								L			21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5
33.0									R			21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**
33.5													21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**
34.0														21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**
34.5	(Tire SLR = F2G - RH)														21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**
35.0																21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0
35.5																	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5
36.0																		21.0	20.5	20.0	19.5	19.0	18.5	18.0
36.5																			21.0	20.5	20.0	19.5	19.0	18.5
37.0																				21.0	20.5	20.0	19.5	19.0
37.5																					21.0	20.5	20.0	19.5
38.0																						21.0	20.5	20.0
38.5																							21.0	20.5

Truck Frame to Ground Height Loaded (F2G)

17.5" Wheel Size | 19.5" Wheel Size | 22.5" & 24.5" Wheel Size

Ride Height Chart for CX245r models (5” round axles), see model drawing.

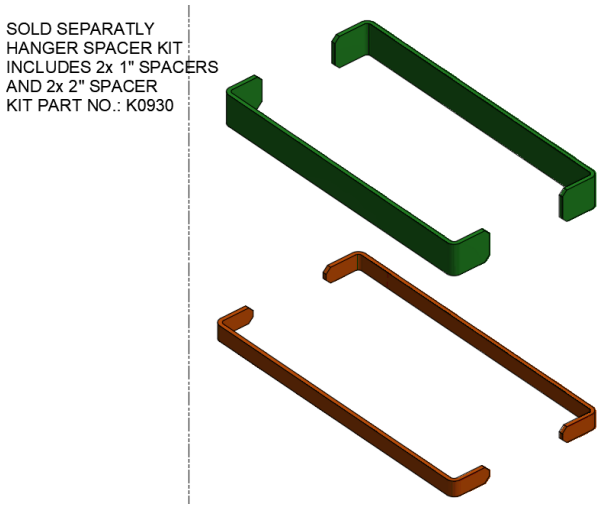
MODEL: CX245R	No Hanger Down Spacers										
Loaded Ride Height (RH) >	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5
Axle Lift >	4.8	5.3	5.8	6.3	6.8	7.3	7.8	8.3	8.8	9.3	9.8
Down Travel	7.0	6.5	6.0	5.5	5.0	4.5	4.0	3.5	3.0	2.5	2.0
Not Available 25											
Not Available 25.5											
Not Available 26											
26.5	14.0										
27.0	14.5	14.0									
27.5	**15.0**	14.5	14.0								
28.0	**15.5**	**15.0**	14.5	14.0							
28.5	**16.0**	**15.5**	**15.0**	14.5	14.0						
29.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0					
29.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0				
30.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0			
30.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0		
31.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0	
31.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5	14.0
32.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**	14.5
32.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**	**15.0**
33.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**	**15.5**
33.5	21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**	**16.0**
34.0		21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0	**16.5**
34.5	T		21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5	17.0
35.0		I		21.0	20.5	20.0	19.5	19.0	18.5	18.0	17.5
35.5			R		21.0	20.5	20.0	19.5	19.0	18.5	18.0
36.0				E		21.0	20.5	20.0	19.5	19.0	18.5
36.5							21.0	20.5	20.0	19.5	19.0
37.0						S		21.0	20.5	20.0	19.5
37.5							L		21.0	20.5	20.0
38.0								R		21.0	20.5
38.5	(Tire SLR = F2G - RH)										21.0

Truck Frame to Ground Height Loaded(F2G)

17.5" Wheel Size | 19.5" Wheel Size | 22.5" & 24.5" Wheel Size

Ride Height Spacing:

- Before placing the hangers on the frame refer back to your **RH Configuration Worksheet** to determine if your application requires ride height frame spacers. If so, mount and weld the spacers to the hangers before mounting the hangers to the frame. If you do not already have spacers they can be ordered from Cush Corp.
- If spacers are required, they must also support above the air spring area or failure of the suspension may occur.



Truck - Driveline Clearance to Lift Axle

The Driveline clearance is the bottom of the driveline while the suspension is fully lifted. It is recommended that the clearance between the two be maintained at all times while the vehicle is in operation and articulation of the drive axle suspension. If additional clearance is needed then spacers can be installed to lower the suspension but will reduce tire lift. Before installing suspension, check that the suspension “Up Travel” (***Chart***) will not let the axle get into the driveline.

Measure “D” on your truck bottom of frame to bottom of driveline with truck unloaded. Verify the equation below is greater than (“D”+1”) to check that the axle will clear the driveline for a 6” bent tube axle.

Pusher Axle Only, Driveline Lift Axle Clearance (DLC) Calculations:

- For 6” bent drop axle & knowing suspension UP Travel
- **DLC**=(“RH” + (distance from tire center to top of bend or drop) – UP Travel (Chart))
- If **DLC** > “**D+1**” Then Proceed, if not contact Cush for review

Installation Procedures

For proper installation please follow the steps below thoroughly after reading the pre-installation notes.

Safety:
For your safety, the first procedure is to make sure the vehicle is safe and secure by chocking your tires and making sure the parking brakes are set on level & stable ground. Unhook and disable all potential energy sources in the frame area you will be working on (air, hydraulic, electrical).

Integration:
If your axle is not pre-welded to the suspension beams from Cush, then integration of the suspension and axle is required. If axle is pre-installed, please skip instructions on Axle Integration. Otherwise go to the Axle Integration for you type of axle, round or I-Beam.

5” Round Axle Installation

1) CX245R models can be mounted with 5” round straight or bent axles. Trailer applications will typically use a straight axle.
2) Use locating fixture or flat surface to space suspension beams and center axle. Check that suspension beams are: parallel, square to axle, and perpendicular to axle.
3) With the suspension hangers mounted to the suspension beams and the pivot bolt snug and all alignment gears set at 12 o’clock, check the frame width of the suspension hangers matches the desired spacing.
4) Clamp the axle to the suspension beams and recheck that has not changed the frame hanger setting, if so you may have to start over by locating and securing the frame hangers in place before clamping the suspension beams to the axle.
5) The suspension axle seat must be tight against the axle with no gap at the center or a max 1/16” gap at center of beam seat to axle and contact of the axle both sides in the axle seat. Bent tube axles are deformed (egg shaped) in manufacturing so some grinding of the suspension beam axle seat may be required to get contact to the axle.
6) The suspension axle seat in this model is oversized to accommodate a bent tube axle so a steel metal wedge can be used to center the axle in the seat and reduce the weld edge gap. Tack the wedge in place and weld over with axle weld.
7) Note: Brake camshaft to be located according to axle manufacturer specifications & suspension model, see suspension layout drawing for details.
8) Weld the axle to the beams per Cush process on suspension drawing, some notes of this process included here, see Cush A0000-1 (3 pass ½” weld):
    - Weld sequence, size, and weld direction should be followed for proper installation.
    - Back-weld .75" over the start/ends of all welds
    - Fill any craters, avoid cold laps, and undercuts.
    - Place 1" tack welds in the center forward of both suspension beams (1-2).
    - Position and weld rear root pass (3-4)
    - After root weld, hit tabs down for better 2nd pass
    - Do not wrap welds over axle seat tabs, no weld .13" from ends on 3rd passes

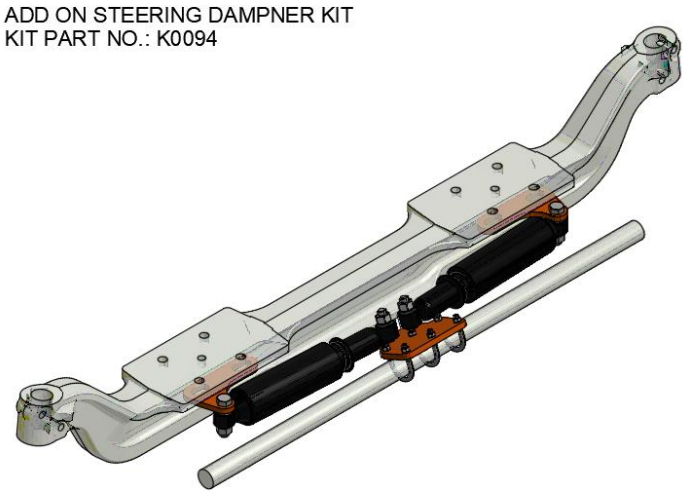
- Weld rear 2nd & 3rd cover pass (5/6-7/8)
- Position & weld front root pass (9-10)
- Weld front 2nd & 3rd cover pass (11/12-13/14)
- Optional, extra durability can be achieved by Hammer Penning after welding, use a 1/8" hardened ball end on weld and area.

RECOMMENDED STEEL WELDING PROCEDURES:
WARNING: If these procedures and specifications are not followed, damage to the axle or suspension could result. The resulting axle or suspension damage could cause an accident, property damage, and/or serious injury.
NOTE: A welder qualified in 2G position per ANSI/AWS D1.1-94 Section 5 Part C "Welder Qualification" must perform the welding.
NOTE: The specification shown below is for horizontal (2F) positioning.
1) Suspension components and their mating parts must be at a minimum temperature of 60°F(15.5°C) and free from moisture, dirt, scale, paint, grease, and other contaminates. (Pre-heat per axle manufacturer)
2) All welds must be performed in a flat, or horizontal, position. Clean welds between each pass.
Standard Wire: AWS ER-70S-6, 0.045"DIA
Volts: 26-30 DCRP
Current: 275-325 AMPS
Gas: 90%AR 10%CO2 at 30 to 35 CFH

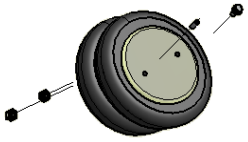
I-Beam Axle Installation

1) CX245i models can be mounted with different drop i-beam steering axles. A new or refurbished i-beam axle can be used. If using a refurbished axle that is steering, the installer is responsible for the reliability of this axle.
2) Use locating fixture or flat surface to space suspension beams and center axle. Check that suspension beams are: parallel, square to axle, and perpendicular to axle.
3) With the suspension hangers mounted to the suspension beams and the pivot bolt snug and all alignment gears set at 12 o'clock, check the frame width of the suspension hangers matches the desired spacing.
4) Clamp the axle to the suspension beams and recheck that has not changed the frame hanger setting, if so you may have to start over by locating and securing the frame hangers in place before clamping the suspension beams to the axle.
5) Check that the i-beam spring pad holes will work to mount the new lift axle suspension beam. If so, mark the bottom of the suspension beam and drill 25/32" holes thru the beam so that the bolt heads will clear the suspension beam structure.
6) Drill two holes behind the axle center web and two holes in front to mount the suspension beams to the axle.
7) After checking square of beams to the axle, each beam should be mounted to the axle with minimum of 4 customer supplied ¾" grade 8 fasteners per beam.
8) With the steering tie rod, adjust the wheel toe-in to a recommended 1/32" to 3/32".
9) Cush recommends to lock the steering knuckles in place with the tires set aligned to the vehicle to prevent self-steering. The installer is responsible to mount a locking plate to fix the tie rod to the suspension beams by method of welding in place.
10) If the customer and installer desire to allow the steering axle to operate in a steering function it is the installers responsibility to check the functionality of this set up and Cush assumes no liability from damage or personal injury of a CX245 model set up to be in self-steering mode.

11) Some installers may choose the functionality of self-steering axle and assume the installation responsibility. Our CX245is model comes with a dampener kit:
    - The unit must be set so that when at laden ride height the self-steering axle is set with a caster angle of 3-5 degrees .
    - The unit must be lifted or steering locked when the vehicle is in reverse mode.
    - A steering axle must have a steering dampener kit attached to the tie rod to reduce shimmy.
    - It is best if the steering dampener kit has a centering device so that the tires are straight when the axle is lifted to avoid damage or personal injury.



Lift Air Spring:



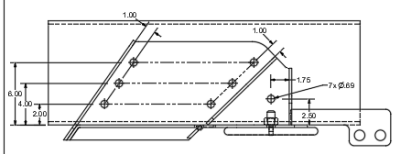
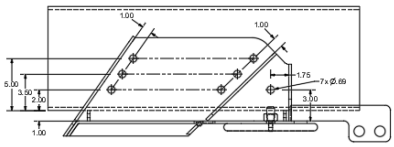
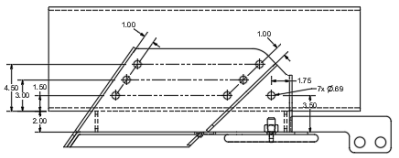
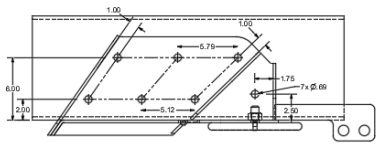
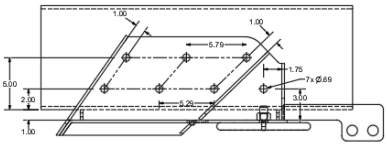
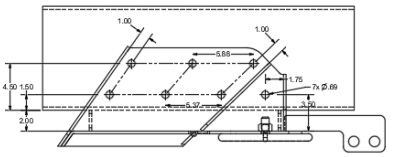
- While the suspension is still on the ground, and before the pivot bolt is snug, mount the lift spring to both the beam and hanger. You may need to open or close the frame hanger to beam opening to allow locating and installation of the lift air spring.

Frame Mounting:

1) Determine the axle position on the frame and mark axle center on the frame, also mark the front of the hanger location. Inspect the frame mounting area for cross-members and outside brackets that may have to be moved.
2) To eliminate a suspension frame hanger cross-member support, a chassis frame cross-member must be located within 6” of the front or over the hanger structure. A cross-member or support gusset over the area of the load air spring is recommended. The suspension installer may have to install one in this area for truck or trailer to protect the chassis frame from damage.
3) The suspension should be mounted to the axle before installation, see the axle integration section of this manual or contact Cush if more information is needed.
4) Clamp the suspension frame hangers in place to the chassis frame so that the axle will be in it’s proper location. Check that the hangers are squarely on the frame so the axle will be properly aligned.
5) For a trailer mount, securely weld the frame hanger in place along with supporting frame cross-members. For a truck c-channel frame mount the hangers should be bolted not welded in place.

Truck Frame Mounting:

1) Double check if vertical spacers are needed before mounting or drilling the frame hanger.
2) Before drilling holes, check that the suspension frame hangers are located in place and clamped tightly to the truck frame.
3) Check the truck frame for any pre-existing holes to see if they can or need to be used to support existing bracketry.
4) NOTE: The suspension frame hanger bolting should be located a minimum of 1” below the top of the frame hanger rail top edge and 2” above the bottom of the chassis frame.
5) **Caution!** It is important that before drilling any holes you inspect the truck frame rail for any obstructions (fuel tanks, wiring harness, air lines, etc…) and move away from area.
6) **Caution!** It is important that you do not weld on, drill, or bolt thru the bottom flange of the suspension frame rail. Check with the chassis manufacturer for details on warranty information.
7) The CX245 suspension series has a hanger with integrated upper air spring support so installation of this is pre-set.
8) Center punch the suspension frame hanger rail per the Cush recommended pattern if possible, a minimum recommendation of 6 bolts above the frame hanger and 1 above the air spring mounting. Drill all holes Ø21/32.
9) NOTE: Recommended mounting hardware (fasteners) not supplied by Cush. Cush recommends using a minimum 5/8” grade 8 bolt type, prevailing torque lock nuts, and hardened washers on both sides of the joint.
10) After mounting the hangers to frame, if needed, install a Cross support to both hangers and weld in place.

NO FRAME SPACER	1" FRAME SPACER	2" FRAME SPACER
		
		

Load Air Spring:

- After installing the frame hanger, mount the load air spring to the beam and bracket using the hardware provided. Caution! Do not over-torque the fasteners to mount the air springs.

Pivot Bolt: This model comes with a 7/8"-9 UNC x 7" long Grade 8 bolt and a Cush Shear-TITE nut that gives torque control. The Shear-TITE nut breaks off at the proper torque when tightened. Do not tighten this bolt until you have done the axle alignment.

CAUTION! Failure to tighten suspension pivot bolt, after alignment, can cause damage or personal injury!

Axle alignment at suspension hanger:

1) The dual eccentric cam gears should always have the ½" square hole to the top.
2) Set the alignment gear indicator tabs at 6 o'clock, the neutral position, both the inside and outside gear on each hanger. Snug the pivot bolts to be tight enough to hold the joint together but loose enough to permit use of the eccentric cam adjustment. Be sure that the eccentric cam plate is clamped down flush against the hanger side and is not riding up the grounding ring.
3) For dual gear adjustment, use breaker bars in the ½" square hole of both gears on one hanger.
4) The hanger pivot bolt alignment gives you 1/4" pivot movement fore and aft per hanger side.
5) To align the axle, rotate both alignment gears of one hanger at the same time to move the pivot fore and aft to get the axle aligned. If needed, go to the other side suspension hanger and rotate the alignment gears in the opposite direction to fine tune the alignment of the axle.

Axle Alignment on Truck

CAUTION: DO NOT APPLY undercoating to the hanger pivot area until after alignment and torque of the suspension pivot bolts.

1) Check that the tire inflation pressure is correct on all tires.
2) Alignment should be performed with the vehicle empty and the brakes released on the axle to be aligned.
3) On a level floor move the vehicle forward and back to straighten, make sure last movement is forward.
4) Remove the outer tires and any other parts from under the chassis that obstruct the measuring distances between the axle ends. If you use a commercially available axle spindle extenders or the edge of the wheel rim, you will not need to remove this equipment.
5) Measuring from the nearest vehicle drive axle, determine the alignment of the auxiliary axle.
6) After achieving proper alignment of the new auxiliary axle, torque the Cush Pivot fasteners per Cush torque specifications on the Cush installation drawing.
7) Align, to within 0.063" tolerance, any additional axles to the drive axle. Use a commercially available alignment gauge or trammel bar if available.

Axle Alignment on Trailer

CAUTION: DO NOT APPLY undercoating to the hanger pivot area until after alignment and torque of the suspension pivot bolts.

1) Check that the tire inflation pressure is correct on all tires.
2) Alignment should be performed with the vehicle empty and the brakes released on the axle to be aligned.
3) On a level floor move the vehicle forward and back to straighten, make sure last movement is forward.
4) Set the landing gear and remove the tractor.
5) Remove the outer tires and any other parts from under the chassis that obstruct the measuring distances between the axle ends. If you use a commercially available axle spindle extenders or the edge of the wheel rim, you will not need to remove this equipment.
6) Measuring from the kingpin, check the alignment of the nearest trailer axle and then determine the alignment of the auxiliary axle.
7) After achieving proper alignment of the new auxiliary axle, torque the Cush Pivot fasteners per Cush torque specifications on the Cush installation drawing.
8) Align, to within 0.063" tolerance, any additional axles to the other axles. Use a commercially available alignment gauge or trammel bar if available.

Air Control

CAUTION! The installer responsible that their air control system meets the criteria of FMVS and any laws or regulations of state operation.

- Installing the air control system will be the responsibility of the installer.
- Do not operate the air control unless the lift axle unit is fully installed and securely mounted.
- A typical air control kit (ACK) must connect to the vehicle air tank supply with a Pressure Protection Valve to protect the brake system, has a pressure regulator and pressure gage that allow the operator to adjust the loading on the auxiliary axle to take load off of the other axles to the ground.
- The lift axle should not be down and loaded above 10 psi when the vehicle is empty.
- Cush has several electric or manual control kits that can vary per the customer specifications.
    - ★ Electric Model L: Key off – axle goes to Lift mode
    - ★ Electric Model LR: Key off – axle goes to Lift mode and has auto-lift in vehicle reverse mode tied unto backup lights.
    - ★ Single panel control, or stackable for multi-lift configuration

Some installers may purchase from other sources or make their own air control kit and should get installation instructions and air schematics from those sources.

Torque

CAUTION! Torque all fasteners, no fasteners come torqued from factory.

CUSTOMER TORQUE INSTRUCTIONS:
1) PIVOT BUSHING JOINT SNUG FROM FACTORY. CUSTOMER TO TORQUE THIS JOINT TO SPECIFICATION AFTER AXLE ALIGNMENT.
2) IT IS THE CUSTOMER'S RESPONSIBILITY TO CHECK AND TIGHTEN FASTENERS TO SPECIFIED TORQUE AT INSTALLATION, AFTER THE SUSPENSION HAS BEEN IN OPERATION FOR 3000 MILES, AND AT SUSPENSION INSPECTION CYCLES. FAILURE TO DO SO CAN RESULT IN LOSS OF WARRANTY.
3) FASTENERS ARE PROVIDED AS DRY, IF A LOWER TORQUE IS DESIRED, LUBED TORQUE SPECS ARE SHOWN. (DO NOT LUBE SHEAR-TITE™ NUTS!)
4) CAUTION: FASTENERS SHOULD NEVER BE REUSED IF REMOVED OR LOSS OF CLAMP LOAD OCCURS. FOR PROPER JOINT CLAMPING CONTACT CUSH FOR REPLACEMENT FASTENERS.
5) CAUTION: OVER-TORQUEING FASTENERS COULD RESULT IN MATERIAL FAILURE.

Use the chart below to torque all fasteners to spec.

WRENCH OR SOCKET SIZE	DESCRIPTION	AIR SPRING TORQUE								
					DRY IN*LBS		DRY FT*LBS		*DRY Nm*	
		SIZE	GRADE	TPI	MIN	MAX	MIN	MAX	*MIN*	*MAX*
9/16	LIFT SPRING BOTTOM	3/8	5/B	16-UNC	180	240	15	20	*20*	*27*
3/4	LIFT SPRING TOP/LOAD SPRING BOTTOM	1/2	2/A	13-UNC	300	420	25	35	*34*	*47*
1 1/8	LOAD SPRING TOP	3/4	5/C	16-UNF	480	600	40	50	*54*	*68*
WRENCH OR SOCKET SIZE	DESCRIPTION	SHEAR-TITE™ NUTS								
					FT*LBS		*Nm*		DOERKEN PLATING ON NUT IS EQUIVALENT TO LUBED SPEC. DO NOT USE ADDITIONAL LUBE OR ANTI-SEIZE.	
		SIZE	GRADE	TPI	MIN	NOMINAL	*MIN*	*NOMINAL*		
1 5/8	PIVOT NUT	7/8	8/C	9-UNC	500	550	*678*	*746*		

Final Installation Check

Prior to using your newly installed Cush CX245 Model thoroughly check for safety.

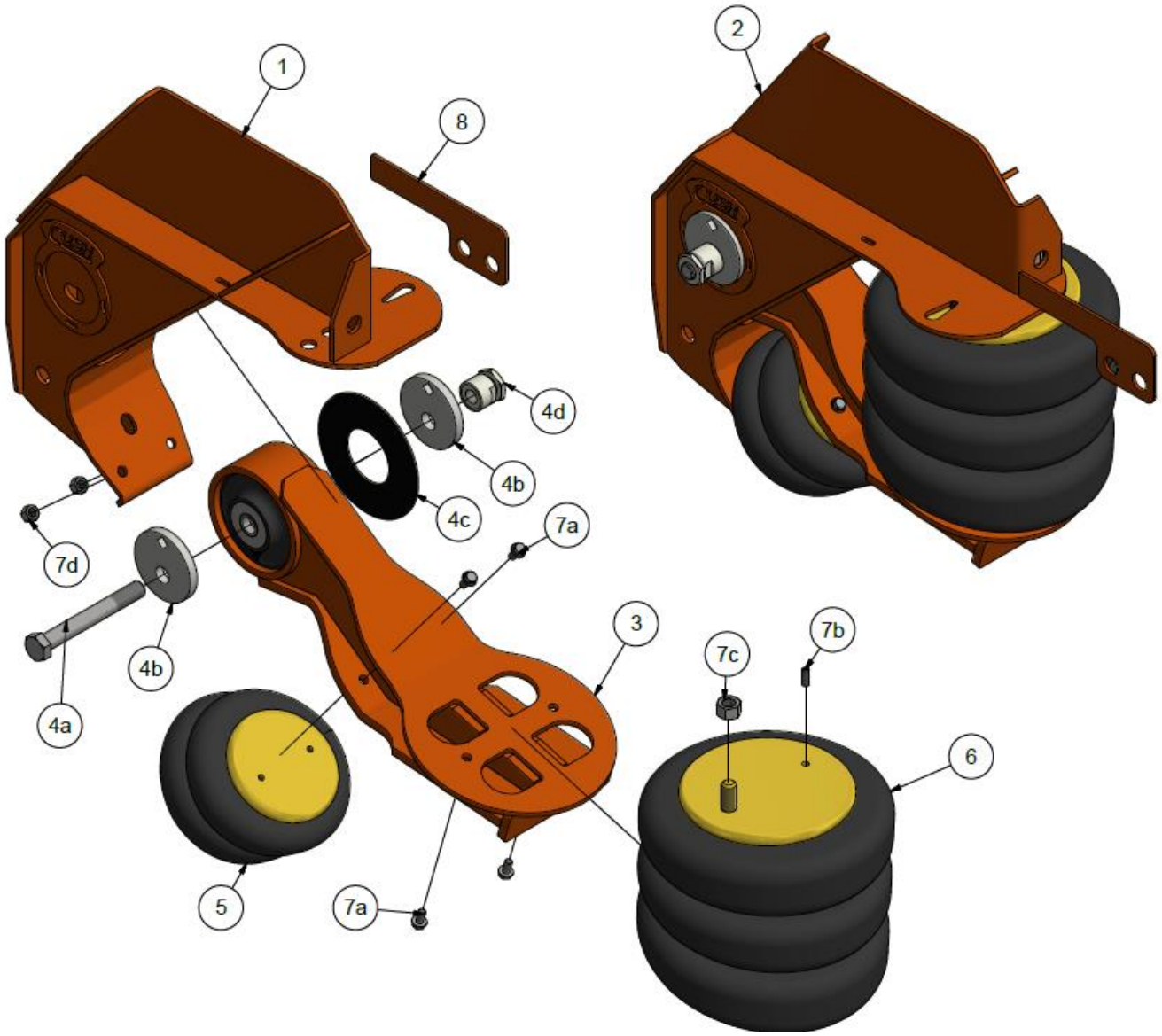
1) Reduce the air pressure to the load springs to below 10 psi. Cycle the suspension up and down to ensure proper operation and suspension clearance to other components of air springs, brake chambers, air lines, tires, and suspension componenets.
2) *For Truck pusher application, check that the driveline has adequate clearance when the suspension is lifted and the vehicle is unloaded.*
3) Check the air system tubing, valves, and fittings for leaks with soapy water.
4) Check that all fasteners, including wheel nuts, are tightened to the proper torque values.
5) Check that brakes and slack adjusters are properly adjusted and that wheels rotate freely.
6) Check hubs for proper oil levels.
7) Verify axle placement and axle alignment
8) Verify axle lift and tire clearance is correct
9) Verify speed of axle lift is adequate
10) Verify auxiliary axle unit will stay lifted for extended period of time

Suspension Operation

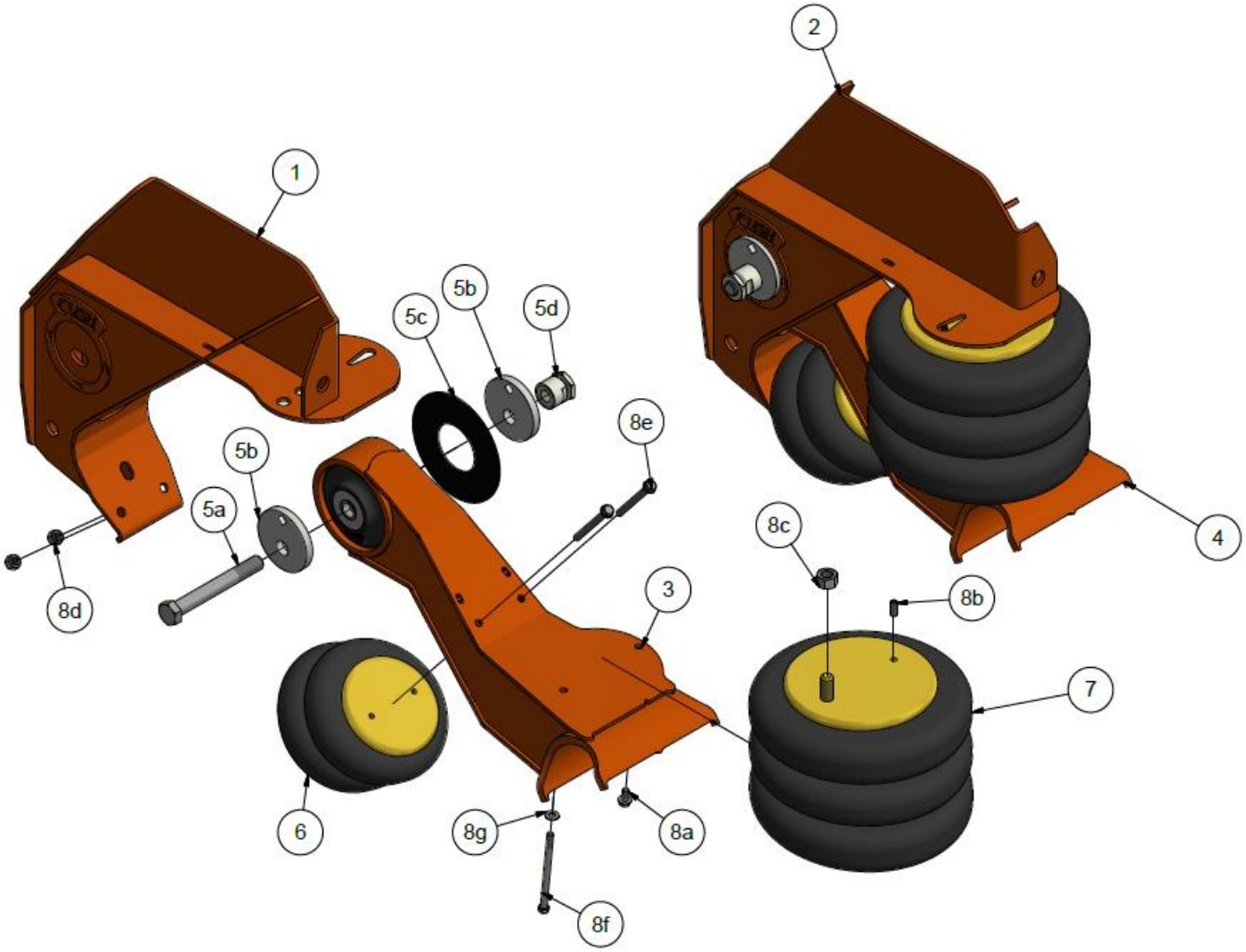
CX245 suspensions may include an electric switch or manual push/pull knob type air control kit to raise and lower the suspension. The kit should also include a pressure regulator and gage to control the load. The operator is required to know the proper air pressure to support a given load to the ground (GVAW). The chart below is an approximate guide of air pressure shown on the gage and the estimated supported load. To obtain a more accurate correlation for your specific setup you may place scales under the loaded auxiliary axle, while adjusting the gage read and make note of the load on the scales per the gage air pressure.

CAUTION! Always lift axle when vehicle is unloaded & do not lower the auxiliary axle unless the vehicle is moving forward below 10mph, otherwise damage or personal injury may occur.

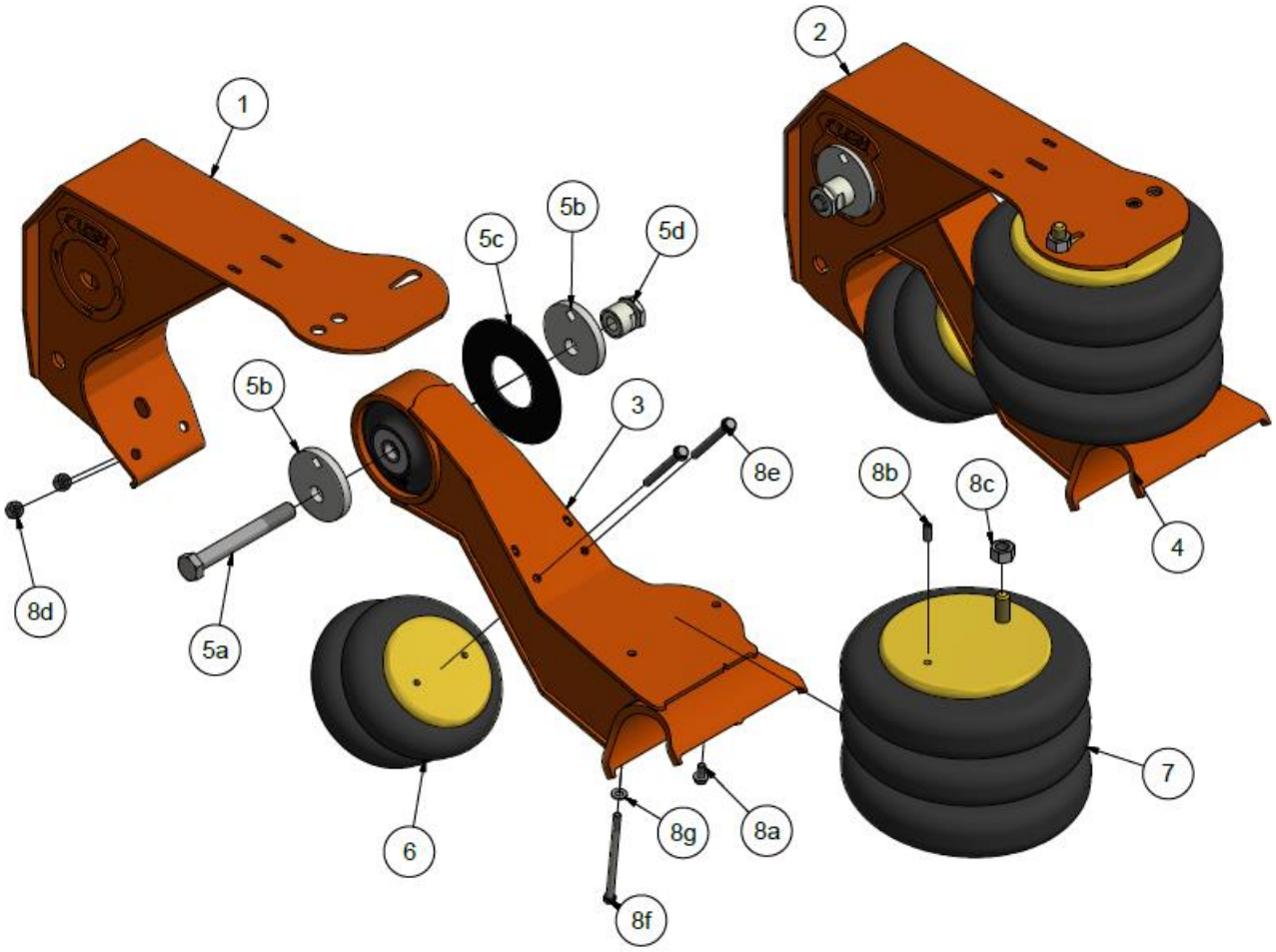
Parts Explosion for CX245i Model (See drawing for part numbers)



Parts Explosion for CX245R Model (See drawing for part numbers)



Parts Explosion for CX245R-T Model (See drawing for part numbers)



Cush auXiliary

CX245 "**Pony Axle**" 13K Lift Axles for Truck & Trailer

Preventative Maintenance

ORIGINAL-INSTALLATION INSPECTION NOTES, VERIFY THAT:

1) THE INSTALLATION CLEARANCE REQUIREMENTS HAVE BEEN MET.
2) THE AXLES HAVE BEEN ALIGNED PROPERLY.
3) THE SUSPENSION FRAME BRACKETRY AND AIR SPRING PLATE WELDS HAVE BEEN PROPERLY COMPLETED PER SPECIFICATIONS.
4) ALL SUSPENSION BOLT TORQUES ARE TO CUSH SPECIFICATIONS.
5) THE SUSPENSION RIDE HEIGHT IS SET PROPERLY.
6) THE SUSPENSION CAN ARTICULATE FREELY THROUGH ITS ENTIRE TRAVEL AND ADEQUATE COMPONENT CLEARANCES HAVE BEEN PROVIDED.

INSPECTION: 30-DAY, 90-DAY, & AT EVERY BRAKE LINING CHANGE.

1) CHECK INSTALLATION CLEARANCE REQUIREMENTS.
2) CHECK FOR ANY SIGNS OF WEAR OR COMPONENT INTERFERENCES.
3) CHECK SUSPENSION ATTACHMENT WELDS FOR SIGNS OF PROBLEMS.
4) CHECK THAT ALL BOLTS ARE IN PLACE AND SECURELY TORQUED.
5) CHECK PIVOT BUSHINGS & CLAMPING CONNECTIONS FOR PROBLEMS.
6) CHECK THAT THE VEHICLE IS LEVEL.
7) CHECK TIRE WEAR THAT MIGHT INDICATE AN ALIGNMENT PROBLEM.

Preventative Maintenance Schedule

Cush Corp. Preventitive Maintenance Intervals	Every 1,000mi	First 6,000mi	Every 12,000mi	Every 36,000mi	Every 50,000mi	Every 100,000mi
Inspectection Required						
Wheel Lubricant	*inspect*					
Wheel Endplay				*inspect*		
Brake Lining				*inspect*		
Brake Drum				*inspect*		
Brake Function				*inspect*		
Bushings				*inspect*		
Air Springs	*inspect*					
Structure	*inspect*					
Lubrication Required						
Brake Cam			*lube*			
Slack Adjuster			*lube*			
Re-Torque Required						
Wheel Nuts				*torque*		
All Fasteners on Suspension		*torque*			*torque*	
Replacement Required						
Wheel Lubricant						*replace*

Lubricant Recommendations

Wheel Lubricant-(API-GL-5 or SAE 80W-90 Mineral Based)

Brake Cam and Slack Adjuster- (NLGI 1 or 2)

Trouble Shooting Guide		
Problem	**Possible Cause**	**Remedy**
Axle Will Not Stay Up	Loose Air Fittings	Check and Retighten
	Damaged Air Lines	Check for Escessive Wear. Replace if Worn or Damaged.
	Damaged or Worn Air Spring	
Punctured Load Air Springs	Other Components Too Close to Air Spring	Check for Clearance all Around Air Spring Move Anything Coming in Contact
Axle Not Tracking Properly	Front Alignment Collars Not Tight	Align Unit and Retorque Pivot Bolt.
	Arm Bushings Worn Out	Install New Arm Bushings
	Axle Seats Not Properly Installed to Axle	Check Axle Seat Location, If Improperly Installed Remove and Install Properly
Unit Not Getting the Correct Lift	Lift Air Bags Not Getting Proper Air Pressure	Check Systems Pressure and Check Air System Piping Drawing Refer to Control Schematic
	Interference With Chassis Drive Line Other Chassis and components	Inspect for Interference
	Unit Not Installed Properly	Check Installation With factory Installation Drawing

Dealer/Installer: Please remove this section, fax to Cush Corp. at 417-724-0126 for warranty registration, then give to customer for records.

Date of Install:_____ Serial No:_____

Dealer Name:_____ VIN#:_____

USE WARRANTY REQUEST FORM w1-3024

Contact Cush Corp if Form Needed

All Repair work must have prior written, or email, approval from Cush to be eligible for warranty coverage.

Warranty

Cush Corp. warrants their suspension's fabricated structural components against failure under normal use for a period of 3 years from date of install by the original purchaser if registered with Cush at time of install, otherwise from the dated of manufacture. Under this warranty Cush Corp. will replace or repair any part that by its inspection if determined to be defective. In addition, for a period not to exceed 1 year*, Cush will provide a labor allowance, using guidelines, which it determines to be adequate to properly replace or repair defective structural parts and/or components within constraints as noted below.

All Parts and components thought to be defective must be returned with company authorization to Cush Corp, with the freight prepaid. These returns must be accompanied by a complete written explanation of claimed defects and circumstances of failure, the serial number, and date of installation. Labor allowance must be authorized by Cush Corp prior to initiation of repairs. Without preapproval from Cush Corp, all parts must be purchased for repairs.

*Purchased components and/or accessories other than the fabricated structure (axle and axle assemblies, air springs, wheel end equipment, brake and brake components, and air control parts) are warranted in accordance with warranty coverage provisions from date of installation.

Limitations

Cush corp. accepts no warranty responsibility for:

- Incidental or consequential damages or loss of time or profits resulting from product failure.
- Damage resulting from owner or operator abuse, misuse or neglect.
- Failure due to improper installation.
- Component parts manufactured by others for Cush Corp., beyond those Company's implied or expressed warranty.