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|---|---|
| **Department** | **Customer Service** |
| **Category** | **Service Manual** |
| **Section** | **Suspension** |
| **Title** | Airglide 380 Air Spring Suspension |
| **Number** | **KM817033** |
| **Date** | 01/29/03 |
| **Model** | W900, T800, T600, and T2000 |
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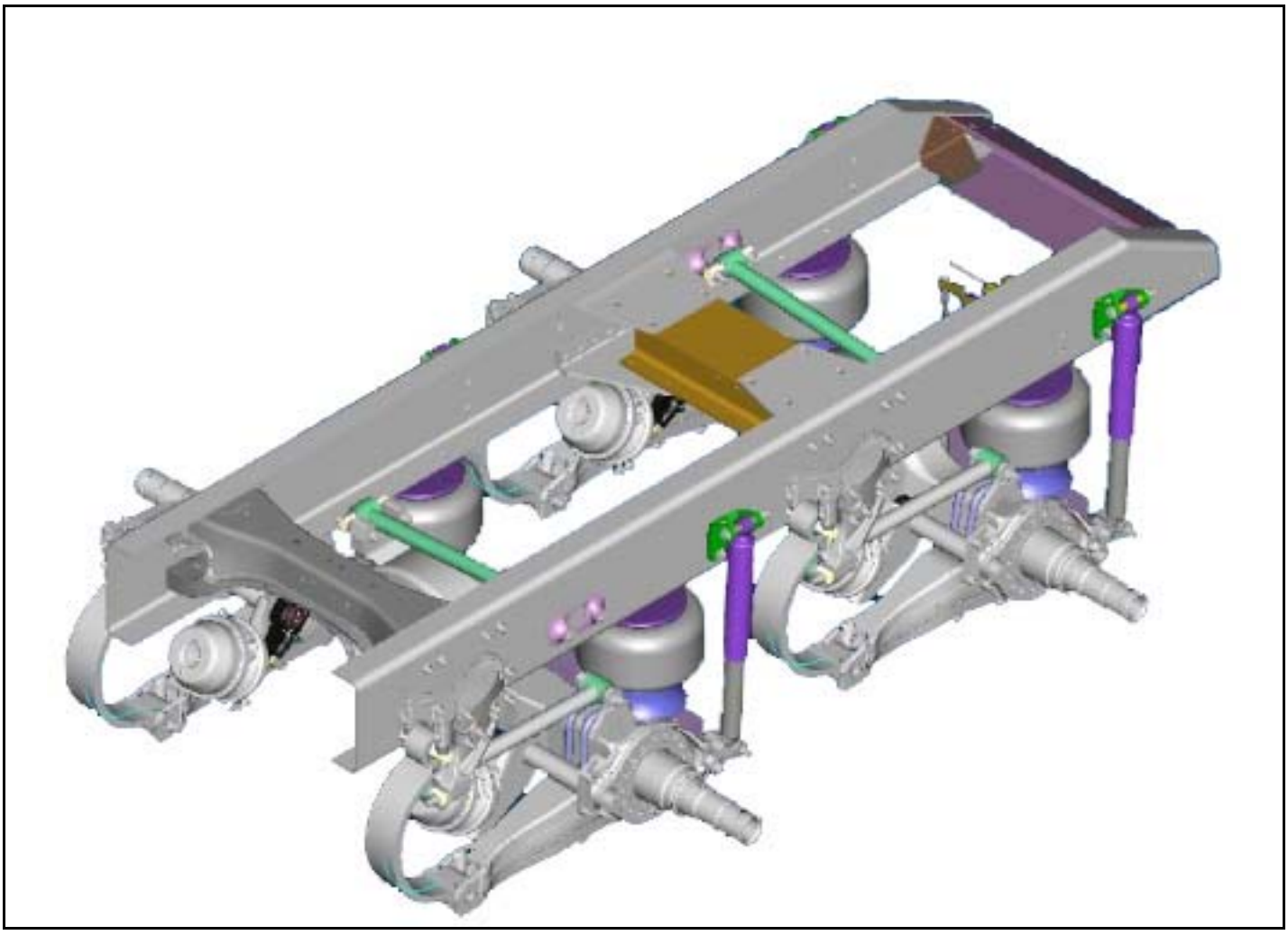
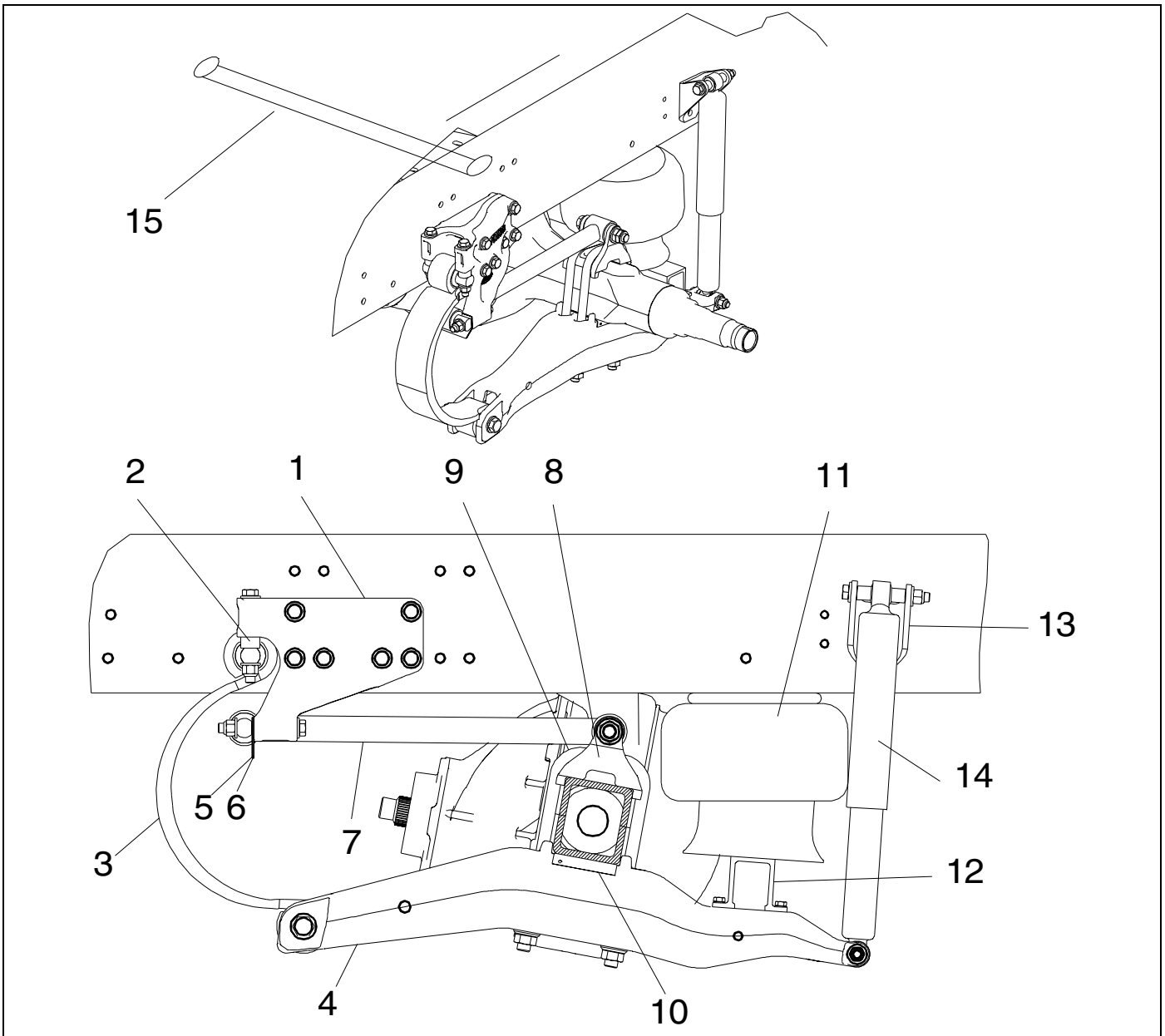
# Service Manual

# Airglide 380 Air Spring Suspension



## Contents

## Parts Identification




| | | | |
| --- | --- | --- | --- |
| 1 | Drive Bracket | 8 | Radius Rod Bracket |
| 2 | Link Spring Spacer | 9 | U-Bolt |
| 3 | Link Spring Assembly | 10 | Transition Shim |
| 4 | Drive Beam Assembly | 11 | Air Spring Assembly |
| 5 | Alignment Shim (0.75 mm) | 12 | Air Spring Support Beam |
| 6 | Alignment Shim (1.5 mm) | 13 | Shock Absorber Bracket |
| 7 | Radius Rod Assembly | 14 | Shock Absorber |
| | | 15 | Track Rod |

**Figure 15-1** Illustration of Airglide 380 Air Spring Suspension

## Manufacturing Start Dates

This information applies to W900, T600, T800 and T2000 chassis built after July 2, 2002:

- - Renton
- - Chillicothe

## Description

The Airglide 380 air spring suspension comprises a stiff, lightweight aluminum drive beam with a semi-elliptic, taper leaf spring mounted at one end and an air spring at the other.

Rated at 38,000 lb, it is designed for on-highway applications that require low weight combined with low ride height (see Figure 15-1).

- The drive bracket positions and restrains the suspension, providing the attachment interface between the suspension and the frame rail. Connected to the drive bracket is the link spring and radius rod. Axle angle and tracking adjustments are made through spacer and shim adjustments at the link spring and radius rod attachments.
- The link spring, in conjunction with the air spring, reacts to frame loads, providing dampened support between the axle and the frame.
- The radius rod transmits acceleration and braking forces between the axle and the frame.
- The drive beam, which is secured to the axle with the radius rod bracket and u-bolts, is the support for the link spring, air spring, and shock absorber.
- The radius rod bracket is secured to the axle using two U-bolts, and provides the attachment between the axle and the radius rod.
- The air spring is a rubberized fabric tube coupled to a piston equipped with an internal bump stop.
- The shock absorber dampens road-induced vibrations and serves as an axle-dropout stop.
- A tracking rod provides lateral load stability.

*NOTE: A bimetallic transition shim located between the steel axle and the aluminum drive beam prevents galvanic corrosion between the axle and drive beam.*

Some other features of the Airglide 380 air spring suspension are

- Low part count
- Axle seat welds eliminated for easier axle alignment and pinion angle adjustment
- Rubber bushings at all pivots providing for quiet operation
- Plastic sleeves in the drive beam U-bolt holes to reduce U-bolt seizing
- No lubrication required

## Inspection

The following schedule contains general recommendations and should be used as a guideline for inspecting an Airglide 380 air spring suspension. As indicated by early inspection and/or service experience, the inspection frequencies may need to be accelerated.

***Every 60,000 miles (96 540 km):***

- Inspect rubber bushings in the link spring as well as radius rod and tracking rod ends for squeeze-out or cracking. Replace the component if necessary.
- Inspect the shock absorber for leakage, damage or bushing deterioration.

***Every 60,000 miles (96 540 km):***

- Check the torques of these items:

| **Fastener** (Phosphorous / Oil Plated) | **Torque [Lb. ft. (N.m.)]** |
| --- | --- |
| Drive Bracket - Frame Bolts | 160 - 200 (217 - 271) |
| Drive Bracket: Link Spring Bolt<br>Drive Bracket: Radius Rod Bolt<br>Drive Beam: Shock Bolt (Lower)<br>Shock Bracket: Shock Bolt (Upper)<br>Tracking Rod Bolts (All) | 120 -160 (163 - 217)<br>120 -160 (163 - 217)<br>120 -160 (163 - 217)<br>120 -160 (163 - 217)<br>120 -160 (163 - 217) |
| Air Spring Support Beam Bolts | 24 - 32 (33 - 43) |
| Drive Beam: Link Spring Bolt<br>Radius Rod Bracket Bolt | 380 - 460 (515 - 624)<br>380 - 460 (515 - 624) |
| U-Bolt | 325 - 375 (441 - 508) |
| Air Bag Stud Nut | 20 - 30 (27 - 41) |

- As indicated in the Maintenance Schedule: Check the rear axle alignment.

*NOTE: If required, see "Adjusting Lateral Alignment (Tracking)" on page 13"Adjusting Lateral Alignment (Tracking)" to adjust axle alignment].*

## Ride Height

***WARNING! This procedure requires servicing the vehicle with the transmission in neutral, keys removed from ignition, and the parking brakes released. The vehicle must be parked on a completely flat/level surface with both front wheels chocked on both sides. Failure to adequately chock the wheels or remove the keys may lead to the vehicle rolling into someone/something, or someone starting the engine, causing an accident and possible serious personal injury and/or equipment damage.***

***WARNING! To prevent vehicle from rolling and causing personal injury and/or property damage, use chocks at the front tires.***

*NOTE: Suitable wheel chocks are at a minimum an 18-inch (46 cm) long 4 x 4.*

***CAUTION: If a drive beam assembly for a rear-drive axle is installed on a forward-drive axle, or vice versa, pinion angle adjustment will be adversely affected. If pinion angles are not set properly, then the drive-train could be damaged.***

*NOTE: Although they look similar, the forward and rear drive beams are different. If you experience difficulty adjusting pinion angle, check the part number of the drive beam assembly to ensure that the correct component is installed.*

***CAUTION: If a radius rod assembly for a rear-drive axle is installed on a forward-drive axle, or vice versa, pinion angle adjustment or ride quality will be adversely affected. If pinion angles are not set properly, then the drivetrain could be damaged.***

*NOTE: The forward and rear radius rods have different lengths. If you are experiencing rough ride or difficulty in adjusting pinion angle, verify that the correct radius rod is installed. To do this, either check the part number of the rod or compare the lengths of the installed forward and rear radius rods; a rear radius rod is approximately 1 in. (25 mm) longer than a forward radius rod.*

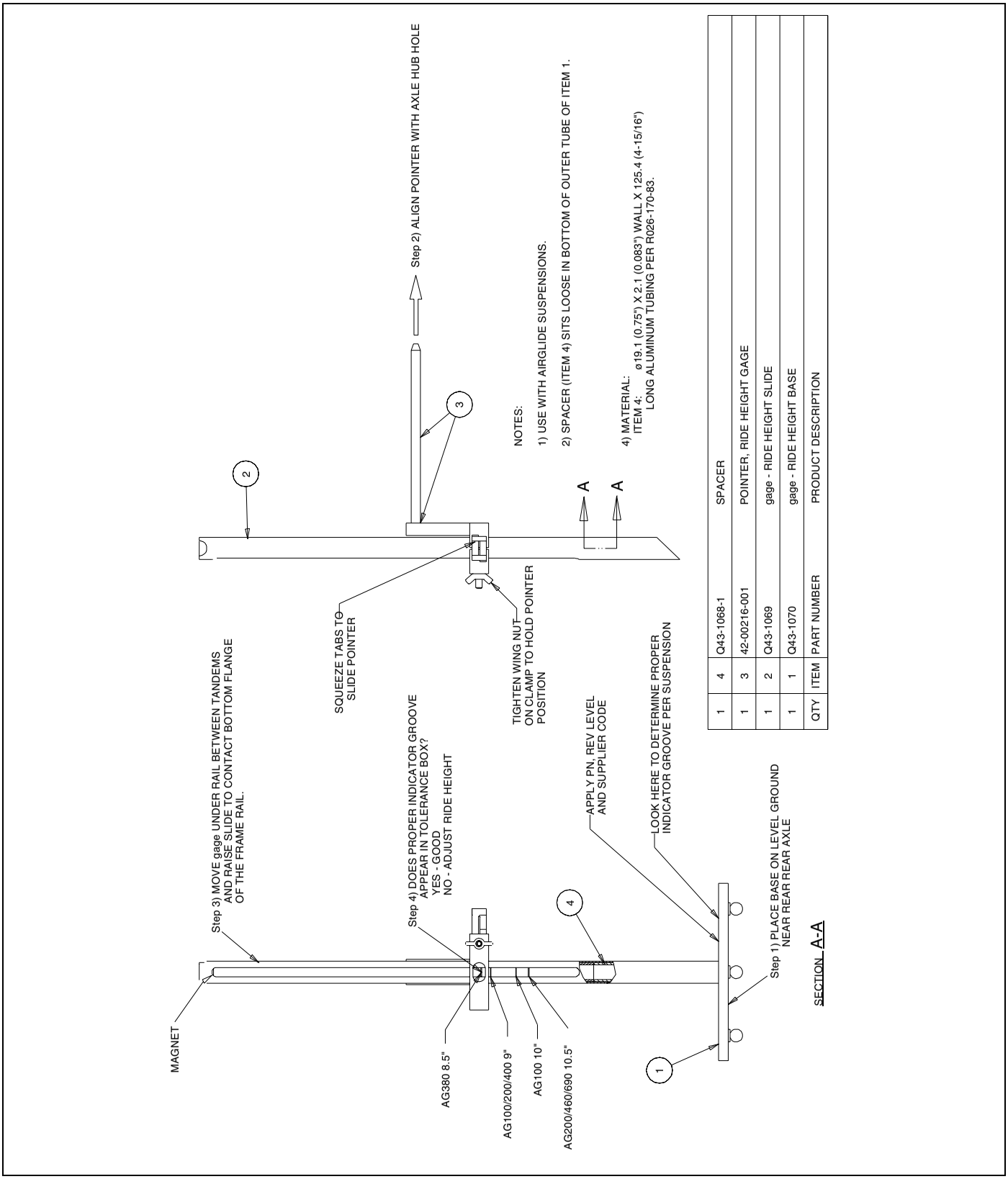
*NOTE: Ride Height must be set prior to checking or adjusting the Pinion Angles.*

This adjustment procedure removes the effect of frame rake variation on pinion angles. Using this method permits setting rear driver and interaxle driveshaft angles to provide the best possible axle travel and U-joint cancellation as well as keep torsional acceleration within specifications. Follow this procedure to set ride height and adjust rear axle pinion angles.

The following tools are required:

- Ride height tool (gage) P/N Q43-1068
- Pro-3600 or Pro-360 Anglemaster (inclinometer)

1. Ensure that the vehicle is in an unladen condition.
2. Ensure that the air system pressure is in excess of 110psi throughout the procedure.
3. Ensure that tire pressures are at rated psi. See door label for rating.
4. Drive the vehicle onto a flat/level surface. Back straight out for the length of the vehicle and slowly drive back onto the flat/level surface. Gently roll to a stop. Place the transmission in neutral and set the parking brakes.
5. Chock the front wheels on both sides.
6. Release the parking brakes.
7. Remove keys from ignition.
8. Ensure that the ride height gage has the correct Q43-1069 slide installed.




| QTY | ITEM | PART NUMBER | PRODUCT DESCRIPTION |
|---|---|---|---|
| 1 | 4 | Q43-1068-1 | SPACER |
| 1 | 3 | 42-00216-001 | POINTER, RIDE HEIGHT GAGE |
| 1 | 2 | Q43-1069 | gage - RIDE HEIGHT SLIDE |
| 1 | 1 | Q43-1070 | gage - RIDE HEIGHT BASE |

**Figure 15-2** Q43-1068 Ride Height Gage

9. Insert the pointer end of the Ride Height Gage into the center of the axle hub hole of the rearmost drive axle. See Figure 15-3

Pointer Aligned With Center Of Hub

**Figure 15-3**

*NOTE: The clamp mechanism of the gage holds the pointer and the tolerance box in place, allowing the gage to be moved without disturbing the gage position.*

10. Move the Ride Height Gage to the location where the ride height is to be measured.
    - **For tandem axles**, the ride height measurement location is directly below the frame rail, centered between the drive axles.
11. Raise the gage's internal calibrated slider to contact the bottom of the flange of the frame rail. See Figure 15-4.

Gage Repositioned Under Frame,
Between Axles And Slider Raised To Frame

**Figure 15-4**

*NOTE: The magnet imbedded in the slider of the Ride Height Gage allows the slider to maintain contact with the frame rail flange while the measurement is made.*

12. The correct ride height has been achieved when the groove for the suspension being adjusted appears in the tolerance box of the Ride Height Gage. See Figure 15-5. Refer to the base of the gage to identify suspension groove color.

*Groove located in the window of the tolerance box.*

**Figure 15-5**

*NOTE: If the Q43-1068 Ride Height Gage is not available, manually measure the ride height. In a laden condition, the distance between the centerline of the rear drive axle and the bottom of the frame rail should be 8 1/2 in. In an unladen condition, the ride height should be 8 5/8 in.*

When adjusting the ride height of these suspensions, follow this procedure.

X - Y = Ride Height

With an unladen chassis parked on level ground:

**To Find X**

Measure from the bottom of the frame rail to the ground.

**To Find Y**

Measure from the center of the rear axle hub to the ground.

The difference between X and Y is the Ride Height.

*NOTE: Ride height for each chassis is provided in ECAT and is identified as Frame Height. See the note above for laden and unladen ride height.*

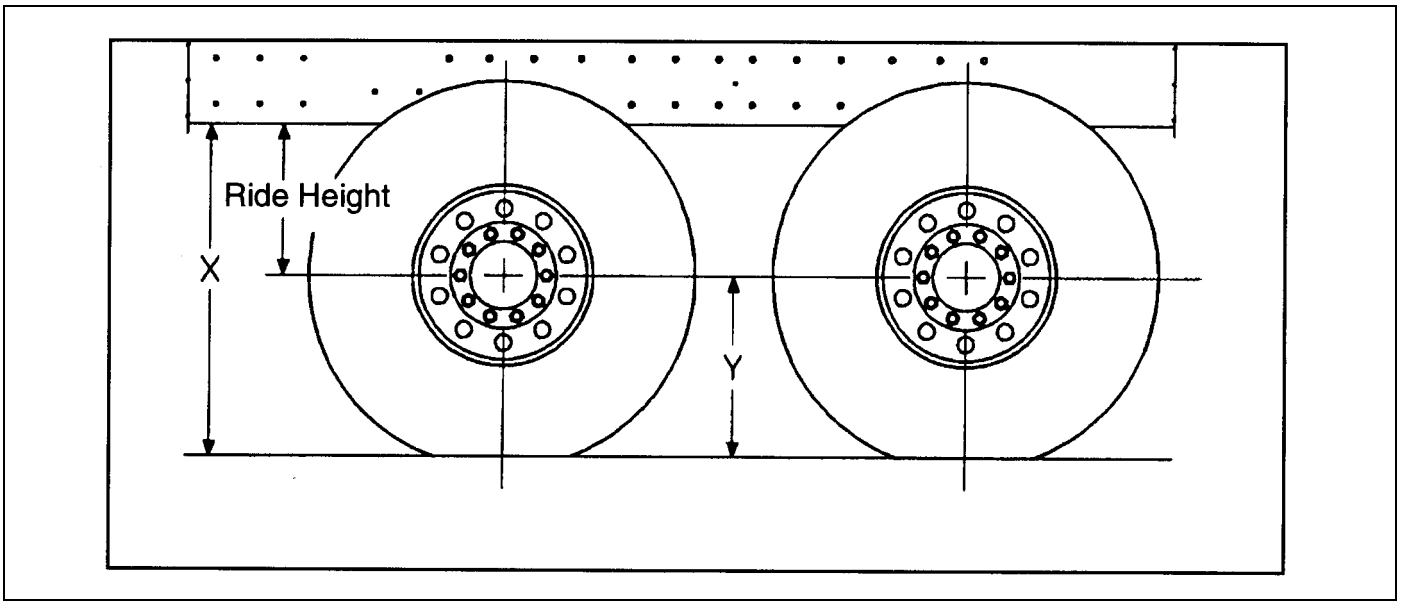



**Figure 15-6**

## Ride Height Adjustment

1. Loosen the nut on the height control valve adjusting block.

   For Leveling Valves Without Dead Band Center Position Pin Locator

   *NOTE: Be sure that the nylon block is at the center of the dead band before tightening the nut. To do this, quickly move the nylon block up and down 15° each way several times.*

   For Leveling Valves With Dead Band Center Position Pin Locator

   To locate nylon block at the center of the dead band before tightening the nut, install the locator pin through the locator pin guides on the valve body and on the nylon block. Remove pin. See Figure 17-8.

2. Exhaust air from air springs.
3. Raise the valve arm until the top of the rear axle is the correct distance from the bottom of the frame rail.

*Only rearmost axle is set to correct ride height.*

1.With the height control valve loosened on the height control valve bracket, adjust the ride height by clocking the height control valve on the bracket. See Figure 15-7.

*NOTE: At least one of the holes in the height control valve bracket is slotted to permit the clocking of the height control valve.*

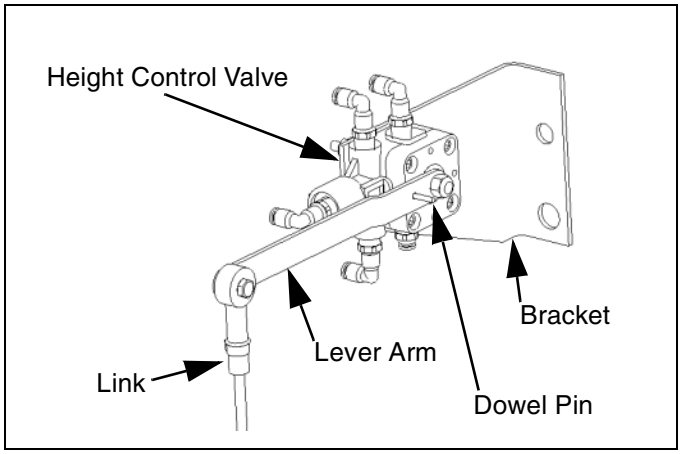



**Figure 15-7**

## Pinion Angles

*NOTE: Ride Height must be set prior to checking or adjusting the Pinion Angles.*

The drive axle inclination measurement requires the use of an appropriate inclinometer, such as a Pro-360 or a Pro-3600 digital inclinometer. The inclinometer must be capable of referencing an inclined surface to allow relative inclination measurements. In addition, the inclinometer must be zeroed to true horizontal at power-on.

### Front Drive Axle

*NOTE: Refer to ECAT Chassis Search (not visual ECAT) for the setting of the forward drive axle. Example:*

*1. Enter chassis number.*

*2. Click on* **Rear Axle.**

*3. Click on* **Rear Axle Complete And Related.**

*4. Click on* **2010-A04-C**_____ *(Eaton or Meritor).*

1. Set the inclinometer to zero on the frame rail with the face of the inclinometer oriented toward the passenger side of the chassis.
2. Take the measurement of the front drive axle inclination on the top or bottom of the axle housing near the axle seat on the long side of the axle with the inclinometer oriented toward the passenger side of the chassis. See Figure 15-8.
3. The front drive axle inclination must be within 0.5 degrees of the setting shown in ECAT. If the front drive axle inclination is out of tolerance, adjust (shim) the axle per the instructions in “Pinion Angle Adjustment” on page 13. Maintain the specified ride height during axle adjustment to achieve valid inclination measurement.

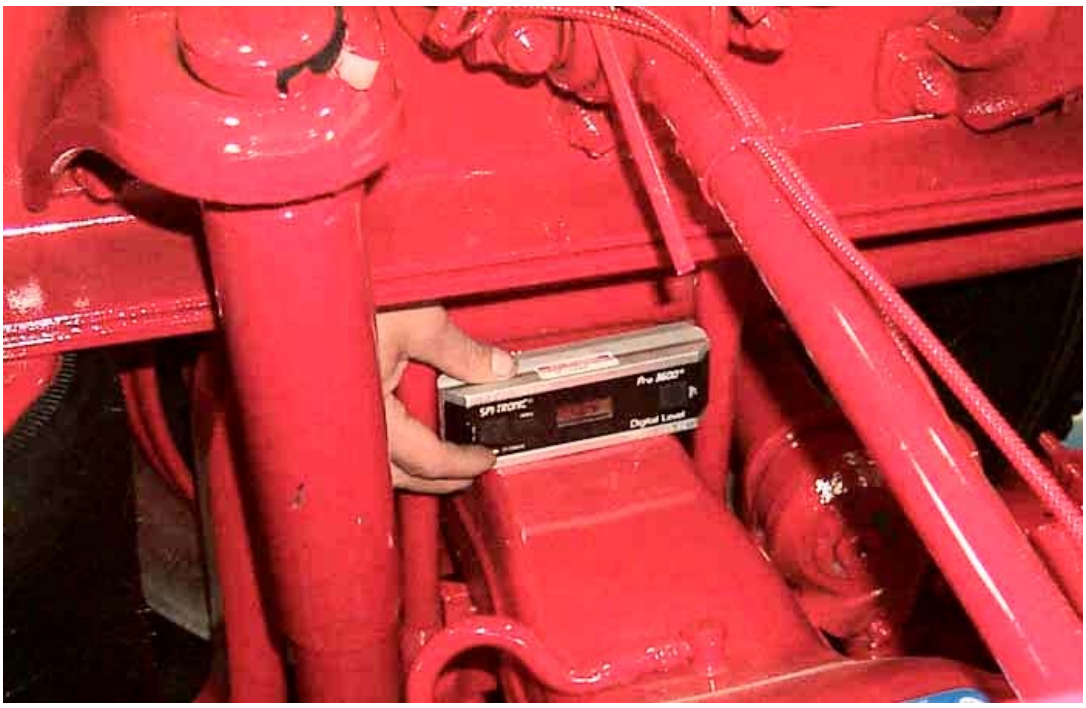


**Figure 15-8**

**Rear Drive Axle**

4. The inclinometer must be zeroed to the floor.

*NOTE: If floor is not smooth and level:*
*1. Place a flat metal bar (minimum 48 in.) on the floor beside the rear tires so that the bar touches the outside edge of both the front and rear driver tires.*
*2. Place the inclinometer on the bar and zero inclinometer on this bar.*

5. Again measure the front drive axle relative to the floor. Record this angle.

*NOTE: This angle, (relative to the floor) might not produce the same reading as the one in ECAT, which is relative to the frame rail. The reason for this change in angle measurement is to removes the effect of frame rake variation on pinion angles. Using this method permits setting rear driver and interaxle driveshaft angles to provide the best possible axle travel and U-joint cancellation as well as keep torsional acceleration within specifications. Follow this procedure to set ride height and adjust rear axle pinion angles.*

6. To determine the proper pinion angle setting for the rear drive axle, refer to charts "Axle Angle Chart, Dana Axles" on page 14 or "Axle Angle Chart, Meritor Axles" on page 15, depending on the axle manufacturer. Locate the forward drive axle pinion angle that was recorded in previous step 5 and note the associated rear drive axle pinion angle.

*NOTE: This angle is also relative to the floor, not the frame rail.*

7. The rear drive axle inclination must be within the tolerance specified by "Axle Angle Chart, Dana Axles" on page 14 or "Axle Angle Chart, Meritor Axles" on page 15, depending on the axle manufacturer.

8. If the rear drive axle inclination is out of tolerance, adjust (shim) the axle per the instructions in "Pinion Angle Adjustment" on page 13. Maintain the specified ride height during axle adjustment to achieve valid inclination measurement.

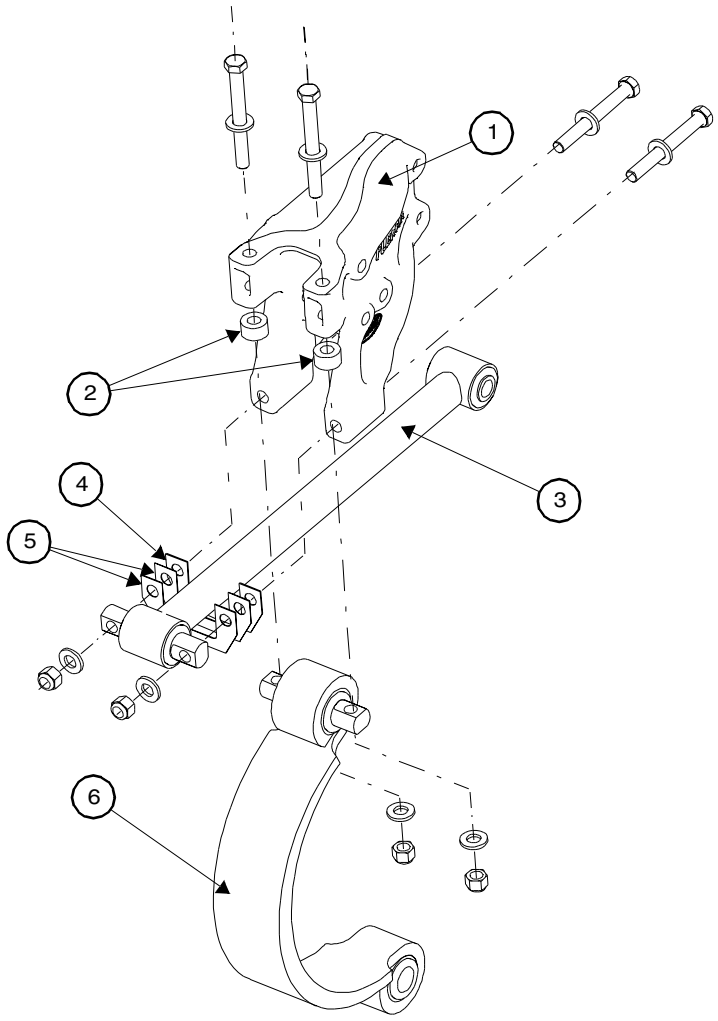

**Figure 15-9**

## Pinion Angle Adjustment

To adjust the axle angle, add or remove spacers between the link spring end and the drive bracket. See Figure 15-10, item 2. For small adjustments, standard 16 mm frame washers can be used.

## Adjusting Lateral Alignment (Tracking)

The alignment of rear axles can be adjusted by adding or removing alignment shims between the radius rod end and the drive bracket. See Figure 15-10, item 4 or 5.




| | |
| --- | --- |
| 1 | Drive Bracket |
| 2 | Link Spring Spacer |
| 3 | Radius Rod Assembly |
| 4 | Alignment Shim (1.5 mm) |
| 5 | Alignment Shim (0.75 mm) |
| 6 | Link Spring Assembly |

**Figure 15-10**

NOTES:

1) USE WITH DANA DSP40/DSP41 AND DSH40/44 AXLES,
52" AXLE SPACING AND BROKEN BACK INSTALLATIONS ONLY.

2) USE WITH 2 ° AND 4 ° FWD AXLE SLANTS.

3) ALL ANGLES IN CHARTS ARE RELATIVE TO GROUND IN UNLADEN CONDITION.
ADD 0.7 DEG TO BOTH THE FORWARD AND
REAR AXLE UNLADEN ANGLES TO OBTAIN EQUIVALENT LADEN ANGLES.

5) REFERENCE CS0152 FOR AXLE ANGLE PROCEDURE.

| FWD AXLE ANGLE | REAR AXLE ANGLE | REAR DRIVER RANGE |
|---|---|---|
| 0.0 | 11.7 | 11.2-12.2 |
| 0.1 | 11.6 | 11.1-12.1 |
| 0.2 | 11.5 | 11.0-12.0 |
| 0.3 | 11.4 | 10.9-11.9 |
| 0.4 | 11.3 | 10.8-11.8 |
| 0.5 | 11.2 | 10.7-11.7 |
| 0.6 | 11.1 | 10.6-11.6 |
| 0.7 | 11.1 | 10.6-11.6 |
| 0.8 | 11.0 | 10.5-11.5 |
| 0.9 | 10.9 | 10.4-11.4 |
| | | |
| 1.0 | 10.8 | 10.3-11.3 |
| 1.1 | 10.7 | 10.2-11.2 |
| 1.2 | 10.6 | 10.1-11.1 |
| 1.3 | 10.6 | 10.1-11.1 |
| 1.4 | 10.5 | 10.0-11.0 |
| 1.5 | 10.4 | 9.9-10.9 |
| 1.6 | 10.4 | 9.9-10.9 |
| 1.7 | 10.3 | 9.8-10.8 |
| 1.8 | 10.2 | 9.7-10.7 |
| 1.9 | 10.1 | 9.6-10.6 |

| FWD AXLE ANGLE | REAR AXLE ANGLE | REAR DRIVER RANGE |
|---|---|---|
| 2.0 | 10.0 | 9.5-10.5 |
| 2.1 | 9.9 | 9.4-10.4 |
| 2.2 | 9.8 | 9.3-10.3 |
| 2.3 | 9.8 | 9.3-10.3 |
| 2.4 | 9.7 | 9.2-10.2 |
| 2.5 | 9.6 | 9.1-10.1 |
| 2.6 | 9.6 | 9.1-10.1 |
| 2.7 | 9.5 | 9.0-10.0 |
| 2.8 | 9.4 | 8.9-9.9 |
| 2.9 | 9.3 | 8.8-9.8 |

| FWD AXLE ANGLE | REAR AXLE ANGLE | REAR DRIVER RANGE |
|---|---|---|
| 3.0 | 9.2 | 8.7-9.7 |
| 3.1 | 9.1 | 8.6-9.6 |
| 3.2 | 9.0 | 8.5-9.5 |
| 3.3 | 9.0 | 8.5-9.5 |
| 3.4 | 8.9 | 8.4-9.4 |
| 3.5 | 8.8 | 8.3-9.3 |
| 3.6 | 8.7 | 8.2-9.2 |
| 3.7 | 8.6 | 8.1-9.1 |
| 3.8 | 8.5 | 8.0-9.0 |
| 3.9 | 8.5 | 8.0-9.0 |

| FWD AXLE ANGLE | REAR AXLE ANGLE | REAR DRIVER RANGE |
|---|---|---|
| 4.0 | 8.4 | 7.9-8.9 |
| 4.1 | 8.3 | 7.8-8.8 |
| 4.2 | 8.3 | 7.8-8.8 |
| 4.3 | 8.2 | 7.7-8.7 |
| 4.4 | 8.1 | 7.6-8.6 |
| 4.5 | 8.0 | 7.5-8.5 |
| 4.6 | 7.9 | 7.4-8.4 |
| 4.7 | 7.8 | 7.3-8.3 |
| 4.8 | 7.7 | 7.2-8.2 |
| 4.9 | 7.7 | 7.2-8.2 |

| FWD AXLE ANGLE | REAR AXLE ANGLE | REAR DRIVER RANGE |
|---|---|---|
| 5.0 | 7.6 | 7.1-8.1 |
| 5.1 | 7.5 | 7.0-8.0 |
| 5.2 | 7.4 | 6.9-7.9 |
| 5.3 | 7.3 | 6.8-7.8 |
| 5.4 | 7.3 | 6.8-7.8 |
| 5.5 | 7.2 | 6.7-7.7 |
| 5.6 | 7.1 | 6.6-7.6 |
| 5.7 | 7.0 | 6.5-7.5 |
| 5.8 | 6.9 | 6.4-7.4 |
| 5.9 | 6.9 | 6.4-7.4 |
| 6.0 | 6.8 | 6.3-7.3 |

NOTES:

1) USE WITH MERITOR RT40/41/44-145 AXLES,
52" AXLE SPACING AND BROKEN BACK INSTALLATIONS ONLY.

2) USE WITH 2 ° AND 4 ° FORWARD AXLE SLANTS.

3) ALL ANGLES IN CHARTS ARE RELATIVE TO GROUND IN UNLADEN CONDITION.
ADD 0.7 DEG TO BOTH THE FORWARD
AND REAR AXLE UNLADEN ANGLES TO OBTAIN EQUIVALENT LADEN ANGLES.

5) REFERENCE CS0152 FOR AXLE ANGLE PROCEDURE.

| FWD AXLE ANGLE | REAR AXLE ANGLE | REAR DRIVER RANGE |
|---|---|---|
| 0.0 | 13.2 | 12.7-13.7 |
| 0.1 | 13.1 | 12.6-13.6 |
| 0.2 | 13.0 | 12.5-13.5 |
| 0.3 | 12.9 | 12.4-13.4 |
| 0.4 | 12.8 | 12.3-13.3 |
| 0.5 | 12.7 | 12.2-13.2 |
| 0.6 | 12.7 | 12.2-13.2 |
| 0.7 | 12.6 | 12.1-13.1 |
| 0.8 | 12.5 | 12.0-13.0 |
| 0.9 | 12.4 | 11.9-12.9 |
| | | |
| 1.0 | 12.4 | 11.9-12.9 |
| 1.1 | 12.3 | 11.8-12.8 |
| 1.2 | 12.2 | 11.7-12.7 |
| 1.3 | 12.1 | 11.6-12.6 |
| 1.4 | 12.0 | 11.5-12.5 |
| 1.5 | 11.9 | 11.4-12.4 |
| 1.6 | 11.8 | 11.3-12.3 |
| 1.7 | 11.8 | 11.3-12.3 |
| 1.8 | 11.7 | 11.2-12.2 |
| 1.9 | 11.6 | 11.1-12.1 |

| FWD AXLE ANGLE | REAR AXLE ANGLE | REAR DRIVER RANGE |
|---|---|---|
| 2.0 | 11.5 | 11.0-12.0 |
| 2.1 | 11.4 | 10.9-11.9 |
| 2.2 | 11.3 | 10.8-11.8 |
| 2.3 | 11.3 | 10.8-11.8 |
| 2.4 | 11.2 | 10.7-11.7 |
| 2.5 | 11.1 | 10.6-11.6 |
| 2.6 | 11.0 | 10.5-11.5 |
| 2.7 | 10.9 | 10.4-11.4 |
| 2.8 | 10.8 | 10.3-11.3 |
| 2.9 | 10.8 | 10.3-11.3 |

| FWD AXLE ANGLE | REAR AXLE ANGLE | REAR DRIVER RANGE |
|---|---|---|
| 3.0 | 10.7 | 10.2-11.2 |
| 3.1 | 10.6 | 10.1-11.1 |
| 3.2 | 10.5 | 10.0-11.0 |
| 3.3 | 10.4 | 9.9-10.9 |
| 3.4 | 10.3 | 9.8-10.8 |
| 3.5 | 10.3 | 9.8-10.8 |
| 3.6 | 10.2 | 9.7-10.7 |
| 3.7 | 10.1 | 9.6-10.6 |
| 3.8 | 10.0 | 9.5-10.5 |
| 3.9 | 9.9 | 9.4-10.4 |

| FWD AXLE ANGLE | REAR AXLE ANGLE | REAR DRIVER RANGE |
|---|---|---|
| 4.0 | 9.8 | 9.3-10.3 |
| 4.1 | 9.8 | 9.3-10.3 |
| 4.2 | 9.7 | 9.2-10.2 |
| 4.3 | 9.6 | 9.1-10.1 |
| 4.4 | 9.5 | 9.0-10.0 |
| 4.5 | 9.4 | 8.9-9.9 |
| 4.6 | 9.3 | 8.8-9.8 |
| 4.7 | 9.3 | 8.8-9.8 |
| 4.8 | 9.2 | 8.7-9.7 |
| 4.9 | 9.1 | 8.6-9.6 |

| FWD AXLE ANGLE | REAR AXLE ANGLE | REAR DRIVER RANGE |
|---|---|---|
| 5.0 | 9.0 | 8.5-9.5 |
| 5.1 | 8.9 | 8.4-9.4 |
| 5.2 | 8.9 | 8.4-9.4 |
| 5.3 | 8.8 | 8.3-9.3 |
| 5.4 | 8.7 | 8.2-9.2 |
| 5.5 | 8.6 | 8.1-9.1 |
| 5.6 | 8.5 | 8.0-9.0 |
| 5.7 | 8.4 | 7.9-8.9 |
| 5.8 | 8.3 | 7.8-8.8 |
| 5.9 | 8.3 | 7.8-8.8 |
| 6.0 | 8.2 | 7.7-8.7 |