HALE

SB-67

MERITOR®

Revised 04-99
$2.50

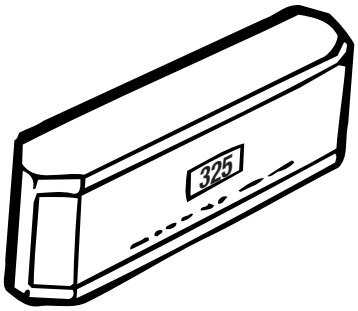
Measuring and Recording Driveline Angles

Reference Guide TP-98121

RPL Series Permalube™

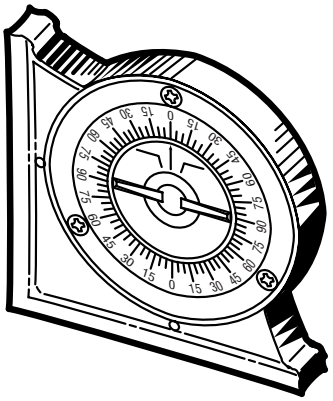
This quick reference guide provides instructions on how to measure and record main driveline angles.

Tools You'll Need



- An inclinometer or a spirit level protractor to measure driveline angles
- A tape measure to measure ride height for air-ride-equipped tractors
- A Data Gathering Worksheet. Photocopy the Data Gathering Worksheet provided at the end of this guide. You will use this photocopy to record the tractor's specifications and driveline angle measurements. Data Gathering Worksheets are also available by calling the Meritor Customer Service Center at 800-535-5560 and ordering TP-98127.

Prepare the Vehicle

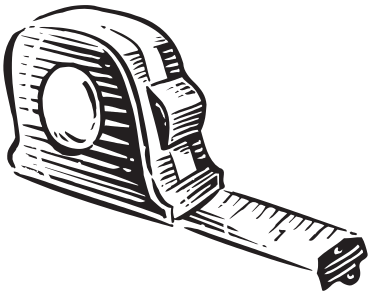


WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

1. Park the vehicle on a level surface. Do not engage the tractor brakes or the parking brakes.
2. Verify that all tires are on a level surface and inflated to the specified pressure.
3. Block the front tires at both the **FRONT** and **REAR**.

For Air-Ride-Equipped Tractors



- Build air pressure to at least 115 psi (792.35 kPa).
- Deflate air from the air bags: Use the dash-mounted deflate switch or release air pressure through the air valve at the rear of the tractor.
- Allow the air bags to inflate completely.
- Measure ride height with a tape measure. If necessary, adjust ride height to correct OEM specifications.

Data Gathering Worksheet

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Fill In the General Information Section at the Top Right-Hand Corner of the Data Gathering Worksheet

Customer Name:	*Robert Smith*				
Phone:	*(555) 555-1234*	**Fax:**	*(555) 555-6789*		
OEM:	*XXXXX*	**Model:**	*XXXXXX*		
VIN: (Last 6 digits only)	*XXXXXX*	**Unit:**	*XXXXX*	**Year:**	*99*
Date:	*1/1/99*	**DSM:**	*XXXXXX*		

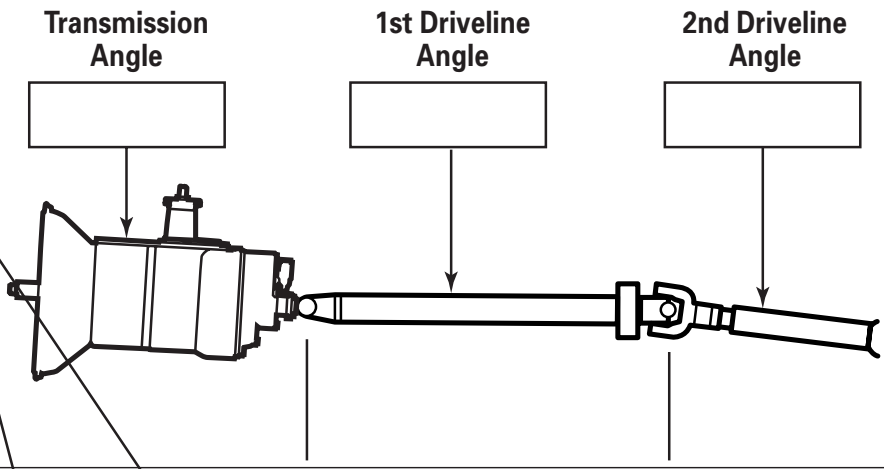
Phasing Type (Refer to the reverse side.)

Maximum Engine RPM *2200*

Transmission Top Gear Ratio *0.86:1*

Rear Suspension Ride Height *37"*

Maximum Engine HP



Usually found on the engine specification label attached to the tractor's engine block.

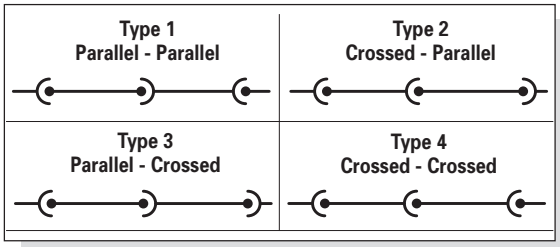
If equipped with air ride.

Usually found on the transmission specification plaque attached to the tractor instrumental panel.

Then Fill In the "Phasing Type" Box on the Data Gathering Worksheet

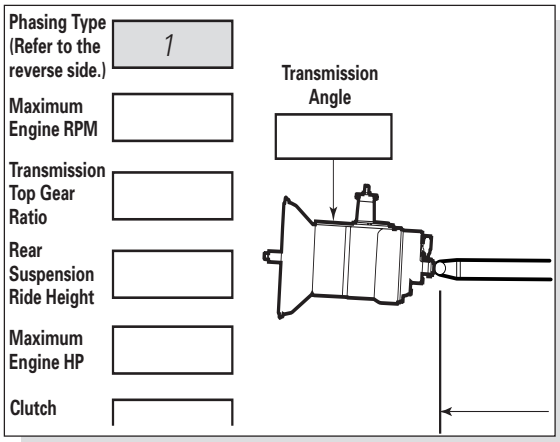
Refer to **Phasing Type 1, 2, 3** and **4** examples listed on the worksheet. **Figure 1.**

Figure 1



If you are unsure of the tractor's phasing type, use **"1"** in the box. **Figure 2.**

Figure 2

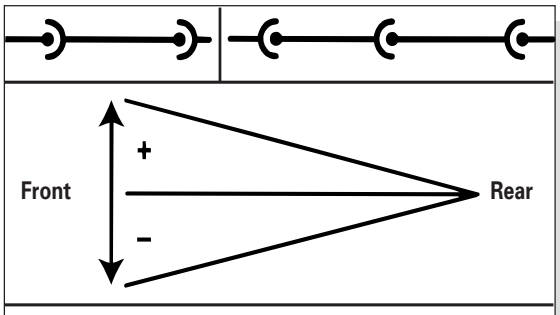


Before You Measure a Component, Determine the Positive (+) and Negative (–) Designations

You must fill in driveline angle measurements on the Data Gathering Worksheet as **positive (+)** and **negative (–)** dimensions.

Before you measure a component, go to the side of the vehicle and look at the driveline. If the **FRONT** of the component is **HIGHER** than the **REAR** of the component, the dimension will be **positive (+)**. If the **FRONT** of the component is **LOWER** than the **REAR** of the component, the dimension will be **negative (–)**. **Figure 3.**

Figure 3

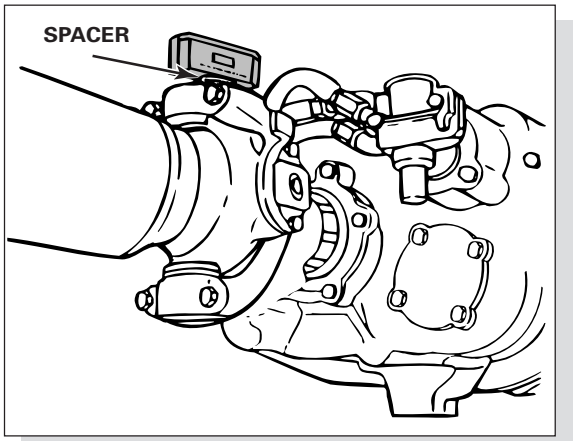


ame. Measure joint center to joint center lengths of
580 or call the Center at 800-535-5560 for assistance.

Measure the Transmission Output Yoke Angle

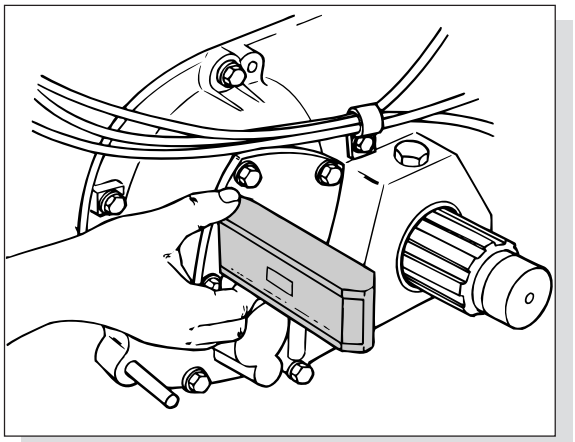
Place the inclinometer or spirit level protractor on a spacer and on the transmission output yoke to measure the transmission output yoke angle. If a measurement is difficult to obtain on the yoke, you can measure from a flat transmission surface, including the countershaft bearing covers or the PTO cover. **Figure 4** and **Figure 5.**

Figure 4



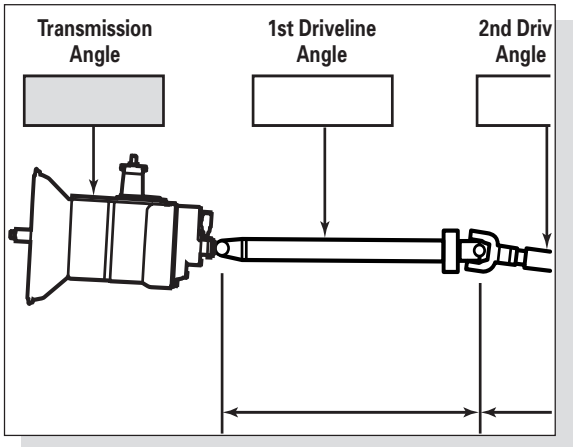
OR

Figure 5



Record the measurement in the **Transmission Angle** box on the Data Gathering Worksheet. **Figure 6.**

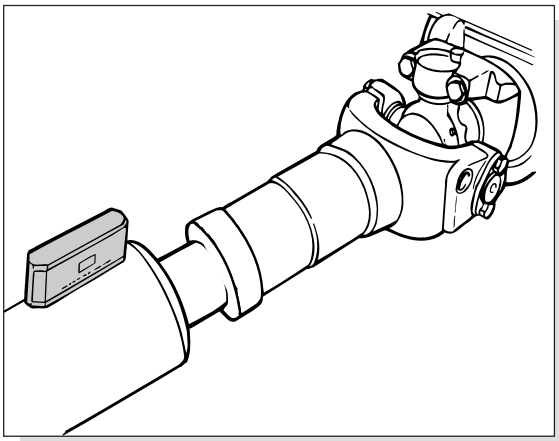
Figure 6



Measure the First and Second Driveline Angles

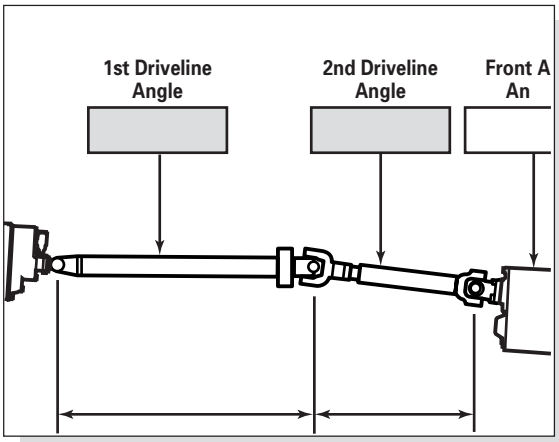
Place the inclinometer or spirit level protractor on a smooth, flat portion of the driveshaft tubing to measure the first and second driveline angles. **Figure 7. Do not measure over welds or balance weights. The measurements will not be valid.**

Figure 7



Record the measurements in the **First Driveline Angle** and **Second Driveline Angle** boxes on the Data Gathering Worksheet. **Figure 8.**

Figure 8

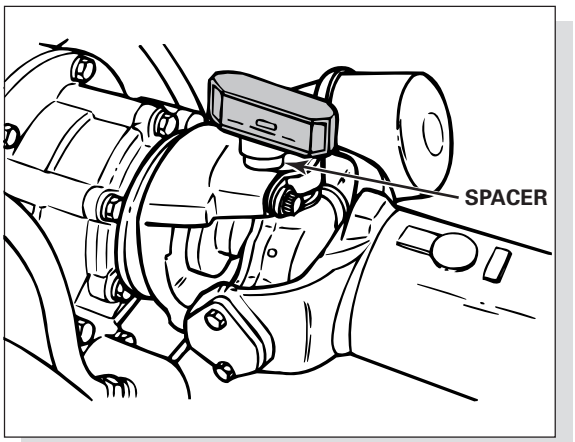


Measure the Forward Rear Drive Axle Angle

Place the inclinometer or spirit level protractor on a spacer and on the output yoke or on a smooth, flat portion of the axle housing tube (the "long" side, away from the bowl and near the suspension U-bolt) to measure the forward rear drive axle angle. **Figure 9** and **Figure 10**.

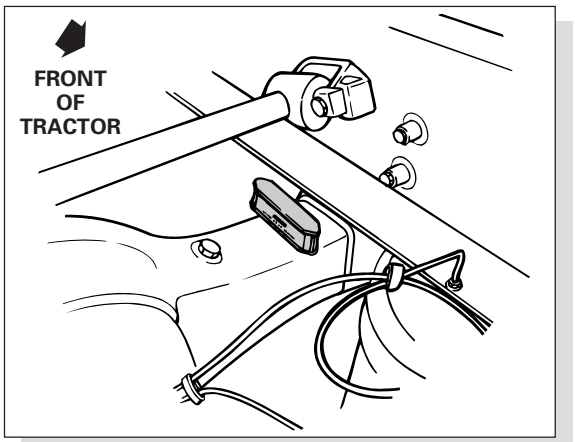
NOTE: Figure 9 is the preferred measurement method.

Figure 9



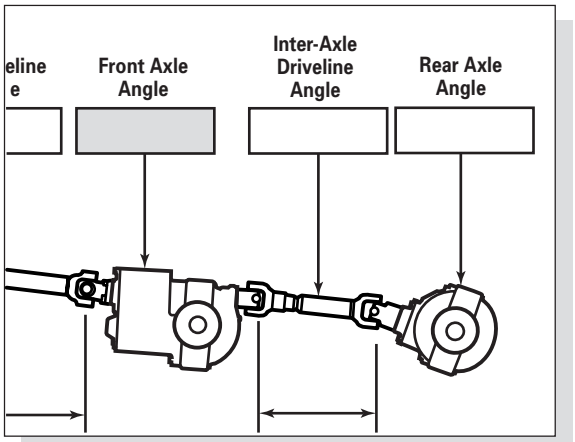
OR

Figure 10



Write the measurement in the **Front Axle Angle** box on the Data Gathering Worksheet. **Figure 11.**

Figure 11



Measure the Inter-Axle Angle

Place the inclinometer or spirit level protractor on a smooth, flat portion of the driveshaft tubing to measure the inter-axle angle. **Figure 12. Do not measure over welds or balance weights. The measurement will not be valid.**

If the driveline tubing is too short, place the edge of the inclinometer or spirit level protractor vertically on the tube. Subtract 90 degrees from the reading to determine the correct angle. **Figure 13.**

Figure 12

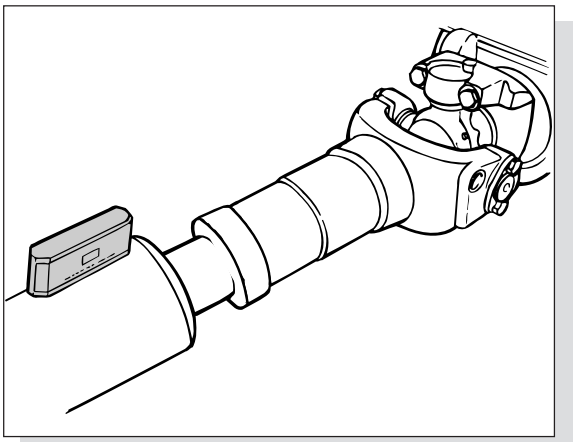
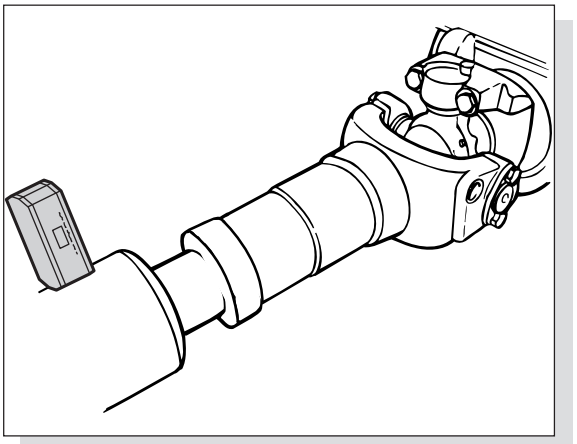
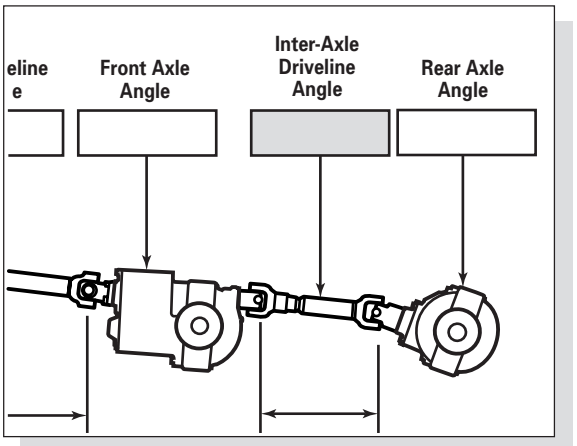


Figure 13



Write your measurement in the **Inter-Axle Angle** box on the Data Gathering Worksheet. **Figure 14.**

Figure 14

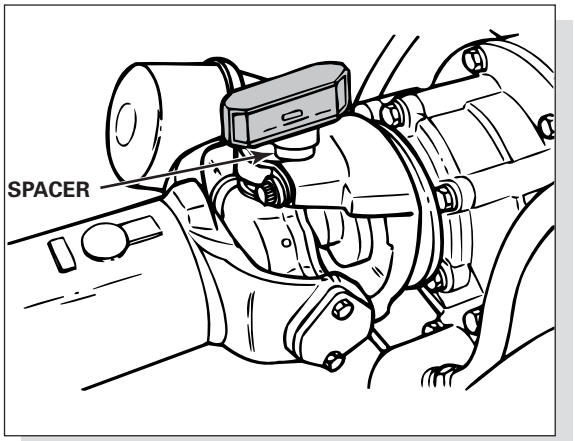


Measure the Rear Axle Angle

Place the inclinometer or spirit level protractor on a spacer and on the input yoke or on a smooth, flat portion of the axle tube (the "long" side, away from the bowl and near the suspension U-bolt) to measure the rear axle angle. **Figure 15** and **16.**

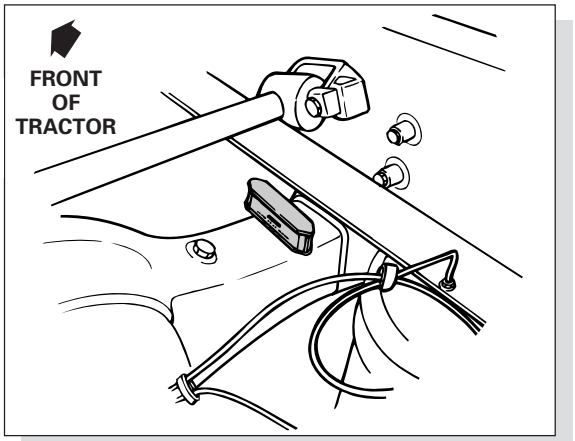
NOTE: Figure 15 is the preferred measurement method.

Figure 15



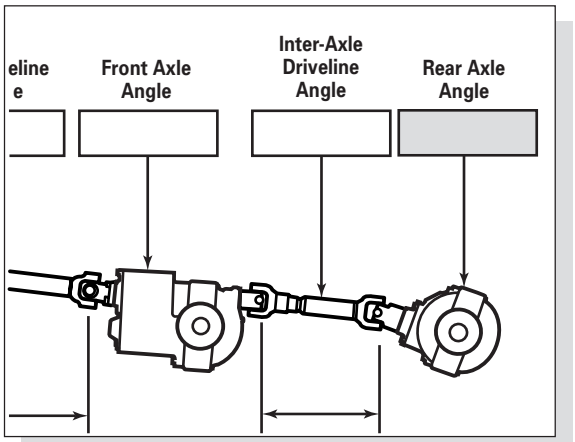
OR

Figure 16



Write the measurement in the **Rear Axle Angle** box on the Data Gathering Worksheet. **Figure 17.**

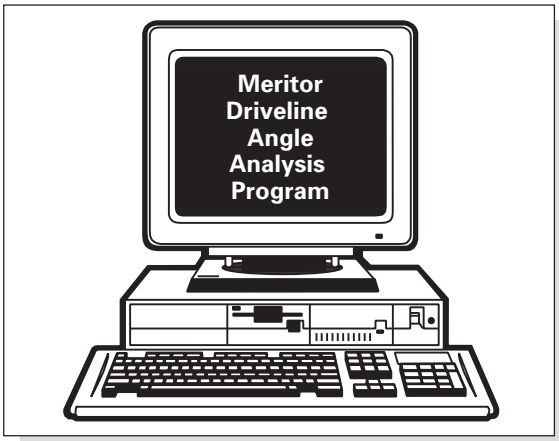
Figure 17



When You Finish Measuring the Driveline Angles

1. Set the tractor's parking brake.
2. Remove the blocks from the front tires.
3. You are now ready to enter the dimensions you recorded on the Data Gathering Worksheet into the Meritor Driveline Angle Analysis program. **Figure 18.**

Figure 18



Customer Name:		
Phone: ( )	Fax: ( )	
OEM:	Model:	
VIN: (Last 6 digits only)	Unit:	Year:
Date:	DSM:	

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Driveline Angle Analysis Data Gathering Sheet

Phasing Type (Refer to the reverse side.)

Maximum Engine RPM

Transmission Top Gear Ratio

Rear Suspension Ride Height

Maximum Engine HP

Clutch Model

Transmission Model

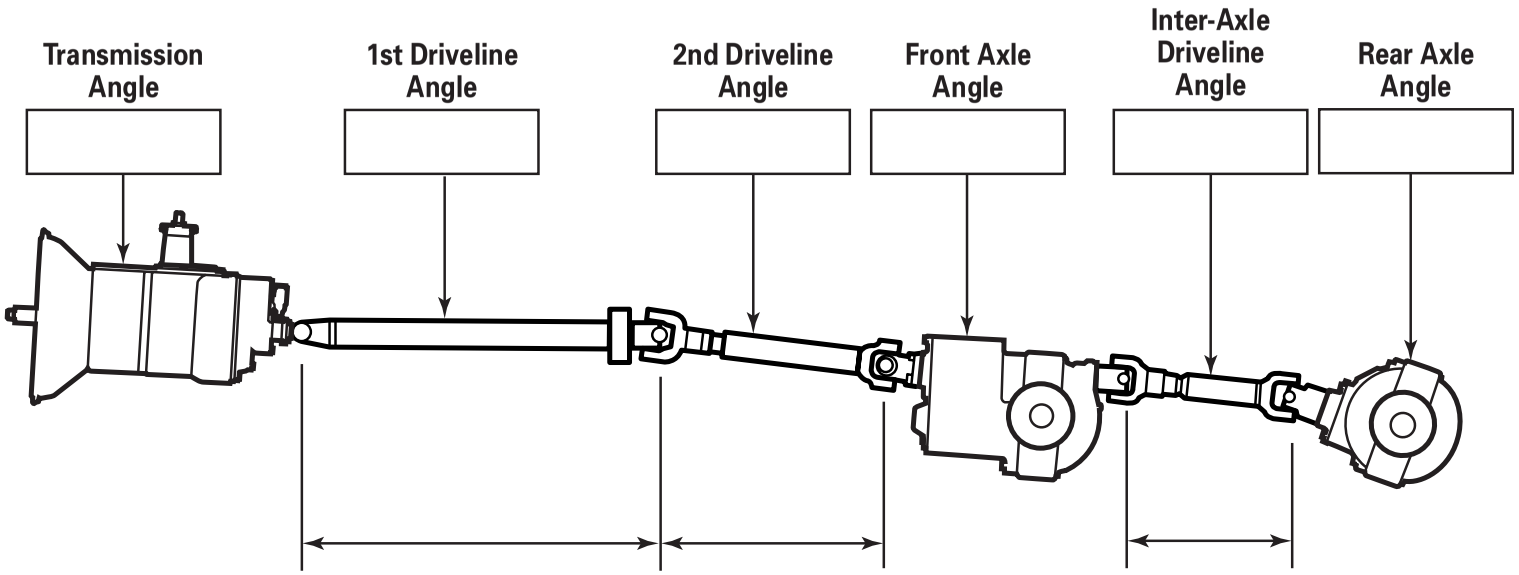
Main Driveline Series

Axle Model

Ratio

I/A Driveline Series

Tire Size



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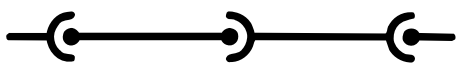
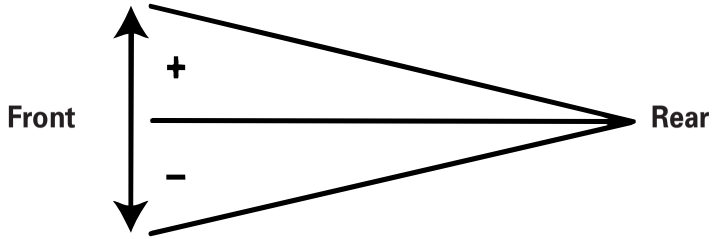
Driveline Angle Analysis Data Gathering Sheet

Type 1 Parallel - Parallel	Type 2 Crossed - Parallel	Type 3 Parallel - Crossed	Type 4 Crossed - Crossed
			

Before you measure a component, go to the side of the vehicle and look at the driveline:

- If the **FRONT** of the component is **HIGHER** than the **REAR** of the component, the dimension will be **positive (+)**.
- If the **FRONT** of the component is **LOWER** than the **REAR** of the component, the dimension will be **negative (–)**.



Assumptions

1. **Drivelines are in the same plane. The top view shows all drivelines in a straight line.**

   For drivelines outside of the same plane, measure the offsets of each joint to the frame. Measure joint center to joint center lengths of each shaft. Fax this information to Meritor's Customer Service Center at 248-435-5580 or call the Center at 800-535-5560 for assistance.

2. **Drivelines are balanced according to Meritor's driveline specifications.**

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