



TL113012 INSTALLATION MANUAL FOR TELMA AD50-90 ON IC BUS UC & HC CUTAWAY CHASSIS MaxxForce7 and MaxxForceDT engine AIR AND HYDRAULIC BRAKES WITH SPL100 U-JOINTS FROM MODEL YEAR 2010 WITH DIAMOND LOGIC CONTROL



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SCOPE OF THIS MANUAL

This manual covers the installation of Telma into the IC Bus UC and HC cutaway chassis equipped with Spicer Life SPL100 driveline. This manual and the kits listed are not compatible with driveline u-joint sizes larger than SPL100 such as Spicer Life SPL140 or Spicer 10 series 1710. Contact Telma engineering support at engineering@telmacse.com for additional information or help with a Telma installation on a chassis equipped with these larger u-joint sizes.

Due to the nature of the Navistar HC and UC chassis which can have many different options which affect the driveline such as engine choice, transmission choice, air or hydraulic brakes, and air or spring suspension, it is necessary to submit an installation drawing request using our <u>Online Installation Drawing</u> <u>Request Form</u>. <u>TIL03019 Chassis Measurement Templates</u> and <u>TIL03020</u> <u>Driveline Retarder Pre-Installation Measurement Guide</u> can be used as worksheets to gather the necessary information. Contact Telma engineering support at <u>engineering@telmacse.com</u> if you have any questions.

The control system instructions included in this manual take advantage of the Navistar body controller and the programmable functions using Advanced Diamond Logic. If programming support is needed contact Navistar to locate a facility with Advanced Diamond Logic level 3 programming certification.

SECTION 1 PREPARATION OF THE CHASSIS

1.1 DRIVELINE

Remove the complete drive-shaft assembly after measurements have been taken.

1.2 EXHAUST

Cut the exhaust just past the DPF sensors and before the first bend. Remove for later reinstallation.

1.3 CROSS MEMBER (169WB HC CHASSIS ONLY)

On 169WB HC chassis the "C" cross member will need to be moved back to clear the Telma. This has been approved by Navistar and should provide for a better positioning of the rear drive shaft hoop when the Telma is installed. The distance to move the cross member is not specified but should be far enough to clear the Telma unit and position the drive shaft hoop and may be approximately 12 to 14 inches.



SECTION 2

RETARDER INSTALLATION

2.1 INSTALLATION KIT TIK11203 (HYDRAULIC BRAKES)

PART NUMBER	DESCRIPTION	QTY
BB301158	AD50-90 12V 1480/1550/1610/SPL90/SPL100	1
JC120102	FOOT CONTROL SWITCH	1
JZ100280	SIDE PLATE FASTENERS	1
JZ1007XX-45	MOUNT KIT	1
TIB01017	RELAY BOX BRACKET INSIDE MOUNT	2
TIB01022	NAV HC PEDAL BRACKET	1
TIB01031	NAV HC FOOT SWITCH BRACKET	1
TIB03121	LEFT RETARDER BRACKET	1
TIB03122	RIGHT RETARDER BRACKET	1
TIB03108	INSIDE MOUNT CHASSIS BRACKET	2
TIB03109	RELAY BOX BRACKET OUTSIDE MOUNT	1
TIB01023	NAV 3200 PEDAL CLAMP	1
TID13021	HARNESS W/BAC NAV HC DIAMOND LOGIC	1
TIF01063	HEX BOLT 1/4"-28UNF X 1"	2
TIF03001	3/8-24UNF ALL METAL LOCK NUT	16
TIF03003	9/16-12UNC NUT	10
TIF03005	9/16" LOCK WASHER	10
TIF04001	HEX BOLT 9/16-12UNC X 2"	10
TIF05000	LOCK WASHER 1/4"	2
TIF05002	NUT 3/8 – 16 UNC HEX G5	2
TIF05003	LOCKWASHER 3/8 G5	1
TIF05004	NUT 1/4-28UNF	2
TIF05010	LOCKWASHER 5/16" RELAY BOX MOUNTING	4
TIF05011	NUT 5/16" RELAY BOX MOUNTING	4
TIF05012	BOLT 5/16"-18UNC X 1 1/4" RELAY BOX MOUNTING	4
TIF05019	BOLT 3/8 – 16 UNC x 2 ELEVATOR BOLT G5	1
TIF05021	RETURN SPRING	1
TIG11010	TELMA LIGHT BAR DISPLAY	1
TIB05013	1/2" bolt for relay box bracket	2
TIB05014	1/2" lock washer for relay box bracket	2

Note: SPL90 flange yokes 2 x Spicer part number 90-2-19 must be ordered separately.



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2.2 INSTALLATION KIT TIK11204 (AIR BRAKES)

AD 50-90 12V 1610 SAE	1
LEFT RETARDER BRACKET	1
RIGHT RETARDER BRACKET	1
INSIDE CHASSIS BRACKET BUS (AD5)	2
SIDE PLATE FASTENERS	1
2-PC TELMA MOUNT KIT WITH FASTENERS (AC/CC	1
LOCKNUT 3/8 – 24 UNF	16
CAP SCREW 9/16 12 UNC 2 1/2 LONG GR8	10
NUT 9/16 – 12 UNC G8	10
LOCKWASHER 9/16 G8	10
HARNESS W/BAC NAV HC DIAMOND LOGIC	1
PRESSURE SWITCH MANIFOLD	1
OUTSIDE MOUNT RELAY BOX BRACKET	1
LOCKWASHER 5/16 SPLIT	4
NUT 5/16	4
BOLT 5/16-18UNC x 1-3/4 HEX HEAD G5	4
TELMA LIGHT BAR DISPLAY	1
	AD 50-90 12V 1610 SAE LEFT RETARDER BRACKET RIGHT RETARDER BRACKET INSIDE CHASSIS BRACKET BUS (AD5) SIDE PLATE FASTENERS 2-PC TELMA MOUNT KIT WITH FASTENERS (AC/CC LOCKNUT 3/8 – 24 UNF CAP SCREW 9/16 12 UNC 2 1/2 LONG GR8 NUT 9/16 – 12 UNC G8 LOCKWASHER 9/16 G8 HARNESS W/BAC NAV HC DIAMOND LOGIC PRESSURE SWITCH MANIFOLD OUTSIDE MOUNT RELAY BOX BRACKET LOCKWASHER 5/16 SPLIT NUT 5/16 BOLT 5/16-18UNC x 1-3/4 HEX HEAD G5 TELMA LIGHT BAR DISPLAY

Note: SPL90 flange yokes 2 x Spicer part number 90-2-19 must be ordered separately.



2.3 INSTALLATION OF THE CHASSIS BRACKETS

- Remove any bolts such as battery box and/or exhaust hanger mounts that will interfere with the chassis bracket mounting
- Mark the reference hole at dimension T1 from the top of the frame down to the reference hole.
- Mark the reference hole at dimension CC from the center of the transmission u-joint or X1 from cross member A, or BOC from back of cab.
- Drill a 9/16" hole in the frame and bolt the chassis bracket (TIB03108) against the inside of the frame rail.
- Rotate the bracket to the angle specified on the installation drawing and tighten the reference bolt and nut to the specified torque to hold the bracket in place at the correct angle.
 NOTE: Use electronic angle meter with 0.1° accuracy (e.g. SPI Pro360 digital protractor). All angles indicated are with frame reference of 0°.
- Drill four more 9/16" holes in the chassis bracket and frame rail keeping away from fuel and brake lines and secure with bolts (TIF03002), nuts (TIF03003), and lock washers (TIF03005) included in the kit.
- Tighten the 9/16" bolts to 150 lb-ft (±10%).
- Drill through the chassis bracket any holes needed for battery box and/or exhaust hanger mounts and reinstall the original bolts that were previously removed.

NOTE: cross member must be moved back approximately 12-14 inches for 169WB.





2.4 RETARDER BRACKET INSTALLATION

- Identify the Telma brackets. TIB03122 is for the right or passenger side. TIB03121 is for the left or driver side. The part numbers are stamped into the bracket.
- Identify the driver's side of the Telma from the passenger side. To do so, orient the arrow of the red plate on the Telma towards the axle with the red sticker on the driver's side.
- Attach the retarder brackets to the retarder as shown below according to the position indicated on the installation drawing.
- Use four of the M14x2.0x30mm bolts, and Trep washers provided with the set of fasteners (JZ100280) to fasten each Telma bracket onto the side of the unit. Tighten bolts to 65 lb.-ft. (±10%). Do not use the flat washers included in the kit.



POSITION 3



POSITION 4



2.5 INSTALLATION OF THE TELMA IN THE CHASSIS

- Assemble the mounts to the Telma brackets as shown below with the female portion of the mounts on the bottom side of the brackets.
- Use fasteners included in the rubber mount kit JZ1007XX-45 to attach the Telma and bracket assembly to the chassis brackets which were installed previously.
- Install the Telma, equipped with the brackets and rubber mounts to the chassis brackets in the hanging position.
- As shown below, secure the Telma to the chassis bracket using the M16x2.0x110mm long bolts through the holes in the chassis brackets, mounts and retarder brackets. At each mount, install two M16x71mm (2.80") diameter flat washers (one on each end of the rubber mount, one M16 spring washer under the head of the bolt and another between the large diameter flat washer and the M16 all metal lock nut. Tighten to 150 lb.-ft. (±10%).





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2.6 INSTALLATION OF THE TELMA IN THE CHASSIS

- Install the Telma, equipped with the brackets to the chassis brackets in the hanging position.
- Secure the Telma to the chassis brackets using the M16 x 110mm long bolts through the holes in the chassis brackets, mounts and side plate brackets. At each mount, install the 2 3/4" diameter flat washer, the 5/8" lock nut and tighten to 150 lb.-ft (±10%).





2.7 DRIVE SHAFT MODIFICATION AND INSTALLATION

- A slip assembly is required on each side of the Telma. The slip position should be at center of slip travel when the shaft is installed.
- Refer to chassis manufacturers guidelines for proper drive shaft manufacture, balance, straightness, and critical speed limits.
- Refer to the installation drawings in the appendix for approximate shaft lengths.
- Always verify proper shaft lengths before modification.
- Connect the flange yoke to the Telma coupling flange using 3/8-24UNF all metal locknuts TIF03001.
 - FRONT DRIVE SHAFT 1-1 OR 1-2 CONFIGURATION





2.8 EXHAUST MODIFICATION

- Cut the exhaust as shown below about 1 inch past the exhaust sensors
- Rotate the exhaust pipe outboard to clear Telma
- After the Telma bring the exhaust back to the original position in accordance with Navistar document G-2481 (Exhaust Modifications Allowed) estimated to require (2) 45 degree bends.
- Reuse existing exhaust hangers and positions as much as possible.



Ok to cut here and rotate exhaust outboard to clear Telma. After the Telma bring the exhaust back to original position in accordance with International document G-2481 (Exhaust Modifications Allowed) estimated to require two 45 degree bends. Reuse original exhaust hangers and positions as much as possible.



SECTION 3 CONTROL SYSTEM COMPONENTS INSTALLATION

3.1 RELAY BOX MOUNTING

- Mount the relay box bracket TIB03109 to the outside left frame rail using two of the chassis bracket mounting bolts.
- Install the relay box on bracket TIB03109. Refer to diagram in section 2.5.
- Tighten the four 5/16" bolts to 17 lb-ft ($\pm 10\%$) and the two $\frac{1}{2}$ " bolts to 75 lb-ft ($\pm 10\%$).

3.2 LIGHT BAR INSTALLATION

- The Light Bar should be mounted so that it is easily visible to the driver.
- Make a rectangular hole, 7/8" wide x 1 ³/₄" tall in the lower dash to the right of the steering column or install the Light Bar in an existing console receptacle.
- Feed the harness through the hole and connect to the Light Bar.
- Plug the light bar into the hole.





3.3 HYDRAULIC BRAKE FOOT SWITCH ASSEMBLY (HYDRAULIC BRAKES ONLY)





3.4 HYDRAULIC BRAKE FOOT SWITCH ADJUSTMENT (HYDRAULIC BRAKES ONLY)

The plunger type foot switch should be carefully adjusted to avoid switch damage and optimize

retarder activation in the free play of the pedal. With the return spring installed, use a feeler gauge and adjust the switch stop (item 5) until there is 1/8" gap. The switch plunger should be fully compressed and the brake pedal should be in its highest position.

ITEM	DESCRIPTION
1	3/8" lock washer
2	Pedal bracket
3	foot switch JC120102
4	feeler gauge
5	3/8" diameter switch stop adjusting bolt
6	3/8" jam nuts

3.5 AIR BRAKE PRESSURE SWITCH MANIFOLD (AIR BRAKES ONLY)

- Mount the pressure switch manifold so that the pressure switches face up and will not collect air line water and in a suitable place convenient for connecting the air line from the brake pedal valve and connection to the relay box harness
- Connect a ¼" air line from the pressure switch manifold to the primary delivery port of the brake pedal valve

SECTION 4 WIRING HARNESS INSTALLATION

4.1 HARNESS ASSEMBLY TID11021

4.1 POWER HARNESS INSTALLATION

- From the relay box, route the Telma power connection and ground harness along the inside of the frame rail and up over the top along the middle of the Telma.
- Connect the 8G orange, blue, yellow, and brown wires to the connecting block at the top right corner.
- Connect the 8G relay box ground cable and the 2G Telma main ground cable to the insulated ground terminal at the Telma top left corner. Coat the terminals with anti-corrosion paint or body undercoat after the connections are made.
- Secure the harness to the center of the Telma brackets with rubber coated cable clamps. The harness should be secured along the centerline of the Telma and as far away as possible from either rotor to avoid heat damage to the harness. No cables should cross the heat outlets in the periphery of the rotors.
- Connect the black 2G ground cable and to negative terminal of the battery pack or frame mounted battery pack ground point. Secure the cable with rubber coated cable clamps.
- Connect the red 2G power positive cable to the positive terminal of the battery pack or battery disconnect switch. Secure the cable with rubber coated cable clamps.

4.2 CONTROL HARNESS INSTALLATION

- Route the control harness into the cab through a hole with rubber grommet in the fire wall.
- For hydraulic brake applications:
 - Install the four wires (org, blu, yel, brn) found in the relay box control harness into the hydraulic brake foot switch connector positions 1, 2, 4, 5 respectively.
 - Install the wire from the Diamond logic body controller relay into position 3 of the connector.
 - Plug the connector onto the foot switch JC120102.
- For air brake applications:
 - Install the four wires (org, blu, yel, brn) found in the relay box control harness into the pressure switch mating connector positions 1, 2, 3, 4 respectively.
 - Install the wire from the Diamond logic body controller relay into position 5 of the connector.
 - Plug the connector onto the pressure switch manifold connector.
- Install the five wires (org/wht, blu/wht, yel/grn, brn/wht, blk) found in the relay box control harness into the Light Bar mating connector positions 1-5 respectively.
- Feed the harness equipped with the light bar mating connector through the light bar hole and plug in the Light Bar.
- Plug the light bar into the hole.

Program the Diamond Logic Body Controller as shown below.

Note: Navistar Advanced Diamond Logic Level 3 programming certification is required.

4.3 HYDRAULIC BRAKE WIRING DIAGRAM

4.3 AIR BRAKE WIRING DIAGRAM

SECTION 5 RECOMMENDED TOOLS

- Transmission Jack
- Heavy duty drill motor
- Standard assortment of mechanics hand tools
- Vehicle hoist, pit, or floor jack with stands
- Electrical terminal crimping pliers for use with non-insulated terminals
- Electronic angle meter with 0.1° accuracy (e.g. SPI Pro360 digital protractor)

CHASSIS #:

2.1.11

CHASSIS MAKE/MODEL:

T . I .

D/1

SECTION 6 INSTALLATION FOLLOWUP CHECKLIST

Use checklist below to verify that correct installation was performed and file in the vehicle records.

TL105068

Revised: 6apr12jh

	1	eima P/N	, serial #:				
Friction Free Efficiency		End C	Customer:				
Thore Linciency	INSTALLER:						
	IN	SPECTIC	N DATE:				
		INSPEC	TED BY:				
INSTALLATION FOLLOWUP CHECKLIST		Х	N/A	COMMENTS			
air gap within specifications (focal)							
harness bracket installed (focal)							
harness properly routed at Telma to prevent rotor damage and							
allow for axle articulation (focal)							
sufficient clearance to crossmember to prevent contact in							
bumped condition (focal)							
AC/AD minimum 1/4" clearance between chassis bracket and							
retarder bracket (AC/AD)							
harnesses routed on inside of frame rail away from heat							
sources, sharp edges, etc. and secured with rubber coated							
metal cable clamps							
correct cable eyelet size at battery / disconnect switch							
relay box mounted vertical with wiring exiting from the bottom							
and can be easily accessed							
Telma battery power cable connected to battery switch or to							
battery "+" terminal and is protected with corrosion inhibitor							
Telma battery ground cable connected to frame rail bare metal							
surface where battery pack is grounded or directly to battery							
ground post and protected with corrosion inhibitor							
cables, hoses and air lines are at least 4" from rotors or are							
heat wrapped							
drive shaft weld quality, slip installed on each side of Telma at							
center of travel, balance, u-joints same quality as OEM							
Telma angle measurement							
T1 dimension measurement							
CC dimension measurement							
First shaft angle and installed length measurement							
Second shaft angle and installed length measurement							
Third shaft angle and installed length measurement							
Fourth shaft angle and installed length measurement							
drive shaft lengths/angles, Telma angle conforms to drawing							
AC/AD flange yokes in same plane							
electrical connections connections (weatherproof connectors,							
no quick splice, avoid butt connectors)							
hydraulic foot switch installation and adjustment							
pressure switch manifold mounted with screws and oriented							
with switches up to prevent water damage							
Light Bar Display installed correctly, visible to driver, and							
operates properly							
Telma Control Module accessible and secured with screws							
Alternator / batteries / charge circuit - sufficient capacity		1					
(refuse 200A / 2AWG / 3 to 4 batteries)							
Telma activates when moving and brakes are applied or hand		1					
control is activated							
Telma foot control shuts off automatically no higher than 2		1					
mph		1					

APPENDIX

CHASSIS MAKE / MODEL	NAVISTAR HC	CUSTOMER	
WHEFI BASE	169.0"		
	NAVISTAR MaxxForce7	CONTROLS	DIAMOND LOGIC
TRANSMISSION MAKE / MODEL	ALLISON 2100PTS (5SP)	TIRE SIZE	245/70R-19.5
	MERITOR RS17145	GVW / GCW	23500 lbs
	4X2	BRAKES	HYD
RETARDER MODEL	AD50-90	ABS	BENDIX
RETARDER PART NUMBER	BB301158	AXLE RATIO	4.33
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	90-2-19
MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE
Note: If any of the above mentioned fact	ors vary with your application, r	lease call our TECHNICAL DE	PARTMENT.
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TRANSMISSION: 3.5°	HASSIS BRACKET: 1.5°		1.2 (+1.0°). 8.6°
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CAUTION:	All and from conter of LL isint and a	igie loterance ± 0.2°. Dimen	SIGH LOIEFAILCE ± 1/10
NOTE 1. Drive shall lengths are measur	ed from center of 0-joint and a	e installed lengths.	natha hafara madification
NOTE 2. All drive shalls must be dynam	Ically balanced after modificatio	on. Always verify proper shall le	igins before modification
NOTE 3: Flange Yokes on either side of	the Telma must be in the same	e plane	
NOTE 4: When not specified, the front & the rear	drive shafts, on each retarder side, mu	st have at least the same slip as the orig	inal drive shaft
NOTE 5: When not specified, the flange yoke on	each retarder side must have the maxin	num working angle capacity available in	the driveline series concerned.
NOTE 6: After installation is completed, n	neasure drive shaft angles and co	ompare to the angles on the insta	llation drawing.
Contact TELMA Customer Supp	ort Engineering if the angles mea	isured do not conform to the drav	ving
NOTE 7: USE MOUNTING BRACKETS	TIB03108, TIB03121, TIB0312	2	
NOTE 8: USE BRACKET POSITION 4			
NOIE 9: adjust retarder to angle indicate	ed by rotating bracket		
NOTE 10: IF NECESSARY, ADJUST AX	LE ANGLE TO 5.5° WITH CHA	SSIS REFERENCE OF 0°	
NOTE 11: Move "C" cross member ba	ck to clear Telma		

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CHASSIS MAKE / MODEL		HC	CUSTOM	FR		
WHEEL BASE	169.0"					
	NAVISTAR Maxx	ForceDT	CONTROL	S		DIAMOND LOGIC
TRANSMISSION MAKE / MODEL	ALLISON 2100P	TS (5SP)	TIRE SIZE	-		245/70R-19.5
AXLE MAKE / MODEL MERITOR RS17145				ŚW		23500 lbs
	4X2		BRAKES			AIR
RETARDER MODEL	AD50-90		ABS			BENDIX
RETARDER PART NUMBER	BB301158		AXLE RA	TIO		4.33
RETARDER SERIAL NUMBER			DRIVE LI	NE SERIES	8	SPL100
RETARDER CONTROL SYSTEM	FOOT		FLANGE '	YOKE	-	90-2-19
MILEAGE AT TIME OF INSTALL			SUSPENS	SION TYPE		AIR
HOURS AT TIME OF INSTALL			VOCATIO	N		SHUTTLE
Note: If any of the above mentioned fact	ors vary with your app	lication, pl	ease call o	our TECHN	IICAL DEF	PARTMENT.
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TRANSMISSION: 3.5°	HASSIS BRACKET	2.5° *				1 2 (+1 0°) [.] 8 6°
	RETARDER: 6	5.5° ⊦				$PEAP AYLE: 65^{\circ}$
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5/ 5/8 3 1/2 13	17 17	00 n/a	00 n/a	17	17	18
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NOTE 1: Drive shaft lengths are measur	ed from conter of LL io	int and ar	gie luiere	longthe	. Dimen	SIGH COLETANCE I 1/10
NOTE 1. Drive shall lengths are measured by dynamic	ically balanced after m	nit and are		ieriyuis. vorify propy	or chaft lor	aths before modification
NOTE 2. All drive shalls must be dynam	the Telme must be in	the seme	I. Always	verily prope	er snant ier	Iguis before modification
NOTE 4. WILL STOKES OF EITHER SIDE OF		the same	plane			
NOTE 4. When not specified, the front & the rear	drive shafts, on each retard	er side, mus	t have at leas	st the same sli	p as the orig	nal drive shaft
NOTE 5. When not specified, the flange yoke on	each retarder side must hav	e the maxim	um working a	angle capacity	available in t	the driveline series concerned.
NOTE 6: After installation is completed, in	neasure drive shaft ang	les and co	mpare to th	he angles o	n the insta	llation drawing.
Contact TELMA Customer Supp	ort Engineering if the ar	ngles meas	sured do no	ot conform	to the drav	ving
NOTE 7: USE MOUNTING BRACKETS	TIB03108, TIB03121,	TIB03122	2			
NOTE 8: USE BRACKET POSITION 4						
NOTE 9: adjust retarder to angle indicate	ed by rotating bracket					
NOTE 10: IF NECESSARY, ADJUST AX	LE ANGLE TO 6.5° W	ITH CHAS	SIS REFE	ERENCE C	0⊢ 0°	
NOTE 11: Move "C" cross member ba	CK to clear Telma					
1						

	VEHICI E TECHI	NICAL DATA	
CHASSIS MAKE / MODEL	NAVISTAR H		
WHEELBASE	193.0"	VEHICLE NUMBER	
ENGINE MAKE / MODEL	NAVISTAR MaxxForce	e7 CONTROLS	DIAMOND LOGIC
TRANSMISSION MAKE / MODEL	ALLISON 2100PTS (5S	P) TIRE SIZE	245/70R-19.5
AXLE MAKE / MODEL	MERITOR RS171	15 GVW / GCW	23500 lbs
DRIVE TYPE	4X2	BRAKES	HYD
RETARDER MODEL	AD50-90	ABS	WABCO HPB
RETARDER PART NUMBER	BB301158	AXLE RATIO	4.33
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	90-2-19
MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE
Note: If any of the above mentioned fact	ors vary with your application	please call our TECHNICAL D	EPARTMENT.
		Dc loaded	/unloaded: 20 1/2
	C1		
		<u> </u>	
		L2-	
TRANSMISSION: 3.5° C L1: 4.4°	HASSIS BRACKET: -0.8° RETARDER: 3.2°		L2 (±1.0°): 6.2° REAR AXLE: 3.0°
		S.	
		······································	
		R 11 12	
9 1/2 13 11/16 14 5/8			
	Y1 61 62		
	12 17 17		
		$\frac{11/2}{4} = \frac{11/2}{11/2} = \frac{11/2}{1}$	$\frac{10}{10}$
NOTE 1: Drive shaft lengths are measured in the second structure in the second s	ed from center of U-joint and ically balanced after modifica the Telma must be in the sar drive shafts, on each retarder side, r each retarder side must have the ma neasure drive shaft angles and ort Engineering if the angles m TIB03108, TIB03121, TIB03	are installed lengths. tion. Always verify proper shaft l ne plane nust have at least the same slip as the o ximum working angle capacity available compare to the angles on the ins easured do not conform to the dr 122	engths before modification iginal drive shaft n the driveline series concerned. tallation drawing. awing
NOTE 9. adjust retarder to angle Indicat NOTE 10: IF NECESSARY, ADJUST AX	LE ANGLE TO 3.0° WITH CH	IASSIS REFERENCE OF 0°	

				<u>VE</u>	HICLE	<u> IECHNI</u>	<u>CAL DA</u>			-		
CHASSIS	CHASSIS MAKE / MODEL NAVISTAR HC					CUSTOM	ER					
WHEELBA	ASE			193.0"			VEHICLE	NUMBER				
ENGINE MAKE / MODEL NAVISTAR MaxxForceDT				xForceDT	CONTROL	S		DIAMONE) LOGIC			
TRANSMISSION MAKE / MODEL ALLISON 2100PTS				TIRE SIZE			245/70R-1	9.5				
AXLE MAKE / MODEL MERITOR RS17145				GVW/GO	CW		23500	lbs				
DRIVE TYPE 4X2				BRAKES			HYD					
RETARD	ER MODEL	_		AD50-90			ABS			WABCO F	-IPB	
RETARDE				BB30115	8		AXI F RA	TIO		4 33		
RETARDE	ER SERIAI		2	00001100					\$	SPI 100		
				FOOT					0	00 2 10		
				1001					_	30-2-13 AID		
MILEAGE			LL				SUSPENS					
HOURS A	AT TIME O						VOCATIO			SHUTTLE	_	
Note: If a	ny of the a	bove men	tioned facto	ors vary wi	ith your ap	plication, p	lease call o	our TECHI	VICAL DEF	PARTMEN	Τ.	
								Do	loaded/u	inloaded:	20 1/2	
			□ ^{B1}			21			ſ	-D		
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TRANS	MISSION:	3.5°	С	HASSIS E	RACKET:	-0.8°				l	_2 (±1.0°)	: 6.2°
TRANS	MISSION: L1:	3.5° 5.2°	С	HASSIS E RE	RACKET:	-0.8° † 3.2°				l RE	_2 (±1.0°) AR AXLE	: 6.2° : 3.0°
TRANS	MISSION: L1:	3.5° 5.2°	c	HASSIS E RE	BRACKET: TARDER:	-0.8° 3.2°				l RE	_2 (±1.0°) AR AXLE	: 6.2° : 3.0°
	MISSION: L1:	3.5° 5.2°	c	HASSIS E RE		-0.8° 3.2°	POSITIVE			l RE	_2 (±1.0°) AR AXLE	: 6.2° : 3.0°
	MISSION: L1:	3.5° 5.2°	C			-0.8° 3.2°				ا RE	_2 (±1.0°) AR AXLE	: 6.2° : 3.0°
	MISSION: L1:	3.5° 5.2°	RETR			-0.8° 3.2°				ا RE	_2 (±1.0°) AR AXLE	: 6.2° : 3.0°
	MISSION: L1:	3.5° 5.2°	C RETR		BRACKET:	-0.8° 3.2°	POSITIVE			ا RE	-2 (±1.0°) AR AXLE	: 6.2° : 3.0°
	MISSION: L1:	3.5° 5.2°	C RETR RETL	HASSIS E RE	BRACKET:	-0.8° 3.2°				I RE	_2 (±1.0°) AR AXLE	: 6.2° : 3.0°
	MISSION: L1:	3.5° 5.2°	C RETR RETL	HASSIS E RE	BRACKET: TARDER:	-0.8° 3.2°			S 4	I RE	-2 (±1.0°) AR AXLE	: 6.2° : 3.0°
	MISSION: L1:	3.5° 5.2°		HASSIS E	BRACKET: TARDER:	-0.8° + 3.2°			S 4	I RE	-2 (±1.0°) AR AXLE	: 6.2° : 3.0°
	MISSION: L1:	3.5° 5.2°		HASSIS E	BRACKET: TARDER:	-0.8° 3.2°	POSITIVE R		S 4	L3	-2 (±1.0°) AR AXLE	: 6.2° : 3.0°
TRANS	MISSION: L1: 2 B1 13 11/16	3.5° 5.2° 			BRACKET: TARDER:	-0.8° 3.2°	POSITIVE POSITIVE R 10 7/16	L1 46 3/8	L2 54 1/2	L3 N/A	_2 (±1.0°) AR AXLE	: 6.2° : 3.0°
TRANS	MISSION: L1: 2 B1 13 11/16 T	3.5° 5.2° 		HASSIS E	BRACKET: TARDER: M 3 1/4 S1	-0.8° 3.2° G 3 1/4 S2	R 10 7/16 S5	L1 46 3/8 S6	L2 54 1/2 RETR	L3 N/A RETL	_2 (±1.0°) AR AXLE	: 6.2° : 3.0°
TRANS	MISSION: L1: 1 2 B1 13 11/16 T 7 5/16	3.5° 5.2° C C 14 10/16 T1 3	C RETR RETL C DD INSIDE 33 1/2	HASSIS E RE	BRACKET: TARDER: M 3 1/4 S1 17	-0.8° 3.2°	R 10 7/16 S5 n/a	L1 46 3/8 S6 n/a	L2 54 1/2 RETR 17	L3 N/A RETL 17	-2 (±1.0°) AR AXLE	: 6.2° : 3.0°
TRANS	MISSION: L1: 1 2 B1 13 11/16 T 7 5/16 N:	3.5° 5.2° 	C RETR RETL C- DD INSIDE 33 1/2	HASSIS E RE	BRACKET: TARDER: M 3 1/4 S1 17	-0.8° 3.2° G 3 1/4 S2 17 Ar	R 10 7/16 S5 n/a	L1 46 3/8 S6 n/a nce + 0 2	L2 54 1/2 RETR 17 ° Dimen	L3 N/A RETL 17 sion tolera	-2 (±1.0°) AR AXLE	: 6.2° : 3.0°
TRANS	MISSION: L1: 1 2 B1 13 11/16 T 7 5/16 N: Drive shall	3.5° 5.2° ————————————————————————————————————		HASSIS E RE	BRACKET: TARDER: M 3 1/4 S1 17	-0.8° 3.2° G 3 1/4 S2 17 Ar	R 10 7/16 S5 n/a ngle tolera	L1 46 3/8 56 n/a ance ± 0.2 lenoths	L2 54 1/2 RETR 17 °. Dimensi	L3 N/A RETL 17 sion tolera	-2 (±1.0°) AR AXLE	: 6.2° : 3.0°
TRANS	MISSION: L1: L1: B1 13 11/16 T 7 5/16 N: Drive shaf	3.5° 5.2° C1 14 10/16 T1 3 t lengths a	C RETR RETL C- DD INSIDE 33 1/2 re measure	HASSIS E RE X1 13 24 from ce	BRACKET: TARDER: M 3 1/4 S1 17 enter of U-j	-0.8° 3.2° G 3 1/4 S2 17 Arr oint and ar modification	R 10 7/16 S5 n/a ngle tolera e installed	L1 46 3/8 56 n/a ance ± 0.2 lengths.	L2 54 1/2 RETR 17 ²⁰ . Dimension	L3 N/A RETL 17 sion tolera	$2 (\pm 1.0^{\circ})$ AR AXLE	: 6.2° : 3.0°
TRANS	MISSION: L1: L1: B1 C B1 13 11/16 T 7 5/16 N: Drive shaf All drive ss	3.5° 5.2° C1 14 10/16 T1 3 t lengths a hafts must	C RETR RETL C DD INSIDE 33 1/2 re measure be dynami	HASSIS E RE X1 13 ed from ce cally balan	BRACKET: TARDER: M 3 1/4 S1 17 enter of U-j nced after	-0.8° 3.2° G 3 1/4 S2 17 Ar modificatio	R 10 7/16 S5 n/a e installed n. Always	L1 46 3/8 56 n/a since ± 0.2 lengths. verify prop	L2 54 1/2 RETR 17 2°. Dimensi er shaft ler	L3 N/A RETL 17 sion tolera	$L2 (\pm 1.0^{\circ})$ AR AXLE L4 N/A S4 18 ance $\pm 1/$ re modifica	: 6.2° : 3.0°
TRANS	MISSION: L1: DI B1 13 11/16 T 7 5/16 N: Drive shaf All drive si Flange Yc	3.5° 5.2° C1 14 10/16 T1 3 it lengths a hafts must kes on eith	C RETR RETL C DD INSIDE 33 1/2 re measure be dynami ner side of	HASSIS E RE X1 13 ed from ce cally balar the Telma	BRACKET: TARDER: M 3 1/4 S1 17 enter of U-j nced after must be in	-0.8° 3.2° G 3 1/4 S2 17 Ar modificatio n the same	R 10 7/16 S5 n/a gle tolera e installed n. Always plane	L1 46 3/8 56 n/a nce ± 0.2 lengths. verify prop	L2 54 1/2 RETR 17 2°. Dimension er shaft ler	L3 N/A RETL 17 sion tolera	$L2 (\pm 1.0^{\circ})$ AR AXLE L4 N/A S4 18 ance $\pm 1/$ re modifica	: 6.2° : 3.0°
TRANS	MISSION: L1: B1 13 11/16 T 7 5/16 N: Drive shaf All drive s Flange YC When not sp	3.5° 5.2° C1 14 10/16 T1 3 it lengths a hafts must kes on eitl ecified, the fro	C RETR RETL C DD INSIDE 33 1/2 re measure be dynami ner side of ont & the rear	HASSIS E RE X1 13 ed from ce cally balar the Telma drive shafts,	BRACKET: TARDER: M 3 1/4 S1 17 enter of U-j nced after must be ir on each retar	-0.8° 3.2° G 3 1/4 S2 17 Ar modificatio n the same rder side, mus	R 10 7/16 S5 n/a ngle tolera e installed n. Always v plane st have at lease	L1 46 3/8 S6 n/a ince ± 0.2 lengths. verify prop	L2 54 1/2 RETR 17 • Dimena er shaft ler	L3 N/A RETL 17 sion tolera	L^2 (±1.0°) AR AXLE L^4 N/A S4 18 ance ± 1/ e modifica	: 6.2° : 3.0°
TRANS	MISSION: L1: B1 13 11/16 T 7 5/16 N: Drive shaf All drive s Flange YC When not sp When not sp	3.5° 5.2° C C C 14 10/16 T1 3 t lengths a hafts must kes on eitl ecified, the fra ecified, the fra	C RETR RETL C DD INSIDE 33 1/2 re measure be dynami ner side of ont & the rear ange yoke on	HASSIS E RE X1 13 ed from ce cally balar the Telma drive shafts, each retarder	M 3 1/4 S1 17 Snter of U-j nced after must be in on each retai r side must ha	-0.8° 3.2° G 3 1/4 S2 17 Ar modificatio n the same rder side, mus ave the maxim	R 10 7/16 S5 n/a ngle tolera e installed n. Always v plane st have at leas	L1 46 3/8 S6 n/a ince ± 0.2 lengths. verify prop	L2 54 1/2 RETR 17 °. Dimensi er shaft ler ip as the orig v available in	L3 N/A RETL 17 sion tolera ngths befor inal drive shaft	$L2 (\pm 1.0^{\circ})$ AR AXLE L4 N/A S4 18 ance $\pm 1/$ e modifica t eries concer	: 6.2° : 3.0°
TRANS	MISSION: L1: B1 13 11/16 T 7 5/16 N: Drive shaf All drive si Flange Yc When not sp When not sp When not sp	3.5° 5.2° C1 14 10/16 T1 3 t lengths a hafts must kes on eitl ecified, the fra ecified, the fra	C RETR RETL C DD INSIDE 33 1/2 re measure be dynami ner side of ont & the rear ange yoke on o	HASSIS E RE X1 13 ed from ce cally balar the Telma drive shafts, each retarder easure dri	BRACKET: TARDER: TARDER: M 3 1/4 S1 17 enter of U-j nced after must be in on each retai r side must ha ve shaft an	-0.8° 3.2° G 3 1/4 S2 17 Ar ooint and ar modificatio n the same rder side, mus ave the maxim gles and co	R 10 7/16 S5 n/a ngle tolera e installed n. Always v e plane st have at leas num working a pompare to ti	L1 46 3/8 S6 n/a ance ± 0.2 lengths. verify prop st the same sl angle capacity the angles c	L2 54 1/2 RETR 17 •• Dimen: er shaft ler ip as the orig v available in on the insta	L3 N/A RETL 17 sion tolera ngths befor inal drive shaf the driveline s llation draw	$_2$ (±1.0°) AR AXLE $_1$ $_1$ $_1$ $_1$ $_1$ $_1$ $_1$ $_1$: 6.2° : 3.0°
TRANS	MISSION: L1: B1 13 11/16 T 7 5/16 N: Drive shaf All drive si Flange YC When not sp When not sp When not sp After insta Contact TE	3.5° 5.2° C1 14 10/16 T1 3 t lengths a hafts must kes on eitl ecified, the fin ecified, the fin llation is co	C RETE C DD INSIDE 33 1/2 Ire measure be dynami ner side of ont & the rear ange yoke on o ympleted, m ymer Suppo	HASSIS E RE XI 13 ed from ce cally balar the Telma drive shafts, each retarder leasure dri wrt Enginee	BRACKET: TARDER: TARDER: M 3 1/4 S1 17 enter of U-j nced after must be in on each retai r side must ha ve shaft an ering if the a	-0.8° 3.2° G 3 1/4 S2 17 Ar ooint and ar modificatio n the same rder side, mus ave the maxim gles and cc angles mea	R 10 7/16 S5 n/a ngle tolera e installed n. Always v e plane st have at leas num working a pompare to th sured do no	L1 46 3/8 S6 n/a ance ± 0.2 lengths. verify prop at the same sl angle capacity the angles co ot conform	L2 54 1/2 RETR 17 •• Dimen: ip as the orig v available in on the insta to the drav	L3 N/A RETL 17 sion tolera ngths befor inal drive shaf the driveline s llation draw ving	L2 (±1.0°) AR AXLE	: 6.2° : 3.0°
TRANS	MISSION: L1: B1 13 11/16 T 7 5/16 N: Drive shaf All drive si Flange YC When not sp When not sp When not sp When not sp USE MOL	3.5° 5.2° C1 14 10/16 T1 3 t lengths a hafts must kes on eitl ecified, the fin ecified, the fin llation is co cLMA Custo UNTING BI	C RETR RETL C DD INSIDE 33 1/2 Ire measure be dynami ner side of ont & the rear ange yoke on o mpleted, m mer Suppo RACKETS	HASSIS E RE XI 13 ed from ce cally balar the Telma drive shafts, each retarder easure dri rt Enginee TIB03108	BRACKET: TARDER: TARDER: M 3 1/4 S1 17 enter of U-j nced after nust be ir on each retar r side must ha ve shaft an ring if the a , TIB03121	-0.8° 3.2° G 3 1/4 S2 17 Ar oint and ar modification n the same rder side, mus ave the maxim gles and cc angles mea 1, TIB0312.	R 10 7/16 S5 n/a ngle tolera e installed n. Always plane st have at leas num working a pompare to th sured do no	L1 46 3/8 S6 n/a ance ± 0.2 lengths. verify prop at the same sl angle capacity the angles o ot conform	L2 54 1/2 RETR 17 20. Dimension ip as the orig v available in the insta to the draw	L3 N/A RETL 17 sion tolera inal drive shaf the driveline s llation draw ving	L2 (±1.0°) AR AXLE	: 6.2° : 3.0°
TRANS	MISSION: L1: B1 13 11/16 T 7 5/16 N: Drive shaf All drive si Flange YC When not sp When not sp When not sp When not sp USE MOL USE MOL USE BRA	3.5° 5.2° Cl 14 10/16 Tl 3 t lengths a hafts must kes on eitl ecified, the fir clified, the fir clified, the fir clified, the fir clified, the fir clified and clified that clified and clified clified and cl	C RETR RETL C DD INSIDE 33 1/2 Ire measure be dynami her side of ont & the rear ange yoke on o sympleted, m omer Suppor RACKETS SITION 4	HASSIS E RE XI 13 ed from ce cally balar the Telma drive shafts, sach retarder easure dri rt Enginee TIB03108	BRACKET: TARDER: TARDER: M 3 1/4 S1 17 enter of U-j nced after must be ir on each retar r side must be ve shaft an ring if the a , TIB03121	-0.8° 3.2° G 3 1/4 S2 17 Ar oint and ar modificatio n the same rder side, mus ave the maxim gles and cc angles mea 1, TIB0312	R 10 7/16 S5 n/a ngle tolera e installed n. Always plane thave at leas num working a ompare to the sured do not	L1 46 3/8 S6 n/a ance ± 0.2 lengths. verify prop at the same sl angle capacity he angles c ot conform	L2 54 1/2 RETR 17 °. Dimen er shaft ler ip as the orig vavailable in ' n the insta to the drav	L3 N/A RETL 17 sion tolera inal drive shaf the driveline s llation draw ving	L2 (±1.0°) AR AXLE	: 6.2° : 3.0°
TRANSI	MISSION: L1: B1 13 11/16 T 7 5/16 N: Drive shaf All drive si Flange YC When not sp When not sp When not sp When not sp USE MOL USE BRA adjust ref2	3.5° 5.2° C1 14 10/16 T1 3 t lengths a hafts must kes on eitl ecified, the fir ecified, the fir ecified, the fir clation is co clath Custo INTING BF CKET POS arder to an	C RETR RETL C DD INSIDE 33 1/2 Ire measure be dynami her side of ont & the rear ange yoke on o impleted, m omer Suppor RACKETS SITION 4 gle indicate	HASSIS E RE XI 13 ed from ce cally balar the Telma drive shafts, sach retarder leasure dri rt Enginee TIB03108	BRACKET: TARDER: TARDER: M 3 1/4 S1 17 enter of U-j nced after must be ir on each retar r side must ba ve shaft an ring if the a , TIB03121 ing bracke	-0.8° 3.2° G 3 1/4 S2 17 Ar oint and ar modificatio n the same rder side, mus ave the maxim gles and cc angles mea 1, TIB0312. t	R 10 7/16 S5 n/a ngle tolera e installed n. Always v plane st have at leas num working a ompare to th sured do no	L1 46 3/8 S6 n/a ance ± 0.2 lengths. verify prop at the same sl angle capacity the angles o bot conform	L2 54 1/2 RETR 17 •• Dimen: er shaft ler ip as the orig vavailable in the insta to the drav	L3 N/A RETL 17 sion tolera inal drive shaf the driveline s llation draw ving	L2 (±1.0°) AR AXLE	: 6.2° : 3.0°
TRANSI	MISSION: L1: B1 13 11/16 T 7 5/16 N: Drive shaf All drive si Flange YC When not sp When not sp When not sp When not sp USE MOL USE BRA adjust reta	3.5° 5.2° Cl 14 10/16 Tl 3 t lengths a hafts must kes on eitl ecified, the fir ecified, the fir ecified, the fir clation is co LMA Custo INTING BI CKET POS arder to an SARY AF	C RETR RETL C DD INSIDE 33 1/2 Ire measure be dynami her side of ont & the rear ange yoke on of mpleted, m mer Suppor RACKETS SITION 4 gle indicate JUIJST AXI	HASSIS E RE XI 13 ed from ce cally balar the Telma drive shafts, sach retarder leasure dri rt Enginee TIB03108	BRACKET: TARDER: TARDER: M 3 1/4 S1 17 enter of U-j nced after must be ir on each retar r side must ha ve shaft an ring if the a , TIB03121 ing bracke	-0.8° 3.2° G 3 1/4 S2 17 Ar oint and ar modificatio n the same rder side, mus ave the maxim gles and cc angles mea al, TIB0312 t WITH CHAY	R 10 7/16 S5 n/a ngle tolera e installed n. Always v plane st have at leas num working a ompare to the sured do not 2 SSIS REFE	L1 46 3/8 S6 n/a nCe ± 0.2 lengths. verify prop at the same sl angle capacity the angles of ot conform	L2 54 1/2 RETR 17 •• Dimen: ip as the orig v available in the in the insta to the drav	L3 N/A RETL 17 sion tolera inal drive shaf the driveline s llation draw ving	L2 (±1.0°) AR AXLE	: 6.2° : 3.0°
TRANSI	MISSION: L1: B1 13 11/16 T 7 5/16 N: Drive shaf All drive si Flange YC When not sp When not sp When not sp When not sp USE MOL USE BRA adjust reta	3.5° 5.2° Cl 14 10/16 Tl 3 t lengths a hafts must kes on eitl ecified, the fir ecified, the fir clation is co clath Custo INTING BF CKET POS arder to an cSARY, AE	C RETR RETL C DD INSIDE 33 1/2 Ire measure be dynami her side of ont & the rear ange yoke on of mpleted, m mer Suppor RACKETS SITION 4 gle indicate)JUST AXL	HASSIS E RE XI 13 ed from ce cally balar the Telma drive shafts, each retarder leasure dri rt Enginee TIB03108 ed by rotat .E ANGLE	BRACKET: TARDER: TARDER: M 3 1/4 S1 17 enter of U-j nced after nust be ir on each retar r side must be ve shaft an sring if the a , TIB03121 ing bracke : TO 3.0° V	-0.8° 3.2° G 3 1/4 S2 17 Ar oint and ar modificatio n the same rder side, mus ave the maxim gles and cc angles mea 1, TIB0312, t WITH CHAS	R 10 7/16 S5 n/a ngle tolera e installed n. Always v plane st have at leas num working a sured do no 2 SSIS REFR	L1 46 3/8 S6 n/a ance ± 0.2 lengths. verify prop at the same sl angle capacity the angles of ot conform	L2 54 1/2 RETR 17 •• Dimena er shaft ler •• available in to •• the insta to the drav	L3 N/A RETL 17 sion tolera ngths befor inal drive shaf the driveline s llation draw ving	L2 (±1.0°) AR AXLE	: 6.2° : 3.0°

VEH			
CHASSIS MAKE / MODEL	NAVISTAR H		
WHEFI BASE	205.0"		
ENGINE MAKE / MODEL	NAVISTAR MaxxForce	CONTROLS	DIAMOND LOGIC
TRANSMISSION MAKE / MODEL	ALLISON 2100PTS (5SP	TIRE SIZE	245/70R-19.5
AXLE MAKE / MODEL	MERITOR RS1714	GVW / GCW	23500 lbs
DRIVE TYPE	4X2	BRAKES	AIR
RETARDER MODEL	AD50-90	ABS	BENDIX
RETARDER PART NUMBER	BB301158	AXLE RATIO	4.33
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	90-2-19
MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE
Note: If any of the above mentioned fact	ors vary with your application,	please call our TECHNICAL DE	PARTMENT.
TRANSMISSION: 3.5° L1: 4.3°	CHASSIS BRACKET: -0.5° RETARDER: 3.5° L2: 2.5°		L3 (±1.0°): 6.9° REAR AXLE: 2.5°
	IVI G	N LI LZ	23 L4 37 3/4 N/A
	X1 S1 C2	S5 S6 DETD	RFTI SA
	13 17 17	17 17 17	17 18
CAUTION: NOTE 1: Drive shaft lengths are measur NOTE 2: All drive shafts must be dynam NOTE 3: Flange Yokes on either side of NOTE 4: When not specified, the front & the rear NOTE 5: When not specified, the flange yoke on NOTE 6: After installation is completed, n Contact TELMA Customer Supp NOTE 7: USE MOUNTING BRACKETS NOTE 8: USE BRACKET POSITION 4 NOTE 9: adjust retarder to angle indicate NOTE 10: ADJUST SECOND SHAFT (L2	A ed from center of U-joint and a ically balanced after modificati the Telma must be in the sam drive shafts, on each retarder side, mi each retarder side must have the maxi neasure drive shaft angles and c ort Engineering if the angles me TIB03108, TIB03121, TIB0312 ed by rotating bracket 2) TO 2.5° WITH CHASSIS RE	ngle tolerance $\pm 0.2^{\circ}$. Dimer re installed lengths. on. Always verify proper shaft le e plane st have at least the same slip as the orig num working angle capacity available in ompare to the angles on the insta asured do not conform to the dra 22 FERENCE OF 0°	sion tolerance ± 1/16" ngths before modification ginal drive shaft the driveline series concerned. allation drawing. wing
NUTE 11: IF NECESSARY, ADJUST AX	LE ANGLE TO 2.5° WITH CHA	SSIS REFERENCE OF 0°	

CHASSIS MAKE / MODEL	NAVISTAR HC		
WHEEL BASE	205.0"		
	NAVISTAR MaxyEorceDT		
TRANSMISSION MAKE / MODEL			245/70R-19 5
AXI E MAKE / MODEL	MERITOR RS17145	GVW/GCW	23500 lbs
	MERITOR 1317143	BDAKES	
		ABS	
	RB301158		4 33
	66301138		4.33 SDI 100
	FOOT		00 2 10
	1001		90-2-19 AID
Note: If any of the above mentioned fact	ors vary with your application in		
	ors vary with your application, p		loaded/unloaded: 20 1/2
		DC	
	1 C 1		D
T T	F	- 1	
		-	
\top	╫║│││╟╢ᢪҨ҄ҵ┍╌┍╸		
			\$L ∪
	1 🖛 - G 🖬 R 🖛	L 3	
ſ	HASSIS BRACKET: -0.5°	X	
TRANSMISSION: 3.5°	RETARDER: 3.5°		1 3 (+1 0°) [.] 6 9°
11: 5 2°	12:25°	X	$PEAP AXIE: 2.5^{\circ}$
	LZ. 2.0		
I			
S1 RETR		Íss	
S2 RETL		S 6	×4 -/
		<u> </u>	ų j
│			Y
A B1 C1 P	MG	R L1 L2	L3 L4
9 1/2 13 11/16 14 11/16 16	3 1/4 3 1/4	10 7/16 46 3/8 28 3/4	37 3/4 N/A
CC T T1 DD inside	X1 S1 S2	S5 S6 RETR	RFTI S4
54 5/8 7 5/16 3 33 1/2		17 17 17	17 18
	Ar	ngle tolerance + 0.2° Dimen	sion tolerance $\pm 1/16$ "
NOTE 1. Drive shaft lengths are measur	red from center of U-joint and ar	e installed lengths	
NOTE 2. All drive shafts must be dynam	ically balanced after modificatio	n Always verify proper shaft ler	oaths before modification
NOTE 3: Flange Yokes on either side of	the Telma must be in the same	nlane	
NOTE 4: When not specified, the front 8 the real	drive shafts on each retarder side mus	t have at least the same slip as the orig	nal drive shaft
NOTE 5: When not specified, the flore value on	unve sharts, on each relater side, mus	st have at least the same slip as the ong	
NOTE 5. When not specified, the hange yoke on	each relarder side must have the maxim	ium working angle capacity available in	ne anveine series concerned.
NOTE 0. After installation is completed, in	neasure drive shaft angles and co	ompare to the angles on the insta	liation drawing.
	on Engineering if the angles mea	Sured do not conform to the drav	ning
	TID02100 TID02404 TID0240	1	
	TIB03108, TIB03121, TIB0312	2	
NOTE 7: USE MOUNTING BRACKETS NOTE 8: USE BRACKET POSITION 4	TIB03108, TIB03121, TIB0312	2	
NOTE 7: USE MOUNTING BRACKETS NOTE 8: USE BRACKET POSITION 4 NOTE 9: adjust retarder to angle indicat	TIB03108, TIB03121, TIB0312 ed by rotating bracket		
NOTE 7: USE MOUNTING BRACKETS NOTE 8: USE BRACKET POSITION 4 NOTE 9: adjust retarder to angle indicat NOTE 10: ADJUST SECOND SHAFT (L2	TIB03108, TIB03121, TIB0312 ed by rotating bracket 2) TO 2.5° WITH CHASSIS REF		

VFH	ICLE TECHNICAL I	ΔΤΔ	
CHASSIS MAKE / MODEL	NAVISTAR HC	CUSTOMER	
WHEELBASE	217.0"	VEHICLE NUMBER	
ENGINE MAKE / MODEL	NAVISTAR MaxxForce7	CONTROLS	DIAMOND LOGIC
TRANSMISSION MAKE / MODEL	ALLISON 2100PTS (5SP)	TIRE SIZE	245/70R-19.5
AXLE MAKE / MODEL	MERITOR RS17145	GVW / GCW	23500 lbs
DRIVE TYPE	4X2	BRAKES	HYD
RETARDER MODEL	AD50-90	ABS	WABCO HPB
RETARDER PART NUMBER	BB301158	AXLE RATIO	4.33
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	90-2-19
MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE
Note: If any of the above mentioned fact	ors vary with your application, p	lease call our TECHNICAL DE	PARTMENT.
	1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1		
TRANSMISSION: 3.5° L1: 4.3°	RETARDER: 3.5° L2: 2.5°		L3 (±1.0°): 5.2° REAR AXLE: 2.5°
S1 RETR			
A B1 C1 P	MG	R L1 L2	L3 L4
9 1/2 13 11/16 14 11/16 16	3 1/4 3 1/4	10 7/16 55 5/16 28 3/4	49 3/4 N/A
CC T T1 DD inside	X1 S1 S2	S5 S6 RETR	RETL S4
63 5/8 7 5/16 3 33 1/2	13 17 17	17 17 17	17 18
NOTE 1: Drive shaft lengths are measur NOTE 2: All drive shafts must be dynam NOTE 3: Flange Yokes on either side of NOTE 4: When not specified, the front & the rear NOTE 5: When not specified, the flange yoke on NOTE 6: After installation is completed, in Contact TELMA Customer Support NOTE 7: USE MOUNTING BRACKETS NOTE 8: USE BRACKET POSITION 4 NOTE 9: adjust retarder to angle indicate NOTE 10: ADJUST SECOND SHAFT (L2)	All red from center of U-joint and a ically balanced after modification the Telma must be in the same drive shafts, on each retarder side, mu each retarder side must have the maxim neasure drive shaft angles and co ort Engineering if the angles mea TIB03108, TIB03121, TIB0312 ed by rotating bracket 2) TO 2.5° WITH CHASSIS REI	re installed lengths. on. Always verify proper shaft le plane st have at least the same slip as the orig num working angle capacity available in ompare to the angles on the insta issured do not conform to the draw 2 FERENCE OF 0°	ngths before modification inal drive shaft the driveline series concerned. Ilation drawing. ving
NOTE TITE NECESSARY, ADJUST AX	LE ANGLE TO 2.5° WITH CHA	SSIS REFERENCE OF 0°	

VEH			
CHASSIS MAKE / MODEL	NAVISTAR HC	CUSTOMER	
WHEEL BASE	217.0"		
ENGINE MAKE / MODEL	NAVISTAR MaxxForceDT	CONTROLS	DIAMOND LOGIC
TRANSMISSION MAKE / MODEL	ALLISON 2100PTS (5SP	TIRE SIZE	245/70R-19.5
AXLE MAKE / MODEL	MERITOR RS1714	GVW / GCW	23500 lbs
DRIVE TYPE	4X2	BRAKES	HYD
RETARDER MODEL	AD50-90	ABS	WABCO HPB
RETARDER PART NUMBER	BB301158	AXLE RATIO	4.33
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	90-2-19
MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE
Note: If any of the above mentioned fact	ors vary with your application, µ	please call our TECHNICAL DE	PARTMENT.
C TRANSMISSION: 3.5° L1: 5.2°	CHASSIS BRACKET: -0.5° RETARDER: 3.5° L2: 2.5°		L3 (±1.0°): 5.2° REAR AXLE: 2.5°
S1 RETR			
	M		
	IVI G 3 1/2 3 1/2	10 7/16 46 3/8 28 3/4	49 3/4 N/A
CC T T1 DD ineide	X1 S1 S2	S5 S6 RFTR	RFTI S4
54 5/8 7 5/16 3 33 1/2	13 17 17	17 17 17	17 18
CAUTION: NOTE 1: Drive shaft lengths are measur NOTE 2: All drive shafts must be dynam NOTE 3: Elange Yokes on either side of	A ed from center of U-joint and a ically balanced after modification the Telma must be in the same	ngle tolerance $\pm 0.2^{\circ}$. Dimer re installed lengths. on. Always verify proper shaft le	sion tolerance $\pm 1/16$ "
NOTE 4: When not specified the front & the rear	drive shafts, on each retarder side mu	st have at least the same slin as the original	inal drive shaft
NOTE 5: When not specified, the flance voke on	each retarder side must have the maxim	num working angle canacity available in	the driveline series concerned
NOTE 6: After installation is completed in	neasure drive shaft angles and c	ompare to the angles on the inst	allation drawing.
Contact TELMA Customer Supported, II NOTE 7: USE MOUNTING BRACKETS NOTE 8: USE BRACKET POSITION 4 NOTE 9: adjust retarder to angle indicate NOTE 10: ADJUST SECOND SHAFT (L2	ort Engineering if the angles and cort Engineering if the angles mea TIB03108, TIB03121, TIB0312 ed by rotating bracket 2) TO 2.5° WITH CHASSIS RE	FERENCE OF 0°	wing
NOTE 11: IF NECESSARY, ADJUST AX	LE ANGLE TO 2.5° WITH CHA	SSIS REFERENCE OF 0°	

	VEHICLE TECHNI	CAL DATA	
CHASSIS MAKE / MODEL	Navistar IC Bus UC	CUSTOMER	l ranslink
WHEELBASE	195.0"	chassis VIN	DH239550
ENGINE MAKE / MODEL	NAVISTAR MaxxForce7	CONTROLS	DIAMOND LOGIC
TRANSMISSION MAKE / MODEL	ALLISON 1000PTS (5SP)	TIRE SIZE	225/70R-19.5
AXLE MAKE / MODEL	DANA S110	GVW / GCW	19500 lbs
DRIVE TYPE	4X2	BRAKES	HYD
RETARDER MODEL	AD50-90 (3 stages)	ABS	TRW 355 (3 channel)
RETARDER PART NUMBER	BB301158	AXLE RATIO	4.33
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	90-2-19
MILEAGE AT TIME OF INSTALL	4049km	SUSPENSION TYPE	SPRING
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE
Note: If any of the above mentioned fact	ors vary with your application, p	lease call our TECHNICAL DE	PARTMENT
Note: If any of the above memories have a vary many bar approace, prease can be in the nated in the nated in the intervention of the second seco			
De loaded/unitoaded. 17			
	-C1		-D
TRANSMISSION: 3.5° CHASSIS BRACKET: -1.5° \bigvee \bigvee $L2 (\pm 1.0^{\circ}): 4.6^{\circ}$ L1: 3.0° RETARDER: 2.5° REAR AXLE: 2.5°			
A B1 C1 9 11 7/8 12 5/8 CC T1 BOC 63 5/8 4 5/8 44 1/8	M G R 3 1/4 3 1/4 10 7/16 S1 S2 S5 16 3/4 16 3/4 n/a	L1 L2 L3 55 1/4 54 7/16 N/A S6 RETR RETL n/a 16 3/4 16 3/4	L4 N/A S4 17 3/4
 NOTE 1: Drive shaft lengths are measured from center of U-joint and are installed lengths. NOTE 2: All drive shafts must be dynamically balanced after modification. Always verify proper shaft lengths before modification NOTE 3: Flange Yokes on either side of the Telma must be in the same plane NOTE 4: When not specified, the front & the rear drive shafts, on each retarder side, must have at least the same slip as the original drive shaft NOTE 5: When not specified, the flange yoke on each retarder side must have the maximum working angle capacity available in the driveline series concerned. NOTE 6: After installation is completed, measure drive shaft angles and compare to the angles on the installation drawing. Contact TELMA Customer Support Engineering if the angles measured do not conform to the drawing NOTE 7: USE MOUNTING BRACKETS TIB03108, TIB03121, TIB03122 NOTE 8: USE BRACKET POSITION 3 NOTE 9: adjust retarder to angle indicated by rotating bracket NOTE 10: IF NECESSARY ADJUST AXLE ANGLE USING STEEL WEDGE SHIMS TO 2.5° (CHASSIS REFERENCE = 0°) 			

