



TL113006
INSTALLATION MANUAL
FOR
TELMA AD50-90
ON NAVISTAR 3200 CHASSIS
FROM MODEL YEAR 2008

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TIK11203 NAVISTAR 3200 INSTALLATION KIT AD50-90 / 1610 / HYD BRAKES

ITEM	PART NUMBER	DESCRIPTION	QTY
1	BB301158	AD50-90 12V 1480/1550/1610/SPL90/SPL100	1
2	JC120102	FOOT CONTROL SWITCH	1
3	JC251100	SPEED SWITCH (3.3V)	1
4	JZ100280	SIDE PLATE FASTENERS	1
5	JZ100723	MOUNT KIT	1
6	TIB01017	RELAY BOX BRACKET INSIDE MOUNT	2
7	TIB01022	NAV 3200 PEDAL BRACKET	1
8	TIB01021	NAV 3200 FOOT SWITCH BRACKET	1
9	TIB03121	LEFT RETARDER BRACKET	1
10	TIB03122	RIGHT RETARDER BRACKET	1
11	TIB03108f	INSIDE MOUNT CHASSIS BRACKET	2
12	TIB03109b	RELAY BOX BRACKET OUTSIDE MOUNT	1
13	TIB01023	NAV 3200 PEDAL CLAMP	1
14	TID13019e	WIRING HARNESS C5500 & NAV3200	1
15	TIF01063	HEX BOLT 1/4"-28UNF X 1"	2
16	TIF01091	1610/158 INDEX FLANGE YOKE	2
17	TIF03001	3/8-24UNF ALL METAL LOCK NUT	16
18	TIF03003	9/16-12UNC NUT	10
19	TIF03005	9/16" LOCK WASHER	10
20	TIF03011	HEX BOLT 3/4-10UNC X 2 1/2"	2
21	TIF03012	3/4" LOCK WASHER	2
22	TIF03013	3/4-10UNC NUT	2
23	TIF04001	HEX BOLT 9/16-12UNC X 2"	10
24	TIF05000	LOCK WASHER 1/4"	2
25	TIF05002	NUT 3/8 - 16 UNC HEX G5	2
26	TIF05003	LOCKWASHER 3/8 G5	1
27	TIF05004	NUT 1/4-28UNF	2
28	TIF05010	LOCKWASHER 5/16" RELAY BOX MOUNTING	4
29	TIF05011	NUT 5/16" RELAY BOX MOUNTING	4
30	TIF05012	BOLT 5/16"-18UNC X 1 1/4" RELAY BOX MOUNTING	4
31	TIF05019	BOLT 3/8 - 16 UNC x 2 ELEVATOR BOLT G5	1
32	TIF05021	RETURN SPRING	1
33	TIG11010	TELMA LIGHT BAR DISPLAY	1

TELMA RETARDER, INC
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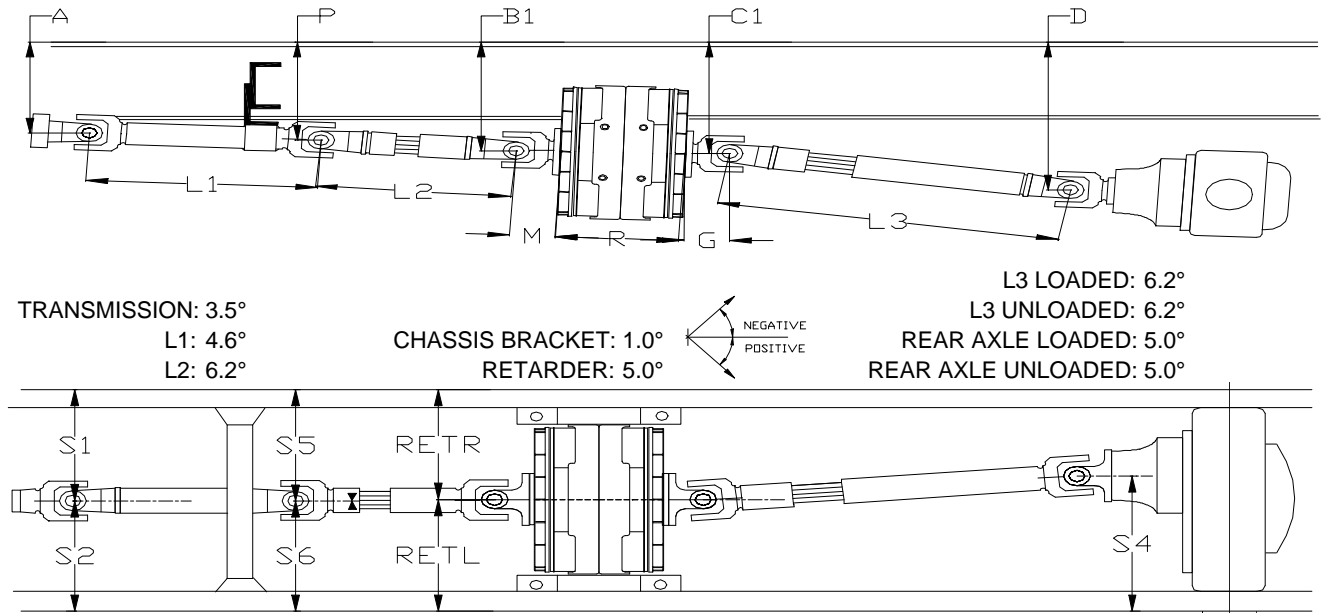


VEHICLE TECHNICAL DATA

CHASSIS MAKE / MODEL	NAVISTAR 3200	CHASSIS VIN:	
WHEELBASE	169.0"	VEHICLE NUMBER	
ENGINE MAKE / MODEL	NAVISTAR MaxxForce7	SPEED SWITCH / INTERFACE	JC251100
TRANSMISSION MAKE / MODEL	ALLISON 2500PTS	TIRE SIZE	245/70R-19.5
AXLE MAKE / MODEL	DANA S14-130	GVW / GCW	21000 lbs
DRIVE TYPE	4X2	BRAKES	HYDRAULIC
RETARDER MODEL	AD50-90	ABS	WABCO HPB
RETARDER PART NUMBER	BB301158	AXLE RATIO	4.30
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	1610 SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	
MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE

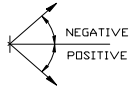
Note: If any of the above mentioned factors vary with your application, please call our TECHNICAL DEPARTMENT.

Dc loaded: 19 3/8
 Dv unloaded: 19 3/8



TRANSMISSION: 3.5°
 L1: 4.6°
 L2: 6.2°

CHASSIS BRACKET: 1.0°
 RETARDER: 5.0°



L3 LOADED: 6.2°
 L3 UNLOADED: 6.2°
 REAR AXLE LOADED: 5.0°
 REAR AXLE UNLOADED: 5.0°

A	B1	C1	P		M	G	R	L1	L2	L3	L4
9 1/2	15 9/16	16 4/8	13		2 3/4	2 3/4	10 7/16	43 3/4	21 1/2	24 5/8	N/A
CC	T	T1	DD INSIDE	X1	S1	S2	S5	S6	RETR	RETL	S4
73 1/4	9 3/16	4 7/8	33 1/2	24	17	17	17	17	17	17	18

CAUTION:

- 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: Angle tolerance ± 0.2°. Dimension tolerance ± 1/16".
- 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 4
- NOTE 9: ADJUST CARRIER BEARING SO THAT SECOND SHAFT (L2) IS 6.2° WITH CHASSIS REFERENCE OF 0°
- NOTE 10: adjust retarder to angle indicated by rotating bracket
- NOTE 11: ADJUST AXLE ANGLE TO 5.0° WITH CHASSIS REFERENCE OF 0°

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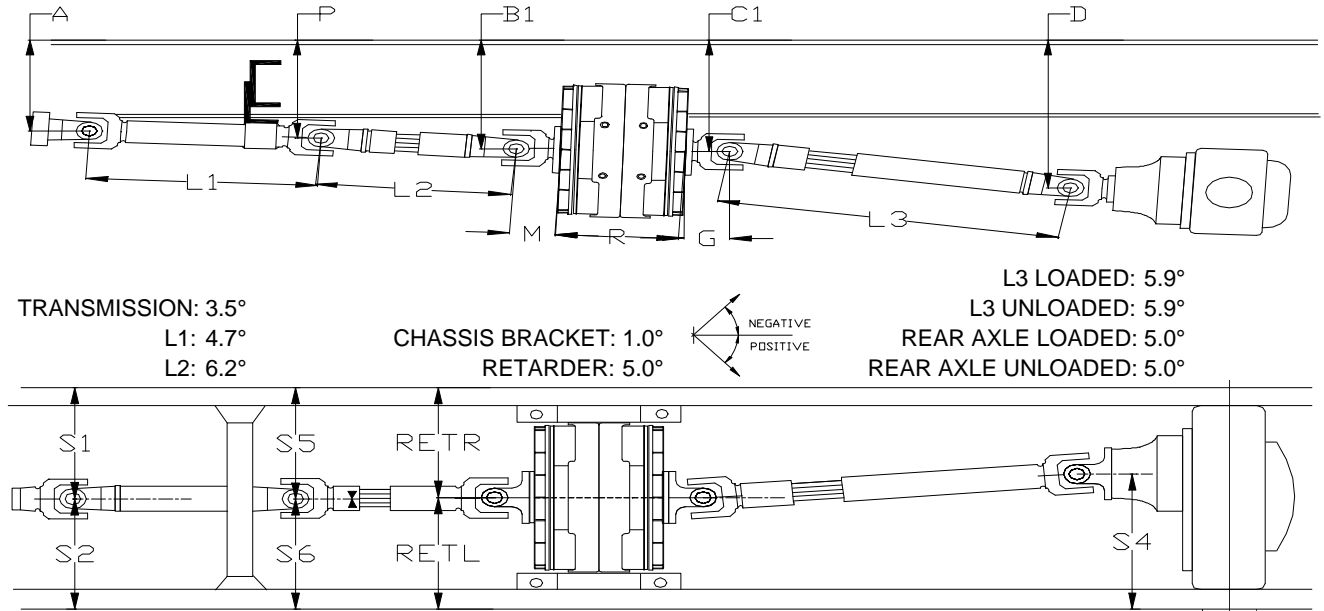


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TRANSMISSION MAKE / MODEL	ALLISON 2500PTS	TIRE SIZE	245/70R-19.5
AXLE MAKE / MODEL	DANA S14-130	GVW / GCW	21000 lbs
DRIVE TYPE	4X2	BRAKES	HYDRAULIC
RETARDER MODEL	AD50-90	ABS	WABCO HPB
RETARDER PART NUMBER	BB301158	AXLE RATIO	4.30
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	1610 SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	
MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE

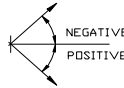
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Dc loaded: 19 3/8
 Dv unloaded: 19 3/8



TRANSMISSION: 3.5°
 L1: 4.7°
 L2: 6.2°

CHASSIS BRACKET: 1.0°
 RETARDER: 5.0°



L3 LOADED: 5.9°
 L3 UNLOADED: 5.9°
 REAR AXLE LOADED: 5.0°
 REAR AXLE UNLOADED: 5.0°

A	B1	C1	P		M	G	R	L1	L2	L3	L4
10 1/8	15 11/16	16 5/8	13 1/8		2 3/4	2 3/4	10 7/16	36 3/4	21 1/2	24 5/8	N/A
CC	T	T1	DD INSIDE	X1	S1	S2	S5	S6	RETR	RETL	S4
66 1/4	9 3/16	4 7/8	33 1/2	24	17	17	17	17	17	17	18

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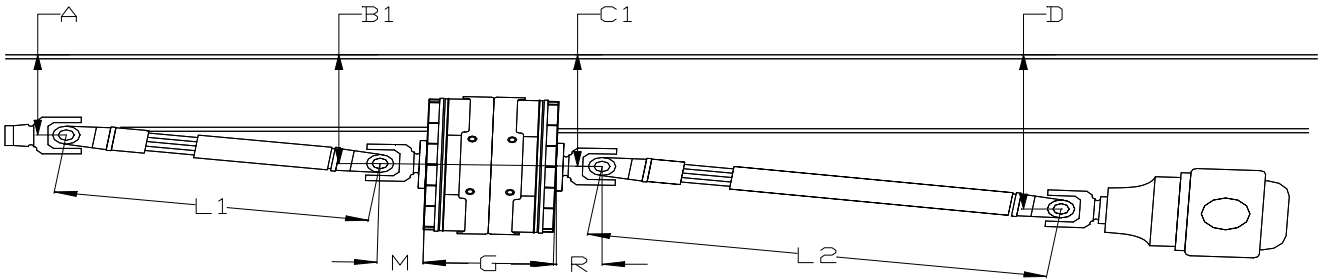


VEHICLE TECHNICAL DATA

CHASSIS MAKE / MODEL	NAVISTAR 3200	CHASSIS VIN:	
WHEELBASE	193.0"	VEHICLE NUMBER	
ENGINE MAKE / MODEL	NAVISTAR MaxxFo7	SPEED SWITCH / INTERFACE	JC251100
TRANSMISSION MAKE / MODEL	ALLISON 2500PTS	TIRE SIZE	245/70R-19.5
AXLE MAKE / MODEL	DANA S14-130	GVW / GCW	21000 lbs
DRIVE TYPE	4X2	BRAKES	HYDRAULIC
RETARDER MODEL	AD50-90	ABS	WABCO HPB
RETARDER PART NUMBER	BB301158	AXLE RATIO	4.30
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	1610 SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	
MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE

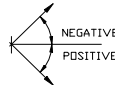
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 Dv unloaded: 19 1/2

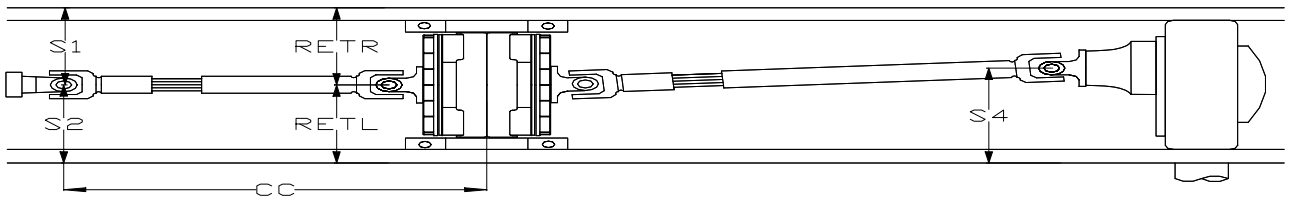


TRANSMISSION: 3.5°
 L1: 4.8°

CHASSIS BRACKET: -0.5°
 RETARDER: 3.5°



L2 LOADED: 4.2°
 L2 UNLOADED: 4.2°
 REAR AXLE LOADED: 3.0°
 REAR AXLE UNLOADED: 3.0°



A	B1	C1			M	G	R	L1	L2	L3	L4
9 1/2	14 3/16	15 3/16			2 3/4	2 3/4	10 7/16	55 1/2	59 3/8	N/A	N/A
CC	T	T1	DD INSIDE	X1	S1	S2	S5	S6	RETR	RETL	S4
63 1/4	7 13/16	3 1/2	33 1/2	12 7/8	17	17	n/a	n/a	17	17	18

CAUTION:

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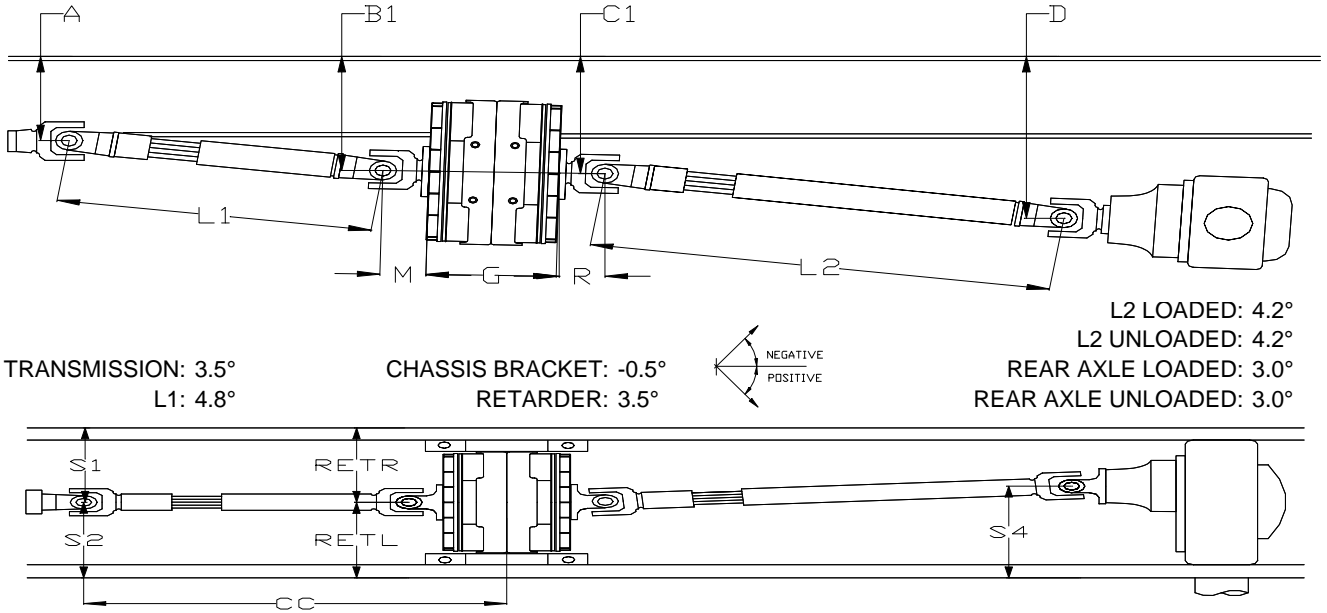


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TRANSMISSION MAKE / MODEL	ALLISON 2500PTS	TIRE SIZE	245/70R-19.5
AXLE MAKE / MODEL	DANA S14-130	GVW / GCW	21000 lbs
DRIVE TYPE	4X2	BRAKES	HYDRAULIC
RETARDER MODEL	AD50-90	ABS	WABCO HPB
RETARDER PART NUMBER	BB301158	AXLE RATIO	4.30
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	1610 SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	
MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE

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Dc loaded: 19 1/2
 Dv unloaded: 19 1/2



A	B1	C1			M	G	R	L1	L2	L3	L4
10 1/8	14 3/16	15 3/16			2 3/4	2 3/4	10 7/16	48 7/16	59 3/8	N/A	N/A
CC	T	T1	DD INSIDE	X1	S1	S2	S5	S6	RETR	RETL	S4
56 1/4	7 13/16	3 1/2	33 1/2	12 7/8	17	17	n/a	n/a	17	17	18

CAUTION:

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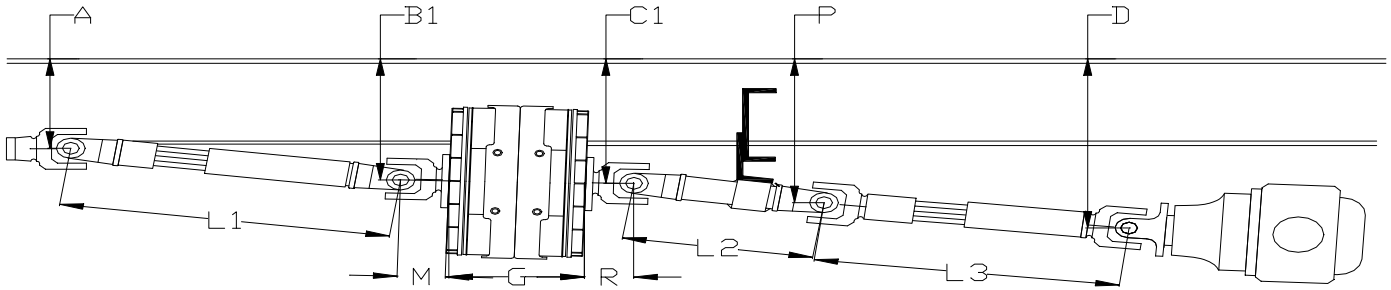
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VEHICLE TECHNICAL DATA

CHASSIS MAKE / MODEL	NAVISTAR 3200	CHASSIS VIN:	
WHEELBASE	205.0"	VEHICLE NUMBER	
ENGINE MAKE / MODEL	NAVISTAR MaxxF7	SPEED SWITCH / INTERFACE	JC251100
TRANSMISSION MAKE / MODEL	ALLISON 2500PTS	TIRE SIZE	245/70R-19.5
AXLE MAKE / MODEL	DANA S14-130	GVW / GCW	21000 lbs
DRIVE TYPE	4X2	BRAKES	HYDRAULIC
RETARDER MODEL	AD50-90	ABS	WABCO HPB
RETARDER PART NUMBER	BB301158	AXLE RATIO	4.30
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	1610 SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	
MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE

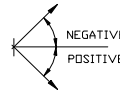
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Dc loaded: 19 1/2
 Dv unloaded: 19 1/2

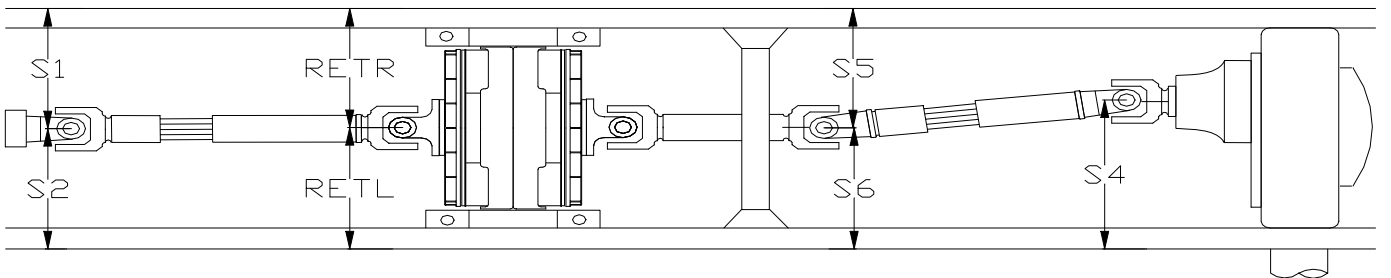


TRANSMISSION: 3.5°
 L1: 4.9°

CHASSIS BRACKET: -0.5°
 RETARDER: 3.5°
 L2: 3.0°



L3 LOADED: 3.8°
 L3 UNLOADED: 3.8°
 REAR AXLE LOADED: 3.0°
 REAR AXLE UNLOADED: 3.0°



A	B1	C1	P		M	G	R	L1	L2	L3	L4
9 1/2	14 3/16	15 3/16	16 11/16		2 3/4	2 3/4	10 7/16	55 1/2	29 9/16	41 3/4	N/A
CC	T	T1	DD inside	X1	S1	S2	S5	S6	RETR	RETL	S4
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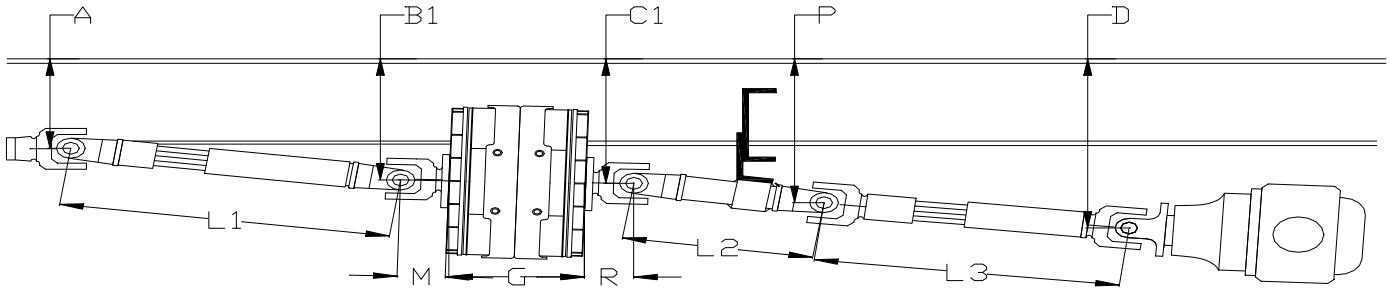
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MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
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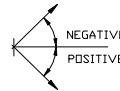
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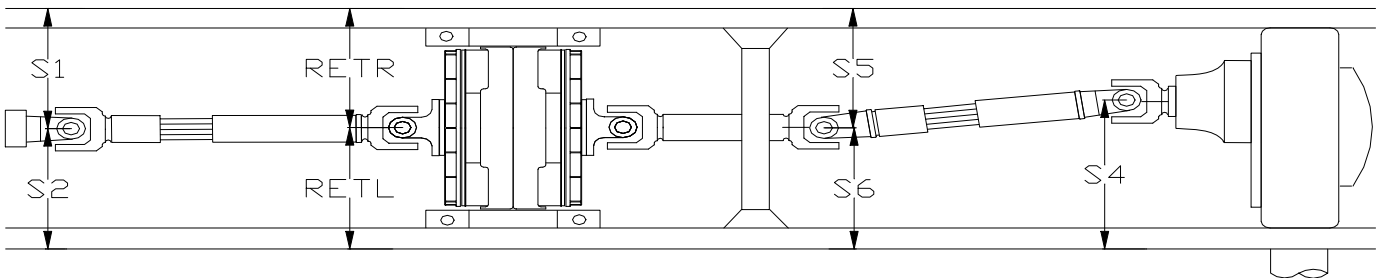


TRANSMISSION: 3.5°
 L1: 4.8°

CHASSIS BRACKET: -0.5°
 RETARDER: 3.5°
 L2: 3.0°



L3 LOADED: 3.8°
 L3 UNLOADED: 3.8°
 REAR AXLE LOADED: 3.0°
 REAR AXLE UNLOADED: 3.0°



A	B1	C1	P		M	G	R	L1	L2	L3	L4
10 1/8	14 3/16	15 3/16	16 11/16		2 3/4	2 3/4	10 7/16	48 7/16	29 5/8	41 3/4	N/A
CC	T	T1	DD inside	X1	S1	S2	S5	S6	RETR	RETL	S4
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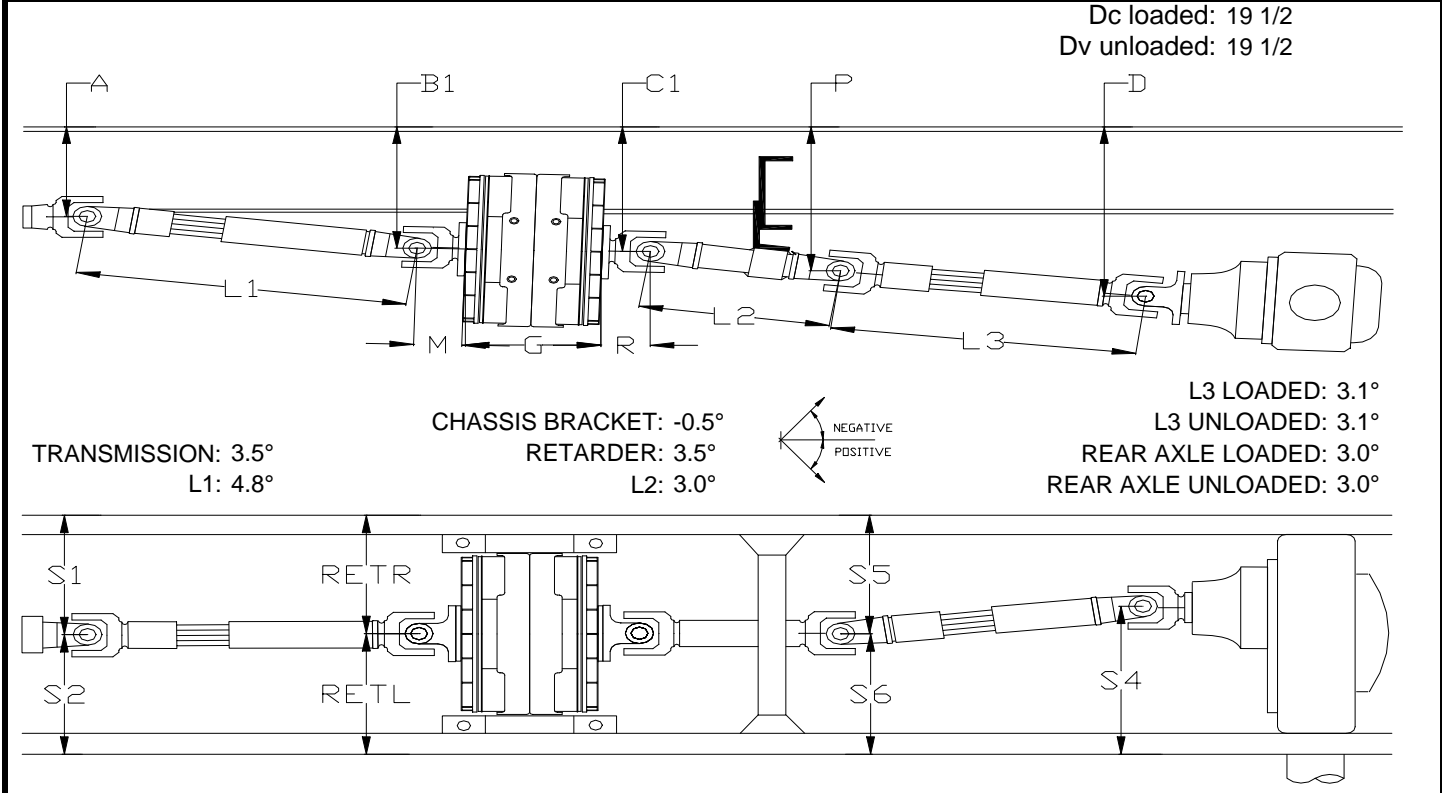
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VEHICLE TECHNICAL DATA			
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WHEELBASE	217.0"	VEHICLE NUMBER	
ENGINE MAKE / MODEL	NAVISTAR MaxxF7	SPEED SWITCH / INTERFACE	JC251100
TRANSMISSION MAKE / MODEL	ALLISON 2500PTS	TIRE SIZE	245/70R-19.5
AXLE MAKE / MODEL	DANA S14-130	GVW / GCW	21000 lbs
DRIVE TYPE	4X2	BRAKES	HYDRAULIC
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RETARDER PART NUMBER	BB301158	AXLE RATIO	4.30
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	1610 SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	
MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE

Note: If any of the above mentioned factors vary with your application, please call our TECHNICAL DEPARTMENT.



A	B1	C1	P		M	G	R	L1	L2	L3	L4
9 1/2	14 3/16	15 3/16	16 5/16		2 3/4	2 3/4	10 7/16	55 1/2	21 9/16	59 1/4	N/A
CC	T	T1	DD inside	X1	S1	S2	S5	S6	RETR	RETL	S4
63 1/4	7 13/16	3 1/2	33 1/2	12 7/8	17	17	17	17	17	17	18

- CAUTION:**
- 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: Angle tolerance ± 0.2°. Dimension tolerance ± 1/16".
 - 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 4
 - NOTE 9: adjust retarder to angle indicated by rotating bracket
 - NOTE 10: ADJUST SECOND SHAFT (L2) TO 3.0° WITH CHASSIS REFERENCE OF 0°



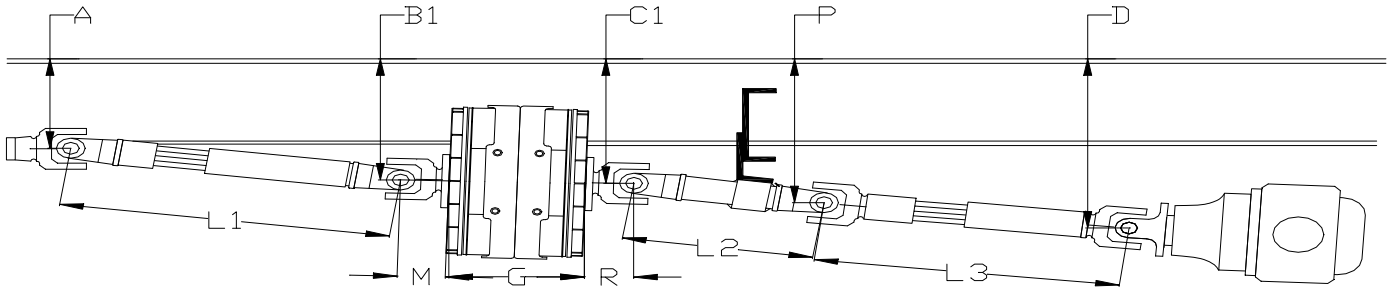
TELMA RETARDER, INC
 1501 Morse Avenue, Elk Grove Village, IL 60007
 Tel: (847) 593-1098 Fax: (847) 593-3592

VEHICLE TECHNICAL DATA

CHASSIS MAKE / MODEL	NAVISTAR 3200	CHASSIS VIN:	
WHEELBASE	217.0"	VEHICLE NUMBER	
ENGINE MAKE / MODEL	NAVISTAR MaxxForceDT	SPEED SWITCH / INTERFACE	JC251100
TRANSMISSION MAKE / MODEL	ALLISON 2500PTS	TIRE SIZE	245/70R-19.5
AXLE MAKE / MODEL	DANA S14-130	GVW / GCW	21000 lbs
DRIVE TYPE	4X2	BRAKES	HYDRAULIC
RETARDER MODEL	AD50-90	ABS	WABCO HPB
RETARDER PART NUMBER	BB301158	AXLE RATIO	4.30
RETARDER SERIAL NUMBER		DRIVE LINE SERIES	1610 SPL100
RETARDER CONTROL SYSTEM	FOOT	FLANGE YOKE	
MILEAGE AT TIME OF INSTALL		SUSPENSION TYPE	AIR
HOURS AT TIME OF INSTALL		VOCATION	SHUTTLE

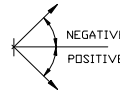
Note: If any of the above mentioned factors vary with your application, please call our TECHNICAL DEPARTMENT.

Dc loaded: 19 1/2
 Dv unloaded: 19 1/2

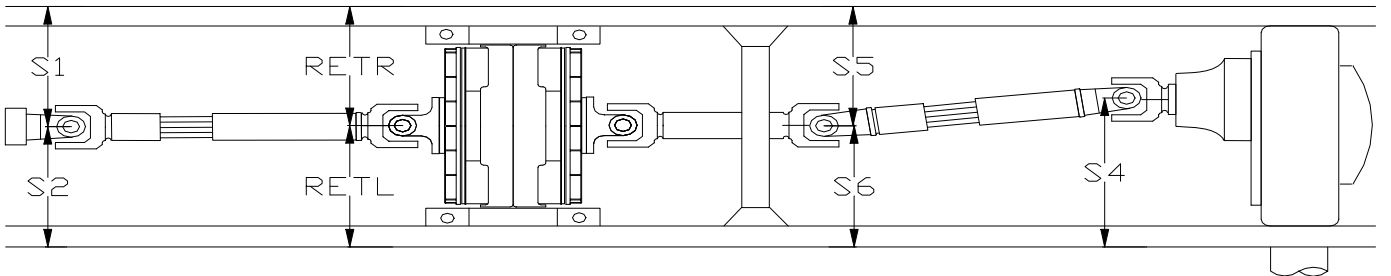


TRANSMISSION: 3.5°
 L1: 4.8°

CHASSIS BRACKET: -0.5°
 RETARDER: 3.5°
 L2: 3.0°



L3 LOADED: 3.1°
 L3 UNLOADED: 3.1°
 REAR AXLE LOADED: 3.0°
 REAR AXLE UNLOADED: 3.0°



A	B1	C1	P		M	G	R	L1	L2	L3	L4
10 1/8	14 3/16	15 3/16	16 5/16		2 3/4	2 3/4	10 7/16	48 7/16	21 5/8	59 1/4	N/A
CC	T	T1	DD inside	X1	S1	S2	S5	S6	RETR	RETL	S4
56 1/4	7 13/16	3 1/2	33 1/2	12 7/8	17	17	17	17	17	17	18

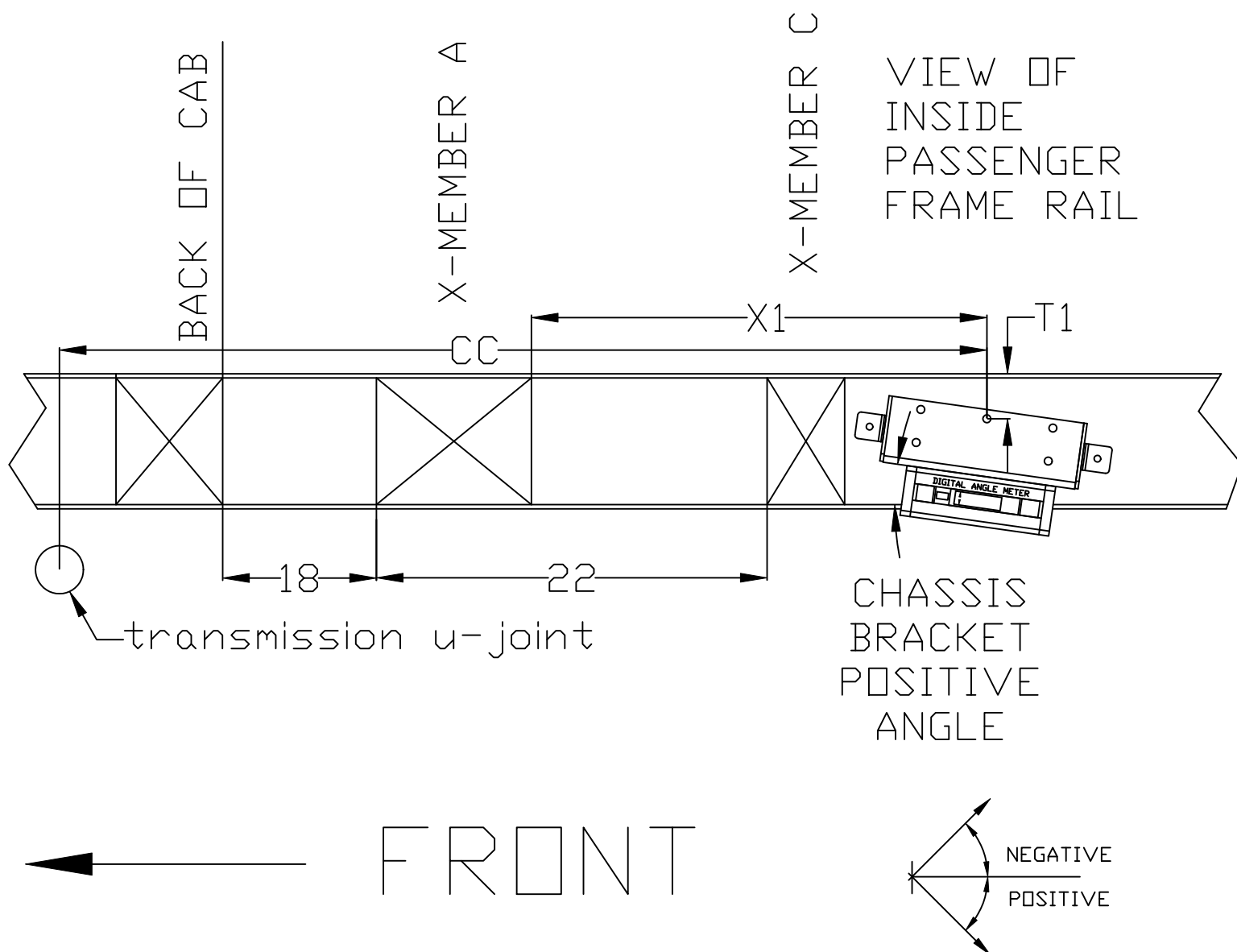
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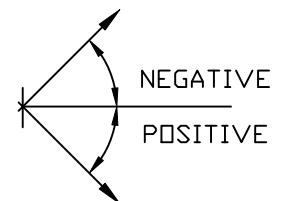
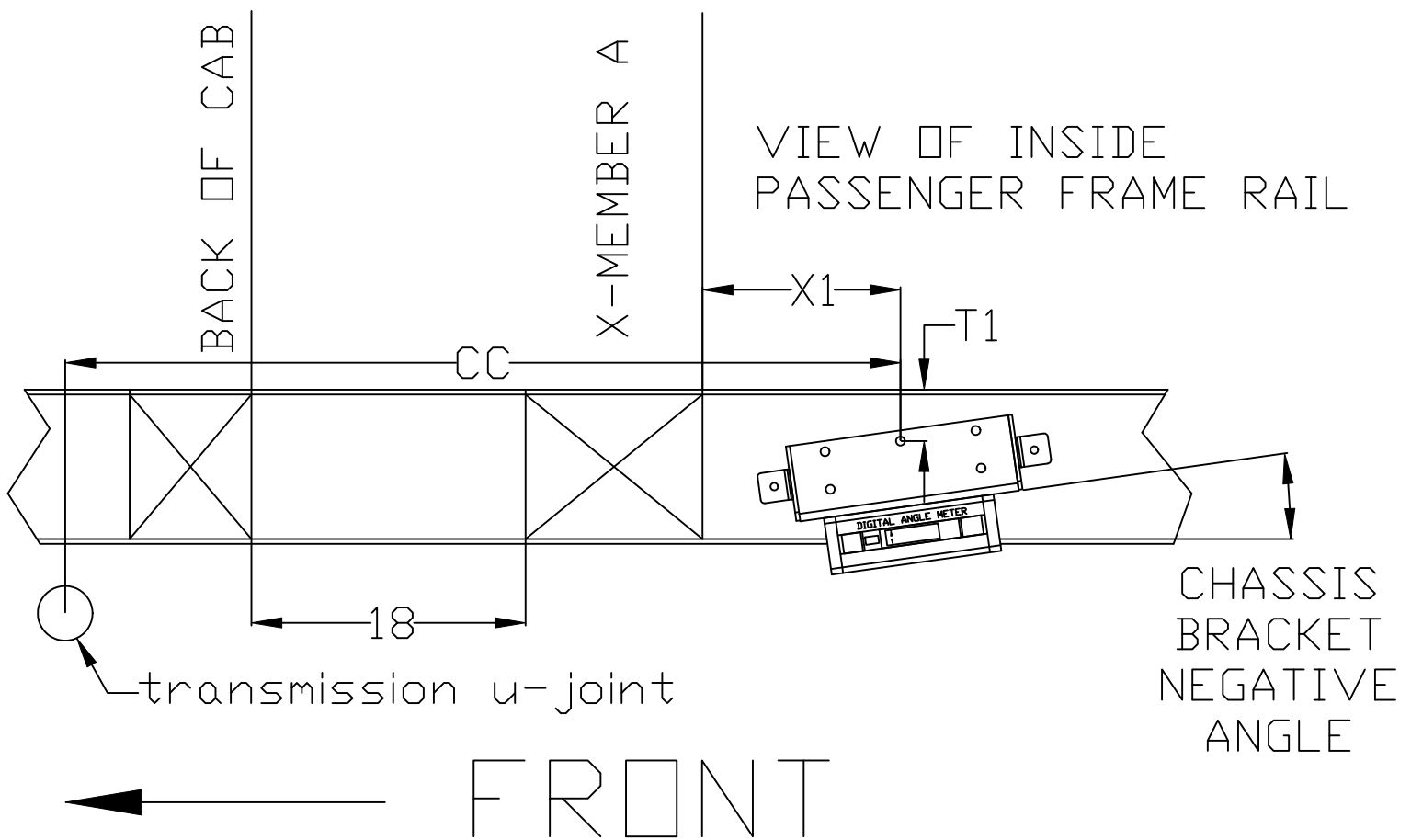
NAVISTAR 3200 CHASSIS BRACKET INSTALLATION 169WB

- 1) Drill reference hole at distance X1 from crossmember (or distance CC from transmission u-joint) and distance T1 from outside top of frame
- 2) Install chassis bracket using one bolt in reference hole of bracket
- 3) Rotate chassis bracket until desired angle is obtained and tighten bolt in reference hole.
- 4) Drill 4 remaining holes and install bolts for a total of five bolts in each chassis bracket

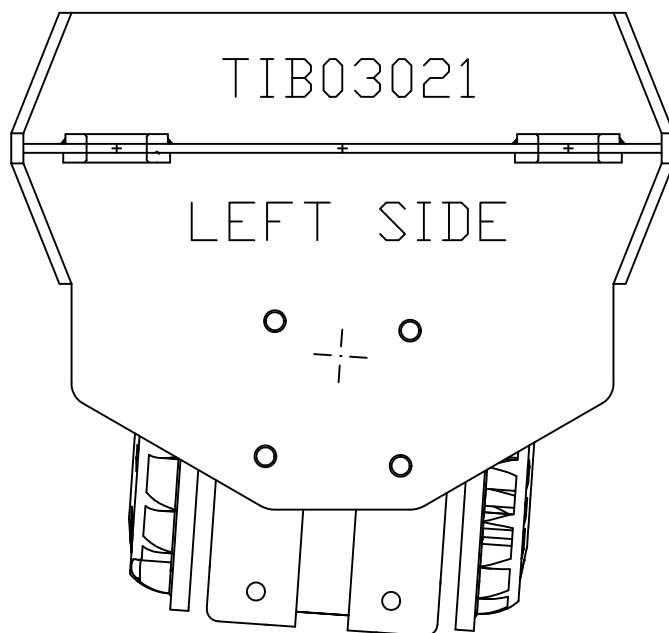


NAVISTAR 3200 CHASSIS BRACKET INSTALLATION

- 1) Drill reference hole at distance X1 from crossmember (or distance CC from transmission u-joint) and distance T1 from outside top of frame
- 2) Install chassis bracket using one bolt in reference hole of bracket
- 3) Rotate chassis bracket until desired angle is obtained and tighten bolt in reference hole.
- 4) Drill 4 remaining holes and install bolts for a total of five bolts in each chassis bracket



RETARDER BRACKET INSTALLATION



POSITION 4

ASSEMBLE RETARDER BRACKETS ON RETARDER
ACCORDING TO THE POSTION SHOWN ON THE
INSTALLATION DRAWING

MOUNT ASSEMBLY

TIB03108
CHASSIS
BRACKET

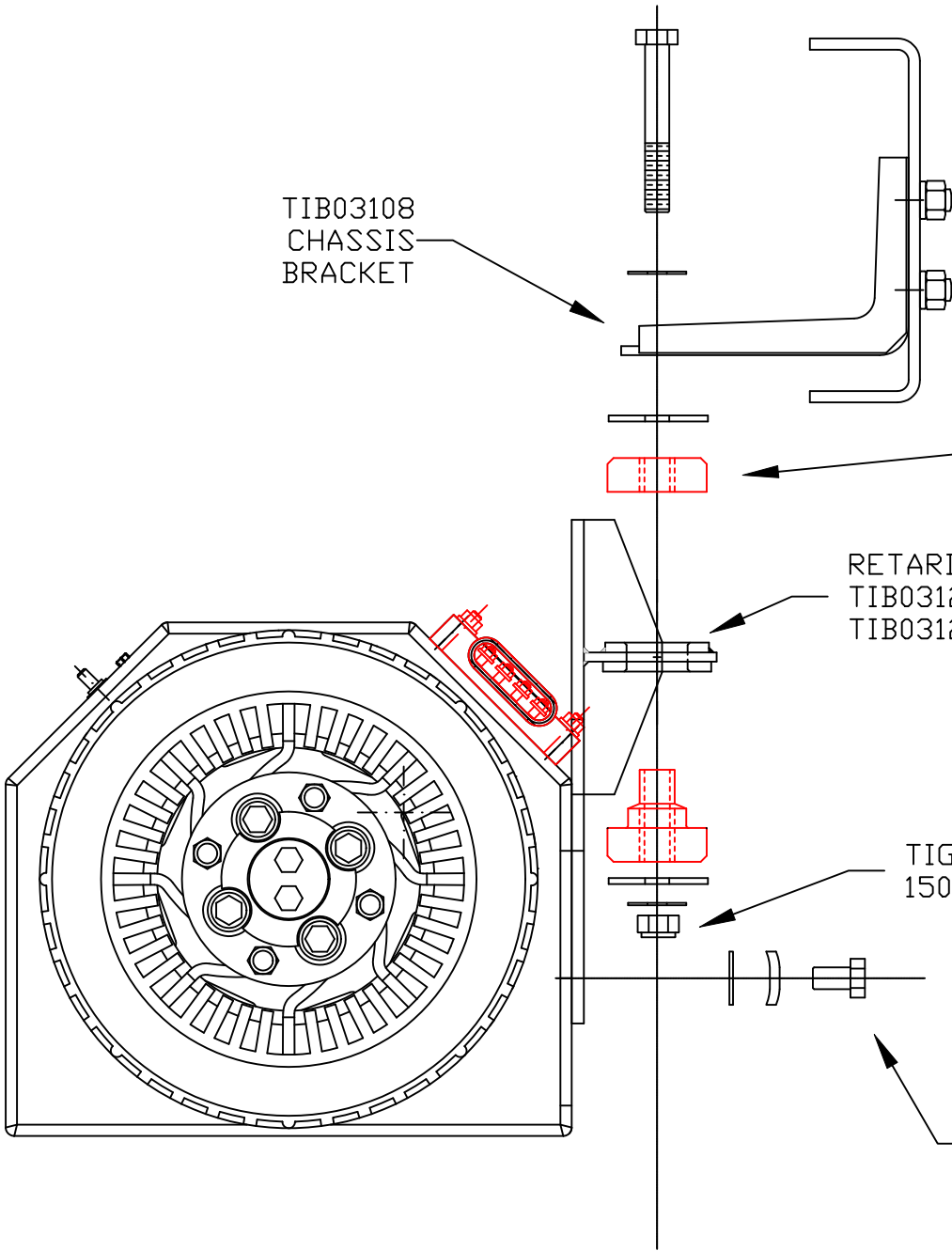
FIVE 9/16"
GRADE 8 BOLTS
INCLUDED WITH KIT
TIGHTEN TO
150 LB-FT ($\pm 10\%$)

JZ100723
MOUNT SET
INCLUDING
BOLTS,
NUTS,
AND WASHERS

RETARDER BRACKET
TIB03121 LEFT SIDE
TIB03122 RIGHT SIDE

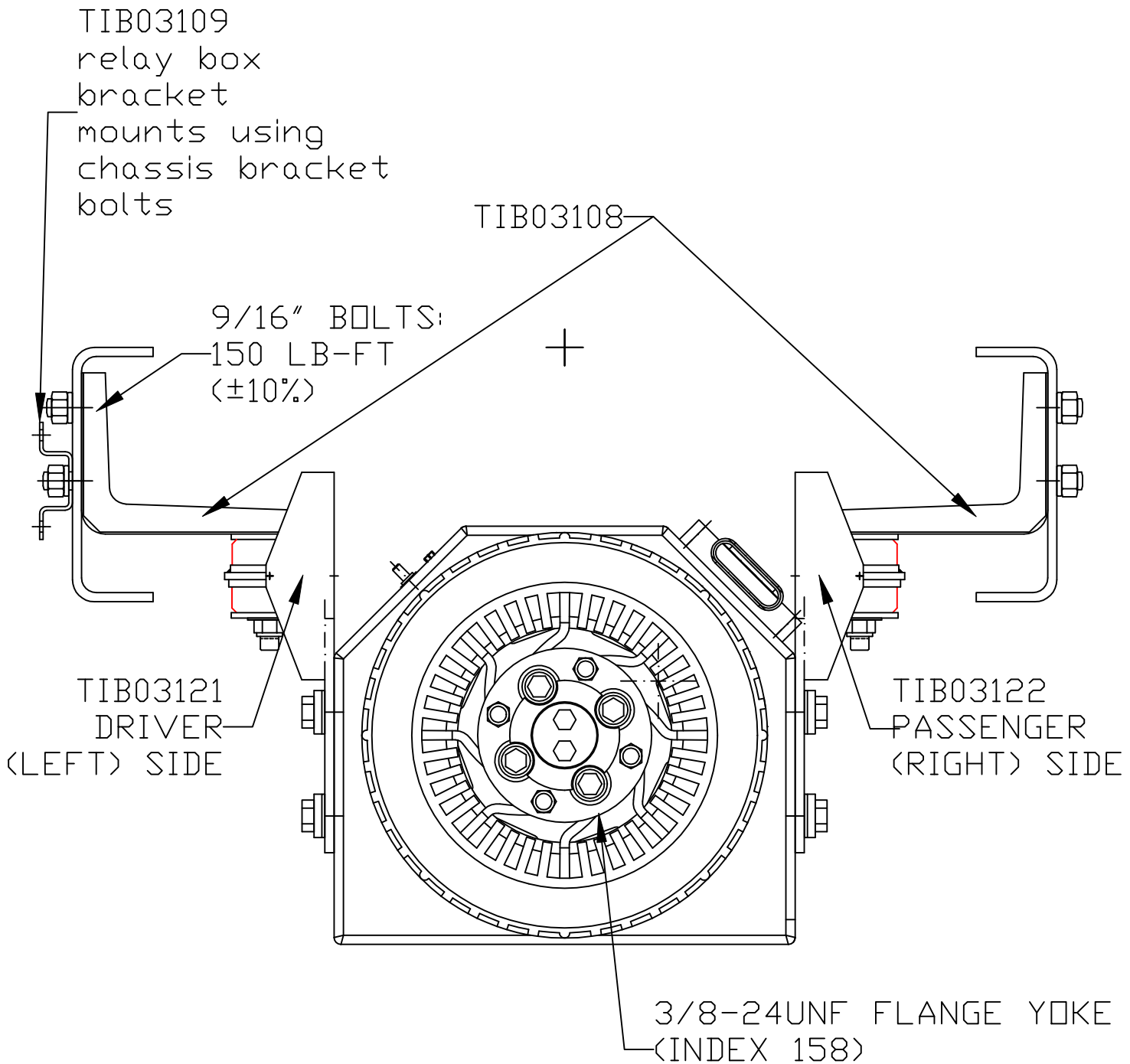
TIGHTENING TORQUE
150 LB-FT ($\pm 10\%$)

JZ100280
SIDE PLATE FASTENERS
SET OF 8 M14 BOLTS,
FLAT WASHERS
AND TREP WASHERS
TIGHTENING TORQUE
65 LB-FT ($\pm 10\%$)



END VIEW

AD50-90 BB301158 REAR FACE



USE MEDIUM STRENGTH LOCTITE ON ALL
FASTENERS AND MARK WITH PAINT AFTER
TIGHTENING TO PROPER TORQUE

NUT TORQUE 40-48 LB-FT

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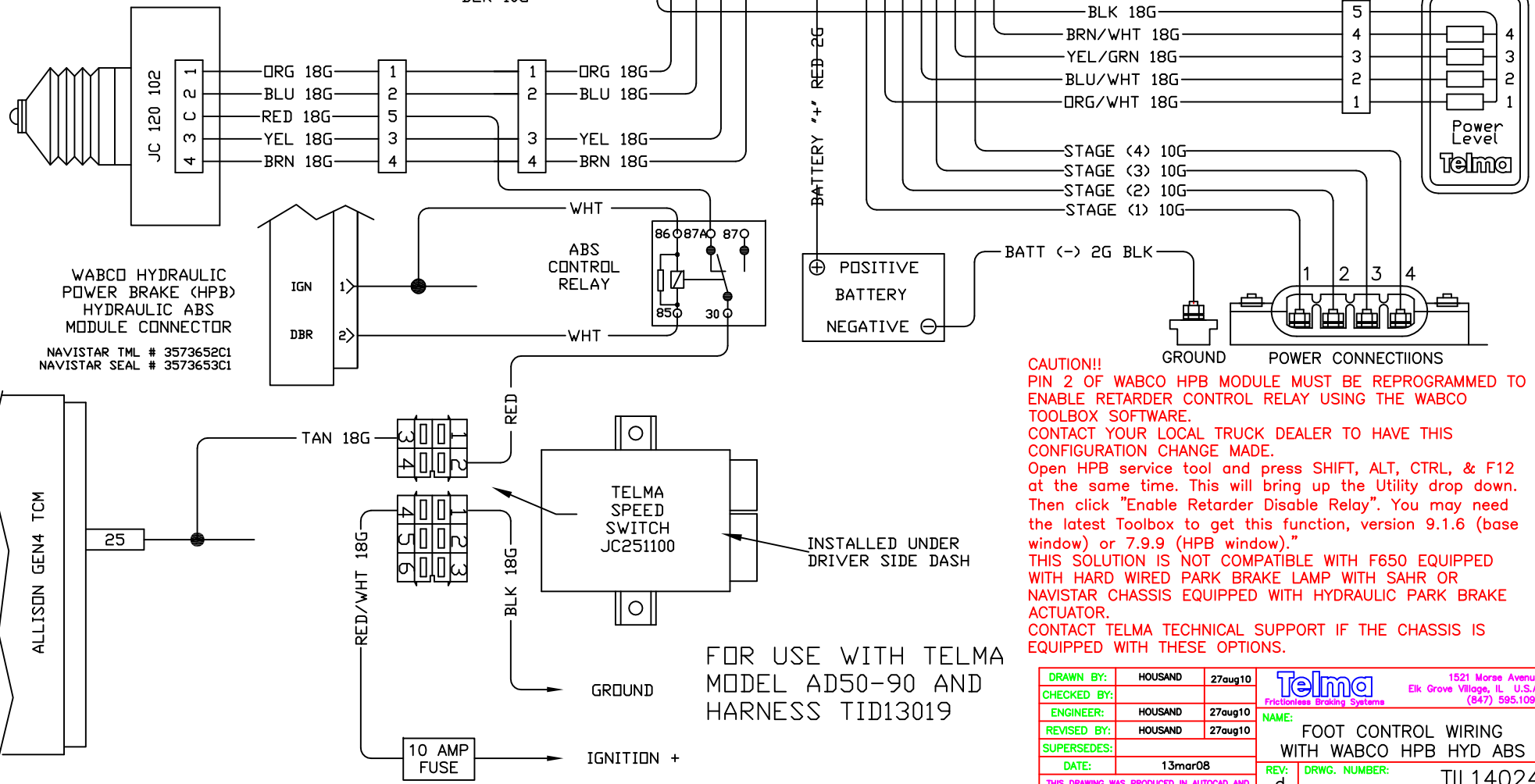
REVISIONS

ZONE	LTR	DESCRIPTION	E.C.O.	DATE	APPROVAL
	a	changes for MY2006		19dec05	
	b	add speed signal wire color		25jan08	
	c	add relay for navistar applications		20feb08	
	d	add note for HPB		27aug10	

TELMA RELAY BOX JD331121

RELAY BOX GROUND
DRILL HOLE OR
USING EXISTING
1/4" HOLE IN FRAME
GRIND SURFACE TO BARE METAL
PROTECT WITH ANTI-CORRSION
AFTER CONNECTION

RELAY BOX GROUND
BLK 10G



CAUTION!!
PIN 2 OF WABCO HPB MODULE MUST BE REPROGRAMMED TO ENABLE RETARDER CONTROL RELAY USING THE WABCO TOOLBOX SOFTWARE.
CONTACT YOUR LOCAL TRUCK DEALER TO HAVE THIS CONFIGURATION CHANGE MADE.
Open HPB service tool and press SHIFT, ALT, CTRL, & F12 at the same time. This will bring up the Utility drop down. Then click "Enable Retarder Disable Relay". You may need the latest Toolbox to get this function, version 9.1.6 (base window) or 7.9.9 (HPB window).
THIS SOLUTION IS NOT COMPATIBLE WITH F650 EQUIPPED WITH HARD WIRED PARK BRAKE LAMP WITH SAHR OR NAVISTAR CHASSIS EQUIPPED WITH HYDRAULIC PARK BRAKE ACTUATOR.
CONTACT TELMA TECHNICAL SUPPORT IF THE CHASSIS IS EQUIPPED WITH THESE OPTIONS.

FOR USE WITH TELMA MODEL AD50-90 AND HARNESS TID13019

DRAWN BY:	HOUSAND	27aug10
CHECKED BY:	HOUSAND	27aug10
ENGINEER:	HOUSAND	27aug10
REVISED BY:	HOUSAND	27aug10
SUPERSEDES:		
DATE:	13mar08	

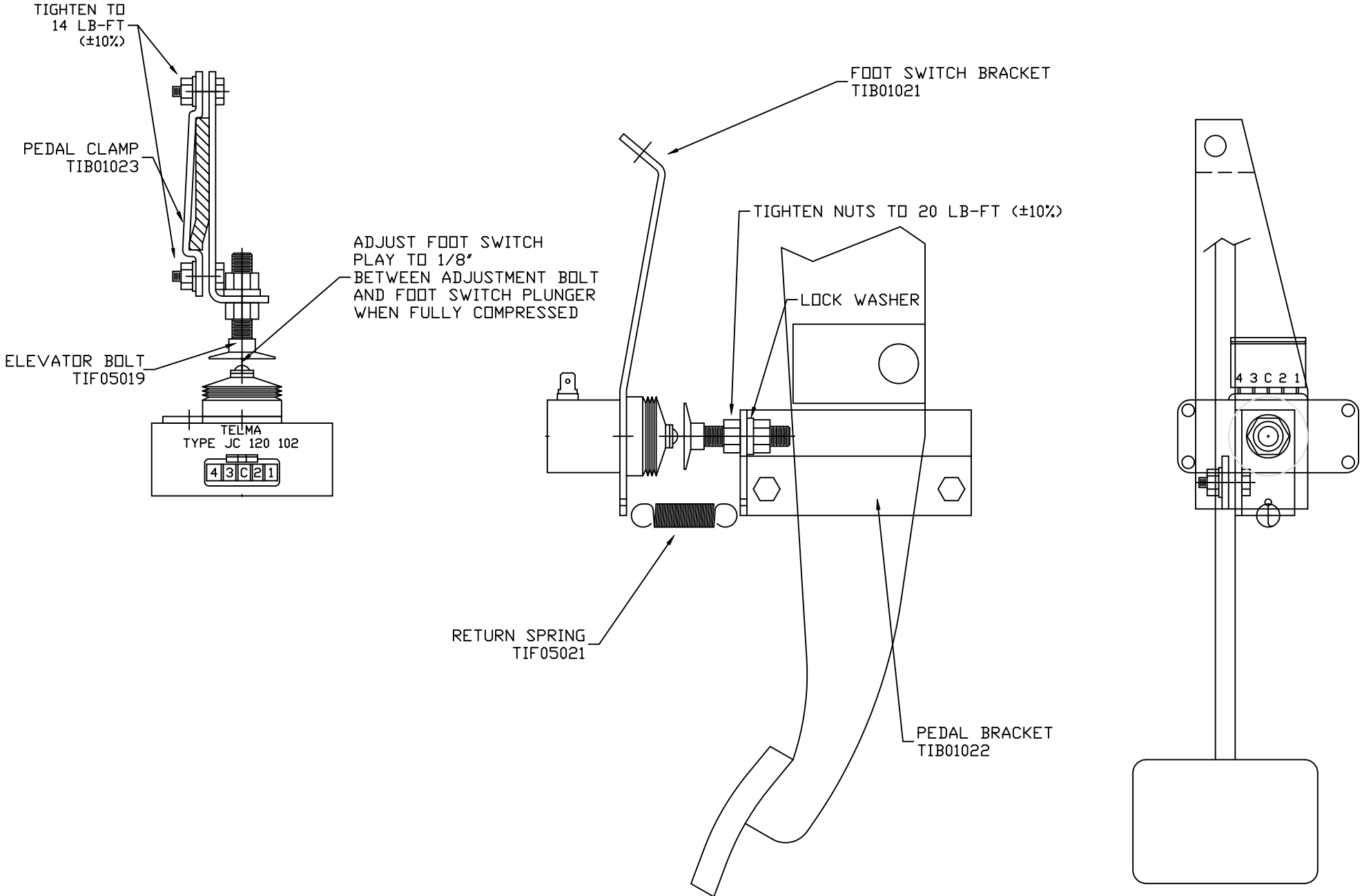
Telma Frictionless Braking Systems
1521 Morse Avenue
Elk Grove Village, IL U.S.A.
(847) 595.1098

NAME: FOOT CONTROL WIRING WITH WABCO HPB HYD ABS

REV: d
DRWG. NUMBER: TIL14024

SCALE: NTS SHEET: 1 OF 1

NAVISTAR 3200 FOOT SWITCH BRACKET ASSEMBLY



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PART NUMBER:

REVISIONS					
ZONE	LTR	DESCRIPTION	E.C.O.	DATE	APPROVAL

MODIFY ORIGINAL SHAFT
REMOVE CARRIER AND ADD SLIP

SLIP SHOULD BE
AT CENTER OF TRAVEL
WHEN INSTALLED ± 0.25"

1610 WELD YOKE

SPL90 SLIP
ASSEMBLY

1610 U-JOINT

1610 FLANGE YOKE SPICER P/N 5-2-279
TELMA P/N TIF01091
AT TELMA

FOLLOW DANA-SPICER GUIDELINES
PERTAINING TO MANUFACTURE,
STRAIGHTNESS, DYNAMIC
BALANCING AND CRITICAL SPEED.

ALWAYS VERIFY SHAFT LENGTHS BEFORE MODIFICATION

VENDOR PART NUMBER:

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
DECIMAL TOLERANCE IS
.00 ±.010, .000 ±.005
ANGLES ±1/2°
FRACTIONS ±1/32"

DRAWN BY:	HOUSAND
CHECKED BY:	
ENGINEER:	
REVISED BY:	
SUPERSEDES:	
DATE:	5nov08

Telma 1521 Morse Avenue
Elk Grove Village, IL U.S.A.
Frictionless Braking Systems (847) 595.1088

NAME:
NAV 3200 FRONT DRIVE SHAFT
1-1 / 1-2 SPL90_1610

REV: PART NUMBER:

THIS DRAWING WAS PRODUCED IN AUTOCAD AND
CAN ONLY BE REVISED IN AUTOCAD.
ANY MANUAL CHANGES DONE TO THIS DRAWING
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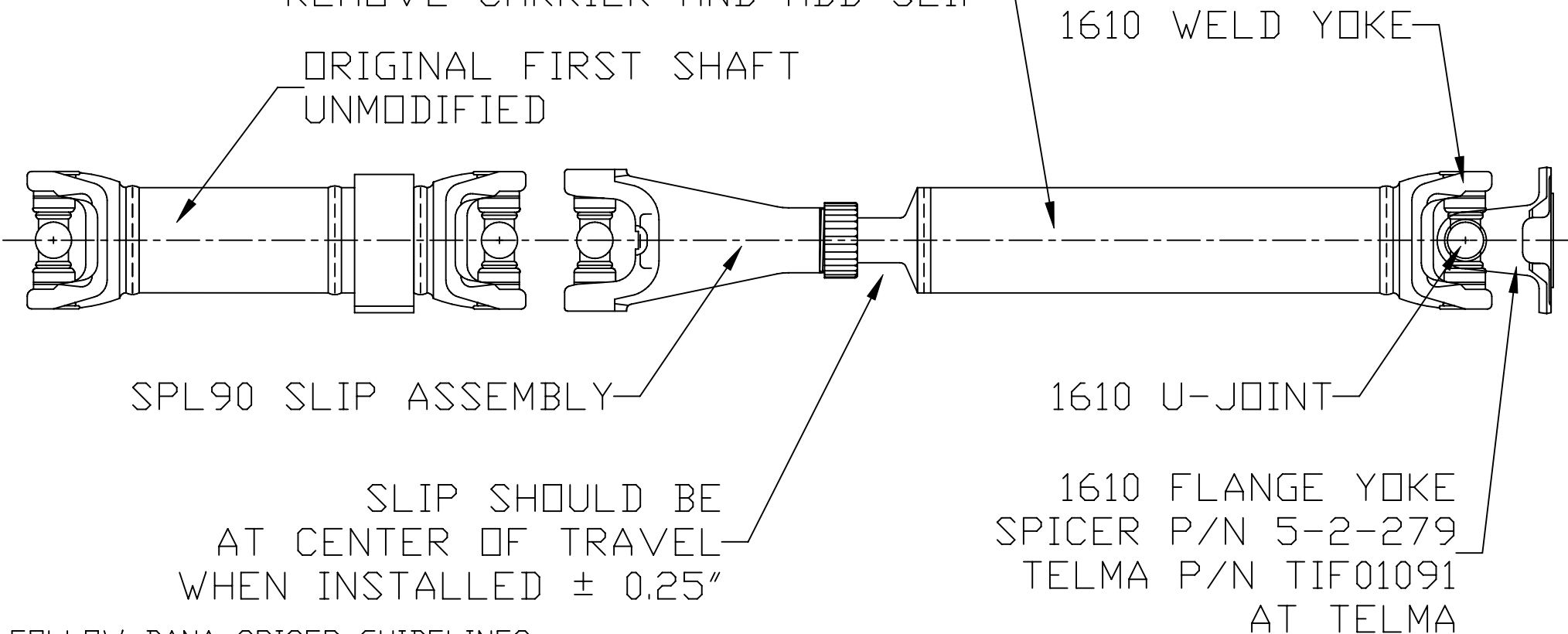
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PART NUMBER:

REVISIONS					
ZONE	LTR	DESCRIPTION	E.C.O.	DATE	APPROVAL

MODIFY ORIGINAL SHAFT
REMOVE CARRIER AND ADD SLIP



FOLLOW DANA-SPICER GUIDELINES
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STRAIGHTNESS, DYNAMIC
BALANCING AND CRITICAL SPEED.

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DECIMAL TOLERANCE IS
.00 ±.010, .000 ±.005
ANGLES ±1/2°
FRACTIONS ±1/32"

DRAWN BY: HOUSAND
CHECKED BY:
ENGINEER:
REVISED BY:
SUPERSEDES:
DATE: 05nov08

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VENDOR PART NUMBER:

Telma 1521 Morse Avenue
Elk Grove Village, IL U.S.A.
Frictionless Braking Systems (847) 595.1098

NAME:
NAV 3200 FRONT DRIVE SHAFTS
2-1 / 2-2 SPL90_1610

REV: PART NUMBER:

SCALE: NTS SHEET: 1 OF 1

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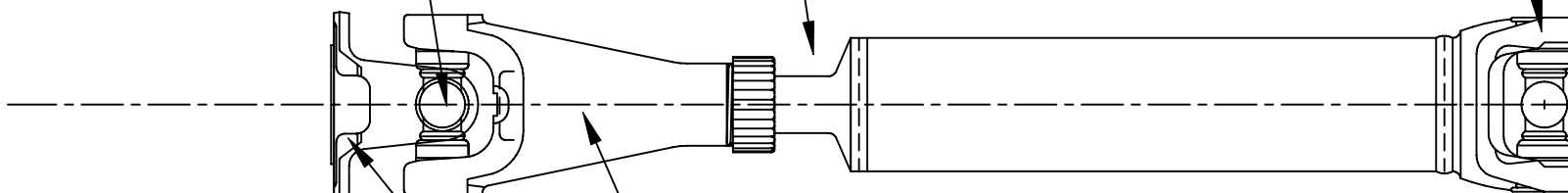
PART NUMBER:

REVISIONS					
ZONE	LTR	DESCRIPTION	E.C.O.	DATE	APPROVAL

SLIP SHOULD BE AT CENTER OF TRAVEL WHEN INSTALLED ± 0.25"

1610 U-JOINT

SPL90 WELD YOKE AND U-JOINT



1610 SLIP ASSEMBLY

1610 FLANGE YOKE SPICER P/N 5-2-279
TELMA P/N TIF01091
AT TELMA

FOLLOW DANA-SPICER GUIDELINES PERTAINING TO MANUFACTURE, STRAIGHTNESS, DYNAMIC BALANCING AND CRITICAL SPEED.

ALWAYS VERIFY SHAFT LENGTHS BEFORE MODIFICATION

VENDOR PART NUMBER:

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMAL TOLERANCE IS .00 ±.010, .000 ±.005
ANGLES ±1/2°
FRACTIONS ±1/32"

DRAWN BY:	HOUSAND
CHECKED BY:	
ENGINEER:	
REVISED BY:	
SUPERSEDES:	
DATE:	5nov08

Telma 1521 Morse Avenue
Elk Grove Village, IL U.S.A.
Frictionless Braking Systems (847) 595.1088

NAME:
NAV 3200 REAR DRIVE SHAFT
1-1_2-1 SPL90_1610

REV: PART NUMBER:

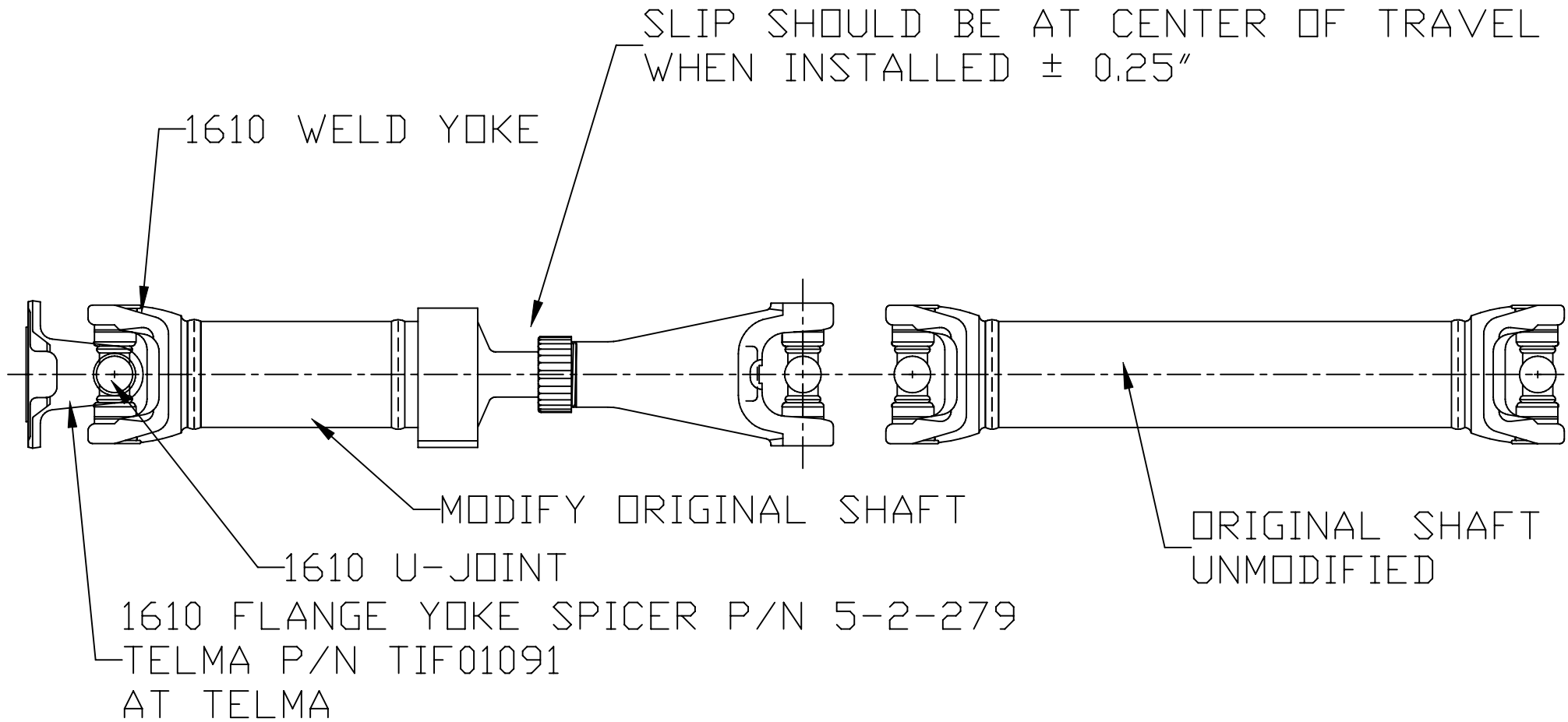
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PART NUMBER:

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DRAWN BY:	HOUSAND
CHECKED BY:	
ENGINEER:	
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VENDOR PART NUMBER:

Telma 1521 Morse Avenue
 Elk Grove Village, IL U.S.A.
 Frictionless Braking Systems (847) 595.1088

NAME:
 NAV 3200 REAR DRIVE SHAFT
 1-2 / 2-2 SPL90_1610

REV: PART NUMBER:

SCALE: NTS SHEET: 1 OF 1

Navistar 3200 Chassis with DPF



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.