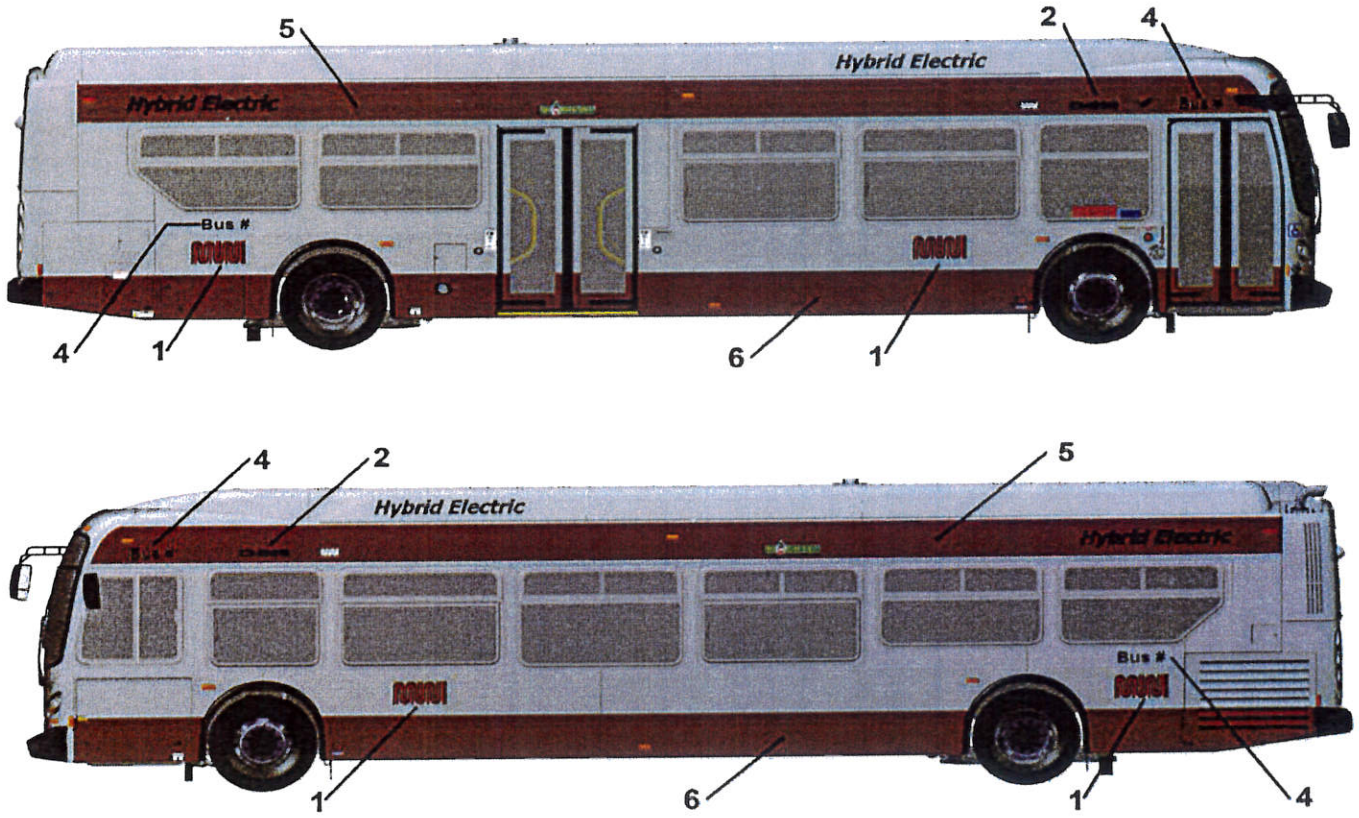
CITY AND COUNTY OF SAN FRANCISCO
San Francisco Municipal Transportation Agency
Request for Proposals
THE PROCUREMENT OF
30-Foot, 40-FOOT AND 60-FOOT LOW FLOOR
DIESEL HYBRID COACHES

Proposal Section	Title	Bid Submission Requirements
3-A	External and chassis dimensions and layouts	1) Supply the following exterior views: left side, right side, front, rear, and roof. 2) Supply a turning envelope diagram, including rear corner swing out. 3) Supply dimensional diagram of hoisting, jacking and towing points. 4) Supply a right side and top view layout of the chassis, showing the locations of major sub-systems. 5) Supply installation and detail design drawings for the front and rear suspensions, propulsion system, and driveline.

New Flyer is providing the requested information in the following attachments. Drawings and other relevant information with regards to the vehicle dimensions and towing is included. We are also providing information on our front, center and rear axles including drawings. Lastly, we are including specifications with regards to our base engine offering; the Cummins ISL 9.0L 330HP. We are providing available pictures from the 40' bus and 60' Trolleys which are similar to the proposed 60' vehicle.

ATTACHMENT 3: DECAL (EXTERIOR NUMBERING)



Two side views of Muni Hybrid Electric bus:

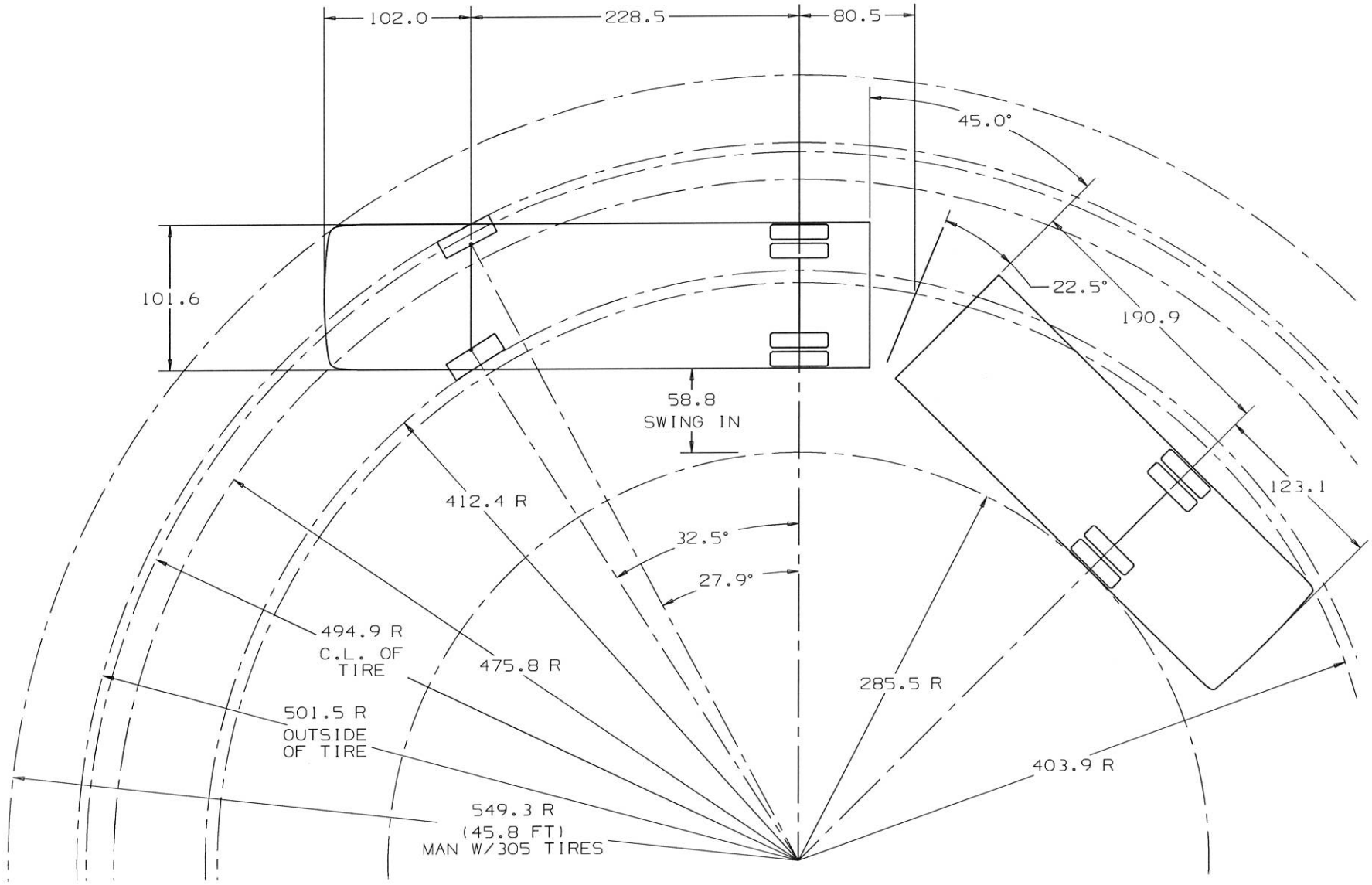
1. MUNI – 10 inch Cardinal Red Reflective
2. ICC#2 in Helvetic CA 49810
3. Bus Number 4" White
4. Bus Number 4" Black
5. Paint Strip in Cardinal Red
6. Decal, Skirt Panel in Cardinal Red

ATTACHMENT 4: SFMTA EXTERIOR COLOR SCHEME

Front View and Rear view of Muni Hybrid Electric:

1. Body Paint Color – Silver #9161 SP
2. Trim Paint Color – Cardnial Red # 916 SP
3. Skirt Decal – Cardinal Red # 916 SP

NOTE: FOR INSTALLATION DRAWINGS PLEASE REFER TO ATTACHED MRF [illegible] SHEET FOR PARTS LISTING



COACH = 60 BRT
WITH 305 TIRES
MAN AXLE
MAX ARTICULATING ANGLE = 45°
MAX STEERING ANGLE = 32.5°
MAX CURB-TO-CURB TURNING RADIUS = 41.8 FT
MAX TURNING RADIUS = 45.8 FT

DO NOT SCALE DRAWING		
DIMENSIONS IN ( ) ARE IN m.m.		
THD ANGLE		
BY	NAME	DD-MMM-YY
DRAWN	C.G.D.	05-JAN-09
CHK'D		
APP'D		

REV	DESCRIPTION	ECO

MATERIAL	UNSPEC'D TOLS.	DEC. IN.
-	.X	±.12
-	.XX	±.06
	.XXX	±.03
WEIGHT	HOLE DIA.	±.015
-	BEND RADII.	±.03
	ANGLE TOL.	±1°
TREATMENT	SIMILAR TO	
-	-	
-		

TITLE
TURNING 60 BRT

NEW FLYER

PART N°
TURNING 60 BRT
(UNIGRAPHICS)

SCALE 1:50 | C | SHEET 1 OF 1

REPORT ALL ERRORS TO ENG. DEPT.

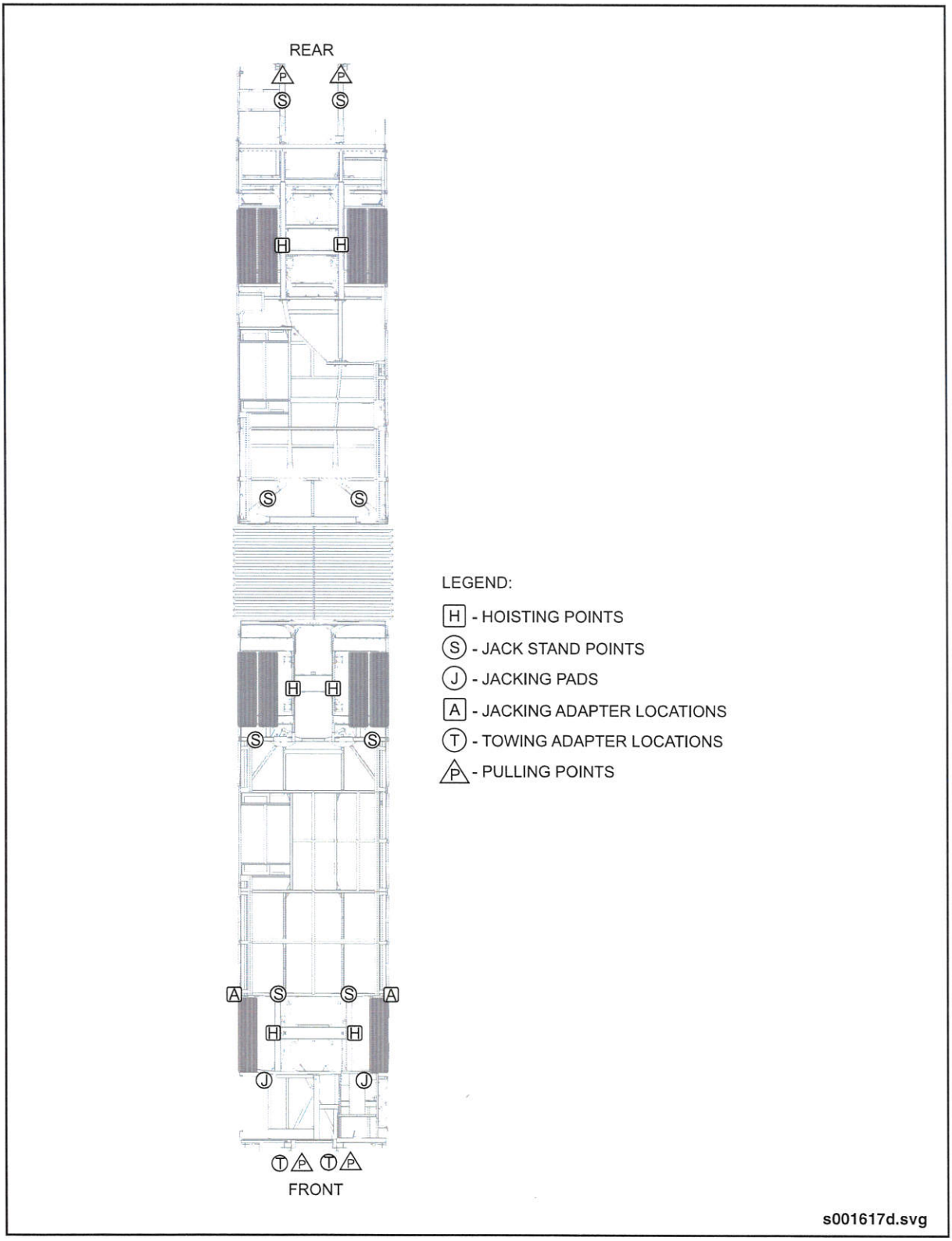


Fig. GI-21: Jacking (hoisting) Points & Stand Placement

14. VEHICLE TOWING

⚠ WARNING

Failure to comply with the safety precautions in this section could result in personal injury or vehicle damage. ALWAYS follow the recommended procedures.

☞NOTE:

The operator of the towing vehicle is ultimately responsible for safely securing and towing the vehicle. Ensure that the operator of the towing vehicle is aware of the safety requirements and towing procedures contained in this section.

14.1. Towing Safety

- ❒ Follow all State (provincial in Canada) and local traffic laws.
- ❒ A vehicle safety restraint system must be used that is independent of the primary lifting and towing attachments.
- ❒ All loose or protruding parts of a damaged vehicle should be secured prior to towing.
- ❒ Do not go under a vehicle which is being lifted by the towing equipment, unless the vehicle is adequately supported by safety stands or appropriate blocking.
- ❒ No towing operation should be attempted for any reason which jeopardizes the safety of the operator, wrecker, bystanders or other motorists.
- ❒ Do not exceed the recommended maximum speed of 35 mph (55 km/h) while towing.
- ❒ Reduce speed over uneven roads, railway tracks or other obstacles.
- ❒ Do not exceed the maximum front and minimum rear clearance specifications when the vehicle is raised. Refer to 14.2.2.4. "Maximum Lifting Height" on page 47 and Refer to 14.2.2.5. "Minimum Vehicle Ground Clearance" on page 47 in this section for dimensions and measuring methods.
- ❒ The vehicle being towed must have its steering secured with the wheels positioned straight ahead.
- ❒ If the vehicle being towed is not equipped with an electrical plug for operating the vehicle tail lights, a light bar must be placed at the rear bumper of the towed vehicle.
- ❒ Vehicles with an articulated joint cannot exceed a maximum vertical joint angle of 10°. If this angle is exceeded, damage to the articulating joint may occur.

14.2. Description

⚠CAUTION

Care must be taken to ensure that the vehicle will not suffer structural or drive train damage as a result of towing. The driveshaft or both rear axle shafts must be removed when towing, regardless of distance or speed traveled. Damage to the transmission/drive unit may occur if the vehicle is towed without first removing the driveshaft or rear axles.

The New Flyer vehicle can be towed from the front using either the flat or raised method. Refer to 14.2.1. "Flat Towing" on page 42 in this section for flat towing procedures. Refer to 14.2.2. "Raised Towing" on page 44 in this section for raised towing procedures. New Flyer recommends the flat towing method to minimize the likelihood of damage to the vehicle. Extra care must be taken when using the raised towing method to ensure adequate ground clearance at the rear of the vehicle. Rear towing is not recommend due to insufficient ground clearance at the front of the vehicle and the problem of locking the front wheels in a straight position.

☞NOTE:

Consult your local Transit Authority for any specific towing procedures and use them carefully in conjunction with the recommended towing procedures contained within this section.

14.2.1. Flat Towing

14.2.1.1.Preparation

1. Prepare the vehicle for towing by removing either the driveshaft or both rear axle shafts. Refer to 14.3. "Driveshaft Removal" on page 48 and Refer to 14.4. "Rear Axle Shaft Removal" on page 48 in this section for procedure.
2. Obtain an approved towing adapter kit if one is not already provided. The towing adapter used for flat towing consists of two L-shaped brackets, clevis pins and cotter pins. Refer to your New Flyer Parts Manual for towing adapter ordering information.

☞NOTE:

The towing adapters mount into receivers in the front frame of the vehicle and provide the proper offset and clearance to allow the attachment of towing equipment.

14.2.1.2.Towing Adapter Installation

1. Install each tow adapter into a receiver and locate with a clevis pin. See "Fig. GI-22: Towing Adapter" on page 43.
2. Secure each clevis pin with a cotter pin.
3. Attach the towing vehicle equipment to the tow eye of each towing adapter. The method used will vary depending on the type of towing equipment available.
4. Secure the towing vehicle to the tow adapters. The method used will vary depending on the type of towing equipment available.
5. Attach two safety restraint chains from the towing vehicle to a fixed location on the towed vehicle. See "Fig. GI-23: Safety Chain" on page 44.
6. Connect the towing vehicle air line and electrical harness to the respective tow connectors on the towed vehicle.

☞NOTE:

An auxiliary air supply must be provided to the vehicle being towed to release the spring brakes and maintain suspension height. The auxiliary air supply should be a minimum of 100 psi.

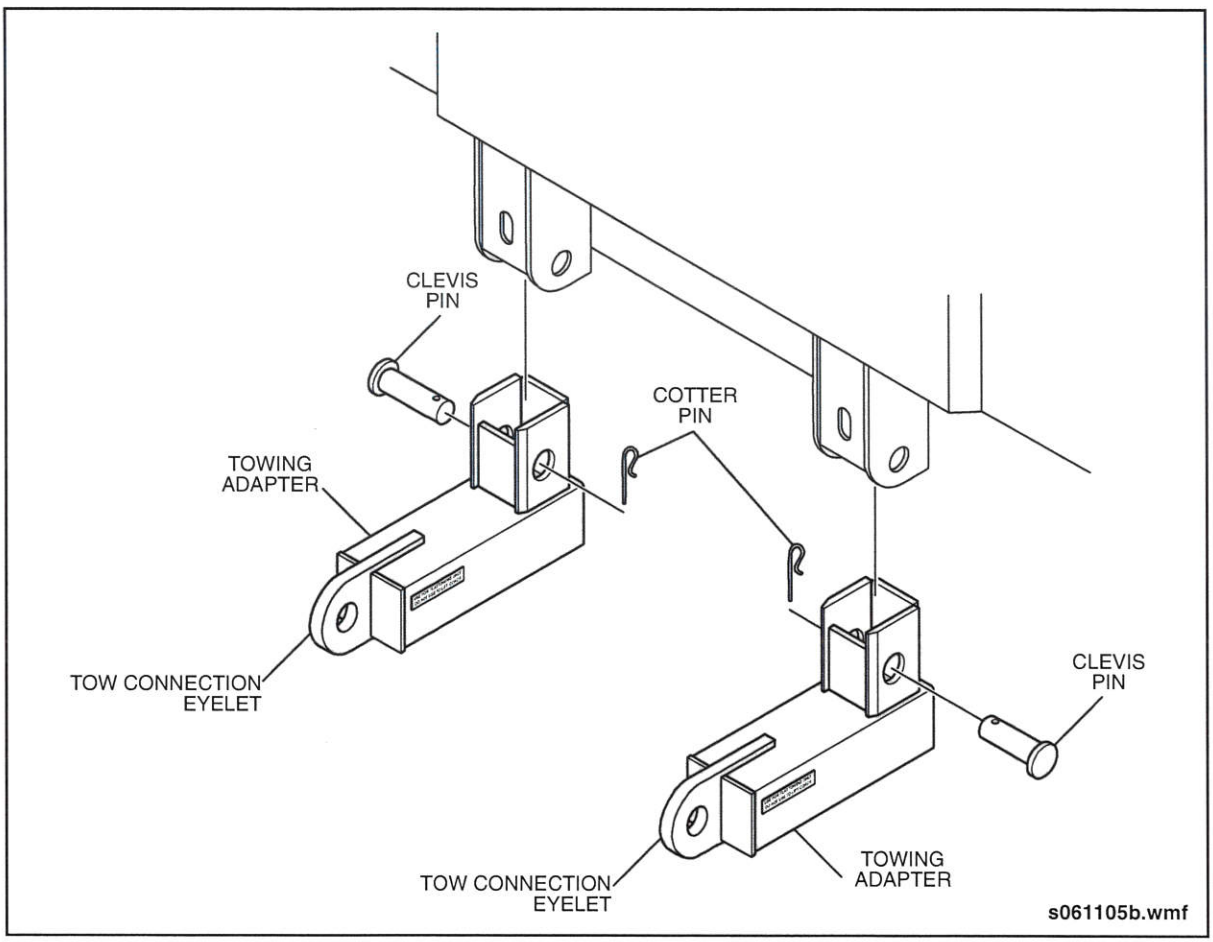


Fig. GI-22: Towing Adapter

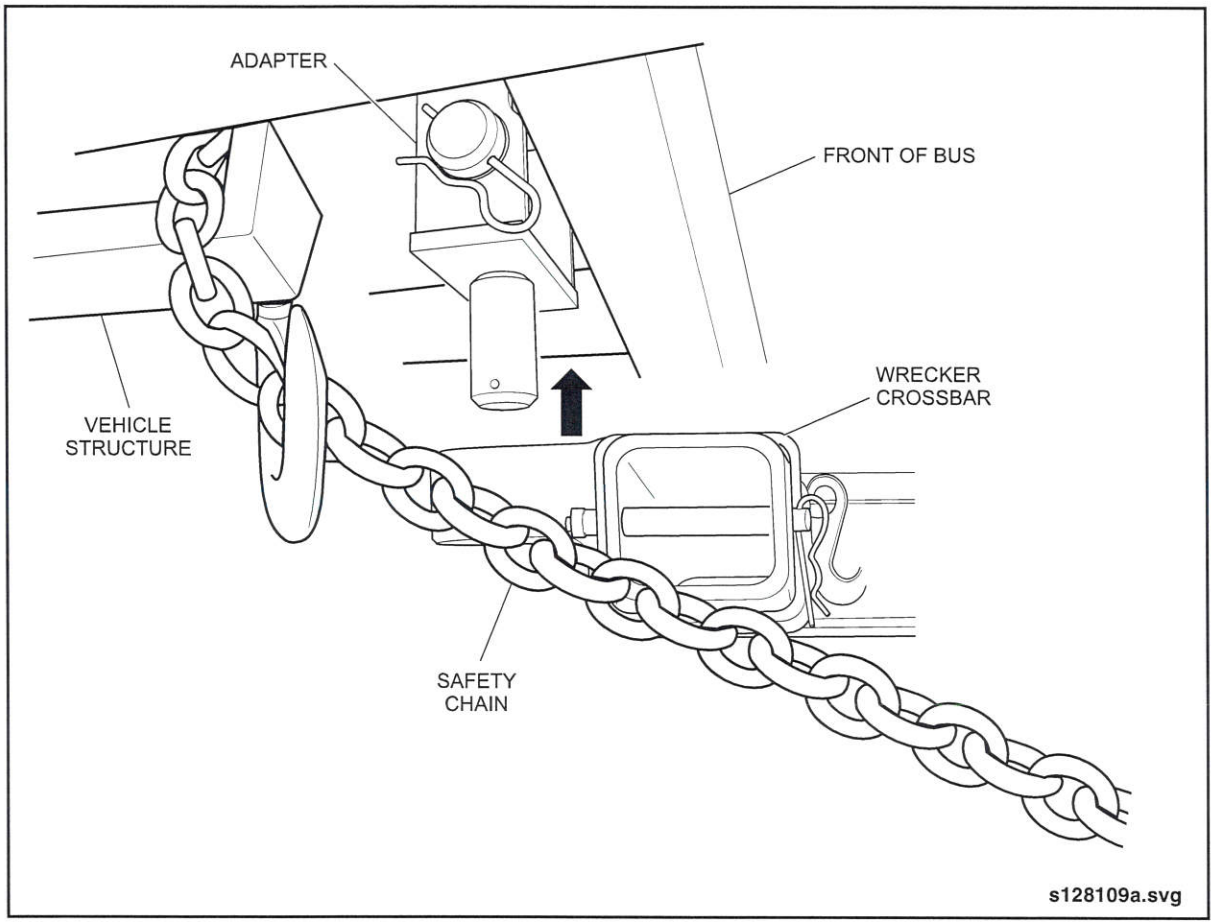


Fig. GI-23: Safety Chain

14.2.2. Raised Towing

14.2.2.1.Preparation

1. Prepare the vehicle for towing by removing either the driveshaft or both rear axle shafts. Refer to 14.3. "Driveshaft Removal" on page 48 and Refer to 14.4. "Rear Axle Shaft Removal" on page 48 in this section for procedure.
2. Obtain an approved towing adapter kit if one is not already provided. The towing adapter kit used for raised towing is a peg and socket configuration that consists of two U-shaped lift adapters that attach to the towed vehicle and two lift receivers that slide onto the towing vehicle crossbar. Refer to your New Flyer Parts Manual for towing adapter ordering information.

☞NOTE:

The towing adapters mount into receivers in the front frame of the vehicle and provide the proper offset and clearance to allow the attachment of towing equipment. The towing adapters are designed to work with Century 9055 Wrecker towing equipment.

14.2.2.2.Lift Adapter/Receiver Installation

1. Install the lift adapters onto the towed vehicle as follows:
   a. Slide lift adapter into vehicle receiver and locate with a clevis pin.
   b. Secure each clevis pin with a cotter pin.
2. Install the lift receivers onto the towing vehicle crossbar and slide into position so that they align with the towed vehicle lift adapters. See "Fig. GI-24: Lift Receiver Installation" on page 45.

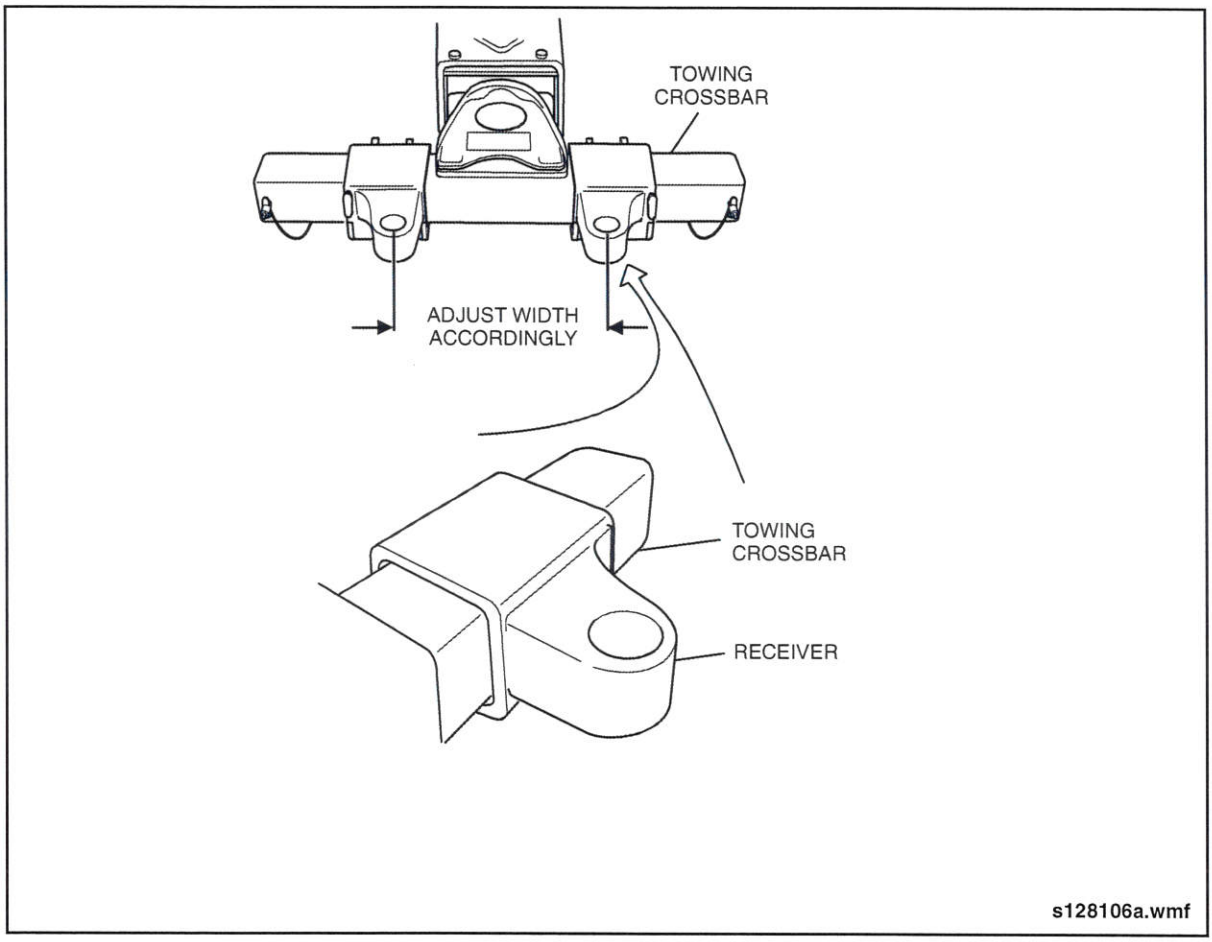


Fig. GI-24: Lift Receiver Installation

14.2.2.3.Raising & Securing the Vehicle

1. Position the wrecker's lifting boom with the lift receivers in place under the pegs of the lift adapters. See "Fig. GI-25: Securing the Lift Receivers to the Lift Adapters" on page 46.
2. Slowly raise the boom until the socket on the lift receivers engage the pegs on the lift adapters. Make any necessary adjustments to the lift receiver positions to ensure proper engagement.
3. Continue to raise the lifting boom until the lift adapters are fully engaged into the receivers.
4. Insert the lock pin through the lift adapters.
5. Raise the front wheels to the height recommended for the specific vehicle being towed and check vehicle ground clearance. Refer to 14.2.2.4. "Maximum Lifting Height" on page 47 and Refer to 14.2.2.5. "Minimum Vehicle Ground Clearance" on page 47 in this section for recommended limits.
6. Connect the towing vehicle air line and electrical harness to the respective tow connectors on the towed vehicle.

☞NOTE:

An auxiliary air supply must be provided to the vehicle being towed to release the spring brakes and maintain suspension height. The auxiliary air supply should be a minimum of 100 psi.

7. Attach two safety restraint chains from the towing vehicle to a fixed location on the towed vehicle.
8. Check to ensure that all clevis and cotter pins are properly inserted, towing equipment is fully engaged and safety chains are clear of the vehicle body before final raising and towing the vehicle.
9. Secure the steering system as follows:
   a. Rotate the steering wheel to position the wheels in the straight ahead position.
   b. Secure the steering system in this position by looping the driver's seat belt around the lower portion of the steering wheel and clipping it into the seat belt buckle. See "Fig. GI-26: Securing the Steering System" on page 47.

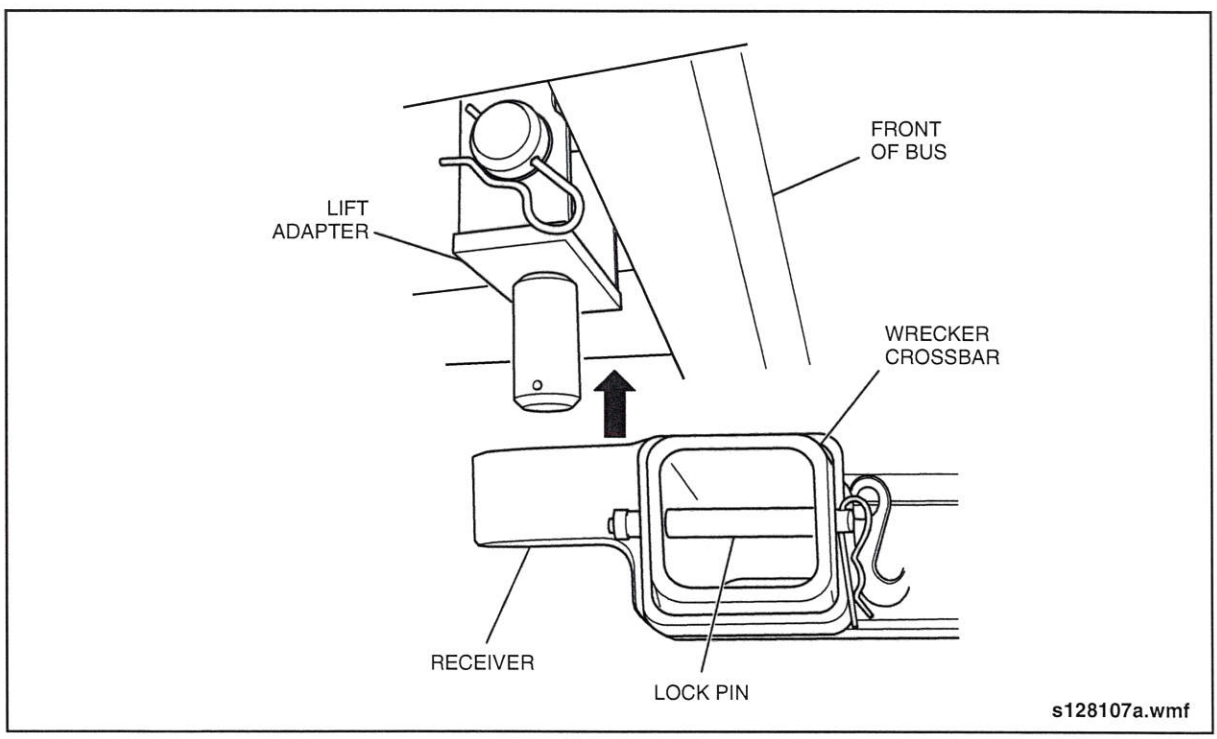
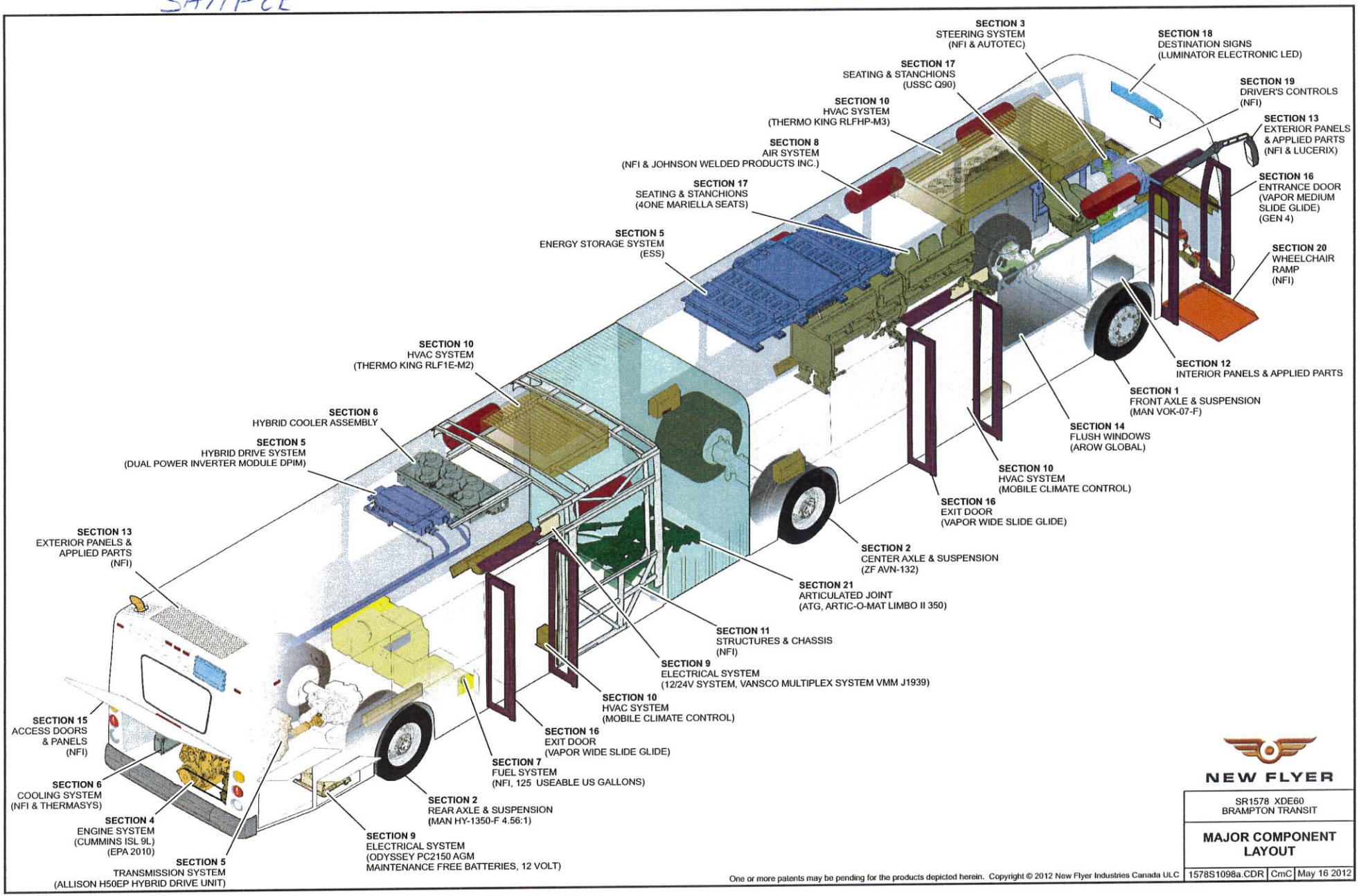


Fig. GI-25: Securing the Lift Receivers to the Lift Adapters

SAMPLE



NEW FLYER

SR1578 XDE60
BRAMPTON TRANSIT

MAJOR COMPONENT LAYOUT

1578S1098a.CDR | CmC | May 16 2012

NEW FLYER

XCELSIOR
BETTER BY DESIGN

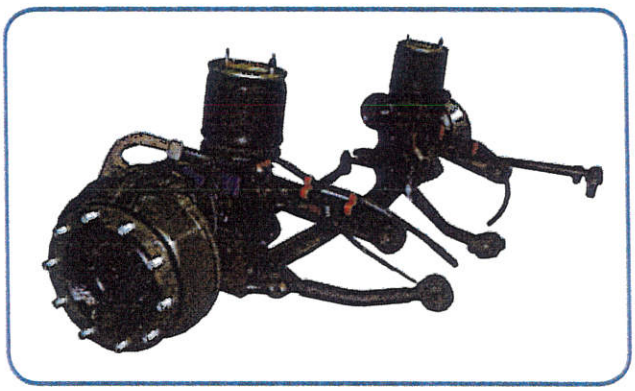
SALES INFORMATION BULLETIN

#203-002 | **Model:** Xcelsior | **Lengths:** ALL | **Propulsions:** DSL, CNG, LNG, ELEC

Front Axle and Suspension

Product Features

The front suspension system consists of the front axle with disc brakes and its brake components: air springs (bellows), height control valves, radius arm assembly, shock absorbers, axle stops and mechanical brake components. Front axle can be fitted with an anti-lock brake system (ABS). This suspension design also consists of a steering damper located in the curb-side wheel-well. Wheel parts are swivel–mounted on king-pins.



Benefits

- An estimated cost savings of $1,225 over 12 years for all disc brakes (front and rear) compared to drum brakes
- Less brake noise
- Brakes run cooler
- Larger suspension travel (4" jounce – 4" rebound) to allow for better suspension travel and a smoother ride for customers
- Drop axle allows for lower kneeling and better ramp slope

AXLE SPECIFICATIONS

Manufacturer	M.A.N.
Model Number	VOK-07F
Type	Cast iron dropped beam with hollow center section, steered, non-driven
Lubrication	M.A.N. utilizes non-serviceable, maintenance-free wheel bearings
Gross axle weight rating	15,873 lbs

Operations

Knorr Brakes

Brakes contain internal automatic adjustments.

Ride Height

Suspension travel consists of 4" jounce and 4" rebound. Ride height for the front suspension is measured between the axle beam and the rubber stop mounted to the frame of the vehicle.

Height Control Valve

The height of the air springs is controlled by height control valves on both front and rear axles. One height control valve on the front axle retains the height of the body in relation to the axle under all loading conditions. The valve has three ports (one for air supply, one for air springs and one for exhaust) and a control arm. A two degree "center dead zone" allows for minor bounces in the suspension without modifying the ride height. Barksdale Leveling Valves are standard.

Radius Arm Assemblies

The front axle is positioned at the front by four rubber bushed radius arm assemblies, which are also the reaction members of the driving, braking and cornering forces from the road to the bus understructure. The radius rods have been specially designed for reduced axle noise.

Shock Absorbers

The two KONI front shock absorbers are a double-acting, telescoping type and consist of a piston assembly, a piston rod, a compression head assembly, an inner cylinder, an intermediate cylinder, a dust tube, and a rod seal.

NEW FLYER

XCELSIOR
BETTER BY DESIGN

SALES INFORMATION BULLETIN #203-001

Axle Stops

Elastomeric axle stops are provided between the axle and frame on each side of the axles to prevent axle and/or frame damage in severe bounce conditions and to allow emergency operation of the vehicle if one or more air bellows are deflated. Front axle stops are incorporated internally in the front air spring/bellows.

NEW FLYER

XCELSIOR
BETTER BY DESIGN

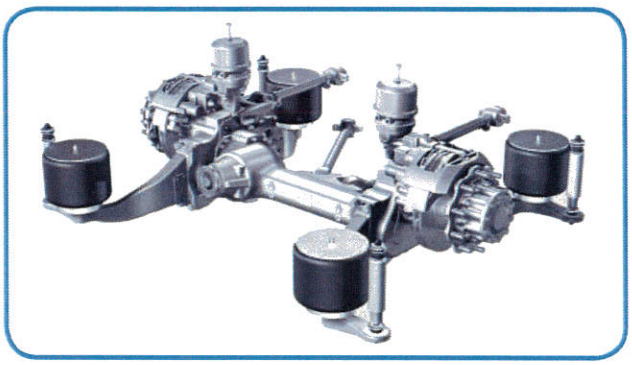
SALES INFORMATION BULLETIN

#204-003 | **Model:** Xcelsior | **Lengths:** 60FT | **Propulsions:** DSL, CNG, LNG, ELEC

Center Axle

Product Features

The center axle with disc brakes and suspension installation consists of a ZF AVN 132 axle. The special design of the drop-center axle makes it possible to lower the floor level of the bus at the center axle to only 405 mm. Passengers benefit from the more comfortable entrance and exit facilities.



Benefits

- An estimated cost savings of $1,225 over 12 years for all disc brakes (front, center and rear) compared to drum brakes
- Quicker passenger boarding and exiting
- Time spent at transit stops is reduced and overall transit times are also shorter
- The AV 132 is extremely quiet, a very welcome benefit in city buses considering their limited scope for sound insulation
- It is painted completely black except for the mounting surfaces which are coated with rust inhibitor

AXLE SPECIFICATIONS

Vehicle width	2500 - 2600 mm
Maximum axle load	11500 kg
Standard tire size	305/70R22.5 twin
Standard wheel size	22.5" x 8.25"
Brakes	Disc
Axle weight (oil filled)	589 kg
Axle system weight	799 kg

Operations

Center Axle

The center suspension beams are integrated into the axle. The assembly incorporates four mounting pads for the air springs, mount supports for the four shock absorbers and four lower radius rods.

Air Springs (Bellows)

The air springs act as the vertical flexible connection between the axles and body to minimize road shocks. Four rolling lobe-type bellows are standard for the center suspension. The bellows are mounted to the suspension beams which are bolted to the center axle.

Height Control Valve

The height of the air springs is controlled by height-control valves on both front, center and rear axles. Two Barksdale height-control valves on the center axle retain the height of the body in relation to the axles under all loading conditions. Each valve has three ports (air supply, air springs, and exhaust). A two degree "center dead zone" allows for minor bounces in the suspension, without modifying the ride height.

Radius Arm Assemblies

The center axle has four rubber-bushed (lubrication-free) radius rods to locate the axle position and to transmit the driving, braking, and cornering forces from the road to the bus understructure. The radius rods have been specially designed for reduced axle noise. Stabilizer bars are not utilized.

Shock Absorbers

The four KONI center shock absorbers are a double-acting, telescoping type and consist of a piston assembly, piston rod, compression head assembly, inner cylinder, intermediate cylinder, dust tube, and a rod seal.

Axle Stops

Elastomeric axle stops are provided between the axle and frame on each side of the axles to prevent axle and/or frame damage in severe bounce conditions and to allow emergency operation of the vehicle if one or more air bellows are deflated.

NEW FLYER

XCELSIOR
BETTER BY DESIGN.

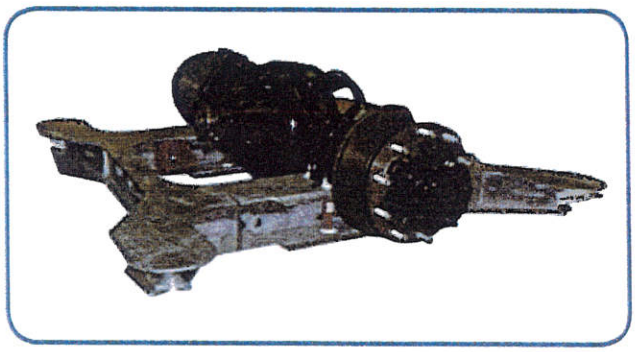
SALES INFORMATION BULLETIN

#204-002 | **Model:** Xcelsior | **Lengths:** 35FT, 40FT, 60FT | **Propulsions:** DSL, CNG, LNG, ELEC

Rear Axle and Suspension

Product Features

The rear axle with disc brakes and suspension installation consists of a M.A.N. HY-1336-F axle and a rear suspension assembly. The air springs and shock absorbers are mounted to structural supports in support brackets in the vehicle structure. Two lower radius rods are bolted to the main beam of the suspension unit and to mounting blocks in the vehicle structure. Two upper radius rods connect the axle housing to mounting blocks in the vehicle structure. The brake chambers are mounted directly to the disc brake caliper.



Benefits

- An estimated cost savings of $1,225 over 12 years for all disc brakes (front and rear) compared to drum brakes
- Less brake noise
- Brakes run cooler
- Noise reduction due to hypoid-gearing single-reduction rear axle
- Air bags moved outboard to offer better ride quality and less body roll

Operations

Rear Axle

This rigid, driven, non-steerable axle is made of high-quality spherical center castings, utilizing a single-stage power reduction gear train. Power is transferred through a differential/ hypoid gear set-up. The power flows from the transmission through the driveshaft to the pinion gear set and differential carrier.

Power is then transmitted along the left and right axle shafts to the corresponding wheel ends, which consists of unitized wheel bearings/hubs.

The wheels and tires represent the final stage of power transfer to the road surface.

(Please refer to attached MAN brochure for more information)

AXLE SPECIFICATIONS

Maximum Axle Load	28.660 lbs
Input Torque	7080.59 lbs-ft
Overall width without tires	83.42 inches
Width across brake drums/hubs	73.27 inches
Spring Track	37.52 inches
Flange to axle centerline, horizontal	2.17 inches
Flange to axle centerline, cross-serrated	15.41 inches
Qty. of wheel studs / hole circle diameter	10/335 mm
Weight without wheels, with oil	1455.05 lbs

Rear Suspension

The rear suspension assembly consists of a one-piece galvanized steel suspension beam assembly. The assembly incorporates four mounting pads for the air springs, mount supports for the four shock absorbers, two lower radius rods and the rear axle.

Air Springs (Bellows)

The air springs act as the vertical flexible connection between the axles and body to minimize road shocks. Four rolling lobe-type bellows are standard for the rear suspension. The bellows are mounted to a suspension frame which is bolted to the rear axle.

Height Control Valve

The height of the air springs is controlled by height-control valves on both front and rear axles. Two Barksdale height-control valves on the rear axle retain the height of the body in relation to the axles under all loading conditions. Each valve has three ports (air supply, air springs and exhaust). A two degree "center dead zone" allows for minor bounces in the suspension, without modifying the ride height.

Radius Arm Assemblies

The axle is positioned at the rear by rubber-bushed radius arm assemblies, which are also the reaction members of the driving, braking and cornering forces from the road to the bus understructure. The rear axle has four rubber-bushed (lubrication-free) radius rods to locate the axle position and to transmit the driving, braking, and cornering forces from the road to the bus understructure. The radius rods have been specially for reduced axle noise. Stabilizer bars are not utilized.

Shock Absorbers

The four KONI rear shock absorbers are a double-acting, telescoping type and consist of a piston assembly, piston rod, compression head assembly, inner cylinder, intermediate cylinder, dust tube, and a rod seal.

Axle Stops

Elastomeric axle stops are provided between the axle and frame on each side of the axles to prevent axle and/or frame damage in severe bounce conditions and to allow emergency operation of the vehicle if one or more air bellows are deflated.

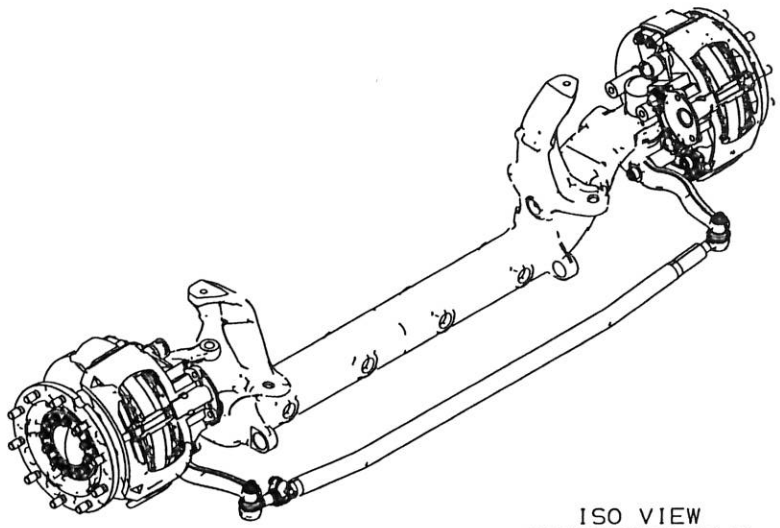
NOTE: FOR INSTALLATION DRAWINGS PLEASE REFER TO ATTACHED MRP BOM SHEET FOR PARTS LISTING

DESCRIPTION: FRONT AXLE ASSEMBLY
C/W DISC BRAKES SYSTEM

VENDOR: MAN

MODEL: VOK-07-F

VENDOR PN. 86.44000.6033



ISO VIEW
REFERENCE ONLY

SPECIFICATION:
- CAPACITY.....7,200 KG (15,873 LB)
- WHEEL TURNING ANGLE, OUTWARD..... 53°
  INWARD..... .37.75°
- CASTER ANGLE.....3°
- CAMBER (NO LOAD).....1°
- KINGPIN INCLINATION.....7°
- RECOMMENDED TOE IN.....0° TO -0°5'
- AXLE OVERALL LENGTH (NO WHEELS)..... 2,583 MM (101.69")
- WHEEL HUB FACE TO FACE WIDTH..... 2,499 MM (98.39")
- HUB PILOT WHEEL MTG PROVISION
  FOR STEEL OR ALUMINUM WHEEL INSTALLATION
  (NO CHARACTERISTIC OF THE BUS SHOULD
  BE COMPROMISED BY USING EITHER STEEL OR ALUMINUM WHEELS
  WITH 305/70R22.5 OR 275/70-R22.5 TIRE AND 22.5x8.25 RIM)
- WHEEL STUD M22 X 1.5 AT 335 MM BCD EQUALLY SPACED,
  PROTRUDING LENGTH 42.0 MM (NUTS NOT SUPPLIED)
- LOW MAINTENANCE WHEEL BEARINGS (HUB UNITS)
- PAINT COMPLETE ASSEMBLY BLACK WITH EPOXY PAINT
  EXCEPT FOR MOUNTING SURFACES WHICH
  SHOULD BE COATED WITH RUST INHIBITOR

BRAKES:
- ABS EQUIPPED (WABCO MERITOR SENSOR, 2000 MM LONG HARNESS)
- KNORR SN7000, 0° CYLINDER ANGLE
  - CALIPER LH MAN P/N 81.50804.6507
  - CALIPER RH MAN P/N 81.50804.6508
- LINING: FERODO 4567 (MAN P/N 81.50820.6061)
- EBS CALIPER WITH PORT PLUGGED
- FMVSS 121 & CMVSS COMPLIANT.

COMPONENTS TO BE SUPPLIED:
- AXLE ASSY WITH WHEEL ENDS & CALIPERS
- ATTACHMENTS FOR 4 RADIUS RODS
- STEERING ARM (MAN P/N 81.46705.0465)
- ASSOCIATED HARDWARE

NOTE:
SIMILAR TO 425525 EXCEPT WITHOUT BRAKE PAD
"END OF LIFE" WEAR INDICATOR SENSOR.

DO NOT SCALE DRAWING		
DIMENSIONS IN [ ] ARE IN m.m.		
THD ANGLE		
BY	NAME	DD-MMM-YY
DRAWN	C.G.D.	14-OCT-10
CHK'D		14-Oct-10
APP'D		14-Oct-10

REV	DESCRIPTION	ECO
C	1. REMOVED NOTE "WITH CONTINUOUS ELECTRONIC BRAKE PAD WEAR INDICATOR" 2. ADDED NOTE "EBS CALIPER WITH PORT PLUGGED" 3. ADDED 'SIMILAR TO' NOTES AT [A2] & [A5]	211839

MATERIAL N/A	UNSPEC'D TOLS.	DEC.IN.	TITLE: AXLE-MAN FRT VOK 07F DISC EBS
WEIGHT 1102 LBS	.X .XX .XXX HOLE DIA. BEND RADII. ANGLE TOL.	±.12 ±.06 ±.03 ±.015 ±.03 ±1°	NEW FLYER
TREATMENT NONE	SIMILAR TO 425525		PART Nº 400559 (NX)
			SCALE NTS / C / SHEET 1 OF 1

REPORT ALL ERRORS TO ENG. DEPT.

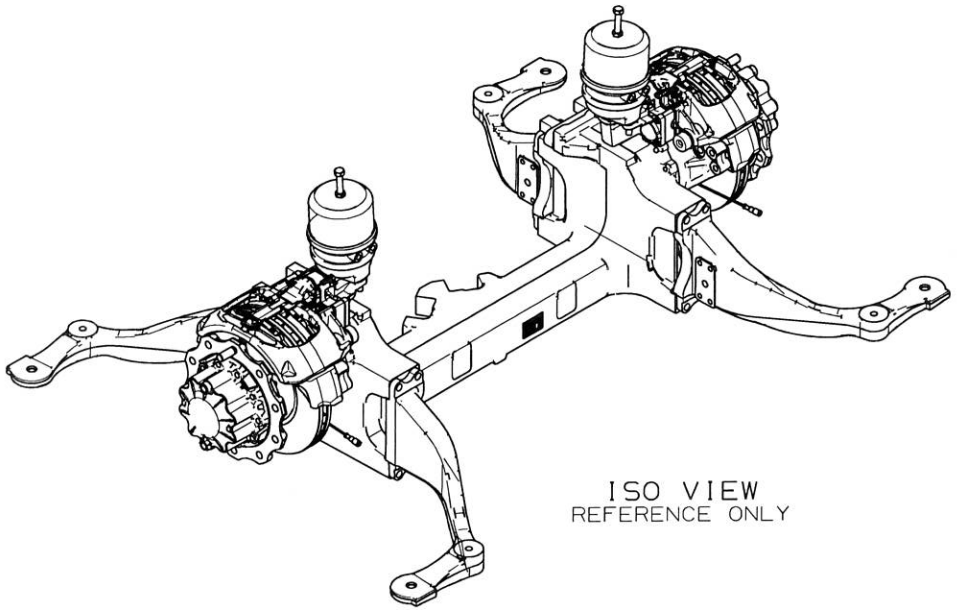
NOTE: FOR INSTALLATION DRAWINGS PLEASE REFER TO ATTACHED MRP BOM SHEET FOR PARTS LISTING

DESCRIPTION: CENTER AXLE ASSEMBLY
C/W DISC BRAKES SYSTEM

VENDOR: ZF PASSAU

MODEL: AVN132-NFI

VENDOR PN: 4472_036_643



ISO VIEW
REFERENCE ONLY

SPECIFICATION:

- CAPACITY..... 11,500 kg (25,350 LB)
- AXLE OVERALL LENGTH (NO WHEELS).. 2,143 mm [84.33"]
- WHEEL HUB FACE TO FACE WIDTH..... 1,887 mm [74.29"]
- HUB PILOT WHEEL MOUNTING PROVISION FOR STEEL OR ALUMINUM WHEEL INSTALLATION (NO CHARACTERISTIC OF THE BUS SHOULD BE COMPROMISED BY USING EITHER STEEL OR ALUMINUM WHEELS WITH 305/70R22.5 OR 275/70R22.5 TIRE AND 22.5x8.25 RIM)
- 10 WHEEL STUDS M22x1.5 AT 335 mm BCD EQUALLY SPACED PROTRUDING LENGTH 55 mm (NUTS NOT SUPPLIED)
- AIR SPRING ATTACHMENT BOLT SPAN
  - FORE/AFT..... 1,490 mm [58.66"]
  - CROSS/CAR..... 1,562 mm [61.50"]
- LOW MAINTENANCE WHEEL BEARINGS (HUB UNITS)
- PAINT COMPLETE ASSEMBLY BLACK EXCEPT FOR MOUNTING SURFACES THAT ARE TO BE COATED WITH RUST INHIBITOR

BRAKES:

- ABS EQUIPPED (WABCO MERITOR SENSOR, 2,000 mm LONG HARNESS)
- CALIPERS WITH 3.0° CYLINDER ANGLE
  ZF P/N'S(*TBD* RH, *TBD* LH)
  KNORR P/N'S(SN7086-K014997 LH, SN7096-K014998 RH)
- LINING: FERODO 4567 (ZF P/N *TBD*)(KNORR P/N K015073)
- WITH CONTINUOUS ELECTRONIC BRAKE PAD WEAR INDICATOR
- WITH SIZE 20/24 BRAKE CHAMBERS (ZF P/N *TBD*)
- FMVSS 121 & CMVSS COMPLIANT

INTERFACES TO BE MACHINED FOR NFI USE:

- RADIUS ROD ATTACHMENTS
- AIR SPRING SUPPORTS
- SHOCK ABSORBER BRACKET ATTACHMENTS
- LEVELING VALVE ROD BRACKET ATTACHMENTS

COMPONENTS TO BE SUPPLIED WITH AXLE ASSY:

- WHEEL ENDS, CALIPERS & BRAKE CHAMBERS
- ASSOCIATED ASSEMBLY AND INSTALLATION HARDWARE
- WEIGHT WITHOUT WHEELS ..... *TBD* kg [*TBD* LBS]

DO NOT SCALE DRAWING			
DIMENSIONS IN [ ] ARE IN m.m.			
THD ANGLE			
BY	NAME	DD-MMM-YY	
DRAWN	Z.I.P.	11-FEB-10	
CHK'D		03-Mar-10	B
APP'D		09-Mar-10	REV

REV	DESCRIPTION	ECO
B	1. TITLE WAS AXLE-CTR ZF 13T X60 2. NOTE VENDOR PN: 4472_635_479 WAS VENDOR PN: 4472_036_643 3. NOTE - CAPACITY...11,500 kg (25,350 LBS) WAS - CAPACITY...13,000 kg (28,660 LBS) 4. NOTES UPDATED WITH AVAILABLE PART NUMBERS 5. NOTES UPDATED TO REFLECT RADIUS RODS AND OIL REMOVAL FROM ASSEMBLY 6. PICTORIAL UPDATE	200643

MATERIAL N/A	UNSPEC'D TOLS.	DEC. IN.
WEIGHT TBD	.X ±.12 .XX ±.06 .XXX ±.03 HOLE DIA. ±.015 BEND RADII. ±.03 ANGLE TOL. ±1°	
TREATMENT SEE SPECS	SIMILAR TO	

TITLE: AXLE-CTR ZF 11.5T X60

NEW FLYER

PART Nº 387829 (NX)

SCALE NTS | C | SHEET 1 OF 1

REPORT ALL ERRORS TO ENG. DEPT.

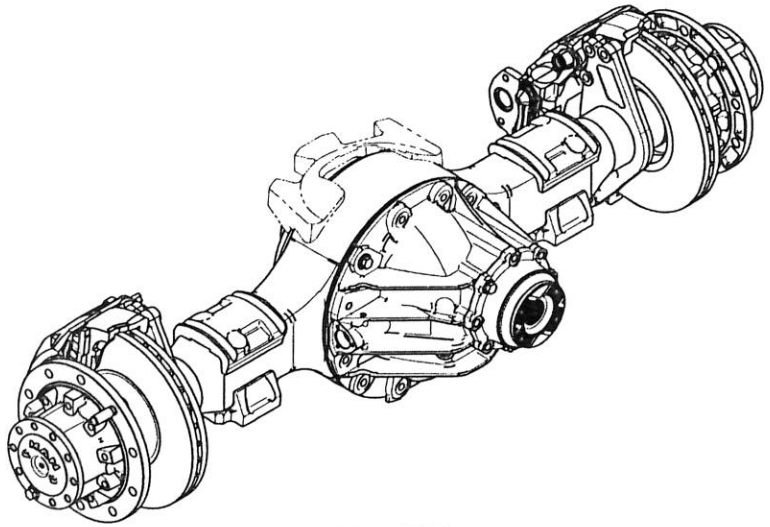
NOTE: FOR INSTALLATION DRAWINGS PLEASE RE[illegible]O ATTACHED MRP BOM SHEET FOR PARTS LISTING

DESCRIPTION: REAR AXLE ASSEMBLY
C/W DISC BRAKES SYSTEM

VENDOR: MAN

MODEL: HY-1350-F

VENDOR PN: 86.3501.6374



ISO VIEW
REFERENCE ONLY

SPECIFICATION:

- GEAR RATIO..... 4.56
- CAPACITY.....13,000 kg [28,660 LB]
- AXLE OVERALL LENGTH (NO WHEELS)..... 2,123 mm [83.58"]
- WHEEL HUB FACE TO FACE WIDTH.....1,861 mm [73.27"]
- HUB PILOT WHEEL MOUNTING PROVISION
  FOR STEEL OR ALUMINUM WHEEL INSTALLATION
  (NO CHARACTERISTIC OF THE BUS SHOULD
  BE COMPROMISED BY USING EITHER STEEL OR ALUMINUM WHEELS
  WITH 305/70R22.5 OR 275/70R22.5 TIRE AND 22.5x8.25 RIM)
- 10 WHEEL STUDS M22x1.5 AT 335 mm BCD EQUALLY SPACED
  PROTRUDING LENGTH 59 mm (NUTS NOT SUPPLIED)
- LOW MAINTENANCE WHEEL BEARINGS (HUB UNITS)
- CROSS-SERATED FLANGE (ISO 8667-T155)
  - HORIZONTAL OFFSET..... 70 mm
  - VERTICAL OFFSET..... 30 mm
  - AXIS TO FLANGE CONTACT DISTANCE..... 402 mm
- AXLE MOUNTING PAD / PINION ANGLE.....4.25°
- AXLE PAD DOWEL PIN HOLES DIA 28 mm (2+2 PLCS)
- PAINT COMPLETE ASSEMBLY BLACK EXCEPT FOR MOUNTING SURFACES
  THAT ARE TO BE COATED WITH RUST INHIBITOR

BRAKES:

- ABS EQUIPPED (WABCO MERITOR SENSOR, 2,000 mm LONG HARNESS)
- KNORR SN7000, 0° CYLINDER ANGLE
  - CALIPER LH 22.5" (MAN P/N 81.50804.6507)
  - CALIPER RH 22.5" (MAN P/N 81.50804.6508)
- LINING: FERODO 4567 (MAN P/N 81.50820.6061)
- EBS SENSOR PORT PLUGGED
- FMVSS 121 & CMVSS COMPLIANT

COMPONENTS TO BE SUPPLIED WITH AXLE ASSY:

- WHEEL ENDS & CALIPERS
- CROSS-SERATED FLANGE (ISO 8667-T155)
- MEMBRANE BREATHER (MAN P/N 81.35306-0035)
- BREATHER TUBE COILED AND SECURED TO THE AXLE (MAN P/N *TBD*)
- ASSOCIATED ASSEMBLY AND INSTALLATION HARDWARE

DO NOT SCALE DRAWING		
DIMENSIONS IN [ ] ARE IN m.m.		
THD ANGLE		
BY	NAME	DD-MMM-YY
DRAWN	T.C.	12-APR-13
CHK'D		
APP'D		

REV	DESCRIPTION	ECO
B	1. VENDOR PN WAS "TBD". 2. ANNOTATION IN "BRAKES" AND "COMPONENTS TO BE ..." UPDATED. 3. MODEL UPDATED WITH CORRECT FLANGE.	ECN-018834

MATERIAL	UNSPEC'D TOLS.	DEC. IN.
N/A	.X	±.12
	.XX	±.06
	.XXX	±.03
	HOLE DIA.	±.015
	BEND RADII.	±.03
	ANGLE TOL.	±1°
WEIGHT 1453 LBS		
TREATMENT SEE SPECS	SIMILAR TO	

TITLE: AXLE-RR MAN 13T 4.56 W/FLG X60

NEW FLYER

PART Nº 387720 (NX)

SCALE NTS | C | SHEET 1 OF 1

REPORT ALL ERRORS TO ENG. DEPT.

2. ENGINE & ACCESSORIES

2.1. Cummins ISL 9.0L (EPA 2013) Engine

2.1.1. Description

The Cummins ISL9 engine is an 8.9 liter, four-stroke, inline, six cylinder, diesel engine. See "Fig. 4-1: Engine Views" on page 3.

The major components and accessories of the engine are:

- ❒ Fuel System (Refer to Section 7 of this manual).
- ❒ Engine Protection System
- ❒ Air Intake System
- ❒ Exhaust System
- ❒ Engine Switch Box
- ❒ Electronic Control Module (ECM)

2.1.2. Engine Specifications

Rated Power ..... 330 HP @ 2000 RPM

Peak Torque ..... 1100 ft-lb. @ 1300 RPM

Displacement..... 8.9 liters (540 cu. in.)

Firing Order 1-5-3-6-2-4

Aspiration ..... Turbo Charge

Engine Weight (dry) ..... 1678 lb. (761 kg)

Oil Capacity (including filter) ..... 28 U.S. qt. (26.5 liters)

Coolant Capacity (engine only) ..... 13.1 U.S. qt. (12.4 liters)

Refer to the Cummins Operation & Maintenance Manual for further information on the engine.

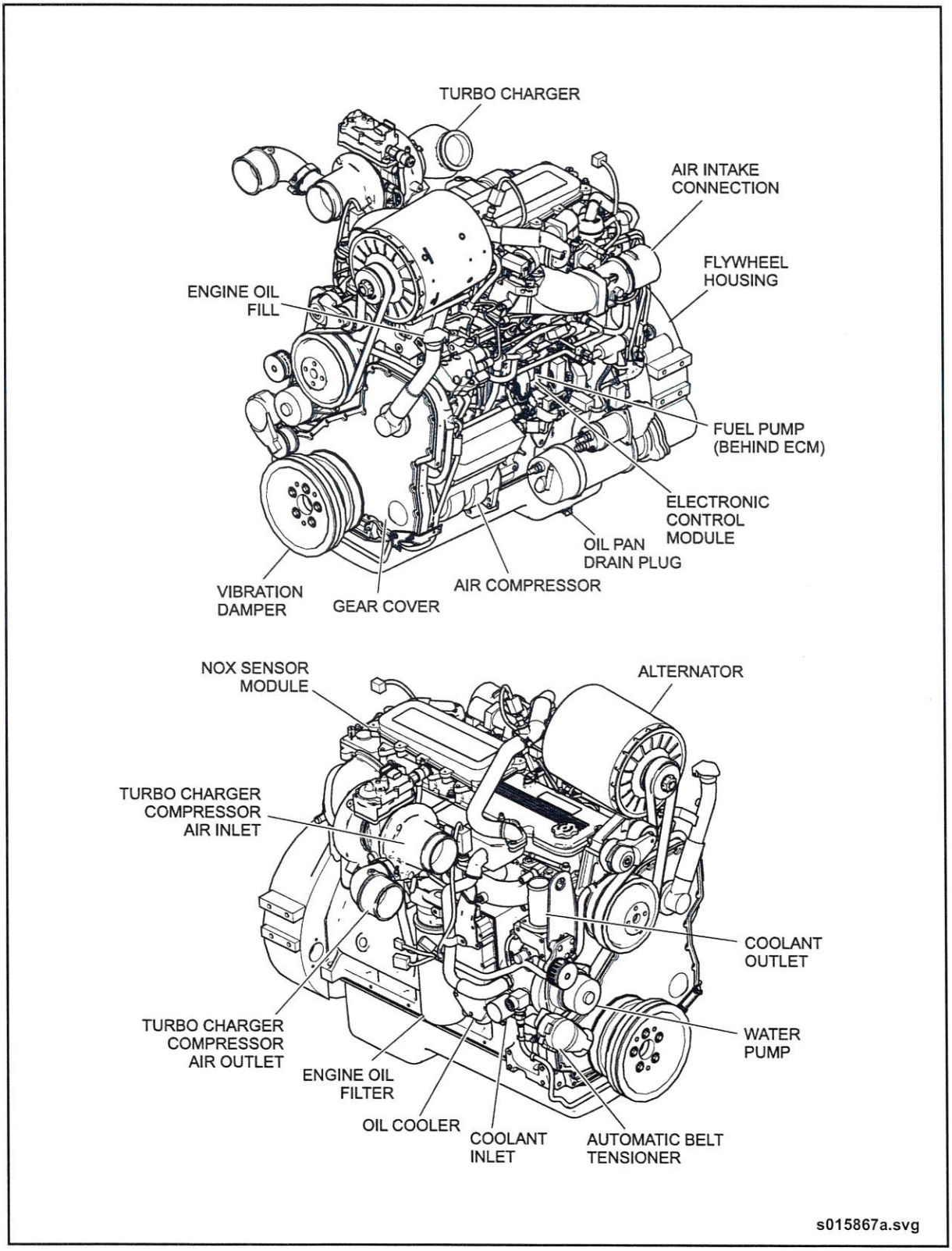


Fig. 4-1: Engine Views