



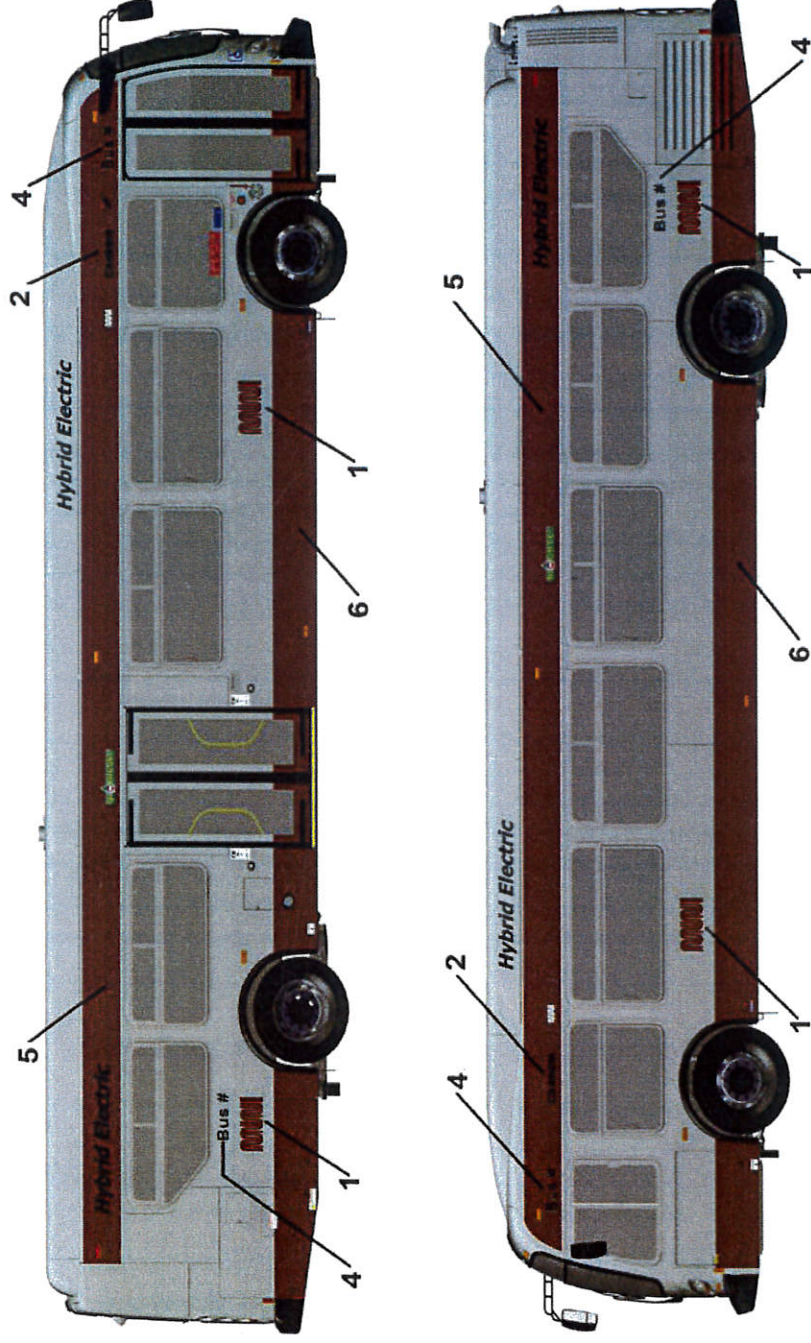
CITY AND COUNTY OF SAN FRANCISCO
San Francisco Municipal Transportation Agency
Request for Proposals
THE PROCUREMENT OF
30-Foot, 40-FOOT AND 60-FOOT LOW FLOOR
DIESEL HYBRID COACHES

Proposal Section	Title	Bid Submission Requirements
3-A	External and chassis dimensions and layouts	<ol style="list-style-type: none">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 and rear axles including drawings. Lastly, we are including specifications with regards to our base engine offering; the Cummins ISB 6.7 L.

For the optional Allison system we are proposing the Cummins ISL330 with the Allison EV50.

ATTACHMENT 3: DECAL (EXTERIOR NUMBERING)



Two side views of Muni Hybrid Electric bus:

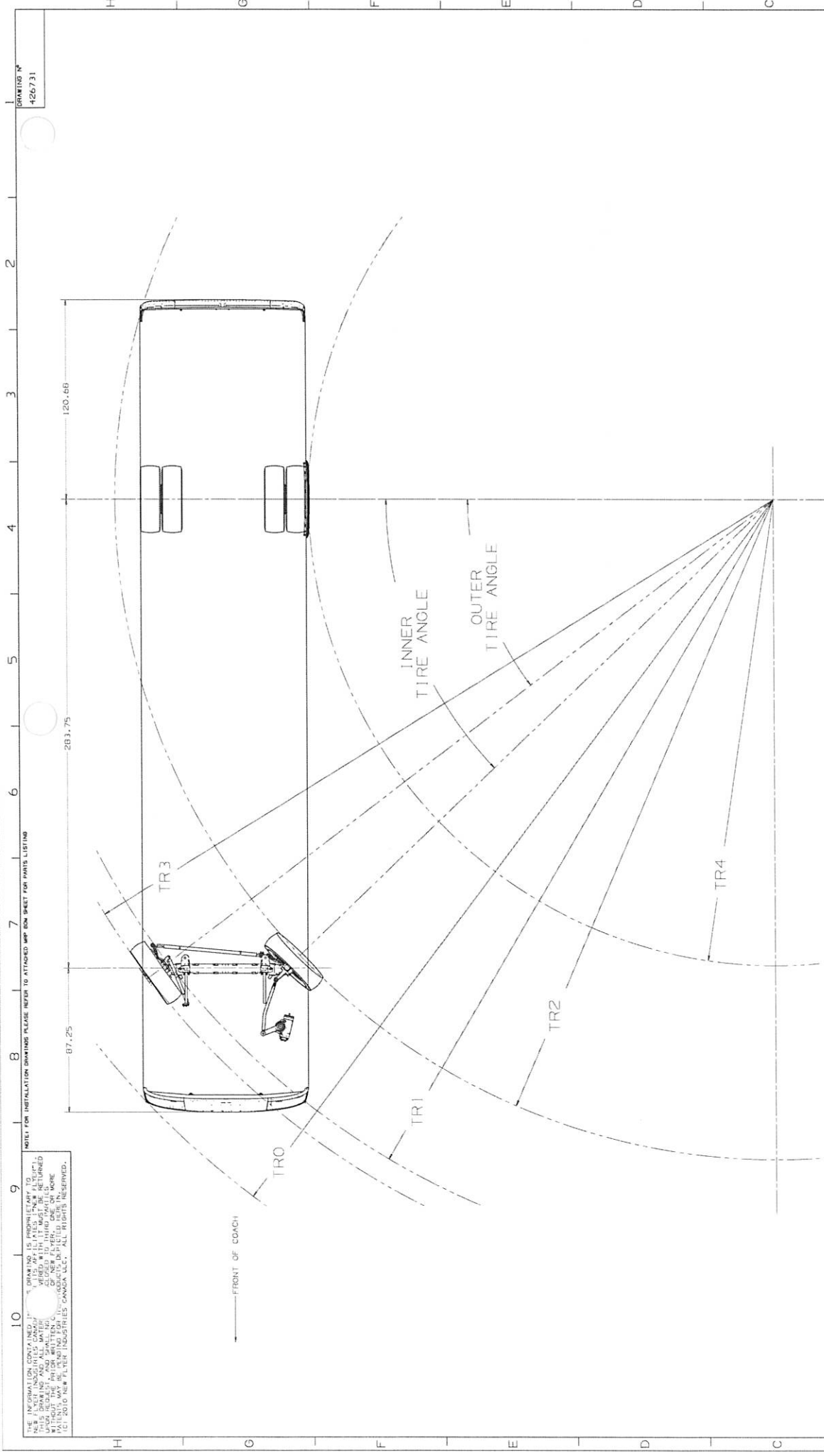
1. MUNI – 10 inch Cardinal Red Reflective
2. ICC#2 in Helvetic CA 49810
3. Bus Number 4" White
4. Bus Number 4" Black
5. Paint Strip in Cardinal Red
6. Decal, Skirt Panel in Cardinal Red

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 – Cardinal Red # 916 SP
3. Skirt Decal – Cardinal Red # 916 SP



TIRE (SEE COACH CONFIG.)	RIM (SEE COACH CONFIG.)	UNIT		FIRESTONE		GOODYEAR		BRIDGESTONE		MICHELIN	
		AL	STEEL	AL	STEEL	AL	STEEL	AL	STEEL	AL	STEEL
TR0		FT	43.5	44	43	44	44	44	44	43	44
TR1		FT	38.2	38.6	38.6	38.6	38.6	38.6	38.6	37.8	38.6
TR2		FT	32.7	33.3	33.4	33.3	33.3	33.3	33.3	32.3	33.3
TR3		FT	39.4	39.9	39.9	39.9	39.9	39.9	39.8	38.7	39.8
TR4		FT	22.8	23.5	23.5	23.5	23.5	23.5	23.5	22.1	23.6
INNER TIRE ANGLE		°	44.5	43.8	43.7	43.7	43.7	43.7	43.7	45.3	43.7
OUTER TIRE ANGLE		°	37.9	37.3	37.3	37.3	37.3	37.3	37.3	38.6	37.3
PROPERTY (SEE NOTES)											

NOTES:

- THE TURNING RADIUS VALUES ARE DEPENDENT ON THE FOLLOWING CONDITIONS DURING TESTING:
 - STEERING ROTATED TO MECHANICAL STOP (MAXIMUM ANGLE);
 - DRIVING SURFACE LEVEL LESS THAN 5 MPH, 10 MPH, 15 MPH, 20 MPH, 25 MPH, 30 MPH, 35 MPH, 40 MPH, 45 MPH, 50 MPH, 55 MPH, 60 MPH, 65 MPH, 70 MPH, 75 MPH, 80 MPH, 85 MPH, 90 MPH, 95 MPH, 100 MPH, 105 MPH, 110 MPH, 115 MPH, 120 MPH, 125 MPH, 130 MPH, 135 MPH, 140 MPH, 145 MPH, 150 MPH, 155 MPH, 160 MPH, 165 MPH, 170 MPH, 175 MPH, 180 MPH, 185 MPH, 190 MPH, 195 MPH, 200 MPH;
 - TEST INITIATED BY DRIVING THE COACH 50°;
 - RECORDING ONE WAY THE TURNING TEST IS ABOVE 50° (110° C);
 - COACH IS CONFIGURED AS SHOWN BELOW.
- THE PROPERTY FIELD IS PURPOSELY BLANK. IT IS USED BY IDENTIFY WHICH TIRE & RIM COMBINATION AND CORRESPONDING TURNING RADIUS VALUES THE PROPERTY WILL RECEIVE.

COACH CONFIGURATION:

- PLATFORM: 40' XCELSIOR
- AXLE: MAIN MODEL: VOK 07 F
- AXLE: FRONT MODEL: VOK 07 F
- RIM: 22" X B-25
- BLK/RACK: NONE
- ALIGNMENT SPEC: COMPONENTS WHILE SETTING THE TURN ANGLE.
- COACH AT CURB WEIGHT.

10 9 8 7 6 5 4 3 2 1

H G F E D C B A

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

283.75 120.66 87.25 213.75

FRONT OF COACH

INNER TIRE ANGLE

OUTER TIRE ANGLE

TR0 TR1 TR2 TR3 TR4

DRIVING IN 1

THIS SCALE (IN) 1:1

BY NAME (S) MM YY

DATE (J. J.) P. P. / 00 / 10

APP'D

REV

DESCRIPTION

9 8 7 6 5 4 3 2 1

SCALE: 1:1

REV 1 OF 1

TO SHEET 426731

THE INFORMATION CONTAINED HEREIN IS PROPRIETARY TO NEW FLYER INDUSTRIES COACH. IT IS APPLICABLE TO NEW FLYER LINES, LINES, BEANS, AND SPANIELS. IT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM. WITHOUT THE WRITTEN PERMISSION OF NEW FLYER INDUSTRIES CANADA LLC, ALL RIGHTS RESERVED.

MARKED TO THIS DRAWING TITLE

MATERIAL

WEIGHT

TREATMENT

SCALE: 1:1

REV 1 OF 1

TO SHEET 426731

SPEC-XCELSIOR TURNING RADIUS

NEW FLYER INDUSTRIES

DATE: 07/07/10

SCALE: 1:1

REV 1 OF 1

TO SHEET 426731



12.4.2. Rear Jacking Procedure



DO NOT attempt to jack the vehicle on an incline or on a rough or uneven surface.

1. Apply the park brake.
2. Ensure the front wheels are facing forward.
3. Place blocks in front of the front wheels.
4. Using a 10" bottle jack on a stable, level surface, jack the rear side of the vehicle as follows:
 - a. Locate the appropriate jack stand point under the frame rail at the rear of the vehicle. See "Fig. GI-20: Jacking (hoisting) Points & Stand Placement" on page 41.
5. Lower the vehicle using the bottle jack as follows:
 - a. Position the bottle jack under the jack stand point.
 - b. Raise the bottle jack to free the support blocks.
 - c. Remove the support blocks.
 - d. Lower and remove the bottle jack.
6. Remove the blocks from in front of the front wheels.

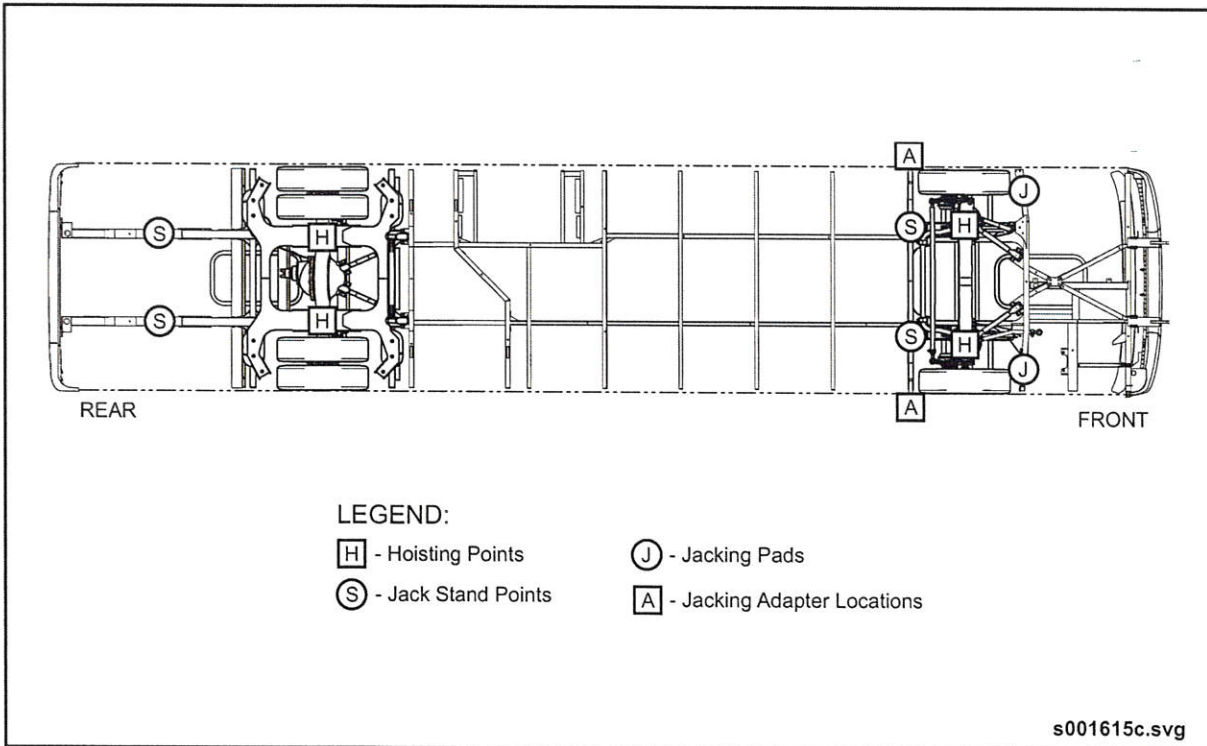


Fig. GI-20: Jacking (hoisting) Points & Stand Placement



VEHICLE TOWING

13.2.1.2. Towing Adapter Installation

1. Install each tow adapter into a receiver and locate with a clevis pin. See "Fig. GI-21: Flat Towing Adapter" on page 44.
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-22: Safety Chain" on page 45.
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.

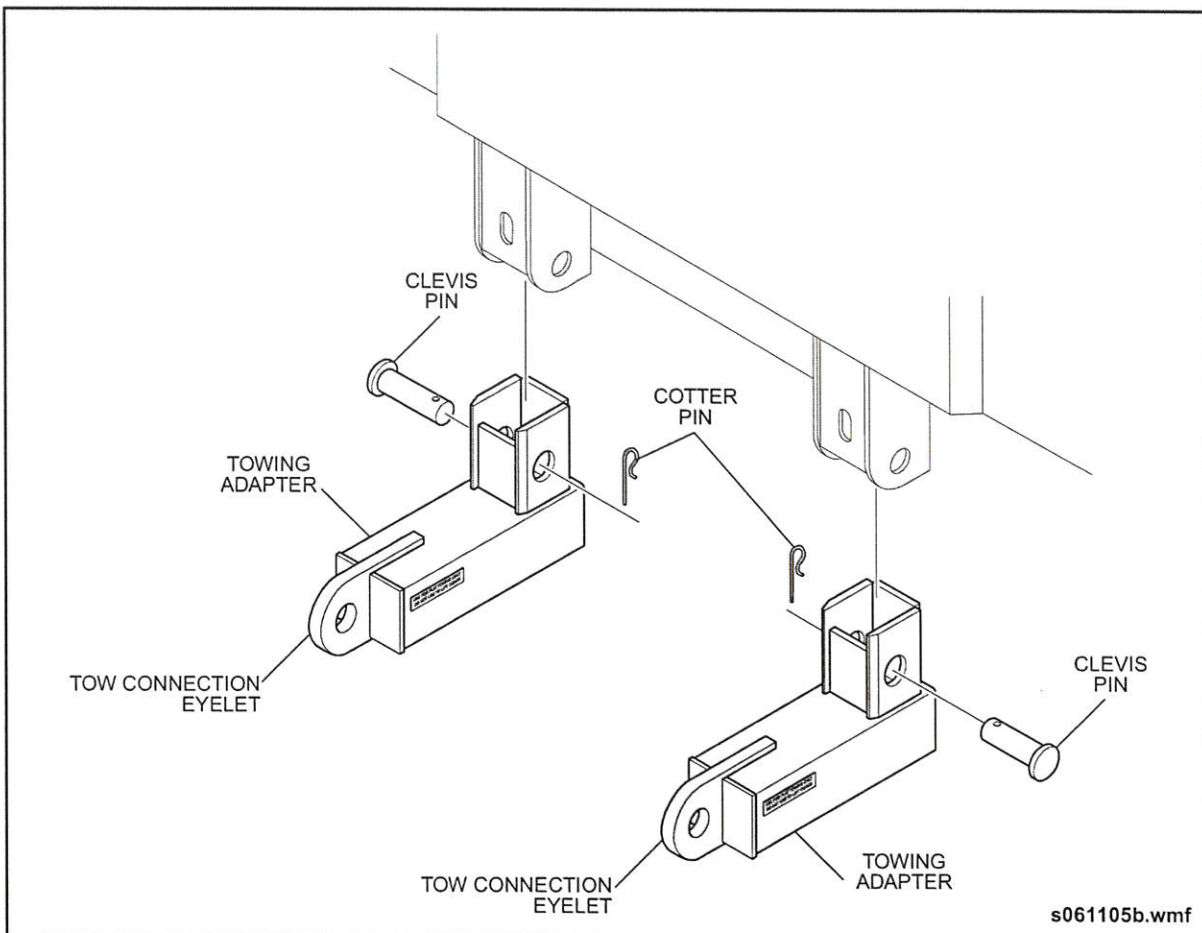
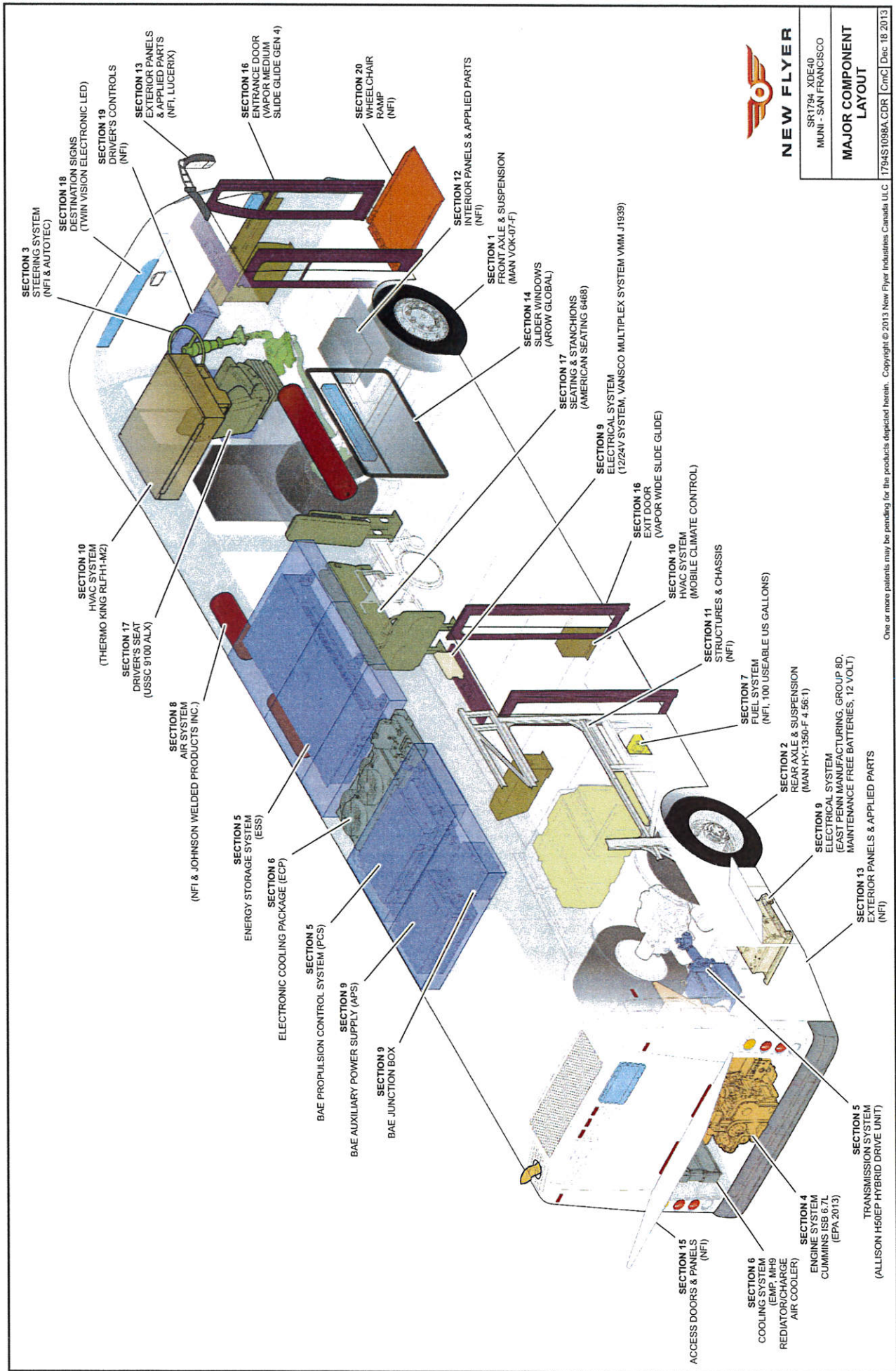


Fig. GI-21: Flat Towing Adapter



NEW FLYER

SRI794 XDE40
MUNI - SAN FRANCISCO

MAJOR COMPONENT LAYOUT



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

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.



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



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.

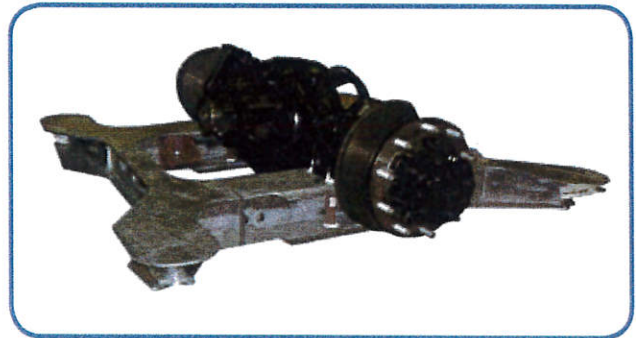
SALES INFORMATION BULLETIN

#204-002 | **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



NEW FLYER



XCELSIOR
BETTER BY DESIGN.

SALES INFORMATION BULLETIN

#204-001

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.

THE INFORMATION CONTAINED IN THIS DRAWING IS PROPRIETARY TO NEW FLYER INDUSTRIES CANADA U.L.C. OR ITS AFFILIATES. IT IS TO BE USED ONLY FOR THE MANUFACTURE OF THE PARTS IDENTIFIED HEREIN. MATERIALS AND DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE. THIS DRAWING AND MATERIALS ARE RELEASED TO THIRD PARTIES WITHOUT THE PRIOR WRITTEN CONSENT OF NEW FLYER. ONE OR MORE PATENTS MAY BE PENDING FOR THE PRODUCTS DEPICTED HEREIN. © 2010 NEW FLYER INDUSTRIES CANADA U.L.C. ALL RIGHTS RESERVED.

NOTE: FOR INSTALLATION DRAWINGS PLEASE REF

0 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

SPECIFICATION:

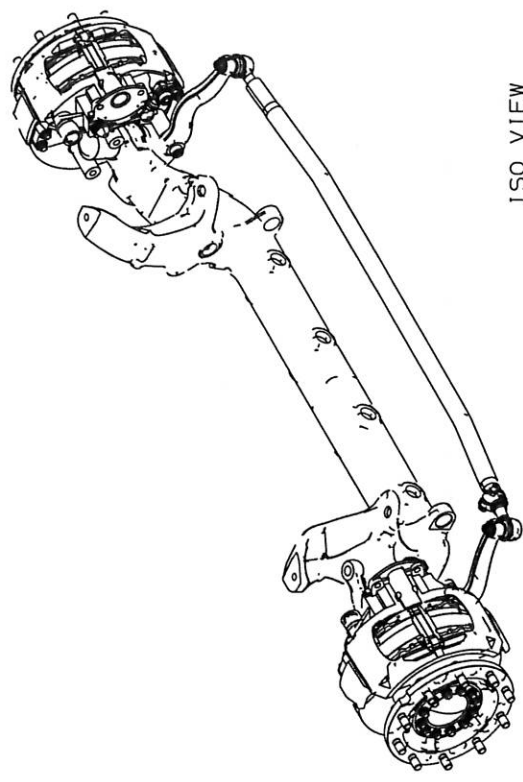
- CAPACITY.....7,200 KG (15,873 LB)
- WHEEL TURNING ANGLE, OUTWARD..... 53°
- WHEEL TURNING ANGLE, INWARD..... 37.75°
- CASTER ANGLE.....3°
- CAMBER (NO LOAD).....1°
- KINGPIN INCLINATION.....7°
- RECOMMENDED TOE IN.....0° TO -0°5'
- AXLE OVERALL LENGTH (NO WHEELS)..... 2,583 MM (101.69")
- WHEEL HUB 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)

- WHEEL 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 MERCITOR 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



ISO VIEW
REFERENCE ONLY

DO NOT SCALE DRAWING
DIMENSIONS IN 1
ARE IN mm.
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

NOTE: SIMILAR TO 425525 EXCEPT WITHOUT BRAKE PAD "END OF LIFE" WEAR INDICATOR SENSOR.	
DESCRIPTION	ECO
211839	

MATERIAL N/A	UNSPEC'D TOLS. .XX .XXX HOLE DIA. BEND RADII. ANGLE TOL.	DEC. IN. #.12 #.03 #.015 #.03 #.1	TITLE AXLE-MAN FRT VOK 07F DISC EBS
WEIGHT 1.102 LBS	SIMILAR TO 425525	SCALE NTS C	PART N° 400559
TREATMENT NONE		NEW FLYER	SHEET 1 OF 1
			REPORT ALL ERRORS TO ENG. DEPT.

THE INFORMATION CONTAINED IN THIS DRAWING IS PROPRIETARY TO NEW FLYER INDUSTRIES, CANADA ULC OR ITS AFFILIATES ("NEW FLYER"). THIS DRAWING AND ALL MATERIALS HEREON ARE TO BE USED BY THE USER WITHOUT THE PRIOR WRITTEN CONSENT OF NEW FLYER. ONE OR MORE PATENTS MAY BE PENDING FOR THE PRODUCTS DEPICTED HEREIN. (C) 2013 NEW FLYER INDUSTRIES CANADA ULC. ALL RIGHTS RESERVED.

NOTE: FOR INSTALLATION DRAWINGS PLEASE REF

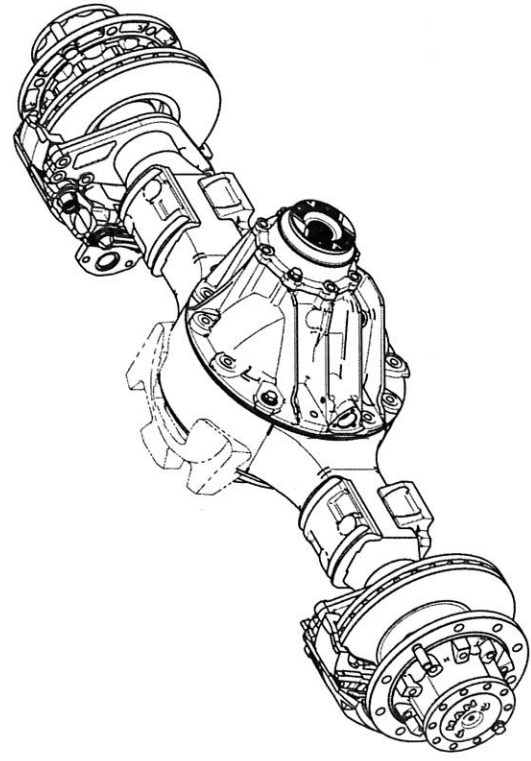
0 ATTACHED MRP BOM SHEET FOR PARTS LISTING

DESCRIPTION: REAR AXLE ASSEMBLY
C/W DISC BRAKES SYSTEM

VENDOR: MAN
MODEL: HY-1350-F
VENDOR PN: 86.3501.6374

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 (150 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



ISO VIEW REFERENCE ONLY

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 (150 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 INCHES
THD ANGLE
BY NAME DD-MMM-YY
DRAWN T.C. 12-APR-13
CHK'D
APP'D
REV
B
DESCRIPTION
ECO
ECN-018834

MATERIAL	UNSPEC'D TOLS.	DEC.IN.	TITLE
N/A	.XX .XXX HOLE DIA. BEND RADII. ANGLE TOL.	+12 +06 +03 +015 +1	AXLE-RR MAN 13T 4.56 W/FLG X60
WEIGHT	SIMILAR TO		PART N°
1453 LBS			387720
TREATMENT	SCALE		NTS
SEE SPECS	C		SHEET 1 OF 1





Cummins ISB 6.7L (EPA 2013) Engine

2. ENGINE & ACCESSORIES

2.1. Cummins ISB 6.7L (EPA 2013) Engine

2.1.1. Description

The Cummins ISB engine is a 6.7 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 280 HP @ 2400 RPM

Peak Torque 660 ft-lb. @ 1600 RPM

Displacement..... 6.7 liters (409 cu. in.)

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

Aspiration Turbo Charge

Engine Weight (dry) 1151 lb. (522 kg)

Oil Capacity (including filter)
..... 18.6 U.S. qt. (17.65 liters)

Coolant Capacity (engine only)
..... 12 U.S. qt. (11.5 liters)

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

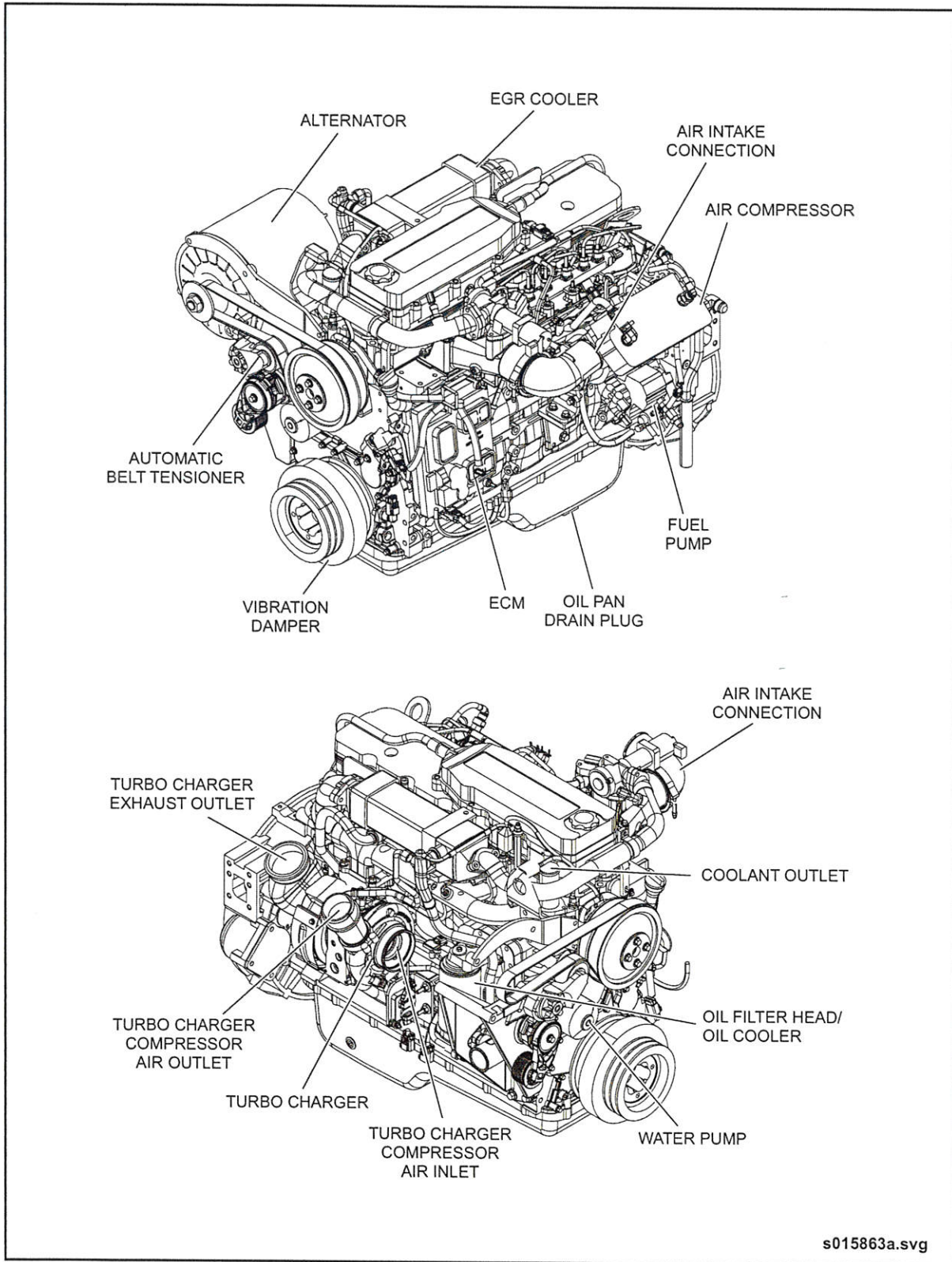


Fig. 4-1: Engine Views