APPENDIX A – SPECIFICATION SHEET – NEW FLYER 40’ AND 60’ BUS

SECTION A. GENERAL

A.1 Battery Electric Bus Specification

A.1.1 This Appendix provides the expected specifications for the two types of battery electric buses which are intended to be charged at the charging stations to be procured by this project. The estimated specifications are found in Table 1.

Table 1: Bus Specifications

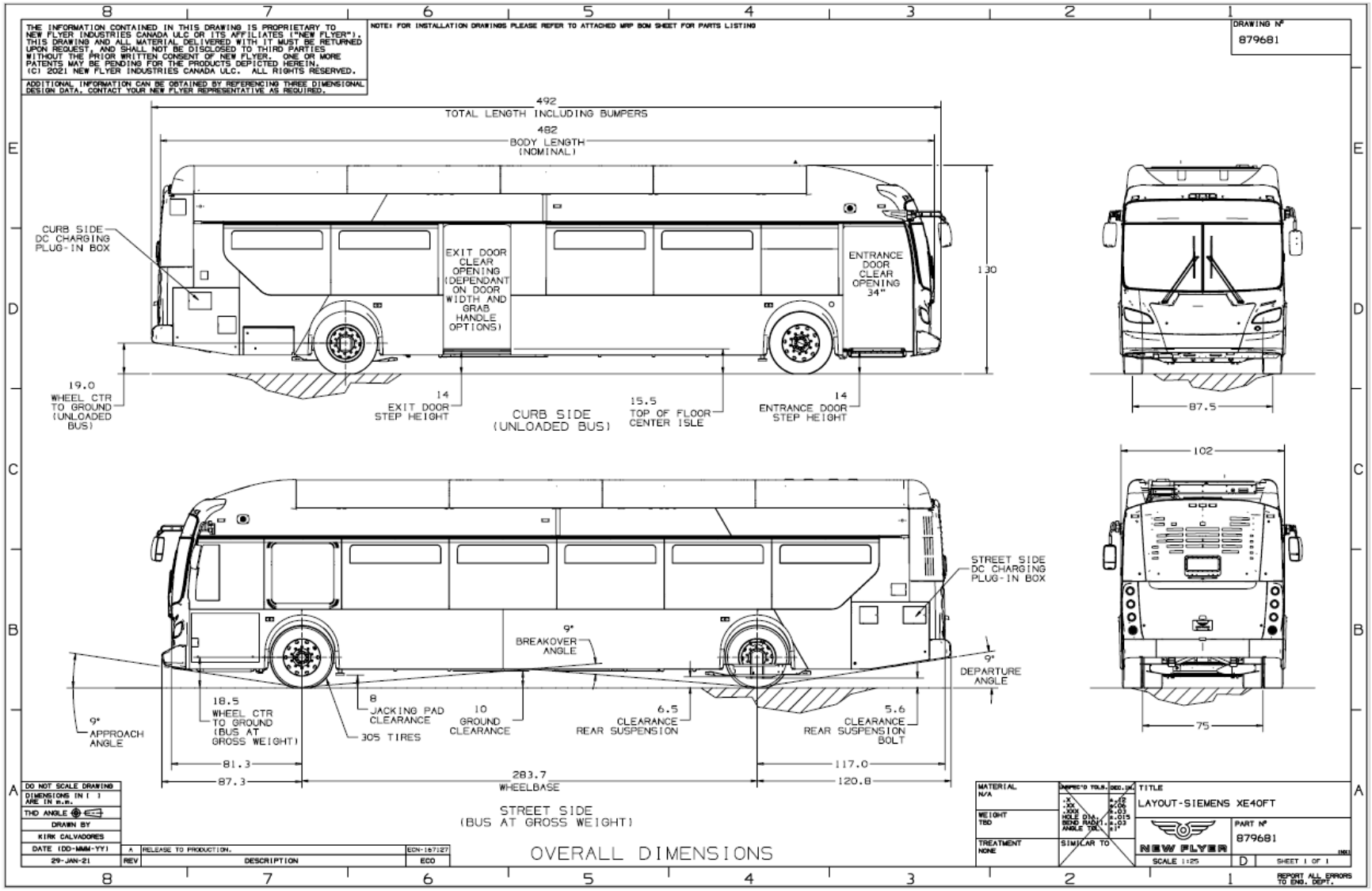
Specification Category	Specification	40' Bus	60' Bus
Bus	**Model**	New Flyer Xcelsior Charge NG XE40	New Flyer Xcelsior Charge NG XE60
	Curb Weight	14,905 kg	23,453 kg
Battery	**Number of battery packs**	5	7
	Battery Name Plate Capacity	432 kWh	605 kWh
	Usable Capacity	90%	90%
	Battery Usable Capacity	390kWh	544.5 kWh
	Battery System Nominal Voltage	620 V	620 V
	Charge Peak	0.5C / 71 A	0.5C / 71 A
	Continuous Charge	0.4C / 56.87A	0.4C / 56.87A
Charging	**Receptacle Type**	CCS1	CCS1
	Receptacles	2	2
	Receptacle Location	Curbside Rear/ Streetside Rear	Curbside Rear/ Streetside Rear

SECTION B. NEW FLYER XCELSIOR CHARGE NG

B.1 General

B.1.1 Any information presented are approximations only provided by the manufacturer for the purpose of planning only, and are not representative of the City of Winnipeg's Bus build. Proponent shall verify final vehicle information with New Flyer Industries during the design process

B.2 Drawings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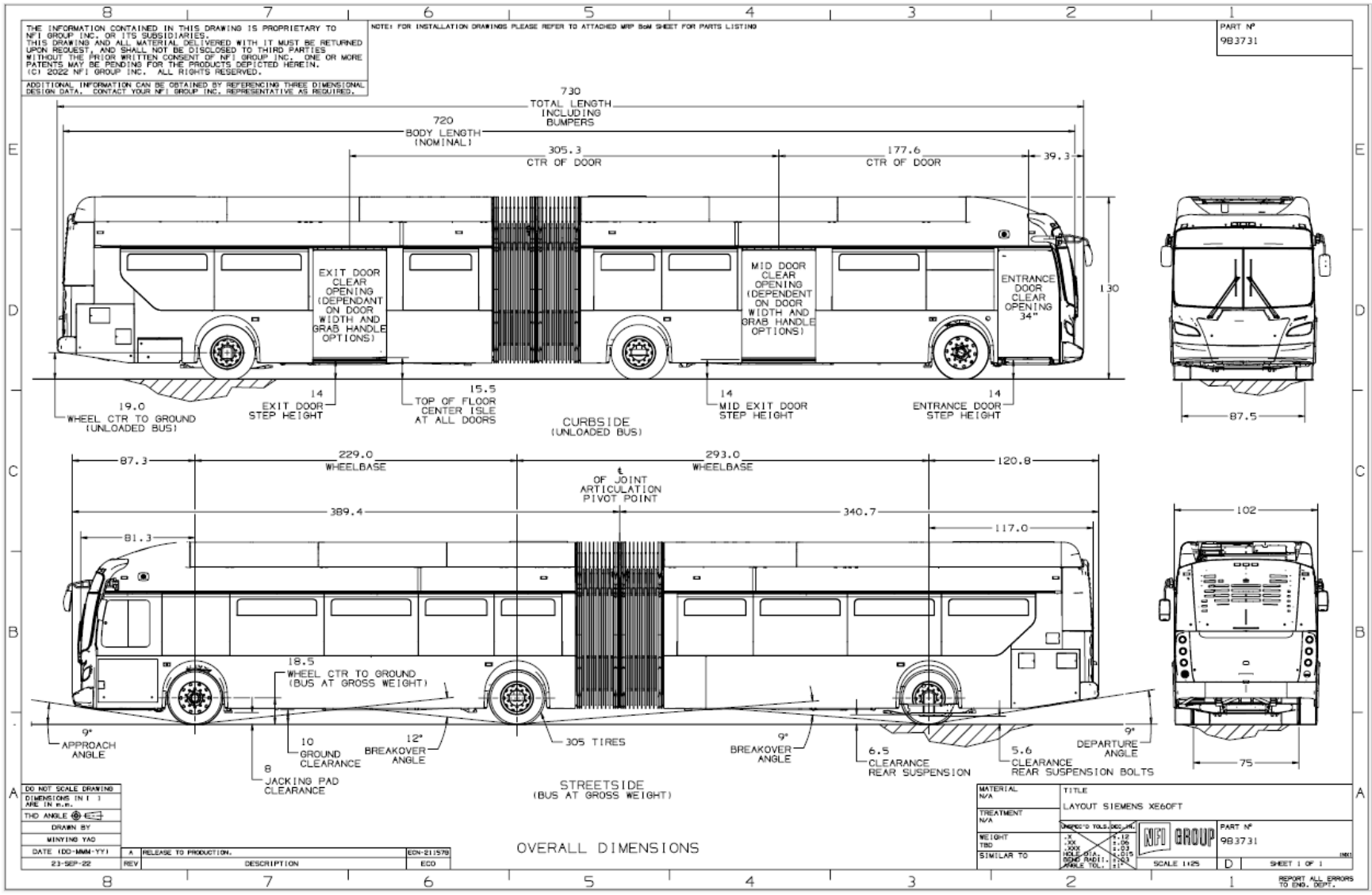
ADDITIONAL INFORMATION CAN BE OBTAINED BY REFERENCING THREE DIMENSIONAL DESIGN DATA. CONTACT YOUR NEW FLYER REPRESENTATIVE AS REQUIRED.
NOTE: FOR INSTALLATION DRAWINGS PLEASE REFER TO ATTACHED MRP BOM SHEET FOR PARTS LISTING
DRAWING Nº 879681
492
TOTAL LENGTH INCLUDING BUMPERS
482
BODY LENGTH (NOMINAL)
CURB SIDE DC CHARGING PLUG-IN BOX
EXIT DOOR CLEAR OPENING (DEPENDANT ON DOOR WIDTH AND GRAB HANDLE OPTIONS)
ENTRANCE DOOR CLEAR OPENING 34"
130
19.0
WHEEL CTR TO GROUND (UNLOADED BUS)
14
EXIT DOOR STEP HEIGHT
CURB SIDE (UNLOADED BUS)
15.5
TOP OF FLOOR CENTER ISLE
14
ENTRANCE DOOR STEP HEIGHT
87.5
102
STREET SIDE DC CHARGING PLUG-IN BOX
9°
BREAKOVER ANGLE
9°
DEPARTURE ANGLE
9°
APPROACH ANGLE
18.5
WHEEL CTR TO GROUND (BUS AT GROSS WEIGHT)
8
JACKING PAD CLEARANCE
305 TIRES
10
GROUND CLEARANCE
6.5
CLEARANCE REAR SUSPENSION
5.6
CLEARANCE REAR SUSPENSION BOLT
75
81.3
87.3
283.7
WHEELBASE
117.0
120.8
STREET SIDE (BUS AT GROSS WEIGHT)
OVERALL DIMENSIONS
DO NOT SCALE DRAWING
DIMENSIONS IN [ ] ARE IN m.m.
THD ANGLE
DRAWN BY
KIRK CALVADORES
DATE (DD-MMM-YY)
29-JAN-21
A RELEASE TO PRODUCTION. ECN-167127
REV DESCRIPTION ECO
MATERIAL N/A
WEIGHT TBD
TREATMENT NONE
SIMILAR TO
TITLE
LAYOUT-SIEMENS XE40FT
PART Nº 879681
NEW FLYER
SCALE 1:25
D
SHEET 1 OF 1
REPORT ALL ERRORS TO ENG. DEPT.


THE INFORMATION CONTAINED IN THIS DRAWING IS PROPRIETARY TO NFI GROUP INC. OR ITS SUBSIDIARIES.
NOTE: FOR INSTALLATION DRAWINGS PLEASE REFER TO ATTACHED MRP BoM SHEET FOR PARTS LISTING
PART Nº 9B3731
730 TOTAL LENGTH INCLUDING BUMPERS
720 BODY LENGTH (NOMINAL)
305.3 CTR OF DOOR
177.6 CTR OF DOOR
39.3
EXIT DOOR CLEAR OPENING (DEPENDANT ON DOOR WIDTH AND GRAB HANDLE OPTIONS)
MID DOOR CLEAR OPENING (DEPENDENT ON DOOR WIDTH AND GRAB HANDLE OPTIONS)
ENTRANCE DOOR CLEAR OPENING 34"
130
19.0 WHEEL CTR TO GROUND (UNLOADED BUS)
14 EXIT DOOR STEP HEIGHT
15.5 TOP OF FLOOR CENTER ISLE AT ALL DOORS
CURBSIDE (UNLOADED BUS)
14 MID EXIT DOOR STEP HEIGHT
14 ENTRANCE DOOR STEP HEIGHT
87.5
87.3
229.0 WHEELBASE
293.0 WHEELBASE
120.8
℄ OF JOINT ARTICULATION PIVOT POINT
389.4
340.7
117.0
81.3
102
18.5 WHEEL CTR TO GROUND (BUS AT GROSS WEIGHT)
9° APPROACH ANGLE
10 GROUND CLEARANCE
12° BREAKOVER ANGLE
8 JACKING PAD CLEARANCE
305 TIRES
STREETSIDE (BUS AT GROSS WEIGHT)
9° BREAKOVER ANGLE
6.5 CLEARANCE REAR SUSPENSION
5.6 CLEARANCE REAR SUSPENSION BOLTS
9° DEPARTURE ANGLE
75
DO NOT SCALE DRAWING
DIMENSIONS IN [ ] ARE IN m.m.
THD ANGLE
DRAWN BY
MINYING YAO
DATE (DD-MMM-YY)
23-SEP-22
A RELEASE TO PRODUCTION. ECN-211579
REV DESCRIPTION ECO
OVERALL DIMENSIONS
MATERIAL N/A
TREATMENT N/A
WEIGHT TBD
SIMILAR TO
TITLE
LAYOUT SIEMENS XE60FT
PART Nº 9B3731
SCALE 1:25
D
SHEET 1 OF 1
REPORT ALL ERRORS TO ENG. DEPT.

B.2.1 New Flyer Xcelsior Charge NG Brochure

NEW FLYER

xcelsior CHARGE NG

Our next generation, battery-electric, zero-emission bus.

Xcelsior CHARGE NG™ is New Flyer's next generation battery-electric, zero-emission bus. It is lighter, simpler, has longer range with better energy recovery and is smart city capable – making it the most advanced electric bus on the market.

Available in 3 Lengths

Three distinct technology advancements to deliver a high-performance bus.

High-Energy Batteries

Next generation high-energy batteries.

Battery Packaging

Advanced protective battery packaging designed for easy installation and streamlined maintenance.

Traction Propulsion System

A new lightweight electric traction propulsion system with up to 90% energy recovery.

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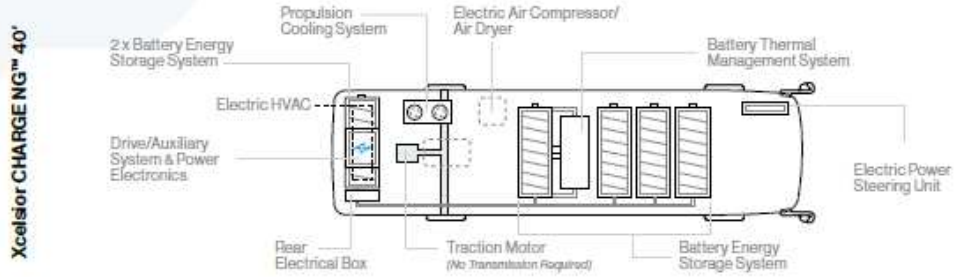
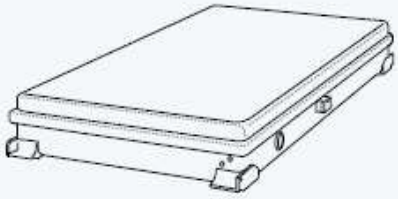
How it works.

The Xcelsior CHARGE NG™ uses an electric motor powered by energy stored in rechargeable batteries.



Technology advancements.

1 More efficient and streamlined battery enclosure.



A standardized waterproof battery enclosure is mounted on the rooftop and in the propulsion compartment using a "plug and play" approach, lending simplicity and efficiency in design, install, maintenance and manufacturing.

Rooftop application uses a modular approach with a simplified mounting system comprised of two rails running the length of the bus.

The same standardized battery enclosure is also mounted in the propulsion compartment on a rack. With this approach, the same battery enclosure can be mounted in any position on the bus.

Simpler

- One simple and standardized approach for better quality, consistency, and accuracy.
- If a battery needs to be replaced, the module can be removed and replaced with a new/backup module. The module needing troubleshooting can be serviced in the shop while the bus with the new/backup module onboard returns to service.
- With every battery having the same enclosure, service manuals are the same for every single bus model and length.
- Service parts are reduced by 90% going from 250 to less than 50 parts.

Waterproof

- With an ingress protection rating of IP67, the battery enclosure is 100% waterproof if submerged in water, which greatly reduces the likelihood of water leaking into the battery enclosure.
- With an ingress protection rating of IP69 for dust, high temperatures, and high-pressure washing, there is 100% protection from intrusion of dust or water particles. This is ideal for demanding operating conditions, and situations where sanitization and rigorous cleaning is undertaken.

More Efficient

- Modules are better insulated resulting in better management of battery temperature for optimal performance.

Easier to Service

- The casings are built using a reinforced composite fiber that is non-conductive.
- Service technicians can simply and safely plug in or unplug the battery module with less exposure to high-voltage electricity.

Lighter

- The standardized battery enclosure is lighter in weight, increasing the maximum passenger capacity on the bus by 4 additional standees.

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2 High-grade Siemens traction system.

ELFA 3 is Siemens' next generation traction system that introduces a more efficient design with compact inverters and embedded drive controllers.

Safer

It's easier and safer to maintain with shorter cable runs and touch-safe high voltage connections.

Smaller

It's smaller and lighter allowing for increased passenger capacity.

More Efficient

- Minimal rack requiring no covers.
- Shorter cable runs offer decreased risk of issues or faults, improved electromagnetic compatibility (EMC) and greater power efficiency.
- Delivers up to 90% energy recuperation.
- Delivers smooth, quiet, emission-free driving (with no engine noise, no idling, and zero local emissions).
- Better torque accuracy.

3 Next generation, high-energy batteries.

The batteries are made of world-class energy storage systems (ESS), engineered for safe, robust, and reliable use in transit.

The battery chemistry is Lithium Nickel Manganese Cobalt (NMC), providing the best balance of energy, power, safety, and life.

More Energy

- 13% more energy available.
- Greater capture of regenerative energy (during braking at top state of charge).

Extended Range

Range is extended by 13% without compromising quality.

CONNECT 360

Connect 360™ is included on every new Xcelsior CHARGE NG™. Learn more at **nfigroup.com/connect**.

- **Additional range** capability with improved driver performance.
- **Decision-making information** to optimize charging strategies.
- **Intelligence** on how to preserve battery energy throughout the day.
- **Reduced operating cost** and maximum fleet utilization.

Connect 360™, operated by NFI Connect™, is a customizable performance dashboard that provides smart analytic reporting to expand insight and intelligence for managing your Xcelsior CHARGE NG™ battery-electric bus.

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12-Year comprehensive warranty available on batteries, inverters and electric motors.

Six minutes of rapid recharge time with a 450 kW charger equals 1.5 hours of operation.

Rapid charge configuration fully compliant with OppCharge and charging protocols.

OPPcharge SAE

Charging.

New Flyer buses are interoperable with charging equipment that supports all heavy-duty electric vehicles. You can customize your Energy Storage Systems (ESS) and charging solutions so you can develop the right ESS and infrastructure solution for your needs.

Xcelsior CHARGE NG™ is interoperable with charging systems available from:

SIEMENS ABB
chargepoint. heliox

On-Route Charging

The on-route rapid charger provides the means for the Xcelsior CHARGE NG™ to stay in service 24 hours daily. To charge, the bus stops underneath the charger and the pantograph makes contact with the charge bars.

Plug-In Charging

Plug-in chargers are available as a supplement or alternative to on-route rapid chargers and can be used for overnight, mid-day and on-route charging. Depot charging for a full charge requires 3.8 hours for a 525 kWh ESS.

The 40′ Xcelsior CHARGE has a range of up to 251 miles (525 kWh)* on a single charge, but with on-route charging, range is unlimited.

* Range per FTA Altoona test protocol - HVAC off.

Length	ESS (kWh)	Range (Miles)
35′	350 440	179 220
40′	350 440 525	174 213 251
60′	525	153

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Functionality + accessibility.

Kneeling

SmartRider™ enables kneeling to variable heights and minimizes the slope difference between a low-floor ramp and the bus floor.

Self-Leveling

SmartRider™ ramp achieves a 1:6 slope ratio with a self-leveling feature that can withstand up to 1000lbs.

Capacity

Industry-leading passenger carrying capacity with up to 84 total (40 seated and 44 standees).

NFI Infrastructure Solutions™

NFI Infrastructure Solutions™ is a service dedicated to providing safe, reliable, smart and sustainable charging and mobility solutions.

Learn what Infrastructure Solutions can do for you at **nfigroup.com/IS**

What our Infrastructure Solutions team provides.

Supports mobility projects from start to finish.

Focuses on energy management optimization.

Provides infrastructure planning and development.

Provides cohesive transition of bus fleets to zero-emission electric technology.

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	35′ XE35	40′ XE40	60′ XE60
Measurements			
Length	36' 3" (11.05m) Over bumpers; 35' 5" (10.80m) Over body	41' 0" (12.50m) Over bumpers; 40' 2" (12.24m) Over body	60' 10" (18.54m) Over bumpers; 60' 0" (18.29m) Over body
Width	102" (2.6m)	102" (2.6m)	102" (2.6m)
Roof Height	11' 1" (3.3m) Over charging rails	11' 1" (3.3m) Over charging rails	11' 1" (3.3m) Over charging rails
Step Height	14" (356mm)	14" (356mm)	14" (356mm)
Front Step Height (Kneeled)	10" (254mm)	10" (254mm)	10" (254mm)
Interior Height – Floor to Ceiling	79" (2m) Over front and rear axle; 95" (2.4m) Mid-coach	79" (2m) Over front and rear axle; 95" (2.4m) Mid-coach	79" (2m) Over front and rear axle; 95" (2.4m) Mid-coach
Tire Size	305/70R22.5	305/70R22.5	305/70R22.5
Wheelbase	226.75" (5.8m)	283.75" (7.2m)	229" (5.8m) Front / 293" (7.4m) rear
Propulsion			
Motor	Siemens electric drive system; Standard or optional high gradeability motor	Siemens electric drive system; Standard or optional high gradeability motor	Siemens electric drive system; ZF AVE130 in-wheel motor center drive axle
Rated Power	160 kW	160 kW	320 kW
Rated Torque (*Based on 1:5.67 ratio axle)	1,033 lb-ft	1,033 lb-ft	2,066 lb-ft
Passenger Capacity *Based on 160 kWh (35'/40') & 213 kWh (60') ESS configurations, with ELFA 2 Siemens Traction System			
Seats	Up to 32*	Up to 40*	Up to 61 (with one exit door)*
Standees	Up to 35*	Up to 44*	Up to 62 (with one exit door)*
Accessibility			
Doors	2	2	2 or 3 (option for up to 5 doors)
Wheelchair Accessibility	32" (813mm) Wide, 1:6 slope; Flip out NFIL ramp, front door	32" (813mm) wide, 1:6 slope; Flip out NFIL ramp, front door	32" (813mm) wide, 1:6 slope; Flip out NFIL ramp, front door
Wheelchair Locations	2 - Front location, rear location also available (other options available)	2 - Front location, rear location also available (other options available)	2 - Front location, rear location also available (other options available)
Approach Angle			
Approach/Departure/Breakover Angles	9°/9°/12°	9°/9°/9°	9°/9°/12° (front) 9° (back)
Turning Radius (Body, with aluminum wheels; *Varies with wheel type)			
Turning Radius	39' (11.9m)*	43.5' (13.3m)*	42' (12.8m)*
Main Components			
Floor	Marine grade plywood floor; Optional composite floor; Composite rear interior step; Tarabus, Altro, RCA floor covering	Marine grade plywood floor; Optional composite floor; Composite rear interior step; Tarabus, Altro, RCA floor covering	Marine grade plywood floor; Optional composite floor; Composite rear interior step; Tarabus, Altro, RCA floor covering
Electrical System	Parker Vansco	Parker Vansco	Parker Vansco
Propulsion Cooling System	Electric cooling fans	Electric cooling fans	Electric cooling fans
HVAC	Thermo King TE15 (rear)	Thermo King TE15 (rear)	Thermo King RLFE (front) TE15 (rear)
Axles	MAN VOK 07 Front disc brakes; MAN HY-1350 Rear disc brakes; Single reduction axle	MAN VOK 07 Front disc brakes; MAN HY-1350 Rear disc brakes; Single reduction axle	MAN VOK 07 Front disc brakes; ZF AVN 132 Center disc brake; MAN HY-1350 Rear disc brakes; Single reduction axle
Energy Storage System			
Long Range (Rapid charging available)	360 kWh, 440 kWh	360 kWh, 440 kWh, 525 kWh	525 kWh

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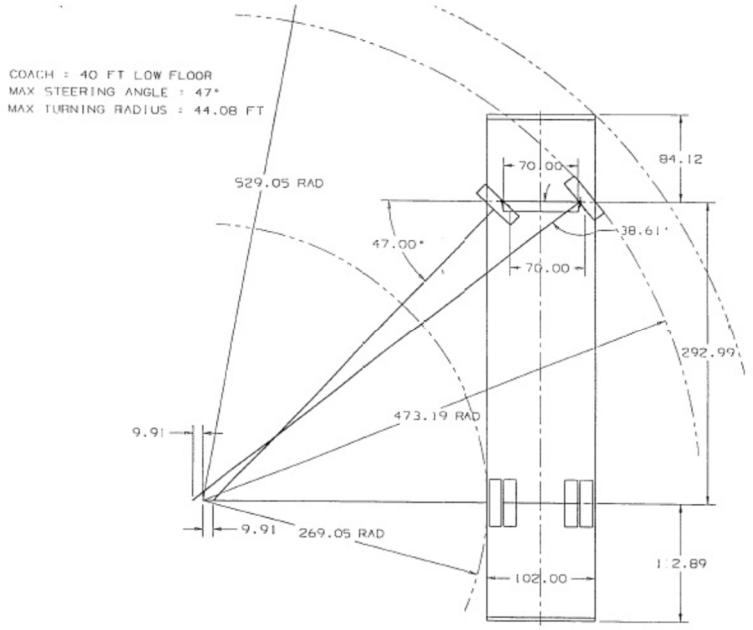
NEW FLYER

B.3 Turning Radius

B.3.1 Turning Radius 40-foot Bus



B.3.2 Turning Radius 60-foot Bus