



631-2014 ADDENDUM 3

SUPPLY AND DELIVERY OF HEAVY-DUTY 40 FT. LOW-FLOOR TRANSIT BUSES

URGENT

PLEASE FORWARD THIS DOCUMENT TO WHOEVER IS IN POSSESSION OF THE BID OPPORTUNITY

ISSUED: August 13, 2014
BY: Glen Kuhl
TELEPHONE NO. (204) 986-5801

THIS ADDENDUM SHALL BE INCORPORATED INTO THE BID OPPORTUNITY AND SHALL FORM A PART OF THE CONTRACT DOCUMENTS

Template Version: A20131129

Please note the following and attached changes, corrections, additions, deletions, information and/or instructions in connection with the Bid Opportunity, and be governed accordingly. Failure to acknowledge receipt of this Addendum in Paragraph 9 of Form A: Bid may render your Bid non-responsive.

PART B – BIDDING PROCEDURES

Revise: B2.1 to read: **The Submission Deadline is 4:00 p.m. Winnipeg time, August 20, 2014.**

Add: B16 **ELIGIBILITY**

B16.1 Various organizations provided investigative services with respect to this Bid Opportunity. In the City's opinion, this relationship or association does not create a conflict of interest or will not likely create a perception of conflict of interest because of this disclosure. The organizations are:

- (i) New Flyer Industries Ltd.
- (ii) Nova Bus

PART D – SUPPLEMENTAL CONDITIONS

Revise: D2.1 to read: The Work to be done under the Contract shall consist of the supply and delivery of low floor transit diesel buses from the date of award to October 30th, 2015, **with the option of four (4) mutually agreed upon one (1) year extensions.**

Revise: D2.1 (a) to read: Each **(4) four year extension** will be for approximately thirty-three (33) low floor transit diesel buses.

Remove: From D2.5:

In-process drawings	30 days prior to pilot bus	Scale drawings	1
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Revise: D2.5 to read: Referencing APTA Guideline SP 2.3 Contract Deliverables:

Contract deliverables associated with this Contract are set forth in the table below, along with other pertinent information. Contract deliverables shall be submitted in accordance with E1. Due dates shown note the last acceptable date for receipt of Contract deliverables. All documents must be acceptable to the City. All parts and service corrections must be made, on the master electronic copy, within 30 days of notice. The electronic corrections must be followed by all hardcopy updates within 90 days of notice. The City will consider early receipt of Contract deliverables on a case-by-

case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.

Contract Deliverables

Deliverable	Due Date	Format	Quantity Due
Material samples	Pre-production meeting		1
Undercoating system program	Pre-production meeting	Electronic	1
Technical review of electronic functionality	Pre-production meeting	Hardcopy Electronic	1 1
Interior security camera layout	Pre-production meeting	Electronic	1
Technical review of powerplant	Pre-production meeting	Electronic	1
Engineering support	Pre-production meeting	Contracts	1
List of OEM component repair manuals	Pre-production Meeting	Hardcopy	1
Training – 100 instructor hours per contract year	Accumulated hours to be used by the end of the contract		100 hours
Pre-production meeting minutes	15 days after each meeting	Electronic	2 originals
Recommended spare parts list	Provided 10 business after the Pilot Bus delivery	Electronic	1
Part number index	Provided 10 business after the Pilot Bus delivery	Electronic	1
Current price list	30 days prior to pilot bus	Electronic	1
Striping layout	30 days prior to pilot bus	Hardcopy	1
Resolution of issues “subject to City approval”	30 days prior to pilot bus	Hardcopy	1
Preliminary Parts & Service Manual	With pilot bus	Electronic	1
All available OEM manuals (including but not limited to engine, transmission, passenger seating, HVAC, etc.)	With pilot bus	Hardcopy Electronic	3 1
Complete Engineering Bill of Material.	With pilot bus	Electronic	1
Electrical and air schematics	With pilot bus	Hardcopy Electronic	3 1
Glazing drawings/spec for all window glass on the bus	With pilot bus	Electronic	1
Current index file displaying all Part Numbers, description, manual location, Build #.	With pilot bus	Electronic	1

Contract Deliverables

Deliverable		Due Date	Format	Quantity Due
	Engine Emissions Certificate — NOx levels	With pilot bus	Hardcopy	1
	List of serialized units installed on each bus	With each bus	Electronic	1 per bus
	QA manufacturing certificate	With each bus	Hardcopy	1 per bus
	Pre-Delivery Bus Documentation Package	With each bus	Hardcopy	1 per bus
	Motor Vehicle Pollution Requirements Certificate	With each bus	Hardcopy	1
	Operator's log and incident report	With each bus	Hardcopy	1 per bus
	Title documentation	With each bus	Hardcopy	1 per bus
	As-built drawings	Within 60 days after final bus delivery	Electronic Media	1
	Final Manuals - current service manual(s) and OEM manuals to include preventative maintenance procedures, diagnostic procedures or trouble-shooting guides and major component service manuals, current parts manual(s), and standard operator's manual(s)	90 days after pilot bus	Hardcopy	7 per build (total)
			Electronic	1
	All electronic software	To be held in escrow	Electronic	1 Each
	Bus Supplier / OEM Part Number Cross-reference, including OEM identification and contact information	90 days after pilot bus	Electronic	1 Each
	All full versions of diagnostic and programming software, licenses and necessary patch cables and associated hardware for all vehicle sub-systems	90 days after pilot bus	Hardcopy Electronic Patch cable	1 10 per build 10

Revise: D17.1 to read: Referencing APTA Guideline SP 7.2 Documentation:

The Contractor shall exert its best efforts to keep maintenance manuals, operator manuals and parts books up to date for a period of twelve (12) years. The supplied manuals shall incorporate all equipment ordered on the buses covered by this procurement. In instances where copyright restrictions or other considerations prevent the Contractor from incorporating major components information into the bus parts and service manuals, separate manual sets as published by the subcomponent supplier will be provided.

Revise: D19.1 (a) to read: Referencing APTA Guideline WR 1.1.2 Complete Bus:

The complete bus (excluding City of Winnipeg installed items), propulsion system, components, all subsystems and body and chassis structure are warranted to be free from defects and related defects for one year or 80,000 kilometres, whichever comes first, beginning on the date of revenue service but not longer than 15 days after acceptance under "Inspection, Testing and Acceptance." The warranty is based on regular operation of the bus under the operating conditions prevailing in the City's locale.

In the event of "coach down" for repairs, in excess of 14 days, the warranty date shall be adjusted to compensate for the days the coach was not in revenue service. In the event of Coach Down for warranty repairs, in excess of 30 days, Liquidated Damages as referenced in D12 shall be incurred.

Revise: D19.1 (d) to read: Referencing APTA Guideline WR1.1.5 Emission Control System (ECS):

The Contractor warrants the emission control system for five years or 160,000 kilometres, whichever comes first. The ECS shall include, but is not limited to, the following components:

- complete exhaust system, including catalytic converter (if required)
- after-treatment device
- components identified as emission control devices

Revise: D19.1 (f) to read: Referencing APTA Guideline WR 1.1.7 Extended Warranty:

The City requires the following additional subsystems to be warranted to be free from Defects and Related Defects for three years or 300,000 miles whichever comes first.

- Shock absorbers

Revise: D19.1 (i) to read: Referencing APTA Guideline WR 1.3.1 Pass-Through Warranty

The Contractor shall not transfer warranty responsibility to any sub-Supplier, or to others.

The Contractor shall be solely responsible for the administration of the warranty as specified with exception of the following; engine, transmission, HVAC, destination signs and batteries.

Clarification of D19.1 (n): The intention is that Winnipeg Transit will handle normal warranty defects with complete reimbursement per warranty specifications.

Revise: D19.2 to read:

Further to C11, the City and the Contractor may negotiate an agreement for the City's own forces to perform warranty repair work under the following conditions:

- monthly warranty repairs beyond 100 hours shall be charged at overtime rates;
- the Contractor will either supply all materials necessary to perform the warranty repair or reimburse to the City, the full costs of parts and materials supplied by the City within 60 Calendar Days of use;
- labour rates for warranty repair work performed by City forces during normal working hours will be \$ 95.00 per person hour, the overtime labour rate will be \$ 120.00 per person hour.

PART E – SPECIFICATIONS

Revise: E2.17 to read: Referencing APTA Guideline TS 5.8 Noise:

Interior Noise

The combination of inner and outer panels and any material used between them shall provide sufficient sound insulation so that a sound source with a level of 80 dBA measured at the outside skin of the bus shall have a sound level of 65 dBA or less at any point inside the bus. These conditions shall prevail with all openings, including doors and windows, closed and with the engine and accessories switched off.

The bus-generated noise level experienced by a passenger at any seat location in the bus shall not exceed 80 dBA. The operator area shall not experience a noise level of more than 75 dBA.

Exterior Noise

Airborne noise generated by the bus and measured from either side shall not exceed 80 dBA under full power acceleration when operated 0 to 55 km/h at curb weight. The maximum noise level generated by the bus pulling away from a stop at full power shall not exceed 83 dBA. The bus-generated noise at curb idle shall not exceed 65 dBA. If the noise contains an audible discrete frequency, a penalty of 5 dBA shall be added to the sound level measured. The Contractor shall comply with the exterior noise requirements defined in local laws and ordinances identified by the City and SAE J366.

Revise: E2.24 to read: Referencing APTA Guideline TS 6.4 Step Height

The step height shall not exceed 14.6 inches at either doorway without kneeling. A maximum of two steps is allowed to accommodate a raised aisle floor in the rear of the bus.

Revise: E2.29 to read: Referencing APTA Guideline TS 6.8 Floor Height:

Height of the step above the street shall be no more than 14.6 in. measured at the centerline of the front and rear doorway. The floor may be inclined along the longitudinal axis of the bus, and the incline shall not exceed 3.5 degrees off the horizontal except locally at the doors where 2 degree slope toward the door is allowed. All floor measurements shall be with the bus at the design running height and on a level surface and with the standard installed tires. A maximum of two steps is allowed to accommodate a raised aisle floor in the rear of the bus.

Revise: E2.31 to read: Referencing APTA Guideline TS 6.10 Aisle Width:

The minimum clear aisle width between pairs of transverse seats with all attached hardware shall be at least 22 inches.

The aisle width between the front wheelhouses shall be at least 35 inches, and the entire area between the front wheelhouses shall be available for passengers and mobility aid devices.

Revise: E2.43 to read: Referencing APTA Guideline TS 10.1 Engine Cooling:

A means of determining satisfactory engine coolant level shall be provided. A spring-loaded, push-button type valve or lever shall be provided to safely release pressure or vacuum in the cooling system with both it and the water filler no more than 60 inches above the ground. Both shall be accessible through the same access door.

The radiator shall be of durable, corrosion-resistant construction with removable tanks. The radiator or coolant system drain shall be easily accessible from the engine compartment and equipped with a flat

faced coupler manufactured by “Stucchi”. Stucchi coupler #800901001 and protective boot #815100001.

Radiators with a fin density greater than 12 fins per inch or a louvered slit design shall not be used. No heat-producing components or climate control system components shall be mounted between the engine cooling air intake aperture and the radiator. The radiator and charge air cooler shall be designed to withstand thermal fatigue and vibration associated with the installed configuration. The radiator and charge air cooler cores shall be easily cleaned (to include engine side core surface) with standard pressure-washing equipment or using high volume, low pressure if water is used to clean the system.

Screen in Front of Radiator and Charge Air Cooler

For radiators with lower edge less than 36 inches to the ground

The radiator and air cooler shall be protected by an aluminum perforated screen with staggered ¼” holes. The screen shall be capable of maintaining sufficient air flow for the cooling requirements.

Standard Requirement for Coolant Filtration

The engine cooling system shall be equipped with a properly sized water filter with a spin-on element and an automatic system for releasing supplemental coolant additives as needed to replenish and maintain protection properties. When replacing the water filter, only the water in the filter will be lost.

Cooling Fan Control and Drive Design

Control and drive of the radiator and charge air cooler fan(s) shall be an electric EMP or Modine system.

The cooler fans shall have integrated controllers. Cooler fans shall be capable of automated reverse operations for periodic self-cleaning of the radiator and charge air cooler. Radiator cooling and Charge Air cooling must operate independently.

Clarification of E2.49 to: Oil Pressure and Coolant gauges can be mechanical gauges, electrical gauges or digital display.

Revise: E2.54 to read: Referencing APTA Guideline TS 15. Radiator:

Radiator piping, within 36 inches of the ground, shall be stainless steel or brass tubing, and if practicable, hoses shall be eliminated. Necessary hoses shall be impervious to all bus fluids. All hoses shall be secured with stainless steel clamps that provide a complete 360-degree seal. The clamps shall maintain a constant tension at all times, expanding and contracting with the hose in response to temperature changes and aging of the hose material.

Revise: E2.59 to read: Referencing APTA Guideline TS 17.2.1 Design and Construction, Diesel:

Fuel Tank(s)

The fuel tank(s) shall be made of high-density cross-linked polyethylene plastic material.

Installation

The fuel tank(s) shall be securely mounted to the bus to prevent movement during bus maneuvers.

The fuel tank(s) shall be equipped with an external, hex head, drain plug. It shall be at least a ¾-inch size and shall be located at the lowest point of the tank(s). The fuel tank(s) shall have an inspection plate or easily removable filler neck to permit cleaning and inspection of the tank(s) without removal from the bus. The tank(s) shall be baffled internally to prevent fuel-sloshing noise regardless of fill level. The baffles or fuel pickup location shall assure continuous full power operation on a 6 percent upgrade for 15 minutes starting with no more than

95 litres of fuel over the unusable amount in the tank(s). The bus shall operate at idle on a 6 percent downgrade for 30 minutes starting with no more than 38 litres of fuel over the unusable amount in the tank(s).

The materials used in mounting shall withstand the adverse effects of road salts, fuel oils, and accumulation of ice and snow for the life of the bus.

Labeling

The capacity, date of manufacture, manufacturer name, location of manufacture, and certification of compliance to Federal Motor Carrier Safety Regulation shall be permanently marked on the fuel tank(s). The markings shall be readily visible and shall not be covered with an undercoating material.

Fuel Filler

The fuel filler shall be located 7 to 33 feet behind the centerline of the front door on the curb side of the bus. The filler cap shall be retained to prevent loss and shall be recessed into the body so that spilled fuel will not run onto the outside surface of the bus.

The fuel lines forward of the engine bulkhead shall be in conformance to SAE Standards.

Dry-break fuel filler

The fuel filler shall accommodate a nozzle that forms a locked and sealed connection during the refueling process to eliminate spills. Fuel shall not be allowed to flow into the tank unless the nozzle has been properly coupled, locked and sealed to the filler. With the nozzle open, fuel shall enter the tank at a fill rate of not less than 150 litres per minute of foam-free fuel without causing the nozzle to shut off before the tank is full. The nozzle shall automatically shut off when the tank is essentially full. Once disconnected, fuel shall not be allowed to flow through the nozzle at any time. Any pressure over 3 psi shall be relieved from the fuel tank automatically. An audible signal shall indicate when the tank is essentially full. The dry break system shall be compatible with the City's system. The fuel filler cap shall be hinged.

Revise: E2.69 to read: Referencing APTA Guideline TS 22.2 Crashworthiness:

The bus body and roof structure shall withstand a static load equal to 150 percent of the curb weight evenly distributed on the roof with no more than a 6 in. reduction in any interior dimension. Windows shall remain in place and shall not open under such a load. These requirements must be met without the roof-mounted equipment installed.

The bus shall withstand a 40 km/h impact by a 1800 kg automobile at any side, excluding doorways, along either side of the bus with no more than 3 in. of permanent structural deformation at seated passenger hip height. This impact shall not result in sharp edges or protrusions in the bus interior.

Exterior panels below 35 inches from ground level shall withstand a static load of 907 kg applied perpendicular to the bus by a pad no larger than 5 square inches. This load shall not result in deformation that prevents installation of new exterior panels to restore the original appearance of the bus.

Revise: E2.70 to read: Referencing APTA Guideline TS 23. Corrosion:

The bus flooring, sides, roof, under-structure and axle suspension components shall be designed to resist corrosion or deterioration from atmospheric conditions and all de-icing materials for a period of 18 years or 1.2 million kilometres, whichever comes first. It shall maintain structural integrity and nearly maintain original appearance throughout its service life.

All materials that are not inherently corrosion resistant shall be protected with corrosion-resistant coatings. All joints and connections of dissimilar metals shall be corrosion resistant and shall be protected from galvanic corrosion. Representative samples of all materials and connections shall withstand a two-week (336-hour) salt

spray test in accordance with ASTM Procedure B-117 with no structural detrimental effects to normally visible surfaces and no weight loss of over 1 percent.

Corrosion Resistance Requirements for Exposed and Interior Surfaces of Tubing Throughout Entire Vehicle

All exposed surfaces of tubing and other enclosed members shall be corrosion resistant through application of a corrosion protection system. All interior surfaces, excluding corrosion resistant stainless, shall be corrosion resistant through application of a corrosion protection system.

Revise: E2.116 to read: Referencing APTA Guideline TS 37.3 Air Lines and Fittings:

Air lines, except necessary flexible lines, shall conform to the installation and material requirements of SAE Standard J1149 for copper tubing with standard, brass, flared or ball sleeve fittings, or SAE Standard J844 for nylon tubing if not subject to temperatures over 200 oF. The air on the delivery side of the compressor where it enters nylon housing shall not be above the maximum limits as stated in SAE J844. Nylon tubing shall be installed in accordance with the following color-coding standards:

- Green: Indicates primary brakes and supply.
- Red: Indicates secondary brakes.
- Brown: Indicates parking brake
- Yellow: Indicates compressor governor signal.
- Black: Indicates accessories.

Line supports shall prevent movement, flexing, tension, strain, chafing and vibration. Copper lines shall be supported to prevent the lines from touching one another or any component of the bus. To the extent practicable and before installation, the lines shall be pre-bent on a fixture that prevents tube flattening or excessive local strain. Copper lines shall be bent only once at any point, including pre-bending and installation. Rigid lines shall be supported at no more than 5-ft intervals. Nylon lines may be grouped and shall be supported at 30 in. intervals or less or as approved by property inspector (agency).

The compressor discharge line between powerplant and body-mounted equipment shall be flexible Teflon hose with a braided stainless steel jacket. All lines necessary to maintain system reliability shall be flexible Teflon hose with a braided stainless steel jacket. End fittings shall be standard SAE or JIC brass or steel, flanged, swivel-type fittings. Flexible hoses shall be as short as practicable and individually supported. They shall not touch one another or any part of the bus except for the supporting grommets. Flexible lines shall be supported at 2-ft intervals or less or as approved by property inspector (agency).

Air lines shall be clean before installation and shall be installed to minimize air leaks. All air lines shall be routed to prevent water traps to the extent possible. Grommets or insulated clamps shall protect the air lines at all points where they pass through understructure components.

Revise: E2.136 to read: Referencing APTA Guideline TS 40.5 Electrical Compartments:

All relays, controllers, flashers, circuit breakers and other electrical components shall be mounted in easily accessible electrical compartments. All compartments exposed to the outside environment shall be corrosion-resistant and sealed. The components and their functions in each electrical compartment shall be identified and their location permanently recorded on a drawing attached to the inside of the access panel or door when possible. The drawing shall be protected from oil, grease, fuel and abrasion. The front compartment shall be completely serviceable from the operator's seat, vestibule or from the outside. "Rear start and run" controls shall be mounted in an accessible location in the engine compartment and shall be protected from the environment.

The PLC shall be initialized from the rear engine compartment when the following conditions are met;

- **rear run switch is in the rear run position**
- **start push button held for 5 seconds**
- **audio/visual warning activated; (i.e. back-up lights/amber light flashing)**

Revise: E2.145 to read: Referencing APTA Guideline TS 42.1 General:

The primary purpose of the multiplexing system is control of components necessary to operate the vehicle. This is accomplished by processing information from input devices and controlling output devices through the use of an internal logic program.

Versatility and future expansion shall be provided for by expandable system architecture. The multiplex system shall be capable of accepting new inputs and outputs through the addition of new modules and/or the utilization of existing spare inputs and outputs. All like components in the multiplex system shall be modular and interchangeable with self-diagnostic capabilities. The modules shall be easily accessible for troubleshooting electrical failures and performing system maintenance. Multiplex input/output modules shall use solid-state devices to provide extended service life and individual circuit protection.

All modules shall be repairable at the component level.

Ten percent of the total number of inputs and outputs, or at least one each for each voltage type utilized (0V, 12V, 24V), at each module location shall be designated as spares.

The Contractor must supply 4 - notebook computers per bus build to be used for diagnostic and programming functions. The computers must be equipped with the latest version of the Windows operating system, colour screens, integral pointing devices, CD Rom Drives, floppy drive, the largest capacity hard drive available for the computer and twice the minimum RAM memory required to run all applicable software.

The computers shall be equipped with the latest versions of all software required for diagnostics and programming of the Engine, Transmission, PLC, ABS, Electronic Signs, and all other Electronic equipment included in the vehicle. All software must be installed and functional.

The computers shall include all peripheral communication hardware, such as PIC's, links and adapters used in downloading and programming of the equipment. Data Link connectors shall be provided 10 connectors per bus build to function with computer equipment and all applicable software provided. Cigarette type plug-in to be provided at Lap Top diagnostic plug locations for Lap Top operation.

The City of Winnipeg shall have final approval of the hardware and software to be supplied. Computers supplied under contract must be available for testing of all functions and data link connections during pre-delivery inspections.

Revise: E2.163 to read: Referencing APTA Guideline TS 44.5 Normal Bus Operation Instrumentation and Controls:

The following list identifies bus controls used to operate the bus. These controls are either frequently used or critical to the operation of the bus. They shall be located within easy reach of the operator. The operator shall not be required to stand or turn to view or actuate these controls unless specified otherwise.

Systems or components monitored by onboard diagnostics system shall be displayed in clear view of the operator and provide visual and/or audible indicators. The intensity of indicators shall permit easy determination of on/off status in bright sunlight but shall not cause a distraction or visibility problem at night. All indicators shall be illuminated using backlighting.

The indicator panel shall be located in Area 1 or Area 5, within easy view of the operator instrument panel. All indicators shall have a method of momentarily testing their operation. The audible alarm shall be tamper-resistant and shall have an outlet level between 80 and 83 dBA when measured at the location of the operator's ear.

On-board displays visible to the operator shall be limited to indicating the status of those functions described herein that are necessary for the operation of the bus. All other indicators needed for diagnostics and their related interface hardware shall be concealed and protected from unauthorized access. Table 6 represents instruments and alarms. The intent of the overall physical layout of the indicators shall be in a logical grouping of systems and severity nature of the fault.

Consideration shall be provided for future additions of spare indicators as the capability of onboard diagnostic systems improves. Blank spaces shall contain LEDs.

Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Master run switch	Rotary, four-position detent	Side console	Master control for bus, off, day run, night run and clearance ID lights	
Engine start, front	Approved momentary switch	Side console	Activates engine starter motor	
Engine start, rear	Approved momentary switch	Engine compartment	Activates engine starter motor	
Engine run, rear	Three-position toggle switch	Engine compartment	Permits running engine from rear start, normal front run position and off	Amber light
Drive selector	Touch panel switch	Dash right wing	Provides selection of propulsion: forward, reverse and neutral	Gear selection
HVAC	Switch or switches to control HVAC	Side console	Permits selection of passenger ventilation: off, cool, heat, low fan, high fan or full auto with on/off only	
Operator's ventilation	Rotary, three-position detent	Above Side console or Dash left wing	Permits supplemental ventilation: fan off, low or high	
Defroster fan	Rotary, four-position detent	Dash left wing	Permits defroster: fan off, low, medium and high	
Defroster temperature	Variable position	Dash left wing	Adjusts defroster water flow and temperature	
Windshield wiper	Variable rotary position operating each wiper separately	Dash left wing	Variable speed control of left and right windshield wipers	
Windshield washer	Push button	Dash left wing	Activates windshield washers	

Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Dash panel lights	Rotary rheostat or stepping switch	Dash left wing	Provides adjustment for light intensity in night run position	
Interior lights	Two-position switch	Side console	Selects mode of passenger compartment lighting: off, on	
Fast idle	Two-position switch	Side console	Selects high idle speed of engine	
Front door ramp	Three-position momentary switch	Side console – within hand reach of door control handle	Permits deploy and stow of front ramp	Red light, warning alarm
Front kneel	Three-position momentary switch with protective guard	Side console – within hand reach of door control handle	Permits kneeling activation and raise and normal at front door remote location	Amber indicator. Ext alarm and Amber light
Right remote mirror	Four-position toggle type	Side console	Permits two-axis adjustment of right exterior mirror	
Mirror heater	Temperature activated		Permits heating of outside mirrors when required	
Passenger door control	Five-position handle type detent	Side console, forward	Permits open/close control of front and rear passenger doors	Red light
Rear door override	Two-position switch in approved location	Side console, within hand reach of door control handle	Allows operator to override activation of rear door passenger tape switches	
Engine shutdown override	Momentary switch with protective cover	Side console	Permits operator to override auto engine shutdown	
Hazard flashers	Two-position switch with 50mm actuator lever	Side console	Activates emergency flashers	Two green lights
Mobile data terminal	Mobile data terminal coach operator interface panel	Above right dash wing	Facilitates operator interaction with communication system and master log-on	LCD display with visual status and text messages

Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Farebox interface	Farebox coach operator interface panel	Near farebox	Facilitates operator interaction with farebox system	LCD display
Destination sign interface	Destination sign interface panel	in approved location	Facilitates operator interaction with destination sign system, manual entry	LCD display
Turn signals	Momentary push button (two required) raised from other switches	Left foot panel	Activates left and right turn signals	Two green lights and audible indicator
PA manual	Momentary push button	Left foot panel	Permits operator to manually activate public address microphone	
Microphone	Atlas Sound gooseneck assembly or GFI (Genfare) gooseneck assembly	Left front corner of the operator's compartment.	Permits operator to make announcements with both hands on the wheel and focusing on road conditions	
High beam	Detent push button	Left foot floor	Permits operator to toggle between low and high beam	Blue light
Parking brake	Pneumatic PPV	Below or on Side console	Permits operator to apply and release parking brake	Red light
Park brake release	Pneumatic PPV	Below or on Side console	Permits operator to push and hold to release brakes	
Park brake alarm	Alarm	Under Dash	Warns operator park brake disabled when master switch off	Buzzer
Remote engine speed	Rotary rheostat	Engine compartment	Permits technician to raise and lower engine RPM from engine compartment	
Master brake interlock	Toggle, with protective guard	Overhead left Out of operator's reach	Permits operator override to disable brake/throttle interlock	
Master door	Toggle switch	Overhead left Out of operator's reach	Permits operator override to disable door	

Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Warning interlocks deactivated	Red light and Alarm	Dash panel center	Illuminates to warn operator that interlocks have been deactivated.	Red light and Alarm
Retarder disable	Toggle switch	Within reach of Operator	Permits operator override to disable brake retardation/regeneration	Red light
Auxiliary power	12 volt power receptacle	Approved locations	Diagnostic Connector	
Speedometer	Speedometer, odometer, and diagnostic capability, 10 kilometres increments, no trip meter	Dash center panel	Visual indication of speed and distance traveled, accumulated vehicle kilometres, fault condition display	Visual
Air pressure gauge	Primary and secondary, 5 psi increments	Dash center panel	Visual indication of primary and secondary air systems	Red light and buzzer
Fire detection	Coach operator display	Property specific or dash center	Indication of fire detection activation by zone/location	Buzzer and red light
Door obstruction	Sensing of door obstruction	Dash center	Indication of rear door sensitive edge activation	Red light and Buzzer
Door ajar	Door not properly closed	Property specific or dash center	Indication of rear door not properly closed	Alarm and red light
Low system air pressure	Sensing low primary and secondary air tank pressure	Dash center	Indication of low air system pressure	Buzzer and red light
Engine coolant indicator	Low coolant indicator may be supplied as audible alert and visual and text message	Within operator's sight	Detects low coolant condition	Amber light
Hot engine indicator	Coolant temperature indicator may be supplied as audible alert and visual and text message	Within operator's sight	Detects hot engine condition and initiates time delay shutdown	Red light

Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Low engine oil pressure indicator	Engine oil pressure indicator may be supplied as audible alert and visual and text message	Within operator's sight	Detects low engine oil pressure condition and initiates time-delayed shutdown	Red light
ABS indicator	Detects system status	Dash center	Displays system failure	Amber light
ABS blink code	Toggle switch	Inside front sign above operator	Retrieve ABS code	
Charging system indicator (12/24 V)	Detect charging system status	Dash center	Detects no charge condition and optionally detects battery high, low, imbalance, no charge condition	Red light flashing or solid based on condition
Fuel tank level	Indicator light	Dash center	Indication of fuel tank level/pressure, at less than 55 litres useable	Yellow
DEF gauge	Level Indicator	Center dash	Displays level of DEF tank and indicates with warning light when low	Red light
Active regeneration	Detects Status	Dash center	Indication of electric regeneration	Amber
Regeneration	Multi-Toggle switch	Inside front sign above operator	Initialize, inhibit, normal regeneration	
Auxiliary Heater	Toggle switch	Overhead left Out of operator's reach	Inhibit auxiliary heater operation	
Stop Request Light	Indicator Light	Dash Centre	Passenger Stop Request	Red, 2 cm

Revise: E2.196 to read: Referencing APTA Guideline TS 50. Operator's Side Window:

The operator's side window shall be a fore and aft sliding type, requiring only the rear half of sash to latch upon closing. The front sash shall open sufficiently to permit the seated operator to easily adjust the street-side outside rear view mirror and shall have an interior handle only. When in an open position, the window shall not rattle or close during braking. This window section shall slide in tracks or channels designed to last the service life of the bus. The operator's side window shall not be bonded in place and shall be easily replaceable. The glazing material shall have a single-density tint.

The operator's side window shall include a "Rapid Replacement Glazing System" that permits the removal and installation of each piece of glass in three (3) minutes or less. Glazing materials shall be one quarter inch or six millimeter (1/4" or 6mm) nominal thickness laminated safety glass strictly conforming to applicable sections of FMVSS 205 and ANSI Z26. 1 – 1997, Test Grouping 2 and the Recommended Practices defined in SAE J673. The maximum permissible light transmittance of the fore and aft sliding sections shall be 75% (Green) and the maximum permissible solar energy transmittance shall be 68% as measured by ASTM-424.

The operator's view, perpendicular through operator's side window glazing, should extend a minimum of 33 in. (840 mm) to the rear of the heel point on the accelerator, and in any case must accommodate a 95th percentile male operator. The view through the glazing at the front of the assembly should begin not more than 26 in. (560 mm) above the operator's floor to ensure visibility of an under-mounted convex mirror. Operator's window construction shall maximize ability for full opening of the window.

The operator's side window glazing material shall have a 1/4 in. nominal thickness laminated safety glass conforming with the requirements of ANSI Z26.1-1996 Test Grouping 2 and the Recommended Practices defined in SAE J673.

The design shall prevent sections from freezing closed in the winter.

Standard Operator's Side Window, Traditional Frame

- full slider
- non-egress

Quick Change Operator's Side Window

Glazing in the window assembly shall be replaced without removing the window from its installed position on the bus or manipulation of the rubber molding surrounding the glazing. The glazing shall be held in place mechanically by a formed metal extruded ring constructed to last the life of the vehicle.

Revise: E2.231 to read: Referencing APTA Guideline TS 68.1 Location:

Bumpers shall provide impact protection for the front and rear of the bus with the top of the bumper being 28 inches, ± 2.5 inches, above the ground. Bumper height shall be such that when one bus is parked behind another, a portion of the bumper faces will contact each other.

Revise: E2.243 to read: Referencing APTA Guideline TS 71.4 Headlights:

Sealed Beams with Daytime Running Lights

Headlamps shall incorporate a daytime running light feature. Standard OEM headlight installation shall be provided in accordance with FMVSS 108 and Part 393, Subpart B of the FMCSA as applicable.

Headlamps shall be LED and /or a combination of LED low beam and high intensity halogens.

Revise: E2.247 to read: Referencing APTA Guideline TS 73. Interior Panels:

Panels shall be easily replaceable and tamper-resistant. They shall be reinforced, as necessary, to resist vandalism and other rigors of transit bus service. Individual trim panels and parts shall be interchangeable to the extent practicable.

Interior panel required to meet FMVSS 302.

Interior side panels shall be Melamine-type material. Interior finish may include combination of melamine, fiberglass and ABS plastic for the vehicle interior.

Revise: E2.279 to read: Referencing APTA Guideline TS 77.1 Assists:

Excluding those mounted on the seats and doors, the assists shall have a cross-sectional diameter between 1¼ and 1½ inches or shall provide an equivalent gripping surface with no corner radii less than ¼ inch. All passenger assists shall permit a full hand grip with no less than 1½ inch of knuckle clearance around the assist. Passenger assists shall be designed to minimize catching or snagging of clothes or personal items and shall be capable of passing the NHTSA Drawstring Test.

Any joints in the assist structure shall be underneath supporting brackets and securely clamped to prevent passengers from moving or twisting the assists. Seat handholds may be of the same construction and finish as the seat frame. Door mounted passenger assists, connecting tees, angles and hardware shall be 304 or 316 grade stainless steel. Assists shall withstand a force of 300 lbs applied over a 12-inch lineal dimension in any direction normal to the assist without permanent visible deformation. All passenger assist components, including brackets, clamps, screw heads and other fasteners used on the passenger assists shall be designed to eliminate pinching, snagging and cutting hazards and shall be free from burrs or rough edges.

Revise: E2.272 to read: Referencing APTA Guideline TS 76.6 Hip-to-Knee Room:

Hip-to-knee room measured from the center of the seating position, from the front of one seat back horizontally across the highest part of the seat to vertical surface immediately in front, shall be a minimum of 26 inches. At all seating positions in paired transverse seats immediately behind other seating positions, hip-to-knee room shall be no less than **26.5 inches**.

Revise: E2.289 to read: Referencing APTA Guideline TS 78.2 Door Glazing:

The upper section of both front and rear doors shall be glazed for no less than 45 percent of the respective door opening area of each section. The lower section of the front door shall be glazed for no less than 25 percent of the door opening area of the section. The lower section of the rear door shall not be glazed

Door glazing shall be easily replaceable in a quick change exterior frame.

The front door panel glazing material shall have a nominal ¼ inch thick laminated safety glass conforming to the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.

The rear doorway glazing material shall have a nominal ¼ inch thick laminated safety glass conforming to the requirements of ANSI Z26.1. The rear door shall be tinted gray and have a maximum solar energy transmittance of 44 percent, as measured by ASTM E-424. Luminous transmittance shall be measured by ASTM D-1003.

Revise: E2.290 to read: Referencing APTA Guideline TS 78.3 Door Projection:

Exterior

The exterior projection of the front doors beyond the side of the bus shall be minimized and shall not block the line of sight of the rear exit door via the curb side mirror when the doors are fully open. The

exterior projection of both doors shall be minimized and shall not exceed 5.25 inches during the opening or closing cycles or when doors are fully opened.

Interior

Projection inside the bus shall not cause an obstruction of the rear door mirror or cause a hazard for standees.

Revise: E2.293 to read: Referencing APTA Guideline TS 78.6 Actuators:

Doors shall open or close completely in 3.5 seconds from the time of control actuation and shall be subject to the closing force requirements. Door actuators and associated linkages shall maximize door holding forces in the fully open and fully closed positions to provide firm, non-rattling, non-fluttering door panels while minimizing the force exerted by the doors on an obstruction midway between the fully open and closed positions.

Door actuators shall be adjustable so that the door opening and closing speeds can be independently adjustable to satisfy the above requirements. The door actuator shall have a damper adjustment to fully cushion door slamming. Actuators and the complex door mechanism shall be concealed from passengers but shall be easily accessible for servicing. The door actuators shall be rebuild-able. Air exhausted from the door system shall be routed such to prevent accumulation of any oil that may be present in the air system and to muffle sound.

The rear doors shall be passenger-controlled. The vehicle operator shall unlock and enable the opening mechanism, which shall be annunciated by illumination of a green light near the door. After enabling and unlocking, the doors shall be opened by the passenger by a powered mechanism actuated by passenger activation of a touch bar.

A switch located within finger reach of the door control, shall duplicate a passenger activated rear door signal.

Doors that employ a “swing” or pantograph geometry and/or are closed by a return spring or counterweight-type device shall be equipped with a positive mechanical holding device that automatically engages and prevents the actuation mechanism from being back-driven from the fully closed position. The holding device shall be overcome only when the operator’s door control is moved to an “Exit Door Enable” position and the vehicle is at 0 kph, or in the event of actuation of the emergency door release.

Locked doors shall require a force of more than 300 lbs to open manually. When the locked doors are manually forced to open, damage shall be limited to the bending of minor door linkage with no resulting damage to the doors, actuators or complex mechanism.

Revise: E2.320 to read: Referencing APTA Guideline TS 83.4.1 Operators Speaker:

Each bus shall have a speaker, protruding no more than 1 inch, in the ceiling panel above the operator. This speaker shall be the same component used for the speakers in the passenger compartment. It shall have 8 Ohms of impedance.