Dallas Area Rapid Transit's New CNG Buses

ARRIVING IN 2013

Low Floor And Fueled By Compressed Natural Gas

DART's arriving fleet of North American Bus Industries (NABI) LFW buses are newly-styled, low floor models, with an aerodynamic look, larger windshields and a roof line design that complements the lines of the vehicle. These compressed natural gas (CNG) models will serve DART customers far into the future, at an operational cost savings over their diesel predecessors.

- A total of 459 buses have been ordered
- Buses are to be two sizes, 31 and 40 foot
- CNG Fuel stored in 6 ea. 16 inch diameter tanks
- Low-floor buses have 6:1 ramp angle for easier entry
- New electronics enhance communication and data collection

New NABIS Buses — 40 and 31 Feet in Length

Compressed Natural Gas (CNG) on DART buses:	Low Floor Bus Design includes:
• Stored in vessels mounted atop the bus	• Large windows – increased visibility
• A clean fuel that is domestically produced	• A more spacious and open feel
• Less expensive than diesel fuel	• Greater flexibility with wheelchairs and mobility devices

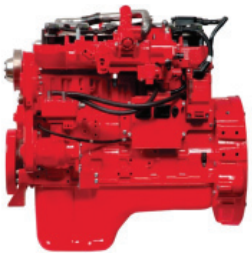
New Bus Technology Improves Comfort, Reduces Emissions, and Increases Performance

Compressed Natural Gas Powered

The ISL G natural gas engine not only meets all of today's emission levels, it also sets a benchmark for lower alternative fuel vehicle life cycle costs. In high fuel use applications, the lower alternative fuel costs, improved fuel economy, and lower incremental maintenance costs save valuable fleet dollars.

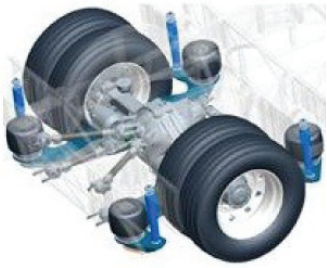
This 8.9-liter, 280 HP engine is rugged and reliable. It shares many components and parts with Cummins L Series diesels. Turbocharged and with electronic controls, the engine provides performance which is like its diesel counterpart.

Because it creates an oxygen-free exhaust, a simple three-way catalyst after-treatment is used. The ISL G does not require active after treatment such as diesel particulate filters or urea injection fluids which adds to its operating cost advantage.



NABI Rear Suspension

NABI Places air bellows at the far outboard edges of the bus. This arrangement provides excellent ride quality and resists the tendency for sway, especially when heavier CNG or Hybrid components are roof mounted. To stabilize the axle, diagonal rods are used on the front and rear axles. No rear stabilizer bar is required.



Allison B400R Transmissions with Integral Brake Retarder

Allison has long been an industry leader. Today's transmissions not only offer durability, but with the continuing volatility of fuel prices, can also contribute to reducing fuel consumption. The transmission, as a major driveline component, is an important factor in driveline efficiency. Allison transmissions, along with a vehicle specification appropriate for the particular duty cycle, can provide superior fuel efficiency and optimum fuel economy. The transmission selector is electronic and is conveniently located in the driver's area.

Disc Brakes and Anti-lock Braking System

DART buses will be equipped with disc brakes which use a flat disc-shaped metal rotor which spins with the wheel. When the brakes are applied, a caliper squeezes the brake pads against the disc slowing the wheel and thereby slowing and stopping the bus.

Disc brakes were chosen because they dissipate heat better than the previously used drum type brakes. Under severe conditions disc brakes take longer to lose effectiveness (brake fade). Disc brakes also lend themselves to easier and faster repair and relining.

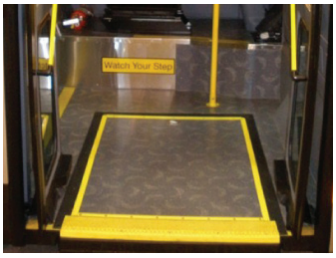
The buses are also equipped with ABS system. ABS controls the wheels to counter any wheel slippage and also regulates the transmission retarder to avoid wheel slippage.

New Features Improve Safety and Enhance Maintenance

Low Floor Design

DART's new buses will exceed the requirements of the Americans with Disabilities Act. With a floor height less of than 16 inches, the low-floor design allows for easy entry and exit. The bus kneels to an even lower level and is equipped with an electrically operated flip-out ramp.

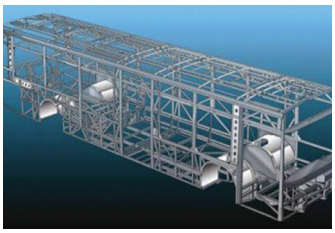
The combination of the low floor, the wide doors, and the easily operated ramp makes the bus accessible for passengers with varying levels of mobility.



Passenger seating on the new buses is located on two levels. A lower level in the front of the bus accommodates two wheelchairs and has additional passenger seats. The mezzanine area in the rear of the bus has the balance of the seating.

Modular Structure

DART will be receiving buses in 40 and 31 foot lengths, to be allocated within the route structure based on the route environment, customer needs, and function. Both buses use the same modular platform and are



nearly identical in their component makeup of welded tubular steel treated to resist corrosion. Side panels and most exterior doors are aluminum, and the roof is a single fiberglass unit. In addition, the buses are equipped with a new composite subfloor material which is lighter in weight and resists floor degradation due to water exposure.

Interior Monitors

Bright thin film transistor monitors are located within the bus to provide riders with visual images, including next stop, rider alerts, passenger information, and stop requests. When used along with DART's GPS tech-

nology, pertinent localized information–including advertisement for local businesses–can be displayed.

Interior Cameras

DART buses will feature a "smart" system with 5 cameras recording all passenger and driver areas.

Destination SIgns

All-LED (light emitting diode) destination signs are provided on each bus. The front full-color destination sign system has superior readability and vibrant colors, and is the largest available. The side destination is displayed in the upper transom immediately behind the front door and a run number is also displayed on the rear of the bus. In addition to being prominent on the destination sign, LEDs are used for virtually all bus interior and exterior lighting.

Passenger Seating

4-One Aires STS passenger seating is provided on both bus sizes. Seats have stainless steel trim and are in 26 and 37 passenger arrangements. Where possible, seats are cantilevered from the sidewall to facilitate the bus cleaning process.

Operator's Seat and Door

The operator's seat is an air suspension seat with 11" fore and aft slide and has adjustable lumbar. A driver's door divides the area between a driver and an entering patron.

Multiplexing Electrical System

DART buses are equipped with an electrical multiplexing system which controls the components necessary to operate the vehicle. The multiplex system is designed to allow

future expansion as DART's needs change during the life of the vehicle. The modular design provides self-diagnostic capabilities, and is easily accessible for troubleshooting electrical failures and performing system maintenance in various locations on the bus.

Ultra Capacitor Starting

The bus starting system includes an ultra capacitor to assist with engine start. The ultra capacitor provides power for starting the engine, without being affected by parasitic loads.

High-Efficiency AC

The Sutrak all electric HVAC system is deck mounted above the engine compartment, is thermostatically controlled, and provides conditioned air through a full-length ducting system.

CNG Tanks Location

DART's new CNG buses come equipped with roof mounted CNG tanks. These tanks are located within a rooftop enclosure which is designed to enhance the aesthetics of the bus while also being easily accessible for routine inspections and maintenance. The buses utilize a bolt-on fuel tank cradle-structure, which mounts to the roof structure. The CNG tanks are neck-mounted to the cradle, and the entire fuel storage network (including valves

and plumbing) is concealed from street-level view with roof fairings. Total capacity of the tanks is 19,992 standard cubic feet.

Performance Data Logging

Much of the new technology on DART buses is tied together by a state of the art vehicle data logger (VDL) system. The system collects huge amounts of data which can be used by DART's maintenance, operations, security, and planning staff. Data collected from the VDL can be wirelessly downloaded for use by various DART departments to efficiently correct issues, streamline and improve service, and to determine incident causes and corrective actions.

Adjustable Foot Pedals

In order to achieve the highest comfort level for drivers, each bus is equipped with an adjustable brake and accelerator pedal system. With the push of a single button the pedals can be adjusted to suit each driver's individual needs

Exit Door-Vapor Class System

- Ultrasonic transducers emit bursts of pulses to survey exits
- The received echoes are analyzed and the smart electronics determine whether an obstacle is present in the doorway
- CLASS senses passengers or other objects and issues OPEN or HOLD OPEN requests
- Exit doors not required on 30-foot bus

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