

Transforming urban mobility. The Tata Starbus way.



The rapid route to modernity

As the saying goes, roads are the lifeline of any city or metropolis. If this lifeline starts choking because of traffic jams, the city itself faces a crisis. Air, noise and visual pollution increase significantly. Parking problems get aggravated. And the risk of road accidents increases rapidly. Ultimately, the city's march towards modernity slows down considerably.

Much of the traffic congestion is due to a significant increase in the vehicle population of major cities in India. Owners shun public transport, preferring to travel in their own cars and two-wheelers instead.

The solution lies in introducing a clean and efficient public transport system. Vehicle owners would find this system worth switching over to, thus ensuring a visible reduction in congestion.

The Government of India and several State Transport Undertakings are making efforts to modernize mass transport in major cities of India. **They have identified the Bus Rapid Transport System (BRTS) as a modern and viable means of mass transport.**

One of the most important features expected of BRTS is passenger-friendly buses that are clean, efficient and contemporary in looks. The Tata **Starbus** range of low floor buses with rear engine is ideally suited to BRTS. What's more, the sleek design, contemporary looks, comfort features and speed make Starbus the bus to be seen in.

Delhi Transport Corporation – one of the largest transport undertakings in the world, catering to the needs of urban commuters – has shown confidence in Starbus, and placed orders for 525 ultra modern Starbus vehicles.



TATA *Starbus* – Trendy & passenger-friendly

More and more cities in India are preferring Starbus as a means of mass transport. It has proved to be very popular with passengers, particularly in Indore where it forms the backbone of the **Indore City Transport Service Ltd. (ICTSL)**. In fact, Starbus offers citizens a swift, clean and dignified way to travel within the city.

Following its success with ICTSL, Starbus was chosen by the **Government of Rajasthan** for mass transport in major cities of this state. Other states of India too are opting for this bus.

What sets apart Starbus is its low floor entry and its rear engine. The low floor entry, with a height of 380 mm, makes entry and exit fast and easy. On the other hand, the rear engine cuts out noise vibration and heat inside the passenger cabin, thereby giving a pleasant ride experience. What's more, its power steering enhances driving comfort.

The Starbus Cities of India

Indore • Bhopal • Jabalpur • Jaipur • Kota
Udaipur • Jodhpur • Nagpur • Kolkata
Ahmedabad • Raipur • Aurangabad



**The best thing about
this bus is that
I reach office in time.**



- Young office executive, Indore

The choice of Starbus

The Starbus range of BRTS and BRTS-enabled buses, with rear engine and two wide doors, is presently available in 3 unique designs. These are • Low Floor CNG Walk-in Bus • Low Floor Diesel Walk-in Bus • Semi Low Floor Diesel 2-Step Entry Bus. The new Semi Low Floor CNG 2-Step Entry Bus will be launched shortly.

The 'star' appeal of Starbus

A survey* conducted in cities has shown that an increasing number of passengers prefer Starbus over ordinary transport buses. They want to be seen travelling in Starbus, thanks to its sleek, contemporary looks and its smooth, speedy movement. Adding to its aesthetic appeal are the neat ABS interiors and the saloon lights. No wonder, Starbus has a 'star' presence that no other bus on India's roads can match.

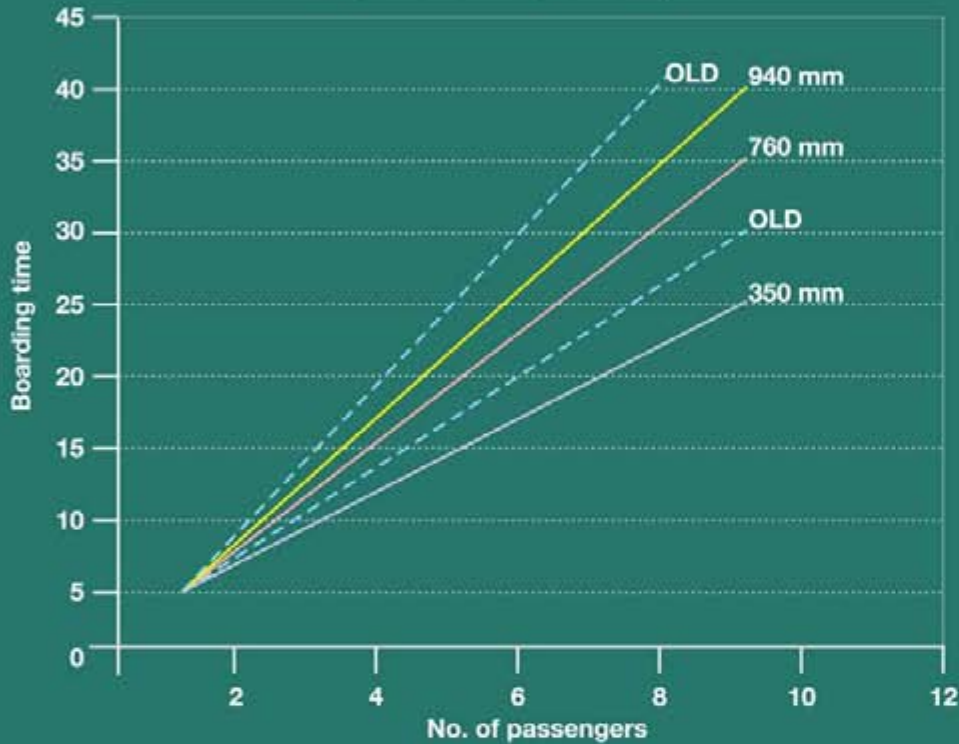
* Survey of commuters by Tata Motors Internal Market Research Agency



Less halt time, more business sense

A study conducted by IIT Delhi in 2007 shows that lower the floor for entry, higher the number of passengers boarding a bus. For instance, with a 350 mm floor height at entry, a bus enables 12 passengers to board it within 25 seconds. This is evident from the graph shown below.

Boarding time and height of bus platform



These buses have changed the image of public transport in the city. In spite of paying more for them, we are making a profit as we are providing quality to our customers. The frequency of these buses is being increased because of the demand.

- Vivek Aggarwal, IAS
Collector & Dist. Magistrate, Indore
Executive Director, ICTSL



Starbus offers two unmatched features that make it the ideal choice of urban city transport. These are its two wide doors and its low floor for entry. The two doors in Starbus are each 1.2 m wide. On the other hand, the low floor for entry and exit measures just 380 mm in height. Together, these features enable faster alighting and boarding of passengers – 25 passengers in just 25 seconds in the low floor CNG and Diesel Starbus variants, and a nominal 45 seconds in the Semi Low Floor Diesel Starbus variant (see table alongside).

Consequently, Starbus takes in more passengers per hour per direction, with lesser halt time – leading to lower fuel consumption and higher revenues.

Comparison of Features of Tata Starbus for BRTS

Description	Low Entry CNG BSIII	Low Entry Diesel BSIII	Semi Low Floor Diesel BSIII
No. of seats	32	32	44
Standing area	13 m ²	13 m ²	10 m ²
Crush passenger-carrying capacity	97	97	94
No. of steps from pavement	Walk-in	Walk-in	2
No. of doors	2	2	2
Width of door (average)	1.2 m	1.2 m	1.2 m
Time required to halt for movement of 25 passengers	25 secs	25 secs	45 secs
Top speed	81 km/hr	80 km/hr	78 km/hr
Acceleration @ rated GVW (0-60 kmph)	18 secs	22 secs	43 secs
Gradeability	32%	24%	24%
Estimated time for 30 km stretch in BRTS route	40 min.	45 min.	45 min.

“With the operating cost on which we carry 100 passengers, the mini bus and tempo people carry 16 passengers. Thus our profit is 5 fold.”

- Chandramauli Shukla
SDM, Indore
CEO, ICTSL



Passenger-friendly

Besides ensuring easier movement with its low floor for entry, Starbus has been thoughtfully designed to provide a manually operated ramp. This facilitates easy entry of wheelchairs into the bus.



I am 50 years old, yet I could easily board the bus with my grandchild in my arms.



- Lady commuter, Indore

Comfort inside out!

Starbus stands out for its bright and spacious interiors, comfortable seating with smooth edges, enough legroom for passengers to sit comfortably, wide aisles and doorways. There is also ample standing space, so that passengers do not have to jostle each other. In fact, a survey* of commuters reveals that they have given **a rating of 8.2 on a scale of 1 to 10** for floor height, ease of movement, seating comfort, ride comfort, noise and vibration.



Safety-on-wheels

Safety of passengers was the first consideration in the design of Starbus. It incorporates several features that ensure a safe and smooth travel for every passenger on board. Among them are • grab handles with slip resistant covers, mounted with solid clamps • wide jackknife cross doors with a buzzer that must be closed before the bus can make a move • a crossbelt that acts as a restraint mechanism to ensure that a passenger on wheelchair remains secure in one place • for the first time in India – windows with rubber beading and rounded corners, to ensure that passengers don't get hurt • an emergency exit door that opens completely from top to bottom, for easy exit of passengers.

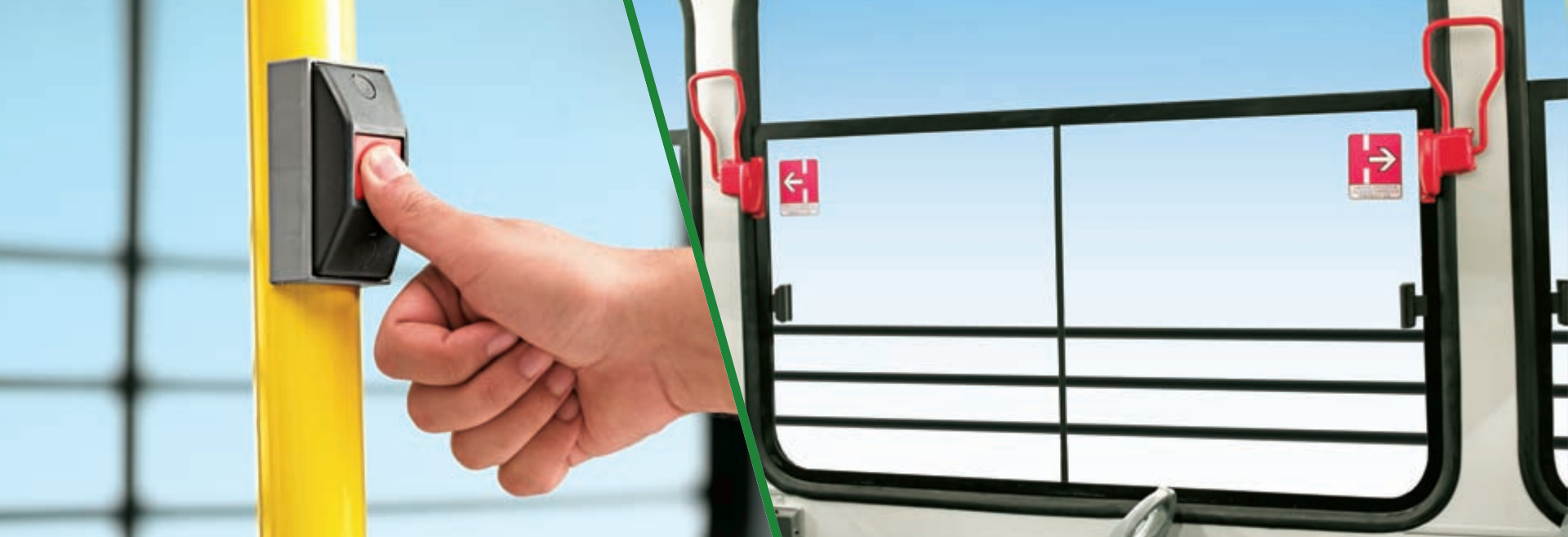


As this bus has proper aisle space, it makes standing easier. I am not afraid that I will fall, or anybody else will fall on me because of any sudden braking. The hand rails are also at a very good height and comfortable to hold.



- Young lady passenger, Indore

* Survey of commuters
by Tata Motors Internal Market
Research Agency



The wide window panes of this bus give a very airy feeling. Even on a hot day the perspiration is minimum and I reach office very fresh. The seats are also very comfortable.

- Young office executive, Indore



A breath of fresh air

Starbus makes sure passengers arrive at their destination in better shape. This is thanks to its wide and spacious window panes that help circulate fresh air. What's more, the windows have a good height, giving passengers a full and clear view of the passing scenery.

All in all, Starbus from Tata Motors is poised to revolutionise public transport in India.

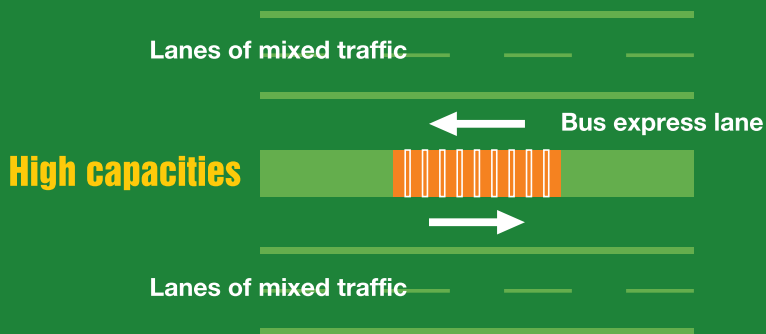
Fast lane to the future

What is a Bus Rapid Transport System (BRTS)?

BRTS is essentially a mass transport system that uses buses to provide a service of higher quality than an ordinary bus line. The buses must offer low floor entry and other passenger-friendly features. To make BRTS successful, it is necessary to improve infrastructure and scheduling. The goal is to make the service quality of BRTS match that of rail transit, so that motorists avail of it as an alternative to using private vehicles on road. **Ultimately, BRTS can actually decongest roads and reduce pollution to a great extent.**



2 ways to operate BRTS



BRTS operates in 2 ways:

- **Open loop:** the route or path is NOT dedicated to BRTS and so, the bus can go up to the last mile of connectivity.
- **Close loop:** the route or path is dedicated to BRTS with its own corridor. Here, the bus goes only up to the specified destination.



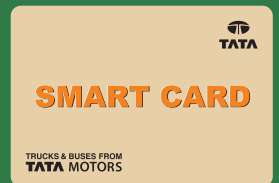


The **advantages** of BRTS are too numerous to ignore:

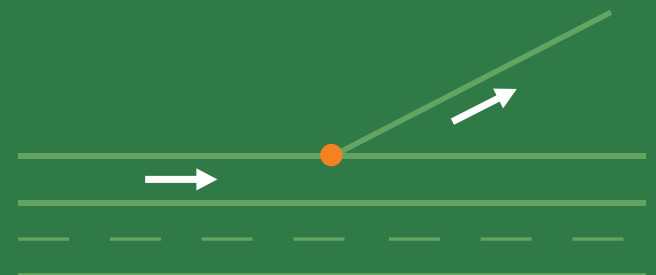
- One-tenth the cost of a rail system.
- Highest fuel efficiency per passenger per kilometre.
- Segregated busways – carved from existing city roads.
With less road space for cars, motorists will most likely shift to BRTS.



- Rapid boarding & alighting – wide doors enable 30/40 passengers to enter and alight simultaneously.
- Clean, comfortable bus stations – low cost all-glass & metal structures that are spacious and modern in design.
- Pre-board fare collection – a smart card system collects single ticket fares which are grabbed by the gate at the end of journey.



- Effective licensing & regulatory regimes for BRTS operators.
- Clear, prominent signage & realtime display of bus routes & timings.
- Transit prioritization – priority of passage at flyovers & traffic signals.
- Modal integration at stations & terminals – feeder buses and taxis offer onward means of transport to passengers.
- Clean Starbus technologies – choice of CNG & low sulphur Diesel buses.



One-stop source

Tata Motors, through its synergy with other Tata Group companies, can provide a package solution for implementation of BRTS, anywhere in India.

Tata Motors is making a significant investment over the next 2 years, on enhancing its bus manufacturing capabilities. This will go into developing Starbus, the BRTS and BRTS-enabled next generation buses.

Besides the BRTS and BRTS-enabled Starbus, Tata Motors will offer expertise on crucial aspects of BRTS, as indicated overleaf.





Fleet Management Systems

In BRTS, Fleet Management Systems help locate the whereabouts of a bus accurately, at any given point of time.

For efficient fleet management, Tata Motors, in partnership with other member companies of the Tata Group, offers the following systems:

- **GPRS/GPS System.** Installation of this system helps in communicating the exact location of a Starbus in realtime, to bus stations. A central server controls all information which it receives through GPRS/GPS.
- **Display on the bus.** This is an LCD or LED display that provides passengers details of the bus route, next stop, time of arrival and other relevant information.





- **Smart card reader and door control with RF**

TAG. Controlled by the driver, it keeps an account of the trip and amount spent, and discards the card on the last journey.

- **Display at the bus stand with back server.**

Operating on solar and back-up with AC, it provides information on bus arrival and other details like route, availability, etc. It also offers scope for advertising. What's more, in future, tickets will also be issued at this place with a vending machine.

- **Driver kit with bus controller & display system on the bus.**

This is a plug-in unit with cash register, loaded with single trip smart card, etc. with flash memory. The driver can issue smart tickets for short trip requests or one-time use by the passenger. It also acts like an on-board server.

- **Skills upgradation for Starbus drivers.** At the very outset, Starbus drivers are taken through a 2-day course on driver safety and economy at the operator's premises. This enables the driver to be comfortable with Starbus and confident of driving it on city roads. Thereafter, a residential skills upgradation training is provided to drivers at the Tata Motors state-of-the-art training centre at Jamshedpur or Pune.





Design of bus station and access points

Tata Motors provides technical expertise to operators for the design of bus stations and access points in BRTS.

Maintenance of bus fleet

For the convenience of operators, Tata Motors offers an Annual Maintenance Contract. This ensures that Starbus remains in smooth running condition at all times.

How BRTS has worked in Bogota, Colombia

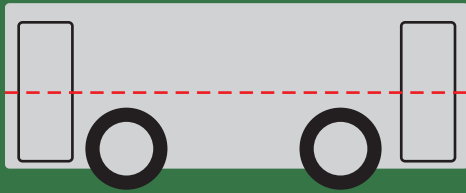
The Transmilenio – Bogota is a BRTS that transports 45,000 passengers per hour, with about 470 dedicated buses. It has emerged as the nerve centre of economic activity. By enabling a modal shift from cars to buses, it has reduced congestion and pollution, at the same time offering adequate space for pedestrians and bicycles.

Impressive track record

Tata Motors, established in 1945, is one of the leading companies of the prestigious Tata Group of Companies. With revenues of US\$ 7.2 billion in 2006-07, it is India's largest automobile company and the world's second largest heavy bus manufacturing company. It is also the world's sixth largest medium and heavy commercial vehicle manufacturing company. The Tata Motors international footprint includes Hispano Carrocera, a bus and coach manufacturer of Spain in which the company has a 21% stake, and a joint venture with Marcopolo, the Brazil-based body-builder of buses and coaches. Tata Motors has a significant presence in Asia, Europe, Africa and Latin America. Driven by a pioneering spirit and constant innovation through 50 eventful years, it has achieved high levels of customer satisfaction and goodwill.

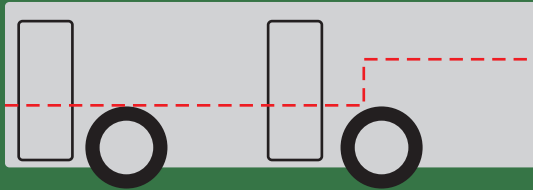
Starbus is the latest product of the Tata Motors track record of innovation.





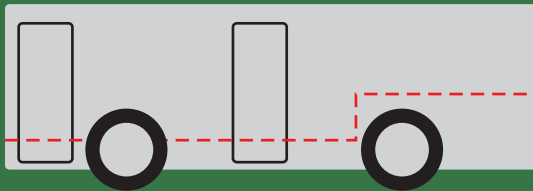
Standard Deck Buses:

- Front engine • 3 steps into bus
- Available in diesel and CNG



Semi Low Floor Buses:

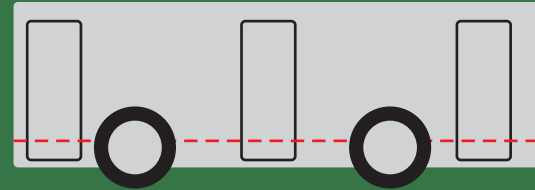
- Rear engine • 2 steps into bus • Available in diesel (CNG variant will be available shortly)



Low Entry Buses:

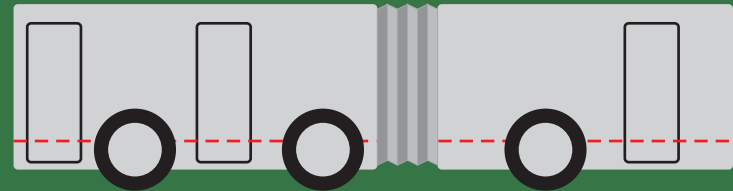
- Rear engine • Walk-in bus • Rear portion raised
- Available in diesel and CNG

TATA Starbus



Low Floor Buses:

- Rear engine • Walk-in bus
- Floor flat right through



Vestibular Buses:

- Multi-axle • 18 m long • Low floor

Description	Semi Low Floor	Low Entry Diesel	Low Entry CNG
Chassis	LPO 1612/59 RESLF	LPO 1615/62 LE	LPO 1623 CNG LE
Emission	BSIII	BSIII	BSIII
Engine	130 HP Cummins	155 HP 697	230 HP Cummins LB
Engine Position	Rear	Rear	Rear
Fuel Injection	Mechanical - Rotary FIP	ECU Controlled - Rotary FIP	ECU Controlled - Rotary FIP
Auto Transmission	NA	NA	Optional
Clutch G/box	352 dia, G600	352 dia, G600	352 dia, G600
Front Axle	Rigid	Deep Throat Rigid	Deep Throat Rigid
Rear Axle	RA 109RR	RA 109RR	RA 109RR
Suspension Front	Mechanical	Pneumatic	Pneumatic
Suspension Rear	Mechanical	Pneumatic	Pneumatic
Tyres	10 x 20	11 R 22.5 Tubeless	11 R 22.5 Tubeless
Brakes Front	Drum Brakes	Disc Brakes	Disc Brakes
Brakes Rear	Drum Brakes	Drum Brakes	Drum Brakes
Fuel Tank	160 L	150 L	9 Cyl x 80 L = 108 kg Gas
Gear Shift	Mechanical	Cable	Cable (NA for Auto Transmission)
Power-assisted Clutch	Clutch Booster	Clutch Booster	Clutch Booster
Floor Height	710 mm	380 mm	380 mm
Kneeling	NA	Optional	Optional
Length	11.2 m	12.0 m	12.0 m
Width	2.6 m	2.6 m	2.6 m
Air Conditioning	Optional through Auxilliary Engine	Direct Drive for AC	Direct Drive for AC
Electrical System	24 V, 150 AH Battery	24 V, 150 AH Battery	24 V, 180 AH Battery

Urban Transit Bus

		Semi Low Floor	Low Entry Diesel	Low Entry CNG
Seating Layout	Option for Wheelchair No. of Passenger Seats Manual Foldable Ramp with Wheelchair Restraint	NA 44 NA	Optional 32* Optional	Optional 32* Optional
Type of Seats	Anti-Vandalism Seats Cushion on Seat & Backrest	Yes Optional	Yes Optional	Yes Optional
Door	Twin 1200 mm Door Front & Middle Mechanical Double Jackknife Door Pneumatic Double Jackknife Door	Yes Yes Optional	Yes Yes Optional	Yes Yes Optional
Window	Top One-third Fixed with Bottom Sliding Tinted Glasses (for AC) Roof Hatch in Front & Rear	Yes Optional Yes	Yes Optional Yes	Yes Optional Yes
Flooring	Anti Skid Vinyl Flooring AI Chequered	Yes Optional	Yes Optional	Yes Optional
Interiors	PVC Coated GP Panel PVC Coated AI Panel Slim Fluorescent Tubelights Stop Switches on Stanchion Pipes	Yes Optional Yes Yes	Yes Optional Yes Yes	Yes Optional Yes Yes
Exterior Panels	Roof GP Panel Side GP Stretch and AL Skirt FRP & Rear Front Face & Bumper	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes
Front	FRP Dashboard with Instrument Cluster Panoramic Wipers Overhanging Outer Rear View Mirror Saloon Mirror Half Driver Partition Drop Down Sunvisor 4-Way Adjustable Driver Seats	Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes
Electronics/Telematics	Electronic Destination Board at Front, Rear & Side GPS Vehicle Tracking System Public Address System with Stereo & Speakers Automatic Ticketing System with Smart Card Reader	Optional Optional Optional Optional	Optional Optional Optional Optional	Optional Optional Optional Optional
Safety Features	Fire Extinguisher Roof Hatches First Aid Box Emergency Door & Emergency Exit Signalling Devices (Side, Top Markers, Warning Triangles) Fire Retardant Upholstery, Plywood, Panels & Dashboard	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes

* With Wheelchair

TATA MOTORS

For more information, please visit our website: <http://buses.tatamotors.com>. You can also contact our Sales Office: 26th Floor, Centre 1, World Trade Centre, Cuffe Parade, Mumbai 400 005. Tel: (022) 6656 1800; Fax: (022) 6636 0408 / 0409. Email: businfo@tatamotors.com

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