

## Bus Specifications (Indicative)

### 1. Low Floor AC buses (400 MM Platform) : Tata Motors Ltd. – Model No. LPO 1624 RE LE AC bus (30 Buses)

Sr No	Parameters	Details	
1	Doors	Minimum Width of Service Doors	1. 1300mm door aperture. 1100 at handhold level after fitment of doors. 2. Doors mandatory 3. Type of Door opening : Preferably in swinging
2	Windows	Minimum width of Windows (clear vision zone)	500 mm
		Minimum Height of Windows:	500 mm
		Type of Window	AC buses there shall be provision for adequate ventilation in case of AC failure
3	Guard Rails		1) The first guard rail shall be provided at a height of 75 mm from the lower window sill 2) The distance between two guard rails shall be 75 to 100 mm. 3) Guard rail for other types of buses may not be provided if the lower edge of the window sill is at least 200 mm above the uncompressed top of the seat cushion
4	Emergency Exits	No of Emergency Exits & Dimensions (min)	At least 1 Emergency doors/ Exits or apertures Dimension –1250 mm x 550 mm (for emergency window – - min 4000 cm <sup>2</sup>
5	Steps	Maximum Height of first step from ground	400 mm
		Maximum Height of Other steps	250 (300 if door behind rear axle) mm max for Type-I
6	Maximum Floor Height	The floor height shall be measured at any one of the service doors of the vehicle in unladen condition (reference point to be specified by the manufacturers)	650 mm ( 35 % of total floor area min. ) or 400 mm ( 35% of total floor area)
7	Gangway	Minimum Height	1900 mm
		Minimum Width	450 mm
8	Seat	Seat Layout	2X2 layout

		Seating Area/ Space Per Passenger (Total Width X Depth)	400x350 mm (AIS 052)
		Seat spacing (AIS 023)	650 mm - Type I
9	Destination Board	Minimum No. of Destination Board in line with AIS 052	1) Min. Height of Destination Board: 220 mm 2) Min. width of Destination Board : 1800 mm for front & 900 mm for rear and service door side. 3) Location centered in top of front face
		Illumination of Destination Board	Shall be Provided
		Internal Destination Board	Shall be Provided
10	Pad Material		In line with AIS 052 : preferably no padding (plastic moulding seats )
11	Upholstery		In line with AIS 052 : preferably no padding (plastic moulding seats )
12	Other Features	Headrest	Not Required
		Stanchion	As per ECE R 36 ( AIS 046 to be aligned)
		Deleted	
		Deleted	
		Deleted	
		Air Conditioning	The Air-conditioning system wherever applicable shall have a minimum cooling capacity of 47KW Tonnage. The Cooling shall be suitable for Ludhiana city stage carrier operation of City Buses. The temperature control-setting unit shall be provided on the Driver Instrument panel board. The Air-Conditioning system shall be main engine driven preferably with Automatic Thermo cut off. The Air conditioning system shall also include features like louvers for each passenger seat. Air Condition system shall be mounted on the roof/chassis and shall be accessible for maintenance from the top. The portion between the interior and exterior panels on the roof and sides shall be adequately insulated, to prevent Cooling loss. They should adhere to the following specifications. ISO/ TS – 16949 certified manufacturer for Heating, Ventilation and Air Conditioning of buses. Compressor capacity- 650cc Bitzer (Germany)/Indian Make. Dash Control for showing outside and cabin temp, with self diagnostics. FLRY type wiring harness meeting DIN SPECS. Lead free PVC cable for all wiring harness. Louvers for each passenger seat will not be provided. Spehros make AC will be provided. Performance of AC shall be Checked by LCBCL
		Reading Lights	Not Required
Cabin Luggage Carrier	Not Required		

		Audio visual system in line with AIS 052	Shall be Provided
13	Standing Capacity		To be determined on the basis of seat layout as per the bus code
14	Engine		230 HP (BS III)
15	Power Steering		Shall be Provided
16	Transmission i.e Automatic/ Manual		Automatic Transmission
17	Seat Belts Requirement		Not required other than driver
18	Anti Lock Breaking System (ABS)		Not Required
19	Suspension type for Front / Rear		Air suspension (In BRT buses the level of floor should be same irrespective of load using any technology )
20	Acceleration		Acceleration – 1 m/sec/sec in full load (Max for passenger, min for design) 0-30 kmph in 10 sec or less Max Speed : 30-90 kmph
21	Engine Location		Optional ( can be decided by the manufacturer)
22	Side Facing Seats		Optional
23	Door Closing Requirements for Bus Movement		Mandatory
24	Fire Extinguisher		Required
25	Gear Shifting Position	Column/ Floor	Automatic Transmission Gear is dashboard mounted
26	Kneeling Requirements		kneel down height 340 mm from ground
27	Approach Angle (Min)		Min 8°
28	Departure Angle (Min)		Min 8°
29	Passenger Compartment Internal Height (Rear Axle Floor Area)		1900 mm in non low floor area (1700 mm in case of rear saloon area of Rear Engine bus)
30	Type of Floor	Sloping/ Plain	Plain
31	Steps on Floor	Yes/ No	Optional
32	Maximum Floor Space		Max 6% (As per AIS 052)
33	Low Floor Area	(% of total floor area)	35%
34	Floor Surface		Anti skid floor surface
35	Requirement for Passenger with	Wheel chair anchoring	In bus with 400 mm floor height
		Priority Seats	Atleast 2

	limited mobility	Stop Request	On every pillar,
		Manual Ramp	Shall be provided
36	Deleted		
37	ITS Related Requirement	Ticketing	Bus architecture should be compatible with ITS
		Smart Card	Required
		PIS	Required (Audio-Visual)
		Vehicle Tracking System	Bus architecture should be compatible with vehicle tracking system
38	Lighting		(Fog lamp to be categorically provided in Northern region buses) As per AIS 052
39	Deleted		
40	Warning Triangle		As per CMVR, Chapter VI,138(4)(C)
41	Driver's Working Space		As per Bus Body Code Clause 2.2.16 of AIS:052 and Point no. 21 and 22 of Amendment no.1 to AIS 052
42	Rear View Mirrors		As per CMVR (AIS:001 & AIS:002)
43	Safety Glass		As per CMVR Clause 128
44	Brakes		<p>Dual line Full Air Brake system shall be provided on all four wheels with Auto Slack Adjusters, and quick release exhaust valve.</p> <p>Graduated type hand control valve shall be provided for Hand Brake system with actuators operating on rear wheels.</p> <p>The control valve shall be provided on the right hand/left hand side of the driver on the Dash Board or floor.</p> <p>Auxiliary tank shall be provided forutilizing air for air suspension etc.</p> <p>Auto Slack Adjusters applicable for Rear Wheels only as Front will be Disc Brakes</p>
45	Other Standard Fitments		FWS blinder partition for driver. All flap doors with locking arrangement, 2no. roof hatches with exhaust fans (Optional for Non AC, Compulsory for AC buses),First aid kit & Warning triangle as per CMVR Rules, Fuel tank conforming to specifications of SAE 703 a of minimum capacity of 150 lts Colour Schemes, Graphics, Logos etc to be provided as specified by the LCBSL. 2no. roof hatches without exhaust fans

46	Electrical System	<p>The system shall be of 24 Volt DC. A battery /Electrical Isolating switch can be on the rear of the bus with on/off control at Driver Dash Board or near the driver seat - Batteries -12Vx2 nos. min - 150AH.</p> <p><b>Electrical Isolator switch shall be provided (One Piano Switch shall be provided near driver for easy control).</b></p> <ol style="list-style-type: none"> <li>1. Bus shall be provided with Master Master Multiplexing system</li> <li>2. Current Measurement and Trip facility is available with current multiplexing system</li> <li>3. Back office monitoring will be possible</li> </ol>
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## 2. Semi Low Floor buses (650 MM Platform): Ashok Leyland Ltd. (25 buses)

Sr No	Parameters	Details
1	Doors	<p>Minimum Width of Service Doors</p> <ol style="list-style-type: none"> <li>1. Door aperture - 1300. Clear door aperture. Jack knife door is a standard feature.</li> <li>2. Doors mandatory</li> <li>3. Type of Door opening : Preferably in swinging</li> </ol>
2	Windows	<p>Minimum width of Windows (clear vision zone)</p> <p>500 mm</p>
		<p>Minimum Height of Windows:</p> <p>500 mm</p>
		<p>Type of Window</p> <p>The window panes shall be sliding type for all buses except AC buses. In AC buses there shall be provision for adequate ventilation in case of AC failure</p>
3	Guard Rails	<ol style="list-style-type: none"> <li>1) The first guard rail shall be provided at a height of 75 mm from the lower window sill</li> <li>2) The distance between two guard rails shall be 75 to 100 mm.</li> <li>3) Guard rail for other types of buses may not be provided if the lower edge of the window sill is at least 200 mm above the uncompressed top of the seat cushion</li> </ol>
4	Emergency Exits	<p>No of Emergency Exits &amp; Dimensions (min)</p> <p>At least 1 Emergency doors/ Exits or apertures Dimension –1250 mm x 550 mm (for emergency window – - min 4000 cm<sup>2</sup></p>

5	Steps	Maximum Height of first step from ground	400 mm
		Maximum Height of Other steps	250 (300 if door behind rear axle) mm max for Type-I
6	Maximum Floor Height	The floor height shall be measured at any one of the service doors of the vehicle in unladen condition (reference point to be specified by the manufacturers)	650 mm ( 35 % of total floor area min. ) or 400 mm ( 35% of total floor area)
7	Gangway	Minimum Height	1900 mm
		Minimum Width	450 mm
8	Seat	Seat Layout	39+1 with 2X2 configuration including wheel chair
		Seating Area/ Space Per Passenger (Total Width X Depth)	400x350 mm (AIS 052)
		Seat spacing (AIS 023)	650 mm - Type I
9	Destination Board	Minimum No. of Destination Board in line with AIS 052	1) Min. Height of Destination Board: 220 mm 2) Min. width of Destination Board : 1800 mm for front & 900 mm for rear and service door side. 3) Location front top left hand corner
		Illumination of Destination Board	Provided
		Internal Destination Board	Provided
10	Pad Material		In line with AIS 052 : preferably no padding (plastic moulding seats )
11	Upholstery		In line with AIS 052 : preferably no padding (plastic moulding seats )
12	Other Features		
		Stanchion	As per ECE R 36 ( AIS 046 to be aligned)
		Seat arm	Not Required
		Magazine Pouch	Not Required
		Individual Seat row fans	Not Required
		Deleted	
		Reading Lights	Not Required
		Cabin Luggage Carrier	Not Required
	Audio visual system in line with AIS 052	Shall be Provided	
13	Standing Capacity		22
14	Seating/ Standing Ratio		Not Required
15	Power Steering		Provided
16	Transmission i.e Automatic/ Manual		Automatic
17	Seat Belts Requirement		Not required other than driver

18	Anti Lock Breaking System (ABS)		Not Required
19	Suspension type for Front / Rear		Air suspension (In BRT buses the level of floor should be same irrespective of load using any technology )
20	Acceleration		Acceleration – 1 m/sec/sec in full load (Max for passenger, min for design) 0-30 kmph in 10 sec or less Max Speed : 30-90 kmph
21	Engine		180 HP (BS III)
22	Deleted		
23	Door Closing Requirements for Bus Movement		Mandatory. Door will not open when vehicle speed is more than 5 Kmph
24	Fire Extinguisher		Provided
25	Gear Shifting Position	Column/ Floor	-
26	Deleted		
27	Approach Angle (Min)		Min 8 <sup>0</sup>
28	Departure Angle (Min)		Min 8 <sup>0</sup>
29	Passenger Compartment Internal Height (Rear Axle Floor Area)		1900 mm in non low floor area (1700 mm in case of rear saloon area of Rear Engine bus)
30	Type of Floor	Sloping/ Plain	Plain Floor
31	Steps on Floor	Yes/ No	No
32	Maximum Floor Space		Max 6% (As per AIS 052)
33	Low Floor Area	(% of total floor area)	35%
34	Floor Surface		Anti skid floor surface
35	Requirement for Passenger with limited mobility	Wheel chair anchoring	In bus with 400 mm floor height
		Priority Seats	Atleast 2
		Stop Request	Regarding the Stop Request on every pillar the participant says not required on every stanchion.
		Manual Ramp	Provided
36	Deleted		
37	ITS Related Requirement	Ticketing	Bus architecture should be compatible with ITS
		Smart Card	Required
		PIS	Required (Audio-Visual)
		Vehicle Tracking System	Bus architecture should be compatible with vehicle tracking system
38	Lighting		(Fog lamp to be categorically provided in Northern region buses) As per AIS 052
39	Deleted		
40	Warning Triangle		As per CMVR, Chapter VI,138(4)(C)

41	Driver's Working Space		As per Bus Body Code Clause 2.2.16 of AIS:052 and Point no. 21 and 22 of Amendment no.1 to AIS 052
42	Rear View Mirrors		As per CMVR (AIS:001 & AIS:002)
43	Safety Glass		As per CMVR Clause 128
44	Brakes		Dual line Full Air Brake system shall be provided on all four wheels with Auto Slack Adjusters, and quick release exhaust valve. Graduated type hand control valve shall be provided for Hand Brake system with actuators operating on rear wheels. The control valve shall be provided on the right hand side of the driver on the Dash Board or floor. Auxiliary tank shall be provided for utilizing air for air suspension etc. <b>Relay valve in place of Quick release valve.</b>  <b>Hand brake valve on LH side of Driver on Dashboard</b>
45	Tyres		Tyres – 6 nos + 1 Spare, 11R x 20 or 11R x 22.5 or 295R 22.5 Radial tyres of approved makes only. (Preferred to be mounted though need not be mounted on bus chassis). To be amended to 10 <sup>x</sup> 20-16 radials
46	Steering		The steering position shall be on the right hand side of the bus. Turning circle radius not more than 11500 mm for Low floor Buses. The Bus should have either adjustable steering column or 4 way adjustable driver seats. It should be in such a design to withstand peak road shocks without risk of component failure or inadvertent alternation of steering geometry. <b>Turning circle radius will meet as per CMVR.</b>  <b>Fixed steering column with 4 way adjustable driver seat will be provided</b>
47	Electrical System		The system shall be of 24 Volt DC. A battery /Electrical Isolating switch can be on the rear of the bus with on/off control at Driver Dash Board or near the driver seat - Batteries -12Vx2 nos. min - 150AH. <b>Electrical Isolator switch shall be provided (One Piano Switch shall be provided near driver for easy control).</b>  1. Bus shall be provided with Master Master Multiplexing system 2. Current Measurement and Trip facility is available with current multiplexing system 3. Back office monitoring will be possible
48	Instrument Panel		Aesthetically designed Instrument panel should consists of Speedo meter with Km counter, Air Pressure Gauges, Flashing – Side indicator and switch, Warning lamp / buzzer for low air pressure, warning lamp / buzzer for discharging of batteries, Starter Switch, Dipper switch, Ammeter /Voltmeter, Temperature

			<p>Gauge, Engine oil pressure gauge, Engine RPM Meter Etc.</p> <p><b>1. Instrument Panel shall be with all required features except</b></p> <p><b>a. warning lamp/buzzer for discharging of Battery (currently lamp available for Battery charging only)</b></p> <p><b>b. Since Vehicle is on Master-Master Multiplexing configuration, Voltmeter is a part of the LCD display. ammeter Cannot be provided.</b></p>
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**3. Midi Bus Non AC and AC Buses : SML ISUZU Pvt. Ltd. .  
Manufacturing in 2013 ZT54AB TCIII LWB: Non AC buses- 70  
buses and AC buses 25**

Sr No	Parameters	Details	
1	Doors	Minimum Width of Service Doors	730 mm X 1940 mm 2 passenger Door Jack Knife type doors
2	Windows	Minimum width of Windows (clear vision zone)	450 mm
		Minimum Height of Windows:	725 mm
		Type of Window	The window panes shall be sliding type for all buses except AC buses. In AC buses there shall be provision for adequate ventilation in case of AC failure

3	Guard Rails		<p>1) The first guard rail shall be provided at a height of 75 mm from the lower window sill</p> <p>2) The distance between two guard rails shall be 75 to 100 mm.</p> <p>3) Guard rail for other types of buses may not be provided if the lower edge of the window sill is at least 200 mm above the uncompressed top of the seat cushion</p>
4	Emergency Exits	No of Emergency Exits & Dimensions (min)	At least 1 Emergency doors/ Exits or apertures Dimension –1370 mm X 745 mm (for emergency window – min 4000 cm <sup>2</sup> )
5	Steps	Maximum Height of first step from ground	350 mm
		Maximum Height of Other steps	245 mm
6	Maximum Floor Height	The floor height shall be measured at any one of the service doors of the vehicle in unladen condition (reference point to be specified by the manufacturers)	890 mm
7	Gangway	Minimum Height	1829 mm (Internal Height)
		Minimum Width	355 mm
8	Seat	Seat Layout	2X2
		Seating Area/ Space Per Passenger (Total Width X Depth)	405 mm X 400 mm
		Seat spacing (AIS 023)	680 mm
9	Destination Board	Minimum No. of Destination Board in line with AIS 052	Min. Height of Destination Board: 220 mm Min. width of Destination Board : 800 mm – Location front top left hand corner
		Illumination of Destination Board	Provided
		Internal Destination Board	Provided
10	Pad Material		Compliance with AIS-023 as against requirement of AIS 052
11	Upholstery		Compliance with AIS-023 as against requirement of AIS 052
12	Other Features	Headrest	Not Provided
		Stanchion	Provided
		Seat arm	Not Provided
		Magazine Pouch	Not Provided
		Individual Seat row fans	Not Provided

		Air Conditioning	Not Provided
		Reading Lights	Not Provided
		Cabin Luggage Carrier	Not Provided
		Audio visual system in line with AIS 052	Provided
13	Standing Capacity		-
14	Seating/ Standing Ratio		Not Applicable
15	Power Steering		Provided
16	Transmission i.e Automatic/ Manual		Manual
17	Seat Belts Requirement		Not required other than driver
18	Anti Lock Breaking System (ABS)		Not Required
19	Suspension type for Front / Rear		Normal Suspension
20	Engine		102 HP
21	Engine Location		Under the Front Cabin area
22	Side Facing Seats		Front Facing Seats on 2X2 layout
23	Door Closing Requirements for Bus Movement		Provided
24	Fire Extinguisher		Provided
25	Gear Shifting Position	Column/ Floor	Column Mounted
26	Deleted		
27	Approach Angle (Min)		Min 8 <sup>0</sup>
28	Departure Angle (Min)		Min 8 <sup>0</sup>
29	Passenger Compartment Internal Height (Rear Axle Floor Area)		1829 mm
30	Type of Floor	Sloping/ Plain	Plain
31	Steps on Floor	Yes/ No	No
32	Maximum Floor Space		Plain
33	Low Floor Area	(% of total floor area)	Plain (Low floor area not applicable)
34	Floor Surface		Anti skid floor surface
35	Requirement for	Wheel chair anchoring	Not Required

	Passenger with limited mobility	Priority Seats	Atleast 2
		Stop Request	On every pillar
		Deleted	
36	Deleted		
37	ITS Related Requirement	Ticketing	Bus architecture should be compatible with ITS
		Smart Card	Required
		PIS	Required (Audio-Visual)
		Vehicle Tracking System	Bus architecture should be compatible with vehicle tracking system
38	Lighting		(Fog lamp to be categorically provided in Northern region buses) As per AIS 052
39	Crashworthiness Requirements		As per CMVR
40	Warning Triangle		As per CMVR, Chapter VI,138(4)(C)
41	Driver's Working Space		As per Bus Body Code Clause 2.2.16 of AIS:052 and Point no. 21 and 22 of Amendment no.1 to AIS 052
42	Rear View Mirrors		As per CMVR (AIS:001 & AIS:002)
43	Safety Glass		As per CMVR Clause 128

#### 4. Indicative list of ITMS fitments to be provided by Bus Manufacturers

	ITS fitments	Tata Motors	Ashok Leyland	SML ISUZU
		AC Low Floor buses	Semi Low Floor buses	Mini Bus NAC Buses
<b>A</b>	<b>Destination Boards</b> (Provided /Not Provided)	Provided	Provided	Provided
	External and Internal (mention numbers)	External : 3 Internal :1	External: 3 Internal:1	External: 2 Internal: 1
<b>B</b>	<b>ITS related requirements</b>			
1	Ticketing: Bus architecture should be compatible with ITS	Compatible	Compatible	Compatible
2	Passenger Information system (Audio) (P/NP)	Provided	Provided	Provided
3	Bus architecture should be compatible with Vehicle tracking system	Compatible	Compatible	Compatible
4	Buses shall have <b>single controller</b> compatible with the following: (P/NP)	Provided	Provided	
	1) Ticketing machine	Compatible		Not Provided (Electrical Provisions only)
	2) Smart card reader	Compatible	Not Provided	Not Provided (Electrical Provisions only)
	3) PIS (Audio & Visual)	Provided	Provided	Provided
	4) Vehicle Tracking System		Not Provided	Not Provided (Electrical Provisions only)
	5) Driver bus routes guidance	Compatible	Not Provided	Not Provided
	6) Multiplex wiring system	Provided	Provided	Provided
5	Controllers shall have inbuilt GPS, GPRS capability (GSM or CDMA or Private Network) to be able to integrate with Back office ITS requirements.	Provided	Provided	GPS Provided, GPRS NOT Provided
6	The memory size of the Controller should be min 64 MB	Provided	Provided	Not Provided
7	Two cameras on the bus (1 in case of mini/midi). The camera recording for at least 48 hours should be available on the Bus	Provided	Provided	Not Provided
<b>C</b>	<b>Electrical System</b>			
1	Master Master Multiplex with onboard diagnostic display panel.	Provided	Provided	Provided