

Potential of CNG Buses in Pakistan

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Engineering Development Board
Ministry of Industries, Production & Special Initiatives
Government of Pakistan

Greener Pakistan

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Preamble

Natural gas being a fossil fuel is cheap and clean to burn as compared to diesel. World over, there is a trend to deploy advance transportation technologies that reduce the nations import bill of oil while improving the air quality.

2. Diesel fuel buses pollute the air by generating toxic gases and particulates, comprising 10 - 30% of the emissions of fine particulate matter thus reducing visibility. Not only this, but these are also associated with adverse health effects, excess mortality, cardio pulmonary disorders, bronchitis, asthma and lung cancer. On the other hand, advantage of CNG gas usage in the buses is that it burns cleaner than diesel fuel. It is primarily methane which is sulphur free, a relatively simple molecule and mixes more uniformly than diesel fuel in the ignition chamber leading to more complete combustion and fewer emissions of several types of pollutants. Studies reveal that CNG driven buses produce 50-60% lesser oxides of Nitrogen (NOx), 85% lower Total Particulate Matter (TPM) and 89% lower Carbon Monoxide (CO). Moreover, CNG buses have significantly low noise and engine vibrations.

3. Current upsurge in the oil price demands to think in terms of switching over to CNG buses not only to reduce the ozone forming pollutants but also taking it as a step forward towards cleaner transport technologies. This Report is being published by EDB as an information document for the stakeholders who intend to explore the potential of locally manufactured CNG Buses in Pakistan.

A handwritten signature in black ink, appearing to read 'Imtiaz Rastgar'.

Imtiaz Rastgar
Chief Executive

POTENTIAL OF LOCALLY MANUFACTURED CNG BUSES IN PAKISTAN

The following units have CNG bus production/assembly facilities in Karachi:

- i) Hinopak Motors Ltd.
- ii) Afzal Motors (Pvt) Ltd.
- iii) Pakistan Engineering Works (Bus Body Makers)

Manufacturing Capabilities

2. The dedicated CNG engine, CNG conversion kit, cylinders and other accessories are being imported by the manufacturers whereas local manufacturing / assembly of chassis, body and trims etc. for CNG buses is being done by the manufacturers. The CNG buses manufactured in Pakistan are compliant to Euro II emission standards and also offer optional pneumatic / air suspension. Currently, one Hino CNG bus is being tested at Islamabad.

3. Hino Japan had developed a dedicated CNG engine especially for Pakistan which is an indicator of their interest in this market. Daewoo, on the other hand, already have co-developed the CNG engine with Alternate Fuel Systems (AFS) Canada and are not only catering for South Korea's domestic market but also exporting CNG buses to other countries.

Capital Cost

4. The initial capital cost of a CNG bus is higher by approximately 30-35% as compared to a diesel bus. This high cost is due to the additional CNG kit, CNG cylinders, catalytic converter and other CNG accessories. Another factor adding to initial cost is the higher operating cost of the manufacturers which is due to low production volumes. These operating costs can automatically come down if the higher production volumes are achieved.

Cost Efficiencies

5. The operating cost of a CNG bus is lower than that of an equivalent diesel bus with same specifications. The per km fuel cost of a CNG bus is approximately 15% lower and per km maintenance cost is approximately 20% lower as compared to an equivalent diesel bus, thus creating cost efficiencies.

Prices of CNG Buses

6. The market price of a CNG Bus ranges between Rs 3.8 million to Rs. 4.0 million as compared to Diesel Bus which has a price range between Rs. 3.0 million to Rs 3.2 million.

Production Capacities

7. **Hinopak** has the capacity to manufacture 6000 chassis per annum which can be used either for buses or trucks. The production capacity for buses alone is estimated to be 2,400 units per annum. Currently, Hinopak has a working order of 12 CNG buses from Al-Shahbaz Transport Co. Specifications of locally assembled Diesel and dedicated CNG buses by HinoPak Motors are depicted below:

AK1J Bus Specs		
MODEL	AKIJ-DIESEL	AK1J-CNG
Engine Model	J08C	J08C-CNG
Max. Output – PS(KW)/rpm	210(155)/2900	125(170)/2700
Max. torque- Kgfm(Nm)/rpm	56.5(554)/1500	519(53)/1000
Max. Engine Speed (rpm)	3200	2700
Clutch Size Mm(inch)	350(13.78)	Same
Gear Box Type	LJ06S	
1 st Gear Ratio	7.663	
Differential Type	SH16	
Final Gear Ratio	5.125	
GVW Rating	14,000 Kg	
Tire Size	9.00-20-14PR	

Salient Features

- Zero emission of black smoke, NO_x, CO, and HC.
- Approved by OGRA/HDIP.
- Reduced noise level
- Clean burning
- Improved cold start





HinoPak Motors specialized in manufacturing of Fiber Glass body parts for Buses

8. **Afzal Motors** is in the process of completing the main assembly facilities and shall have the capacity to assemble/manufacture 5000 Daewoo dedicated CNG buses per annum upon completion of their plant. These buses with high powered engines and latest technological features are focused to meet countries present and future demand. Six of their engineers are being trained by Daewoo Korea presently.

Specifications of Daewoo CNG Buses	
Description/Model	BH 115E
Type of Bus Chassis	Rear Engine
Engine Power(Hp)	240
Torque(Kg-m)	90
Engine Type	Turbo Intercooler
Emission Type	Euro -II
Overall length(mm)	11,494
Clutch Size(mm)	380
Gross Vehicle weight(Kg)	16,500

Salient Features

- ✦ Euro-II- low rpm Engines
- ✦ Fuel efficient, large seating capacity
- ✦ Power clutch and strong Transmission
- ✦ Full Air Brakes
- ✦ Endurance at extended operational hours



Afzal Motors Bus Assembly Facilities

9. **Pakistan Engineering Works** is specialized in the manufacturing of motor vehicle bodies, installation of machinery, steel structure, platforms, other forms of light fabrication and fiberglass works. They use mild steel, stainless steel, aluminum and provide full design and fabrication services to suit particular requirements of the customers. The company is dedicated to gain market share in each of its business through a combination of product performance, high reliability, widespread distribution, excellent support service and competitive price.

10. Pakistan Engineering Works is offering body making facilities in the following specialized areas:

- Ambulance
- Bus
- Bullet Proof Van
- Beverage Vehicle
- Car / Cargo Trailer
- Container Trailer
- Dump Trucks
- Fire Fighting Vehicle
- Mobile work shop
- Mobile Dispensary
- Refrigerator Container
- Trailer
- Tank Trailer
- Refuse Van
- Water / Fuel Bower



Bus Bodies produced at Pakistan Engineering Works



Fast Food Kitchen & Restaurant for Export to Germany. A specialized activity of Pakistan Engineering Works, apart from Bus Body Building

Installed Capacities & Production Statistics of Local Bus Manufacturers:

11. Installed capacities of different bus manufacturers in Pakistan and their Production trends for the last eight years are depicted in the table below.

	Installed Capacity for Chassis Assembly	Installed Capacity for Bus Body manufacturing		98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06
Hino	6,000	2,400	P	258	534	444	630	756	1,195	1,392	668
			%Cap Util	10	22.3	18.5	26.3	31.5	49.8	58.0	27.8
Nissan (Ghandara)	4,200	1,800	P	266	146	102	36	60	96	120	48
			%Cap Util	14.8	8.1	5.7	2.0	3.3	5.3	6.7	2.7
Dong Feng (Sind Engg)	3,000	1,000	P	600	780	780	420	480	89	110	40
			%Cap Util	60.0	78.0	78.0	42.0	48.0	8.9	11.0	4.0
Master	5,000	5,000	P	~	~	~	~	~	~	21	6
			%Cap Util							0.4	0.1
Isuzu (Ghandara Nissan)	3,000	2,000	P	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	119	63
			%Cap Util							6.0	3.2
Afzal Motors (Daewoo)	5,000	5,000	P	-	-	-	-	-	-	-	-
TOTAL BUSES:	26,200	17,200	P	1,124	1,460	1,326	1,086	1,296	1,380	1,762	825
			%Cap Util	6.5	8.5	7.7	6.3	7.5	8.0	10.2	4.8
Bus Body Makers in unorganized sector *		4500-5000 Units per annum									1000

Source: PAAMA, *EDB's own research

Apart from the manufacturers / assemblers in the organized sector ,almost 200 units in the unorganized sector are reported to be operational in the main cities i-e Karachi, Lahore, Gujranawala, Faisalabad, Rawalpindi, Chiniot, Sargodha & Sadiqabad. These units have an annual capacity of manufacturing almost 4500-5000 bus bodies. Since idle capacities of chassis manufacturing exists in the country therefore CNG bus chassis once available can be used by several contenders in the unorganized sector to take up the job of bus body making. Details of bus body making companies in the unorganized sector are placed at **Annexure I**. Most of these bus body manufacturers are members of Quami Tajir Ittehad Bus Body Makers Association.

Engine Types

12. CNG Engines are available in many formats but the following are most commonly used:

(i) ***Dedicated, Mono-fuel or Monovalent***

Also referred to as Spark Ignited Engine, its a dedicated engine having advantage of being 'optimized' for CNG operations.

(ii) ***Bi-fuel or Bivalent***

These engines operate on both, natural gas or gasoline. Sometimes another spark ignited fuel like ethanol is also used.

(iii) ***Dual-fuel***

Utilizing a mixture of natural gas and diesel, these engines are ignited by a diesel 'pilot'. Usually diesel engines are converted into dual fuel engines and have an advantage of entirely not depending on natural gas for fuel supply.

(iv) ***Tri-fuel***

A combination of 'flex-fuel (gasoline and ethanol) and natural gas.

Core Issues

13. ***Narrowing gap between Diesel & CNG prices:*** The gap between the prices of Diesel and CNG buses is narrowing due to constant increase in gas prices as per the Government's Policy. This is disturbing the economic feasibility of switching over to CNG from Diesel Buses thus discouraging the transporters and operators. The situation cannot improve unless there is a substantial difference between the prices of diesel and CNG bus operations.

14. ***Fueling infrastructure:*** Sufficient fueling infrastructure required for operations of CNG bus fleet is non existent in the country at present. At an existing filling station, on an average, one bus takes at least 20 minutes to fill its CNG tank, if not in queue, whereas world over the infrastructure availability is far better .

15. ***Dedicated routes in UTS for CNG buses:*** Presently, there are no rules for providing exclusive routes to CNG buses in the Urban Transport System.

16. **No incentives** for attracting transporters for switching over to CNG buses.
17. **MVE rules:** No priority for CNG buses in MVE rules to check environment pollution.
18. **Import of used buses:** Import of second hand buses is a constant threat for the local bus manufacturers. If the same situation prevails, the existing assembly capacities of the local manufactures would remain unutilized.



Many People like these will lose jobs if we encourage import of used buses into Pakistan

19. **Recommendations:** The CNG filling stations for buses with required capacities and facilities should be installed in different areas especially on the Motorways to minimize the off road time of buses.

Salient Features of Korean Model

In accordance with the surge of global interest in reducing vehicular emissions and mitigating greenhouse gases, the Ministry of Environment (MOE) Korea has actively initiated the replacement of the current fleet of some 20,000 diesel-powered buses with Compressed Natural Gas (CNG) buses by 2007. This CNG bus promotion plan covers 9 major cities in Korea including Seoul metropolitan city.

Highlights

- i) Readily available CNG engine technology from Korean vehicle manufacturers;
- ii) An existing nationwide natural gas pipeline;
- iii) Political willingness to revise existing laws and regulations across disciplines, agencies, and governments;
- iv) Availability and fair pricing of fuel and;
- v) Tax incentives and other financial incentives or instruments for encouraging and facilitating new bus purchases and gas station build-out.

The Korean Model in this regard may be studied and followed accordingly where 9 CNG filling stations for buses with a capacity to fill 20 buses simultaneously have been installed in Seoul by the Government.

◆ New rules should be incorporated in the Urban Transport System for exclusive routes of CNG buses.

◆ Incentives to be offered by the Government for attraction of transport operators for only “Fully dedicated CNG buses”. Following proposals are put forth in this context:

- The interest rate on the leasing / loans for purchase of CNG buses may be shared/absorbed by the Government as is being practiced by the Government of Punjab in case of CNG rickshaws.
- CNG may be offered to CNG buses only at special reduced prices.

- ◆ The Government should create discrimination among the commercial transport vehicles on the basis of environmental pollution caused by them. Stringent criteria should be developed for the inspection of buses regarding the environmental pollution to promote and stimulate the use of CNG fuel in buses.
- ◆ The Government, at any stage, should not consider to allow import of used CNG buses.
- ◆ As discussed in the preceding pages, a variety of CNG engines are available to suit a wide range of applications of vehicles but for Pakistan's environment, dedicated, Mono-Fuel Engines are most suitable, since they ensure maximum efficiency, optimum emission as well as safety.
- ◆ The Government may consider use of CNG buses and development of fuelling infrastructure, in a small manageable city, as a pilot project.



Annexure

Annexure-I

BUS BODY MAKERS ADDRESSES		
Sr. No.	Names of Manufacturers /Associations	Addresss
1	Sher Borhters	Sher Kot Bund Road , Lahore .
2	S. Fukhur-u-din & Sons	S.Fukhur-u-din & Sons , main G.T road Shahdara, near Imamia Colony.
3	Babar Brothers	Bund road near Motorway Chock Shera Kot,Lahore
4	Butt Bus Body Builders	56-Bund road, Lahore
5	Super Eagle Bus Body makers	near ice factory stop Sanda near one minrat mosque Bund Roaed Lahore
6	National Busy Body makers	Bund Road Lhr
7	Master Brother Bus Body makers	Bund Road Lhr
8	Islamabad Bus Body makers	Bund Road Lhr
9	Bismilla Bus Body makers	Bund Road Lhr
10	Sartaj Bus Body makers	Bund Road Lhr
11	New Eagel Bus Body makers	Bund Road Lhr
12	Tariq Bus Body makers	
13	Hakimullah & Brothers	Nishtar road Karachi
14	Ismail & Co. (PVT) Ltd.	116 Kashmir road, Rawalpindi
15	New Fancy Body Makers	Near Rahim Steel Mills, Bund road, Lahore
16	Pakistan Engineering Works	D/134, S.I.T.E, Karachi
	The main cities of the bus body makers of A/C & Non-A/C buses are Lahore, Karachi, Gujranwala, Faisalabad, Rawalpindi, Chinoit, Sargodaha & Sadiqabad.	Approximately 200 units are operating in these cities.
	Aggregate Capacity of the unorganised sectors in the above cities.	4500-5000 buses annualy

Brochures



HINOPAK MOTORS LIMITED



Introduces **CNG** Bus

Manufactured for the first time in Pakistan

- Zero Emission of Black Smoke.
- Reduced emission of NOx, CO and HC.
- Reduced engine noise level.
- Clean burning characteristics result into longer engine life & lesser maintenance cost.
- Improved cold start ability as it is introduced in vapor form.



**Superior
Japanese
Technology**

CNG as an automobile fuel:

- CNG is environment friendly, is lead free and produces 89% less CO than diesel, almost no sulfur dioxide, no particulates and 15% less reactive hydrocarbons than gasoline.
- CNG has safety features that enable it to be inherently a safer fuel as compared to gasoline, diesel or LPG.
- 1. CNG is lighter than air so if it leaks, it dissipates into the atmosphere.
- 2. It has a self ignition temperature of 700°C against 455°C for diesel.
- 3. CNG cylinders are built of special material to withstand high pressure and are far safer than diesel tanks.
- Clean burning characteristics of CNG result into longer engine life & lesser maintenance cost.
- CNG engine has Improved cold start ability as it is introduced in vapor form.



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Fax #: (081) 452598
Email : hino-quetta@hinopak.com



Hinopak Motors Limited

UAN: 111-25-25-25 Website: www.hinopak.com

Additional Advantages

- Longer life of tune up and spark plugs
- Reduced noise level
- Reduced emission level
- Engine oil remains clean.



Body Specifications

Structure

Single deck, skeleton type bus body with hollow square and rectangular steel tubes.

Doors

One no. standard folding type pneumatically operated with toughened tinted glasses at front over hang.
One No. wider folding type pneumatically operated with toughened tinted glasses at center.
One no. each emergency and driver door.

Windscreens

One piece front windscreen of clear safety laminated glass.
Three piece rear windscreen with tinted toughened glasses.

Passenger Seats

44 FRP Seats in 2X2 configuration

Wheel Base

mm 5,800

Overall length

mm 11,510

Overall width

mm 2,455

Overall height

mm 3,280

Chassis Specifications

GVW Rating	kg	14,000
Engine model	JO8C-CNG (P)	
	4-stroke, 6-cylinder, overhead cam water-cooled, NA	
Max. Out put	Kw (PS) / rpm	125 (170) / 2700
Max. Torque	Nm (kgfm) / rpm	519 (53) 1,000
Displacement	cc	7961
Fuel System	Impco / Gill	
Clutch Size	mm (inch)	350 (13.78)
Gear Box Model / Ratio	LJ06S / 7.663-1.000	
Differential Model / Ratio	SH16 / 5.125	
Tire Size	9.00-20-14PR	
Gradeability (tan Ø%)	28.21	



HINOPAK MOTORS LIMITED

Introduces

New Era in Urban Transportation of Pakistan

Comfortable,
Durable,
Modern and
Economical



Hino Metro Bus The Choice for Urban Transport

- Ultra modern and innovative body design.
- Large size windscreen for better visibility.
- Sliding windows for better ventilation.
- Increased room height & spacious seating layout for passenger comfort.

Salient Features of

Exterior

Large size route boards with lights

لائٹوں کے ساتھ بڑے روٹ بورڈ

Large size rear view mirrors and under view mirrors

بڑے سائز کے ریئر ویو میرو اور
انڈر ویو میرو

Separate folding type door for ladies in front and wider door for gents in center with low step height for safety and easy entry and exit

خواتین کے لئے علیحدہ دروازہ آگے کی طرف اور مردوں کے لئے ڈبل دروازہ پیچھے میں پائیدار پہلے سے زیادہ نیچا تاکہ چڑھنے اور اترنے میں آسانی رہے۔

Interior

*Important Note : Seats shown in the brochure are optional

Route map with glass cover at passenger door for convenience

مسافروں کی سہولت کے لئے مسافر
دروازے کے اوپر روٹ میپ گلاس کور کے ساتھ

Grab handles and rails for support to standing passengers

کھڑے ہوئے مسافروں
کے پکڑنے کے لئے ڈنڈے اور ہینڈل۔

Customised seats for passengers' comfort

کسٹمر کی پسند کے مطابق انتہائی کشادہ، آرام دہ سیٹیں

Matching dashboard with interior

انٹیریئر سے میچ کرتا ہوائے ڈیزائن کا ڈیش بورڈ

Emergency door

ایمرجنسی دروازہ

of Hino Metro Bus

Large size window with double sliding glasses

بڑے سائز کی کھڑکیاں جن کو آسانی سے دونوں طرف کھولا جاسکتا ہے



New improved design for wheel arch

نئے ڈیزائن کے وھیل آرچ

route board

روٹ بورڈ



Front Face

اگلا حصہ



Rear Face

پچھلا حصہ

Elegantly designed front and rear faces with curved & single piece windscreen offering a modern look and better visibility

نئے ڈیزائن پر تیار کردہ اگلے اور پچھلے حصے میں خم دار ونڈ اسکرین سے بس کی خوبصورتی اور ڈرائیور کے دیکھنے کی صلاحیت میں اضافہ ہوا ہے۔

Chassis Specifications **AK1JRKA** (Right-hand drive) Bus Chassis GVW rating 14,000 kg

Gear Ratios & Performance

Drive	4x2		
Engine Position	Front		
Max. Speed (km/h)	112		
Max. Gradeability (Tan 0)% @ 14 ton GVW	30.4		
Transmission gear ratios & speeds		LJ06S	Speeds
		Ratios	Km/h
	1st	7.663	15
	2nd	4.751	24
	3rd	2.898	39
	4th	1.844	61
	5th	1.288	87
	6th	1.000	112
Rev.	7.173		
Rear axle ratio	5.125		

Dimensions and Weights (Chassis only) approx.

AK1JRKA			
Wheel Base	mm	5,800	
Weight	Total	kg	4,405
	Front	kg	2,640
	Rear	kg	1,765
Overall length	mm	11,080	
Overall width	mm	2,410	
Overall height	mm	1,975	
Overhang	Front	mm	1,890
	Rear	mm	3,150
Tread	Front	mm	1,920
	Rear	mm	1,840
Road clearance (At front axle)	mm	255	

Engine

Model
Type

Hino J08C-NA (EURO1)
Diesel, 4-stroke, 6-cylinder
vertical, in-line, overhead cam
with 24 valves, direct injection,
water cooled, naturally aspirated.
210 PS @ 2,900 rpm
56.5 kgf.m @ 1,500 rpm
7,961 cc

Max. out put
Max. torque
Displacement

Clutch

Dry single plate with damper
springs, hydraulic control with
air booster.

Transmission

Six forward speed one reverse,
direct drive, synchromesh
2nd - 6th

Steering

Telescopic and tilt steering
column with locking device.
Recirculating ball with hydraulic
booster (Power steering).



Fluorescent room lights

فلوورسٹ روم لائٹس



4 nos roof ventilators with
improved design for passengers'
comfort even at rush hours

بس کی چھت میں بہترین ڈیزائن کے
چار عدد ہواواں جو رش کی حالت میں بھی
تھکن اور گرمی سے محفوظ رکھتے ہیں



HINOPAK MOTORS LIMITED

Introducing Environment Friendly Urban Buses with Dedicated CNG and EURO Engines



CNG Bus
Manufactured for the
first time in Pakistan

AK1J Chassis
Dedicated CNG Engine

- Zero emission of Black Smoke. • Low emission NOx, CO and HC. • Low noise level.
- Clean burning characteristics result into longer engine life & lesser maintenance cost.

**Rear Engine Citibus
with Euro Engine**



RK1J Chassis
JO8C Euro Engine

- Spacious and graceful interior with innovative seating and large sliding type windows.
- Slide-Glide type passenger doors. • Low boarding height. • Option for air-conditioning



Hinopak Motors Limited

UAN: 111-25-25-25 Website: www.hinopak.com

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FAISALABAD : Hino Faisalabad, Street, No.6,
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QUETTA : Room # 3, Kasi Plaza # 1, Zarghoon Road, Tel : (081) 452598 FAX #: (081) 452598. Email : hino-quetta@hinopak.com

*Now
Being Manufactured in
Pakistan...*

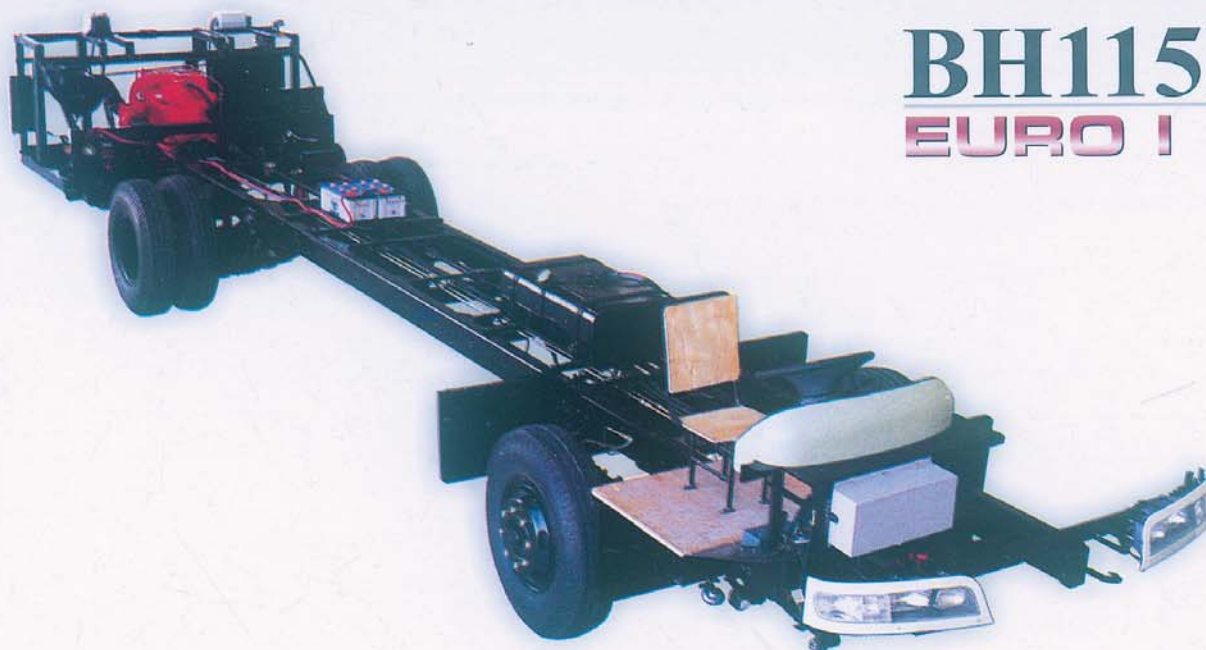
BH115E
EURO I



AFZAL MOTORS (PVT.) LTD.

145/147, Naiclass 102, Razzaqabad, Main National Highway, Deh Khanto, Karachi, Pakistan.

Tel: 92-21-4102720 (10 Lines) Fax: 92-21-4102501-2



BH115E

EURO I

SPECIFICATIONS

MAJOR SPECIFICATIONS

STEERING POSITION

RIGHT HAND DRIVE

ENGINE MOUNTING

REAR

CHASSIS DIMENSION (mm)

OVERALL LENGTH (OL)

11445

OVERALL WIDTH (OW)

2460

OVER ALL HEIGHT (OH)

1975

WHEEL BASE (WB)

6100

OVERHANG (FRAME) FRONT (FOH)

2030

OVERHANG (FRAME) REAR (ROH)

3080

TREAD FRONT (TF)

2070

TREAD REAR (TR)

1853

WEIGHT (kg)

PERMISSIBLE G.V.W

16500

CHASSIS WEIGHT

5850

PERFORMANCE

MAX. SPEED

115 km/h

MIN. TURNING RADIUS

11.7 m

GRADEABILITY (%)

0.397

ENGINE (EURO I)

MODEL

DE12T, DIESEL

TYPE

4 CYCLE, WATER COOLED TURBO CHARGED

NO OF CYLINDER

6, IN-LINE

BORE & STROKE

123 x 155 mm

DISPLACEMENT

11051 cc

MAX. HORSE POWER

300ps / 2200rpm

MAX. TORQUE

110 kgm / 1300 rpm

AIR CLEANER

DUAL TYPE



CLUTCH

TYPE

DRY SINGLE PLATE WITH COIL SPRING DAMPER CONTROLLED BY HYDRAULIC WITH PRESSURE ASSISTED

Size

430 mm

TRANSMISSION

MODEL
GEAR BOX

K-1006R (6 .O.D)						
6 SPEED FORWARD AND 1 REVERSE						
1 st	2 nd	3 rd	4 th	5 th	6 th	Rev.
5.500	3.482	2.147	1.346	1.000	0.755	5.774

FRAME

TYPE LADDER TYPE CHANNEL SECTION

STEERING

OPERATION POWER

AXLE

FRONT AXLE

TYPE REVERSE ELLIOT "I" BEAM
CAPACITY 6,000 kg

REAR AXLE

TYPE BANJO FULL FLOATING
CAPACITY 10,500 kg
FINAL GEAR RATIO 4.875

BRAKE

SERVICE BRAKE FULL AIR DUAL CIRCUIT BRAKE SYSTEM
PARKING BRAKE SPRING ACTUATOR AT REAR WHEEL SPRING CHAMBER TYPE
AUXILIARY BRAKE EXHAUST BRAKE

SUSPENSION

SEMI-ELLIPTICAL ALLOY STEEL HEAVY DUTY LEAF SPRING FRONT & REAR WITH HYDRAULIC DOUBLE ACTING TELESCOPIC FRONT & REAR SHOCK ABSORBER.

TIRE & WHEELS (FRONT/REAR)

TIRE 10.00-20-16pr TUBE TYPE
WHEEL RIM 7.00T-20 WHEEL

FUEL TANK

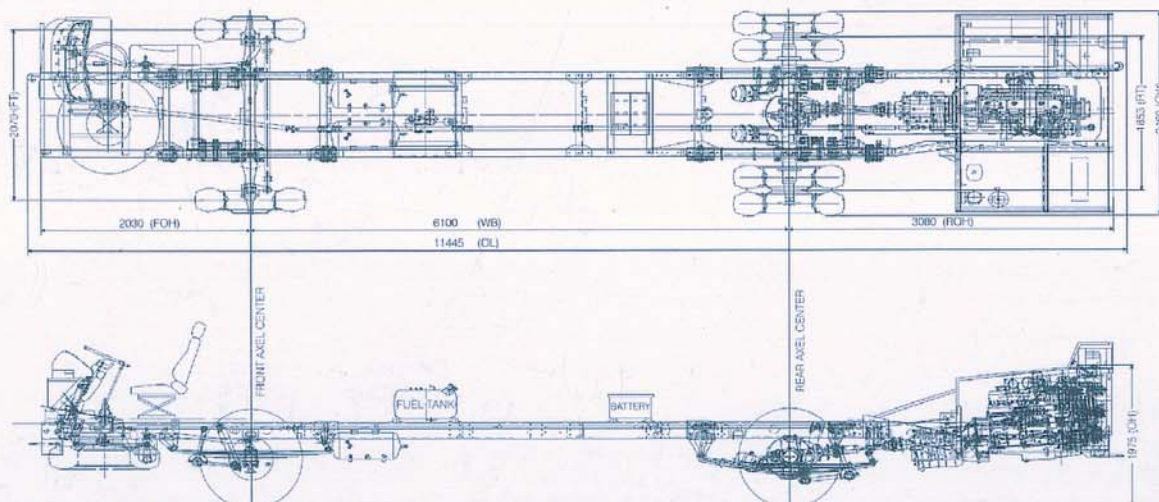
CAPACITY 200 L

ELECTRIC SYSTEM

BATTERY 12V DC/MF - 150 AH 2 PIECES
ALTERNATOR 24V DC/150 AMP
STARTER 24V DC/6.0KW

METER AND GAUGE

ELECTRIC SPEEDOMETER & ODOMETER
AIR PRESSURE GAUGE, FUEL GAUGE, VOLTMETER
WATER TEMPERATURE GAUGE, ENGINE OIL GAUGE
ENGINE OIL PRESSURE WARNING LAMP, BRAKE QUANTITY WARNING LAMP
COOLING WATER WARNING LAMP, AIR PRESSURE WARNING LAMP



* All dimensions have been specified in millimeters(mm).



■ **KARACHI - SHOWROOM**

Plot No.986, Block-C, Street No.06, Shershah, Karachi.
Tel: 92-21-2578383-86 Fax: 92-21-2573833

■ **RAWALPINDI**

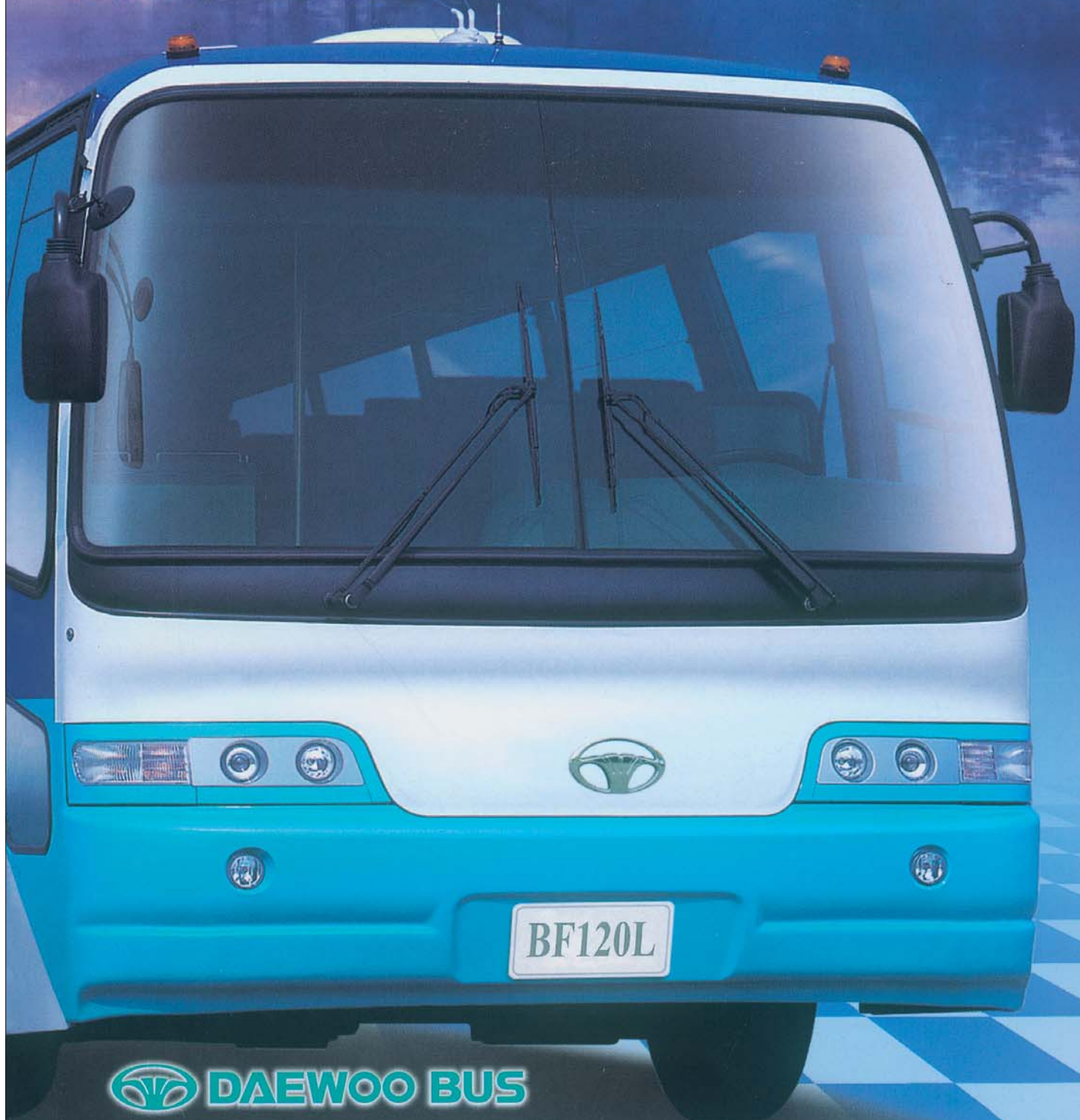
Plot No.659, Nasirabad, Peshawar Road, Rawalpindi Cantt.
Tel: 92-51-5473112, 5473132 Fax: 92-51-5480713

■ **PESHAWAR**

Plot No.1855, Adnan Mansion, Kurshen Pura, G. T. Road, Peshawar.
Tel: 92-91-2218896-7 Fax: 92-91-2565271

Now
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Pakistan...

BF120L
EURO II



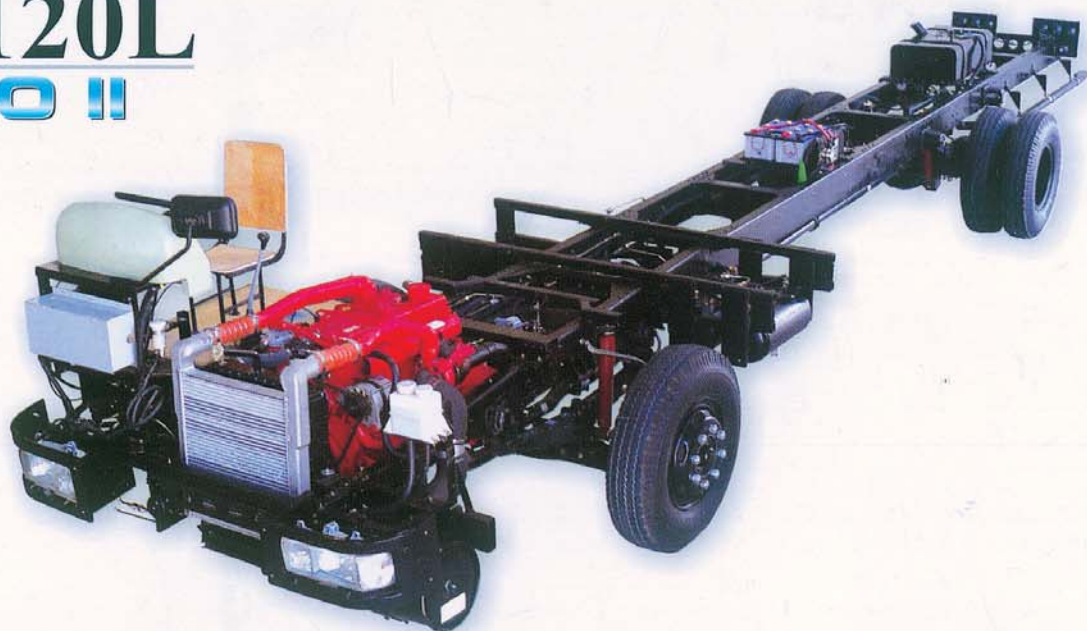
 **DAEWOO BUS**

AFZAL MOTORS (PVT.) LTD.

145/147, Naiclass 102, Razzaqabad, Main National Highway, Deh Khanto, Karachi, Pakistan.
Tel: 92-21-4102720 (10 Lines) Fax: 92-21-4102501-2

BF120L

EURO II



SPECIFICATIONS

MAJOR SPECIFICATIONS

STEERING POSITION

RIGHT HAND DRIVE

ENGINE MOUNTING

FRONT

CHASSIS DIMENSION (mm)

OVERALL LENGTH (OL)	12080
OVERALL WIDTH (OW)	2460
OVER ALL HEIGHT (OH)	2025
WHEEL BASE (WB)	6100
OVERHANG (FRAME) FRONT (FOH)	2100
OVERHANG (FRAME) REAR (ROH)	3435
TREAD FRONT (TF)	2070
TREAD REAR (TR)	1853

WEIGHT (kg)

PERMISSIBLE G.V.W	16500
CHASSIS WEIGHT	4900

PERFORMANCE

MAX. SPEED	106 km/h
MIN. TURNING RADIUS	10.4 m
GRADEABILITY (%)	0.402

ENGINE (EURO II)

MODEL	DE08TIS, DIESEL, TURBO-INTERCOOLER
TYPE	4 CYCLE, WATER COOLED
NO OF CYLINDER	6, IN-LINE
BORE & STROKE	111 x 139 mm
DISPLACEMENT	8071 cc
MAX. HORSE POWER	240ps / 2300rpm
MAX. TORQUE	90 kgm / 1000 rpm
AIR CLEANER	DRY PAPER ELEMENT



CLUTCH

TYPE	DRY SINGLE PLATE WITH COIL SPRING DAMPER CONTROLLED BY HYDRAULIC WITH PRESSURE ASSISTED
Size	380 mm

TRANSMISSION

MODEL

T-9DS6P (6SP O.D)

GEAR BOX

6 SPEED FORWARD AND 1 REVERSE

1 st	2 nd	3 rd	4 th	5 th	6 th	Rev.
7.076	4.777	2.640	1.575	1.000	0.744	6.720

FRAME

TYPE

LADDER TYPE CHANNEL SECTION

STEERING

OPERATION

POWER

AXLE

FORNT AXLE

TYPE

REVERSE ELLIOT 'I' BEAM

CAPACITY

6,000 kg

REAR AXLE

TYPE

BANJO FULL FLOATING

CAPACITY

10,500 kg

FINAL GEAR RATIO

5.571

BRAKE

SERVICE BRAKE

FULL AIR DUAL CIRCUIT BRAKE SYSTEM

PARKING BRAKE

SPRING ACTUATOR AT REAR WHEEL SPRING CHAMBER TYPE

AUXILIARY BRAKE

EXHAUST BRAKE

SUSPENSION

SEMI-ELLIPTICAL ALLOY STEEL HEAVY DUTY LEAF SPRING FRONT & REAR WITH HYDRAULIC DOUBLE ACTING TELESCOPIC FRONT & REAR SHOCK ABSORBER.

TIRE & WHEELS (FRONT/REAR)

TIRE

10.00-20-16pr TUBE TYPE

WHEEL RIM

7.00T-20 WHEEL

FUEL TANK

CAPACITY

200 L

ELECTRIC SYSTEM

BATTERY

12V DC/MF - 150 AH 2 PIECES

ALTERNATOR

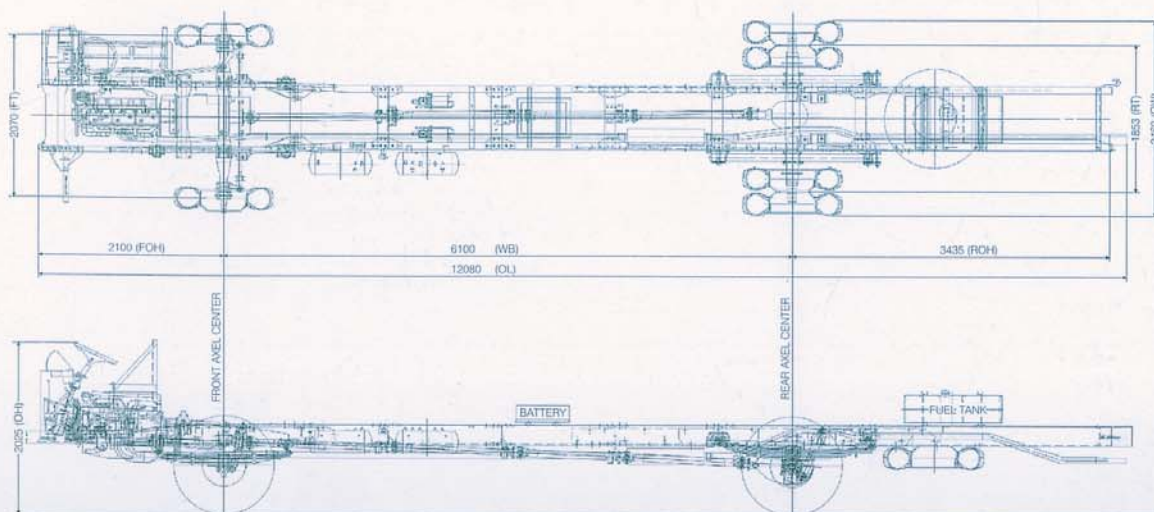
24V DC/60 AMP

STARTER

24V DC/4.5KW

METER AND GAUGE

ELECTRIC SPEEDOMETER & ODOMETER
AIR PRESSURE GAUGE, FUEL GAUGE, VOLTMETER
WATER TEMPERATURE GAUGE, ENGINE OIL GAUGE
ENGINE OIL PRESSURE WARNING LAMP, BRAKE QUANTITY WARNING LAMP
COOLING WATER WARNING LAMP, AIR PRESSURE WARNING LAMP



* All dimensions have been specified in millimeters(mm).



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New model
LUXURY COACHES



Pakistan Vehicle Engineering (Pvt) Ltd.

A Division of Pakistan Engineering Works

ISO 9001: 2000 Certified

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Ph: 92-21-2571426, 2574884-5 E-mail: pve@engineer.com

New Look of Urban Buses

Important Features



New Model of Urban Buses

New designs with two Pieces Curved wind Screen



Rear Face

New Straight Back View with Single Piece Glass

Large size window with double sliding glasses

Windows



Doors

> Wider Auto Doors for Ladies and Gents in Center with Low Step height for Safety and Easy entry

> Seperate Auto Exit Door for Gents

> Emergency Exit



Interior

> Wide interior with Comfortable imported Plastic Seats

> Easy Standing Space with Grap Handles and Rails for Passengers



Specification

Body Structure:

Square/Rectangular Tube Structure
light and durable structure meeting international
regulation on safety and having a life of less
than 10 Years.

Weight Distribution:

Weight on front axle should not be less than
25% of the total weight

Floor:

plywood covered with P V C venyle sheet

Inside lining:

Ceiling and sides to be provided with easily
cleanable and durable, non-metallic

Windows:

Windows with one fixed one sliding toughened
glasses.

Front Windscreens:

Curved, clear laminated glass two piece.

Passenger Door:

Two door clear width 1450 mm and 900 mm
on left side with imported door mechanism,
lockable from inside.

Emergency Door:

Flap type door right side with safety lock and alarm bell

Insulation:

Heat insulation on roof, body sides ect.
sound insulation on under floor, wheel arches, step
well etc.

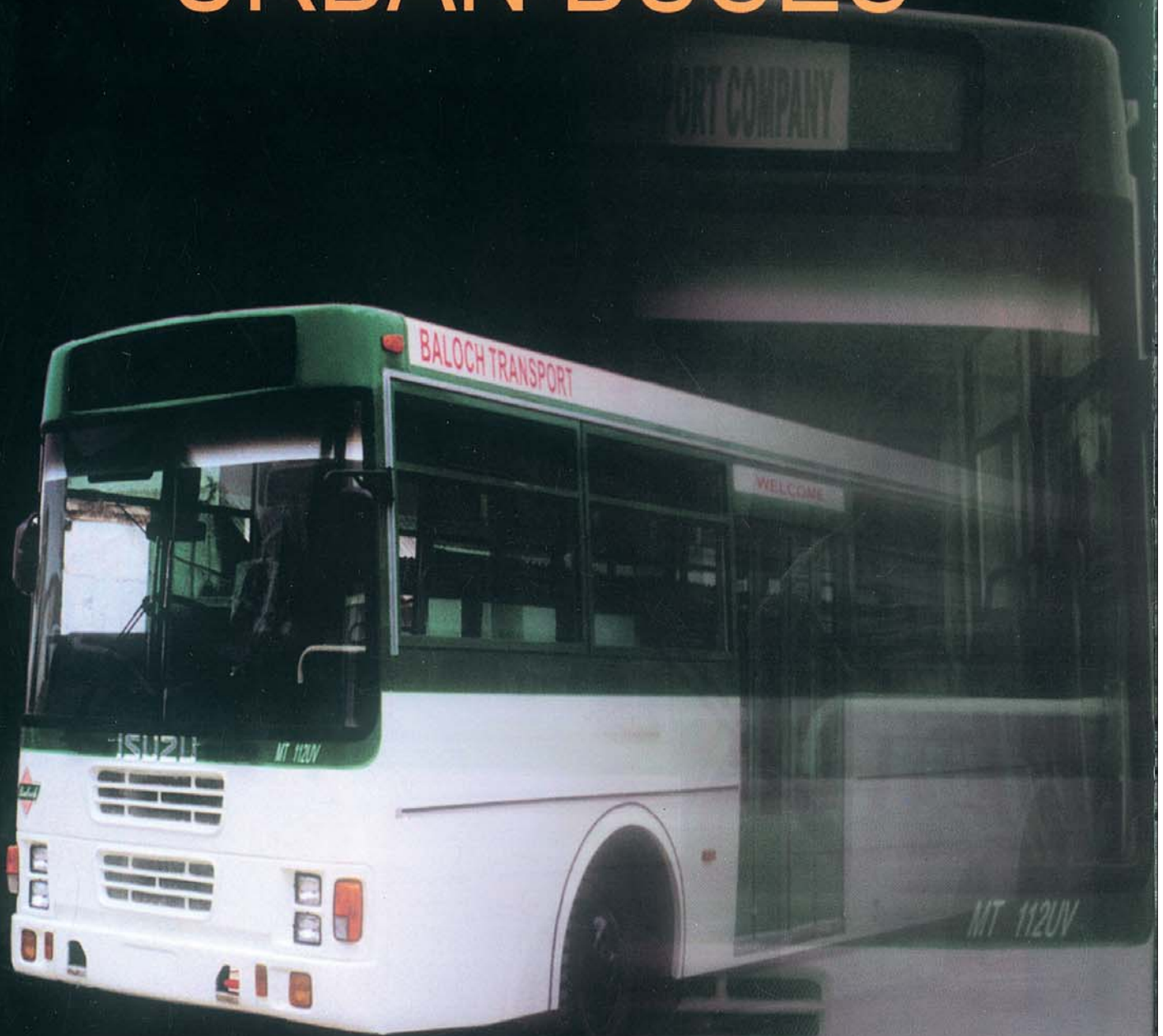
Anti corrosive treatment:

All box section and closed areas to be treated
with rust preventive wax material.

Painting:

Exterior and interior color schemes to be approved
by The Customer
All Steel parts should be primer before application
of Paint.

New model
URBAN BUSES



Pakistan Vehicle Engineering (Pvt) Ltd.

A Division of Pakistan Engineering Works
ISO 9001: 2000 Certified

Redefining Performance

RAPIDLINER

Deluxe Coach



HINO

Rapidliner Coach on Hino FB2WGKZ bus Chassis

STD: 31 Seater - DLX: 29 Seater

Specifications

1. **BODY**
Body type and frame
Single deck skeleton type bus body with Principal frame work of hollow square and Rectangular Steel tubes.
Steel sheet
FRP moulded panel
Laminated sheet.
Styro foam
2. **BODY PANELLING**
Exterior sides & roof
Front & rear
Ceiling & sides
below windows
Heat insulation
3. **DOORS**
Passenger door
STD. Two nos. folding type manually operated doors with clear toughened glass.
DLX: 1 no. folding type manually operated door with tinted glass.
Flap type with window having double sliding glass.
One on driver's side.
- Driver door
Emergency door
4. **WINDSCREEN & WINDOWS**
Front windscreen
Single piece clear safety laminated curved glass.
Rear windscreen
Single piece tinted toughened glass.
STD. Aluminium window with single sliding frame fitted with clear toughened glasses.
DLX. Aluminium window single sliding frame fitted with tinted toughened glasses.
5. **FLOOR**
Floor board
Inspection / service lids.
Plywood covered with PVC mat.
One each for transmission / fuel tank.

6. **SEATS**
Capacity & Type
Seat layout
Driver seat
STD. 31 nos. foam cushioned with combined bottom and combined back covered with rexene (Shuttle Seats)
DLX. 29 Nos. foam cushioned with combined bottom and independent back covered with fabric / rexene.
2x2 configuration.
Foam cushioned sliding type with seat belt.
7. **EXTERIOR & INTERIOR FITTINGS**
Ventilator
Doorway support pipes
Curtain
Fire Extinguisher
2 nos.
stainless steel pipes.
Fabric curtains. (for DLX Model only)
Equipped.
8. **PAINTING**
Parts
Exterior
All parts given anti-rust treatment prior to applying high bake epoxy primer.
Low bake primer applied prior to final paint. Final top coat in low bake paint.
Design paint in NC.
9. **OPTIONAL (Provided at additional cost)**
 - Hat rack
 - Full length on both sides.
 - Defogger
 - For front windscreen
 - Room heater
 - Tuner cassette player with Speakers
 - Seat pocket and cup holder

Hinopak Motors Limited reserves the right to change the specifications without prior notice



HINOPAK MOTORS LIMITED

UAN: 111-25-25-25

Karachi :
D-2 S.I.T.E, Manghopir Road,
P.O.Box No. 10714 Karachi.
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Fax : (021) 2564517, 2563028
Email : marketing@hinopak.com

Lahore :
19KM, Multan Road, Lahore
Tel : (042) 7512003-6
Fax : (042) 7512005
Email : hino-lahore@hinopak.com

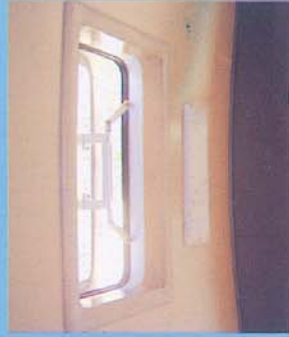
Islamabad :
1-D, Unit 14, Rehmal Plaza,
2nd Floor, Blue Area, Islamabad.
Tel : (051) 2276234-5
Fax : (051) 2272268.
E-mail: hino-islamabad@hinopak.com

Peshawar :
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Road, Peshawar
Tel : (091) 2218998
Fax : (091) 2218998
Email : hino-peshawar@hinopak.com

Multan :
28-X, New Multan
Multan
Tel No: 061-4556176
Fax : 061-4556177
Email : hino-multan@hinopak.com

Faisalabad :
Hino Faisalabad, Street, No.6, Rashid
Abad, Main Jhang Road, Faisalabad.
Tel : (041) 2551331-2
Fax : (041) 2551332
Email : hino-faisalabad@hinopak.com

Quetta :
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Zarghoon Road,
Tel : (081) 2452598
FAX # : (081) 2452598.
Email : hino-quetta@hinopak.com





Since 1976

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Since 1976



Aircondition Bus 42 Seats/63 Seaters

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Head Office Factory

D/134, S.I.T.E. Manghopir Road, Karachi-75700

Tel. 021-2574884-5, 2571426, Fax. 021-2562429

Email: pve@engineer.com

**Multan Qasba Gujrat
Manufacturing Workshop**

Near PARCO Refinery

Tel. 0697-491 457

Email: pve@engineer.com

**Islamabad
Manufacturing Workshop**

Main Peshawar Road,

Jhonghi Syedan, Chongi No. 26

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Intercity Bus 63 Seaters

Our Professional Products

Fabrication of Containers, Bus Bodies, Fuel Tank Trailers, Dump Trucks, Ambulances, Dispensary Van, Refuse Collector Van and Industrial Trucks



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Fuel Bowzer 40

nk Trucks and Trailers



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All over Products
Guaranty Minimum
2 years



Petrol Bowser 1000 Ltrs

k Trailers, Dumpers, Van Mobile Offices, Fiber Products
Van and Industrial Handling equipments



Fuel Bowser 40,000 Ltrs



Water Proof Canvas
Longitudinal Folding S

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for all types
Military Vehicles
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Pizza Hut Mobile Kitchen Trailer

ong Time Warranty



Staff Bus



seats



Ambulance

Pakistan Engineering Works

Pakistan Engineering Works

Quality assurance



Fuel Bowzer 25,000 Ltrs

country-wide



Garbage Container

ance



Container

Pakistan Engineering Works was established in 1976 with the object of developing indigenous mechanical components, heavy steel structure, fabrication based mechanical equipments and parts in the field of mechanical engineering.

PEW also provides designs, engineering and manufacturing services.

PEW is ISO-9000 certified for "Design & Manufacturing of Process & mechanical engineering".

PRODUCT RANGE:

Bus body, Dump Truck body, Wooden Truck, Container, Trailer, Mobile Workshop, Fuel / Water Bowser, Portable Cabin, Mobile Caravan, Ambulances, Roof Top for Pickups, Fiber Bodies, Canopy, Fiber Shades and all Fiber Products as per Clients specification and requirements.

General Engineering Works:

Steel Platform, Sliding Heavy Gates, Shuttering Plates, Material Handling equipments and all types of mild steel & stainless steel work.

service





Engineering Development Board

Ministry of Industries, Production & Special Initiatives

Government of Pakistan

SEDC Building (STP), 5-A, Constitution Avenue, Islamabad

Ph: +92-51-9205595-8, Fax: +92-51-9202108

www.engineeringpakistan.com