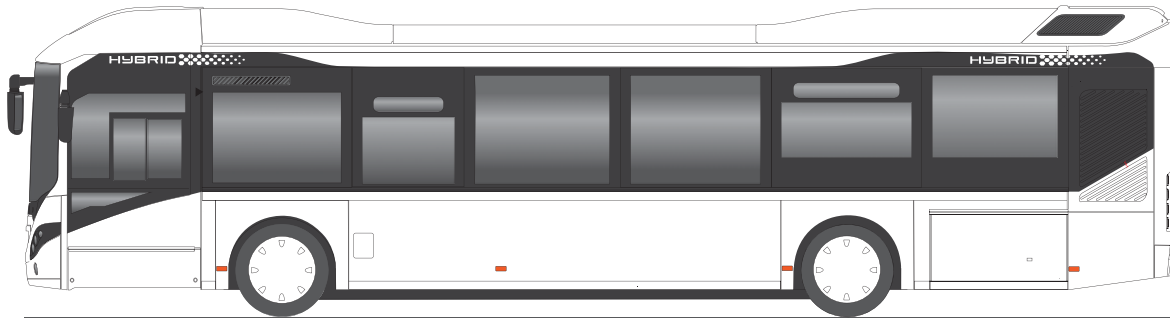


# VOLVO 7900 HYBRID

LHD, RFS, 4x2, Euro 5, EEV



## Dimensions & Weights

### Overall dimensions

G Overall length.....	12084 mm
Y Height at battery cover.....	3224 mm
X Height at radiator cover.....	3221 mm
K Overall width.....	2550 mm
A Wheelbase.....	5945 mm
I Front overhang.....	2704 mm
J Rear overhang .....	3435 mm
Approach angle.....	6.1 °
Departure angle.....	6 °
Kneeling.....	70mm
Ground clearance.....	200 mm
Entrance height.....	340 mm
Turning circle	
Outer front corner.....	10828 mm
Outer front wheel.....	8873 mm
Lock angle inner wheel.....	53 °
Track width with tyres.....	275/70R22.5"
and steel disc rim .....	7.5"x22.5"
M Track, front.....	2107 mm
N Track, rear .....	1885 mm
Max body width.....	2550 mm

### Weights

Permitted front axle load.....	7100 kg
Permitted rear axle load.....	12000 kg
Permitted GVW.....	19000 kg

## Engine

Parallel hybrid system with Volvo D5F215 diesel engine and Electric Motor. 4-cylinder, 4-stroke turbocharged and inter-cooled in-line diesel engine with overhead valves and electronically-controlled direct injection. Common rail fuel system (1600 bar). Volvo EMS2.2 engine control system. Electronic oil level sensor. Hydraulic fan with electronic thermostat. Closed crank case ventilation. On-off fan clutch. Engine software protection and on-board diagnostic to detect, warn and to take action for malfunctions leading to increased emission. Operation altitude up to 1500m above the sea level. Engine fulfils EEV emission level requirements. I-SAM permanent magnet motor/generator with master Hybrid Powertrain Control Unit (HPCU) and DC/AC Power Electronic Converter (PEC). DC/DC voltage converter with control unit (DCU). HEV Junction Box (HJB) for energy distribution and as electrical centre with fuse box.

### D5F215

Bore.....	108 mm
Stroke.....	130 mm
Displacement.....	4.76 dm <sup>3</sup> (l)
Compression ratio.....	17,3:1

Output ISO 1585.....	161 kW (216 hp)
at.....	2200 rpm
Torque ISO 1585.....	800 Nm
at.....	1200-1700 rpm

### Electric Motor

Power output, max.....	120 kW (161 hp)
Torque ISO 1585, max.....	800 Nm
Power output, continuous.....	70 kW (94 hp)
Torque ISO 1585, continuous.....	400 Nm
Retardation:	
Max brake torque.....	800 Nm
Continuous brake torque.....	400 Nm

### Fuel tanks

Plastic fuel tank located above front wheel arch.	
Fuel tank.....	215, 250l

### Energy storage system

Lithium-Ion battery with battery management unit (BMU), isolation resistance monitor (IRM) and battery disconnect unit (BDU). Roof mounted, water cooling and heated/charged with 230V plug-in application.	
Voltage.....	600 V
Capacity.....	4.8 kWh

## Exhaust and Cooling System

Stainless steel exhaust system with SCR catalytic converter, AdBlue pump and 30 l urea tank. Catalytic converter is integrated with the silencer. On Board Diagnostics that alerts the driver if the level of air pollutants in the exhaust gases is excessive, and when AdBlue refilling is needed.

Optional.....DPF

## Transmission

### Volvo AT2412D I-Shift

Automatic gearbox, 12 forward gears, 4 reverse, electronic control system. Electric motor as a retarder. 3-buttons gear selector.

Gear ratios: 14.94:1, 11.73:1, 9.04:1, 7.09:1, 5.54:1, 4.35:1, 3.44:1, 2.70:1, 2.08:1, 1.63:1, 1.27:1, 1.00:1. Reverse gears: 17.48:1, 3.73:1, 4.02:1, 3.16:1.

## Rear Axle and Tyres

### Rear axle

ZF single reduction portal axle AV132 with low offset 80° input from the engine via the propeller shaft. Max speed km/h at 2200 rpm with tyre 275/70R22.5:

Ratio:.....4.72:1

AT2412D .....80

The maximum speed on the highest gear is restricted.

### Tyres & Rims

10-stud steel or aluminium disc wheels. Chrome or zinc wheelnut protector ring. Dual driving axle wheels.

Rims.....Tyres

7.5"x22.5".....275/70R22.5"

## Suspension and Steering

Electronically Controlled Suspension (ECS2), rigid low front axle. Stabilizer both front and rear. Double-acting, hydraulic telescopic shock absorbers, two in front, two at rear. Full front kneeling. Kneeling interrupt configuration (stop or return).

Numbers.....Front.....Rear

Air bellows .....2.....4

Levelling sensors ..... 1.....2

### Steering gear

Power steering of ball and nut type with built-in servo unit. Approx. 4.5 turns of wheel from lock to lock. Left steering wheel position. Steering wheel feed knob. Steering wheel diameter:450 or 500 mm

Optional.....Steering wheel lock

## Air and brake System

Separate circuits for front and rear wheels. Volvo disc brakes combined with electronic braking system. EBS5 medium package. Available features: ABS, TC, lining wear sensing, analysis and warning, brake blending, drag torque control, differential lock synchro, automatic differential lock, hill start

aid, brake temperature warning, poor brake performance warning, brake assistant, doorbrake, EBS status recorder.

System operating pressure ....8.5 kp/cm<sup>2</sup>

### Electric air compressor

The compressor is of rotary type and air cooled, driven by electric motor independently from diesel engine with power supplied by DC/DC converter.

Voltage.....600 V

Frequency.....50 Hz

Drive ratio motor:compressor.....1:1

Cut-out pressure.....12,0 bar

Compressor capacity at 10 bar and

engine speed 33 r/s (2000 r/min)

.....920 l/min

Compressor ratio.....1.116:1

### Air tanks standard

- Primary.....1x25dm<sup>3</sup> + 2x30 dm<sup>3</sup> (l)

- Front circuit.....30 dm<sup>3</sup> (l)

- Rear circuit.....30 dm<sup>3</sup> (l)

- Park circuit.....15 dm<sup>3</sup> (l)

- Purge tank.....6 dm<sup>3</sup> (l)

Compressed air system can easily be filled from external circuit.

### Handbrake

Air operated spring brake acting directly on the drive axle wheels. Application is infinitely variable by means of a control on the fascia.

## Glazing

Glued one-piece panoramic wind screen, clear or green tinted, side windows with single or double glazing tinted, rear window with single glazing tinted only. All other glazing, bronze tinted apart from drivers window which is clear only. Driver's side double glazed window manually operated; without electric heating or single glazing with heating. Available 4 or all hopper windows (in total 8 for 2+2+2 or 9 for 2+2+0 door layout).

## Exterior

Front and rear walls made from fibre glass and ABS elements. External side panelling are made of a single sheet of aluminium under the window line combined with glass fibre plates and is finished of with a aluminium lower skirt for the sides. Hatches are made of the same glass fibre panelling. Wheel arches of DCPD. Roof made of 1 mm thick single-piece aluminium sheet, glued to the roof frame. Mekra or Wilke external mirrors. Electrically adjusted, heated or not. 3-piece bumpers. Top hinged service compartment hatches with snap or cylinder locks. Mounted outside wide angle mirror on the RHS, flagholder. Available: school bus equipment, warning signalization when front hatch open, head lamp cleaner, exit light above door2, high rear direction indicator. 1 or 2 roof hatches, electrically or manually operated; with emergency exit mechanisms.

## Doors and Door System

ISAF double doors inward gliding on all positions pneumatically powered with single bronze tinted glazing. Door operation available in a range of combinations. Control via button/joystick or both with various safety function combinations for door operation available. Can be fitted with 8 mm square male or key cylinder locks for door1 locked from inside or outside.

Door configurations .....2+2+2; 2+2+0

Door buttons for driver right hand operated.

External emergency valves at all doors.

Mechanical or electrical access ramp at second door.

## Ventilation and Heating and AC Systems

Water heating system with 2-pipe convectors and blower heating for driver's area, door1, pram area and door2 if fitted. Roof air conditioning units with heating + cooling. Driver's cabin has convector or blower heating and can have own AC system. Door1 entrance can be heated by electrical mats in floor, preventing icing. A Multiplex 3-knob control panel enables automatic setting of the climate parameters in the bus. External temp. meter installed and optional interior temp. meter. Convactor heating:

Output.....551W/m

Weight.....3.1kg/m

Blower heating for driver's area, door1,

pram area and door2: data per blower

Output .....2.8 kW

Air flow .....156 m<sup>3</sup>/h

Weight .....2.7 kg

Total power output from convectors and blowers.....2.1 to 3.4kW depending

on spec.

Additional heater heats the passenger compartment, defrosts the windscreen and preheats the engine. Available 7-day timer for programming the heater.

Additional heater capacity.....30 kW

Fuel consumption .....4,0kg/h

Additional heater fuel tank.....40l

Defroster:

Air flow, min/max ....446 m<sup>3</sup>/h / 731 m<sup>3</sup>/h

Heat output, min/max .....7 kW/15 kW

Air Conditioning system for cooling and

heating the passengers compartment:

Spheros Citysphere AC units (2 pcs,

equivalent with conventional 24kW system).

Semi-hermetic compressor, gearless drive

by electric motor (engine rev independent).

Constant maximal refrigerating capacity,

air distribution direct into passenger's

compartment through outblow duct.

Roof mounted driver's AC unit .....3,5 kW

## Vehicle Structure

The body is based on the patented Volvo Bus concept, where an aluminium alloy providing superior corrosion resistance is used. The structure is made of extruded

aluminium profile. Chassis floor structure built-up by steel RHS-profiles, welded together with open c-profile cross-members. The combined aluminium and steel frame combines good stability with low weight and gives long service life and increased loading capabilities. Rigidity provides good stability and driving.

### Interior

Materials fulfil the European Directive 95/28, annex 4 and 5 concerning flammability. Stepless, low floor throughout the interior, covered by antislip plastic Tarabus coverings. For the sidewall is used laminate and the floor is made of laminated plywood with noise damping properties in the engine area. Handrails in one standard colour: yellow RAL1021. Available light or heavy hammers with wire, which additionally can have signalisation. On the front wheelbox can be arranged a luggage rack. Partition walls are behind each door.

**Additional equipment:** passenger barrier, fire extinguisher 6 kg, first-aid box, wheelchair safety wall, waste boxes for passengers, additional interior mirror.

### Passenger and Courier Seat

Volvo seats. Modular, moulded construction, single and double seating places, seats for wheel arches and rear bench. Cantilever mounted to the wall. Foldable seats available.

Space available to standing passengers...  
.....7,7m<sup>2</sup> (DL220), 8,8m<sup>2</sup> (DL222)

### Drivers Seat and Station

Volvo dashboard, two satellites on the right and the left side as standard.. Adjustable steering wheel, both height and tilt. Self canceling turn indicators.

**Dashboard, center:** speedometer, rev counter driver's display, fuel gauge, coolant temperature, brakes, turbo and oil pressure, indicator and warning lamps.

**Dashboard, left:** emergency switch, tachograph.

**Steering wheel, left satellite:** control buttons, Light Control Panel.

**Steering wheel, right satellite:** gearbox selector, doorbrake knob, switches and warning lamps.

**Instruments, engine compartment:** selector switch for front or rear operation. These controls enable engine operation from the tail of the vehicle during service work

**Roof panel:** Digital tachograph, radio  
**ISRI driver's seat,** with optional 2 or 3-point safety belt. Adjustment of: horizontal position, weight suppression, stroke, height and rake, seat cushion, backrest. The driver's seat can have left side armrest, electrically heated seat/backrest, has air suspension with a swivel base. The driver's compartment can have a low or high door with fixed protection. Front 1-piece sunvisor

can be manually or electrically operated. Side sun visor.

Optional.....Alcolock  
Optional.....VDV Dashboard  
Optional.....Data logging  
Optional.....External temperature meter  
Optional.....Fuel economy meter  
Option.....mainswitch can be located behind front hatch.

### Electrical System

The electrical system is a 24-volt system, where the chassis and engine frame are used as a ground. DC/DC converter provides electricity sourced from Electric Motor. 2nd generation Bus Electrical Architecture BEA 2 with electronic databus system Multiplex 2 - a digital system for data transmission, system controlling, monitoring and coordination of functions of bus assemblies, equipped in electronic control units, connected in a two link network for transmission of data, defect codes, work parameters. Multiplex 2 provides diagnostic information for the driver and workshop. For testing, calibrating and programming of the bus control units a PC based software package VCADS Pro is used. The system is equipped with three function main switch: engine shut off, fuel shut off and electrical shut off. Tachograph system is available, analog or digital.

Battery capacity.....2x225 Ah  
DC/DC converter.....7.5 kW/210A  
Optional.....FMS1 or 2 Gateway interface  
Optional.....FMS preparation kit  
Optional.....Basic or extended electric interface  
Optional.....2 types of reverse alarm  
Optional.....Battery charger  
Day running lights: available in 4 different set ups, End outline marker, side marker and position lamps, low/high beam halogen or xenon. Tail lamp of LED type (apart from direction indicators).

### Audio System

Stereo radio with CD player or preparation for radio. Public address system foot controlled. Installed speakers in roof panels, 1 external loudspeaker (option), loudspeaker for driver, driver microphone, Volvo brand equipment. City amplifier.  
Optional.....Radio switches in the steering wheel.

### Information system

ITS4mobility is an intelligent Transport System designed for Bus operations in public transport. It will assist the operator and driver with real time information about the traffic and provide passenger inside the bus with information regarding next stop, following stop, route number, end destination and panic button for driver in case of emergency which will inform traffic control centre with position. A number of combinations of

hardware for the vehicle are available.

**Modular, electronic destination signs,** with maintenance free illumination in the front, rear and side walls. LED destination signs as standard.

Standard control via AIC and ITS4mobility or Mobitec ICU400.

Type/nominal voltage .....LED/24 V DC  
Data communication .....RS 485, IBIS  
Mounted pram/wheelchair buttons inside/ outside for signalisation to driver. Stop request buttons on handrails. 8 mm square female or male key for the destination boxes. One interior bus stop sign.

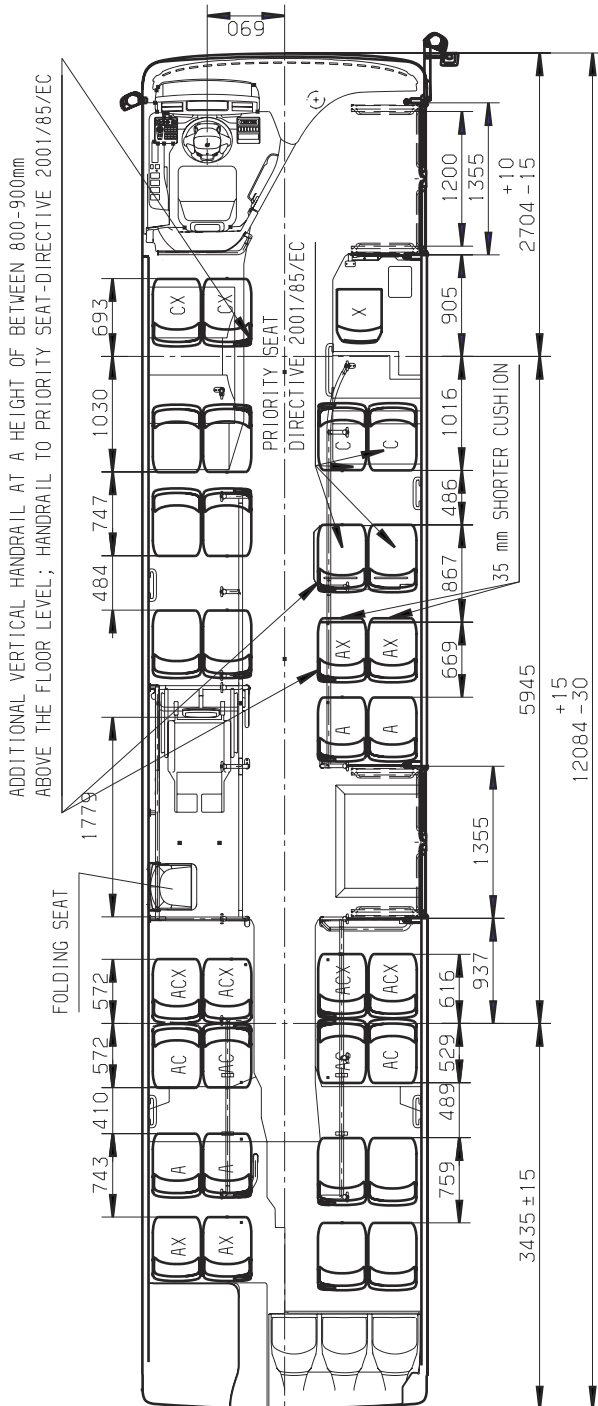
### Painting and Labels

Steel elements: primer and topcoat finishing.

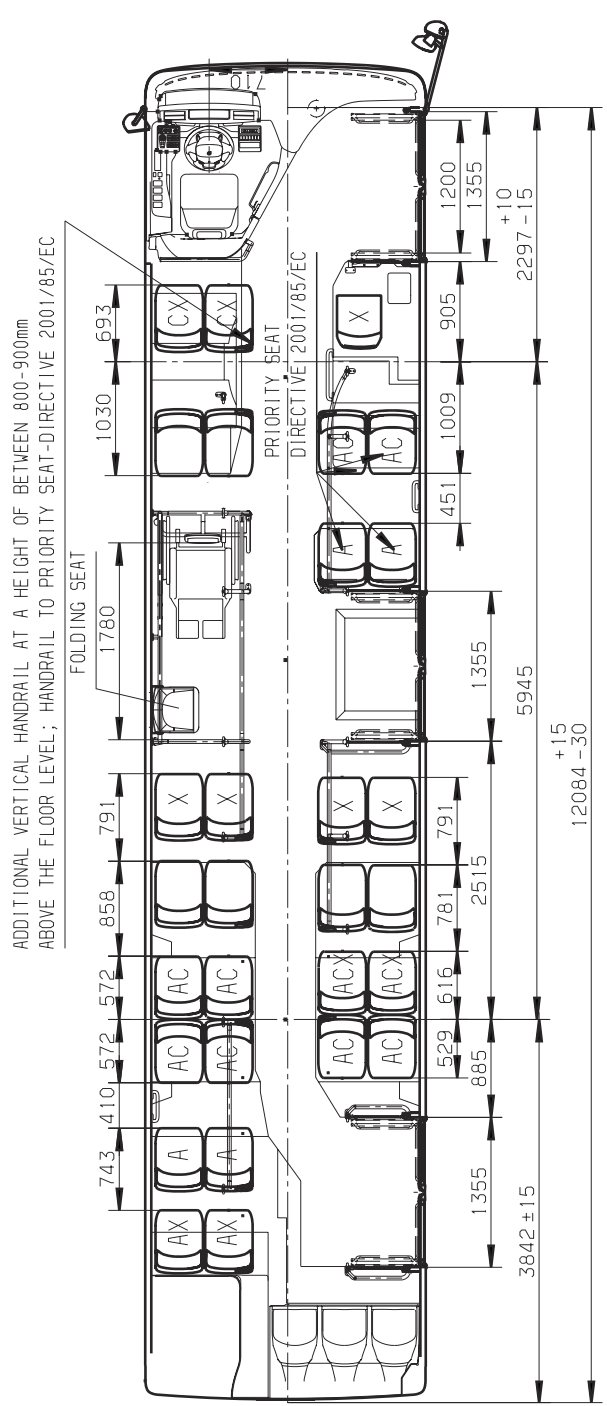
Under body coating process: sealing with an anti - corrosion/ protection / silencing compound. Spraying a conservation agent one the chassis profiles. Wheel arches: sealed with an anti-corrosion compound and an anti-gravel protection. Body paneling: primed, then painted with filler and topcoat.

Outside painting std.....white, RAL9010

# VOLVO BUSES. DRIVING QUALITY OF LIFE



Seat layout with KIEL litelc750 seats. Door layout DL220. Seating places 36+1 foldable seats.



Seat layout with KIEL litelc750 seats. Door layout DL222. Seating places 32+1 foldable seats.

# VOLVO

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