



Bogdan

Automobile Corporation

Car Assembly Plant #1

(Subsidiary of PJSC
Automobile Company Bogdan
Motors“

– a part of Bogdan Corporation

Lutsk, Ukraine, 2019



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Content

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2. **Production capacity of the plant**
Bogdan vehicles line-up
3. **International projects of Bogdan vehicles**
4. **The way of Bogdan vehicles creation**



1. Company profile



Content

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- 1.2. Production profile**
- 1.3. CEO**

Total area - 18.55 ha
The area of production capacities is 74 622 sq.m.

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1.1. General information



Main task of the company

is production of small, medium, large and the very large classes of buses, trolleybuses of different modifications, electric buses and other vehicles.

CAR ASSEMBLY PLANT #1
(Subsidiary of PJSC "Automobile Company "Bogdan Motors")
CAP #1 (SE of "AC "Bogdan Motors", PJSC) is an Ukrainian vehicle manufacturing company, forming part of Bogdan Corporation. It is an industrial manufacturer of "Bogdan" buses, trolleybuses and electric buses. The plant is located in Lutsk, Ukraine.

Bogdan Corporation was founded in February'2005.

Today, Bogdan Corporation is considered as one of the fastest growing company in Ukraine.

It unites facilities for production of buses, trolleybuses, cars, trucks and commercial vehicles, and also has its own extensive sales and service network.



1.2. Production profile

Production profile of CAP #1 starting from 1951

For 60 years, the company has produced:

500 000 vehicles, including:

- **269 000** passenger cars
LuAZ-969 of various modifications,
- **168 000** passenger cars
VAZ, UAZ, KIA, Hyundai, (SKD assembly),
- **5500** trucks;
- **3500** buses and trolleybuses Bogdan





1.3. CEO

Dmytro Pysaniy



Education:

- Kharkiv National Medical University;
- Yaroslav Mudryi National Law University

Career, main facts:

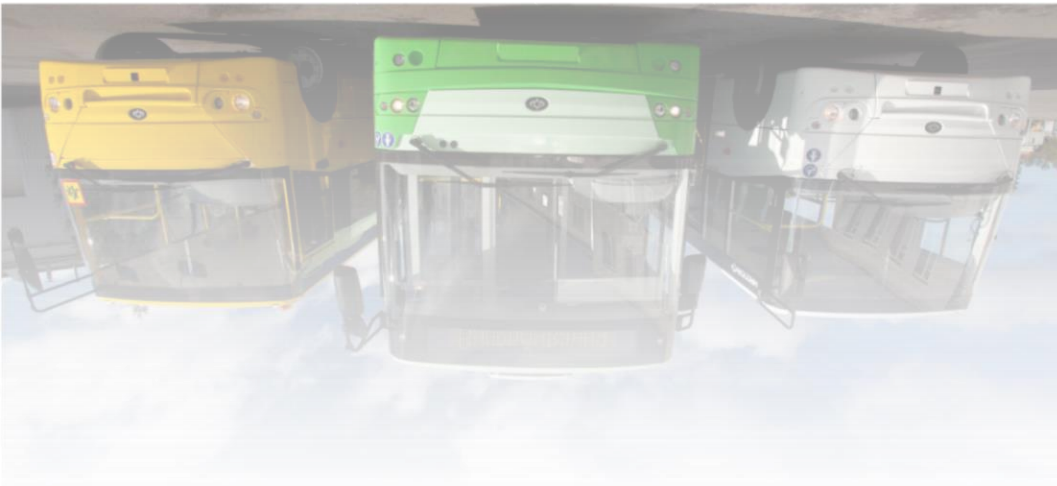
- **2010 – present:** BOGDAN CORPORATION, Head of bus business sector, CEO of “Car assembly plant #1 Subsidiary of “AC “Bogdan Motors”;
- **2008-2010** – AVTEK (vehicle sales), CEO;
- **1998 – 2008** – AIS CORPORATION, CEO (sale and service of transport)



2.1. Production capacity of the plant

Content

- 2.1. Production capacity of the plant**
- 2.2. Current Bogdan vehicles line-up**
- 2.3. Detailed specification of current Bogdan vehicles**
- 2.4. Bogdan vehicles which are under development**





2.1. Production capacity of the plant

During the period of 2005-2011 years, the company worked at the expansion of existing and creation of new production facilities. Today the production capacity of our plant amounts to 2200 units, and after reconstruction it will reach 6000 buses and trolleybuses per annum.

Structure of “CAP #1” Subsidiary of PJSC “AC “Bogdan Motors” production facilities

Mechanical procurement workshop



Body welding workshop



Painting workshops

“Firat” painting section



“Eisenmann” painting section



Assembly production workshop



Delivery and diagnostics workshop



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2.2. Current Bogdan vehicles line-up. BUSES

Model range of buses for local customers

A22112

City bus, with low floor level in rear body overhang



A22212 Intercity bus



A22412

School bus



A70132

City bus, low-floor



A14532 / A14542

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2.2. Current Bogdan vehicles line-up. TROLLEYBUSES

Model range of trolleybuses

T 701 City trolleybus, low floor



T 901

Low floor, articulated city trolleybus



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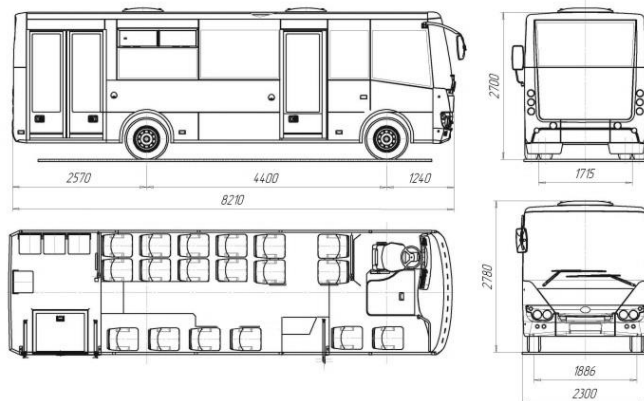
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2.3. Bogdan A22112, city bus with low floor level in rear body overhang

BUS



L / W / H, mm	8210/2300/2780
Wheelbase, mm	4400
Wheel tread, front/rear, mm	1886/1715
Maximum speed, km/h	90
Engine	Ashok Leyland
Engine location	front longitudinal
Cylinders quantity and location	6, in line
Displacement, l	5,759
Power, kW (HP)	123 (167)
Torque, Nm	550
Emission standard	Euro 5
Transmission	mechanical, 5 gears, Ashok Leyland (license ZF)
Steering	Ashok Leyland (license ZF)
Hydraulic booster	integral
Suspension	
Front suspension	dependent, leaf spring
Rear suspension	dependent, pneumatic
Front axle	Ashok Leyland
Rear axle	Ashok Leyland (license Meritor)
Brake system, type	pneumatic
Passenger capacity (without driver), persons	61
Wheels / Tires, size	6,75×17,5 / 235/75R17,5

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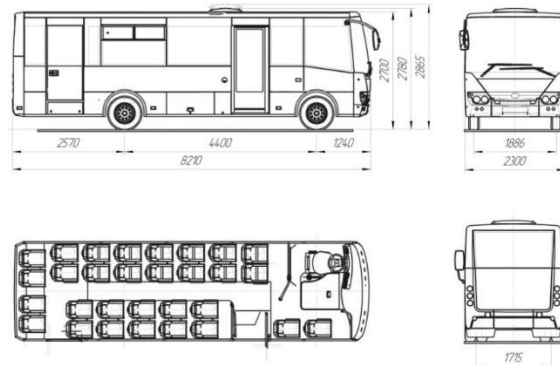
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2.3. Bogdan A22212, inter city bus

BUS



L / W / H, mm	8210/2300/2780
Wheelbase, mm	4400
Wheel tread, front/rear, mm	1886/1715
Maximum speed, km/h	70 (speed limiter)
Engine	Ashok Leyland
Engine location	front longitudinal
Cylinders quantity and location	6, in line
Displacement, l	5,759
Power, kW (HP)	123 (167)
Torque, Nm	550
Emission standard	Euro 5
Transmission	mechanical, 5 gears, Ashok Leyland (license ZF)
Steering	Ashok Leyland (license ZF)
Hydraulic booster	integral
Suspension	
Front suspension	dependent, leafspring
Rear suspension	dependent, pneumatic or leafspring
Front axle	Ashok Leyland
Rear axle	Ashok Leyland (license Meritor)
Brake system, type	pneumatic
Passenger capacity (without driver), persons	29, 31 (depending on the version)
Seats capacity (without driver)	29, 31 (depending on the version)
Wheels / Tires, size	6,75x17,5 / 235/75R17,5

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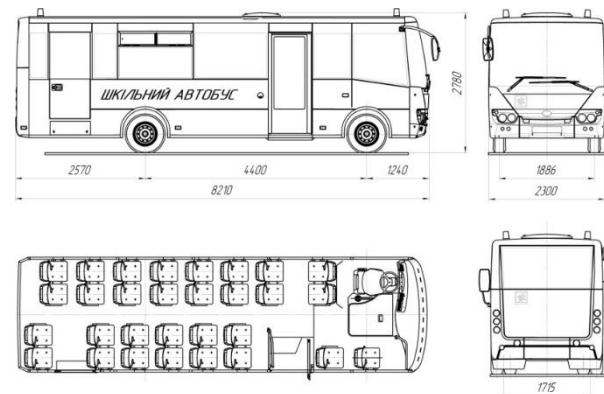
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2.3. Bogdan A22412, school bus

BUS



L / W / H, mm	8210/2300/2780
Wheelbase, mm	4400
Wheel tread, front/rear, mm	1886/1715
Maximum speed, km/h	70 (speed limiter)
Engine	Ashok Leyland
Engine location	front longitudinal
Cylinders quantity and location	6, in line
Displacement, l	5,759
Power, kW (HP)	123 (167)
Torque, Nm	550
Emission standard	Euro 5
Transmission	mechanical, 5 gears, Ashok Leyland (license ZF)
Steering	Ashok Leyland (license ZF)
Hydraulic booster	integral
Suspension	
Front suspension	dependent, leafspring
Rear suspension	dependent pneumatic or leafspring
Front axle	Ashok Leyland
Rear axle	Ashok Leyland (license Meritor)
Brake system, type	pneumatic
Passenger capacity (without driver), persons	29, 31 (depending on the version)
Seats capacity (without driver)	29, 31 (depending on the version)
Wheels / Tires, size	6,75x17,5 / 235/75R17,5

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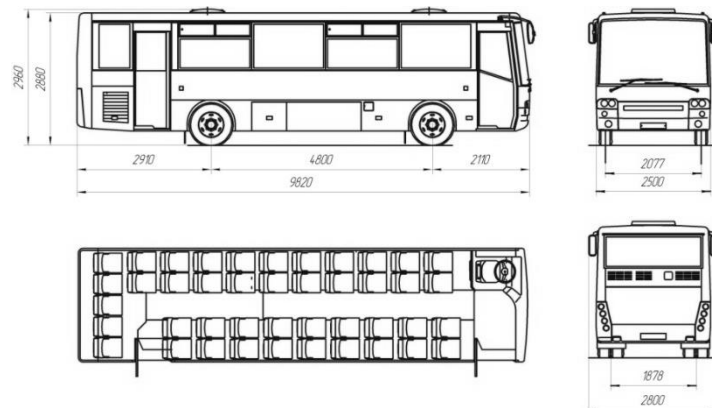
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2.3. Bogdan A14532, suburban / intercity bus

BUS



L / W / H, mm	9820/2500/2960
Wheelbase, mm	4800
Wheel tread, front/rear, mm	2077/1878
Maximum speed, km/h	90 (speed limiter)
Engine	IVECO
Engine location	rear, longitudinal
Cylinders quantity and location	6, inline
Displacement, l	5.9
Output, kW (HP)	194 (264)
Torque, Nm	1000
Emission standard	Euro 5
Transmission	EATON, mechanical, 6 forward gears
Steering	
Hydraulic booster	integral
Suspension	
Front suspension	dependent, pneumatic
Rear suspension	dependent, pneumatic
Brake system, type	pneumatic
Passenger capacity (without driver), persons	70/41
Seats capacity (without driver), persons	43/41
Wheels / Tires, size	8,25x22,5 / 275/70R22,5

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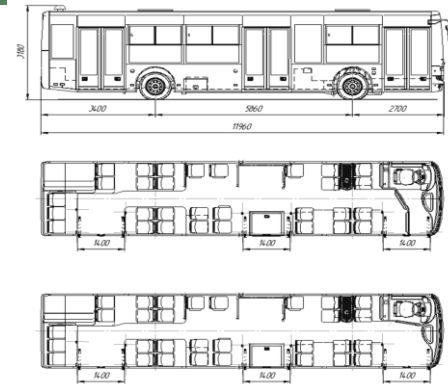
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2.3. Bogdan A70132, city bus with low floor level

BUS



L / W / H, mm	11960/2550/3070
Wheelbase, mm	5860
Wheel tread, front/rear, mm	2160/1890
Maximum speed, km/h	70
Engine	IVECO NEF F4AE-6
Engine location	rear, longitudinal
Cylinders quantity and location	6, inline
Displacement, l	5,9
Power, kW (HP)	194 (264)
Power, Nm	1000
Emission standard	Euro 5
Transmission, type	Allison, automatic
Steering	
Hydraulic booster	integral
Suspension	
Front suspension	independent, pneumatic
Rear suspension	dependent, pneumatic
Front axle	ZF
Rear axle	ZF, portal
Brake system, type	pneumatic
Passenger capacity (without driver), persons	106
Seats capacity (without driver)	30
Wheels / Tires, size	8,25x22,5 / 275/70R22,5

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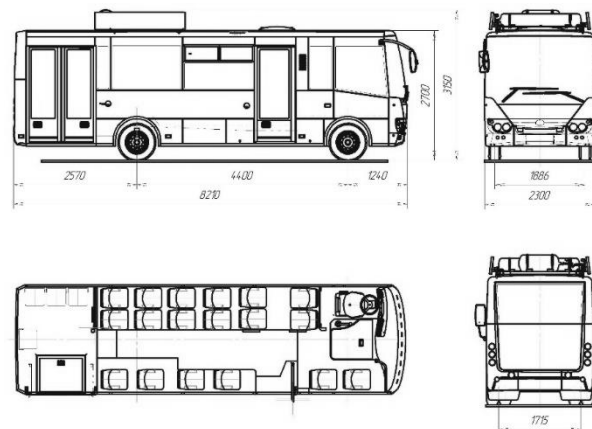
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2.3. Bogdan A22115, CNG bus

BUS



L / W / H, mm	8210/2300/3150
Wheelbase, mm	4400
Wheel tread, front / rear, mm	1886/1715
Maximum speed, km/h	90
Engine	Ashok Leyland H6E4GD137
Type	CNG
Engine location	front longitudinal
Cylinder quantity and location	6, in line
Displacement, l	5,759
Power, kW (HP)	144 (196)
Torque, Nm	600
Emission standard	Euro 5
Total volume of gas cylinders, l	385
Transmission, type	mechanical, 6 forward gears, Ashok Leyland (license ZF)
Steering	Ashok Leyland (license ZF)
Hydraulic booster	Integral
Suspension	
Front suspension	dependent, leafspring
Rear suspension	dependent, pneumatic
Brake system, type	pneumatic
Passenger capacity (without driver), persons	56
Seats capacity (without driver)	18+4 folding seats (option)
Wheels / Tires, size	6.75x17,5 / 235/75R17,5

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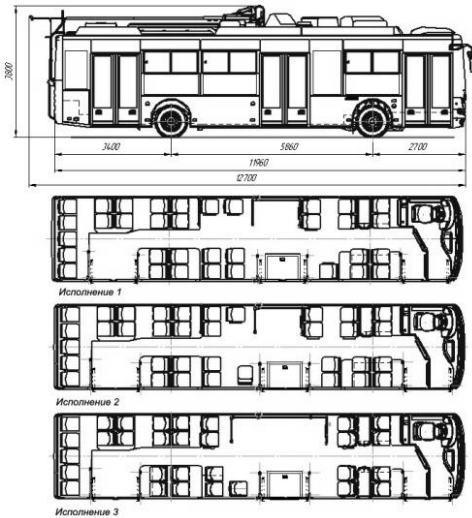
2.3. Bogdan T70117, 12m trolleybus

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TROLLEYBUS



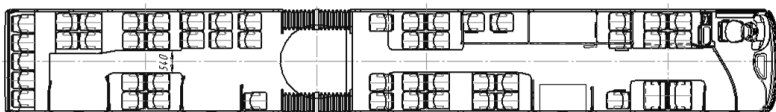
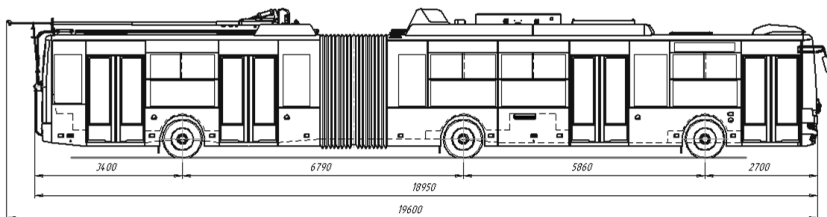
Trolleybus	T 70117
Intended purpose	city trolleybus, low floor
Wheelbase, mm	5860
Wheel tread, front/rear, mm	2160/1890
L (over the current receivers) / W / H,	11960 (12670)/2550/3800
Curb weight, kg	11760
GVW, kg	18900
Axles capacity, front/ rear, kg	7400/11500
Maximum speed, km/h	70
Traction electric motor	
Type	asynchronous
Rated power, kW	180
Traction motor control system	
Type	transistor on IGBT, with recuperation
Steering	
Hydraulic booster	integral
Suspension	
Front suspension	independent, pneumatic
Rear suspension	dependent, pneumatic
Front axle	ZF
Rear axle	ZF, portal
Brake system	
Type	electrodynamics + pneumatic
Parking brake system	spring power accumulator
Auxiliary brake system	electrodynamics engine
	braking mode
Emergency brake system	one of operating brake system circuit
ABS	+
Body	wagon-type
Passenger capacity (without driver), persons	105
Seats capacity (without driver)	30, 34 *
Heating system	air, electric calorific heating system
Wheels / Tires	
Size	8,25x22,5 / 275/70R22,5
Electrical equipment	
Rated voltage, V	24

* - Depending on the version



2.3. Bogdan T90117, 19m trolleybus

TROLLEYBUS



Trolleybus	T 90110	T 90117
Intended purpose	low floor, articulated city trolleybus	
Wheelbase, mm	5860/6790	
Wheel tread, front/rear, mm	2160/1890	
L (over the current receivers) / W / H,	18950 (19600)/2550/3800	
Curb weight, kg	17980	
GVW, kg	30500	
Maximum speed, km/h (not less than)	55	
Traction electric motor		
Type	direct current	asynchronous
Rated power, kW	2 x 140	2 x 125
Traction motor control system		
Type	transistor on IGBT, with recuperation	
Steering		
Hydraulic booster	integral	
Suspension		
Front suspension	independent, pneumatic	
Rear suspensions	dependent, pneumatic	
Front axle	ZF	
Rear axles	ZF, portal	
Brake system		
Type	electrodynamics + pneumatic	
Operating brake system	electrodynamics, pneumatic, dual-circuit	
Parking brake system	spring power accumulator	
Auxiliary brake system	electrodynamics engine braking mode	
Emergency brake system	one of operating brake system circuits	
ABS	+	
Body	wagon-type	
Number of passenger doors	4	
Passenger capacity (without driver), persons	184	
Seats capacity (without driver)	50	
Heating system	air, electric calorific heating	
Type of seats	semi-upholstered	
Wheels / Tires		
Size	8,25x22,5 / 275/70R22,5	
Electrical equipment		
Rated voltage, V	24	

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2.4. Bogdan A701, 12m urban electric bus with low floor/low entry

ELECTRIC BUS



Under development

Wheel formula / driving wheels	4x2 / rear axle
Type of body	Wagon type, integral
Total passenger capacity, pass.:	80
Overall dimensions, length/width/height, mm:	11960/2550/2800
Wheelbase, mm	5860
Wheel track, front/rear, mm:	2160/1890
Traction electric motor:	As part of the electro portal drive axle
- type	Asynchronous
- total power, kW	232
Traction engine control system	Production of EU countries
Traction batteries	180S01P Electric Bus Rooftop Battery Box («BMZ», Poland) or equivalent
- type of batteries	Li-ion (NMC)
- nominal voltage, V	662
- Power, not less, kW*h	249
Location of traction battery units	Roof
Maximum power reserve on storage units without recharging, km	200
The compressor unit:	TA06 («Hydrovane», Great Britain)
- engine	asynchronous
- type	helical
Power steering unit:	Motor-pumping group ABYAG-PGF-008/100L-4
Front axle	Independent ZF RL 82EC
Drive axle	Electro portal ZF AVE 130
Suspension:	
- front axle	Independent, pneumatic
- rear axle	Dependent, pneumatic
Steering	«Robert Bosch Automotive Steering».
Brake systems:	pneumatic
Wheels (discs):	
- type, size	Steel welded 8,25x22,5
Tires:	Tubeless, 275/70R22,5 152/148 E

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2.4. Bogdan A70133, 12m city bus with low floor/low entry

BUS



Under development

Bus model	A70133
Intended purpose	city bus, low floor
L / W / H, mm	11960/2550/3050
Wheelbase, mm	5860
Wheel tread, front/rear, mm	2160/1890
Curb weight, kg	10860
GVW, kg	18250
Axles capacity, front/ rear, kg	7100/11500
Maximum speed, km/h	70
Engine	IVECO
	N67 ENT VI
Engine location	rear, longitudinal
Cylinders quantity and location	6, inline
Displacement, l	6,7
Power, kW (HP)	210 (285)
Emission standard	Euro 6
Transmission	Allison
Type	automatic
Steering	ZF
Hydraulic booster	integral
Suspension	
Front suspension	independent, pneumatic
Rear suspension	dependent, pneumatic
Front axle	ZF
Rear axle	ZF, portal
Brake system	
Type	pneumatic
Primary braking system	dual circuit
Brake assist system	retarder
emergency brake system	one of primary circuits
ABS	+
Body	wagon-type
Passenger capacity (without driver), persons	106
Seats capacity (without driver)	30
Wheels / Tires	
Size	8,25x22,5 / 275/70R22,5
Electrical equipment	
Rated voltage, V	24
Additional equipment (options)	
Video system	+
AC	+
Driver's cab AC	+

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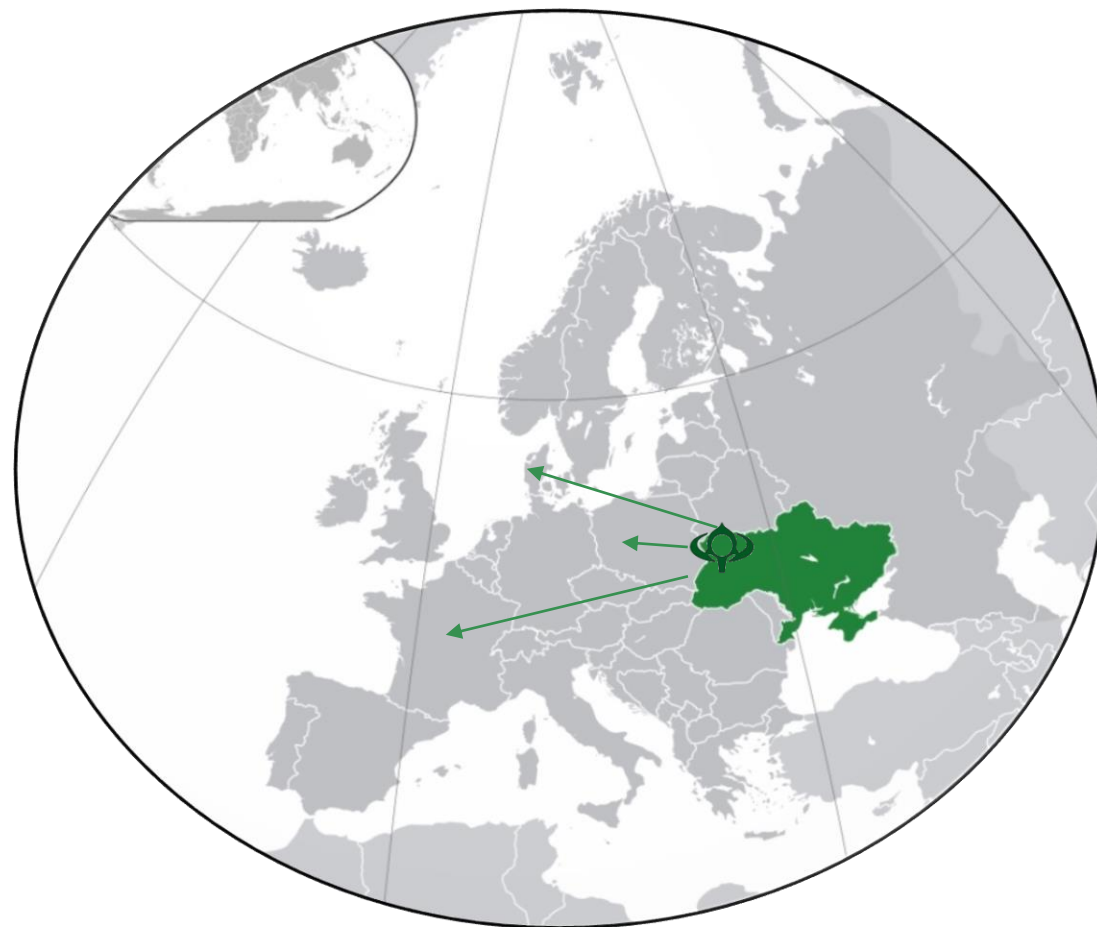
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3. International projects of CAP #1



Content

- 3.1. Poland – electric bus and trolleybuses 2013-2015**
- 3.2. Current project. Denmark – electric refuse collection vehicle**
- 3.3. Current project. France – bodies for electric buses**



3.1. International projects of CAP #1

Poland 2013-2015

Trolleybus **T70116**



38 such trolleybus **T70116** were supplied to Poland during 2013-2015

- Length/width/height, mm - 11960/2550/3700
- Passenger capacity (for sitting / total) – 28/76
- Asynchronous traction motor
- Transistor control system
- Front axle and drive axle ZF
- Autonomous run up to 5 km
- Driver's cabin and passengers air conditioning
- Compliance with UNECE Regulation No. 107. Certified in EU. Operated on routes of Lublin (Poland)

1 electric bus which was produced together with Polish company URSUS

Electric bus **A70100**



- Length/width/height, mm - 11960/2550/3380
- Passenger capacity (for sitting / total) – 26/77
- Enika Traction Control System (Poland)
- Synchronous permanent magnet traction motor
- Battery type - Li-Ion
- Total battery power, kWh - 120 (4x30 kWh)
- The maximum power reserve without recharging, at least, km - 100
- Front axle and drive axle ZF
- Compliance with UNECE Regulation No. 107. Certified in EU. Operated on routes of Lublin (Poland)
- Additional equipment – passengers air conditioner, driver's cabin air conditioner, e-payment system

TROLLEYBUS

ELECTRIC BUS

Bogdan

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3.1. Current international projects

Denmark 2017 – till now

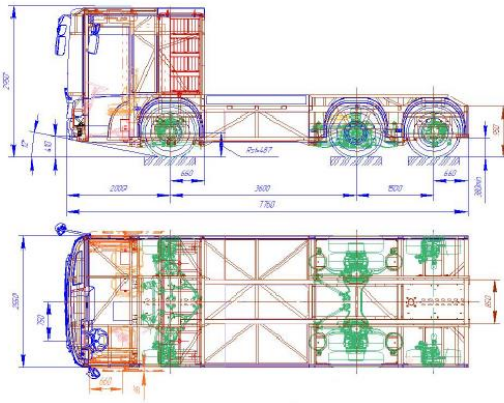
Electric refuse collection vehicle



Electric refuse collection vehicle	ERC V27
Axle type	6x2-4 (axles 1 and 3 – active steered; axle 2 – electric drive axle)
Available wheel basis	3600 mm
Seat configuration	2 crew plus 1 driver, or 3 crew plus 1 driver
Cabin entry height	400 mm, fully flat cabin floor, 1 step at the driver's operation place
Width of the cabin	2550mm
Cabin doors	Passenger and driver side, sliding door opening only 80 mm outside of the vehicle
Internal standing height in the cabin	2000 mm
Front axle	ZF RL82EC / 8000 kg
Drive axle	ZF AVE130 / 11500 kg
Rear steer axle	ZF RL82EC / 7500 kg
Spread of rear bogey	1500 mm between drive and tag axles
Frame material	DIN 1.4003 Stainless steel with anti-corrosion coating
Frame height	980 mm @ 295/80R22,5 wheels
Brake mechanisms	Ventilated Discs on all axles
Suspension	Air suspension on all axles
Tires	295 / 80 R 22.5
Cabin Ventilation	Roof hatch with electric control, sliding windows in both doors, electric fan for air circulation
Cabin heating	Water heaters using excess heat of the cooling system in combination with front air electric heater

WEIGHTS AND PERFORMANCE

Gross vehicle weight	27000 kg
Curb weight of the chassis (w/o compactor)	9920 kg
Maximum speed	80 km/h
Maximum gradeability	14% @ GVW
Turning radius	7,4 m @ 3600 mm wheel base
Total power of traction motors	2x60 kW nominal, 2x125 kW (340hp) for 10 minutes
Total capacity	220 or 245 kWh, shared between driveline and E-PTO
Battery Technology	LiFePO4
Battery Voltage	614 V DC (560...710 V DC)
Battery Lifetime	> (plus) 2000 full charging cycles





3.3. Current international projects

France 2017 – till now

Since 2017, by order of the French company Bluebus, bodies for electric buses of this company have been manufactured at Bogdan Motors





4. The way of Bogdan vehicles creation

All works concerning Bogdan vehicles are performed by specialists of “CAP #1” Subsidiary of PJSC “AC “Bogdan Motors” at production facilities of the plant, namely:

1. Engineering

- specialists of “Bogdan Motors” Design bureau worked hard and do everything in their power to create the design of high-quality vehicles

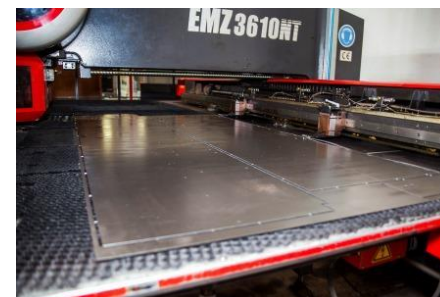


2. Procurement of components and materials for vehicles

- specialists of “Bogdan Motors” Logistic department look for all materials needed for production process anywhere in the world.

3. Mechanical procurement workshop

- all necessary details for vehicles will be manufactured at workshop

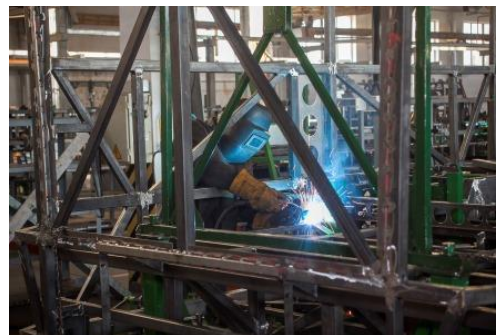




4. The way of Bogdan vehicles creation

4. Two body welding workshop

– the frames for vehicles will be welded at plant's facilities



5. Painting workshop

- at painting workshop the frames will be painted in accordance with all the requirements of the painting technique



6. Assembly production workshop

- in the assembly production workshop future vehicles will be equipped with all necessary nodes and components





4. The way of Bogdan vehicles creation

7. Delivery and diagnostics workshop

– all Bogdan vehicles goes through the final diagnostics at this workshop



8. Road tests

- all Bogdan vehicles go for road tests – the difference is only in the length of routes



9. Quality checking

- all Bogdan vehicles pass the strictest inspection by the quality department and only then go for Customers





THANK YOU!

Sincerely yours,

CAP #1 Subsidiary of AC Bogdan Motors