Comprehensive turnkey electromobility solutions for cities

Irizar Group

Irizar is a business group with an international presence whose business is focussed on the passenger transport, electromobility, electronics, electric motors and generators, connectivity and energy sectors.

The Irizar Group consists of seven companies (Irizar, Irizar e-mobility, Alconza, Datik, Hispacold, Masats and Jema) with production operations in 13 production plants in Spain, Morocco, Brazil, Mexico and South Africa in addition to their own R&D centre whose purpose is applied research and technological development of products and systems for the Group.

Irizar, S. Coop is the parent company of the Group and its central headquarters is located in Ormaiztegi (Guipuzcoa, Spain) where Creatio, the Group's Research and Development Centre, is also located.

Founded in 1889, today, the Irizar Group is well-established with more than 3,500 employees and an aggregate sales volume exceeding 800 million euros. It is geographically and industrially diversified, continuously growing and firmly committed to the brand, technology and sustainability.

Technology and innovation

The innovation and knowledge provided by the Group's companies are the pillars on which Irizar promotes mobility in cities, promoting the use of the bus as the best alternative for the mass transport of people in urban environments. The technological capacity of the Irizar Group and the collaboration with the most advanced research centres enables the group to offer top-level products, services, and turnkey solutions, positioning ourselves as a technological leader for European electromobility.

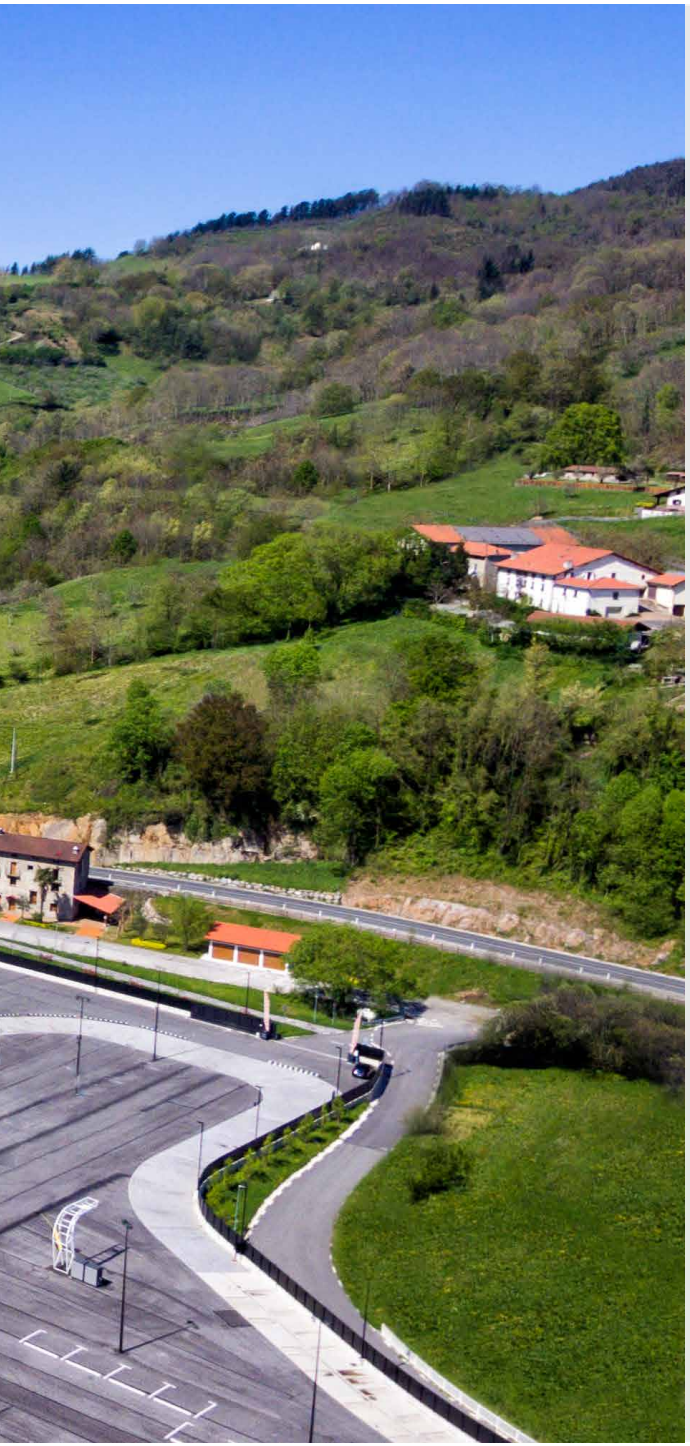
Irizar, coach and bus manufacturer; Hispacold, producer of climate control equipment; Jema Energy, specialised in high-end power electronics; Datik, technology company offering smart transport solutions; Masats, dedicated to accessibility and PMR systems; and Alconza, dedicated to electrical motors and generators for the marine, hydraulic and special purpose industrial generation sectors and Creatio R+D Centre have joined forces to promote the development of zero emissions urban vehicles and their major components and systems.

These companies, provide comprehensive, independent, and proprietary technology capable of solving all aspects involved in the design and development of products and systems, in compliance with all European regulations. As such, the range of Irizar's zero emissions and e-mobility products are based on first-class reliable technology, developed in Europe, with cutting-edge design that incorporates pioneering technical features in the sector and which have been thoroughly tried and tested by European city operators since 2014 with satisfactory results.

The Irizar Group is currently actively involved in major European projects for the future electrification of cities and public transport. These projects relate to autonomous vehicles, improvements in energy storage systems, energy efficiency, standardization of charging systems, connectivity, big data, artificial intelligence, etc., which are basic for the implementation of a new transportation concept.


PHILIPS


Irizar e-mobility: The first European electromobility plant
Irizar
e-mobility



Leading the change transition

Irizar e-mobility offers comprehensive electromobility solutions for cities, both in terms of manufacturing zero emissions 100% electric vehicles, and in terms of manufacturing and installing the major infrastructure systems necessary for charging, traction, and energy storage, all with the application of the Group's completely European technology and with Irizar's warranty and service quality.

Our product range includes 10.8m and 12m city buses, which have been operating since 2014 in various European cities, 15m buses, articulated buses, and other electric vehicles to service cities, as the Irizar ie truck, all zero-emission.

All with the clear objective of providing the operator with an additional advantage, by being the sole interlocutor in all phases of the project, including detailed advice, comprehensive vehicle care, and customized post-sale service, repair and maintenance (R&M).

Green energy factory

We have a new manufacturing plant of 18,000 m2 designed exclusively for electromobility. An innovative and state-of-the-art plant which is open to knowledge and talent that generates wealth and employment.

The construction uses innovative elements and cutting-edge solutions with a special emphasis on those concepts that define eco-sustainability. It includes a warehouse and domestic hot water heating system that works by using the surplus steam from a company located in the adjoining plot.

We generate all the energy consumed by this plant, which makes it the first fully sustainable plant in Europe.

For a better life

Because we want to contribute to building a better world

Zero direct emissions

Our electric buses eliminate tons of emissions into the atmosphere each year.

Noise reduction

The electric technology makes the noise of the combustion engine disappear, which means there are no exterior sound emissions to irritate pedestrians when the bus is stopped and starting (0 dBA). When driving, the reduction of the Irizar ie bus noise emission is 20%.

Green energy factory

We generate all the energy consumed by this plant, which makes it the first fully sustainable electromobility plant in Europe.

Eco design

We carry out continuous research and development of new bus manufacturing technologies and new materials, which means that we are positioned at the forefront of ecodesign in our sector with environmentally sustainable products.

Eco efficiency

We are succeeding in energy efficiency, in optimising waste management and in reducing the environmental impact caused by our business activities and products.

Eco innovation

We are continuously vigilant in our innovation projects in order to replace materials and technologies with new ones that are more environmentally friendly and by using lighter materials and technology to reduce consumption and toxic gas emissions.

Towards an EDP

We are the first company in the world in the sector to begin a project of Environmental Product Declaration which will provide it with data on the impact on global warming and depletion of resources, energy consumption of fossil or renewable resources, pollutant emissions in the manufacture or content of dangerous substances, etc.

Commitment

We promote Responsible energy consumption and encourage the commitment of all our personnel regarding these aspects of environmental, social and economic sustainability.

Recyclability

The manufacture of the buses prioritizes the disassembly and recyclability of its components. Vehicle recyclability and recoverability rates are above 90% according to ISO 22628.

The bus has a longer service life and lower maintenance needs.

The inverters and the rest of the components of the ie bus's traction system have a service life that is equal to or greater than that of the bus; however, this is not the case for combustion vehicles.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le tram
Jema
BORNE DE CHARGE N°17
Jema
BORNE DE CHARGE N°16

Turnkey solutions

Supporting the customer from start to end

We offer totally customized turnkey projects, designed and created to meet customer needs.

In addition to conducting energy studies of the operator's lines in order to determine how much energy to load the bus with to ensure optimal range, and to planning the means and infrastructure necessary, the company also develops charging stations, coordinates works and even offers cloud-based fleet management systems and financing packages.

The service network is still in the process of expansion and it is currently possible to locate an approved Irizar warranty workshop in all places where its vehicles operate.

At Irizar e-mobility, we have decided to establish an exclusive and high-quality after-sales service in cities using our electromobility solutions, which offers personalised R&M packages and is managed by technical experts and locally hired employees, thus helping to create local wealth and jobs.

Irizar does it for you

Customized study *of the operator's service lines (data on operations, speed, climate, terrain).*

Proposal for optimising ***service operations****.*

Advice *on the* ***energy needed to embark****, optimization strategy.*

Advice on optimum parameters for power, charging ***strategies****, charging* ***times*** *and battery* ***life****.*

Civil works*.*

Implementation and start-up *of the system.*

Optimization of ***end-of-life management****.*

Integral ***monitoring and maintenance****.*

Incorporated systems update *to optimize the life of each vehicle, improving its assets' value.*

Irizar systems and components

The Irizar Group's technological capacity and partnerships with the leading research centres enable us to offer first-rate products and services with completely European technology.

Energy storage and management

Our battery system uses a modular concept, designed to meet the needs of any operator. A robust and safe system that complies with the latest European regulations: R100.v2, R10.v5 and UN38.3.

The batteries incorporate different chemicals depending on how the operator intends to use them. Thus, we are able to offer a solution to each specific need. Because better storage and use of energy is a commitment to sustainability.

Electric drive system

Unlike other projects which are constrained by more standardised motors, the motorisation of our vehicles has been developed using proprietary technology created exclusively for our products so that it adapts perfectly to the products' requirements. The powertrains are manufactured by companies that belong to the Irizar Group.

Charging systems

We offer a range of smart charging options to provide solutions to the different conditioning factors clients face in terms of power limits, as well as space and operating restrictions.

Air conditioning system

The electric climate control system is designed specifically for zero-emission electric vehicles.

Electric doors

The vehicles have been equipped with electric or manual ramps developed by companies belonging to the Irizar Group.

Driver assist system

This system enables safe communication with the driver which helps them to be more efficient, improving their daily work as well as the service provided to the passengers. This assists the driver for creepage manoeuvres, when stopping and pulling out. It also improves safety, comfort and punctuality.


ie bus
Irizar

The driver is our focus

The driving position has been designed prioritizing concepts of ergonomics, comfort, functionality, safety, and service while complying with the EBSF standards (European bus system for the future-project managed by UITP and VDV).

We have taken into account access to controls, vibration protection, acoustic and micro-climatic considerations to facilitate driving and reduce driver fatigue. The passenger compartment is equipped with a Zero Emissions climate control unit, with cooling (3.5 kW) and heating (8 kW) functions.

We also want to guarantee their safety, providing them with a clear view of the surroundings thanks to an optimized cab design, with comfortable and ergonomic access and a modular distribution (cabin door with safety window or cockpit).

For the design of the seats, the different driver body shapes have been taken into account. We also offer a wide range of customisation options including pioneering technologies that assist the driver in real time with the aim of reducing the vehicle's energy consumption while increasing its operating range.

Ahead in autonomy

In European markets, with a single charge of three hours, the Irizar ie bus 10, 12 and 18-metre models offer a range of between 220 and 250 km at an average speed of 15-17 km/h, ensuring between 15 and 17 hours of driving in heavy city or intercity traffic conditions. With a nominal capacity of 180kW, the on-board energy in the vehicle is 280-350kWh.

For the other models, we conduct energy studies of the operator lines in order to determine how much energy the bus requires, with the objective of ensuring the maximum autonomy possible.

We provide storage systems capable of identifying and efficiently managing energy flows and peaks to guarantee optimum autonomy.

We have pantograph systems for fast charging during travel to ensure operation for the entire day.

We can also equip the vehicles with assisted driving systems so as to contribute to reducing the vehicle's energy consumption and thus increasing its autonomy.

The buses that are currently operating in different cities, along with the different tests being conducted by operators and urban transport authorities in various European cities, support these operating ranges.

The Irizar ie bus - new generation

Increased range, greater passenger capacity

In addition to an aesthetically pleasing design, this new generation, available in 10, 12, 15 and 18 metres, incorporates innovations and new batteries. The space has been optimised, achieving greater passenger capacity and improved modularity.

A new generation of more efficient batteries combine with a regenerative braking system to further reduce consumption and offer greater vehicle range.

In urban environments, with a charge of 350kWh and in standard weather conditions, we obtain an approximate range of 250km, which is equivalent to around 17 hours of operation.

In the new Irizar ie bus, we offer up to 5 interoperable slow charging point positions using a combo 2 connector.

Charging time has decreased and the vehicle can be slow charged in 3 hours. There is also the option of fast charging via pantograph.

The charging capacity can vary from 50 kW to 600 kW.

The new generation of the Irizar ie bus can be certified in Class 2.

A safer vehicle

We were pioneers in complying with the ECE-R66/02 rollover safety regulations in electric vehicles.

We now incorporate AVAS (Acoustic Vehicle Alerting System), an acoustic warning system that complies with requirement R138, as well as a new dashboard with quality materials that comply with fire safety regulation 118R annex 6, 7 and 8.

The new generation of Irizar ie bus enables the vehicle to be maintained more easily and more ergonomically.

A design for the future

We have worked meticulously on both the exterior and interior design of the bus, achieving a more attractive, efficient, reliable and safe vehicle.

The front of the vehicle, with a more striking and elegant look, adopts the aesthetic features of Irizar's products. When it comes to the interior design, although the standard version has a more conventional specification, some of the Irizar ie tram options may be incorporated, including large windows, side lighting or screens above the windows, amongst others.

The Irizar ie bus has been operating since 2014 in several European cities. The experience and data obtained in recent years demonstrate the reliability and safety of this vehicle.


Irizar ie bus
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The Irizar ie tram

A tram on the tarmac

The Irizar ie tram is a 100% electric, zero-emission bus with the appearance of a tram that combines the large capacity, ease of access and internal configuration of a tram with the flexibility of a city bus. This model is available in versions of 12 to 18 meters, with a maximum capacity of 155 passengers and with the possibility of overnight or pantograph charging.

The minimalist aesthetic language that defines the design of the Irizar ie tram responds to specific functional aspects, enabling an identity and an image easily recognizable by users. Accessibility, safety, passenger flow and passenger comfort are the inspiration behind the interior design architecture, resulting in a bright, comfortable, spacious, pleasant and safe interior.

Accessibility and passenger flow are further enhanced by up to 8 sliding doors, the integral low floor, the seating arrangement, the interior distribution with wide aisles, the signage on the seats reserved for wheelchairs and/or prams, the audible stop request information, the installation of ticket validation devices, the design of the driving position and the comfortable and effortless access.

In the inter circulation area, a system with very low lateral inclinations has been designed to provide an open space towards the rear trailer. The system is translucent and avoids the separation of the two passenger areas and is equipped with LED lighting.

The sliding doors, up to a total of 8, single-level low floor, arrangement of seats, design of the driving position and the interior layout with wide aisles, facilitate comfortable and effortless access.

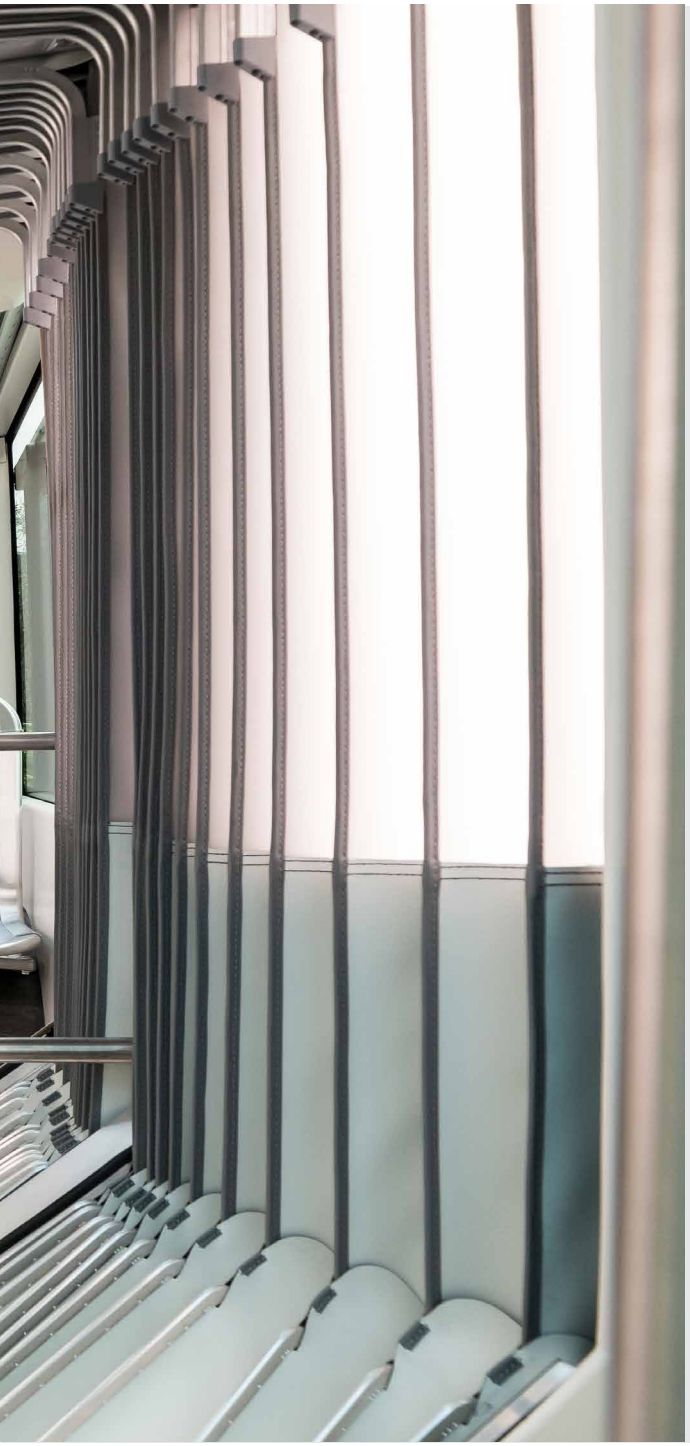
Seat signage, areas reserved for wheelchairs and/or prams, audible stop request information, and installation of ticket validation devices also enhance the orderly flow of passengers.

For entertainment, Irizar enables the installation of a wide range of solutions: USB chargers, WiFi, Braille buttons, luggage racks, passenger information, interior vinyl, etc.

The innovative, inspiring design of the Irizar ie tram breaks with the classic transport codes and enhances the charm of the city by reflecting urban cultural diversity.

Care has been taken with the most minor details to achieve the aesthetics of the tram, for example, the hubcaps, as well as the wing mirrors, have been replaced by cameras that project their images onto two displays located in the interior of the vehicle on either side of the driver.


100%
CONNECTÉ



The interior

The search for a unique space

We have designed the passenger compartment taking into account traveller behaviour and interaction with the urban vehicle as well as different lifestyles and future trends. The arrangement of the seats, their high level of comfort and the integration of essential comfort and safety features mean that the idea of social cohesion can be approached.

We think of everything and everyone

- *An atmosphere free of acoustic emissions.*
- *A quiet vehicle, low noise level.*
- *A bright and spacious environment.*
- *Sliding electric doors to facilitate the exit and entry of passengers, thus reducing stop time in the station.*
- *A vehicle accessible to all: spaces for wheelchairs and prams.*
- *Fluid movement inside the vehicle.*
- *The "kneeling" function, with heights of between 250-270 mm, enables comfortable and effortless access to the bus.*
- *A wide range of entertainment solutions: USB chargers, WiFi, Braille buttons, luggage racks, passenger information, interior vinyl, etc.*

Irizar energy storage and management

In house battery manufacturing

Our energy management and storage solutions, developed and manufactured in our Aduna plant (Guipúzcoa), are designed to cover the needs of today's European market and to offer the best solution for each of the operator's requirements.

We offer different modular solutions, based on Lithium-ion technology:

- Slow charging (Energy Pack): Designed so that the vehicle can travel the maximum number of kilometres and complete the operation with a single daily charge. Its design enables us to find a balance between vehicle range and number of people.
- Fast-charging (Nano Pack): The perfect coupling of vehicle range and charging capacity. Ideal for mixed operations, where the vehicle has sufficient battery life to operate during peak hours. The load can be both slow and fast.
- Ultra-fast charging (Power Pack): The solution for a 24/7 operation with charging of up to 600kW.

Our Irizar battery packs are modular and incorporate liquid cooling systems that enable the service life of the batteries to be optimized and make it possible for the vehicles to operate in extreme weather conditions.
They meet the latest European regulations on electrical, thermal and mechanical safety: R100.v2, R10.v5 and UN38.3

We work with customers to study their needs so that we can provide the best solution within our range of different types of pack.

Our battery pack is highly recyclable. We use a controlled process to ensure that all its components are processed and we assess whether or not it can be used in other types of applications.

	Slow charging (Energy Pack)	Fast charging (Nano Pack)	Ultra-fast charging (Power Pack)
Loaded energy	280 – 525 kWh	185 – 260 kWh	90 - 150 kWh
Range per load	220 – 250 km	100 - 120 km	50 – 60 km

**For vehicles travelling about 65,000km / year*


adeep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Irizar charging systems

A range of charging options are offered to provide solutions to the different conditioning factors clients face in terms of power limits, as well as space and operating restrictions.

Pantograph charging

Recommended for 24/7 operation. Loads are made during the journey as well as in the depot. The charging stations are located at strategic points throughout the cities, at the end or start of each line, in order to charge/supply several buses or lines.

This charger is a system for conversion of energy from a three-phase power network - rated power of 600 kW, and has been approved by ENEDIS, a French company that manages the state electrical network. We are the first systems manufacturer to obtain this validation.

It enables the vehicle to be charged in a few minutes through the charger connection (automatic or manual modes) to the bus batteries. It is an articulated mechanism installed in the roof of the bus and a vault connected to the charger and located in a structure or adapted pole. When the bus needs its batteries charging, the pantograph arm extends and establishes timely connections.

Its modern and minimalist design offers easy integration into the urban landscape.


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Pantograph in depot

With this solution, we offer the possibility of complete automation of slow in-depot charging through the commissioning of vaulted contact structures installed above the parking spaces, replacing the outlet solution, manually connected by the operator.

The automation of the contact between the vault and the pantograph of the parked bus allows instant charging. This alternative reduces the presence of cables on the floor and, therefore, improves the safety of the operators.

In-depot charging

This is the easiest and most traditional, in which the operator connects the charger to the bus using a combo 2 cable or via a pantograph. It enables the slow charging of vehicles and is available from 50kW to 150kW, in both outdoor and indoor models.

The chargers comply with Standards IEC61851-1, -23 and -24, as well as interoperability Standards ISO15118 and DIN7012 and have the capability of remote cloud monitoring as well as sending alerts by email or SMS. Additionally, communication with the operator is carried out via MODBUS TCP or protocol OCPP 1.6.

The chargers incorporate smart charging functionality, which allows definition of vehicle planning and guarantees fleet charging with the lowest possible power.

Intelligent charging system

This is a control centre that efficiently manages all the charging conditions/restrictions in the depot. The system identifies the different charging requirements of each bus in order to optimise the total power required.

It centralizes and records all data of the chargers and connected buses; it displays the vehicle fleet and their charge status; it minimizes the electrical power of the network by dividing the available power between the different vehicles; it limits the charge power to the maximum power contracted by the customer and configures the different electric rate times to prioritize charges with a less expensive budget; it centralizes the information from the remote diagnosis system; it monitors the charging procedure of all connected vehicles.

The smart charging system generates daily charge reports and allows remote monitoring of the charging process through the iPanel.

Interoperability

The Irizar Group's charging solutions are interoperable in accordance with ISO 15118, DIN70121, OCPP 1.6 CE mark, EMC 61000-6-2, 61000-6-4, IEC 61851, IEC 61000.

Irizar ie bus distribution and technical data
10.8m

Num. of doors	2
Wheelchair areas	1
Num. of seats	28
Num. of standing passengers*	35
Total num. of passengers : Maximum	76

Dimensions	
Length	10.850 mm (2 axles)
Maximum height	3.209 mm
Width	2.550 mm
Wheelbase	4.645 mm
Rear overhang	2.805 mm / 3.405 mm
Interior height	2.400 mm
Height from ground	340 mm
Lead angle	6.5°
Departure angle	7°
Height on step:	
• Door 1	250 mm (320 mm without kneeling)
• Doors 2 and 3	270 mm (340 mm without kneeling)
Door width ie bus:	
• Door 1	1.100 mm
• Door 2	1.200 mm

Powertrain	
Manufacturer	Irizar Group
Type	Synchronous
Nominal power	180 kW
Nominal torque	1.500 Nm
Traction capacity even on 18% maximum slopes	

Energy storage system*	
Battery technology	Lithium ion
Slow charging:	
• Max. installed power	350 kWh (depending on customer needs)
• Charging power	100 kW
• Charging time	3-4 h
Fast charging:	
• Max. installed power	185 kWh (depending on customer needs)
• Charging power	450 kW (pantograph) - 150 kW (Combo2)
• Charging time	5 min (pantograph) - 2h (Combo2)
Ultra-fast charging:	
• Installed power	90 kWh (depending on customer needs)
• Power	450 kW
• Charging time	5 minutes (pantograph)

*This data may vary according to the legislation of each country.

Please enquire for other distribution possibilities.

Air conditioning system	
Driver - Hispacold Zero Emissions climate control system	(cooling: 3.5 kW, heat: 13 kW)
Passengers - Hispacold Zero Emissions climate control system	(cooling: 28 kW, heat: 32 kW)
Passengers area and accessibility	
Maximum No. passengers**	76
Low - floor	
One wheelchair area	
Four seats for PRM	
Electric ramp	
Two double doors	
Possibility of assembling cantilever seats at the front area	
Safety and Regulation	
Driver area in accordance with ISO161221, VDV234 and EBSF	
Creepage function: assistance when starting	
Hillholder function: maintains the bus stopped on slopes a few seconds before going backwards	
Electromagnetic compatibility regulation 10R	
EcoAssist: efficient assisted driving	
Eco-mode: intelligent management of air conditioning once the vehicle is switched off	
Compliance with fire-resistance regulation 118R	
Weight	
Maximum front axle weight	7.500 Kg.
Maximum rear axle weight	12.600 Kg.
Other	
Aluminium lateral and roof structure	
Grating / floor Stainless steel	
Front divided into five parts for easy and economic interchange of external bodywork	
Acoustic insulation of ceiling and sides	
Turning diameter	18.600 mm
LED interior and exterior illumination	
Double glazing	
Anti-graffiti materials	

**No. of standees - Data varies depending on the MAM of each country and the number and type of batteries installed on the bus.

Irizar ie bus new generation distribution and technical data
12m

	A
Num. of doors	2
Wheelchair/pram areas	2
Num. of seats	33
Num. of standing passengers*	47
Total num. of passengers : Maximum	80

	A
Num. of doors	3
Wheelchair areas	1
Num. of seats	30
Num. of standing passengers*	49
Total num. of passengers : Maximum	80

Dimensions	
Length:	12.160 mm
Maximum height	3.300 mm
Width	2.550 mm
Wheelbase	5.955 mm
Rear overhang	2.805 mm / 3.400 mm
Interior height	2.400 mm
Height from ground	340 mm
Lead angle	7º
Departure angle	7.5º
Height on step:	
• Doors 1 and 2	250 mm (320 mm without kneeling)
• Door 3	270 mm (340 mm without kneeling)
Door width:	
• Door 1	1.100 mm
• Door 2	1.200 mm
• Door 3	1.100 mm
Powertrain	
Manufacturer	Irizar Group
Type:	Synchronous
Nominal power	180 kW
Nominal torque	1.500 Nm
Traction capacity even on 18% maximum slopes	
Energy storage system*	
Battery technology	Lithium ion
Slow charging:	
• Max. installed power	350 kWh (depending on customer needs)
• Charging power	100 kW
• Charging time	3 h
Fast charging:	
• Max. installed power	185 kWh (depending on customer needs)
• Charging power	450 kW (pantograph) - 150 kW (Combo2)
• Charging time	5 min (pantograph) - 2h (Combo2)
Ultra-fast charging:	
• Installed power	90 kWh (depending on customer needs)
• Power	450 kW
• Charging time	5 minutes (pantograph)

*This data may vary according to the legislation of each country.

Please enquire for other distribution possibilities.

Air conditioning system	
Driver - Hispacold Zero Emissions climate control system	(cold: 3.5 kW, heat: 13 kW)
Passengers - Hispacold Zero Emissions climate control system	(cold: 35 kW, heat: 32 kW)
Passengers area and accessibility	
No. passengers for slow charging**	65-95
No. passengers for fast charging**	80-100
No. passengers for ultra-fast charging**	85-105
Low - floor	
One or two wheelchair/pram areas	
Four seats for PRM	
Manual ramp	
Two to three double doors	
Possibility of assembling cantilever seats	
Safety and regulation	
Compliance with fire-resistance regulation 118R annex 6, 7 y 8	
Compliance with ECE-R66/02 safety regulation	
AVAS (Acoustic Vehicle Alerting System) integrated according to R138 regulation	
Compliance with standard ITxPT	
Driver area in accordance with ISO161221, VDV234 and EBSF	
Electromagnetic compatibility regulation 10R	
Creepage and Hillholder function	
EcoAssist: efficient assisted driving	
Eco-mode: intelligent management of air conditioning once the vehicle is switched off	
Weight	
Maximum front axle weight	8.200 Kg.
Maximum rear axle weight	13.000 Kg.
Other	
Customizable internal illumination	
Charging possibilities: front, lateral or rear	
Wheel covers option	
Turning diameter	21.374 mm
Anti-graffiti materials	

	A	B
Num. of doors	2	3
Wheelchair areas	1	1
Num. of seats	27	25
Num. of standing passengers*	53	54
Total num. of passengers : Maximum	81	83

**No. of standees - Data varies depending on the MAM of each country and the number and type of batteries installed on the bus.

Irizar ie tram distribution and technical data
12m

	A	B
Num. of doors	3	3
Wheelchair areas	1	3
Num. of seats	28	21
Num. of standing passengers*	68	75
Total num. of passengers : Maximum	97	99

Dimensions	
Length	12.165 mm (2 axles)
Maximum height	3.400 mm
Width	2.550 mm
Wheelbase	5.955 mm
Rear overhang	2.805 mm / 3.405 mm
Interior height	2.400 mm
Height from ground	320 mm
Lead angle	7.5º
Departure angle	7.5º
Height on step:	
• Door 1, 2	250 mm (320 mm without kneeling)
• Door 3	270 mm (340 mm without kneeling)
Door width ie tram:	
• Door 1	800 mm
• Door 2	1.200 mm
• Door 3	1.100 mm
Powertrain	
Manufacturer	Irizar Group
Type:	Synchronous
Nominal power	180 kW
Nominal torque	1.500 Nm
Traction capacity even on 18% maximum slopes	
Energy storage system*	
Battery technology	Lithium ion
Slow charging:	
• Max. installed power	350 kWh (depending on customer needs)
• Charging power	100 kW
• Charging time	3-4 h
Fast charging:	
• Max. installed power	185 kWh (depending on customer needs)
• Charging power	450 kW (pantograph) - 150 kW (Combo2)
• Charging time	5 min (pantograph) - 2h (Combo2)
Ultra-fast charging:	
• Max. installed power	90 kWh (depending on customer needs)
• Charging power	450 kW
• Charging time	5 minutes (pantograph)

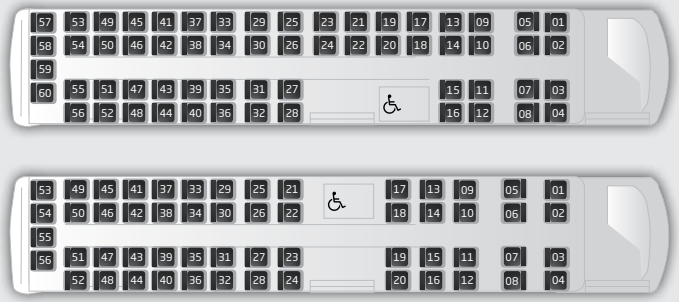
*This data may vary according to the legislation of each country.

Please enquire for other distribution possibilities.

Air conditioning system	
Driver - Hispacold Zero Emissions climate control system	(cold: 3.5 kW, heat: 13 kW)
Passengers - Hispacold Zero Emissions climate control system	(cold: 28 kW, heat: 32 kW)
Passengers area and accessibility	
Maximum No. passengers**	100
Low - floor	
One or two wheelchair areas	
Four seats for PRM	
Electric ramp for people with disabilities	
Two to three double doors	
Possibility of assembling cantilever seats at the front area	
Safety and regulation	
Driver area in accordance with ISO161221, VDV234 and EBSF	
Creepage function: assistance when starting	
Hillholder function: maintains the bus stooped on slopes a few second before going backwards	
Electromagnetic compatibility regulation 10R	
EcoAssist: efficient assisted driving	
Eco-mode: intelligent management of air conditioning once the vehicle is switched off	
Weight	
Maximum front axle weight	7.500 Kg.
Maximum rear axle weight	13.000 Kg.
Other	
Aluminium lateral and roof structure	
Grating / floor Stainless steel	
Front divided into five parts for easy and economic interchange of external bodywork	
Acoustic insulation of ceiling and sides	
Turning diameter	20.870 mm
LED interior and exterior illumination	
Double glazing	
Anti-graffiti materials	

**No. of standees - Data varies depending on the MAM of each country and the number and type of batteries installed on the bus.

Irizar ie bus distribution and technical data
15m



	A	B
Num. of doors	2	2
Wheelchair areas	1	1
Num. of seats	60	56
Num. of standing passengers*	45	49

Dimensions	
Length	14.980 mm (3 axles)
Maximum height	3.300 mm
Width	2.550 mm
Wheelbase 1	7.115 mm
Wheelbase 2	1.655 mm
Rear overhang	2.805 mm / 3.405 mm
Interior height	2.400 mm
Height from ground	340 mm
Lead angle	7.5°
Departure angle	7.5°
Height on step:	
• Door 1	250 mm (320 mm without kneeling)
• Door 2	250 mm (320 mm without kneeling)
Door width ie bus:	
• Option1: Door 1 double	1.100 mm
• Option 2: Door 2 single	800 mm
• Door 2 double	1.200 mm
Powertrain	
Manufacturer	Irizar Group
Type	Synchronous
Nominal power	240 kW
Nominal torque	2.300 Nm
Traction capacity even on 18% maximum slopes	
Energy storage system*	
Battery technology	Lithium ion
Slow charging:	
• Max. installed power	525 kWh (depending on customer needs)
• Charging power	150 kW
• Charging time	4 h
Fast charging:	
• Max. installed power	260 kWh (depending on customer needs)
• Charging power	500 kW (pantograph) - 200 kW (Combo2)
• Charging time	5 min (pantograph) - 2h (Combo2)
Ultra-fast charging:	
• Max. installed power	150 kWh (depending on customer needs)
• Charging power	600 kW
• Charging time	5 minutes (pantograph)

*This data may vary according to the legislation of each country.

Please enquire for other distribution possibilities.

Air conditioning system	
Driver - Hispacold Zero Emissions climate control system	*(cooling: 3.5 kW, heat: 13 kW)*
Passengers - Hispacold Zero Emissions climate control system	*(cooling: 49 kW, heat: 55 kW)*
Passengers area and accessibility**	
*Maximum No. passengers***	*105*
Low - floor	
Low -entry	
2 wheelchair areas	
Four seats for PRM	
Electric ramp for people with disabilities	
Two to three double or single doors	
Possibility of assembling cantilever seats at the front area	
Safety and regulation	
Driver area in accordance with ISO161221, VDV234 and EBSF	
Creepage function: assistance when starting	
Hillholder function: maintains the bus stooped on slopes a few second before going backwards	
Electromagnetic compatibility regulation 10R	
EcoAssist: efficient assisted driving	
Eco-mode: intelligent management of air conditioning once the vehicle is switched off	
Compliance with fire-resistance regulation 118R	
Weight	
Maximum front axle weight	*7.500 Kg.*
Maximum Tandem axle weight	*19.000 Kg.*
Other	
Aluminium lateral and roof structure	
Grating / floor Stainless steel	
Front divided into five parts for easy and economic interchange of external bodywork	
Acoustic insulation of ceiling and sides	
Turning diameter	*24.200 mm*
LED interior and exterior illumination	
Double glazing	
Anti-graffiti materials	

Num. of doors	*3*
Wheelchair areas	*1*
Num. of seats	*47*
*Num. of standing passengers**	*58*

**No. of standees - Data varies depending on the MAM of each country and the number and type of batteries installed on the bus.

Irizar ie bus distribution and technical data
18m

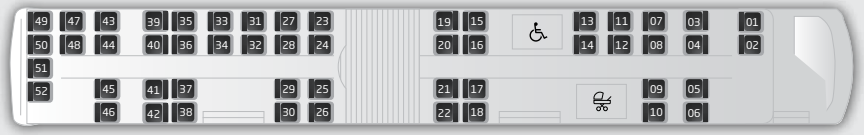
	A	B
Num. of doors	4	4
Wheelchair areas	3	2
Num. of seats	32	39
Num. of standing passengers*	119	116

Dimensions	
Length (axles)	18.730 mm (3 axles)
Maximum height	3.300 mm
Width	2.550 mm
Wheelbase 1	5.980 mm
Wheelbase 2	6.540 mm
Rear overhang	2.805 mm / 3.405 mm
Interior height	2.400 mm
Height from ground	350 mm
Lead angle	7.5º
Departure angle	7.5º
Height on step:	
• Door 1, 2, 3	250 mm (320 mm without kneeling)
• Doors 4,5	270 mm (340 mm without kneeling)
Door width ie bus:	
• Doors 1,5	1.100 mm
• Doors 2, 3, 4	1.200 mm
Powertrain	
Manufacturer	Irizar Group
Type	Synchronous
Nominal power	240 kW
Nominal torque	2.300 Nm
Traction capacity even on 18% maximum slopes	
Energy storage system*	
Battery technology	Lithium ion
Slow charging:	
• Max. installed power	525 kWh (depending on customer needs)
• Charging power	150 kW
• Charging time	4 h
Fast charging:	
• Max. installed power	260 kWh (depending on customer needs)
• Charging power	500 kW (pantograph) - 200 kW (Combo2)
• Charging time	5 min (pantograph) - 2h (Combo2)
Ultra-fast charging:	
• Max. installed power	150 kWh (depending on customer needs)
• Charing power	600 kW
• Charging time	5 minutes (pantograph)

*This data may vary according to the legislation of each country.

Please enquire for other distribution possibilities.

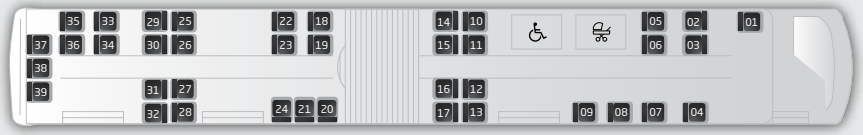
Air conditioning system	
Driver - Hispacold Zero Emissions climate control system	(cooling: 3.5 kW, heat: 13 kW)
Passengers - Hispacold Zero Emissions climate control system	(cooling: 49 kW, heat: 55 kW)
Passengers area and accessibility	
Maximum No. of passengers**	155
Low - floor	
One or two wheelchair / pram areas	
Four seats for PRM	
Up to eight doors available (single or double)	
Electric ramp for people with disabilities	
Possibility of assembling cantilever seats at the front area and after the articulation	
Safety and regulation	
Driver area in accordance with ISO161221, VDV234 and EBSF	
Creepage function: assistance when starting	
Hillholder function: maintains the bus stooped on slopes a few second before going backwards	
Electromagnetic compatibility regulation 10R	
EcoAssist: efficient assisted driving	
Eco-mode: intelligent management of air conditioning once the vehicle is switched off	
Compliance with fire-resistance regulation 118R	
Weight	
Maximum weight on front axle	7.500 Kg
Maximum weight on axle	10.000 Kg
Maximum weight on axle	13.000 Kg
Other	
Aluminium lateral and roof structure	
Grating (Edging?) / floor: Stainless steel	
Front divided into five parts for easy and economic interchange of external bodywork	
Acoustic insulation of ceiling and sides	
Turning diameter	23.700 mm
LED interior and exterior illumination	
Single glazing	
Anti-graffiti materials	



Num. of doors	3
Wheelchair areas	2
Num. of seats	52
Num. of standing passengers*	48

**No. of standees - Data varies depending on the MAM of each country and the number and type of batteries installed on the bus.

Irizar ie tram distribution and technical data
18m



	A	B
Num. of doors	4	4
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Interior height	2.400 mm
Height from ground	350 mm
Lead angle	7.5º
Departure angle	7.5º
Height on step:	
• Door 1, 2, 3	250 mm (320 mm without kneeling)
• Doors 4,5	270 mm (340 mm without kneeling)
Door width ie tram:	
• Door 1	800 mm
• Doors 2, 3, 5	1.200 mm
• Door 4	1.000 mm
Powertrain	
Manufacturer	Irizar Group
Type	Synchronous
Nominal power	240 kW
Nominal torque	2.300 Nm
Traction capacity even on 18% maximum slopes	
Energy storage system*	
Battery technology	Lithium ion
In-depot charging:	
• Max. installed power	525 kWh (depending on customer needs)
• Charging power	150 kW
• Charging time	4 h
Fast charging:	
• Max. installed power	260 kWh (depending on customer needs)
• Charging power	500 kW (pantograph) - 200 kW (Combo2)
• Charging time	5 min (pantograph) - 2h (Combo2)
Ultra-fast charging:	
• Max. installed power	150 kWh (depending on customer needs)
• Charging power	600 kW
• Charging time	5 minutes (pantograph)

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Maximum weight on axle	13.000 Kg
Other	
Aluminium lateral and roof structure	
Grating (Edging?) / floor: Stainless steel	
Front divided into five parts for easy and economic interchange of external bodywork	
Acoustic insulation of ceiling and sides	
Turning diameter	23.700 mm
LED interior and exterior illumination	
Single glazing	
Anti-graffiti materials	

**No. of standees - Data varies depending on the MAM of each country and the number and type of batteries installed on the bus.

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