



ACTIVE | CONNECTED | FUTURE READY

BYKKO™ Smart Bike Share Ecosystem



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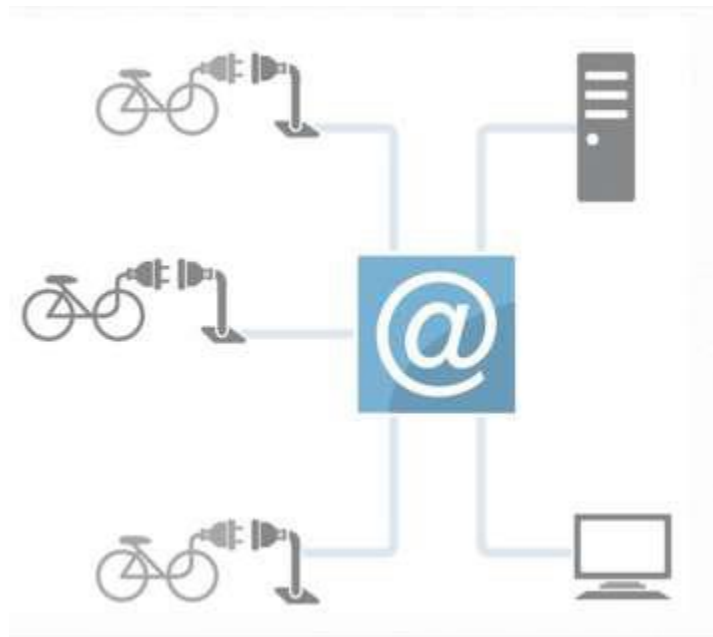
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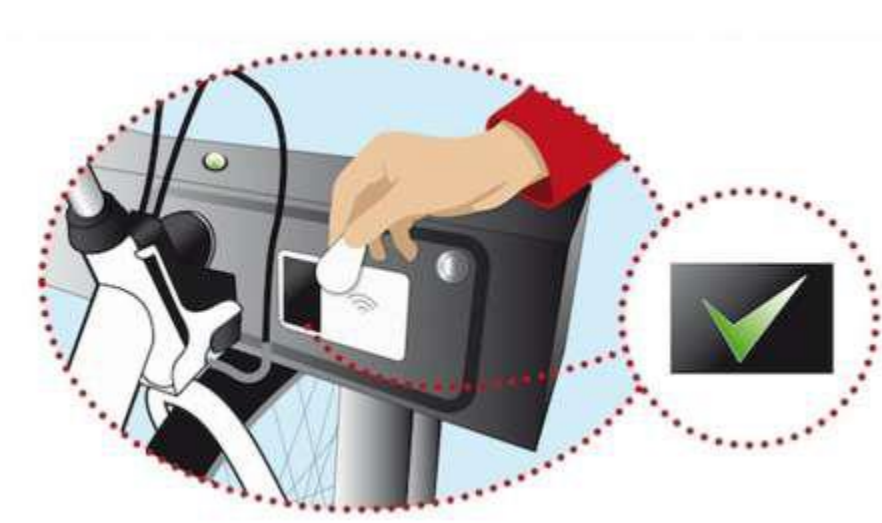
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1. Principle of operation

The bikes are securely locked and automatically charged in terminals. These charging terminals are connected together to form one or more stations. These stations are connected via the Internet to a central server (BYKKO server). Bicycles, user database, terminals and stations are stored in a database on that server.



When an user wants to "borrow" a bike, he identifies himself on the terminal with its badge (card, key chain, various formats are possible). The terminal sends the request to the station which transfers it to the BYKKO server. That verifies the validity of the badge of the user and sends the open signal (or refusal) back to the terminal.



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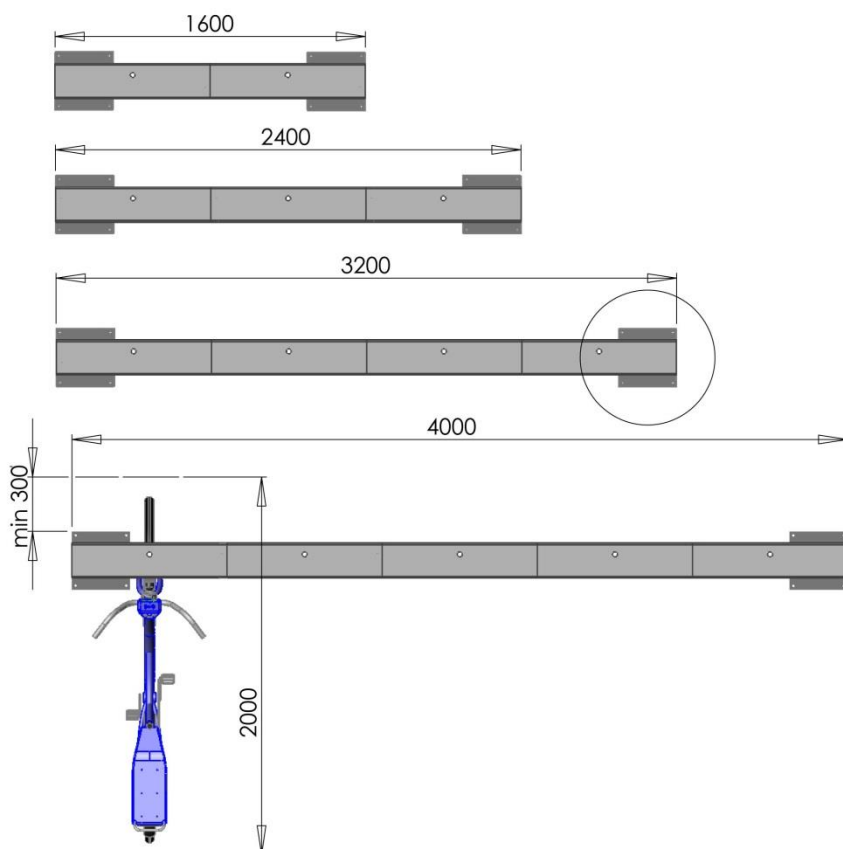
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When the bike is out of the terminal, the station informs the server that stores the trip information (date, time, user, bike, station, battery level...). Users with an open trip cannot take another bike. When the bike is returned (at any station), the server is notified and "closes" the current trip. It's then calculating the trip's duration and deducts the "cost" (as defined formula for the park, e.g. First 30min free then \$5 / hour). The user can then see the debited "cost" of borrowing from his personal account. When it reaches the lower limit (set for the park), an email is sent and the account is temporarily disabled. The user must then make a "payment" to the park operator to reset the account level and thus be able to borrow bikes again. Flexible payment plans or free schemes are available.

2. Equipment

2.1 The station

The station consists of a shaped structure (the "beam ") in which are housed between 2 and 32 charging terminals for electric bikes. This beam is mounted on several feet. The beam is composed of modules of two or three charging terminals connected by a set of metallic plates and sleeves.



2.2 The charging terminal

Each terminal consists of an electro-mechanical system (the « locker ») that locks and connects the ebike. A 125 KHz RFID reader identifies the bike. The locker is connected to an electronic card (MP v12.6) which controls the terminal. This card is equipped with a 13.56MHz RFID reader to identify the user badge. A charger loads the ebike's battery when it is locked when needed. An LED screen displays the battery level and status of the terminal. A tricolour LED mounted on top of the beam also gives the status of the terminal (green = available, red = problem, yellow = in connection).

2.3 The station master

To communicate with the central server, each station is equipped with a small local server (the "station master"). It is usually located at one end of the terminal. This server is then connected to the Internet via either a cable (LAN) (recommended) or a modem / router GPRS.

2.4 The ebike connector

At the front of the ebike, a fastening system allows the connection with the charging terminal. This system is composed of a metallic bracket, a wired connector to the battery, a protective plastic guide and a clip bracket.

2.5 Option solar shelter

One option is to mount the station under a shelter. In this case, the beam is fixed directly on the structure of the shelter. It can also be equipped with solar panels that will supply electricity for bicycles. These options need specific studies and customised solutions.



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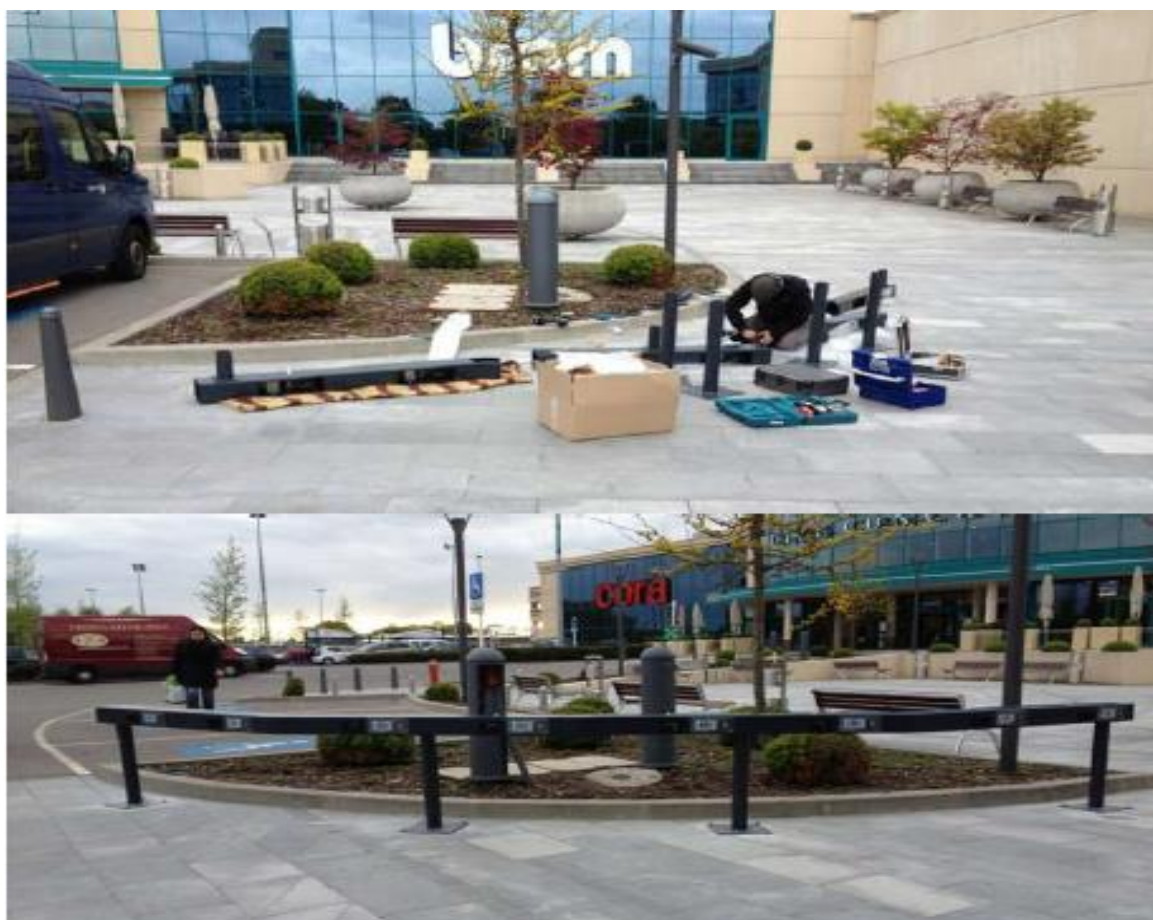
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3. Installation and commissioning

3.1 Ground anchors and flatness

The floor must be flat and solid. The legs are fixed to the ground thanks to four anchors M10 x 100mm or with jigs directly fixed in concrete. Foundations under each foot must ensure the stability of the station. It is advisable to have at least 30x50x50cm concrete under each foot (or steal slab).

If the selected location cannot ensure sufficient flatness (level II = max 5mm under a rule 2m), the station will be equipped with guide for bikes front wheel. These guides help settle each terminal under the height of the bike. If mounted on tiles, it may be possible to adjust one tile for the front wheel of each bike.



3.2 Power supply

The station is electrically powered at one end of the beam (cable passing through the foot). The cables should outgo from the floor in the centre of the foot.



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The minimum 220VAC power supply is 1.3A/terminal (or 110VAC 2.6A/terminal). There should also be a ground connection if the station is isolated (no building around). It also is necessary to install a differential protection with the power station (GCFI).

A 20VDC to 40VDC power supply is also possible but requires specific chargers. In this case, it needs at least 3.5A/terminal.

3.3 Internet connection

The station must be connected to the Internet to communicate with the central server. It is possible to connect the master station in 2 ways:

1. a wired connection (LAN) via an existing network or a wired phone connection with a router
2. through a mobile connection types GPRS/3G or 4G

The wired connection is recommended because it is much more stable and robust. However, it is also possible to operate the service properly with a mobile connection but without an absolute guarantee of the continuity of the connection.

The master station is supplied without the connecting hardware (neither router nor modem), an RJ45 jack allows connection directly to the server station. The mobile routers or LAN can be provided on request.

The internet is default automatic DHCP (given by the router or network IP address mode).

A fixed IP configuration is also possible on request.



4 Electric Bike Specification



Technical Specification

Frame	Alloy 6061, size 45cm
Front fork	Alloy, 26 inch white
Wheels	
Rim	Alloy double frame
Spokes	Stainless steal
Front hub	Motor 36V 250W
Rear hub	Shimano Nexus 3 speed
Tires	26" Kenda anti-puncture
Tube	Kenda, Schrader valves
Transmission	
Chainwheel	Alloy Black 32theets
Chaingard	Closed chainguard
Brakes	
Front brake	Shimano V-brake
Rear brake	Shimano Rollerbrake
Brakes levers	Tektro with V-cut sensor
Handlebar	
Stem	black fixe stem
Handlebar	With integrated basket
Bell	Rotation bell
Saddle	Black gel
Seat post	Alloy with anti-theft locking system
Mudguards	Full plastic mudguard with custom logo
Electrical system	
Display	LEDS with battery level and 3 level of assistance
Controller	Sin-wave BLDC controller
Sensor	Integrated pedal sensor
Lights	powered by ebike battery
Front light	Spanninga micro FF
Rear light	Spanninga Vega
Battery	36V 11Ah or 14.5Ah Lithium battery direct connection to charging station

