

# Bike locking with Tecomat Foxtrot SBS – Smart Bike Station

IQRF Summit 2017, Praha

Ing. Jaromír Klaban  
Teco a.s.

## Teco:

- name of the company since 1993, with history of predecessors since 1919



1919-1929



1929-1945



1945-1993



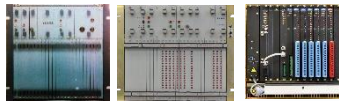
1993-2013



New logo: 2013-2016

## Tecomat:

- family name of controllers with 41 years of experience since 1976



NS-910  
1976

NS-915  
1980

NS-905  
1983



NS-940  
1989



NS-950  
1992



NS-946  
1994



TC-600  
1997



TC-650  
2005



TC-700  
2003-



Foxtrot  
2007-

## Foxtrot:

- first name of youngest member of Tecomat family
- Well matured - since 2007
- Smallest,
- Most powerful



# Tecomat – from Czechia worldwide

Hotel  
Van Der Valk  
Veenedaal,  
Netherlands



Family house  
Düsseldorf,  
Germany



Damly houses  
Ecomodula,  
France



Hotel  
My Story,  
Lisboa,  
Portugal



Czech pavilion  
EXPO 2015  
Milano,  
Italy



Showroom,  
Sao Paulo,  
Brazil



Smart metering  
Gas meters  
Istanbul,  
Turkey



Museum  
Cypriotian  
Theater,  
Limasol,  
Cyprus



HVAC  
Smith Medicals,  
Czechia



Apartmán Tri veže,  
Bratislava, Slovakia



Family house,  
Hungary



AHU by VBW,  
Gdańsk, Poland



Vila Corfu  
Greece



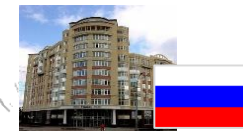
Liberty  
Technology  
Park, Cluj ,  
Romania



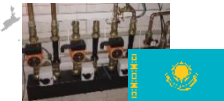
Boiler house for  
Biomass  
Kohila. Estonia



Boiler room  
Lvov  
Ukraine



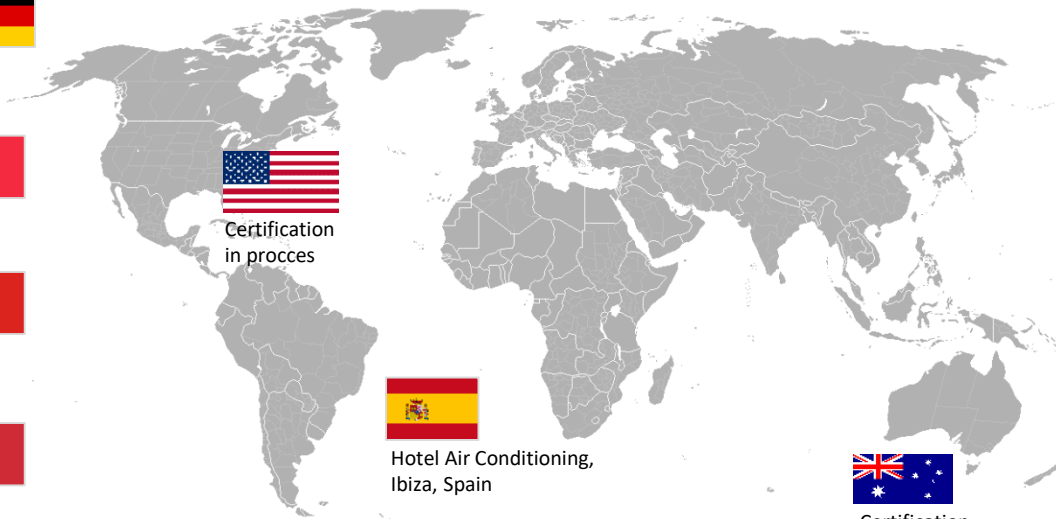
Parking  
Tichin,  
Ekatërinburg  
Russia



Air Conditioning  
Astana,  
Kazakhstan



Samsung,  
LED manufacturing  
Korea



Certification  
in procces



Hotel Air Conditioning,  
Ibiza, Spain



Certification  
in procces



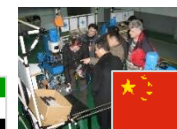
Black Sea Terminal,  
Poti, Georgia.



110 km water pipeline,  
Larestan, Iran



Al Dar sweets,  
AbuDhabi, UAE



Automotive, China



Water turbine  
Fujishida,  
Japan



Hospital, Jeddah  
Saudi Arabia

## Tecomat Foxtrot – Přehled systému

LTE, 3G routery    
 WiFi/ADSL Routery    
 TECO ROUTE Cloud services    
 SmartGrid    
 Microsoft Azure    
 Foxtrot App    
 Tablety    
 Chytré telefony    
 SmartTV    
 Reliance PC, SCADA    
 KNX Switch    
 BAO5 RPI    
 ID-31 Wall Touch    
 ID-18 Wall Touch    
 MOSAIC IEC 61131-3    
 Engineering, service tool

Ethernet / LAN / WLAN (WiFi) / Internet    
 TCP/IP, UDP, SMTP, Sntp, HTTP, MODBUS TCP, IEC-61870-5-104, BACNET/IP, XML, JSON

**CP-1000 / CP-1001**  
SDHC, 32GB     CH1 RS-232

**Komunikační submoduly**

- MR\_0104, MR\_0114, MR\_0124, RS-232, RS-485, RS-422
- MR\_0105, MR\_0106, MR\_0115, 2x RS-232, 1x RS-232, 3x RS-485, 1x RS-485, 2x RS-485
- MR\_0161, MR\_0160, MR\_0152, CAN, 2x CAN, Profibus DP slave
- UC-1205, SX-1181, GSM, M bus, Modem

**IO**

- PX\_7811, PX\_7812, 7DI, 4DI, 3DO

**Základní moduly**

- CP-1003: 8DI, 4DO, 10RO, 8AI, 4AO
- CP-1004: 4DI, 4DI/AI, 6RO
- CP-1005: 6DI/AI, 6RO, 2AO
- CP-1006: 2 DI, 13DI/AI, 10RO, 2DO-triac, 2AO
- CP-1008: 1 DI, 11DI/AI, 10RO, 4AO
- CP-1972.xx, CP-1970.xx

**PLC I/O Rozšiřující moduly**

- IB-1301, OS-1401, IR-1501, IT-1604, IT-1602, OT-1651, 12DI, 12DO, 4DI, 8RO, 8AI, 2AO, 8AI, 2AO, 4AO

**Polohovací moduly**

- GT-1753: 1-4 osé polohování
- UC-1203, UC-1204, SC-1101, SC-1102, SC-1103, SC-1111, OpenTerm, MP bus, RS-232, RS-232, CAN, RF, RS-485, RS-485, Wireless MBus

**Komunikační moduly**

- ID-14, ID-17, ID-31 - nástěnný, ID-32 - vestavný, 4" dotykový panel, ID-36: 10" vestavný dotykový panel

**Operátorské panely s klávesnicí/dotykové**

**CIB - Common Installation Bus, C-Fox®**

**R-Fox® 868MHz**

**Další dostupné designy:**

- OBZOR, legrand, GIRA, B. Schneider Electric, ABB, bticino, JUNG

Všechny obchodní značky náležejí jejich vlastníkům. Všechna práva vyhrazena.

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**C-OR-0011M-800** 11RO    
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**C-DM-0402M-RLC** 2x 3SmVAc, 230V AC/500VA    
**C-DM-0006M** 6x 5SmVAc, 6x 5SmVAc    
**C-DM-0008M** 8x 5SmVAc, 2x RO    
**C-DM-0002M** 2x AO 0-10V, 2x AO 0-10V, 2x AO 0-10V, 2x AO 0-10V    
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**C-EM-0401M** 31x1 elektroměr    
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**C-BS-0018M** DTVNEM-1 / CB

**C-WS-0200R** krátkodobě dvojitá čítko    
**C-WS-0400R** krátkodobě trojitá čítko    
**C-WS-0500R** ID Glass    
**C-WS-0600R** ID Glass    
**C-OR-0000** 8M, 8B    
**C-OR-0011M-800** 11RO    
**C-JC-0000M** 6 ovladačů 3AI/3DI, 6RO, 3AO    
**C-HM-0308M** 3AI, 8DI, 3AI, 8DI, 9RO, 2AO    
**C-HM-1113M** 3AI, 8DI, 19RO, 2AO    
**C-HM-1121M** 3AI, 8DI, 19RO, 2AO    
**C-DM-0402M-RLC** 2x 3SmVAc, 230V AC/500VA    
**C-DM-0006M** 6x 5SmVAc, 6x 5SmVAc    
**C-DM-0008M** 8x 5SmVAc, 2x RO    
**C-DM-0002M** 2x AO 0-10V, 2x AO 0-10V, 2x AO 0-10V, 2x AO 0-10V    
**C-IL-0064M** 64x DI/DO/DSI    
**C-EM-0401M** 31x1 elektroměr    
**C-BS-0018M** DTVNEM-1 / CB

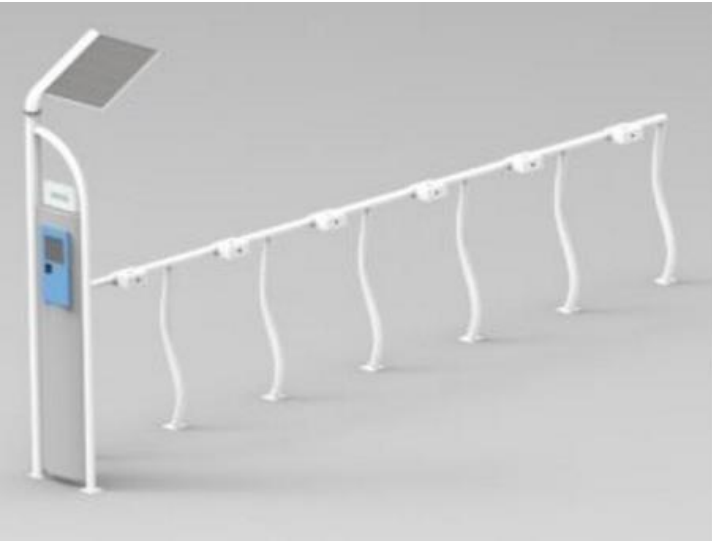
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**C-DM-0402M-RLC** 2x 3SmVAc, 230V AC/500VA    
**C-DM-0006M** 6x 5SmVAc, 6x 5SmVAc    
**C-DM-0008M** 8x 5SmVAc, 2x RO    
**C-DM-0002M** 2x AO 0-10V, 2x AO 0-10V, 2x AO 0-10V, 2x AO 0-10V    
**C-IL-0064M** 64x DI/DO/DSI    
**C-EM-0401M** 31x1 elektroměr    
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**C-DM-0002M** 2x AO 0-10V, 2x AO 0-10V, 2x AO 0-10V, 2x AO 0-10V    
**C-IL-0064M** 64x DI/DO/DSI    
**C-EM-040**

**SBS** SMART BIKE  
STATION



**S B S** SMART BIKE  
STATION



- Electronic safety stand, enabling the bicycle to be secured by means of digital identification of the person.
- Bike stand with electric lock
- Locking and unlocking by wireless card or RFID tag or NFC tag
- Communication with PLC Foxtrot base and from there to the cloud
- Application on smart phone

**S B S** SMART BIKE  
STATION









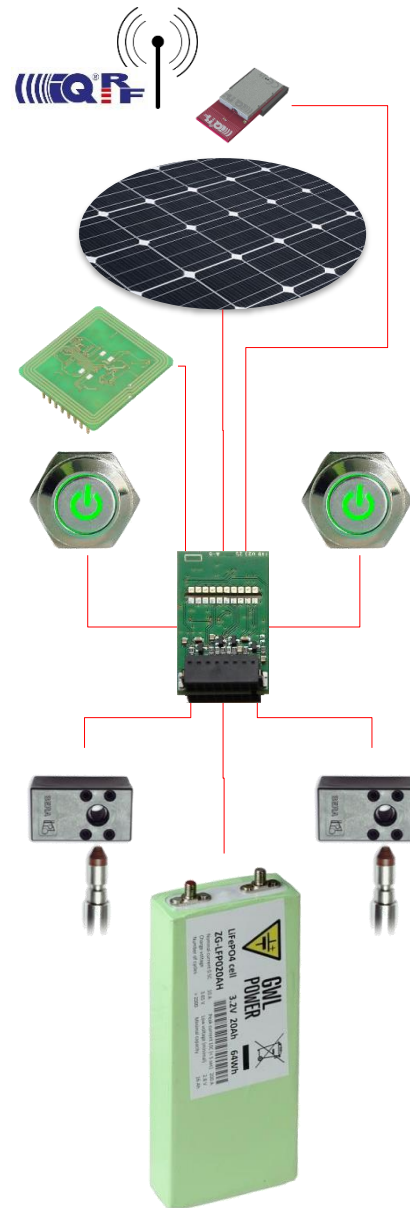


- Autonomous smart stands with its own solar charging, internet access and reader of all standard contactless cards
- Connectivity of solutions and tariffs with the current offer of time tickets in the city
- Easy connectivity of multiple cities and locations
- Access to proprietary city applications on their own cards, if necessary.
- Debit card tokenisation can be implemented

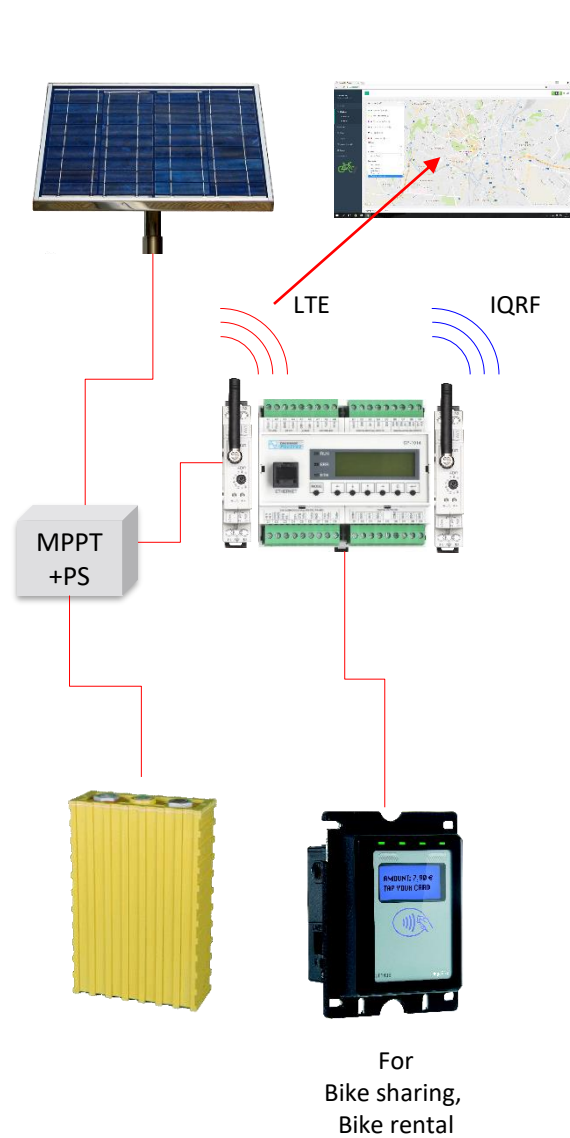


- Delivery with a base - possibility to deploy the stand for a limited time to a specific location without the need to anchor into the ground.
- Quality technical components from Czech companies.
- All activities, including the energy state of racks, available online.
- Access to data via web services.

# Internal structure of teh bike station

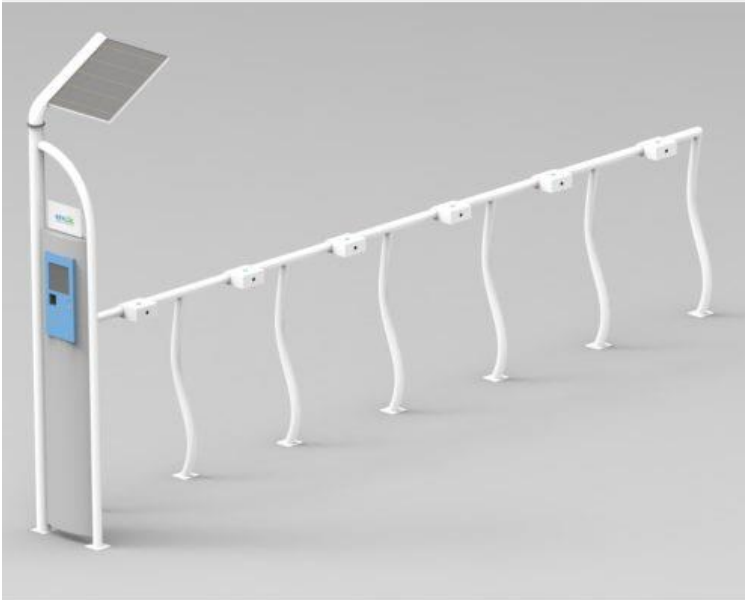


- Application specific electronic module integrates:
- Local functions
- IQRF communication module
- PV panel
- LiFePo battery to survive most cloudy period.
- RFID/NFC tag reader
- 2 buttons to wake up module and define side of the bike holder
- 2 locks of 2 chains

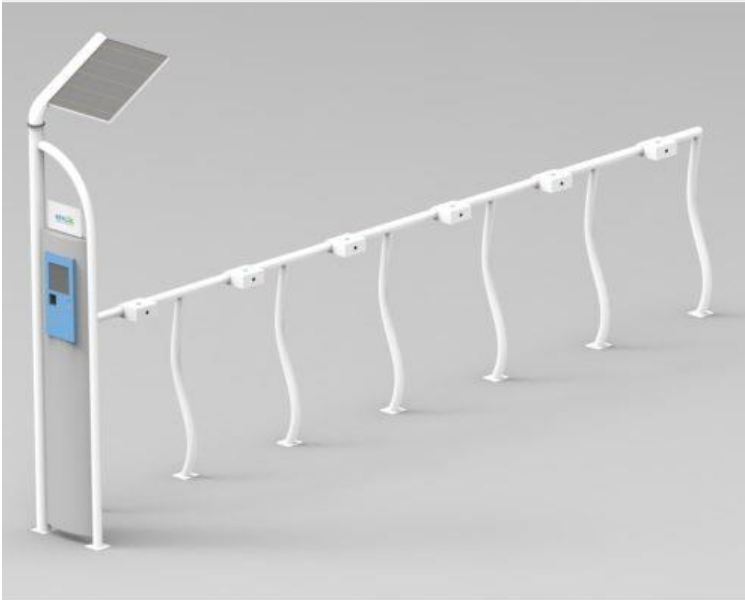


**S B S** SMART BIKE  
STATION





- 2 versions: for classic bikes and electric bikes.
- Kiosk fitted with a payment terminal.
- Bike rental is provided via a credit card, without the need for online registration.
- When the loan is booked the maximum price of the loan + deposit,
- The bill takes place after 24 hours
- Possibility to accept prepaid tariffs on city and payment cards



- Automatic bike recognition on return
- Online reporting of occupancy, use of stands and not returned leases
- Online tracking of bike motion and position
- Web services for integration into third-party applications





- Battery mounted directly in the frame tube
- Lithium-ion battery
- Engine power 250W
- Maximum speed 25km / h
- Driving on a single charge 40-60km
- 21 combinations of Shimano gears
- suspension fork
- Disc brakes TEKTRO
- LCD display
- Charging 4-5 hours
- Battery life of 600 charging cycles
- Load capacity 120kg

Smart Bike Station x

Zabezpečeno

Example user  
Example position ▾

- Status
- Stojany
  - Seznam
  - Mapa
- Zámky
- Kola
- Mapa
- Karty/Uživatelé
- Práva
- Účetnictví

**Mapa stojanů** Zavřít

- Volné zápůjční 2
- Volné soukromé 2
- Obsazené zápůjční 1
- Obsazené souromé 0
- Neaktivní 2
- Problémové 1

Město: Brno

Partner: Město Brno

Zapůjčitel:  
nevybráno  
nevybráno  
Nejkola a.s.  
Firma s.r.o.  
**Prázdná duše s.r.o.**

Mapa legend:  
--- SIŤ A ● SBS A ● SBS A+B --- SIŤ B ● SBS B

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7:26  
6.4.2017



**SBS** SMART BIKE  
STATION



- Possible compatibility of SBS between cities.
- The possibility of connecting public and private SBS (restaurants, sports clubs, employers)
- A strong pro-action element within sustainable mobility in cities.
- Problem solving:
  - 72% of stolen bicycles are out of public space.
  - Only 0.5% of the value of stolen bicycles is returned to the owner.

**S B S** SMART BIKE  
STATION



Thank you for attention!