Information newsletter for users of Teco a.s. systems

March 2016

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TECO Info

Tecomat Foxtrot at the EXPO 2015, Milano in OEM design made for Regulus

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40 years of tradition in PLC system manufacturing

Editorial of the Company Director

This year marks the 40-year anniversary since the beginning of a continuous development and production of PLC control systems manufactured in Kolín, Czech Republic and supplied since 1989 under the brand name TECOMAT. Although many forecasters predicted the end of the era of programmable machines when PCs began to take over, the reality is just the opposite. The fact is that this control system category is being systematically developed and increasingly applied in various fields, where our company plays an important role. Others predicted that with the domestic market opening, which occurred during the early nineties, we will not be able to handle the global competition and will go down. That is not

what happened either, as we managed to remain successful at our "domestic playground" and gradually introduced to the market nine generations of programmable logic controllers and even managed to turn the trend around and begin exporting to various parts of the world. Recently, we have opened our office in Dubai which focuses on the Middle East, and we are currently in the process of obtaining a certificate to export our goods to Australia. We have delivered our first systems to Jordan and Saudi Arabia, and we have trained our distributor in Kuwait.

In all these markets, including our own domestic market of course, the last generation of compact controllers Tecomat Foxtrot is doing really well. We have manufactured more than 20,000 various designs. Thanks to the outstanding performance of these systems they are being increasingly applied in various fields even where automation systems have not fully penetrated yet. Therefore, this purposeful and targeted development of an open and flexible system utilizing free programming and capable of solving the most challenging tasks in various areas of automation, including the increasingly popular areas such as Smart House, Smart Grid and Smart City, is now paying off.

Our great economic results are closely related to these facts. Once again, I happy to report that 2015 was successful in all aspects. In comparison, the year-to-year turnover has increased by 10% and exports by 33 %. We have received AAA certificate for the second time – the highest credibility rating issued by an independent rating company Bisnode. Therefore, we have confirmed our place in a highly exclusive group of Czech companies that have been complying with the highest credibility and reliability criteria for the past ten years. In February, we were among the first ones who were able to successfully pass the certified quality management system in line with the revised ISO 9001: 2016 standard. Similarly, 20 years ago, we were the second electrical engineering company in the Czech Republic, which ever qualified for the ISO 9001 certificate. All these great achievements represent a huge commitment for the future and prove to our customers that they have chosen the correct path thanks to utilizing our TECOMAT control systems product line, which is continuously evolving and will be evolving in the future to keep the pace with other leaders in the technological world.

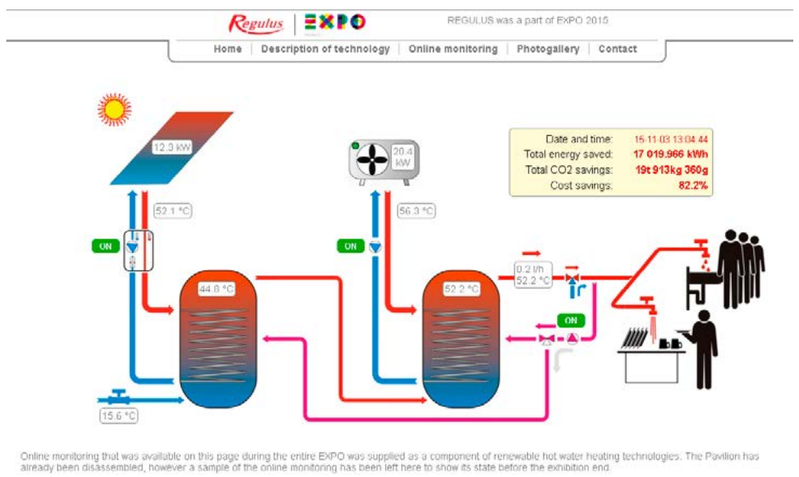
Tecomat Foxtrot at the EXPO 2015, Milano

in OEM design made for Regulus

Hot water for the Czech pavilion at the EXPO 2015 was supplied by Regulus. We are proud of the fact that Regulus used our intelligent controller IR-30 for the management of solar panels and heat pumps. It is an an OEM version of Tecomat Foxtrot system, for which Regulus created its own software dealing with a wide range of heating schemes.

The EXPO 2015 fair was held from May to October 2015 in Milan, Italy. The focus was on key issues such as a sustainable development including global opportunities for presentations and comparison between traditional and innovative practices used in the food production and cultivation. The main ideas dealt with an important question how to make sure that all inhabitants of the planet have enough high-quality foods and drinking water.

The Czech National Pavilion at the EXPO 2015 in Milan was a modular building made by a Czech company called KOMA MODULAR located in Vizovice in accordance with the design created by an architectural studio CHYBÍK + KRISTOF Associated Architects. On 16 June, Teco actively participated during the event called the Day of Czech Water Treatment Technologies which was organized by the Czech Embassy in Rome along with the CzechTrade office in Milan and also in cooperation with the Czech Water Alliance, where Teco is a member. Further, at the EXPO 2015 Teco was also involved as a subcontractor in the delivery of the IR-30 system (OEM version of the central Tecomat Foxtrot module) for Regulus, which installed an economically efficient and environmentally friendly water heating system for the entire Czech Pavilion utilizing thermal solar panels combined with a heat pump. More information available at the Regulus website – www.regulus.cz.



Online monitoring that was available on this page during the entire EXPO was supplied as a component of renewable hot water heating technologies. The Pavilion has already been disassembled, however a sample of the online monitoring has been left here to show its state before the exhibition end.

Hodnocení nejvyšší důvěryhodnosti

Teco managed to keep AAA rating

In 2015, we have received the AAA certificate again – the highest credibility rating issued by an independent rating company Bisnode. Therefore, we have confirmed again our place among a highly exclusive group of Czech companies that have been complying with the highest credibility and reliability criteria for the past ten years. This certification is a very positive evaluation of many years of work, but at the same time a commitment for the future. Thank you!

WE TRAIN at home and abroad

The increase of our business expansion is closely related to the growth in related customer training courses offered to customers who are beginning to use our control systems or try to improve their applications. We regularly conduct an initial training in Kolín as well as specialized training for designers of our control systems. We also provide online introductory training for our foreign partners, where they get familiarized with the hardware structure of our control systems and are introduced to programming. Individually, we also provide training sessions and consultations based on the current requirements of our customers, either directly at our company or at customer facilities, both domestically and abroad.

Customers training in Istanbul, Turkey – June 2015.

You can learn about regular training in advance at our webpage www.tecomat.cz. Individual training and technical consultations may be discussed and arranged with Ing. Urban – urban@tecomat.cz.

Intensive series of training sessions for customers in the Middle East

Thanks to newly open office in Dubai, we have significantly become closer to our customers in the Middle East region. Already in the middle of the year, we have organized the first advanced training in Istanbul, Turkey. This year an entire series of regular training sessions will take place in Dubai. In addition, it is also possible to agree on individual training in the region with our colleague in Dubai Mr. Anas Lutfim – Lutfi.a@tecomat.cz.

Teco opens an office in Dubai

We are proud to announce that starting on July 2015 Teco a.s. will be permanently present in the Middle East. We would like to welcome Mr. Lutfi in our sales team. Mr. Lufti manages our new office in Dubai, which is situated in the commercial zone called Jebel Ali. Mr. Lufi is responsible for sales and technical support for distributors and for technical support of projects that are being implemented not only in the Gulf countries, but within the entire Middle East.

Mr. Lutfi is an experienced salesman with professional backgrounds in CCTV and security systems. He is ready together with his team to provide technical services and sales support to distributors in the region, but also support Teco customer projects that are being implemented in the Middle East and which are utilizing Tecomat control systems.

In line with this promisingly developing business direction, Mr. Lutfi has already organized a training focusing on Tecomat Foxtrot system, which took place in late July in Istanbul.

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Teco presents

In 2015, we have expanded the number of exhibitions at home and abroad. The number of exhibitions have already exceeded the number twenty. In addition to countries where we virtually display our products permanently, we have added the following countries: Azerbaijan, Brazil and France. Let us look at some of them.

Energoprom – Dnepropetrovsk, Ukraine

Země živitelka Fair – České Budějovice

ElectroTechnica & IT – Pardubice

Caspian CTE – Baku, Azerbaijan

Hi-Tech Buildings – Moscow, Russia

Elo Sys – Trenčín, Slovakia

Casacor – Sao Paolo, Brazil – products presented by our partner KERK Solutions

Interclima – Paris, France

Construma – Budapest, Hungary

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Infotherma Ostrava

Automaticon – Warsaw, Poland

Stavotech, Olomouc

AquaTherm – Almaty, Kazakhstan

ISE – Amsterdam, Holland

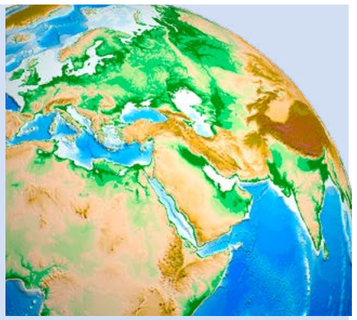
IBF – International Building Fair – Brno

Amper – Brno

Coneco – Bratislava, Slovakia

New partners abroad

France, Jordan, Saudi Arabia, Kuwait



During 2015, we have added into our portfolio of major foreign partners and distributors customers from France, Jordan, Saudi Arabia and Kuwait. We will take a closer look at some of them in this edition of TecoInfo.

INTRODUCING OUR PARTNERS

PORTUGAL

InfraSecur

Main InfraSecur office in Lisbon, Portugal.

InterSecur is a Portuguese company, a part of the INFRA Group, which connects three technology-oriented companies involved in the construction and building technology market. InfraSecur focuses on safety and security, building automation and energy management for medium-sized and large projects, it is headquartered in Portugal and has offices in Lisbon and Porto and also two independent branches in Angola and Mozambique. All branches are independent business units, focusing on a specific local market.

InterSecur is a partner certified by major suppliers of technologies who deliver technologies for the relevant product area and uses our management systems Tecomat Foxtrot for its own control needs. It is a company of professionals with many years of experience in system engineering proven by many years of successful applications in major projects in various countries.

KUWAIT

Gulf Automation Systems Co.

Training of Gulf Automation Systems engineers at the Teco a.s. headquarters.

Gulf Automation Systems has been providing project automation services for the Kuwait oil and gas industry for many years and offers a team of great professionals. After a debate with engineers, Gulf Automation Systems decided to use our control systems TC700 for their projects implemented in the oil industry in Kuwait and particularly focusing on building automation. This area is a very interesting field in Kuwait and engineers from Golf Automation Systems decided to use our control system Tecomat Foxtrot. At the beginning of 2016, an advanced training of engineers from Gulf Automation Systems took place at our facility and we would like to wish them much success in the application our control systems.

NEW PRODUCTS

CIB module controlling Winston LiFePO4 battery charging and discharging

In order to utilize maximum capacity of LiFePO4 battery cells while ensuring full protection of battery cells you must have a system that monitors the status of each battery cell. For this purpose, we have designed and introduced to the market a module that is used to control the charging and discharging process of LiFePO4 batteries (BMS – Battery Management System). This module consists of two parts. The main module BM-C-0202 (master), which stores all the available information and control commands for the entire set of battery cells, is connected directly to the CIB bus. Submodules on individual battery cells are connected to this main module. B-BM-0201X.01 has been designed for Winston batteries with capacity from 40 Ah to 1000 Ah.

C-BM-0202 module is equipped with an input which is used to measure the operating current of batteries with terminals allowing connection of modules to individual cells of B-BM-0202X, and with two relay outputs allowing an emergency disconnection of batteries and the charger, independently of the control system.

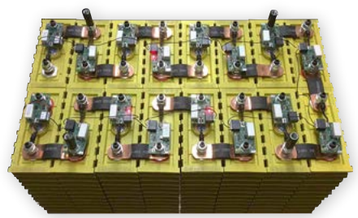
It measures temperature and voltage of the cell, communicates with CIB module C-BM-0202M via a special bus and in the feedback it controls load resistance for balancing the cell during charging and discharging.

B-BM-0201X-01 submodule is mounted directly on each battery cell and it measures the temperature and cell voltage, communicates with CIB and the module BM-C-0202 through a special bus, and controls the load resistance in order to balance the cell during charging or discharging. Batteries with LiFePO4 technology offer today the best solution and not only for stationary energy storage. When used regularly to store surplus energy supplied by photovoltaic plants they achieve and operational life (which represents a decrease in the capacity down to 80%) of approximately 6,000 to 8,000 cycles. They are resistant to freezing temperatures and do not require any special installation locations (may also be installed in residential premises). Winston batteries offer a very good solution in terms of price and quality, and are widely used and have been tested in many applications.

Bus module CBM-0202 is a master of all sub-modules on each LiFePo cell.

There are two types of submodules B-BM-0201x. The end submodule is placed on the first and last cell and the continuous modules are placed on each cell inside the battery connected in series.

* CIB Common Installation Bus ®



All submodules are mounted under the same nuts, as copper links between cells. Then they are connected with one communication wire. Both ends of this special communications line ends in the Master C-BM-0202.

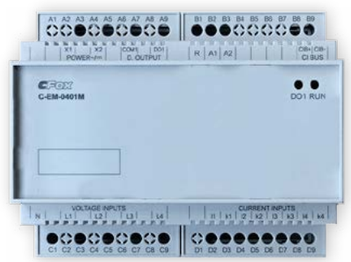
RGB addressable chip, direct control module

Rather atypical peripheral module on the CIB bus is a new controller module C-DM-0001B-SL designed for direct control of addressable LEDs WS2812B, which may be used either directly as a typical LED strip or in various LED combinations (arrangement into a matrix, etc.). The module allows you to "play" files stored on a micro SD card. The files contain data for each RGB chips allowing you to adjust the individual colour and intensity of each RGB chip, or you may send a sequence of RGB data from the file in an adjustable interval. You may create dynamic lighting effects in a line, and a simple video – if the strip is arranged into a matrix, or a space light effects based on the arrangement and connection of individual LEDs.

In total, one module may control up to 5000 RGB chips connected in one row. At the same time it is possible to synchronize multiple modules using a special signal, for example when you need to create assemblies containing more than 5,000 chips.

Quick measuring of production process and consumption of electric power, C-EM-0401M 3-phase electrical meter on CIB bus

For fast, accurate and complex measurements of 3-phase power grids, that is measurements of phase voltages, active or reactive currents, power factors, harmonic distortion frequencies, etc. in a low voltage power grid (230/400 V AC) and within the range of rated currents from 15 A to 300 A (depending on the electrical meter configuration), we have designed a new electrical meter C-EM-0401 which may



be connected directly to the CIB bus without any additional converters.
The electrical meter is also equipped with voltage and frequency protection used to control PVP, HPVP (photovoltaic plants, hybrid photovoltaic power plants,) and cogeneration units. It is equipped with a quick relay output which allows direct implementation of voltage and frequency protection systems. Values of the monitored undervoltage, overvoltage, underfrequency and overfrequency, including reaction times may be configured in the meter parameter setting. The recovery time – after the cause for the activation of the protection system has been repaired or removed is set in similar way. Upon request, the electrical meter C-EM-0401 may be designed with different maximum measured current range (from 5 A to 600 A), and with two current transformers options (through hole or split-core/clamp-on design).

CIB module used to connect the weather sensors, rainfall detectors, water level sensors and icing sensors

The new module C-IS-0504 which is being designed right now is equipped with an optimized configuration system allows direct connection of measuring sensors mounted on a building roof (rainfall detector, anemometer, wind direction sensor). It may also be used to control de-icing of outdoor surfaces and gutters and for monitoring water levels in reservoirs (irrigation systems, etc.).
The module is equipped with 2 inputs to accommodate optimum measuring of conductivity using alternating current, in particular, for detection of rainfall, water level sensor, and evaluation of icing sensors which monitor outdoor surfaces and gutters. The other 3 inputs are used for temperature sensors and impulse sensors (wind speed, meter, gas meters, etc.). The module is equipped with actuators – 3 relay outputs and one 24 V PWM output which allows you to directly control and to supply power to the heating system of a rainfall detector. These relay outputs may control (turn On and Off) the heating system of icing sensors or they may control heated defrosting cables

Library of functions designed to manage recovery units Atrea equipped with digital regulation system

In order to accommodate integration of recovery units Atrea fitted with its own digital control system, Foxtrot is now offering AtreaLib library. Communication between Foxtrot and Atrea heat recovery unit is done through LAN using Modbus TCP protocol. Commands which control heat recovery units are supported by the following units: EC4/ECV4, Flexi, R4 and Multi. One basic Foxtrot module may control several tens of recovery units of this type. The following functions are supported: monitoring – for example inputs and output statuses, bug reporting, current unit status, current performance, ventilated zone, etc, but most importantly, you may control the connected units. You may for example control the ventilated area, number of persons, seasonal settings, cooling, preheating settings, by-pass temperature parameters, etc...

Mosaic extended with open source OSCAT libraries

In the middle of 2015, an open source library OSCAT (Open Source Community for Automation Technology) was released. These libraries are put together by an independent community of users users in Germany independently of the PLC manufacturer and are available at www.oscat.de. The 560 functions currently available and functional blocks available in Mosaic, were added with two new libraries OSCAT Basic 3.3 and OSCAT Building 1.0 plus additional 600 ready and debugged functions. These libraries demonstrate the openness of Tecomat system and consistent compatibility with the IEC 61131.

ID-36 – 10” touch screen panel

At the For Arch 2015 fair, we have introduced additional touch screens from our new line. This time it is a large 10-inch screen with 800×600 resolution. Although it was primarily designed for industrial applications and control panels, its clean design also attracted those interested in home automation. The panel is designed both for compact Foxtrot and for TC700. It uses MiniBrowser as a basic firmware which interprets the built-in Foxtrot website. From this point of view it is also compatible with its predecessor ID-18/28 (5 inch) and the newer ID-31/32 (4 inch).

The new screen automatically scales the pages so they fill the screen area properly without any additional programming work, even though the website was originally created for a different resolution. A demonstration was shown at the exhibition using a live image from 1Mpixel IP camera (see fig.) The touch screen uses the resistive principle, which require an active finger pressure at the required spot. This is preferable for an industrial use, because a finger pressure on the given key confirms the intention of the operator to take the action – unlike capacitive screens which basically respond to any touch, making them vulnerable and prone to respond to any unintentional touch. ID 36 screen is usually connected to Tecomat via Ethernet. However, you may also use RS-485 cable, which is not as fast, but in some cases may eliminate the need to install Ethernet switch. The screen is powered either by an external 24V DC or directly from the Ethernet connection, because the screen supports PoE feature (Power over Ethernet)

iGlass touch switch designed to be used with Foxtrot

We are introducing yet another expansion of our wide assortment of wall-mounted controls connected with a two-wire CIB bus (Common Installation Bus®). At the For Arch fair we have introduced touch switches designed in Italian iGlass style. These control components are available in a square format 80×80 mm, with one, two or four buttons, or in a rectangular format 120×80 mm with up to six buttons. Both formats also offer controls allowing continuous adjustment of the given value by dragging the ring in the middle of the display around. Basic design features include blue-backlit control elements on a black background. Upon request these switches may be delivered with other colour combinations or even with individually selected icons. These icons make the navigation between individual buttons easier. This minimalistic and original timeless design including glass touchpad is offered to architects and investors who are looking for an individual and luxurious accessories for interiors utilizing system installations based on the popular Tecomat Foxtrot system.

Touch controllers in iGlass design are available in black and white colour and in European dimensions...

Wall-mounted rotary controller for Foxtrot

Another addition to our range of bus components used in smart installations Foxtrot is a rotary knob connected directly to the CIB Common Installation Bus®. This controller is mounted on a wall and you may use it to set the desired value by rotating the knob and confirm your selection by pressing. As the first introductory design line that is being introduced to the market, we have selected the LOGUS90 line and most of product lines of Obzor and ABB. Just as other sensors and actuators on CIB bus, the actual function of this controller depends on the final programming. Therefore, it may used for light dimming or adjustment of light colours or to correct the temperature or volume levels of the assigned audio output. Rotating the knob to the left or right along with the push feature is natural and intuitive and the fastest way to enter desired values. Based on great first responses we may assume that this new controller will soon become an integral part of most system installations based on Foxtrot.

Rotary knobs in various designs are new components designed for the CIB bus system.

Tecoreg TR200 and Tecomat TC500.

Do you remember them? Now you may upgrade to Foxtrot easily.

In the mid nineties we came up with a panel-style PLC TC 500 and TR200. These were often used in boiler rooms and heat exchanger stations and needed a relatively large hole. Even though our generation of Foxtrot does not include such PLC panels and the separate display ID-14 requires a smaller hole, it is now possible to upgrade these already discontinued models and use end devices again with a new modern system. We are introducing to the market a new model registered under order number TXN 054 33.01. It is an operator panel ID-14 in a frame, which have the same dimensions and uses the same mounting screws as the TC500 and TR200 panels. Foxtrot may be mounted to the rear of the ID-14 panel, which may be equipped with a short DIN rail. From the pictures you can see that this combination was a successful one.

Comparison of the original TR200 and TC500 with the new ID-14 design in the TECOREG option.

Teco cameras expand the range of the application of Tecomat systems

Users of Tecomat systems have long been using a feature called "Image from the IP camera" that can be uploaded to any webpage presenting the given project. It is worth mentioning that it has been possible for a long time now to place 4 such objects on one webpage and create a simple surveillance system. It has always been our effort to offer universal solutions, so we decided to use a quick slideshow of still images offered by the majority of cameras through a web interface. This solution is compatible with all browsers. So far, we have been avoiding streaming because it requires installation of certain plug-ins for the given web browser, which makes this task more difficult.

To answer many questions we keep receiving and asking us what cameras we recommend, we continue to give the same response and that is, any camera that provides still images in the highest possible frequency. Nevertheless, we did a survey of camera suppliers and found a direct technical and business contact of a suitable camera manufacturer. Together we debugged the firmware version specifically for Foxtrot. This version utilizes an optimal bitrate allowing the webpage to display pictures from 4 cameras smoothly and in real time, essentially in the same way as stream. From here, we took only one step further and were able to introduce Teco brand name cameras. The fact that you may continue using any camera with Foxtrot remains the same, but you the user has to manage that alone. However, if you want to guarantee a mutual compatibility you may now use Teco cameras. As the manufacturer of these cameras we guarantee compatibility and easy setup.

Our basic offer includes cameras with resolutions 1.4 megapixels (1240×1040) and 2.1 megapixel (full HD) in several basic designs, which are shown on the pictures. For larger projects, we are ready to pick from a wide range offered by the primary manufacturer, or discuss with the manufacturer the possibility to develop special or new features. Projected sales and deliveries of Teco cameras are shown in the 2016 second quarter statement. We are accepting orders right now.

Brief overview of Teco camera design

Antivandal Dome 1,4/2,1 MPx

Box 1,4/2,1 MPx

Mini Dome 1,4/2,1 MPx

Panoramic 1,3 MPx

Bullet, Fibre optic 1,4 MPx

PTZ Outdoor 2,0 MPx

Bullet Outdoor 1,4/2,1 MPx

New built-in OEM Foxtrot CP-1972

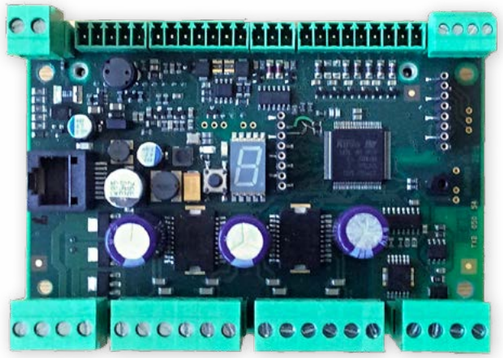
We are launching a new OEM Foxtrot line. It is a newer and smaller "brother" of the last year's new product CP-1970. It is designed for recurring product deliveries to customers. For your information and to have better picture of the given combinations of inputs and outputs connected to terminals along the perimeter, see the brief overview below.

Inputs
- 2× AI/DI – 0-20 mA, potential-free contact
- 4× DI, fast counter function, IRC sensor

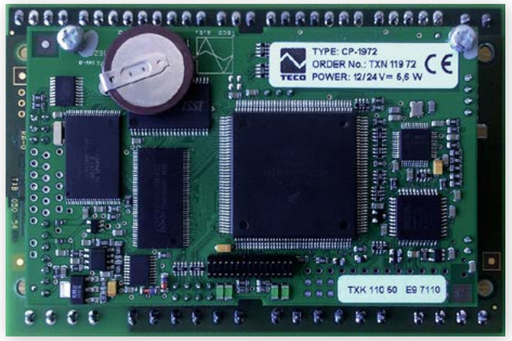
Outputs
- 2× AO/10 V
- 3× DO/3A PWM – e.g. LED strip dimming function
- 8× DO/1A configured as half H-bridge to accommodate connection of stepper motor driver, or for a direct control of DC motor or stepper motor
- 3× DO/3A transistor output

Communication ports
- CH1 RS-485
- CH2 – communication submodule slot
- ETH

Others
- power supply 12 or 24 VDC
- optional audio module (MP3 file playback from inserted microSD card), output 2× 10 W directly to loudspeaker, or in parallel also line output for external amplifier



New OEM Foxtrot CP-1972 – input and output side with connectors



New OEM Foxtrot CP-1972 –side showing the processor board and specification label

NEW ARRIVAL

Microsoft Azure

Connect your Foxtrot into a cloud with Microsoft Azure cloud services

The new feature that is being prepared as a part of the installation of Mosaic 2016/1, is a new communication library of functions that allows you to connect to the Microsoft Azure cloud. You may share and process your own data without the need to use and maintain a database. Microsoft keeps investing into continuous development of the functionality and reliability of its universal Azure cloud storage and now, users of Tecomat Foxtrot and TC700 may start using and benefit from these functionalities offered by this platform thanks to the new AzureLib library. The library is described in this documentation.

Why write into a cloud,

when Tecomat Foxtrot system has its own local storage? And not only one but two! Quick Databox 0.5 MB and large SD card storage. Each of these two repositories/storage units has their primary purpose and offer benefits. However, together with cloud storage they supplement each other perfectly. Quick Databox with unlimited number of writings captures data at every cycle. The SD card can store up to 32 GB, but after 100 thousand writings it becomes unusable. The other integrated function of Datalogger unifies the advantages of both repositories/storage units. It will record the data to the SD card once every day. Foxtrot may use these data, stored in local memory systems, any time and it may use these data to make decisions and to control subsequent actions.

If you need to store even more data, you do not need to store them on your SD card. If your Foxtrot is connected to the Internet, the new communication feature offered by AzureLib will write your data in the cloud on regular basis. If the Internet connection is lost and later resumed do not worry. This intelligent function deals with this issue very well and will combine benefits offered by all three storage systems. Data are continuously stored locally, and after the connection is restored, the system will add the entire missing data sequence into the cloud. This makes Foxtrot a truly robust telemetric system suitable for the most demanding and complex measuring and control tasks. As a new feature, AzureLib also allows storage of entire collections, created by the already mentioned Datalogger, on the Azure cloud.

A suitcase loaded with Foxtrot

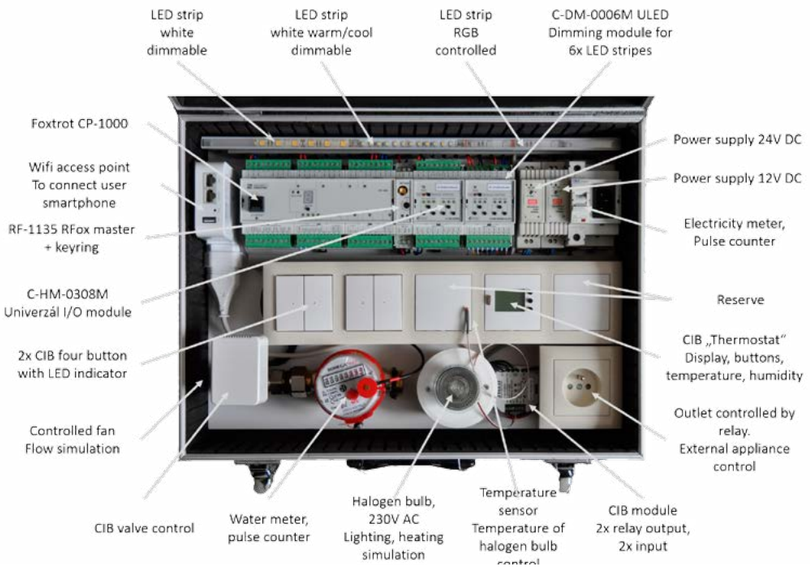
First steps with Foxtrot may be accompanied by a training suitcase. Teco uses the suitcase for both regular training and on-demand training sessions. For example, interested customers from colleges or even universities may decide to use it as appropriate and preferable classroom equipment. When compiling the contents of the suitcase an emphasis was put on the clarity and reality of its equipment and on the option to create wide range of opportunities and simple training tasks including more complex and attractive combinations. That is why the contents of the suitcase may appear somewhat rudimentary and simple. Connections between modules are visible allowing you to reach connection points/terminals. The suitcase equipment is mounted on a base plate, which may be removed allowing you to save space on your desk if necessary.

In a one row the suitcase shows modules installed on DIN rail in a switchboard – a basic CP-1000 module with two CIB master buses. It also includes a combined module C-HM-0308 with three universal inputs for analogue or digital signals, six relay outputs for loads up to 5A and two analogue outputs. This module was primarily designed to allow you to connect your own devices and to further expand the range of training tasks. There is also the C-DM-0006-ULED module which may be used with up to six LED strip dimming channels. All outputs are used up and are connected to three sections at the top. One section is a simple white band. The other section includes a strap made of a pair of hot and cold LEDs where you may practice changes in the temperature of final white light. The third section is a RGB strip which is used to practice the application of light colours. DIN rail also includes RFox radio network master module. The suitcase is ready to practice bus and wireless installation combinations. The DIN rail end is fitted with 12V DC power supply source to power LED light strips and with 24V DC powering the entire control system. There is also an electric meter on the 230V DC side, where you may practice tasks focusing on electric power consumption measurements. The suitcase circuit breaker is not only a safety measure, but it may also be used as the main power switch.

The middle row in the suitcase serves as an example of modules installed on the CIB bus designed for interior use. In the five-unit frame there are 2 short-press buttons, 2 double-colour LED indicators and 1 built-in thermal sensor. There is also a "digital thermostat". The module is fitted with a combined temperature and humidity sensor, a large matrix display capable of displaying two three-digit numbers, a field showing physical units

of displayed numbers and with two fields showing optional icons. One of them marks a function of three buttons. The functionality of keys and how they are displayed on the screen may be programmed. Therefore, you may clearly see that that the range of possible exercises and tasks focusing on simple man-machine interactions has grown significantly here. Two fields in the five-unit frame are open and allow you to add custom-made modules from the standard line of CIB bus wall modules. As a perfect candidate you may see the voice module with a loudspeaker which may be used to practice controlled audio messages or different alarms and alarm clock tones.

Another device you may consider to add to your suitcase may be a rotary element for continuous control of dimmers, colours or for volume control. In the bottom row you will find a real radiator valve controlled by the head installed on CIB



All contents of this suitcase, including complete Foxtrot installation and controlled devices, may be removed and easily placed on a table. Computer or mobile phone may be connected via WiFi. The suitcase is connected to a computer or to LAN with standard RJ45 cable.

bus and behind the valve there is a water meter with pulse output. In addition to the electrical meter mentioned earlier, we have here an additional opportunity to present a measuring process of another media. The water meter is powered by a small fan. A control valve is installed in the airflow offering another possibilities for training tasks, for example, an intervention of an alarm system in case of permanent water flow, or a regulation of the flow rate to achieve the given value etc. There is also C-OR-0202B module with two 16A relay outputs and two universal inputs.

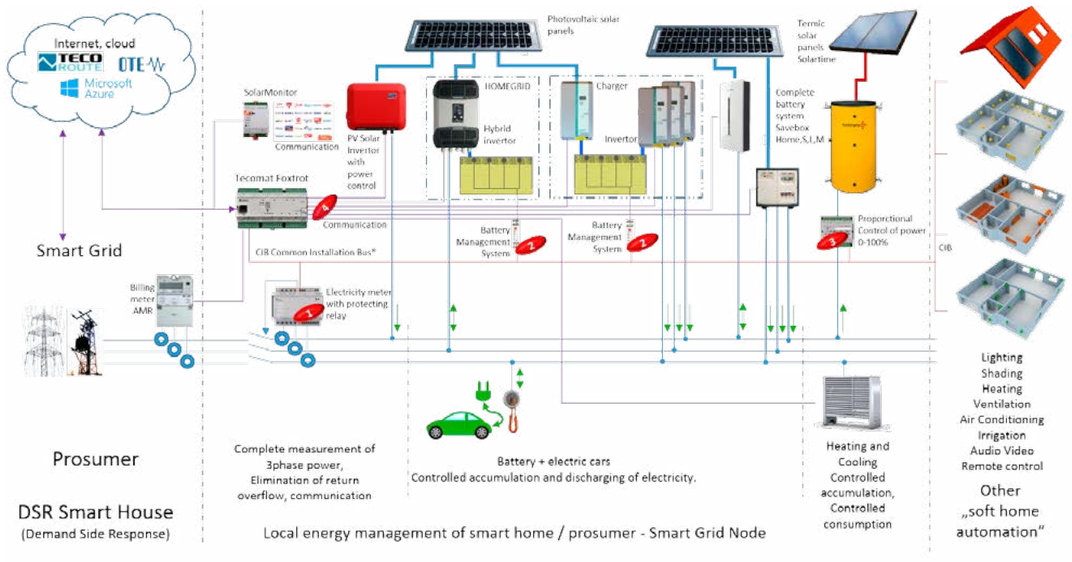
One of these outputs is connected to a thermistor on a cable which may be placed on different measuring points. For example, to the next halogen bulb which is triggered by one of the two relays of the module. Because the bulb is also a quick heat source and cools down quickly, you may practice temperature control. You can clearly see the action of the regulator – light On/Off. Second relay in the module controls the next power socket, where you may connect an external appliance. A kettle for example, and use it to practice preset temperature control – but for slower projects than when using the quick-heating light bulb. All can be combined together which gives you the freedom to create many practical or impractical tasks. For example, you may control the colour of the LED strip based on the thermistor temperature.

Finally, the contents of the suitcase also include a built-in WiFi module which allows students or trainees to connect to the central module easily using not only laptop running Mosaic programming software, but using a mobile phone. This allows the student to practice the endless possibilities offered by WEB maker when creating control screens using websites. If the student goes even further and uses his or her mobile phone to create an excess point connected to the Internet, he may connect the entire suitcase to the Internet and without any additional equipment the student may verify and exercise Foxtrot control functionalities remotely and from anywhere. Because Foxtrot is an open source system and programmable according to IEC/EN/CSN 61131 – 3 "the suitcase is packed with Foxtrot" as a tool used not only for teaching system installations, but also for teaching programming in line with this standard which is used by virtually all major world manufacturers of PLC systems. Foxtrot is the only system which offers a development environment in Czech language under this standard, so there is no need to deal with a language barrier right from the beginning. Mosaic may also be switched to English, Russian or Polish – under full operation.

How Tecomat Foxtrot systems may be used to increase the self-sufficiency of a supply point

It seems that the trend occurring within the power industry took the right direction. It is in no way a straight path and there will certainly be plenty of heated discussions along this way dealing with changes or even legal cases as we see now with the upcoming tariffs. However, the government issued a National Action Plan SmartGrid and this plan mentions the use of renewable energy sources and introduces the issue of electric power accumulation including applicable financial support programmes. The lessening of the severity of rules dealing with unlicensed 10kWp photovoltaic power plants at the drawing point, providing that the zero overflow requirement is complied with, is a clear signal that we are going in this direction.

How will this affect in-house installations? Will there be any changes in the established practices of electricians? Will they need to learn something new? They surely will. Let us introduce in this ar-



A basic scheme of a universal house energy system controlled by Foxtrot, which allows you to optimize storage and energy flows in any direction and according to current energy prices and based on house priorities and Smart Grid network.

ticle the concept that Teco intends to follow. As you would expect this concept is based on the Tecomat Foxtrot system of course, which has already been widely used in so-called smart homes. Until now, home automation has been seen as a system controlling lights, blinds, room temperature or audio and video components. This we may call a "soft" automation but photovoltaic systems, batteries, inverters, water heaters, and solar thermal panels would be called a "hard" automation because these systems deal with higher currents and of course more money is spent for energies. This equipment allows the house to act sometimes as a source of energy, sometimes as an appliance drawing power and sometimes as energy storage (battery) and therefore, it is necessary to comply with the current and applicable connection requirements. This type of house is now known as a "prosumer"s (producer-consumer).

In the event of a network outage, some systems may switch into the so-called island mode, and the stability of its own network must be addressed, which is in essence the same task as a large power grid operator must address. It is therefore evident that such house cannot actually exist without proper control system. Based on experiences gained from the projects implemented by customers who, for various reasons and motives, already use batteries and photovoltaic systems and found Foxtrot tool capable of managing variety of assemblies and combinations, Teco now offers hardware and software innovations that facilitate and improve the utilization of batteries not only in building projects, but basically in any semi-island or island power drawing locations. The picture shows a maximum version of the entire concept, which may be reduced down depending on the extent of the required solution. The left side shows a distribution network which will be transformed into Smart Grid in the future, the right side shows the actual house – a typical place for the aforementioned "soft" automation where the universal two-wire installation CIB Common Installation Bus® is used.

The CIB bus shows three new products numbered 1, 2, 3. Under the number 1 there is a **quick electrical meter** with integrated safety relay ensuring voltage and frequency protection. It can measure 3-phase power systems. It also has an inlet for fourth phase, which may be used for informative measurements of another selected branch. A new product is under the number 2 called **Battery Management System (BMS)** which is used to control any set of lithium batteries. Therefore, in addition to battery packs supplied by third parties you may connect to Foxtrot assemblies made of individual cells. The picture outlines a concept showing batteries connected under a hybrid drive – Studer shown here, which is able to work in an island mode and therefore maintain the frequency and the concept using a separate charger and inverter.

Number 3 is a resistive load proportional control module. This is typically 2kW cartridge in an accumulation reservoir which allows precise balancing/control to ensure that only the exact amount of electricity is drawn from solar panels in order to prevent overflows into the power grid.

The last fourth element necessary for a comprehensive control system represents **communications and software communication blocks in Mosaic** which are used to communicate with conventional photovoltaic inverters, classic but mostly with hybrid inverters, and with battery chargers and inverters through which their performance is proportionally controlled, or rather the storage of surplus power in batteries and their subsequent use. It also includes communication with heat pumps and air conditioning systems which are major players in the entire house energy system.

Just as the actual deployment of Foxtrot into home automation is supported by training sessions and by detailed manuals of the project designer, this new universal household energy section will also be the subject of upcoming training sessions, including issuance of new manuals. Electricians with Foxtrot do not need to worry about the changes and innovations which will soon trasfer these changes into the entire power scheme on national and European level. This applies specially to those who are inquisitive, who are not afraid of self-improvement and are willing to be trained or to learn on their own from the Foxtrot designer guide and follow the news happening in this area.

Where does Tecomat Foxtrot stand out in the field of Building and Home Automation?

Original solution

Tecomat Foxtrot control system is a unique blend between industrial control systems (industrial communication buses used in PLC systems) and smart homes and smart buildings control systems. The installation of CIB Common Installation Bus® – own solution of Teco a.s., protected by a utility model rights, enables easy connection of intelligent modules withing buildings. In total, one central module (control unit) may connect up to 320 modules via CIB bus. In real life so far and in the field of intelligent homes and buildings, a standard solution based on KNX bus, which utilizes distributed control systems without using central unit, has been used throughout entire Europe.

This solution is very popular and widespread and there are many manufacturers producing such modules and components based on this standard, but because they are no central units for KNX bus standard, or rather this bus was not designed for central units, this solution may be used for simpler control functions. All control algorithms for individual modules must already be programmed in the factory. In practice this means that in order to create an intelligent building project the designer must search through component catalogues of the given manufacturer and try to assemble these components into a single system to create all functions desired by the customer. Modern intelligent buildings today, however, cannot be satisfied with functionalities that have been pre-programmed by the manufacturer.

Buildings and technologies installed in them are becoming increasingly more complex. For example, heating systems in new or renovated buildings commonly use multiple heat sources in various combinations and connections. Functions built into modules for KNX bus cannot deal with these tasks. Also, data collection and data logging is not possible with KNX due to the absence of the central unit.

All these drawbacks of this global standard solution are eliminated by Teco a.s. and by our system Tecomat Foxtrot. The solution is a centralized system – a system with central unit which is freely programmable using programming languages in line with CSN EN 61131 (languages commonly used in the PLC system category commonly taught at all colleges and universities at home and abroad).

Foxtrot does not limit functions the project designer can use. The project designer may use Mosaic programming environment to select from a variety of preset functions for all used technologies but at the same time the designer may program any function and add it to the library for further use. This allows the programmer to control any technologies connected to the system, but it also guarantees that if, in the future any requirements or functions are needed, these may be programmed into the already installed system. CIB bus has a free topology, and therefore it may be used to distribute functions simply and inexpensively across the entire building, it may be split into any branches or configured in the future. Further, the system can control wireless elements, which in terms of system programming and design, may be handled as regular bus components.

Tecomat Foxtrot control system also eliminates, in particular in the building automation market, shortcomings of already existing solutions installed by other companies. Companies offering building management and control systems based on industrial PLC solutions limit the customer due to the insufficient number of peripheral modules and due to the cumbersome connection process when connecting modules to the central module, mostly through industrial buses, which significantly raise the price of the solution.

On the other hand, simple home automation systems usually control devices in basic On/Off /or dim modes, but are unable to handle demanding control tasks such as heating curve controlling, etc. Thanks to their own control software the systems allow the customer to select from predefined basic functions, but do not allow the customer to program any other control tasks.

Tecomat Foxtrot removes limitations of both groups. It does not prevent the customer from selecting any function now or in the future, and even though the system is the most advanced control system designed for smart homes and buildings on the market, it is still virtually the cheapest one. As a result, it has become a serious player in the smart homes and buildings market in the Czech Republic. Teco has already produced more than 20,000 Tecomat Foxtrot control units and hundreds of thousands peripheral modules.

Compatibility and long operational life

During our 40-year history Tecomat control systems have always strived to provide maximum service life and reliability, including our systems that control continuous processes. For example, the Singing Fountain in Mariánské Lázně has been using our NS905 system since 1986, similarly, as the Křižík Fountain at the Exhibition Grounds in Prague, which is about 5 years younger. An additional benefit is that we manufacture spare parts at least ten years after end of production of each generation of control systems. This allows customers to purchase products, which will serve for many years without the need to keep buying new products – which today is a bad habit even for reputable manufacturers.

During the development and manufacture of our control systems we strive to maintain full compatibility, which means that a customer using an old control system can expand it with a new one, while the entire system is easily programmable and manageable through one programming environment. So, if you to expand an old control system it is not necessary to throw away the entire existing system and purchase a new one, but the existing control system may be simply expanded, which of course is much less demanding financially.

Industry base

This base is being marketed for various automation fields – industrial automation, measurements and control, building automation, smart homes – always as reliable as industrial PLC. That means that it is an extremely reliable and durable product with an exceptionally long service life, which every user will certainly appreciate regardless of the field or focus. This is a significant advantage especially in the field of building automation and smart homes. As we do not bother with the service life of our components in distribution cabinets because it is extremely long, the same applies to Foxtrot system life as it exceeds several times the lifespan of conventional control devices used in buildings.

Foxtrot does not limit the size of the application

Foxtrot may be used for small applications such as control of individual technologies (heating, lighting, ...) and also for complex control systems in any objects or groups. Tecomat Foxtrot central units may be interconnected between each other and used for large applications via serial lines or through the Ethernet. This allows you to automate any large objects, such as hotels, office buildings, sports facilities, etc. Central units exchange data among themselves and the entire system behaves like a large control system operated from a control room using a PC visualization system SCADA RELIANCE for example.

Connection and communication with third parties

Very important are communication abilities at the level of serial ports and an Ethernet/Internet ports. This communication is essential for connection with other "smart" devices in the house, such as certified security systems (DSC, Tecnoalarm, Galaxy, Paradox), CCTV (IP cameras), access control systems (intercoms, RFID readers, Assa Abloy card locks). This includes communication with heat pumps (Nukleon, AC heating, ACOND, Regulus, Neota), gas boilers (OpenTherm), ventilation and heat recovery systems, air conditioning units (LG, SAMSUNG, CoolerMaster), lighting and roller blind control systems (LUTRON) and even communication with home appliances such as Miele. Also audiovisual systems are popular units which may be connected to intelligent building control systems (Control4, AMX, AVIT, Bang & Olufsen).

The system is sufficiently open to utilize an adequate interface and connect other systems in the given intelligent building, in particular with the KNX system. This will bring additional advantages of a central control system to KNX and other functions including communication with the outside world.

The system is equipped with a counter which reads a set of 10 pulses from heat meters, communication converters, smart energy meters via M-Bus or possibly also wireless meters – reading through Wireless Mbus protocol. Therefore Tecomat Foxtrot systems offer users additional tools for effective control of the consumption and energy savings.

Tecomat Foxtrot central unit offers a built-in feature allowing you to program datalogger – a recording machine that records any measured values and internal statuses into an extended memory. It may also save images from cameras or text messages and maintain a diary of events. Data may be sent to an external server database.

Tecomat Foxtrot compatibility

A new generation of students is being raised on Tecomat Foxtrot control systems

For a long time Teco has been keeping very close ties with most colleges and universities in the Czech Republic where automation is thought. In many of these schools you will find Tecomat Foxtrot control system in various forms and shapes which are used in classes to teach industrial automation and building and home automation.

One of these schools is the Secondary School of Electrical Engineering in Pardubice, where they offer classes focusing on intelligent building management "while following in the Foxtrot's footsteps". The school management realized that this will be an attractive and practical form to provide students with basic logics and algorithms of automation systems. At the same time students will learn programming principles in accordance with the IEC 61131-3 international standard, which will allow students to program any other industrial control systems designed to not only for buildings but also in the field of engineering and the general industry. This method also reveals close links between the work of an electrician during hardware installation and the current programmable automated machines. Students will also get familiar with sensors used to monitor many different variables. They are also involved in creative software design, which will give to their model houses a soul and allow them implement their own ideas. Finally, students will create a website and using their own phone they will test everything to make sure that everything is properly connected and that it may be controlled with a touch of a finger.

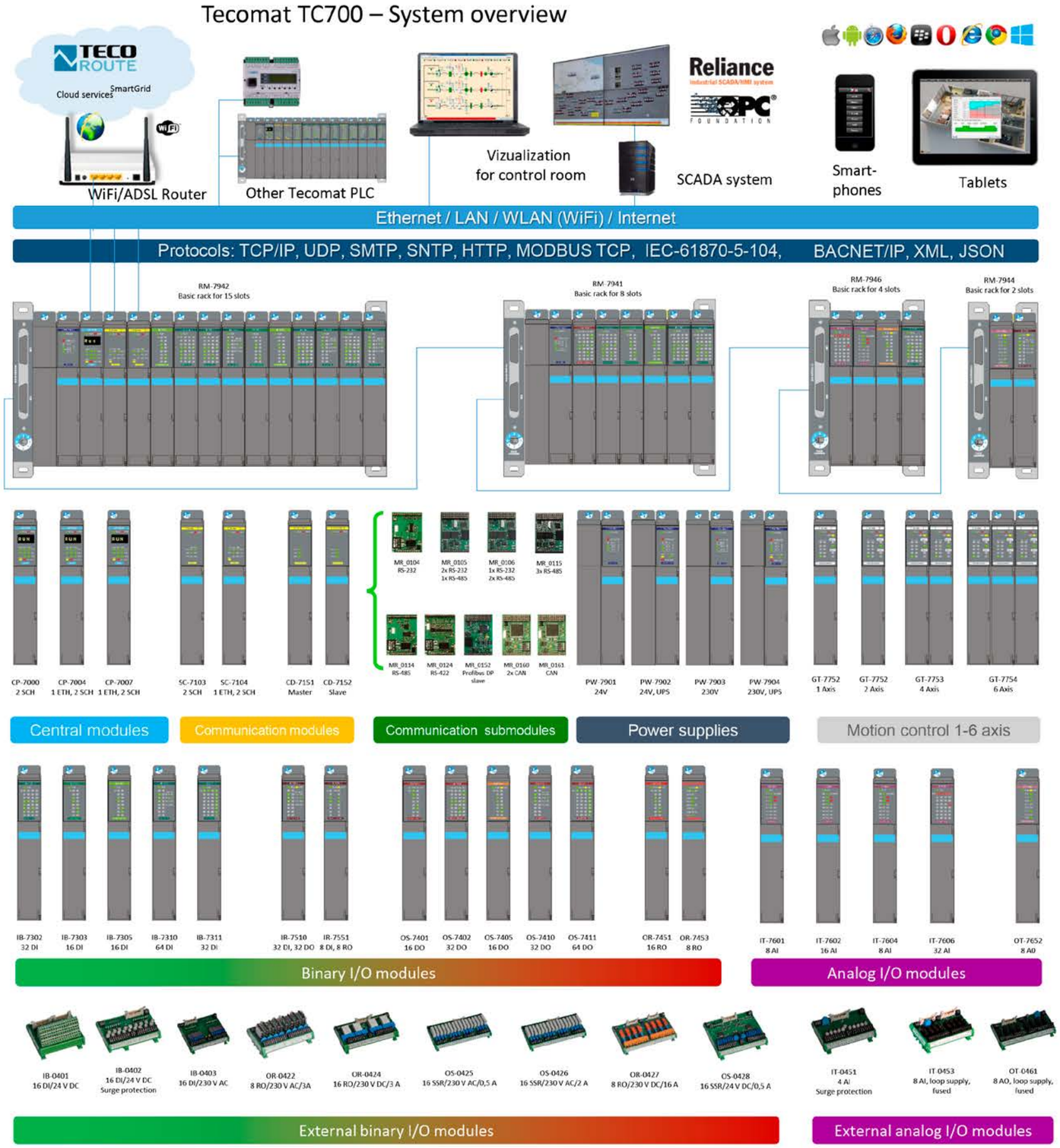
Students of the SPŠE, Pardubice have built their own little house and signed up their project for the student competition fair called the Science and Technology Festival in Pardubice where they successfully passed the regional level and moved onto the next competition called College Science and Engineering, where they won the third place. Another school, which is worth mentioning, is the Secondary Technical School in Zlín, where automation for Mechanical Engineering and Electrical Engineering is thought. Students of the Technical Lyceum in their third grade are thought to programme single chip microcomputers and automated machines. As far as PLC systems programming is concerned, the automation technology laboratory went through a dramatic development during the last few years.

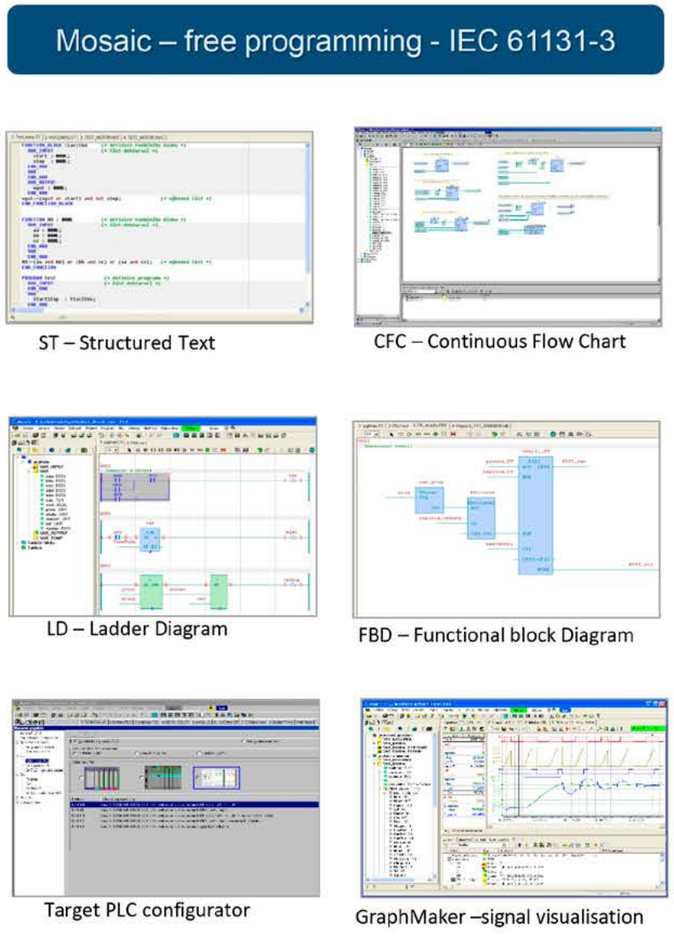
Programmable automated machines are used anywhere where needed, either to monitor, control or manage something. This include factories, power plants, transportation industry and currently also intelligent buildings. Therefore, it was necessary to equip the laboratory with these systems and various modular kits where the functionality of the proposed algorithms may be verified.

The Secondary Technical School in Zlín offers a fully equipped classroom laboratory with Foxtrot systems, including mechanical and electrical models. Ing. Josef Kovář and his colleague Zuzana Prokopová take care of this laboratory.

Tecomat TC700

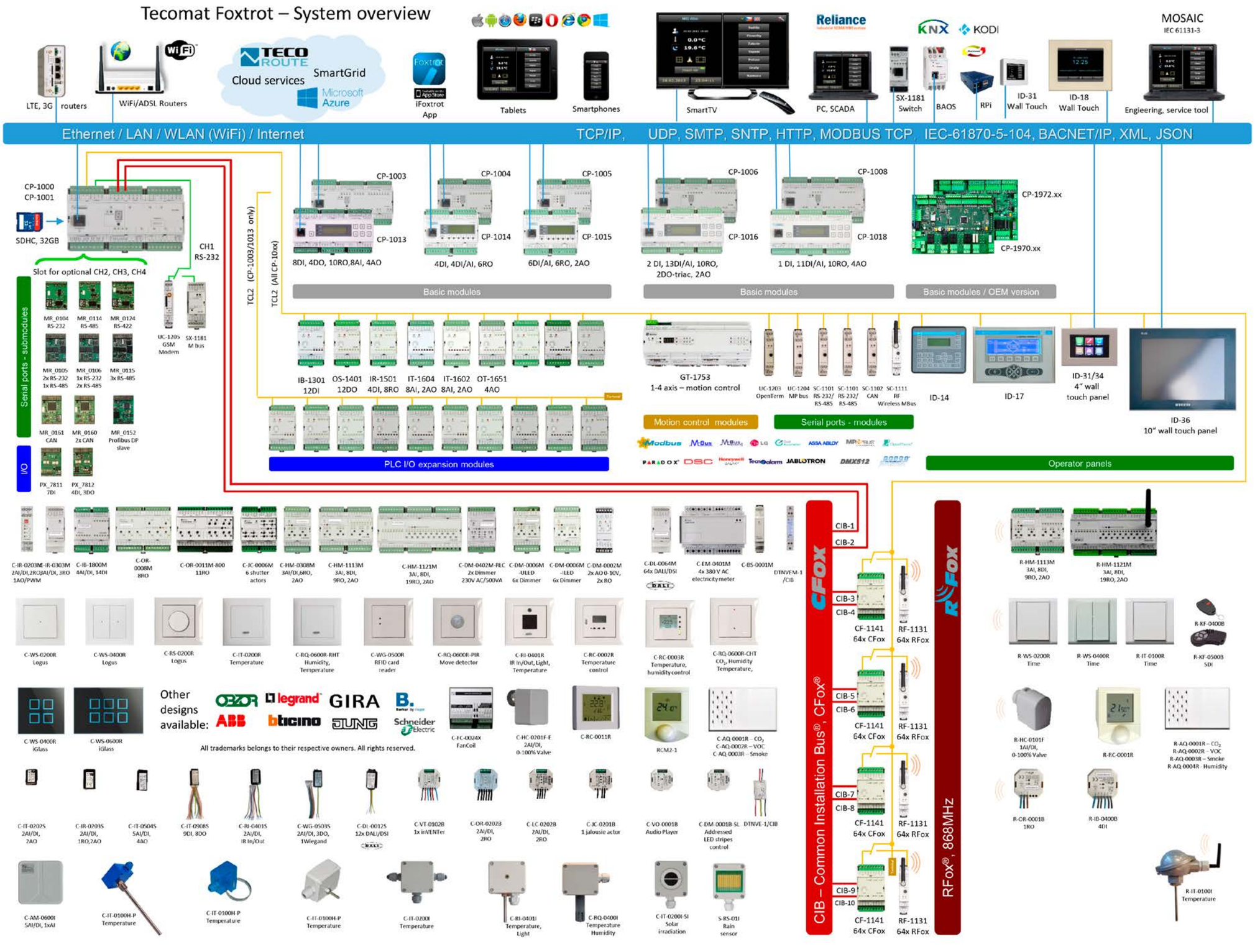
Tecomat TC700 schematic





Tecomat Foxtrot

Tecomat Foxtrot schematic



Selected foreign references

SAUDI ARABIA

Chronic Care Center – Jeddah

Implementation by: Delta Technology, KYBERTEC

In the spring of 2016 in the Saudi Arabian city of Jeddah we have completed the construction of a six-storey hospital where our control system Tecomat Foxtrot was used for building management, connected to SCADA Reliance control centre. This interesting project was implemented together with a Saudi Arabian company called Delta Technology, which is our authorized local partner, together with KYBERTEC, s.r.o.

Tecomat Foxtrot system forms a truly comprehensive control system and integrates the following technologies:

- HVAC systems – cooling, ventilation, air conditioning
- Lighting
- Fire detectors
- Cameras
- Security system
- Electrical circuits switching system
- Energy consumption measurements
- Oxygen distribution
- Water distribution

GERMANY

Heating system control and integration with Lutron system – Berlin

Implementation by: ELPRAMO s.r.o and KD Electronics s.r.o.

Tecomat Foxtrot control system was installed by ELPRAMO s.r.o. and KD Elektronika s.r.o. in a modern apartment in Berlin, Germany, where it is integrated with lighting and roller blinds control system Lutron.

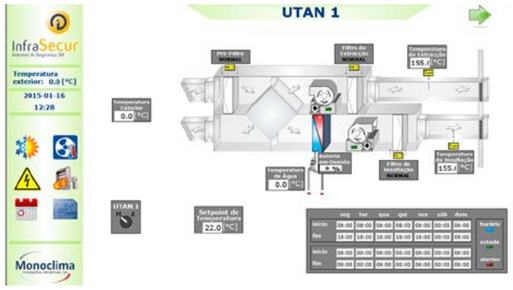
The primary task of Foxtrot is to control heating system, which is composed of radiators, under floor heating piping and fan-coils. There are also Daikin air conditioning units designed for efficient cooling. Thanks to a full integration with lighting control/shading system Lutron, the end user may now enjoy a unified control system and control all these technologies through Lutron components. This form of integration between Foxtrot and Lutron is gaining popularity particularly among German customers because this method synchronizes their technologies and allows them to control them as one unified system.

PORTUGAL

HVAC control and energy measuring – Public Library Marvila – Lisbon

Implementation by: InfraSecur

InfraSecur from Portugal is involved in the building automation industry. Outside of Portugal it is also active in Angola and Mozambique, where the company has its own branches. In terms of orientation, this company has been installing automation systems for medium and large projects – hotels, hospitals, commercial and industrial buildings, etc. One of their projects implemented in Portugal is the implementation of a ventilation and air conditioning control system (AHU and VRV units) and energy measuring system in a public library in Marvila, Lisbon. Tecomat Foxtrot is connected to Reliance SCADA system with 350 data points, of which 320 data points are connected via Modbus. Two CP-1003 central units and expansion modules have been used here.



RUSSIA

Lenta hypermarket technology management – Nizhny Tagil

Implementation by: Territoria Kontrolja

Lenta is one of the largest retail chains in Russia and the second largest chain of hypermarkets in the country. It operates 96 hypermarkets in 55 cities across Russia and 21 supermarkets in the Moscow region. One Lenta hypermarket, which has just been finished, is a store in Nizhny Tagil which is equipped (in addition to other several stores), with our Tecomat Foxtrot control system. Our system controls here heating, lighting, air conditioning and ventilation processes. Foxtrot system was installed here thanks to Territorio Kontrolja, our local partner in the Urals region. All technologies controlled by Foxtrot are connected to a dispatch room equipped with Reliance SCADA software.

Machine for controlled hydrogen dissolution in water made for Samsung

SOUTH KOREA

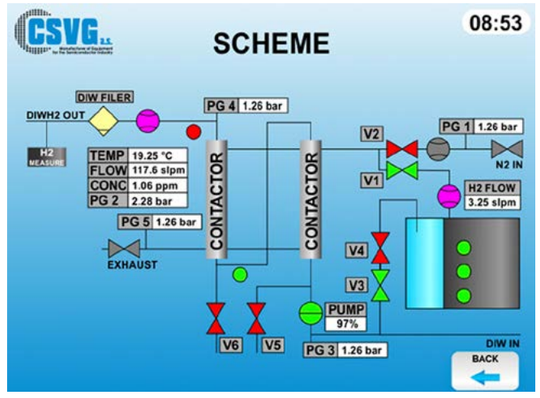
Mobile Displays

Implementation by: CSVG a.s.

CSVG a.s., Olomouc produces special purpose machines and equipment for the semiconductor industry. Their customers can be found all over the world – mainly factories producing chips for consumer electronics or display screen manufacturers. The company uses Teco PLC for most of its products. Tecomat Foxtrot for simple applications and TC700 for more complex machines and production lines. The big advantage for the company programmers is fast technical support and training in Czech language, remote PLC management using TecoRoute, and many simple customer tools – for example, PLC programme update tools.

CSVG developed for Samsung Electronics, South Korea – division of Samsung Mobile Displays, a machine which controls dissolution of hydrogen in water, which is then used to rinse off OLED displays. Due to the impossibility to use chemicals on OLED organic structure, physical properties of the H3O + are used to remove impurities from the surface of the display. The entire system is controlled by a central unit Foxtrot controlled by ID-28 touch screen. Units OS-1401, IT-1604 and IB-1301 are used to expand inputs and outputs. These units are connected to safety sensors, pump control sensors, and to valve control sensors. The entire software including the graphic user interface was created in Mosaic Web Maker.

The first prototype was installed in the Samsung factory in early 2015, and after a successful application in the production process a serial production is expected. Currently, this machine offers incomparable performance and has no competitor on the global market offering the same performance. Part of this success is due to Teco products and thanks to our team of specialists.



HUNGARY

Management and control of a voice presentation system and a robotic DMX lighting system in the museum of János Damjanich – Szolnok

Implementation by: Szinusz Épületautomatika Kft.

In November 11, 2014 the Museum of János Damjanich was open in the Hungarian city of Szolonok. János Damjanich was an army leader and is a national hero in Hungary because he led the Hungarian revolutionary army against the Habsburg Monarchy.

During the renovation of the museum a rather unique tour guide automated system was installed. The museum consists of 10 separate halls – exhibition halls each equipped with a voice system initiated by press of a button. Three halls are also equipped with controlled robotic DMX light reflectors. When the tour begins, the lights in the halls dim and the automated light reflector aims the light on the relevant paintings and at the same time, the voice system is turned On and plays explanations for the given exhibits. Additionally, Foxtrot system turns on a TV clip projected on a canvas, where visitors learn more about the given artefact. Electrical work on this project was carried out by Abandvill Kft., distribution cabinets were installed, by Schrack Technik Kft., and our Hungarian distributor Szinusz Épületautomatika Kft. programmed Tecomat Foxtrot control system, which integrates all technologies together.

The above-mentioned technologies are integrated into our control system Tecomat Foxtrot. Voice servers are connected to Foxtrot via RS232 serial port, light reflectors and TV screens are integrated via IR signal, and lights via DMX and DALI bus. Foxtrot integrates and controls the following devices:

- 3× 4-zone Amplifier 100 V Monacor
- 3× 4-zone PAP-PIC voice server (own development)
- 8× light switching system
- 3× automated DMX lighting reflectors
- 3× DALI light
- 2× projectors
- 1× LCD TV screens

SLOVAKIA

Automated bar and rod warehouse management in Železárny Podbrezová

Implementation by: KPK spol. s.r.o.
Shelf stackers represent an essential equipment of any automated warehouse used in various industries. In Železárny Podbrezová – a metallurgical plant, a company called KPK Martin constructed a warehouse equipped with cassettes which are used to store bars and rods. Cassettes are gripped by their sides and a complete record of stored items is maintained. Images are added with video shots showing the movement of the cassette across the warehouse.

KAZAKHSTAN

Family house heating system control – Astana

Implementation by: Aquatherm NC Group
Tecomat Foxtrot control system is used here in an interesting solution provided by Ritop s.r.o., which represents a controlled heat transfer stations Ritbox. Ritbox is a preassembled and intelligently controlled heating station allowing quick and easy installation. The entire system is controlled by PLC Tecomat Foxtrot equipped with CP-1016 control unit. This particular project was done in Astana, Kazakhstan and the actual installation was carried out by Aquatherm nc group.
Control and system characteristics:
- oil boiler
- three independent heating circuits,
- weather-compensated heating system,
- weekly time schedule,
- solar panels for water heating
- pool heating,
- connection to local WiFi,
- remote monitoring, configuration and service via the Internet,
- heat produced by the exchange station including control of individual circuits,
- PID control,
- hot water boiler control,
- boiler control (On/Off),
- temperature control in individual rooms,
- Internet remote control via Tecoroute.

SLOVAKIA

A complex control of technologies in a family house – Hnúšťa

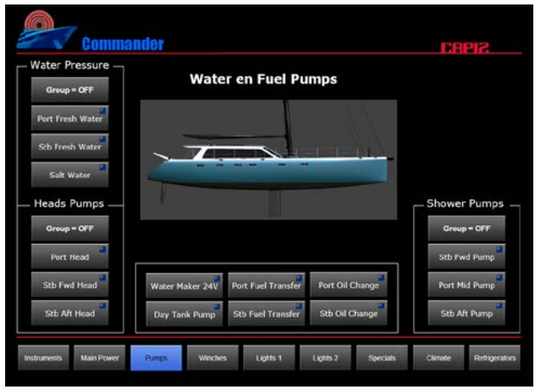
Implementation by: Light Project, s.r.o.
In 2015, Light Project, s.r.o. deployed Tecomat Foxtrot system in the Slovakian town of Hnúšťa designed to control complex technologies in a newly built family house. The actual control process is divided into two parts – the house control and measurements and control of the boiler room. Each part is controlled by one Foxtrot central unit, which are connected together allowing the customer to control the system is one homogeneous system through a web interface, and to configure individual user parameters.

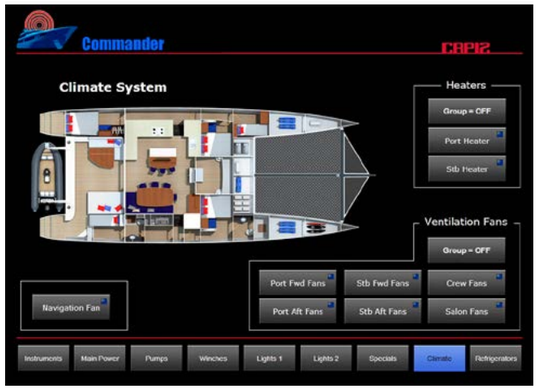
Tecomat Foxtrot system controls the following:
- lighting system (switching, dimming, RGB and DALI)
- shading system/blinds (timing, weather stations, twilight time)
- communication with Paradox safety system,
- under floor heating system and Daikin air conditioning system (zone control)
- sauna control,
- communication with Control4 multimedia system (system controlled by wall-mounted units LOGUS90).

SOUTH AFRICA/USA

Foxtrot riding the waves of the Atlantic – SLIM 66 catamaran control technology

Implementation by: B & R Design
In 2013, one of ten thousand Tecomat Foxtrot control systems has became the basic equipment of a Gunboat 66 class catamaran named SLIM. This happened at the shipyard in Cape Town, South Africa. From there she sailed across the Atlantic to the Caribbean and has been sailing the east coast of the United States ever since. 66 feet long catamaran of the Gunboat class called SLIM has been designed for racing around the world and was custom-built in South Africa. The weight of the racing catamaran has been trimmed down to a fraction of the weight of any comparable cruising boat of similar size while preserving all stringent safety standards. In cooperation with CAPI2 Nederland BV, which fully equipped this catamaran with the necessary electrical equipment, LED lighting and pumps. Another company called B & R Design BV designed the entire control system of the boat using fixed 10" touch panel. The system may also be controlled by an iPad anywhere from the boat.





Tecomat Foxtrot system was fully programmed in Holland. Shipbuilders in South Africa installed the system separately in the catamaran. After that B & R Design fine-tuned the application programme remotely via the Internet and in November 2013 she sailed under the flag of Marschall Islands from her "hometown" of Cape Town on her first six-month voyage across the Atlantic to the Caribbean and then to North America. During her first voyage and over the distance of 5,000 miles – a really remote support, six sailors including one woman, configured the last details.
Foxtrot system constantly controls all technical equipment of the ship. The entire 230 V power grid including appliances, winches, masts, onboard instruments and communication is controlled through a webpage. The crew is able to monitor water and fuel, including pumps from a single point. Also all the lights in the cabin and under the deck, air conditioning system, refrigerators, freezers, and special 12V sockets are under control.

UKRAINE

Management snow cannons – Zhdeniievo

Implementation by: "SAKS" Lviv
In 2015 Tecomat Foxtrot control system was installed with the intention to control the function of snow cannons in Transcarpathian Ukraine. The implementation was done by a Ukrainian company called "SAKS" Lviv. The technology overseas water preparation/treatment and its transportation to ski slopes, where snow cannons are installed. The facilities are located in the ski and spa resort Zhdeniievo.
Description of automatic control handled by Foxtrot:

- monitoring of safe and trouble-free operation of gas boilers, pumps and HVAC fans and air conditioning units. Also electric boilers, valves and safety system components are monitored
- maintaining high pressure and volumes of water supplied within specified time frame, eliminating pressure surges and vibrations in piping throughout the entire operational time
- option to remotely turn On/Off circuits, configuration of times and temperature modes in individual circuits or as one complex unit
- monitoring and instant check of the operation of pumps, valves and protective and safety elements

HUNGARY

Old-timer Vehicle Museum lighting system – Kiskoros

Implementation by: Szinusz Épületautomatika Kft.
Oldtimer Vehicle Museum in the Hungarian town of Kiskőrös was established with the aim to perform professional repairs, renovations and sales of historical vehicles. The exhibition area of the museum building includes 32 separate lighting circuits, which would make traditional control of the lighting system using switches quite difficult. The intention was to use Tecomat Foxtrot control system and to create a single, user-friendly operator interface through which employees could control individual circuits, groups of lights and lighting scenes. The control interface is designed as a webpage stored in the central unit, allowing employees to access and control the system via a touch panel, tablet or PC.
In addition to interior lighting, Foxtrot also controls decorative RGB LED strips on the facade of the museum, which creates a dusk-to-dawn light show. Implementation of Tecomat Foxtrot system was performed in 2013 by our former Hungarian partner and today the distributor of our systems today in Hungary, by Szinusz Épületautomatika Kft.

SLOVAKIA

Dorries SD 160 carousel lathe control

Implementation by: Deak electro, s.r.o.
The requirement of the investor was to completely reconstruct the electrical part of the carousel lathe RH 1968 produced in 1968 which was still in its original condition. The existing relay logic system was replaced with Tecomat Foxtrot (1×CP-1014, 4×1301.4×IB-OS-1401), which allowed us to add automatic features that were impossible before. Control and visualization is handled by SCADA software Reliance via OPC server, which replaces the original control panel with push buttons. OPC server with Reliance is installed on a moveable arm of the machine and communicates with the PLC Foxtrot in the cabinet.
The touch screen is used to fully control the machine, to display error and alarm states and to set up and configure individual parameters. Installation was carried out by DEÁK elektro, s.r.o. as a turn-key operation – including the design of the project, production and installation of the cabinet, supply of components, electrical wiring and PLC Foxtrot and SCADA Reliance programming.

SLOVAKIA

Technology management and control in Koliba – intelligent residence in Bratislava

Implementation by: Domotron, Ltd.
Slovak company Domotron, s.r.o. has created an intelligent electrical system called Domotron, which is another solution for mass deployment of home automation systems based on Tecomat Foxtrot. One of their latest projects is the installation done in Koliba residence in Bratislava. This residence is equipped with many functions that an intelligent building should have. Domotron handles the comfort of residents, allowing them to easily control lighting, shading, heating and air condition units. Lighting control includes switching and dimming circuits including monochrome and RGB colour LED strips that help to induce the right mood. To ensure privacy, exterior blinds installed on large glazed surfaces are controlled via a wall switch or through a web application, but at the same time they are also controlled automatically based on data received from a weather station. Thanks to this combination a pleasant thermal comfort is ensured even during hot summer days. Also season-based hot water heating system and controlled air-conditioning system ensure pleasant environment inside the building.

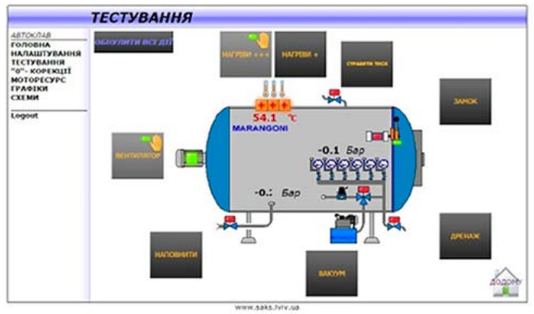
UKRAINE

Retreading truck tire line control system

Implementation by: "SAKS" Lviv
In 2015, Ukrainian company "SAKS" Lviv installed Tecomat Foxtrot system for a truck tire retreading line. Basic module Tecomat Foxtrot CP-1004 and an expansion module IT-1604 was used here. This technology controls and monitors the vulcanization (curing) process of newly retreaded tires. The control system was replaced after the originally installed control system Marangoni collapsed.
Description of the automatic control process:

- increasing air pressure in the curing chamber to the preset value, and maintaining vacuum in "cushions", around which the new treads are wrapped.
- maintaining the specified pressure in the vulcanization chamber – switching the pressure in the reservoirs from the negative to positive value, and maintaining the preset difference in pressure between the chamber and the reservoirs
- monitoring safe and trouble-free operation of motors, electric boilers, valves and safety components,
- providing information about all pressures and temperatures existing throughout the entire line to operators
- providing information about an option to interrupt the process including messages describing the reasons for the occurrence of emergency situations
- continuous storage of all measured values gained during each retreading process
- option to interrupt the vulcanization (curing) process and applying corrections to the entire process
- option to view the functional diagrams of the given technology on a webpage. These diagrams may be used to analyze situations occurring in the technology, to turn On

and Off individual components – to perform diagnostics and troubleshooting
- option to go to the technology test page (through a password) in order to verify proper functioning of the curing chamber control system in automatic or in manual mode
- in order to lower material and production cost, and the time necessary for the manufacture of a new tire a remote control option was installed which may be used by operators, applicator and servicing personnel
- option to remotely turn On/Off circuits, to configure time and work pressure regimes in automatic mode.
- continuous storage of all measured values into weekly file throughout the entire calendar year
- option to turn Off circuits remotely
- option to view basic technological diagrams at a webpage. These diagrams may be used to analyze situations occurring in the technology, to turn On and Off individual components – to perform diagnostics and troubleshooting
- providing information about an option to interrupt the process including messages describing the option to go to the technology test page (through a password) and to verify proper functioning of the curing chamber control system in automatic or in manual mode
- in order to lower material, production cost, and time necessary for the manufacture of a new protector a remote control option was installed which may be used by operators, applicator and servicing personnel



THE NETHERLANDS

Control of a shooting range at the police academy

Implementation by: B & R Design
In 2014 our Dutch partner and distributor B & R Design was asked to create a central control system for a new police shooting range. The building of the shooting range was under a reconstruction and its inner layout was designed for special police force and armed force training. These training facilities are very realistic and teams use real weapons and live ammunition. Originally, the customer was considering a solution based on the KNX system, but when he found that using a solution built on our freely programmable Tecomat Foxtrot system will offer more features and options, the decision to build the entire system on Foxtrot was made. Mainly, because Foxtrot does not require a separate visualization on PC and Smart Web interface. Plus Foxtrot could be used to control other technologies in the shooting range building such as lighting, blinds, CCTV, displays and ventilation.

Using an iPad the customer may activate different scenes and monitor all functions and cameras. The training area is made of massive reinforced concrete walls and bulletproof glass, so we only hope that the control system will not be damaged during training. Following the application of the control system in the training area – a labyrinth, a question arose whether Foxtrot would be able to control 100 meters long police shooting ranges. The shooting range was designed for police and special armed forces training using live ammunition. The original building was built during the seventies and a 3-meter distribution cabinet fully loaded with relays handled and controlled moving targets. During the nineties the system was equipped with PC running Windows operating system, but this system no longer worked.
After examining the original drawings and original documentation it was decided to create a new control system

based on Tecomat Foxtrot. The original 3-meter tall distribution cabinet was replaced with a small switchboard with integrated touch screen control panel. The system may be controlled with buttons or through the touch screen on the switchboard. In addition, instructors may control the system using two wireless remote controllers and initiate various scenes. Thanks to the internal Foxtrot website the entire system may also be controlled with an iPad. Further, the system also controls lights and air conditioning. The lighting system is composed of a series of exterior and interior lights with different colour temperatures. Thanks Foxtrot the user can generate various lighting scenes and simulate real situations suitable for shooting.

ESTONIA

Woodchip boiler control – Kohila

Implementation by: SW Energia
Our Estonian customer – SW Energia is engaged in the construction of boilers which supply heat centrally to cities including the supply of automated control and monitoring systems. SW Energia selected our Tecomat Foxtrot control system for their projects thanks to the best ratio between value and price

One of the projects implemented by SW Energia using our control system is a project of a biomass boiler station in Kohila in Estonia. The boiler station was built and equipped in 2014. At its heart is a fully automated 3 MW woodchip boiler. The boiler is controlled by one Tecomat Foxtrot unit which controls the frequency converters via Modbus.

Selected references from Czech Republic

4-seater cable lift control system – Pec pod Sněžkou

Implementation by: Easy Control Morava spol. s.r.o.
At www.lanove-drahy.cz we have seen pictures showing the installation and commissioning of a new cable lift in the Krkonoše Mountains in a ski resort called Pec pod Sněžkou. The old anchor cable lift was replaced by a detachable chair lift. The seats are attached to a fast moving cable (up to 5m/s) and upon arrival at the station they are disconnected from the cable and ride on a trail driven by rubber wheels, which are geared down to reduce the speed of the seat down to 1.5 of the cable speed.

Top station of Leitner cable lift with a detachable system during installation on a slope in Zahrádky, ski resort Pec pod Sněžkou.

Cable lift control panel in Zahrádky during load tests before its official launch on 8/12/ 2015. Supplier of the control and management system – Easy Control Morava.

This allows passengers to get in and out easily. At the exit the seat accelerates and attaches itself to the cable. The cable lift was manufactured by Leitner and was previously operated in the Alps, Obertauern. In the summer of 2015 it was dismantled and transported to its new place "Zahrádky" in the popular ski resort in Pec pod Sněžkou. During the renovation four old rectangular supports were replaced with new cylindrical tubes, but also the control system was completely renovated. Foxtrot system was installed here by Easy Control Morava. In addition to drive control systems and all monitoring and control components at the top and

bottom station, the company installed CIB bus along the entire 2 km track and attached components that allows the monitoring of each support to this bus. This unique feature increased technical supervision focusing on all technical and safety components with the intention to ensure extended service life and improved fault diagnosis.
There is also an integrated IP camera which monitors the upper station. In addition to other information, the control system receives information via the CIB bus regarding the actual wind direction, strength and temperature. Server www.lanove-drahy.cz offers the entire photo gallery of the assembly process. We also found there a picture of the operator station during load tests of the entire lift. You can see the Foxtrot interface with a large touch screen facing towards the operator and a dedicated console with push buttons and a small touch screen. Easy Control Morava from Rýmařov supplies control systems for refurbished lifts regularly and the company product line is available for viewing at website www.easycm.cz.

Heating and air-conditioning control system installed in manufacturing plant Visteon-Autopal s. r. o.

Implementation by: EV COMP, s.r.o., GEOVAP spol. s.r.o.
Visteon is a global leader in automotive components delivery. In 2015, the company has built a manufacturing plant and technical centre for air conditioning units in the facility of CT Park Nový Jičín Northern Moravia. Implementation of the control and visualization system dealing with heating and air-conditioning system in the Visteon-Autopal plant was implemented by EV COMP, an experienced system integrator, which used our Tecomat Foxtrot control system. Also GEOVAP was involved in the project and supplied hardware for Foxtrot and prepared project visualization in SCADA/HMI Reliance 4 system. The control system consists of our Tecomat Foxtrot PLC, which are installed in six distribution cabinets located around the building factory and control the following:
– 12 air conditioning units
– extraction of air from manufacturing spaces
– boiler room
– compressor room

– air conditioners in offices via Modbus communication protocol
– energy measurements (gas, water, electricity)
The system is ready for future connection of additional air-conditioning units (Sahara). All data from the control system are transmitted to the dispatch computer with runtime Reliance 4 Control Server. Reliance SCADA system uses visualization screens which allows the operator to monitor the status of individual technological units, set parameters, monitor alarm messages and view historical data using graphs or table reports. Also thin client Reliance 4 Web Client is used which allows the building administrator to access visualization and data through a tablet 1.

Foxtrot system in heat pumps ACOND designed for residential buildings

Implementation by: ACOND a.s.
ACOND a.s. has been helping customers with four decades of experience in the field of highly advanced technical solutions, ventilation and heat pumps. Every detail is thought carefully through and processed with the highest focus on reliability, quality and easy servicing. ACOND is our OEM partner and uses Tecomat Foxtrot system to control their heat pump systems. Engineers of ACOND greatly appreciate

the free programming options, creation of own graphical user interfaces and remote supervision and services through TecoRoute. In addition to conventional heat pumps ACOND also offers a unique range of heat pumps designed for residential buildings, hich allows residents significantly reduce heating costs.
One of such projects is the installation of a heat pump in an apartment house in Milevsko. In 2012, a residential building with 40 apartments was completely disconnected from CZT. Disconnection from CZT has not been an easy and smooth process. The local heating plant came up with an expert opinion that the heat price from the heat pumps will be 600 CZK/GJ. However, the heating plant and the expert made a huge mistake, because the price for heating including payments for the circuit breakers came up to 284 CZK/GJ in 2014. Recently, the building roof was insulated, which should further reduce the price per GJ. Residents of the apartment building save half of the price of heat, but additional significant savings were achieved thanks to reduction of heat losses in the hot water circulation – from the heat exchanger, which further lowered the consumption. These losses were eliminated because the heat is now produced directly in the house. Because proven Czech-made heat pumps directly designed for apartment houses and not for outdoor air conditioning units where used, the achieved savings are high and the system is almost noiseless.
This apartment building with the heat pump was visited, just out of curiosity, by the minister of the environment. In 2014 according to the chairman of the apartment building ing. Vaněčka, residents living in the largest apartments (4 + 1) paid on an average less than 2,700 CZK per year.

Lighting system control ***** Hotel Wilson – Prague

Implementation by: ELPRAMO s.r.o.
In the upper right corner of the Wenceslas Square in Prague, under Museum you will find a renovated and expanded luxury five-star hotel Wilson. Our control system Tecomat Foxtrot was selected for the control of the lightning system and it was installed by an experienced integrator, a company called ELPRAMO s.r.o. Tecomat Foxtrot controls lights in communal and public areas in the hotel, which include the lobby area, reception, and dining room. The system also controls the facade lightning system and outdoor advertising boards. The entire system includes a total of 8 dimming and 54 switch circuits. Switch circuits are made of different light sources (halogen lamps, LED strips, LED bulbs, and fluorescent tubes).

In the dining area and reception area the lighting system utilizes preset scenes (breakfast, day, evening, night). The selected scene may be turned On using either a clear graphical visualization via phone/tablet/PC at the reception, or by a wireless key ring. The lighting system in the hallways and outside is controlled by time scenarios, which the user may modify through the supplied visualization. Tecoroute is used by the system administrator for remote access.

Control of an efficient heating system and hot water heating process powered by solar panels, ground wells and a heat pump – Czech Republic

Implementation by: MICRONIC Přerov s.r.o.
In 2015, MICRONIC Přerov completed implementation of Tecomat Foxtrot control system which was used to control efficient operation of heating system and hot water heating process supplied with energy by solar panels, ground wells and a heat pump. The aim was to ensure self-sufficiency of the office building and sports centre. The building is equipped with a combined photovoltaic and solar panels which supply power to the office building during the day. During the summer the solar panels are cooled down to achieve higher efficiency with a heat transferring fluid flowing through the panels. The obtained power is first used to meet energy demands (especially hot water) of the sport hall. Energy surpluses are stored in four wells which accumulate and store the energy. The accumulated energy is used in winter when the heat pumps transfer the ground heat into the heating system of the building.

The entire system is equipped with 39 thermal sensors and 9 calorimeters, which provide a complete overview showing the supplied and drawn energy in each mode of operation. The cut-out shows for example the temperature of the medium in individual wells and monitored temperature values. They are eight measuring points equally spaced between the first and second well. All important values and information about the current status of the system are recorded in a database and continually assessed. In case of a failure SMS message is sent to the operator and an e-mail message to selected persons. The system may be controlled through WEB application or via SMS commands.

Permonium amusement park technology control

Implementation by: Axomer s.r.o.

Permonium – an amusement park with a story – located in the former black coal mine called Kukla, 30 km southwest of the town of Brno. The heart of the amusement park is a 100 years old cultural monument – 41 m tall, architecturally very interesting winding tower with a panoramic lift where strange things happen. Thanks to the attractions of the Permonium amusement park the winding tower has become an active historical attraction accessible to the general public and offering interactive activities. Since the opening five years ago, Tecomat Foxtrot system (installed by Axomer, Brno) has been playing an important role here.

Tasks and specifications:

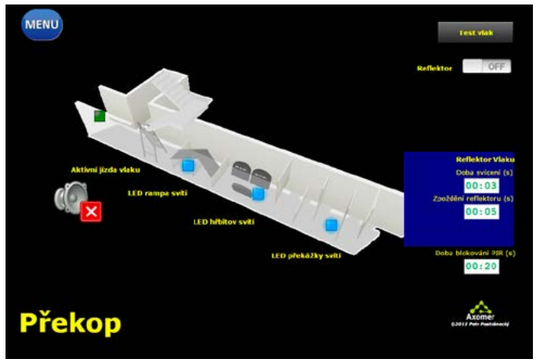
- to interactively monitor and supervise park attractions
- to transport the vision of the authors of the Magic Permon game into the IT world with an interactive interface which would allow players to play and enjoy the game. The principle of the game is to find a task – after the task is displayed and after the correct 4 digit code is entered into the terminal, the players get to perform another task. If you enter the wrong code three times the game ends and the player is sent back to the cashier.
- to connect the game with the park entry system, and with the cashier and restaurant.

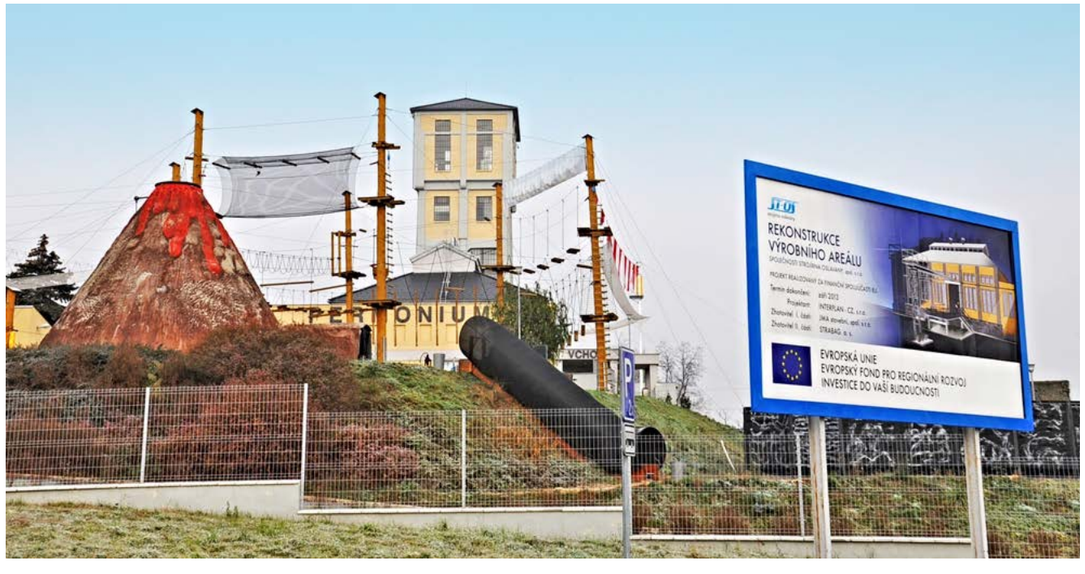
Requirements:

- as simple as possible solution with simple controls which may be easily understand by both the players and staff
- robust and stable system with option to expand or modify the game

Solution:

- a configurator and administrator was created for an intuitive system allowing creation of individual games "route". Graphical user interface was added allowing route editing and also an interface which is used to enter players into the game right at the cash register. The entire system is designed as an open client-server software using PHP programming language. With only small modifications this system may be implemented in other theme parks and used to create stories or other routes. The system is based on Linux server with a database where route data are stored, but also on-line statuses of players. This gives the operator a great way to view the players, for example, if the player has been entering the correct codes, etc.
- also new game variations and statistics are being created, for example, the quickest player. – 125 kHz RFID contact-free system was used to identify the player, to check access to the park, and to use the ordering system (restaurant). This resulted in "apparent" interconnection of these systems allowing the customer to use one chip for everything.
- to efficiently communicate with players; the most appropriate solution proved to be a method which displays information on 10" tablets. (Since 2010 original tablets are still being used). Tablets communicate with the server over a local network.
- contactless RFID chip game kiosk readers are connected to Foxtrot via RS-485 bus. (In 2010 at the time of the implementation, there was no other way to connect RFIDs). Foxtrot identifies the player playing the given game, and if necessary, it communicates with the game server.
- kiosks installed in the park are connected to the server online and if a given kiosk is required to initiate a specific task the required page is displayed on the kiosk – upon activation of inputs or the programme, Foxtrot activates outputs – individual attractions. It also receives from the server information about the activation of certain sub-programmes (e.g. sounds). The status of attractions may be checked through a web interface, or they may be controlled or configured based on the needs of the operator. This configuration may also be done remotely, for example to adjust or control the programme remotely.





Conclusion:

- Although it is not one physical system, thanks to mutual connections between communication interfaces RS485, 125 kHz RFID, and LAN, we were able to build and control the entire park as one integrated unit.
- Thanks to the use of proven and reliable components we have met the requirements on robustness and stability, which has already been verified through 5 years of operation in outdoor environment.
- Also the financial aspect of the project is worth mentioning, because it cost 1/3 of the originally planned budget.
- We have tested several dozens of players playing the game at once and found no communication problems with Foxtrot and its parent server.

Remote control of wind turbines – wind parks in Liberec and Trojmezí

Implementation by: KYBERTEC s.r.o.

In 2014 KYBERTEC s.r.o. installed Tecomat Foxtrot as a remote switch system of wind turbines in wind parks Trojmezí and Liberec (Lysý hill area) for companies called Farma Trojmezí and Konotech Each wind turbine is equipped with individual Tecomat Foxtrot PLC, which receive Off /On instructions from ČEZ system and therefore regulate the power output of individual wind park. This control level is supervised by a higher monitoring level equipped with SCADA Reliance system which monitors the current performance and operating parameters of several wind turbines and any requests which may come from the master system. Because the customer is using Foxtrot system and TC-700 for other purposes as well, the choice to use Foxtrot was a relatively straightforward decision. In addition, PLC net technology and TECORoute technologies were used for additional advantages.

Pool technology control and management – Ponávka pool, Brno

Implementation by: MICRONIC Přerov s.r.o.

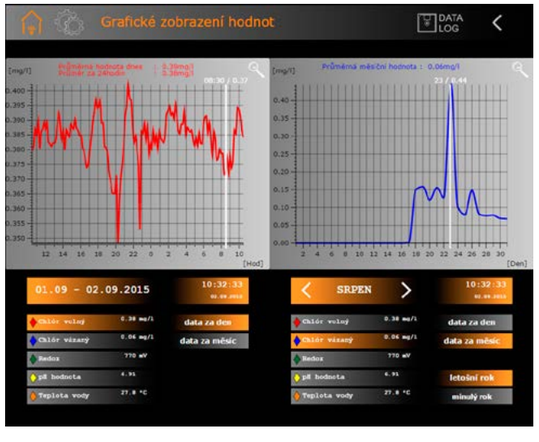
In 2015, MICRONIC Přerov completed the installation of Tecomat Foxtrot control system which was used for controlling, remote monitoring and archiving of measured values provided by the pool technology installed at the indoor pool Ponávka in Brno. The control system consists of a control cabinet equipped with Tecomat Foxtrot CP-1006 PLC and peripheral modules on CIB bus, which are connected to the chemical substance measuring board in the water treatment station. All measured values and status information are visualized and displayed at a webpage. Measured values are neatly compiled into two graphs offering an option to display the selected value.

Each graph may be selected separately and displayed in a daily view mode (10 minute intervals) or monthly view mode (average daily values). All values are backed up in a database and ready for subsequent analysis. The visualization system is based on Mosaic, with WEB output for the PC engineer and the facility manager. This control software represents the first installation of the 2nd generation of these control modules designed for chemicals dispensing including new graphics. Measured values:

- free chlorine
- combined chlorine
- PH
- redox value
- water temperature
- detection of water flowing through the measuring plate
- gas level measurement in the chlorine station, connected to an acoustic alarm
- time and signal information related to the chlorine processing system status

Outputs:

- chemicals dispensing
- valve control
- all alarm values are transmitted to the e-mail addresses
- database values



Complete measurement and control system installed in Metropol – multipurpose cultural and social facility, České Budějovice

Implementation by: Troch s.r.o.

In late September 2015, after a one-month trial operation, Troch s.r.o., Trutnov together with Teco a.s. have handed over a completely reconstructed control and measuring system overseeing the entire multipurpose cultural and social facility called Metropol in České Budějovice. After the flood in 2002, the entire infrastructure of heating and ventilation system was reconstructed. In 2014 the operator learned that the installed foreign system used by the facility will no longer be provided with technical and service support and therefore, a decision had to be made whether to have a newer model from the same vendor installed or to pick a control system from another supplier which offers long-term technical support and service policy.

During the following tender Teco a.s. and our control system Tecomat Foxtrot was selected as the replacement of the old system. Troch s.r.o. from Trutnov was selected to program the new system. The following photographs demonstrate the extent and scope of the measurement and control system. There is a total of 7 centre modules with the necessary peripherals. On the photos you can see that all original power components were kept in the original cabinets including the original sensors used by the technology. Foxtrot was perfectly adapted not only for the types and the number of original inputs and outputs, but also to the dimensions. We even left a room for a possible expansion. Metropol is a multipurpose cultural and social establishment in the centre of the town of České Budějovice capable of serving 2,000 persons. The Metropol facility also includes a large ballroom, theatre, small stage, circular hall, lounges, office building and U tří lvů hotel.

The Opera of the South Bohemian Theatre is headquartered here, as well as a permanent photo art gallery, billiard room, sports betting office, art exhibitions, fitness room, and Patifo dance studio. The building was put into operation in 1970. The current operator is Metropol, spol. s.r.o. The founder of the current operator – the Metropol, spol. s.r.o., consists of five trade unions represented by KOVO union.

Residential building of the future – Sky Barrandov residence in Prague

Implementation by: Haidy a.s.

One interesting projects of a low energy residential building where our system Tecomat Foxtrot was implemented on a large scale is the Sky Barrandov facility designed by a world-renowned architect Eva Jiřičná. The construction begun in 2016 in the Barrandov area in Prague. The facility consists of two separate residential homes and a service centre possessing an ultra-efficient building certificate, or more precisely, the highest energy efficiency class A. The highest energy efficiency class was awarded thanks to architects working for Mrs. Jiřičná but also thanks to special design features of the building, but also thanks to clever ventilation system, which hugely affects the consumption of energy in a large buildings. All 108 residential units in Sky residence Barrandov have been equipped with state-of-the-art recovery units Paul which provide efficient air replacement without the need to open a window.

Triple glass insulation windows in combination with other materials and the layout of the building prevent heat loss occurring during ventilation. Residents often purchase an intelligent control system Haidy for the recuperation unit. Haidy system is a modular, standardized software based on our Tecomat Foxtrot control system, allowing residents to use their smart TV, phone or tablet to control not only the Paul recuperation unit, but also other devices/appliances in the apartment, for example, lightning system and light scenes, heating and under-floor heating, roller blinds, ventilation and security system. All apartments in the Sky residence Barrandov have already been "made ready" for the installation of this technology even before the issuance of the final building permit. This allows HAIDY to begin with the installation of all necessary equipment without making any changes to the apartment structure – once the new residents decide what they want to be able to control with the intelligent system. In addition to being ready for the intelligent system, Sky residence Barrandov is also ready for the installation of CCTV and ready to be connected to the centralized security panel.

"We at HAIDY are very pleased that we were part of this project, which without any exaggerations, may be called the project

of the future. This residential complex in Barrandov clearly demonstrates what trend the housing industry will follow. Smart technologies together with proper structural design are the only way to go if we want to keep offering ever-increasing comfort while lowering the demands both on us and our planet". Filip Rezek (Commercial Director of Haidy a.s.)

Controlling technologies in a family house – IntelioBox – Prague

Implementation by: SUP-TECHNIK spol. s r.o.

SUP-TECHNIK spol. s.r.o. and Insight Home, a.s. came together and developed a new home automation concept called intelioBOX. It is a standardized apartment distribution cabinet, supplied in various sizes for different installations and includes high-voltage and low-voltage residential wiring, including all safety components protecting the entire wiring. Also TV and satellite signals, data network together with configured WIFI router and backup data storage are included.

Intelligent control abilities are handled by Tecomat Foxtrot, which offers comfortable control of lights, blinds, heating system and other equipment, safety and alarm system EZS, camera surveillance system with recording and a multimedia server. All this technology may be controlled by the user thanks to the visualization software using tablets or smartphones. It may also be done remotely, but there is more... The user may even configure temperature regimes and other system parameters. The existing smart home installations are based on individual, unique and unrepeatable solutions designed for each individual project. intelioBOX uses the same technology as for custom-made smart homes, but the technology is supplied fully wired and fully programmed. The installation of a full household automation system may now be done by any ordinary electrician or an installation company not particularly specializing in smart homes. Users also save a considerable sum of money required for project preparation and programming.

One of the projects implemented by IntelioBOX is a family house in Prague, where lighting, heating and shading systems are controlled. This project features a keyless access with biometric sensors, including home security cameras. Owners appreciate wide range of user settings and comfortable control of scenes which is a necessity for larger estates.

Control of technologies in agricultural farm Okluky

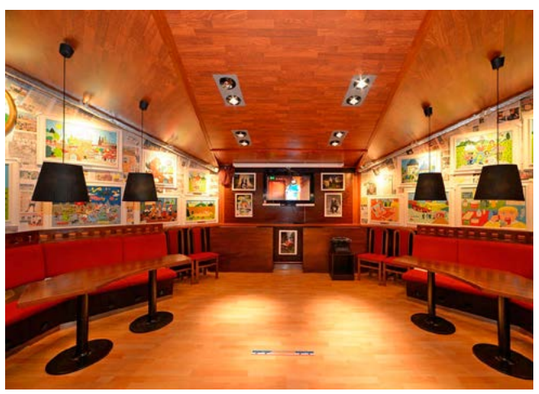
Implementation by: Farmtec a.s

Farmtec a.s. offers comprehensive services in the field agricultural investments – especially in livestock production and in renewable energy. It also offers design and project services including implementation of farms, stables, feedlots, including management of the entire lifecycle of factory farmed animals bred for meat, milk etc. To manage these technologies Farmtec decided to use Tecomat Foxtrot control system simply because they have already used Foxtrot in many factory farming projects realized at home and abroad, such as the successfully completed project in agricultural Farm in Okluky, Dolní Němčín where they work with two separate operations – chicken feeding hall and cattle farm. In the feeding hall Foxtrot controls lighting, automatic feed dispensing, water supply and revolving feeding modes. This ensures automatic alternation between day/night mode several times within 24 hours which increases meat gain. The system also increases rations and feed water, based on the age of the chickens and in line with their breeding cycle. Foxtrot system controls similar processes at the cattle farm, plus monitors thermal comfort and dew levels of the cattle.

Control of audio-visual tour in the Ringoland gallery

Implementation by: HEITECH ČR s.r.o.

More than four dozen original paintings of Frantisek Ringo Čech along with dozens of prints and artefacts from the artist's personal and professional life may be seen in the gallery called RINGOLAND located in the Berg hotel in Staré Splavy near the Máchovo jezero (Macha lake). In 2015, while the gallery was being expanded, a new idea came into existence and that was to control the audio-visual tour through the gallery using Foxtrot Teco a.s. The system now controls sixty independent spotlights and creates lighting scenes that synchronously accompany and supplement the video tour.



Visitors meet the automation system already at the entrance. They enter the gallery using a chip card, before the projection starts they receive voice commands and during video presentations enjoy changing lighting scenes that illuminate paintings, showcases and other displayed objects. So in addition to the lighting system, also the projection system (projector, audio and video signal) and the gallery space is monitored from one location (due to EZS and EPS).

Smart residence in Průhonice

Implemented by: Insight Home, a.s.

Insight Home
Řešení pro chytré bydlení

AMX

LARGE LUXURY VILLA NEAR PRAGUE, DEMONSTRATES A MODERNIST AESTHETICS THAT BLEND WELL WITH ENVIRONMENTAL DESIGN AND STATE-OF-ART HOME CONTROL TECHNOLOGIES

A sophisticated house in minimalist style designed and implemented by renowned architectural firm Jestico + While. From the street the villa looks very discreet thanks to the gray fence made of cembonit plates in metal frames, but when you enter the inner part of the land the villa begins to reveal its generous and comfortable face. AMX inHome automation system controls the villa, which allows the user to control the house using iPad and iPhone applications.

Technologies are controlled by Tecomat Foxtrot, which is integrated into the inHome AMX system used to control the entire house. AMX inHome automation system combines its robustness and excellent functionality of Foxtrot with a pleasant graphical control and user-friendly interface, which was achieved thanks to the main AMX control system. Both systems are fully compatible and communicate between each other via Ethernet.

Lighting and shading systems – all lighting and shading components are connected to Foxtrot. Therefore, PLC directly controls all lights and blinds. These devices may be controlled by wall-mounted buttons and by iPad applications – based on the actual need of the user. The PLC is also programmed with automatic functions which initiate automatically based on preset surrounding conditions and without any intervention of the user.

Heating and cooling – Foxtrot also controls the heating and cooling system. It constantly evaluates the current temperature in each room and based on this information it regulates the flow of water through the under floor heating. This allows the system to maintain comfortable temperature in each room exactly according to the preset configuration or need. Thanks to centralized control and management up to 30% energy savings were achieved.

Measurements of the consumption of energy – the inHome AMX receives signals from energy meters (water, gas, electricity). These signals are processed and stored and the user may open an application on iPad at any time and check the consumption of energy during different periods/seasons.

Safety – the house is equipped with a certified security system called Paradox EVO which is connected to a central monitoring panel. inHome AMX application allows comfortable operation of the security system and surveillance cameras using iPad or iPhone application.

Audio video system – audio and video technology is exclusively controlled by AMX system. Thanks to application in iPad the user can utilize a single interface to control appliances in the living room, such as the TV set, satellite receiver, Playstation and Apple TV.

Comfort and convenience – the house is also equipped with a video intercom used to communicate with incoming visitors and with the weather station which is used to display current weather data as well as system information. This information is used to control automatic functions of the house. Used technologies allow controlling via AMX inHome or by classic wall switches which control lights and blinds, wall thermostats, or remote controls for television or other video devices.

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