

TECO

Info



Nissan Leaf is the first electric car for everyday use which utilizes smart house electrical system controlled by Foxtrot installed by Axomer, Brno to charge its battery.

The number of complex installations using Foxtrot are popping out like crazy all over the place. The universal application of the system keeps rising.

Word of the Company Director

The spring and summer of this year were very productive and eventful times so we decided to publish the autumn issue of the 38th Tecoinfo newsletter now. We have focused on new innovative systems that support Foxtrot system in new ways and in new applications. This includes installations in hotels and guesthouses for which we have prepared new wall-mounted glass control units and displays and integrated DENON

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multi-zone audio system. Further, this also includes the field of intensification of photovoltaic power plants already

built and installed in fields or roofs, but mostly the new ones utilizing advanced hybrid technologies (HFVE) with batteries and even in combination with electric vehicles. Electric mobility and power storage represent new directions and fields which are and will be supported by the state. These fields are booming worldwide. Foxtrot is being installed as the control system even abroad. In the meantime, Foxtrot is in the UL certification process which will allow us to sell and use Foxtrot system in the North American market. As for Australia, Foxtrot has already passed laboratory tests and has been certified for the use in Australia. In Dubai, Foxtrot system is already displayed in a second showroom and it is currently added with a feature allowing

control of professional audio systems used in hotels.

Audio system installations are also mentioned in this issue. Tecoinfo was published to address a series of autumn fairs and conferences where Teco a.s. participates. This series begin in Dallas, Texas at the CEDIA exhibition fair, continues with ForArch in Prague, ELOSYS in Slovakia, ITTF exhibition in Kosovo and ends with Hi-Tech Building in Moscow. We are also partners of SmartCon held in the city of Písek and Smart Energy Forum in Prague which will take place in October. You may meet us at any of these events and discuss any questions or issues you may have as a private investor, installation company, engineering company, or as a manufacturer seeking for the most advanced control systems.

Smart house control systems today

Luxury? Standard? or Necessity?

An article written by Ing. Arch Marek Kuchta published in ERA 21 magazine. With the approval of the publisher we are bringing you the entire text but under a different title.

There were times when an expert dealing with measuring, regulation and control systems entered the construction preparation process as the last one. The task of the expert was to simply connect devices prepared by other experts. But due to the ever-increasing complexity of these systems and the need for their mutual collaboration and because of the need to provide detail evaluation and function control, the requirement to regulate and control these systems has become inevitable. This also includes the need to integrate this technology into the design process at the very beginning. The situation has changed even more dramatically in the technology which seems to be the simplest one. The housing technology field which, based on the TECO experience, has clearly demonstrated that it is catching up fast even with industrial buildings and projects in terms of complexity. It is all due to the fact that electrical wiring used to be separated but is now heading towards an integrated system represented for example by Tecomat Foxtrot which controls the entire building including measuring, regulation and low-voltage systems.

Home automation

The term home automation, in comparison with industrial automation system, may suggest that a home automation is a relatively simple project or even

a hobby fancied by enthusiasts and that the necessary electronic devices may be easily purchased in an e-shop and simply plugged into wall outlets. The control application may be installed in a mobile phone and you are ready to go. Problem solved without difficult programming. This impression or general view is widely accepted mostly due to the fact that the benefits and relative simplicity of home automation are described as such in popular science and technology magazines focusing on living. The reader however, is not an expert most of the time, and needs to have simple and clear information and does not want to be scared with complex issues. But that's not the case in real life. The following model is based on a real-life experience. To make things easier the model has been reduced down and focuses on the house energy efficiency, selection of appliances, energy flows and energy accumulation/storage. All that with the intention to save the operational cost and to achieve environment-friendly performance and thus making a contribution to the "save the planet" initiatives.

Temperature control during all seasons

A house owner living in our climate is primarily interested in a heating system which will be used during winter months. Usually, the house owner first insulates the walls, thoroughly seals windows, and installs a heat pump. After certain time the house owner finds out that the humidity in the interior is increasing and that the risk of mould is



In addition to regular wall switches the house is equipped with a mobile control panel which uses AMX system compatible with Foxtrot. Photo and installation by Insight Home project

increasing as well. In addition, the concentration of CO₂ is also rising thanks to the ill-ventilated rooms. So the house owner introduces a controlled ventilation system, best together with a heat exchange system which will hopefully give a portion of the heat to the fresh air, but at the same time will make the air dryer. Naturally, the owner installs an air humidifier maybe even with an ionizer. In order to eliminate heat losses the owner installs zone regulation system and sets different maximum temperature in each room. But now the owner has too many devices that need to be controlled and coordinated. During the summer time the owner finds out that thanks to the heat produced by people, refrigerator, stove, TV or computer the interior temperature is rising and the well-insulated house will not let it out and that it cannot be controlled by simple ventilation. So the owner decides to install cooling system and air-conditioning, again with a heat exchange system

only to find out that the air conditioning unit works almost continuously during the summer because sunlight passing through glass panels/windows stubbornly heat up the interior of the house. The natural choice is to install window blinds. However, blinds will not let the daylight in so the house owner installs an artificial lighting controlled by smart electrical system able to switch On and Off defined groups of lights exactly according to the pre-programmed scenarios or based on the light intensity measured at the work desk.

Solving household energy demands

To have everything under control, the house owner starts sending numbers measured by electrometers, flow meters and gas meters to one place with the intention to monitor all measured values at all times. However, the displayed development in the power consumption will not make him happy. Ventilator and pump drives, lighting, humidifying, cooling or air-conditioning systems will draw their portion of power even though they claim to be power-saving and economical devices. Desperately trying to lower the energy consumption the house owner shifts the consumption to the lower tariff section. Later still, the owner contemplates getting his own power plant to achieve at least partial self-sufficiency. So he purchases solar panels. Based on the current legislature he may install a power plant with peak output of 10 kW. Almost forty panels – without becoming a small business owner. However, the owner cannot let any excess of electric power back into the power grid. All generated power must be consumed right after the electrometer. So he installs an immediate consumption control system based on the generated power, which is fully dependent on the weather. But what appliance in the house may actually be controlled by this approach? Washer, refrigerator, iron, stove or TV? These simply cannot depend on the current formation of clouds... The sun is shining when nobody is in the house and the power consumption is rising in the morning and evening when the sun is still up or already down. So the house owner begins to store the heat in a water heater or swimming pool. But swimming in a pool with water heated to 45°C even though the water was heated for free is not the ideal scenario.

Cool air produced during the summer may be accumulated thanks to the air-conditioning system but there is too much of it and the cool air cannot

be utilized during the day. The frequency converter may be set to supply less electric power or the user may install batteries to store the power. Now, he has the power but no idea how to use it. Could it be used to lower peaks drawn from the power grid or could a circuit breaker be used for lower nominal current? Or to have an extra electric power available in case of a blackout? If so, the user needs equipment capable of maintaining the so-called island operation. So the house owner begins to monitor the weather forecast to "dump" the energy during the night or to store the energy for the next cloudy day. Other machines which impact the house and energy management are electric cars. Under certain conditions they may serve as stationary batteries which may be charged overnight from the house power grid or during the day from the photovoltaic system. However, electric vehicles are usually travelling and not in the house and their batteries are charged elsewhere. In order to control electric vehicle charging system the owner of the house needs to monitor weather forecast but also to plan his trips.

Home automation systems are catching up with industrial systems

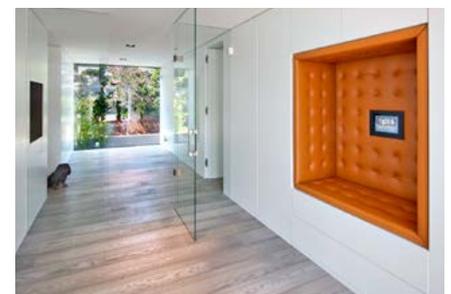
The above scenario represents one of many possible situations. Even if you select the same types of energy sources and appliances there will always be a difference between any two houses. At least in the size and in the need for resources and due to different priorities of different users, different control strategy and due to the level of desirable savings. The comprehensive system of home automation involves other related systems as well, such as security system, camera monitoring system and intercom, access system which controls doors and gates, sprinkle system, pool, weather station, audio and video system or even assistance technology for handicapped persons.

Each of these systems uses its own application installed in a mobile phone. But will a regular person be able to handle, control or even optimize all these applications using a telephone? And does a man (usually not an expert) possess the necessary knowledge and time to set the systems based on the current weather forecast, tariffs or heating factor of the heat pump and according to the outside temperature? All these systems are interdependent and to find an optimal solution is not always easy. As far as the complexity of the entire

system is concerned, the difference between home automation and industrial automation is becoming less and less apparent because the number of installed control systems is almost the same as in industrial projects. To find an optimum solution and to make all persons living in the house happy is a complex task comparable with industrial systems. A regular house owner is not an expert and therefore not able to precisely formulate his requirements. It is therefore a common practice that the house owner requires additional modifications or extensions of the system based on the situation in the house. This makes the supplier of a home automation system almost as important as the family doctor who is familiar with the needs and ailments of individual members of the household and indeed with the need of the entire family and finally, also with the entire infrastructure of the house.

Tecomat Foxtrot system

The situation described above is based on the knowledge and feedback provided by users who utilize in their houses freely programmable open source system called Tecomat Foxtrot known to the industry as PLC (programmable logic controllers). Teco is continuously modifying this system and provides updated software and hardware modules which are used both for industrial and household automation projects. They may be used both for industrial and for home projects. Foxtrot may be directly connected to the Internet because it has its own Web server and therefore, it is ready to handle all tasks which are required today. It is the experience of Teco that clearly demonstrates that the system achieves best results when the architect, the investor and all installation companies are involved in the automation and integration process from the beginning.



The entire infrastructure of a new family house in Průhonice is controlled by Foxtrot; the house was awarded by the professional community and received an honourable reward at the 2015 Architect Grand Prix and also at the event called the Façade of the year 2015; Photo and implementation by Inside Home

Foxtrot in a smart house, building or town

The degradation of the term smart has been enormous in the last years. However, in many cases it refers to a new trend where all systems are interconnected through the Internet. As a matter fact anything can be connected to the Internet – which goes well with the term Internet of things. Teco has been participating in this trend systematically since the time when terms such as smart phone or tablet did not even exist and has gradually been connecting and installing various technologies in houses and in large buildings.

Smart house controlled by Foxtrot system which integrates any technology or subsystem into one unit.

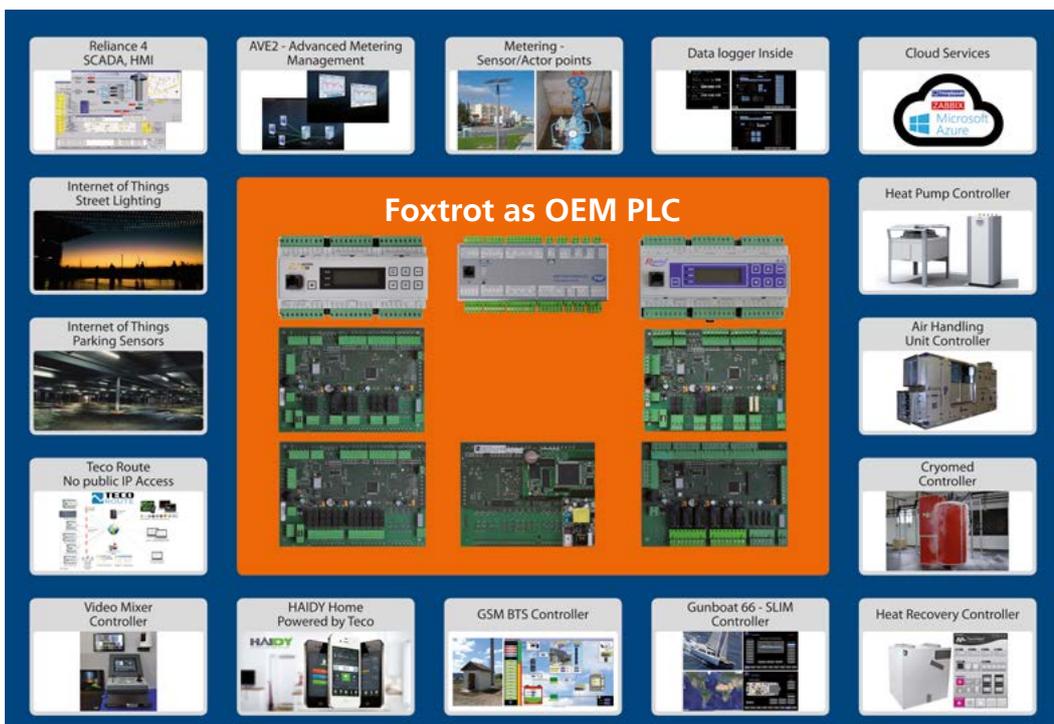


Not only smart buildings and smart houses may be controlled by Tecomat Foxtrot. The picture above shows very specific technologies designed for cities and traffic control systems. This includes for example, the Singing Fountain in Mariánské Lázně or controlled tram stops in Prague. Foxtrot systems have been used to control these technologies for many decades now.





The actual building which uses a comprehensive set of Foxtrot control systems and dispatch with SCADA system Reliance4 showing visualizations of individual operational assemblies. It is the actual hospital in Jeddah, Saudi Arabia which is almost finished now. Project implemented by Kybertec s.r.o.



The flexibility and adaptability of Tecomat Foxtrot system is further supported by OEM Foxtrot versions customized for a particular client and offering higher number of repeatability. Here you may see heat pumps, cryo-chambers, video mixer, data concentrator for cloud services and Internet of things and even automatic baking pans used in culinary projects.

Teco a.s. and UCEEB cooperate through third parties



PV FORECAST is a service developed and operated by UCEEB at www.pvforecast.cz. This forecast is not a typical weather forecast but instead it serves photovoltaic power plants (solar power plants) and

estimates the amount of electric power which will be produced during the next following day. The forecast is valid for the next 24–48 hours and it provides hourly increments. The service depends on several independent resources which increases its reliability. In addition to the sunlight coverage it also forecasts the temperature and rainfall information

applicable to the next number 48 hours. For easy accommodation and utilization of this survey the PLC used by Tecomat Foxtrot includes a functional block Mosaic which ensures and verifies communication with the forecast server. The first test applications focusing on Foxtrot, under a limited range, are already operated by selected customers.

MOISTURE GUARD

continuous humidity monitoring system

Moistureguard system has been designed for continuous monitoring of the status of wooden elements used in wooden houses. The system is capable of discovering problems caused by increasing humidity over time and provide the approximate location of the centre of the humidity occurrence. The system is adapted to be used with central units Tecomat Foxtrot.

Moisture Guard sensor MHT02485 – specifications:

- measures relative humidity in the insulating material or in cavities ranging from 0 to 100% RH, accuracy $\pm 2\%$ RH

- measures temperature with accuracy of $\pm 0.3\text{ }^{\circ}\text{C}$
- allows direct measurement of water content in wood structural components: range 7–30%, accuracy $\pm 2\%$
- sensors are equipped with RS485 communication interface with open RTU Modbus protocol
- bus allows sensor branching and chaining
- easy, two screw installation

The University Centre of energy-efficient buildings in Buřtřhrad, Teco company, system integrators such ELPRAMO or Regulus share many common products and activities. We asked Ing. Jan Vřelák to give us more details.



Modified central module uses several special sensors and works as a humidity measuring unit.



Combined humidity sensor MHT02485 built into a wood element – demonstration.



Sensor HT011485 mounted on a cable. Not equipped with the water content measurement feature.

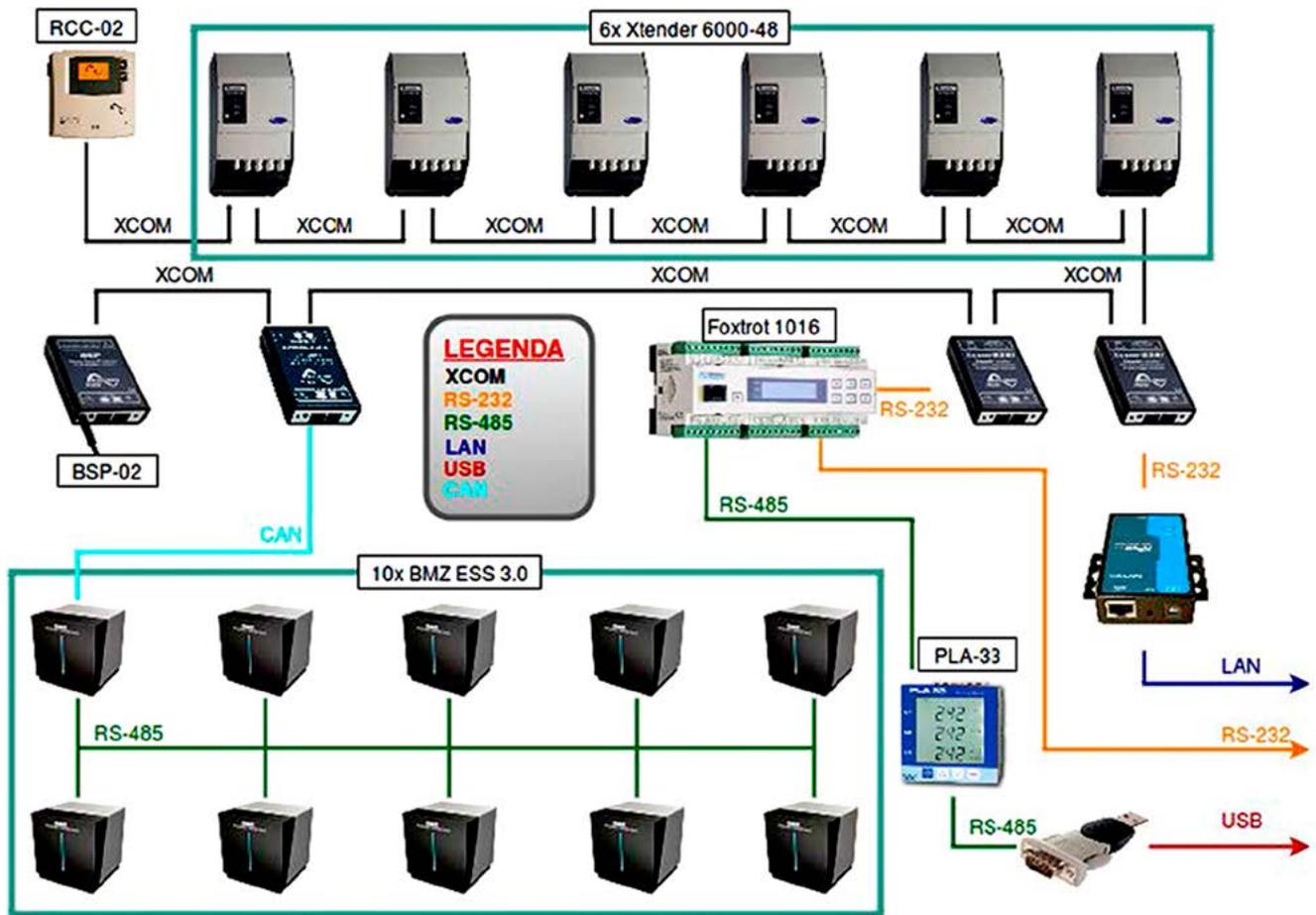
70 kWh battery of BMZ Company controlled by Foxtrot and located in the University Centre of Energy Efficient Buildings

We have obtained information about this battery from a bachelor thesis produced by David Žaitlík called **Optimal control of batteries in buildings**, dated May 2016. Ing. Peter Wolf, PhD was the speaker.

Batteries stored in the UCEEB building consists of ten li-ion batteries ESS 3.0 made by BMZ GmbH, six voltage inverters Xtender XTH 6000-48 and three control units RCC-02 made by Studer Innotec. Three PLCs Foxtrot CP-1016 made by Teco a.s. are installed to control these voltage inverters.

The system is also equipped with converters installed between individual communication protocols. The entire system may be divided into four separate sections for the purpose of carrying out experiments. The first portion, which is the largest, consists of four batteries, three voltage

inverters, one control unit, and Teco Foxtrot PLC unit. The other two sections consist of two batteries, one voltage inverter, control unit, and PLC. In addition to other information the thesis also includes algorithms and portion of the software used by Foxtrot. The battery data connection



Data connection diagram for battery unit in UCEEB where the integration role is "played" by Tecomat Foxtrot CP-1016.

diagram specified in the thesis was also used. The battery unit in the UCEEB building is one of the largest power storage systems of its kind in the Czech Republic. Foxtrot monitors the system and

watches the quarter-hour maximum and balances highly fluctuating power consumption drawn by the building. Basically, the system is running under the same mode as in a smaller family house where

it would be used to reduce the side of the main circuit breaker. Simply put, to make sure that if the electricity tariffs depend in the future on the size of this circuit breaker.

New Foxtrot CP-1091 with a quick electrical meter C-EM-0001M

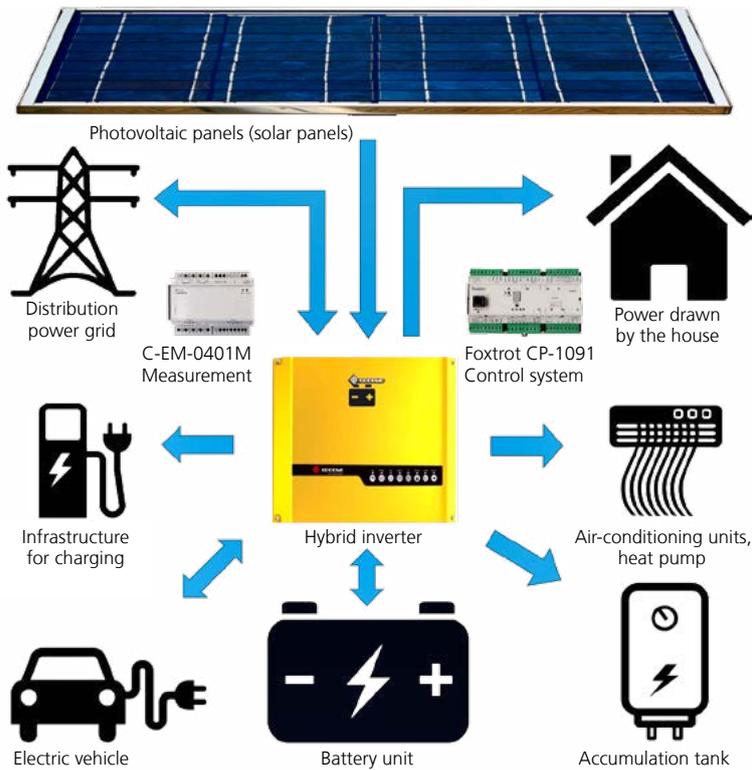
New pair for clever management of household energy needs.

The current legislature, grants and conditions and requirements allow for a significantly simpler installation of photovoltaic power plants FVE but demand at the same time that the given company either through legislature or through an economic interest, fully utilizes the electric power generated at the location of the installation. To achieve these results, and not only on a shiny paper showing off beautiful projects, one demands precise and high quality control and regulation of the generated electric power but also the usage of as many appliances as possible in order to efficiently draw or store the power. The given control

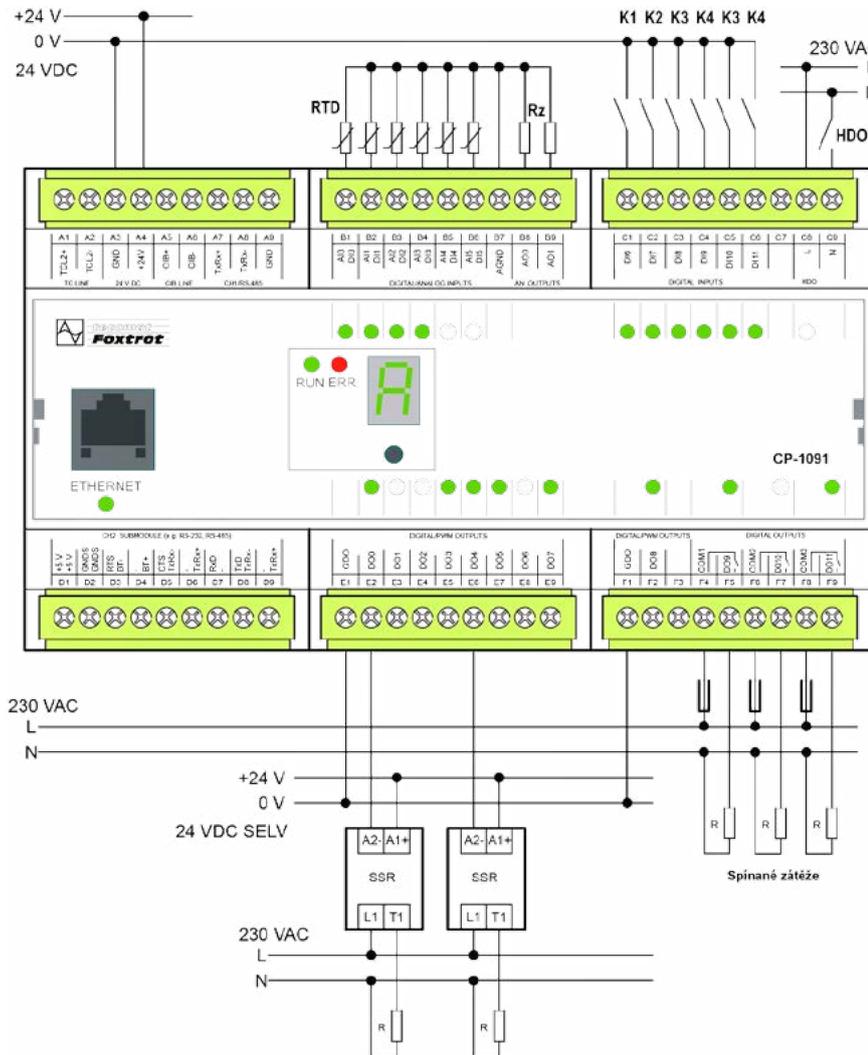
system must be able to control and regulate these appliances. There are many single or multiple purpose regulators which are capable of servicing the given appliances well but lack the other necessary functions plus the range of appliances is limited as well. These include for example a limited range of supported photovoltaic, regular or hybrid inverters, heat pumps and air conditioning units and of course electric vehicle charging systems. In addition, these units offer only the given functionalities and are limited in terms of integration with other systems, or cannot be modified according to the ever-changing legislature. Foxtrot system on the oth-

er hand, offers a rather simple solution which is used to control the consumption in a regular FVE power grid as well as a system able to control hybrid FVE assemblies, and it may also be integrated with many heat pumps, air-conditioning units, interconnected water heating systems, electric vehicle charging systems, swimming pool water treatment systems and other technologies which are able to efficiently utilize the installed FVE. At the same time Foxtrot allows efficient island operation mode. This means that in case of blackout the drawing point/location will switch into island operation mode and the system will efficiently use the power to ensure the necessary functions

and operation, will watch the inverter load and make sure that the operation in this mode last as long as possible. The basic Foxtrot system used for these applications is the new basic module CP-1091 which is equipped with up to 9 outputs that may be directly connected to electric heating systems, with 3 outputs to switch On loads/appliances and up to six 50 electrometer outputs that may be connected to the system including water meter and gas meter which send pulses or other similar signals. The module is capable of measuring up to 6 temperatures provided by the connected sensors. It is fitted with CIB bus which is used to connect quick electrometer C-EM-0401M and other modules – such as solar radiation sensors C-IT-0200I-SI, etc. Also the TCL2 master bus is available for further extension projects. The module is also equipped with RS-485 bus where FVE inverters may be connected. It may also contain up to 3 serial channels – used for example to control a heat pump or air-conditioning unit. In order to control the power draw from FVE power grid in many systems we need the basic CP-1091 (1) module

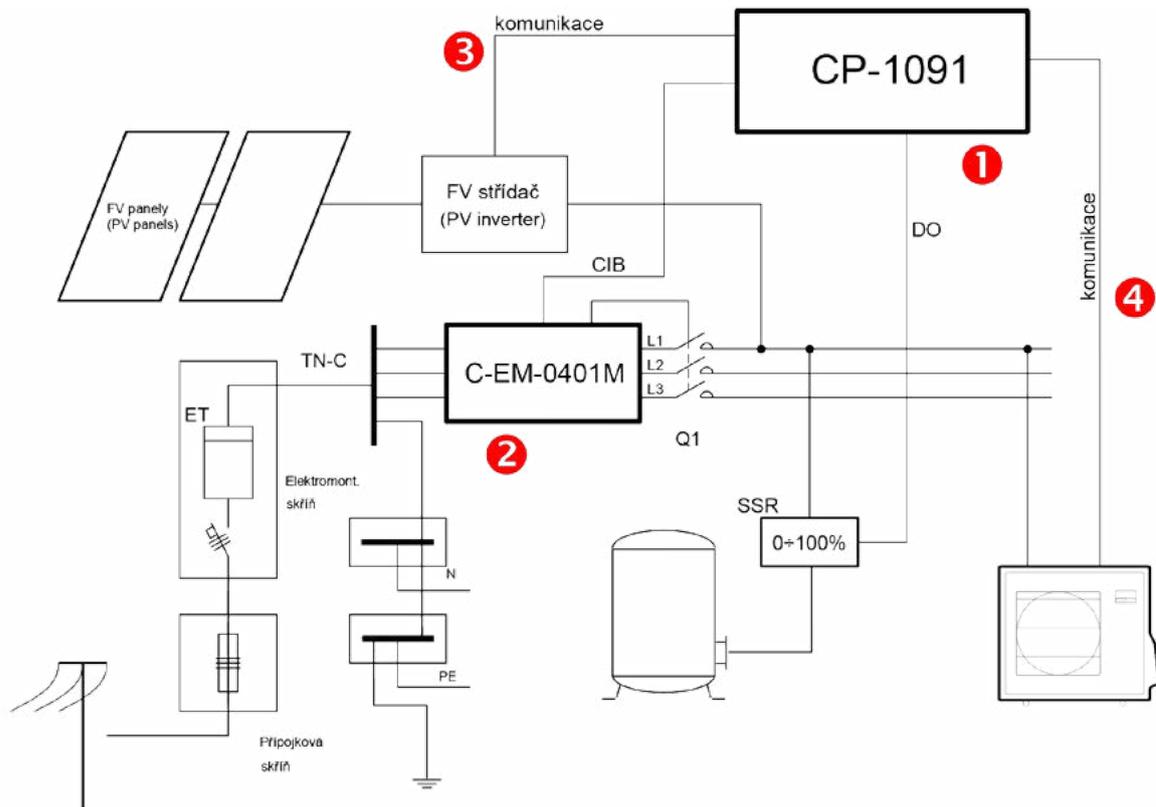


Basic energy flows in a house controlled by Foxtrot with a quick electrical meter make the house or building to act as a basic node of Smart Grid.



with quick electrical meter (2) which controls directly semiconductor power relays which switch On and Off electric water heating system. To achieve highly efficient control a direct communication with the FVE inverter (3) is used. If the system contains a heat pump and air-conditioning unit (4) – direct communication is used as well. Outputs of the CP-1091 module may be used to switch On and Off additional appliances such as sprinkler system pumps etc. and may monitor and watch other devices included in the system (for example water meters) etc. This arrangement allows us to install other FVE grid systems used in smaller applications – family houses, small businesses, but also larger power grid systems employing several 3-phase heating units and 3-phase FVE. By adding the C-EV-0302M module for example (see below), we can create an arrangement which may also efficiently charge one or several electric vehicles. Also other modules may be added including controlled and monitored technologies.

← Basic diagram showing two CP-1091 Foxtrot systems and quick electrical meter C-EM-0401 M in a block diagram of a typical house connected to a power grid equipped with roof photovoltaic panels and common inverter, water heater, heat pump or an air-conditioning unit.



Basic diagram showing two CP-1091 Foxtrot systems and quick electrical meter C-EM-0401 M in a block diagram of a typical house connected to a power grid equipped with roof photovoltaic panels and common inverter, water heater, heat pump or air-conditioning unit.

Axomer uses Foxtrot to charge electric cars using excess power from FVE

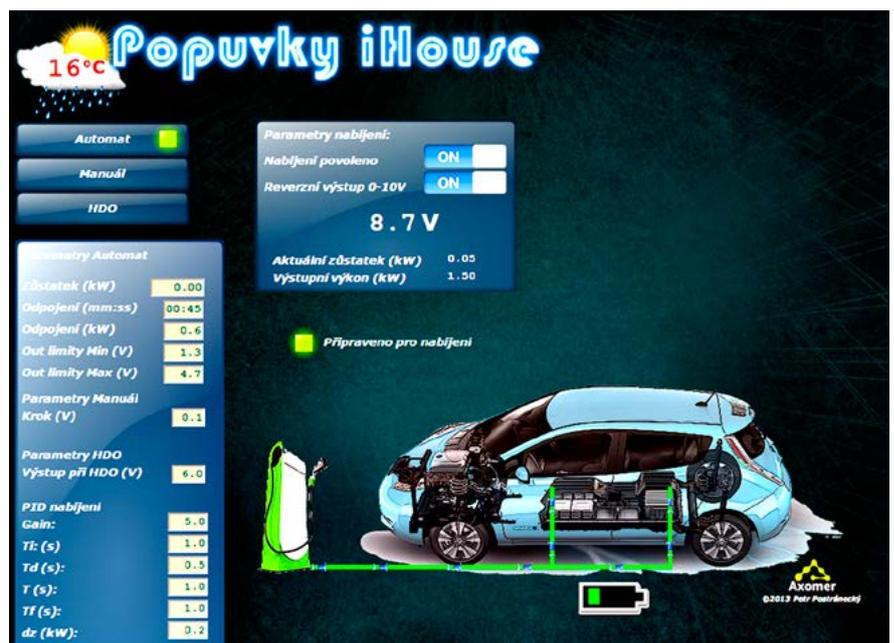


The utilization of excess power generated by FVE is a hot topic today. I was asked by my current

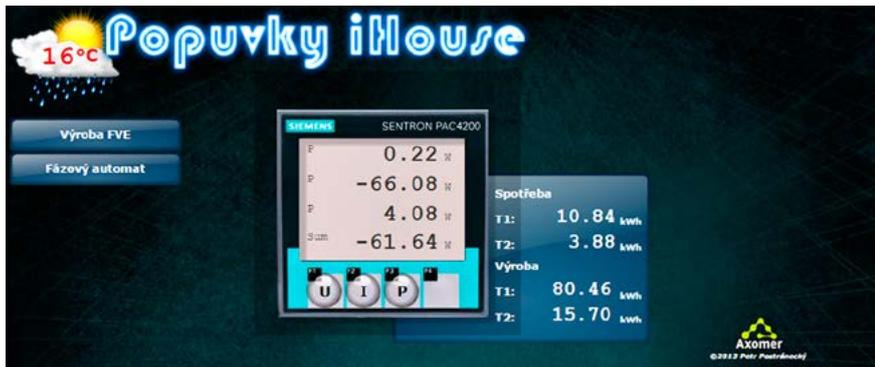
customer, who is using Tecomat Foxtrot system, to come up with a solution to utilize excess power from FVE to charge the battery of an electric vehicle Nissan Leaf 24 kWh, owned by the customer. By studying the system used to charge batteries of electric vehicles I have decided to implement alternating current (AC) single phase charging method. It is actually a standard AC plug with a cable which connects the alternating current directly to the charger in the electric vehicle, which converts it into a direct current used to charge the traction battery of the vehicle. Under this arrangement, the estimated charging time to reach the full battery charge is approximately 10 hours. If I use three phases, the estimated charging time would go down to approximately 6 hours. But the calculations were done for a load of 16A and that is the maximum of a regular wall outlet. To communicate with the vehicle the EVSE Kit is

used, which is a module that handles the communication with the vehicle. EVSE Kit contains electronics and generates 1 kHz

PWM signal, detects the vehicle and controls the switching relay. The bandwidth of the PWM signal may also be set to ac-



Electric vehicle Nissan Leaf integrated into the house system but not only into the house power grid but also into the complex logic system which handles all energies overseen by Foxtrot.

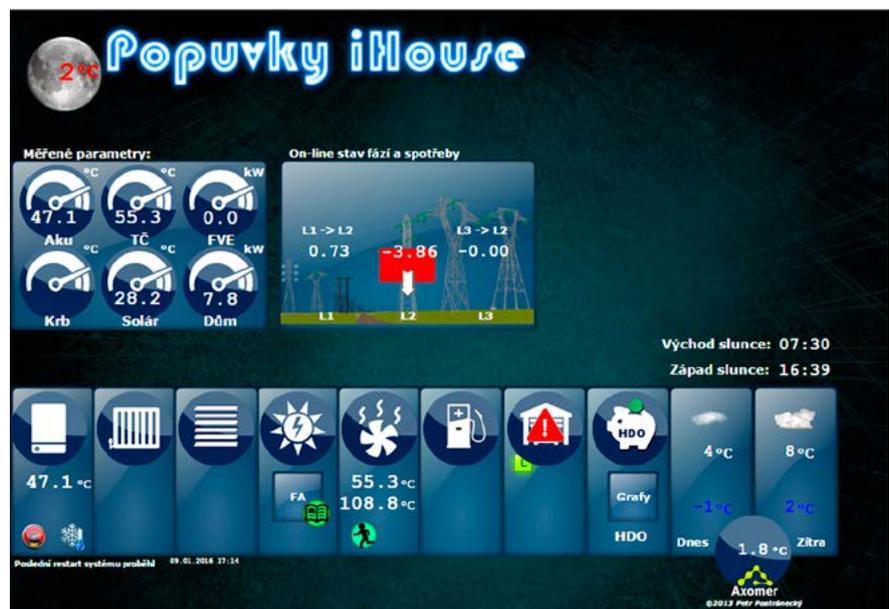


A screen of the entire house control system showing the most important temperature, consumption, power storage and forecast values.

commodate a regular control system and thus control the maximum charge current flowing into the battery of the vehicle. The entire control is fully overseen by Tecomat Foxtrot. A quick electrometer Siemens Sentron 4000 with Modbus protocol was installed to monitor and watch excess flow of electric power into the grid. This system continuously communicates with the control unit and in case of an imminent power excess Foxtrot increases the maximum charging current flowing into the vehicle's battery through the EVSE Kit module and vice versa. If the production goes down due to bad weather, clouds or due to increase in power draw in the household, or in the neighbourhood, the control unit lowers the maximum charge current. If the electric vehicle is not connected or there is no power excess coming from FVE the charging process is blocked. Electrometer online visualization – shows the actual power consumption and power generation. The user setting allows the user to select from three charging modes.

- **Manual** – the battery of the electric vehicle may be charged using a constant current (user-defined current)
- **HDO** – manual charging offering an option to charge only when

a reduced electric tariff is available – HDO. Due to frequent changes in the requirements affecting the automatic charging mode, PID control system proved to be the best one to monitor the charging current provided by EVSE Kit module. The implementation was done between 2013–2014 when a quick electrometer and the charging model from Teco were not available. Today, the system installation is much simpler and quicker thanks to the use of the bus electrometer C-EM-0401M and the new charging current control module C-EV-0302M. This project attracted the attention of Nissan Leaf car distributor operated by AUTO IN and we are currently in the process of preparing a similar project for AUTO IN.
 Petr Postránecký
 Axomer s.r.o.



A Screen of the entire house control system showing the most important temperature, consumption, power storage and forecast values.

Electric car and electric bicycle charging – a new topic for households, companies, smart cities and smart power grids.

The use of electrically powered vehicles has steadily been increasing and thus also the need to charge batteries of these vehicle quickly, efficiently and comfortably. These requirements include the need to charge the vehicle using a regular 230V power outlet – suitable for electrical bicycles for example, but also the necessity to have super-quick chargers for electric vehicles capable of charging the battery within several minutes. However their use is significantly restricted by the structural design and location.

If you want to use an electric vehicle as a company or private car for more frequent but shorter trips (which is probably the most efficient use of these vehicles today), you usually need to charge the vehicle directly in your house, office or company. To do so, the most suitable way is to use alternating current from the power grid available in the building. This allows you to recharge your vehicle continuously overnight using power provided by FVE etc. But to achieve efficient charging ...

you need to coordinate the charging process with other systems, which also demand power, to make sure that you do not overload the main circuit breaker, or to use the FVE power efficiently and of course, to charge the electric vehicle battery as soon as possible. This need for a coordinated control system is even more apparent if you have several electric vehicles. The system must be able to charge several vehicles at the same time or even prioritize the charging process for individual vehicles etc...

New bus module C-EV-0302M supports Foxtrot which is used to control electric vehicle intelligent charging process

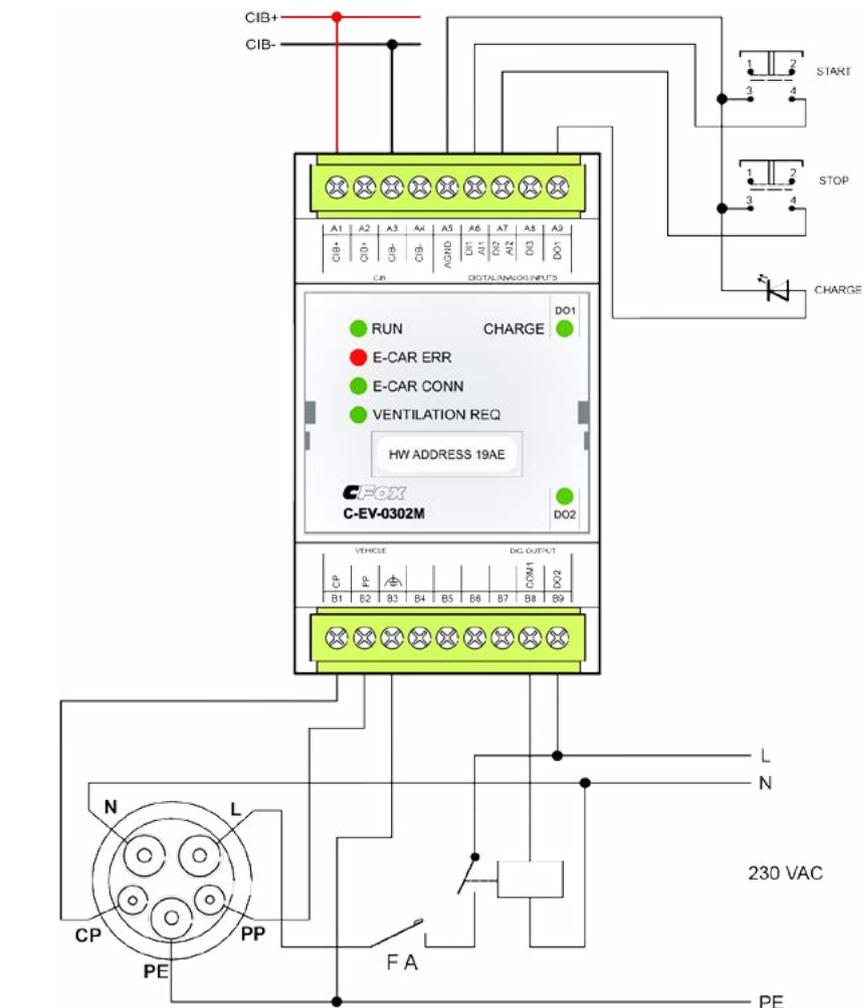
The use of the Foxtrot system added with the new module C-EV-0302M on CIB bus is able to control the charging process for one or several electric vehicles based on the use/operation of other electric appliances, based on the FVE power generation curve, or based on the agreed consumption curve, etc. The system utilizes secondary quick electrometer C-EM-0401M, also on CIB bus, and monitors the actual power consumption drawn at each phase. Based on the preset maximum value and based on immediate surplus in the production of FVE or possibly based on other requirements as well, the C-EV-0302M module controls the actual charge current flowing into the battery of the electric vehicle. The system is also informed about the fact that the electric vehicle is connected and monitors the amount of the supplied power which allows the system to display the actual charge status of the battery. Further, the system evaluates individual error status is, may end or interrupt the charging process at any time, etc. All data are stored locally but may also be displayed remotely which gives selected users the option to always view the charging process or to modify the charging process (for example, you may change the priorities when charging several vehicles).

The module is designed to control the electric vehicle charging process using alternating current available in regular 230/400VAC power grids.

The charging process control module uses CP (Control Pilot) and PP (Proximity function) signals in line with EN 61851-1 standard. Both signals together with the grounding terminal are connected to the B terminal of the module. Also relay output DO0 is connected to this connector which is used to turn On/Off the power contactor which connects the power from the grid to the charging cable.

PP signal is used by the electronics of the electric vehicle to receive information specifying that the charging cable is connected. The signal is controlled by the C-EV-0302M module.

CP signal is used to control the charging current within the range from 5% to 100% of the charging current and at the same time it provides feedback about the status of the charging process and the actual connection such as information about the vehicle connection, charging, charging process with ventilation, and breakdown status. The C-EV-0302M



Module C-EV-0302M and its connection diagram.

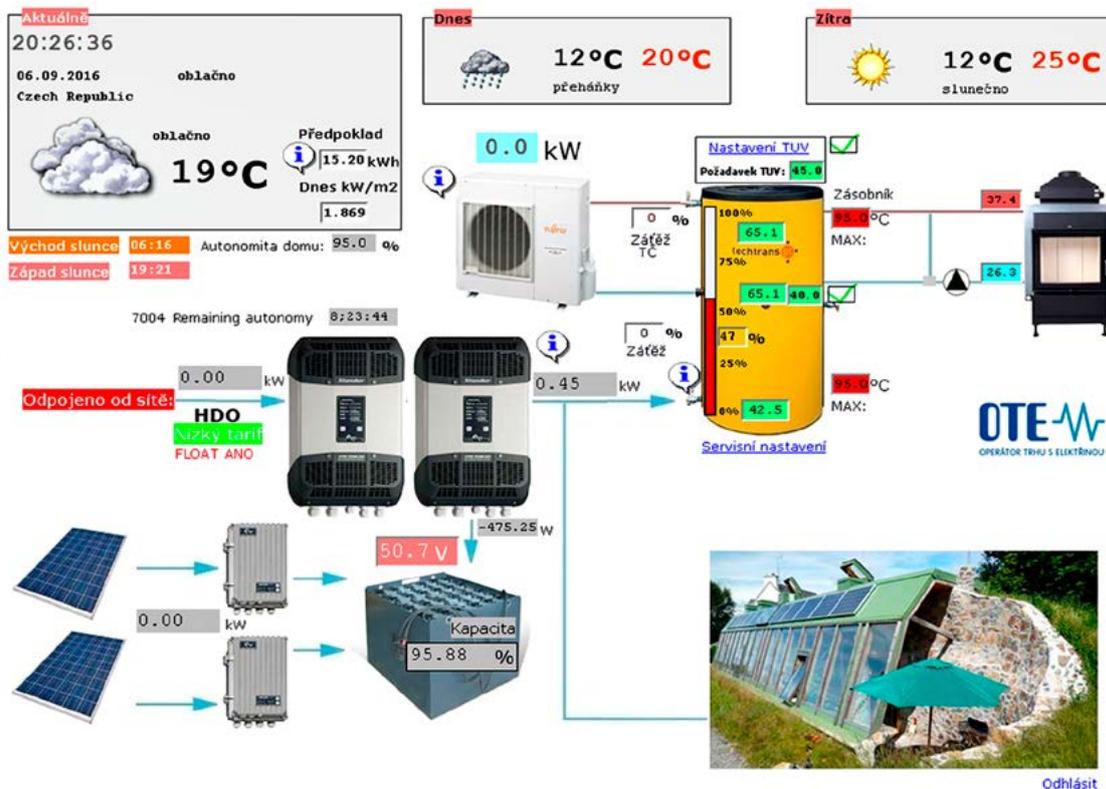
module transfers data over bus into the system for further processing and displays this information on LED on its panel.

The module is equipped with two universal inputs AI/DI1 and AI/DI2 which allow you to connect for example, control pushbuttons START and STOP which may be placed on a panel or box which contains the electronics or you may use these buttons to control the charging process manually from the given location (for example when you arrive or when you leave), or you may use inputs to connect thermal sensors etc. The third input DI3 is mostly designed to connect output of SO electrometer of the given application and where you want to be able to see the amount of power supplied to the vehicle, or you may want to monitor the charging process better, or finally, you may use the input as regular binary input.

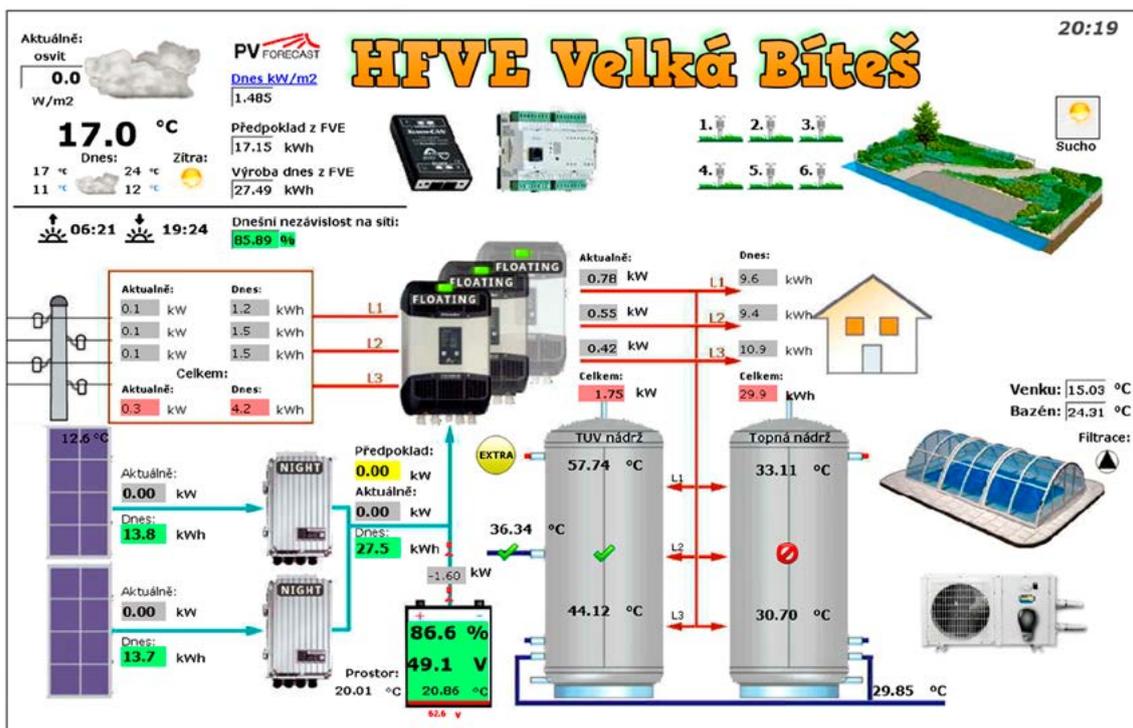
The module is also fitted with binary output DO1, which is only for LED indication diode. This diode may be placed on a panel of the given box next to the pushbuttons and used to indicate the ongoing charging process.

PP and CP signals (in line with IEC 61851-1 standard) supply information to the electric vehicle and tell the vehicle that the charging unit is connected (PP signal), and allows you to control the charging current (CP signal). That means based on the actual available output, which depends on the number of other active appliances at the given drawing point, you may control the charging current for the vehicle to achieve the quickest recharging as possible while making sure that the maximum charging current of the circuit breaker is not exceeded. Also the charging process may be controlled by the actual power output of the local FVE (to minimize cost) etc.

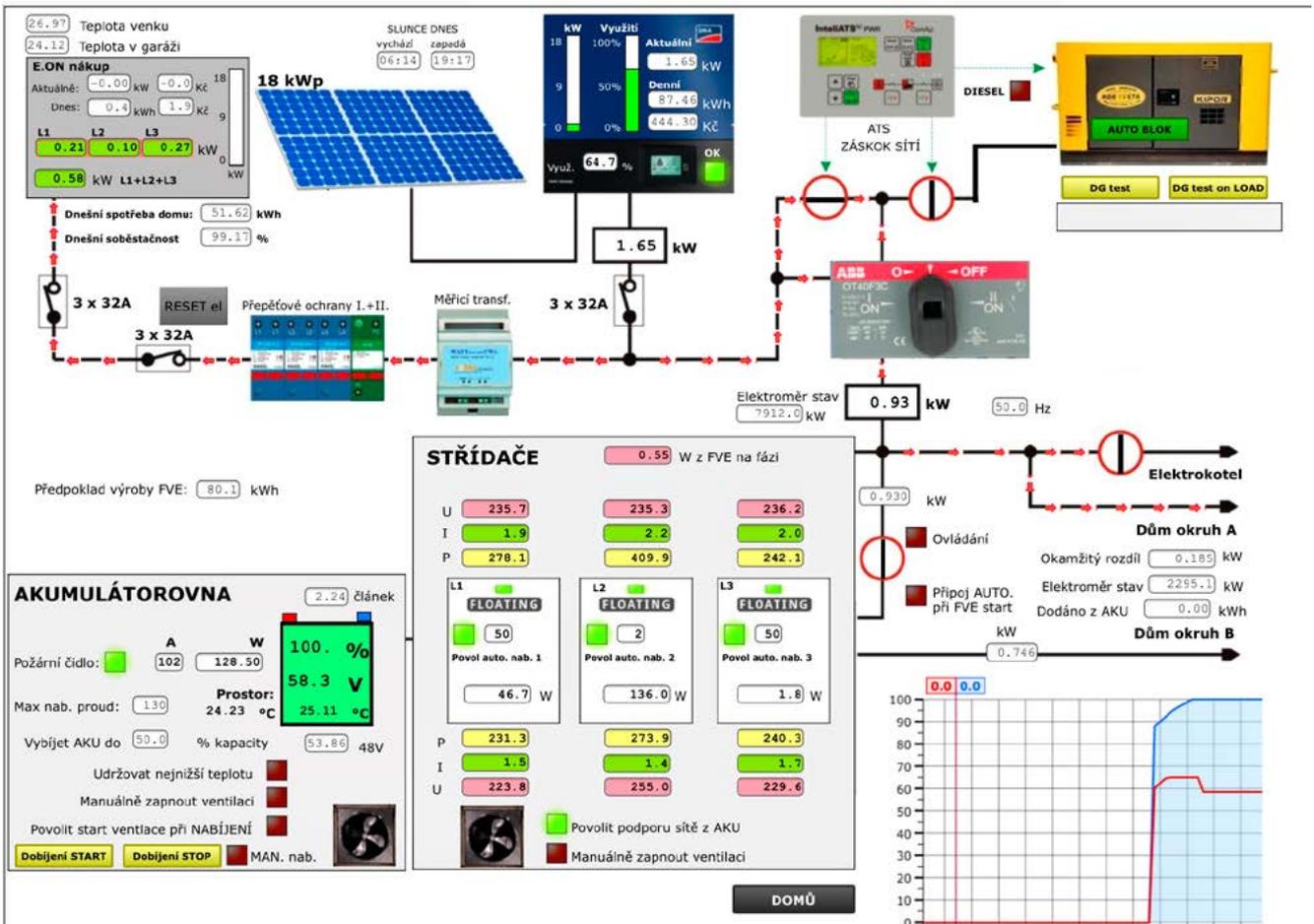
Samples of houses controlled by Foxtrot system with integrated power storage – batteries



Studer voltage inverters installed in a house in Slunířov controlled by Foxtrot inspired the creation of a comprehensive solution called HOMEGRID created by Solární panely.cz company



Hybrid photovoltaic power plant with Studer inverters integrated into the house control system in Velká Bíteš. The system uses weather forecast and sunlight to optimize the use of electric power and rain water used by sprinkle system. The benefit of using Studer inverters is the ability of the system to switch to an island mode and fully overcome possible power grid blackouts thanks to the power stored in batteries.



Complete diagram showing energy connection in a family house in Kyjov including backup diesel power generator.



Battery storage HOMEGRID with integrated Studer hybrid inverter and Foxtrot control system. Foxtrot system is able to use and control power provided by photovoltaic power plant, power grid or by batteries, by water in accumulation tank and heat pump. Supplied by Solární panely.cz



To work, develop and optimize the operation of the company showroom, Fenix company chose the UCEEB building in Buštěhrad. Thanks to good experience with Foxtrot the company chose the system for UCEEB to handle remote monitoring and algorithm modification. Online data monitoring is available through a website.

Other type of supported battery storage units able to work under island mode are SAVEBOX products made by Fitcraft Energy. Interior design of SAVEBOX Home with 4.5–7.5kWh capacity is suitable for family houses. The largest capacity offers 60 kWh and are designed for industrial applications and for larger objects or

may be used as a replacement or supplement to diesel power generators. In comparison, this battery storage is able to overcome smaller but more frequent blackouts. It communicates with Foxtrot via Ethernet port and uses Modbus TCP protocol.



SAVEBOX Home
4,5–7,5kWh

SAVEBOX Home
6–9kWh

SAVEBOX M
18–20kWh

SAVEBOX L
60kWh



Foxtrot – Solar Monitor hotline

Let us repeat the information about the readiness of the Foxtrot system which was already mentioned in the Tecoinfo newsletter demonstrating that Foxtrot is able to improve and solve issues appearing in already installed photovoltaic power plants and in other solar products supplied by various inventors and that it is the functional block supporting connection between the Solar Monitor system specializing in the communication between all types of solar inverters and in reporting processes which provides information about their functions

required by the legislation focusing on centralized servers. In order for us to provide high-quality support for integrators with we have agreed with the Solar Monitor company that the functional block for Foxtrot/Mosaic will be handled by Solar Monitor in order to

ensure continuous update of the block – if changes in the entire chain consisting of a solar inverter – Solar Monitor – Foxtrot, occur. At present, the portfolio of connectable inverters covers more than 90 percent of the assortment of products available in the market.



Solar Monitor communication module and list of supported manufacturers which produce inverters.



Introduction of system partners

TopeníChytře.cz

Comprehensive and economically beneficial solution for thermal comfort of your home.

Be smart and heat or cool your house efficiently

A smart heating system reduces initial cost, allows you to maintain control over your house, gives you the required comfort and saves time. It is simple to use and almost infinitely expandable. It monitors the power consumption history and adaptively monitors and controls technologies installed in your house or apartment.

Heat or cool your house comfortably

You may control the system comfortably and easily from the control panel, computer or your mobile phone. You may also measure and monitor everything including the boiler room, swimming pools, solar panels and individual rooms. This system saves you time. One look and you are able to verify and see the actual status of the house or whether windows are closed or open, etc. One single touch and you will put the system to sleep.

Heat or cool your house reliably

Individual components of the smart heating system ("Topení chytře") utilize the Tecomat Foxtrot system due to its reliability even under highly demanding or industrial conditions. Thanks to an intelligent architecture and easy implementation it is one of the most reliable solutions available in the Czech market available for very competitive prices.

TopeníChytře.cz
Smart solution for your heating system

A single touch is all you need
to efficiently control
the heating system in your house

**WE ARE SEARCHING FOR PARTNERS TO WORK IN VARIOUS REGIONS
AND TO SELL AND IMPLEMENT OUR SOLUTION**

www.TopeniChytre.cz
MICRONIC Přerov s.r.o.

DEVELOPER'S PROJECT CALLED ZLATÉ KRÍDLO (GOLDEN WING) – BRATISLAVA – RAČA



Near the forest of the Malé Karpaty Mountains directly on the slopes of Račianské vinohrady (wine yard) a cozy development project called "Zlaté Krídlo" is being implemented. There are 132 apartments divided into four apartment houses which thanks to their clever design and architectonic approach respect the privacy of future residents.

A revolutionary and experienced Slovakian developer D.O.A.S. a.s. wanted to offer more features to future residents than regular apartments do. And so it happened. The developer offers SMART apartments. After a careful design reviews and preparations we have modified the original electrical wiring system and turned it into the so-called hybrid cable installation. The unique concept of hybrid cable installation supplied by Domotron allows residents to enjoy many rich features offered by the so-called smart household concept – and even for friendly prices. Each apartment may be added with Domotron control system which oversees heating, lightning, blinds,

awnings, and air-conditioning system, closes the water supply pipe and even handles the security. Domotron also monitors the cost. Each resident is able to see information showing the consumption of water, heat and electric power in real time. All power consumption data are safely stored in a cloud. Because all measurement instruments are certified these data are also used by the building management company to break down the cost. No more water meter or heat meter readouts installed on heating units. Clients may decide to go with the Domotron solution at any stage of the project and even after the issuance of the final building permit. Everything was well thought through and there is no need for any additional changes due to cable installation, not even if you go with wireless solution. The entire system is fully adjustable thanks to the unique Tuner environment offered only by Domotron. The system in the house/apartment may be controlled using regular Tuner pushbuttons on walls or using high tech and quick application regardless of the fact whether the owner is in home or on a business trip. You may download the mobile application either for iOS or Android. Just open a demo account and try how easy is to control the system.

www.domotron.sk

Domotron®

APARTMENT BUILDING OF THE FUTURE IN BARANDOV

Should you decide today to purchase or built a low energy or passive family house you may easily get consumed by the huge number of options available out there and you will not be able to choose the best solution for you. If we are talking apartment the situation is very different even if you consider



the fact that based on a consulting company called JLL, 85% more of low energy apartments will be completed this year in comparison with the last year. These are however, still exceptions even though the demand for low energy apartments is increasing rapidly.

One of such unique low energy projects is the Sky Barandov complex of low energy apartments designed by the well-known architect Eva Jiříčná located in the Barandov area in Prague. This complex has been awarded the highest energy saving class A. The team of architects around Eva Jiříčná was able to get the A class thanks to structural properties of the building but also thanks to a smart ventilation system which impacts the energy consumption in such large buildings the most. As standard feature, all 108 apartments in the Sky Barandov building are equipped with top-of-the-line heat exchange units Paul. These units provide highly efficient air circulation in the apartment without the need to open windows. Three panel insulation windows in combination with other used materials and the building layout prevents heat losses which occur during ventilation. New residents often purchase and add to the heat exchange unit an intelligent control system Haidy which allows them to use TV monitor, telephone or tablet to control the heat exchange unit Paul but also other elements in the apartment such as lightning, lightning scenarios/modes, heating or floor heating system, external blinds, ventilation or security system. In addition to the features mentioned above the SKY Barandov residence is ready for installation of a camera system which may be connected to a centralized defence system.



"We at HAIDY are very happy that we have become a part of the project which we call without exaggerating the project of the future. The apartment building complex in Barandov demonstrates the future trend for apartment buildings. Smart technologies together with proper building structural design represent the future alternative approach if we want to keep offering higher comfort of living to people while reducing the cost and the impact on our planet." said Filip Rezek (Business Director of Haidy a.s.).

www.haidy.cz



INTELLIGENT HOUSE NEAR PRAGUE

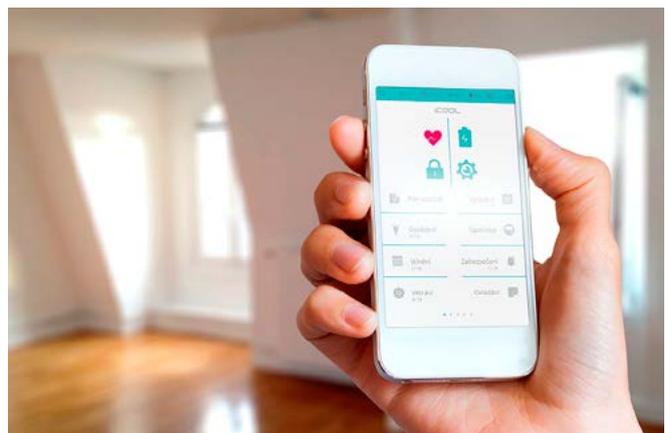


In the town of Středokluky near Prague you will find a house fully equipped with Tecomat Foxtrot technology and with application extension iCOOL. The house is accessible to the general public and you may learn here about the benefits offered by smart buildings.

Most systems which are using the label intelligent electro system focuses on the control of individual devices (most often via mobile phone or tablet), which offer an option to set time programmes for heating, lighting systems, etc., or you may set basic interdependencies (when you leave the lights turn Off). iCOOL system is different and the user will not even know that it has been implemented (it is controlled using regular wall switches and simple temperature regulating units). However, this seemingly easy system harbours a highly sophisticated algorithm that controls individual technologies.

iCOOL system therefore focusing on achieving an ideal operation of the house in terms of energy savings and healthy environment inside the house. However, to achieve correct functionality one needs to know the house in and out and that includes the implemented technologies, which unfortunately is not possible for unified systems. Ideally, the iCOOL system should be designed together with the house and we were able to push this approach in some construction companies, developers and architects.

The fundamental difference of the iCOOL system lies in its service extension which monitors the entire building, including structural elements. The extension system was developed in cooperation with manufactures of wooden houses and the ČVUT (University of Technology). Already during the construction process the house is equipped with sensors which are built into the structure and which monitor the given conditions and are able to detect defects or improper use in advance. The significance of this approach is important for investors but also for manufactures who are now able



to see how the house behaves. This allows them to provide extended warranties or maintenance services. The biggest difference which separates this system from other intelligent houses is the iSMART manager extension which uses a very simple colour graphic screen (ranging from green to red) to display the overall status of the house and individual subsystems (health, energy, maintenance, security). This allows the user to see how the house behaves – it is displayed on the iCOOL home screen, and the user does not need to search and read the data from individual screen sections and interpret them. This function is mostly appreciated by our clients as the majority of our clients try to use the system to save energy but also to create a healthy environment in their houses and to protect their investment.



iCOOL benefit review:

- the system is optimized for a particular house and technology
 - it is designed to create healthy environment, provide energy savings and handle correct maintenance
 - it monitors the structural system of the house and informs investors or manufacturers about defects
 - the operation of all systems running the house is indicated on the home screen by displaying a colour-changing icons
- Should you be interested in an open house visit, please contact us at www.icool.cz



TEFORA FOXTROT CLIENT FOR ANDROID

Tefora s.r.o. is a company based in Prague focusing on projects and implementation, automation and regulatory systems designed for family houses, apartments, offices or manufacturing halls. It puts great emphasis on the actual adaptation of functionalities and on integration with various technologies based on the client's requirements. In doing so, the company relies heavily on its long-term experience and ICT knowledge, in particular in the development of software and system inte-



gration applications. And of course, the company includes Tecomat Foxtrot in its portfolio.

Tefora is technologically agnostic (impartial). It prefers automation and regulation systems based on different manufacturers with the intention to serve the best interests of the client, while other companies sometimes supply a finished "intelligence in a box" with no additional options. But consider this. Heating system control of industrial technology poses different objectives and requirements than heating system designed for an apartment building.

In the recent project Tefora successfully implemented Tecomat Foxtrot system in a new family house which controls the heating system, swimming pool heating and ventilation using Siemens Synco living, which handles the zone heating system. Tefora also frequently deals with special lightning system requirements including remote control. Recently there is an increased demand to control the intensity and colour of LED stripes using regular switches which is a task tailored for automation.

Tefora supplies smart houses with a popular magnetic wireless docking station called LaunchPort made in the US, but it also develops its own software applications which are used to control automation and regulatory systems and are available for download from Google Play. For a regular household owner the free version is usually sufficient, but professional service technicians use the full and paid version. For example. Tefora Foxtrot Client is designed for Tecomat Foxtrot.

Tefora Foxtrot Client allows the user to interpret Foxtrot website and connections through TecoRoute without having a public IP address, but it also integrates technologies controlled by other technical platforms. Tefora s.r.o., Vladycká 1542/9, Prague, 102 00 www.tefora.eu, info@tefora.eu, phone: + 420 724 745 743



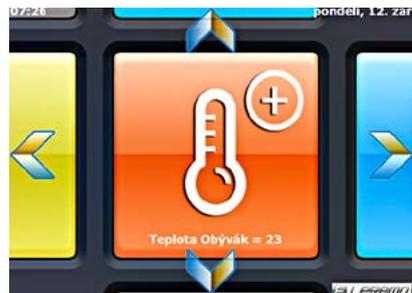
SMART SYSTEM INSTALLED IN PERSONALIZED TELEMEDICINE LABORATORY

case study and reference of ELPRAMO s.r.o.

The laboratory of personalized telemedicine has been established under the framework of a multi-field project designed by the Universal centre of low energy buildings (UCEEB) at ČVUT (University of technology). The goal of this project is to unify medical doctors, scientists, manufacturers and users of assistive medical technologies into one team.



Tecomat Foxtrot system supplied by ELPRAMO s.r.o. controls the lighting system, electric blinds, air-conditioning unit, heating system, multimedia, window and door opening, water supply shut down, and other household technologies in the laboratory (it communicates with Miele appliances).



The control system also monitors movement of people around the laboratory, energy and media consumption, and records these data in the database server using a datalogger.

All technologies are controlled through clear visualizations which is available in two options. The standard visualization version allows the user to easily control the technologies using PC, tablet or smart phone. The simpler version is prepared to be able to use an assistive interface which uses eye-movement to control the given technologies.

The software used by the smart technology installed in the laboratory also offers special functions such as bath filling signalling system, light dimming, automatic blind opening in the morning when a person wakes up, or ceiling light colour management. There are also standard functions such as programmable light scenes including RGB control and the "leave home" button.

After previous arrangement you may visit the laboratory and receive a professionally narrated explanation. Please contact:

Ing. Petr Pokora,
ELPRAMO s.r.o.
pokora@elpramo.cz
605 757 980



The objective of the project is to measure bio-signals of a person every day including signals from his or her surroundings and transfer these data online through a concentrator into a database system. This database will contain technical data (consumption, energies, EZS/security) and medical data (temperature, weight, pulse), which allows the system to monitor correlations or deviations. The system communicates with the user and provides the user with assistance, entertainment and safety.

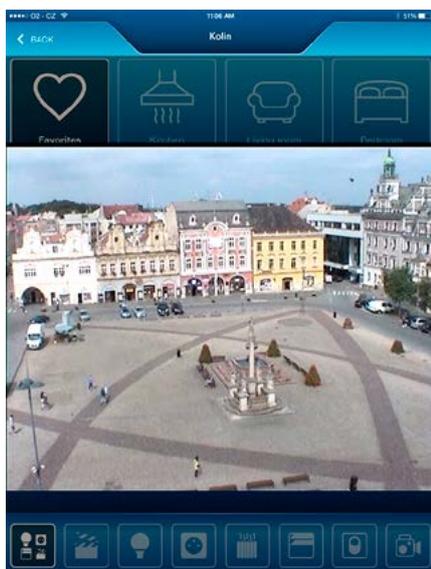
New design of iFoxtrot – Application for iPhone and iPad

iFoxtrot application is now available for download on AppStore and features newly innovated graphic interface and offers many new functions and setting options. Let me briefly describe the application. It is a multifunctional application designed for quick and comfortable control of houses or buildings using Foxtrot system. It has been designed to be able to automatically adapt to an individual programme which is loaded in the given Foxtrot system – programmed in Mosaic using functional blocks from iControlLib

After you press the Foxtrot icon for the first time iPhone or iPad will open the (Obľíbené" and „Všechna zařízení") "Favourite" and "All devices" option menu and the user may drag here any control element that the user sees important or which is used most often. So, to turn the lights On or Off or to dim the lights, the user only needs to press the given icon two or three times. The figure shows screen arrangement displayed by vertically positioned iPhone. You may see the Leave home button, Theatre scene initiation button, camera view and link to a favourite website.



Moving horizontally around the room icon bar (top) and around the device bar (bottom). The movement around the control elements is vertical. The figure shows only buttons corresponding with the given device. Here you see the screen on a vertically positioned iPad and all devices in all rooms are selected.



By pressing the extended function button the system will open a window displaying more detail control and setting options. For example, light colour, heating system time programming or as shown here detail camera view. You may also insert public camera links.



iFoxtrot system allows the user to display several locations controlled by Foxtrot. In the login address, password, and protocol menu you may select the given connection as the main one, which will move the system there directly. You may also set direct access to Foxtrot website using http protocol and therefore go "around" the standard web browser access. In such scenario, the programmer controls directly the graphic interface, window arrangement and control logic and the user is not distracted by regular control elements of the standard web browser. iFoxtrot also supports connection through TecoRoute – it provides connection without public IP address.

In addition, it is also compatible with Control4 system connection. The application is responsive and it may be adapted to different sizes and resolutions of all iPhones and iPads including vertical or horizontal screen positions.

The main objective of the intended ergonomics is the arrangement of buttons, icons and names of individual rooms on the top bar and the arrangement of technology icons on the bottom bar. By selecting the room and the given technology the middle active window will display only those control elements which correspond with the selection. That means that other control elements

do not disrupt – the user does not need to waste time by searching for the correct button.

Let us also mention that the direction of the development of iFoxtrot moves swiftly also in terms of integration of third-party devices. Control buttons of iFoxtrot are also ready to initiate applications of third parties directly.

This allows the user to integrate his or her favourite applications such as multimedia control, track selection from NAS or from services such as Spotify or iTunes, Internet radios and streaming cameras and place them on the first iFoxtrot screen under the frequently used devices menu.



In the setting menu you may add different rooms, change room names or place individual devices in the given room or in the favourite folder. By simply dragging the buttons in each window you may change the order of the buttons.

iFoxtrot also offers the option to create and save your own scenes (screens) using various control elements of any device. The preset scene is then stored by Foxtrot and available to other users as well.



Teco Excel Client

Data from Foxtrot into a cloud and from cloud to Excel

In the last Teco information newsletter we have introduced a new invention – a functional block which ensures continuous data writing from Foxtrot to Microsoft Azure cloud – by using the Storage Tables services. This block is even able to handle temporary communication black-outs. Data stored in this way are now available to users for online processing through the Teco Excel Client plug-in using a popular spreadsheet software Microsoft Excel. This extension allows both data reading and data storing – back in the cloud. This completes the extensively simplified chain of online data flow between Foxtrot and one of the most widespread tools offering intuitive and user configurable data processing.

The plug-in offers the following functionalities:

- Reading data from the cloud and displaying them in Excel periodically, with an option to specify how many last items in the table will be read. The period may be set up on request
- Writing data from Excel to a table in the cloud and giving Foxtrot data or a command.
- Storage of data read/displayed in Excel in .xlsx 2010 format or later, but also in .csv format
- Option to store set parameters under named profiles which may be

restored through reading but also transferred to another computer.

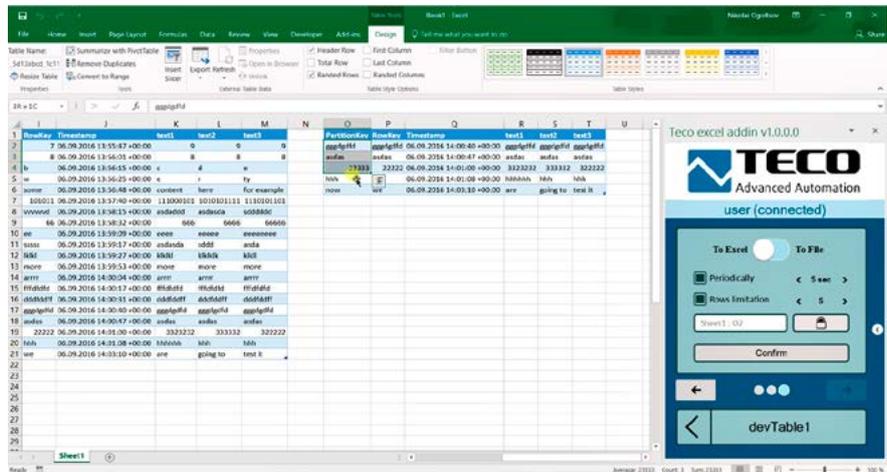
- Profiles are encoded and stored
- Plugin is supported by Win 7, 8, 10 and Office Excel 2010

Sample of uses:

- Floating graph. For cyclic loading of "n" last items of the cloud database into a spreadsheet area in Excel which serves as a data source for the graph.
- Contingent table. Similarly, as with the graph during

cyclic loading of "n" last items into Excel spreadsheet area, which is the data source for contingency tables, we receive automatically updated analytic data.

- When data from the Excel spreadsheet are loaded/written in reverse to the cloud, then these data may be automatically transferred into "n" predefined Foxtrot systems and therefore, using one single writing process new control parameters may be set for all.



Teco Excel Client allows automatic synchronization of "n" sheets from several databases stored in Microsoft Azure cloud – all at once.

New wall-mounted air-conditioning control unit C-RC-0011R

At present, we are introducing to the market an interior controller C-RC-0011R with LCD display and touch buttons connected to CIB bus. This controller is mainly designed for office buildings and for local control of heating, ventilation and air-conditioning systems, or as a remote controller for heating systems etc. The display shows many symbols (see the figure), which allow the user to simply and comfortably display or change basic parameters of the heating system. The module is also ready to accept changes in weekly time programming which was also designed as a form of a functional block for the Mosaic environment to make sure that this module may be similarly controlled from the Foxtrot website (where user graphic interface is available),

using iFoxtrot, SCADA Reliance environment, which is being currently prepared, as well as by the C-RC-0011R controller. The display of the controller offers 5 touch buttons which control the given functions. The module was designed as a standard peripheral using CIB bus. The module is also equipped with Universal input to measure temperature (or humidity as an option) in the interior or it may be connected to an external thermal sensor (for example to measure the temperature of the floor), or to a window sensor, etc. Later, this module will also be equipped with several other inputs and outputs which will allow the controller to display and set parameters directly or to control for example an induction unit in the room, ...

fan-coil or other heating or cooling source. Battery powered module with RF feature will also be available.



Basic option of the wall-mounted air-condition control unit C-RC-0011R

C-KY-0001R

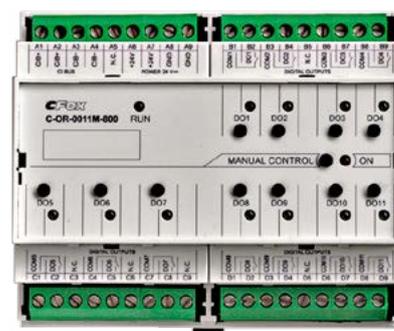
One of the CFox modules that are being prepared is the C-KY-0001R keyboard which offers standard keyboard features for PZTS systems. In addition to the keyboard the module is equipped with RFID chip reader, OLED display used to communicate with the user, and it is also fitted with a measuring unit and with two universal inputs allowing connection of other thermal sensors (for example floor temperature and outside temperature), window contact, switch etc.

The keyboard allows standard PZTS system functions (formerly EZS), such as activation and deactivation of security system, sheathing security mode, sensor bypass, night mode and others. It is also able to displays other information about the building including temperatures, energies etc. Under regular operation the keyboard may display the room temperature or outside temperature and even replace an interior heating system controller in the given room.

The module is housed in a plastic box with transparent front panel which clips onto the rectangular installation box (standard wall installation box).



Key layout and display position on C-KY-0001R keyboard.



C-RM-1109M

Recently we have introduced to the market C-RM-1109M module. Thanks to its arrangement the module may be used to control rooms, hotel rooms (lighting system, heating systems, wall outlets, etc...), and other applications where a combination of inputs and outputs is necessary, in particular, where loads/appliances with certain capacities must be turned On or Off – lightning system circuitry or wall outlet circuitry etc. The module is equipped with 8 binary inputs to connect switching contacts/terminals, for example push buttons which control lightning system, wall contacts, PIR detector and three analogue inputs to connect resistance temperature sensors, 8 relay outputs and 1 voltage analogue output 0–12V, which may be used for example for linked heating units heads. This output may also be used to power PIR detector in the room.

The module is equipped with relays which are designed to switch capacity loads, 4 relays with 16A contact (short-term up to 80A), and 4 relays with 10A contact (short-term up to 50A).

The module is built into a standard 6M box on DIN rail and it is powered either from CIB bus or from an independent 24V power source connected to the given terminals of the module (to lower the load on the bus).

Hotel room control panel with glass control screen C-RC-0005R

We are in the process of designing a control panel C-RC-0005R which will be used in hotels and similar establishments. The module is equipped with several capacitive buttons (see the figure) and with OLED display. Buttons allows you to change the set temperature in the room, ventilation or air-conditioning parameters intuitively, and to set local wake-up calls (if the object is constructed for this feature), and to set "Do not disturb" and "Clean room please" messages displayed on the outer door side of the given hotel room.

The module will also be available with custom glass - that is with the basic colour design, inscriptions, logos, etc.

The module also measures the temperature and humidity in the room and it is equipped with two inputs where additional thermal sensors and window contact sensors, etc. may be connected. The module is enclosed in a plastic box with glass front that clips onto the rectangular installation box (standard installation box installed either into wall or on the wall).



Key and OLED display layout on the controller with integrated functions designed for hotels.

New look for the ID-31 panel

We are in the process of preparation a new look for the UD-31 display. It will be equipped with a transparent front panel and housed in a plastic box which will be installed in a rectangular installation box (the same as C-KY-0001R and C-RC-0005R modules which may be combined). The unit may either be installed on a distribution cabinet door or a panel using attachments screws on the back. As far as the functionalities are concerned, the module has the same functionalities as its predecessor, which includes LCD display and other parameters, which also remained the same.

Bus module C-IS-054M allowing connection of rainfall, icing and water level monitoring sensors

Bus module C-IS-0504M allowing connection of rain, icing and water level monitoring sensors

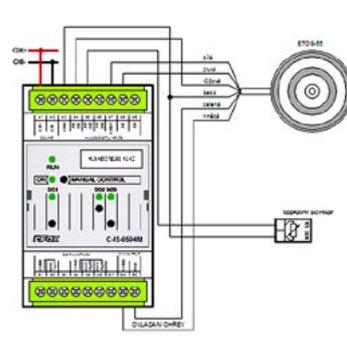
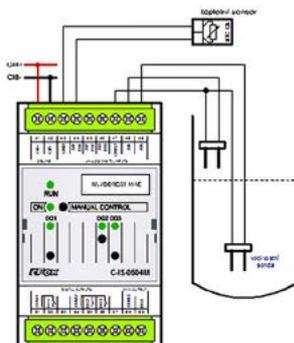
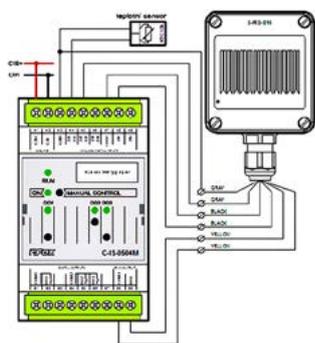
The module is designed to supply power for controlled heating system and for rainfall detector S-RS-011, to supply power for heating and icing sensor measurements requiring voltage of 24V manufactured mainly by V-system company including outputs used to switch cable de-icing system. Also two water level measuring probes may be connected to the module, used for example, to monitor the given limiting levels in a tank. Inputs and outputs may be used as regular AI/DI and DO. The module is equipped with 5 analogue inputs, of which, 3 are analogue inputs allowing connection of resistance sensors or regular binary inputs, and 2 analogue

inputs, which allow alternate measuring of resistance icing sensor, rainfall and water level probes.

Further, the module is equipped with PWM input DO4 designed to supply power and control heating system sensors. This output is designed to supply power only to these sensors with power input of approximately 2W as the output circuitry is not protected against overload.

The C-IS-0504M module is also equipped with three relay outputs one 16A and two 5A, used for example to switch heating system cables, de-icing system etc.

Individual relay outputs may be controlled manually and locally using buttons on the module panel.



Three diagrams and three different sensors (rainfall, water level, icing sensor) connected to one universal module C-IS-0504M on CIB bus.

Peripheral module C-IR-0303M

We are currently preparing a peripheral CFox module C-IR-0303M which is mainly designed to control heating circuits and to easily extend arrangements with Foxtrot systems which are used to control heating systems and assemblies. The module is equipped with 3 universal inputs allowing connection of thermal and binary signal sensors etc. It is also

equipped with 3 relay outputs. Two relay outputs with joint terminal are fitted with 5A relays, and the third output is independent and it is fitted with a reinforced 16A terminal (short-term up to 80A).

The module is designed to be installed on DIN rail and its width is the same as standard 2M box.

Front view of the C-IR-0303M module



New CIB bus gas detectors

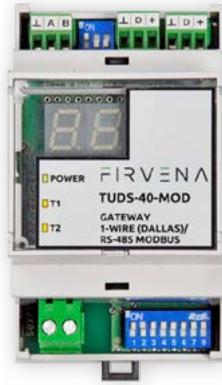
The C-AQ-0005R series is added with new gas detectors able to detect three new gases:

The C-AQ-0005R-CO for carbon monoxide, C-AQ-0005R-M for methane and C-AQ-0005R-B for butane. These detectors may be connected with two

wires to the CIB bus independently or together or with other sensors and active components and are designed for direct installation in the monitored interiors.



Fingerprint reader and outdoor code keyboard



Front view of the TUDS-40-MOD allowing connection of 1-Wire sensors

We have included a fingerprint reader ST-PFP-USB in our portfolio. The reader is connected to CIB bus through C-WG-0503S. It also has an integrated RFID card or tag reader which operates in the 125 kHz band. The reader has capacity to handle 3 RFID cards and 3,000 fingerprints, which are assigned with codes in line with the Wiegand26 or Wiegand34 standard and may be processed or backed through USB. It is also equipped with an audio output.

Another reader is the ST-PDT-M unit. It is an outdoor reader enclosed in a heavy and durable metal housing with code keyboard. It may be connected via the same CIB bus modules as the fingerprint reader. To handle combined identification process it is equipped with an integrated RFID card reader operating in the 125 kHz band.

Integration of 1-Wire sensors

The TUDS-40 MOD unit supplied by Firvena is designed for easy integration of single-use circuits made by Dallas and communicating through 1-Wire bus. The module processes independently communication from DALLAS sensors through two data lines 1-Wire and also forwards the information to Foxtrot system through a standard communication interface RS-485 protocol using MODBUS RTU protocol. Also library with a functional block is available for use in Mosaic environment.



Fingerprint reader equipped with 500 dpi optical sensor and illumination



RFID card reader with keyboard ST-PDP-M

Integration of indoor air-conditioning units made by Mitsubishi

Module supplied by ProfiCom is currently in the testing phase. It connects to Foxtrot through RS485 via Modbus protocol and handles data exchange directly with indoor air-conditioning units

(AC) Mitsubishi Electric. The module is also prepared for CIB bus, but standard functional block for Modbus may already be used.



CIM-ME-C unit – front view

New communication with new generation of Italian security switchboards Tecnoalarm

Even products made by third parties follow their own innovation cycles and this sometimes also applies to communication protocols. Tecnoalarm came up with the new TT8-88 switchboards which stopped using communicating through regular lines and began to use

Ethernet port and encoded protocol. In cooperation with the supplier of this brand Atis Group and also directly with technicians of the manufacturer, we have discovered a new communication block for Foxtrot. It looks like Foxtrot has made it again. Similarly as with Jablotron

switchboards Foxtrot is the first among the first applications for smart systems which support communication for this type of security switchboards.



Zone audio system for hotels and houses

We begin with a professional audio mixer DENON

In cooperation with a Dutch company called B&R Design we have begun focusing on systematic integration of selected multimedia devices. As the first one we have selected the new audio matrix DN-508MX from the PROFESSIONAL series controlled via LAN IP protocol. Even though this multi-room mixer belongs to the professional line, the price is rather friendly and so we have considered installation of these devices in family houses as well. That is why we have included the sample application of the multimedia controller in the model demonstrating the control

system in a family house. You may connect up to 6 microphones to this audio mixer so it will be particularly suitable where voice input over background music is required.

The rear panel of the DN-508MXA with integrated amplifiers is equipped with 5 stereo input CINCH connectors and with 6 microphone inputs with screws – on the right side. To the left of the screw-on connectors you see 8 output channels which may be combined into a group of 4 stereo channels. Four of those may be connected to 4 amplifiers in the upper section. All the way to the upper left you may see four amplified independent audio channels for 8 ohm load/appliance or for long 100 V distribution cables. The audio mixer is connected to the LAN and thus also to

Foxtrot through a standard RJ-45 connector which is on the lower left side ..

This multimedia integration project is a sample template for integrators. The below pictures also show the simple logic behind the operation: After selecting the zone – here the living room – you may control the preset temperature (left side), and individual lights including scene window curtains (in the middle).

The sound control elements are on the right which include the option to select from five signal sources, to control the volume and of course the MUTE button. Using the lower button menu you may scroll through individual rooms or through the technical equipment of the house: air-conditioning system, lighting system, multimedia and camera.

This entire sample project relies on the Foxtrot website. To make sure that individual sections of the project may be copied or modified and that they correspond with the given house, hotel or office building; the webpage guides the integrator through the setting menu for individual inputs, output zones and stereo zones to make sure that the process is time efficient. Should you wish to extend this project further or if you have additional requirements and questions related to specific audio signal source control issues, please contact Teco a.s.



Control elements and display on the front panel of DENON DN-508MX designed to be installed into standard 19" rack. All control elements may also be accessed from Foxtrot graphic interface.



DENON also supplies DN-508MXA model of this audio mixer with double height and with 4 integrated power amplifiers.



Sample application illustrating integrated control in a hotel room or in family house.



Window showing centralized control of 4 audio zones in a house. The upper section shows an active front audio matrix panel indicating the given settings as well as the actual panel in the distribution box. Below is a menu allowing quick selection of the audio source for each zone and volume settings. The right side shows the control of audio sources on individual inputs.

TECO Advanced Automation

Denon .. DN-508 Zonemixer

Denon .. DN-508 Zonemixer Information for system integrator

Module : **Denon DN-508 MX or MXA**
 IP adres : **192 168 134 1** (you can change IP adres here !)
 Port : **TCP/IP Port 80** Communication :

Set DN-508 in default setup : **Default**

Copy the parts that you want to use in your own design !

Audio Input Levels			Audio Output Levels				
Audio Level - Mic/Line 1 :	<input checked="" type="checkbox"/>	Audio Level - Source 1 :	<input checked="" type="checkbox"/>	Audio Level - Zone 1 :	<input checked="" type="checkbox"/>	Audio Level - Zone 5 :	<input checked="" type="checkbox"/>
Audio Level - Mic/Line 2 :	<input checked="" type="checkbox"/>	Audio Level - Source 2 :	<input checked="" type="checkbox"/>	Audio Level - Zone 2 :	<input checked="" type="checkbox"/>	Audio Level - Zone 6 :	<input checked="" type="checkbox"/>
Audio Level - Mic/Line 3 :	<input checked="" type="checkbox"/>	Audio Level - Source 3 :	<input checked="" type="checkbox"/>	Audio Level - Zone 3 :	<input checked="" type="checkbox"/>	Audio Level - Zone 7 :	<input checked="" type="checkbox"/>
Audio Level - Mic/Line 4 :	<input checked="" type="checkbox"/>	Audio Level - Source 4 :	<input checked="" type="checkbox"/>	Audio Level - Zone 4 :	<input checked="" type="checkbox"/>	Audio Level - Zone 8 :	<input checked="" type="checkbox"/>
Audio Level - Mic/Line 5 :	<input checked="" type="checkbox"/>	Audio Level - Source AUX :	<input checked="" type="checkbox"/>				
Audio Level - Mic/Line 6 :	<input checked="" type="checkbox"/>						

Info Zone 1/2 Zone 3/4 Zone 5/6 Zone 7/8 Source Group Back

Service page for an integrator demonstrating a clear arrangement of setting options of DENON DN-508MX zone mixer controlled through FoxTrot web interface.

TECO Advanced Automation

Denon .. DN-508 Zonemixer

Audio Zone 1 - Control Options
 Copy the parts that you want to use in your own design !

--- Mic/Line levels to Zone 1 ---
 -91 -91 -91 -49 -5 -91

Source Inputs: 1, 2, 3, 4, Aux, Mute

Source Volume: 0, 0, -38

Audio Zone 2 = Zone 1 (Stereo Mode)
 Show borders of the faders
 In "Stereo Mode" ... Copy only parts from Zone 1

--- Mic/Line levels to Zone 2 ---
 -91 -91 -91 -49 -5 -91

Source Inputs: 1, 2, 3, 4, Aux, Mute

Source Volume: 0, 0, -38

Info Zone 1/2 Zone 3/4 Zone 5/6 Zone 7/8 Source Group Back

Demonstration showing the integration of two zones into one stereo zone including an integrator's manual advising the integrator what items to copy or what to connect under individual control elements. Volume sliders were created in Web Maker using the "canvas" technique.

Lighting system controlled by Foxtrot is a part of an integrated system installed in the Ratměřice Chateau which was reconstructed and turned into a hotel

Reprint of an article published in Světlo 4/2016 magazine

The objective of this article is to show how an early and separated electrical wiring system of wall outlets and lightning system cables may be integrated with Tecomat Foxtrot system into a single system which controls the entire building including measuring processes and low-voltage devices. This applies not only to new houses but also to re-constructed old and historic buildings such as the Chateau in Ratměřice situated near Votice (see the cover page).

Originally a Baroque-style Chateau with arcades built in 1750 was reconstructed in 1850 by the Chotků family clan and turned into a Classicist style Chateau. In 2012 the new owner has begun with the reconstruction of the historical monument again. The three-floor building was reconstructed and turned into a hotel with 21 rooms and apartments, training and support centre, great wellness centre, and underground wine cellars. The neighbouring building attached to the main building via a short colonnade has been turned into a restaurant with a brand-new support facility which also includes a staff flat. The electrical and low-voltage installation company Micro-comp situated in Pacov has selected Foxtrot system made by Teco a.s. to control the exterior and interior lighting system, heating system, ventilation and other technologies. In total, the entire network contains three basic modules Foxtrot CP 1001 including a number of peripheral modules. The first module controls the hotel rooms and apartments. It is equipped with a total of 10 CIB (Common Installation Bus) branches (hereinafter CIB bus only) and with more than 200 CFox peripheral modules spread over the entire building. The second ba-



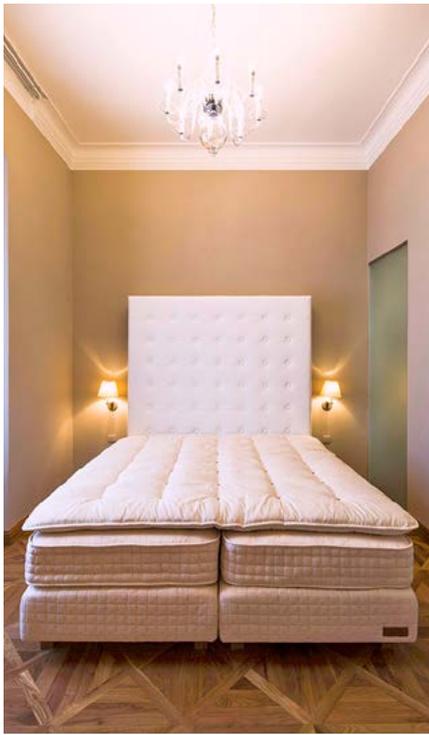
Park in the Ratměřice Chateau with unique trees



Crystal chandeliers supplied by Preciosa in corridors and above stairways



sic module controls measuring and regulation of common spaces in the main building, which includes the boiler room, decentralized ventilation system, corridor and stairway lightning, wellness room and other technologies. It is equipped with 4 CIB buses with approximately 60 CFox peripheral modules. The third basic module is installed in the adjacent restaurant building and also controls the lighting system, ventilation and heating system including MaR (boiler room). It is equipped with 4 CIB buses with more than 60 CFox peripheral modules. Classical chandeliers supplied by Preciosa company are installed above stairways, corridors and in individual apartments and rooms in the main building. Chandeliers are fitted with the latest filament



Hotel room in the Ratměřice Chateau

LED diodes offering warm white colour of light. They are well-suited for classic chandeliers because the colour of the light has the same properties as typical yellow light bulbs.

Apartments and rooms.

Total of 21 hotel rooms and apartments are located on the first and second floor in the main building. Each room is equipped with a distribution cabinet with circuit breakers and other electric components including CFox peripheral modules which control wall outlet circuits, lighting system, nightstand lamps and hallway and wardrobe lights. The cabinet also includes light dimming – the main chandelier in room and bathroom lights. Light dimmer or rather RGB LED window strip controller which creates any light colour scene. This creates an impressive display around the entire building of the Chateau at night. Bathroom mirror dimming and control of the heating ladder is one of the many functions controlled by Foxtrot modules. Wall mounted pushbutton light controllers are installed in the hallway, bathroom and in the living section of the room, which are de facto also multi-functional modules CFox on CIB bus. A panic/emergency button is installed in the bathroom and may be used in case of a fall of if a person is not able to get up. The controllers installed in the bathroom and in the room also measure the room temperature. CFox controller with display is installed in the room and

it may be used to change the set room temperature. A card holder is placed near the main entry door which turns On or Off all room functions. Heating is usually achieved by Sunpower Klimastěna unit installed under the wall plaster and by floor heating system. Heating circuit splitters are installed in corridors and fitted with linked valves directly controlled by CFox module analogue outputs located right at the splitters. A two-wire splitter is connected to the CFox modules which are attached to the same CIB bus. All the above mentioned lighting system control elements and devices are attached to this CIB bus.

Hotel room and bathroom ventilation is achieved by independent ceiling units Atrea Duplex 180 EC. 4D installed in bathroom under ceilings. Units are equipped with electronic air heating system, intake and exhaust fan, heat exchanger, filters, flaps, noise dampers and own digital regulation which is controlled through Modbus TCP by the integrated Foxtrot system.

Training hall and other spaces in the main building.

In the common spaces in the main building Foxtrot controls the classical chandeliers delivered by Preciosa and installed in corridors. Similarly as windows blinds/shades (světelné clony?) in rooms, blinds in corridors are also illuminated by RGB stripes. CFox modules fully control their colour and brightness.

Illumination of the training hall, which virtually takes up the entire attic, is provided by indirect fluorescent tubes attached to the roof supporting struc-



Each hotel room is equipped with a distribution cabinet installed with CFox modules and connected to the central control system Foxtrot via CIB bus.

ture and by spot lamps installed above working areas.

The other spaces in the main building include the wellness and fitness room and wine cellar. The entry to the wine cellar is possible via a bent stairway which is illuminated with spot lamps installed along the stairway level.

Additional spot lamps illuminate the alcove made of special-cut masonry.

The wine cellar, where natural daylight has no access, is equipped with lamps above tables and with colourful RGB stripe installed around the perimeter of the room and above the floor, which illuminates the room from the bottom up.



Wall-mounted controllers in the bathroom are also equipped with thermal sensors and control both the mirror illumination as well as the heating ladder. The apartment is also equipped with larger number of wall outlets, illumination circuits and dimming circuits using RGB LED stripes. Further, the apartment also features floor convectors directly controlled by Foxtrot outputs.



Chandeliers supplied by Preciosa in the main room in the apartment



Chandeliers in the restaurant

Wellness and fitness spaces offer many illumination options and interesting light effects. This applies mainly to the sauna, steam room, whirlpool and rest area. All these common and special spaces are equipped with Foxtrot which controls all branches of the wall or floor heating system including heating ladders in sanitary rooms. Dressing rooms, social areas, corridors and warehousing spaces on the third floor are ventilated by under-ceiling units Altea Duplex 510 EC.4D. The main hall is equipped with ventilation units Duplex 1500 Multi and Duplex S. These units and air heating, intake and exhaust fans, heat ex-

changer, cooling system, filters, flaps and noise dampers are directly controlled by Foxtrot outputs.

Restaurant

The restaurant area is installed with 16 light dimming branches including main chandeliers and lamps. Additional systems include the kitchen and bar lighting system, bar counter lamps, kitchen lighting system, cooker hoods and air-conditioning room. The garage lighting system, dendrologic exposition, and outdoor terrace lamps are controlled from the building. This also includes lightning system of the restaurant outdoor façade. The dendrologic exposition in the restaurant is equipped with dimming light sources and LED ballasts controlled by 0–10V signals from the Foxtrot system. The system also controls power roof windows in the restaurant area.

The heating is ensured by a branch coming from the boiler room in the main building. The system is further assisted by the local gas boiler and solar thermal system. The control of the heating system, all valves, circulation pumps and the solar system is ensured by the third basic Foxtrot module which also handles the wall and floor heating system in all areas of the restaurant. The ventilation is provided by heat exchange units DUPLEX 7100 Basic and DUPLEX 3400 Basic. Air-conditioning/cooling is provided by ACOND units also controlled by Foxtrot. The restaurant also includes a staff flat fitted with a control system. This system controls the illumination in all rooms in the flat, and floor or wall heating units in individual rooms. Further, the system monitors the status of important circuit breakers.

Outdoor areas

The façade of the hotel, paths in the Château park, and the colonnade illumination system is equipped with controlled light dimming system with ballast via DALI interface. Foxtrot distributes commands to these ballasts through CIB bus attached to CFox module with a converter on DALI bus. The hotel access road is equipped with a controlled illumination system and gate control system.

Foxtrot is used in the building not only to control the illumination system but also all heat sources.

As the heating source in the main building a specially designed solar system was selected, which is however assisted by two boilers for solid fuel Atmos 50GSX with a nominal power output of 50 kW and by 2 boilers Protherm with nominal output of 105 kW. The solar system consist of flat solar panels located on the roof and a pressure-free storage tank Sunpower. Solid fuel boilers are equipped with controlled hot gas fans. Heating water outlet goes to a splitter with 6 heating branches, 2 branches for ventilation units and 1 branch to heat up warm water accumulation tanks. Warm water for the main building is provided by three indirectly heated reservoirs with volume of 800 litres. These are preheated by the solar system. The heating pipe goes underground to the adjacent restaurant building.

Conclusion

Besides the lighting system Tecomat Foxtrot system was entrusted with all control



The training hall is the largest room in the building. The lighting system is installed in the roof truss supporting structure.



The wine cellar is equipped with lamps installed above tables and underneath benches.

functions and operational assemblies in the reconstructed Chateau in Ratměřice. This includes direct control of light sources, dimming, switching and light colour scenes controlled by own modules connected to Common Installation Bus CIB

as well as communication with ballasts with input between 1–10V and DALI bus. Heating system, ventilation and cooling system central sources and heat exchangers are controlled separately in each room.

The entire Chateau serves as a real demonstration of the ample use and technical versatility of Foxtrot and its readiness to be implemented in any new building or reconstructed historical monument.

*Ing. Jaromír Klaban, Teco a.s.
Photo by: MgrA. Mirek Pásek, Cinemacom.cz*

Another luxury villa in the Mediterranean controlled by Foxtrot

An exclusive villa in the valley near Larnaca in Cyprus offers soothing privacy with stunning view of the surrounding hills, safety, comfort, and natural environment combined with modern architecture and technologies. The owners of this lavish residence had a specific idea in mind and knew how to get the necessary quality and performance from smart systems while maintaining simple control, which is to be expected from such system. While searching for the right supplier of intelligent home automation systems, they knew that they needed something more than a standard off-the-shelf technology.

Rhine Line company has accepted the challenge and created a house with systems the owners required. After two and a half years of planning the delivered results even surpassed the already high demands. It is an overwhelming project which combines complex control systems with a universal smart home technology NeoMatic which depends on the power and flexibility of Foxtrot system. The planning and installation process was closely negotiated between architects, garden designers, lightning system designers and also with suppliers of mechanical and electrical devices. Owners of this spectacular house may now enjoy their luxurious house and comfortable home entertainment thanks to reliable and simple control system. Rhine Line technicians and engineers designed and programmed the hardware and software components of the system so they may be controlled independently by each member of the household.



Villa in Larnaca at dusk.





Illuminated swimming pool and garden at night.



Universal control system NeoMatic installed in this villa is based on the central module Tecomat Foxtrot CP1014. Expansion modules were divided into two distribution cabinets and placed on the lower floor and the ground floor. 70 outputs were used just for the control of the lighting system and thanks to the range and flexibility of dimming and switching modules Foxtrot engineers were able to meet requirements put on all types of lighting systems as specified by the lighting system designer of Archtube. This system uses a combination of LED spot lights, LED strips, lamps, outdoor lights and emphasizing reflectors. In addition to the lighting system, the owners wanted to be able to automatically control blinds, drapes and curtains in the entire house. There is also an integrated under floor heating system, pool and exhaust fans in bathrooms and toilets. At the request of the house owners Rhine Line collaborated closely with security system suppliers. This enabled Rhine Line to create a precisely tailored interconnections and to program predefined measures applicable in case of theft or fire. The villa has been in operation since the end of 2015 to the full satisfaction of its owners.

Text and photo: Rhine Line, Nicosia, Cyprus

Installed Foxtrot system integrated by Rhine Line under the name Neomatic. The system is installed in high-voltage distribution cabinet which is located in a corridor.

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