

# TECO

## Info

Tecomat Foxtrot controls all valves of photovoltaic panels testing station in company Regulus



## Another successful year is behind us!

### General manager opening

During 2012, company Teco has followed successful trend of years before. We have increased company turnover for 8%, ratio of export has increased to 14% and we got new customers at domestic and foreign markets. Positive trends we may notice already few years in Building Automation market, where Tecomat Foxtrot, thanks to its parameters and features, is becoming a standard solution. On one side as separate control system and on another side as complement of other systems, usually narrowly focused. We see also positive trends in industrial application sales. All these positive results evaluate our own control system development, lasting for tens of years. In the last years we have continued in expanding of new products and product functions, to meet present and future expectation of our customers and users. We still hold very good ratio price/performance. To support our sales, we have participated in

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many domestic and foreign exhibitions and we have arranged many intensive trainings for our customers - integration companies - focusing on all possibilities, they have with our control systems Tecomat TC700 and Tecomat Foxtrot. Trainings are arranging in Czech Republic and abroad and we are glad that the interest of them is still increasing. This is showing us that we are going the right way. And it gives us assumption of further successful growing. In 2013 we expect increasing of turnover at least the same as in 2012, export ration should increase at least to 20%.

Ing. Jiří Kovářik



## Anniversary 20 years of brand Teco and 37 years of PLC manufacturing in Kolin

In 2013, our company is going to celebrate anniversary 20 years from Teco brand founding, that happened by transformation of Tesla Kolin, Industrial Automation Division in privatization. As well, we are celebrating anniversary 37 years of PLC control systems manufacturing in our plant in Kolin. Looking back to our beginning, we have to mentioned, that we have come through hard period, when we had to fight against mistrust and persuade domestic customers about quality of our products. As well we had to find out new customers abroad, because East Europe markets has been broken, and East Europe markets has taken the most of production of former Tesla Kolin state company. Our goal, since or beginning, has been to hold own development and manufacturing and use and evaluate our experience in new products and technologies. Thanks to considerable effort of our employees we passed it and we may be proud of our control systems, that belongs to world leaders.

**20<sup>TH</sup> TECO  
ANNIVERSARY**

**20  
37**

**37<sup>TH</sup> Programmable  
Logic Controllers  
ANNIVERSARY**



## Nwe company logo Teco a.s.

We inform you with a pleasure, that company Teco a.s. is enetring the second 20 years of its history with new company logo, that is available here.



## CIB Common Installation Bus®, CFox®, RFox®, Foxtrot®, FoxTool® and Tecomat® are registered trademarks of company Teco a.s.

During 2012, Industrial Property Office registered CIB Common Installation Bus as trademark of company Teco a.s. It finally confirmed, that all rights to this bus belongs to company Teco a.s. By the way, this has been declared in contract between Teco a.s. and ELKO EP, s.r.o., specifying common project iNELS II.

According to the contract, Teco a.s. put in the project of iNELS II central module, two wires bus including design of hardware for bus interface and parametrization soft-

ware. Because, after finishing first period of system iNELS II development, it has not been agreed further development of the system (technically and contractually) and, because company ELKO EP, s.r.o. has terminated contract for using iNELS trademark, company Teco a.s. continues in further development of system Tecomat Foxtrot on the way to bus instalaltions and building automation under its own trademarks and under own original technical conception. Tecomat is trademark of any PLC from company Teco, Foxtrot is trademark

of compact and modular PLC for middle and small applications. FoxTool is trademark for parametrization software. RFox is trademark for wireless peripheral system fully integrated into Foxtrot. It marks all wireless sensors and actuators developed in DIN rail design and also built-in, interior, portable or designed with high protection cover IP65. CFox is trademark for all modules connecting by two wires bus CIB Common Installation Bus.

This bus is copyrighted by patent and it is a unique combination of few principles. It

is two wires bus. It holds communication and power voltage of all connected modules. The bus may be free branched and each branch does not need termination by resistors. The bus may be backed up against voltage failure and type of the bus

is Master-Slave. Response of fully loaded bus is guaranted up to 150 ms. There is a proprietal protocol a part of this bus, who enables unique identification of modules in the network, initial settings of parameters and configuration, remote diagnose

and remote firmware upgrade. There is automatically diagnosed absence of one or more modules in the bus..

iNELS is trademark of company ELKO EP HOLDING, a.s.

## Announcement for users of system iNELS II

Central modules Tecomat Foxtrot, to be manufactured from 1st March 2013, are equipped by CIB bus master, supporting only bus modules CFox manufactured by company Teco a.s. If there is necessary to connect bus modules iNELS II (from any reason), offered by company ELKO EP to central modules Foxtrot, it is possible to buy driver - application profile TXF 689 99 AP FOXTROT CIB LICENCE.

In such case, central modules and extension CIB masters accept only modules, developed according to contract of iNELS II development, whose firmware has been

developped in company Teco a.s. These modules are published below.

Any other iNELS modules are not supported. If there are such modules offered, sold and installed, for instance like combination of below listed, Teco a.s. is not responsible for their individual functions and for functionality of the whole application.

### The list of iNELS II modules supported by application profile TXF 689 99:

ADC2-40M, DA2-22M, DAC-04B, DAC-04M, DIM6, HC2-01B/AC, HC2-01B/DC, IART2-1, IDRT2-1, IM2-140M, IM2-20B.

IM2-40B, IM2-80B, KEY2-01, KEY2-01R, LBC2-02M, LM2-11B, SA2-012M, SA2-01B, SA2-02B, SA2-02M, SA2-04M, SOPHY2, SOPHY2-L, WMR2-11, WSB2-20, WSB2-40, WSB2-80.

CIB Common Installation Bus is registered trade mark of company Teco a.s. This two wires bus is copyrighted by a patent. Any using of name, principle or development of modules for this bus without permission of company Teco a.s. is copyright violation.

iNELS is registered trade mark of company ELKO EP HOLDING, a.s.

## Tecomat Foxtrot received certificate of merit in Innovation of 2012 Award

On 7th December 2012, the Innovation Of The Year Award 2012 has been awarded in Congress Hall of Czech Upper Chamber (Senate). The award has been published every year since 1996 by Association of Innovative Entrepreneurship Czech Republic. The Association has been since 1993 an independent authority for innovative entrepreneurship. One of the awards – certificate of merit – reached control system Tecomat Foxtrot from our company Teco a.s. Foxtrot has wide range of application in automation and control of machines, processes, technologies, buildings and transport.

„We are very glad to reach the Innovation Award, because it confirms our effort to be

on the top in development of automation and show the direction, which is often followed by even huge multinational corporations. It is appreciation for all our employees and finishing of successful development, it's results – products of control system Tecomat Foxtrot – appreciate customers in about 30 countries, where we export to.” Published Mr. Jaromir Klaban, Business Director of Teco a.s.



Innovation Of The Year 2012 Award has been awarded by Mr. Petr Bratsky, Senator of Upper Chamber Czech Republic (first from left side) and Mr. Karel Sperlink, President of AIP (second from right side) to Teco representatives: Jiri Kovarik, general manager (in the middle), Jaromir Klaban, business director (second from left side) and Petr Ovcacek, business development (in the right side).



## Teco trainings for customers

During 2012 we have mentioned increased interest of customers in trainings of our control systems and so we have arranged a lot of trainings in Czech Republic and abroad. In the Czech Republic we have organized 2 series of trainings - Spring and Autumn, so we have trained customers in 4 cities. These series has been focused on Tecomat Foxtrot hardware for Building Automation. Similar trainings we have arranged also in Hungary, Poland and Slovak Republic. Another regular training is Tecomat Foxtrot,

CFox and RFox, that contains introduction of hardware and software, being arranged in Teco headquarter in Kolin. Last year we have passed 10 such training. Beside of these, we have arranged many individual trainings according to customers specific needs, both for domestic and foreign customers. The knowledge of our control systems we see very important for effective applying in practise and we are going on training our customers in the future. For customers may be interesting to see videotraining and remote training via internet, what we should begin this year.



## Another Foxtrot showroom in Prague

Company ELPRAMO s.r.o. is qualified and experienced integrator of our systems, who opened in Prague (Czech Republic) new showroom for end users, showing them in practice advantages and functions of Tecomat Foxtrot system. In technical background they may see example of modern ventilation and air conditioning technology, the switchboard equipped by modules for Smart Installation including modules for Energy Consumption Metering. Outside, there is weather station, connected to the system. In presentation part of the showroom, customers may see control of shutters and blinds. Visitor of the showroom can test by himself many components to control the system: wall switches, remote portable controller, portable controller with LCD display, iPad, iPhone, smartphone, tablet etc. In the showroom he may see example of preset light scenes and try to set his own scenes. Visitors can also see connection of system Foxtrot with electronic security system, audio/video home entertainment system Control4 or example of home appliance control in intelligent home. To visit the showroom and presentation of the system, please book at these contacts:

Mr. Roman Motliceck: 603 211 654  
Mr. Petr Pokora: 605 757 980



## Looking back to 2012 exhibitions

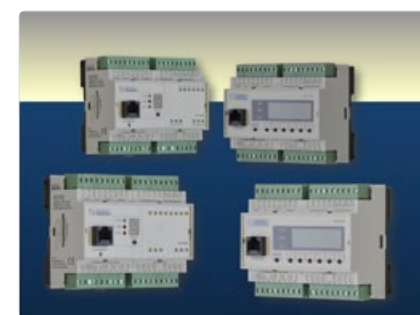
In last time we have participated in many specialized exhibitions. The most important for us at domestic market is AMPER and FOR ARCH. On both we have presented wide range of our control systems for technical customers-integrators and for end users. Beside of these, we have participated in Pragoalarm/Pragosmart, focusing mostly on all about security systems, what is a field, where intelligent buildings belong to. In Ostrava (Czech Republic), there is every year a largest exhibition specialised to heating systems. This year we have participated in this exhibition to-

gether with our integrator company from Ostrava - Lukas Famfulik, and presented the complex control system of intelligent buildings with Tecomat Foxtrot, pointing to control of heating systems. Abroad we have exhibited at the largest European exhibition dedicated to industrial automation SPS IPC Drives in Nurnberg (Germany), in Slovak Republic we have participated in exhibitions ELO SYS and High End and in Ukraine exhibitions Elekrika and Elcom. We are glad, that visitors of all these exhibitions appreciate our control systems, what gives us energy for next development.



## Central modules CP-1004/5 and CP-1014/15 in new design with connectors

In 2012, we have finished redesigning of central modules and expanding modules line to new mechanical design. The difference is in replacement of fixed screw terminals by screw connectors. From installation technician or maintenance technician it makes easier his work during installation or handling with already installed modules. Another advantage of new mechanical design is lower front panel above DIN rail, what expand size between cover of switchboard and front panel. This makes better output of ethernet cable from central module. Central modules have better analog inputs, completed by ranges for other resistant sensors.



Central modules Tecomat Foxtrot CP-1004/05/14/15 with removable connectors.

## Data storage 32 GB direct in central module Tecomat Foxtrot

Central module of system Tecomat Foxtrot hold on increasing of memory card capacity. In Foxtrot's beginning, we tested compatibility with memory cards of 16 MB, 256 MB, 512 MB. Today we cannot find smaller capacity of cards than 2 GB. Because Foxtrot use the most common standard SD, SDHC, it's not problem to operate with cards of capacity 32 GB. Such card is able to load continuously data and events for many years. HD recording, until recently task for PC, is now a part of PLC direct in switchboard or in telemetric station, powered e.g. from solar panels. The card stores also user web pages of Foxtrot, what we may create according to our phantasy and needs.



## Foxtrot connected to network writes directly to SQL databases

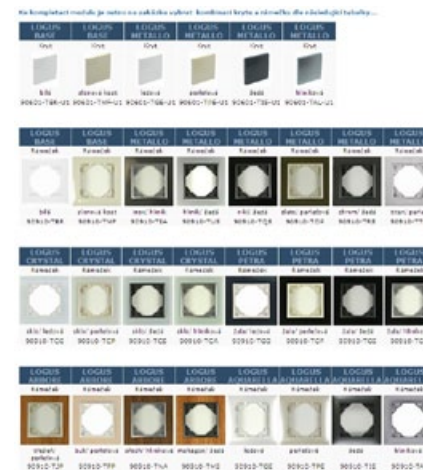
Development in Tecomat Foxtrot's firmware and parallel development of SW support for SQL databases running in public and private data centers meets each other and brings new advantages for Foxtrot users. Without another special software adjustment, only by simple parametrization of config file at SQL server with database, we may reach automated data recording with direct writing into remote database. Important reinforcement of remote data transfer reliability is reached by continuous writing into local memory card. After resumption of interrupted connection with central database, it's possible to restore and synchronize data line, continuously recorder by Foxtrot in its local data storage.

## Wall switches CFox line for CIB bus in LOGUS90 design

In the end of 2012, we have delivered to customers first orders of wall switches in design LOGUS90. These wall switches with name C-WS-0200R-Logus (design with one flap - 2 buttons) and C-WS-0400R-Logus (design with 2 flaps - 4 buttons) are a part of CFox line, so they communicate via CIB bus. Mechanically they come from original design of manufacturer - Portuguese company EFAPEL. We have kept original fixation of flaps into device lever. So we avoid need to change original plastic parts by non-original plastic part, what is very stressed part of device and may be damaged. Wall switches integrate beside of 2 or 4 buttons also two-coloured LED for signalling of the status and built-in temperature sensor, whose data are informative. From the wall switch, there are 6 wires embarrassed. 2 of them are for connection with CIB bus. Next 4 wires are universal inputs for connecting of 2 external sensors. We may evaluate button, other resistance-free contact or temperature sensor. With this we may exactly measure temperature by one input with resistance sensor placed optimally in the room and by another one temperature in the floor for regulating of floor heating. Design LOGUS90 has become favourite even on Czech market. It combines six colors of covers, flaps and sockets with sixteen colors and material types of frames in design of plastic, glass, wood and granite. Because of this wide combination, the device, flaps (covers) and frames to be ordered separately.



Wall switches C-WS-0200R and C-WS-0400R in LOGUS90 design keep original fixation of the flaps, as designed by manufacturer EFAPEL. Switches are expanded with possibility to connect directly other sensors.



Wide range of color and material combinations in design LOGUS90.

## Combined module C-IR-0203M

Numbers in module type name shows us, that module contains 2 universal inputs and 3 outputs. 2 of them are 16A relays with embarrassed switch on and switch off contacts and one analog output, that may be set in mode 0-10V or in mode PWM - pulse width modulation. Module is designed for assembly ion DIN rail in switchboard. The width is one and half standard module and because of its size and switched current, it is equipped by screw terminals. The module has CIB bus connection. At front panel it may be switched into manual mode and both outputs may be controlled independently by buttons. Status of outputs in automated and manual mode is indicated at panel by LED diodes. The module has universal use. It may be used for "gentle tuning" of the system as for inputs and outputs of any type (DI/DO/AI/AO). Module may be used as well for control of jalousie drives. Relay contacts are designed for permanent load 16A, but may be short time overloaded up to 80A. So they are perfect for switching of bulbs. For ordinary switching of bulbs we need even lower current. But when bulb with even small power breaks, it creates electric shock and so creates too high current, that is sometimes able to switch off the circuit breaker. Relays, used in this module, should run this current without any damage. PWM output enables





Module C-IR-0203M is narrow module on DIN rail with wide use thanks to universal inputs and outputs.

connection and smart control of modern circulation pumps or any other device working with pulse width modulation.

### New semi-graphic interior display C-RC-0003R

During last year we have finished integration of new interior controller with backlit semi-graphic display and built-in sensor of temperature and humidity. It is equipped with 3 control buttons and it creates a new standard of interior module for a complex control of climate of each room. It is a tradition, that this module will be available in various designs compatible with wall switches and sockets of different manufacturers. Firstly introduced designs are LOGUS90, BTicino, Legrand, Merten, Gira and Schneider Unica.



New display C-RC-0003R in various designs.

### More serial channels for Foxtrot, communication modules of line CS-110x

Number of communication drivers using serial channels of Foxtrot is continuously increasing and as well number of drivers for devices connected via ethernet port. The only one ethernet port may communicate with unlimited number of IP protocols, but each device, that communicates by serial protocols, needs its own

reserved serial channel hardware. Sometimes four serial channels, which may be connected via submodules into central module, are not enough. That's why we decided to add another serial channels at fast system bus TCL2. We may connect maximally 6 modules of line SC-110x. As first we introduce module SC-110x with one channel UART and dual interface RS-232 and RS-485 on whom we may operate mode UNI with free programmable protocol.

### Module UC-1205 for connection of system into mobile GSM network

Even that during these days we see boom of smartphones with built-in web browser and acceleration of data transfers in 3G mobile networks up to Mb/s, we do not miss a need of communication with intelligent buildings via standard SMS messages and we are introducing new module UC-1205. It is a new GSM modem connected via serial channel and using proven function blocks from library GSMLib for transmitting and receiving of SMS messages. The modem is in one module size so it doesn't take so much place as modem of other manufacturers. We should mention, that modem is not designated for access to Foxtrot's websites. For this purpose it's better to use 3G/UMTS routers, e.g. from Conel or Insys.



Front view of UC-1205. One module size GSM modem for control system Tecomat Foxtrot.

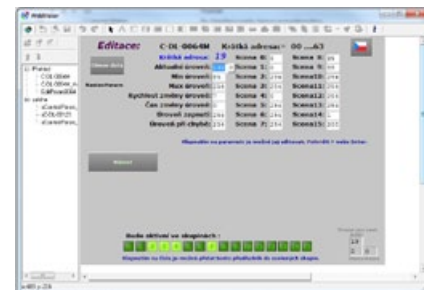
### C-DL-0064M: Module for 64 ballasts in DALI bus

After built-in module C-DL0012S designated for local control of limited number of DALI ballasts we are introducing on the market module for fixing on DIN rail into switchboard for control of up to 64 ballasts in 16 groups in one DALI branch. It reach full specification of NEMA Standards Publication 243-2004. Module has CIB bus connection, so with each one module Foxtrot gets possibility to con-

trol next 64 DALI ballasts. Although DALI bus has been originally designated for fluorescent tube ballasts, today we may find at the market DALI "ballasts" designated for LED light control. The module is compatible even with them and if we connect full color GRB LED, we may set intensity of three channels and by this control color of lights. The module is designated in two modules size. We have prepared new supporting function block for this module, that is connected with Foxtrot's website for user configuration of the whole 64 ballasts network and for setting values of each ballast individually.



Foxtrot's website designated for well arranged addressing of all 64 addresses in DALI bus.



Website of Foxtrot with setting of each ballast parameters. Below in green line we may see matching of ballast into groups. There may be up to 16 groups at DALI bus.

### Module C-WC-0503S and Aperio wireless lock from company Assa Abloy

Last year we have introduced in the market built-in module C-WG-0503S, what is universal module, but by its origin it is designed for connecting of security detectors and access systems units. With its size it may be used for installation direct into detector, if it is possible by construction and size of the detector. Module has integrated power source 12 V DC/60 mA for detectors, derived from CIB bus. For connecting of both alarm and tamper contacts, there are 2 universal inputs there. We may connect each one individually or set inputs as dual-balanced inputs with detection of alarm and sabotage by one input, and in this case we may connect two detectors to the module. Next three inputs are ready for direct connection into output terminals of detectors and keyboards, whose are equipped by



Schéma připojení více bezdrátových zámků na sběrnici CIB.

Wiegand interface and protocol. This is universal protocol, respected by many manufacturers of identification devices like keyboards, RFID cards and chips. The module is an entry gateway for human identification. It may be followed by personified events line and settings, run by intelligent building by itself whose are above possibilities of common access system. Module is equipped by three transistor outputs with open collector, which enable control of up to three independent relay or locks. With this module we may create sophisticated logic of entrance door opening with perfect identification and events recording at entrance of the building.

### New design of ID-18

Wall touch display ID-18 with diagonal 5,7" is designated for interactive control and setting of intelligent home via Foxtrot's website. Even in time of mobile smartphones and tablets it is useful to have display that doesn't move in residents pockets, but is fixed on the wall where everybody may find it at any time. We may be assured by wide offer of wall

stands for iPad or iPhone, that entered the marked and responds to the requirement of fixed place of control panel on the wall. These holders are usually more expensive than the tablet itself. Our touch panel ID-18 after switching on runs the only task - microbrowser, specialised only to Foxtrot website visualization. It is not browser for internet browsing. This seeming limitation is an advantage, because we want to avoid display moving into any other application than home control website, i.g. by accidental press. Single use of this browser is here the advantage. We have supported this direction by expansion of frames desing for this panel. New design is moving the frame off the wall and makes stylish design impression. The line of colors is with no limitation and may be manufactured according to interior designer or cus-



Nový facelift nástěnného dotykového panelu může mít jakoukoliv barvu. Odstup od stěny je výrazným prvkem odlehčujícím celkový dojem.

tomer needs. As standard we offer these beautiful colors: white and anthracite. But all colors are possible, even extraordinary colors like red Ferrari, yellow, gold, etc. If this frame design interested customers with already installed ID-18, there is a possibility of easy exchange. Frames are mechanically compatible and we are ready to give you individual price offer.

### LUTRON, Bang & Olufsen and Foxtrot

At the end of 2011, we have integrated into Tecomat Foxtrot all devices of company Bang&Olufsen via protocol Master Link, that are connectable to this protocol. After this, we continue with integration of US system Lutron, what is a world pioneer in bulb dimming (in sixties of last century). They still holds the position of leader on US market. Lutron brings its products on European market with wall switches and wall controllers, who are very specific and different from all European companies. In blind and jalousie control Lutron is leader thanks to its absolutely quiet drive of blinds and jalousies. For lights control, Lutron has its own control unit with functions optimised just for these two technologies (light & jalousie). Connection of Foxtrot is very interesting in combination of light&jalousie Lutron control and Foxtrot for heating, air-conditioning, boiler and other technologies control. Connection of Foxtrot and central module of Lutron is operated by IP protocol. We have presented this possibility at Pragosmart exhi-



bition in Prague and customers, who like openness and universality of Foxtrot, now have possibility to choose interior controllers and jalousie technique in design of Lutron.

The other way around, customers and house designers, who likes and use Lutron devices, may extend the scope of installation with new possibilities, that



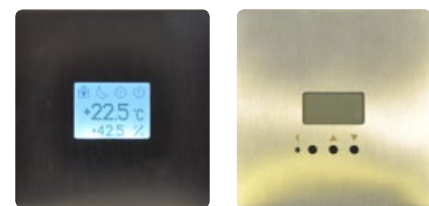
Wall controllers in Lutron design expand design independence of Foxtrot.



The case, presenting connection of Lutron design and advantages with Foxtrot functions and websites.



New semi-graphic displays in CIB bus in Lutron design.



Time proven C-RC-0002R-Lutron and new semi-graphic C-RC-0003R-Lutron.

brings connection with Foxtrot - complete room climate control, metering and optimization of all type energy consumption, connection with alarm and security systems and of course, remote access via web pages. As we mentioned in another article, these web pages are accessible also directly via Smart TV Beovision 11 from Bang&Olufsen. To increase the perfect integration of the heating system, we have developed new, design compatible interior display controller C-RC-0003R-Lutron with backlit and possibility to display more data and icons at once. We have presented this solution to customers and integrators at exhibition ISE 2013 in Amsterdam in January 2013 at Lutron booth.

### Miele and Foxtrot

Remote control of household devices has been firstly introduced by German company Miele. Selected devices may be completed by communication module, that communicates via high-voltage current wires with central gateway XGW2000, where is prepared interface into LAN network.

There is available own web server Miele and also IP protocol with XML messages. Via this, it's possible to read bidirectionally statuses and configuration of each devices and send them command, if it is allowed and preset. Built-in web server we may connect with any device with built-in browser and control the network of devices via icons and web pages of Miele.

With Foxtrot we have looked at the task more generally and prepared driv-



Chart of connection Miele devices to Foxtrot.

er, bounded to application profile, that uses XML protocol of Miele central unit and map control of devices connected to internal variables of Foxtrot. So programmer communicates directly from his program with devices and is able to integrate them into end users web pages according to customers individual needs. This advanced technology Miele calls Miele@home. (Picture taken over from book Miele@home Intelligent solution for your household)

### Connection of Tecomat Foxtrot and KNX

At end of last year, at exhibition SPS in Nurnberg (Germany), we have presented connection of Tecomat Foxtrot and KNX. For connection we used gateway from company Weinzierl, that is connected to Foxtrot by ethernet port. Tecodelivers this gateway together with communication function block bounded on application profile. This block transform transparently control of group addresses in world of KNX to control of variables in PLC memory. This gateway is registered in KNX system, so it is fully supported by parametrization software ETS4 for networks.

Companies, who apply Foxtrot system, get tool, enabling to offer top design interior control modules. Most world manufacturers usually deliver their top designs right in KNX system.

The other way around, companies applying KNX system, it gives powered tool for fast and individual creation of comfortable web access into KNX network. The picture illustrates that connection. Besides, on Foxtrot side there are shown other communication possibilities via ethernet, serial channels or CIB bus. All these subjects may be now combined with KNX system.



Illustration of connecting system Foxtrot with wide range of peripherals with KNX objects.

## New demonstration project at address demo.ovladejsvujdum.cz

In February 2013 we have placed at public address [demo.ovladejsvujdum.cz](http://demo.ovladejsvujdum.cz) new demonstration project. After entering this address in any browser we see access login. The name and the password are empty, so just come in by clicking Login button.

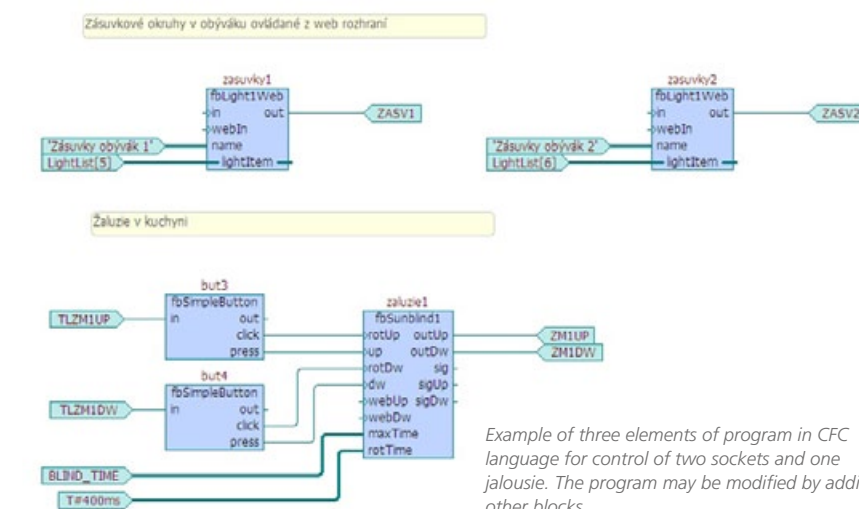
Project may be presented to customer directly on his smartphone or Apple table with Android (version higher than 4.0 or version with Opera on lower versions) or with Bada. It is running also on BlackBerry platform or Symbian with Opera browser. Displaying the pages is available also in Smart TV from LG (version 2012), that have even remote controller with gyroscope and that's why we may control Foxtrot by gestures and smooth moving on TV screen. We may demonstrate more on-line accesses. Just notice, that we set limit in Foxtrot for maximum 5 accesses at the same time, so it's possible that anybody is controlling or demonstrating too.



### Targets of this project:

1. Real control of Prague's showroom.
2. Enabling integrators to demonstrate comfortable and easy local and remote access to building control by Foxtrot's user defined web pages.
3. Enabling integrators to download the project in Mosaic software from website as an example and demonstrate on real project the connection of function blocks, a way of programming and creating user designed web pages for control of system installation.

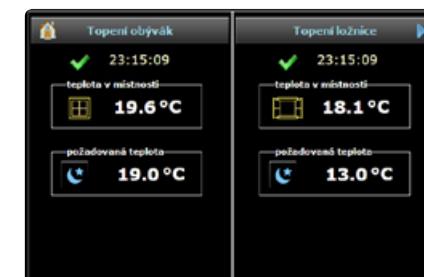
Then we may browse examples of selected pages. They are optimized to use in the smallest displays, what is today smartphone. We may cross from left to right part even by a gesture. Sample project contains program in Mosaic.



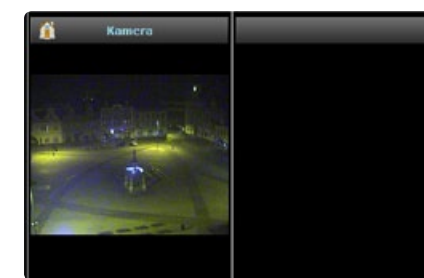
The sample program is made in CFC programming language, what is easy composing of ready to use function blocks and connecting them by lines creates real relation and conditions. Used function blocks may be copied into own programmes and safe time during preparation of the program for customer. There are available inside structures of the blocks there, so programmer may modify them or redesign and safe time again. Function blocks are programmed in structure text, so they are easy to read and they are perfect for training. Sample program contains even documentation, that helps as a guide for both beginners and professionals. It is a part of support for individual study of possibilities offered by Foxtrot free programming.



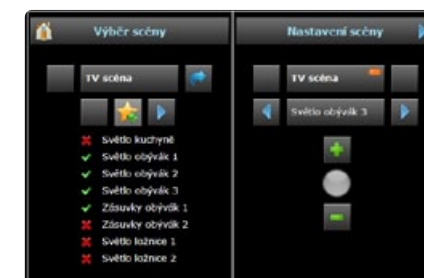
Main window with basic menu. We may choose English or Czech version.



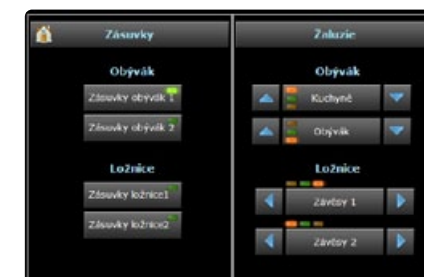
Two windows for heating system control including week user time program settings.



Web page with from selected camera.



Custom setup of sceneries



Web page with control of jalousies and sockets.



## Software news for Tecomat systems users

For users of systems Tecomat we have created few tools, making programming and maintenance easier. First of them is Firmware Updater, a tool designated for firmware update in Tecomat Foxtrot central modules and peripherals. Another useful tool is Project Loader, which enables us to load and backup data and program from PLC. The third one tool is Set PLC IP and you may use it to set IP address and other parameters for communication of the system in Ethernet networks. They are designated most for end users, whom enables working with PLC without necessity to use software Mosaic, but it may be used also by programmers and integrators, who apply the systems. Up to now, all these programs has been distributed together with Mosaic software, from now they are published at our web site as separate applications.

### Firmware Updater

As we have mentioned, Firmware Updater enables to update and maintain firmware (system software loaded by manufacturer) in central modules of Tecomat Foxtrot and in peripheral modules of CFox intelligent installation. Wireless peripheral modules RFox are not supported now. If the computer is connected to internet, Firmware Updater is monitoring status of published firmware on official Teco FTP server and inform the user of possibility to download the actualization. Downloaded actualizations are stored in computer and the user has access to all versions even in off-line mode. After connecting to PLC Updater, there is displayed configuration of connected PLC in well arranged tree structure with information about actual version of each

module firmware with possibility to update the latest version. Update is running automatically and may be started by one button press. After finishing the update it automatically restart the system. Beside of this, it is possible to update each module separately.

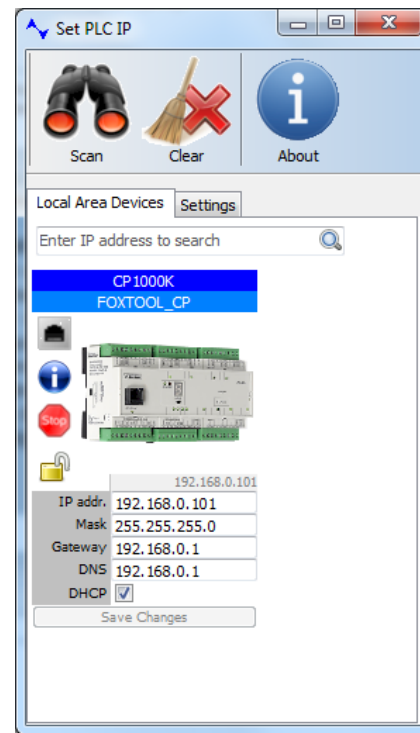
### Project Loader

The second tool, making the maintenance of Tecomat systems easier, is Project Loader. Program enables to find all PLCs connected via Ethernet in local networks. After connecting we may backup existing program in central unit and also data in remanent memory, data in memory Databox designated for archiving of data and files on memory card. Primarily function of the program is loading new application program. Finished program, created in Mosaic, programmer compiles as a package for Project Loader and sends it as an e-mail to end user. End user may easily load the program to the central unit without any development software. New loaded program may be even backed up into Flash EEPROM. Project Loader enables to set system time and date or restart the central module. Project Loader is useful tool for maintenance technicians.



### Set PLC IP

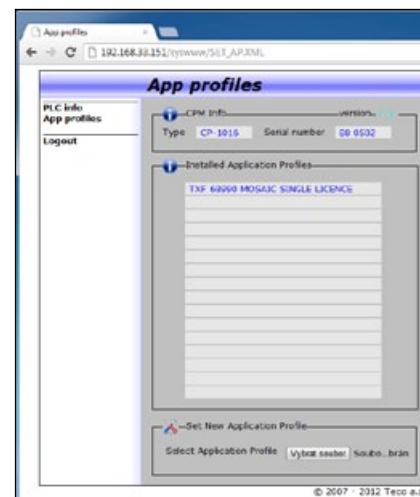
Simple and user friendly application that enables fast setting of basic parameters for Ethernet connection of PLC Tecomat Foxtrot. Thanks to Set PLC IP you may set very fast required IP address, network



mask, IP address of gateway and DNS server and put Foxtrot into operation in user network without using development software Mosaic. You may also set allocation of PLC IP address from server DHCP.

### Application profiles

In last time, Tecomat systems users may see in our software products offer of Application profiles. Application profile is a form of licence, which we need for running of some libraries and programs delivered for PLC Tecomat. This licence is given for a relevant PLC and is loaded right in the PLC. As standard we deliver PLC without application profiles and customers order them separately. If the order of Application profile is a part of PLC order, then we load Application profile into PLC in our manufacturing plant and PLC will be delivered ready to use with application programs and libraries. By application profile we may equip

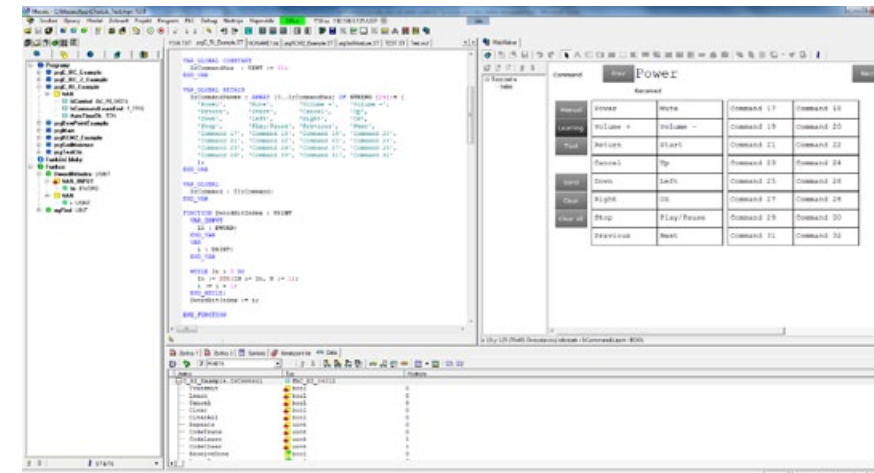


even additionally in already implemented system. User may enlarge his application with new possibilities. In this case there is necessary to put serial number and type of central module on the order form. As well please write the e-mail address where we should send the file with required application profile. Application profiles are supported in existing central

trot systems with installations based on bus EIB/KNX (see the specialised article).

### Communication with security systems DSC, Galaxy, Paradox

One of the basic functions, implemented almost in all intelligent buildings, is security system. For this use there are many specialized EZS systems, which we often



modules of system TC700 (CP-7000, CP-7004 and CP-7007) and all central modules of system Tecomat Foxtrot with firmware version 7.3 and webserver version 1.9. For units with older firmware versions, it is possible to update with Firmware Updater, which we mentioned above.

Most frequent application profiles are at present application profiles with Mosaic licences (Mosaic Single Licence), whose are available both for Foxtrot and TC700. In case that PLC is equipped by this Application profile, PLC doesn't need HW key for Mosaic. About Single licences we have published in last issue of TecoInfo. Another group of application profiles are application profiles for communication with security systems. At present we have in our offer three - DSC, Galaxy and Paradox (see next article). A range of application profiles is completed by profile that contains license for library IEC-104sLib and thanks to this PLC may communicate as slave device by protocol IEC 60870-5-104. This protocol is used in remote control systems and in very large systems (energetics, gas industry or water systems). Protocol enables slave station to require communication with master and pass on the required data very fast to control station in the time of changing monitored variable, e.g. during alarm. Any event is marked by time record for events sequence identification. The last application profile is application profile for library KNXLib, providing communication with KNX IP gateway BAOS. This enables connection of Tecomat Fox-

require to integrate into the unified system, as we could monitor and control all the house from one device. Last years we have connected system Tecomat Foxtrot with four security systems (DSC, Tecnoalarm, Galaxy and Paradox) and for three of them we have prepared library into Mosaic software, that makes from integration of these systems a standardized process. All libraries are tied with application profile, that should be ordered separately. Without application profile the function block communicates with central unit of the security system only 4 hours (like demo or for testing or debugging). Central units of security systems to be connected via any interface RS-232 in system Tecomat Foxtrot. In case of DSC units we may connect model of line Power Series, library ParadoxLib provides communication with units Digiplex EVO and library GalaxyLib is prepared for units Galaxy from Honeywell company. During communication units transfer status of each detector, alarm, tamper and status of errors in zones and status of groups. By controlling we may lock selected group or subsystem in various modes, even with sending the user code.

### Library for work with CFox modules

Library CFox contains function blocks for CFox modules, those operation is not a trivial and is not limited only by reading of inputs and writing to outputs. From mathematical calculations the library contains function for dew point calculation from measured temperature and relative humid-

ity for modules C-AQ-0004R and function block for ground volume humidity metering by modules C-HM-0308M, C-HM-1131M and C-HM-1121M.

Among function blocks providing control of modules we count function block for module C-RI-0401S, respectively R, which provides transmitting, receiving and learning IR codes. In initial status the module is in receiving status and it also knows status of IR code learning and their transmitting and deleting. Bad reading or error during learning or deleting may move the function block to error status. Successful finishing of command transfers module again into receiving status.

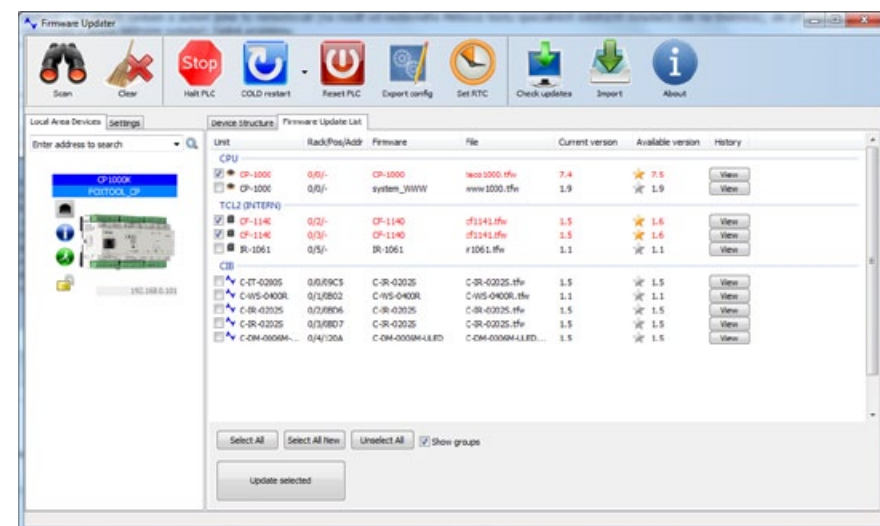
Other function blocks in library are blocks for operation of room controllers C-RC-0002R. The block provides displaying of values (typically temperature in room), editing of value (typically required value) and switching the modes (typically comfort/decline). The is a variant of function block with possibility to edit two values (required temperature for both modes).

The last function block is a block for simple control of room interior module RCM2-1 by field of screen definition. Each item of the field means one screen, we may switch each to another by rotation of multifunctional button. Definition of the screen contains displayed value (numerical or time), symbols, number of displayed decimal digits and sign for editing. In case of authorised editing the module switches to edit mode by rotational multifunctional button press and by turning we set required value. According to number of steps in direction clockwise or counterclockwise and set increment function block set the relevant value of edited variable, which we confirm by press of multifunctional button.

### Library for getting weather forecast YahooWeather

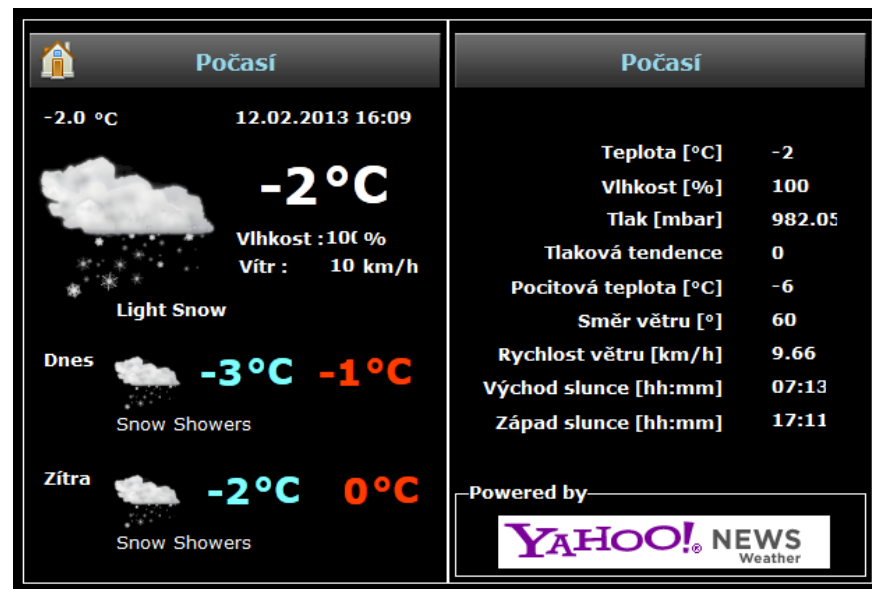
Very popular among the Tecomat Foxtrot users is library for getting information of weather forecast from internet. The base of the library is function block for reading weather forecast from Yahoo server. Function block is getting actual data of weather in selected place including weather forecast for one day. Because the forecast from Yahoo is in English, a part of library is a function to Czech language. For those who are interested in it and are from other countries, there is source code of the function available, so it may be changed for translation into other languages.

Input of the block is the code of the city, what we require forecast for (woeid). Codes of Czech cities we may find at documentation of the library, codes of other cities (worldwide) we may get at server [www.weather.yahoo.com](http://www.weather.yahoo.com). At our web page [www.tecomat.com](http://www.tecomat.com) there is



Configuration of PLC in tree structure with showing firmware versions and possibility to actualize.





available example of using library YahooWeather including web interface, which may be used as template. And as we may notice at Foxtrot users web pages, weather forecast is welcomed addition of their applications.

### Library for air-conditioning units LG

If you need to integrate air-conditioning units into complex and efficient control of house or building, you may use new function block for direct communication with air-conditioning units LG, product lines Multi V Plus, Multi V Super, Multi V Sync, Multi V Water, Multi M/MDX, Multi F/FDX, Single A. As well you may connect units of packed water RAC and ventilation units ecoV.

### Function block is a part of library LG\_HVAC\_Lib and let us monitor following parameters:

- internal unit error monitoring
- warning light monitoring
- room temperature
- direction of rotation
- operation mode
- required room temperature
- forced thermostat switching on/off monitoring
- local thermostat buttons lock
- plasma filter

### From Tecomat Foxtrot system we may control and set following:

- direction of rotation
- fan rotations
- operation mode
- required room temperature
- forced thermostat switching on/off
- plasma filter

### Library EnergyLib

The library with functions for energy consumption monitoring has expanded too. Library now offers function blocks for reading of data from electricity me-

ters both via optic reading head or via interface RS-485. We may read also simple pulses and from them calculate consumption of electric energy, gas or water flow. In the library there are also function blocks for calculation of calorimetric equation. From temperatures and flow on inputs of blocks is calculated supplied or consumed heat. Function blocks calculate with various kinds of heat mediums (water, ethylene glycol, propylene glycol). These function blocks appreciate owners of solar panels, who get information of heat deliveries.

### Library for communication by protocol EPSNET master on Ethernet

There is one more useful library among the others, that is not so often and that's why it's not so much promoted. The library for communication by protocol EPSNET on Ethernet. The library may be used for communication among Tecomat systems by protocol EPSNET UDP in position of superior station. Function block implements from EPSNET protocol service file memory reading services, writing to memory and writing bites to memory. Each commands are placed in commands field and function block reads and automatically execute them from that field.

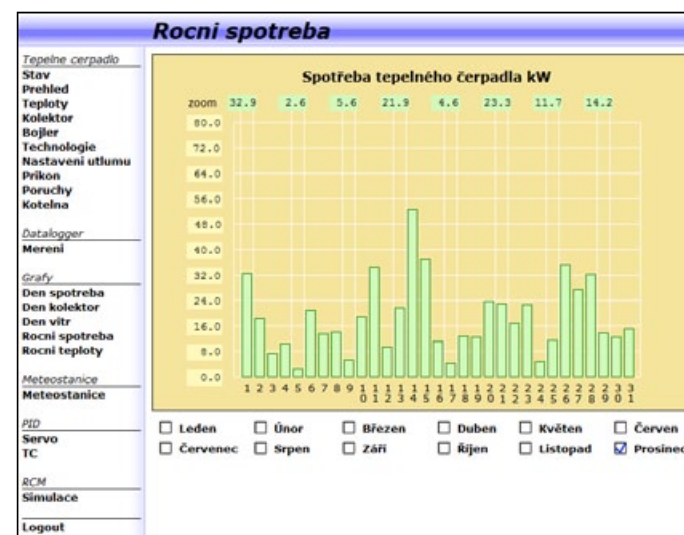
### Library for work with XML documents

There is another new important library there, what exceeds requirements of common user - library XMLLibEx. It has been created by expansion of previous XMLLib library and it brings us possibility to work with data in XML format (eXtensible Markup Language). This

format is used by some devices for data transfer. For example a line of internet servers with weather forecasts provides data in XML format. The library contains two basic blocks for processing and writing of XML document element. For disassembling document to each element we use function block XmlTagParser. And for assembling XML document and writing to variable we use XmlTagComposer.

### Library for interpolation calculation - recalculation of resistors to temperatures

Last mentioned library, added to Mosaic during last year, is library InterpolLib for interpolation of progresses set by point coordinates listing. Function of linear interpolation we may use for example for recalculation of resistors to temperatures in case of using different sensor types than sensors defined directly in firmware of modules designated for temperature measurement. Library contains even function of bilinear interpolation for calculation of coordinate Z from input coordinates X, Y, based on fields describing points network and relevant values. An example is calculation of dew point from temperature and relative humidity.



## Discussion forum and videos at Elekrika.cz

More than one year, there is running forum about Tecomat Foxtrot at web portal Elekrika.cz. Our website in Czech language is connected to this forum and it became a basic discussion forum, where user, integrators and programmers discuss with Teco specialists. Of course, we reply to any question. Because we are a quests of this forum, we follow its rules. The ambition of the forum is to become a unique source of information from electrical engineering. And Tecomat Foxtrot by its use of application belongs to this, of course.

New activity of this portal is opening of internet TV broadcasting at Elekrika.tv, oriented at the same group of readers/viewers and subscribers. Broadcasting of news, interviews, reportages from exhibitions are available on-line from still growing archive. Portal offers even on-line broadcasting, mostly from exhibitions like Amper or Engineering in Brno (Czech Republic) and also on-line broadcasting from studio. Usually we may watch discussions with specialists on some topic and public connecting via internet or Skype. So we may listen and watch the discussion and even ask questions.

Hot news from last year is video record of training for Foxtrot integrators, we have organized in Brno, Czech Republic. 4 hours of original training has been divided into 8 blocks. The block are commented, so first you may go through the topics and then click on the topics you are interested in. Useful function, that saves your time. The link to this videotraining you may find at our website at part For Designers. At present it is published in Czech language, but we are preparing English version too.

Relation of portals Elekrika.cz and Elekrika.tv is not coincidental. The studio is equipped by Foxtrot with remote access via its web pages, what has been tested



Record from Foxtrot training is available at Elekrika.tv at any time.

by editor in chief Mr. Minarik by his own fingers and eyes on iPad at SPS exhibition in Germany. We have invited him to official presentation of connection Foxtrot with KNX system. This is interested topic for Elekrika.cz, because a part of building, where they are placed, is equipped by KNX system. So soon we may expect in Elekrika.tv practical experience from connection of these two systems.



Connection with Foxtrot in Elekrika.tv studio from exhibition SPS in Germany (Nurnberg).

## Smart Switchboard

### Technology of smart house without programming

Companies SUP-TECHNIK and Insight Home has joined and created new concept for home automation - Smart Switchboard. It is standardized house and flat switchboard, delivered in few sizes for various installations.

It contains technologies for high and low current house wires including modules for protection of the whole electrical installation. It also contains TV and satellite wires, data network including preset wifi router and backed up data storage. The intelligence is provided by control system Tecomat Foxtrot, here used for comfortable control of lights, shutters, heating and other devices, certified electronic security system, camera system and multimedia system with recording.

All included technologies are ready to use by user immediately after connection from modern visualization via tablets, smart phones and even remotely. And more over: user may create his own scenes, temperature modes and other parameters of the system.

Existing way of smart house realization is based on individual, non-repeatable solution of each installation. Smart Switchboard uses the same technologies as tailor-made applied intelligent house, but it is delivered as fully connected and fully programmed. That's why the whole implementation of intelligent house may be done by ordinary electrician or electric

cal company, who aren't specialised into smart houses. User - end customer may save a lot of money for project preparation and programming.



## News is Tecomat Foxtrot designers manual

Designer manual for Tecomat Foxtrot designers is perfect and basic source of information for anybody who's beginning to work with system, but even for qualified professionals, which may find here all important information about new technologies implemented into the system.

Last year we have added in the manual information about connection of new supported electronic security systems. As well we extended examples of security systems connection (new RFID readers, keyboards), lighting metering (interior, exterior), drives control of gates, doors, heating and solar water heating. And we input the solution of controlled watering including volume ground humidity metering.

Soon we should put in the manual information to new GSM modem (connection, choosing of antennas), new solution of electronic locks integration and designers information to new preparing peripheral modules CFox and RFox. And many customers are waiting for examples of connection KNX gateway with Foxtrot.

Last version of Tecomat Foxtrot designers manual you may download at our website:

[www.tecomat.cz](http://www.tecomat.cz)



## Why to use Tecomat Foxtrot for building automation?

Control system Tecomat Foxtrot is exceptional on the market by combination of centralized control system (PLC) according to international standard IEC EN 61131, own proprietral two-wires installation bus CIB Common Installation Bus, integrated ethernet port, serial channels and high capacity storage memory up to 32 GB. Integrated web server and own free programmable web pages directly connected with all measured and controlled values creates from Foxtrot a perfect base for creating the core of modern intelligent house. Tecomat Foxtrot safes energy (by principles of energy control - heating, air-conditioning, recuperation, optimized control of sources) and as well minimal consumption of central module, what is only 2 - 3 W. It is incomparably less than most systems based on PC server, which has about hundred times higher permanent consumption.

It is the smallest but most powerful programmable controller from Tecomat line. System is compatible with previous generation of Teco systems. Control systems Tecomat comes from general principles and rules of category PLC (Programmable Logic Controller), what gives them a long operation cycle in end application. Up to now there are running some applications, realized before 30 years, like Singing Fountain in Maria Bad (Czech Republic). This gives to investors very good sign of long compatibility of the system and safes their investment to the future.

### Centralised system with distributed peripheral modules

Foxtrot system is a resultant of different directions and trends of world development in control, telecommunication and installation technologies. The development continues in centralised systems, whose peripherals - in terminology of building installation we call them sensors and actuators - are free distributed within building via buses and at the last time even wireless. Inputs and outputs are passive from algorithm and function point of view. All functions and function blocks are processed in central module. Still each module has its own powerful microprocessor. It provides communication with central module, diagnostic, and operates preprocessing of data - filtration of measured analog values, linearization of temperature sensors and transforming values into engineering units. It cumulates counted pulses to registers or at dimmers it transform set parameters to smooth crossing among light levels. Module firmware may be upgraded and serviced by bus both locally and remotely. System is resistant against failure or disconnection of any module. On-line exchange of modules during operation may be allowed.

### CIB Common Installation Bus®

Specially for building automation company Teco developed universal installation bus CIB Common Installation Bus®. This bus contains few basic and impor-



Systém Foxtrot je flexibilní a má přímá propojení na další systémy.

tant features: deterministic control of type master-slave and that's why fast response of any large application up to 150 ms, free topology with possibility of free branching without need of impedance termination of each branch and minimization of wire number to two. Through these wires are powered connected modules and also communicate with central module. The longest branch may be up to 500 m. One central module Foxtrot may hold up to 10 CIB masters. Each master may hold up to 32 CIB modules. So in total 320 modules under one central module.

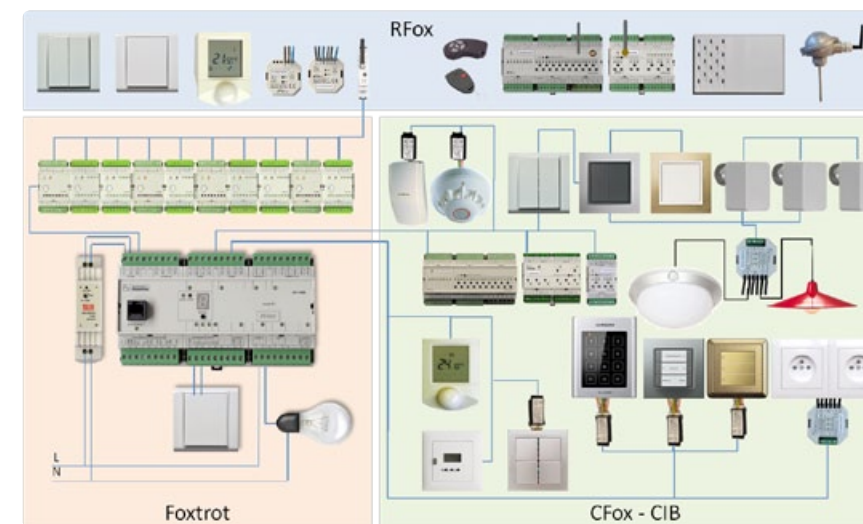
Modules are designated as interior modules, under installation box cover, into installation box, into switchboard on DIN rail or as exterior modules with high protection IP65. Usually they are combined sets of buttons, temperature sensors, humidity sensors, thermostats controllers or controlled thermostatic valves. Modules into switchboard hold even more than 30 inputs and outputs, dimers or direct

LED lines and power LED diode control. Modules into installation box may connect sets with 8 buttons or fire or security detectors, IR receivers and transmitters, light sensors. In our product range we have also such modules, which may connect code keyboards, wireless card readers, locks via Wiegand bus or convertor to DALI bus. Range of modules with CIB bus is still growing under our own trade mark CFox.

### Wireless network RFox®

Masters of CIB bus may be exchanged and combined with masters of RFox wireless network. One central module may hold up to 4 wireless masters, each with 64 modules. Product range of wireless modules is similar to CFox bus modules.

After pairing RFox modules with relevant master, there is not a different in configuration and programming the whole installation of both bus and wireless sensors and actuators. For large applications we may use repeaters and extend signal cov-



Foxtrot in the center of PLC peripherals, bus installation system CIB and wireless networks RFox.

erage (mesh technology). RFox network operates in frequency band 868 MHz.

### Speed bus TCL2

Into Foxtrot we may connect even classic speed peripherals with time of reading and writing up to 5 ms. This makes integrators free with using in such kind of application, where systems specialised to building automation reach its system limits. Thanks to this feature, Foxtrot is used by many manufacturers of heating pumps, parking access systems or recuperation units in their products. This speed bus cannot be free branched because of its high speed. It must reach the line and have impedance adaptation. The modules may be distributed up to 300 - 400 m. There exist modules transferring this bus to optical fibre to reach distance up to 1,7 km or for galvanic separation and for elimination of electromagnetic field interfering. To the other end we may connect e.g. other CIB bus masters or wireless RFox with relevant ranges and possibility of branching.

### Ethernet and serial ports

In last ten years, ethernet broke from PC networks into industrial applications and houses. Each PC desktop or notebook has integrated ethernet port and each smart phone, tablet and now even television has integrated wireless ethernet - WiFi. Foxtrot follows this trend and you may find ethernet port in each central module. Support of ethernet communication is an integral part of all CPU firmwares. This gives users possibility of direct connection to standard data infrastructure of the building or house and share the medium designated primarily for high data transfers with high data volumes.

Built-in data transfer protocols TCP/IP and application profile HTTP enables connect Foxtrot to internet with all its ad-

vantages. We do not think only remote access and management of the system. Foxtrot may read data useful for house or building control directly from internet. One example is weather forecast, another one is a plan for switching high or low tariffs of electrical energy for real place and real user.

Traditional serial channels stay in Foxtrot mostly for connection of complex devices like security systems, air-conditioning units, heat pumps or frequency converters, heat meters or GSM modems etc. According to Foxtrot type, number of serial channels may be increased up to four. Interfaces are optional according to type of connected device, e.g. RS-232, RS-585, CAN, Profibus, DMX, M-bus etc. Foxtrot holds its free programming even for ethernet and as well for serial channels. Programmer may use UNI mode and programm the contain of messages as he needs. Many protocols he may find directly in firmware, e.g. Profibus, Modbus, HTTP, BACnet/IP or may input them in form of library function blocks, for instance e-mail (SMTP, synchronization with time servers (SNTP), DMX etc. So, Tecomat Foxtrot is also free programmable convertor of different protocols.

### Central module Foxtrot - high performance, data storage, communication unit and web server at once

In the center of all buses and communication channels, there is central module. It is a holder of all functions for end application. Because it comes from traditional PLC, it is oriented at high performance and speed of tasks processing. Foxtrot works in cycles and in real time. It reads statuses of inputs (sensors), run the application program, what calculates outputs, and outputs writes into physical outputs (actuators). In one turn it goes through all communication in ethernet

and in serial channels. Because of high performance of central module it looks like parallel proceeding of all partial tasks in real time. Typical cycle lasts from 10 to 100 ms.

### Internal memory back up

Foxtrot is resistant to power failure. It has adaptation for direct connection of back up accumulators without need to use UPS. Even in case of real disconnection of supply voltage 24 V DC it holds its actual status. After supply voltage restoration it continues where it has been interrupted. For storing preset parameters it has remanent memory that stores all values when supply voltage breaks. The program is stored in memory backed up by battery and as well in Flash memory. If the program is from any reason damaged, it is automatically restored from Flash memory. A part of Flash memory is reserved for storing of complete source code (project). The record may be protected by password. In such case the program may be accessed only by programmer or authorised person and after years they are sure that they work with last version of program and there is not necessary to find program in their backup.

### Data logger, database services

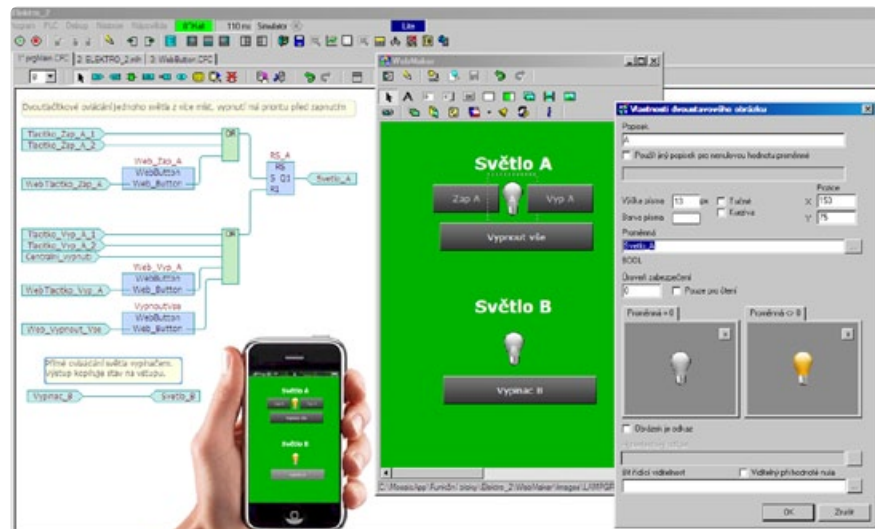
Každý Foxtrot je vybaven Databoxem. Each Foxtrot is equipped by Databox. This speed memory of size 0,5 MB is designated for frequent record of operation data with period of tens milliseconds. Because central module has real time, each such record may be marked by time sign. The last kind of memory in Foxtrot is common SD/SDHC memory card, inserting into free slot. It is useful local high capacity data storage for operation data and events recording and as well for storing of system information and user web pages. Foxtrot has integrated file system, so it access to this memory via similar organized files as we see in PC or digital cameras. Present capacities 2-32 GB are big enough to store large internal web pages or long time archives. System supports transferring of these archives to remote FTP servers and databases via internet. On the card we may also store archive images from IP cameras connected to system.

As a part of application program we may switch on user configurable Datalogger, that records values of up to 64 quantities and automatically stores to SD card files with daily reports in csv format. These may be opened in MS Excel or other databases.

### Integration of ethernet/internet, web server

Central module is based on powerful 32 RISC processor with integrated ethernet port directly in chip. Data are transmit-





Programming in CFC language together with creation of web page for control via mobile phone. Programming makes easy a lot of supporting functions. Built-in simulator enables program debugging even without connected PC.

ted to network without need of conversion via other communication modules. It means, that Foxtrot is developed from the beginning for direct integration to LAN and WAN networks. Implemented HTTP protocol enables direct access to application layer WWW. It means compatibility with web browsers, either operated on desktop PC, notebook or smart phones, tablets or TV devices (e.g. Smart TV from LG - 2012 Edition).

Used technology ensures compatibility with both present platforms iOS from Apple and Android from Google, but also with future devices, that for sure will exchange present devices of end users. System Foxtrot in principle of its free programming enables creation of user web pages with any graphic and any control logic. With Web Maker tool, system integrators, programmers and project designers may create their own control of the building or its part.

### Mosaic for programming, FoxTool for parametrization

From integrators and project designers point of view, there are important software tools for easy creation of application program and its long time maintenance.

The basic and universal tool is software Mosaic, that has developed for a long time. By Mosaic we may maintain applications of Tecomat systems, installed to end customer more than 15 years ago. This principle gives projection of the same access and attitude to system support for the future. Mosaic software in last version is ready for download at Teco web pages. After downloading it is ready to run in Mosaic Lite mode as trial for testing. For most application there is

need to have licence. The licence is non-transferable, loaded into real PLC, or transferable, bounded with USB HW key.

Mosaic offers 5 programming languages. These languages, the same as structure of program blocks, data, data types, are specified by international standard IEC 61131-3. Programers with knowledge of this standard are able to begin programming let's say immediately, the others may learn how to program according to this standard. Two languages are text type, three are graphic. The latest one and user most friendly is editor CFC (Continuous Function Chart). Using method drag&drop we connect function blocks each other and inputs with outputs. Each function block may be created in different language and final program connect all in one wholeness. A matter of course is creation of own function blocks and their organizing into user libraries.

For those, who need only standard functions and like easy non-programmable setting of the system, we offer parametrization tool FoxTool. Programing of the system is reduced to connecting of preset functions with real configuration of sensors and actuators. It enables easy read installed peripheral modules on bus CIB, name them and by form of dialog windows to match them with functions and mutual relations.

## Teco actively participates in professional conferences

Participation in specialized conferences is always helpful. It brings possibility to present our solutions to professionals in automation and open new discussions, helping us to direct next system development. Let's mention few conferences we have participated in last time:

- Automation in Breweries
- Perspectives of Living I
- Perspectives of Living II - A man in a smart house
- Safety 2012: Assistive technologies - Safe household and safe-sufficiency
- Intelligent Buildings



## Regulus and thermic solar panels

Company Regulus is a leading Czech company delivering complex heating systems. Professionals from Regulus assemble and tune up tailor made combination of heating sources, accumulation tanks and boilers and heating units, which is afterwards installed by installation company under contract. The news in their product range (since 2012) is intelligent controller IR-12, whose base is OEM design of Tecomat Foxtrot. Controller has own application program, containing company know-how from thousands of deliveries, so the program is a user friendly specialized program for heating systems. Company delivers in foreign countries, so for Regulus is very important remote access of IR-12 via web pages and also direct access by our Mosaic software. Company Regulus has built on the roof of their new development and training center building a unique testing and measuring workplace for thermic solar panels. Switching station on the roof is



Intelligent controller IR-12 from Regulus.



equipped not only by electrical switchboards, but also by unique field of valves controlled by IR-12 controller, that is able by program to rebuilt a way of heat water from fourteen sets of parallel operating panels, so they may exactly measure and compare efficiency of panels from various manufacturers. That's the only way how to find a really optimal solution for end user.

Illustrative images we have taken during Tecomat Foxtrot training for project designers, which we arranged in fall 2012 and in February 2013 right in Regulus training center in Prague (Czech Republic).

### House above dam

Control system of luxury family house - Brno, Czech Republic



Modern house with sandstone tiled facade with cedar wood and titan-zinc accessory. The view of the house from driveway is inconspicuous. You can pass by and miss it, but if you come inside you will be amazed.

"The house was a real challenge, exceptional, but complicated land and against this really generous clients requirements," says architect Rostislav Jakubec from the company ATX Architects.

### Process of birth

„At the beginning of designing, the most important for us is to find out why the client actually wants to create a house and what is expected from the result,” says Mr. Jakubec.

With the standard things the architect can advise. „We are interested in unusual things, for example, I would love to have room for design railing ,or’ I wish to have a giant aquarium.” Then we usually create several options for the client that verify the possibilities of use of the

given space, explains the architect. In this case we discussed the project rather shortly, a couple of months, says architect Jakubec. The most important things to be discussed are the look of the house and technologies of user interface.

### Control system

- interior lighting (wall switch buttons, motion detectors)
- exterior lightings (according to sunrise and sunset)
- exterior blinds, pool cover
- floor heating
- air-conditioning units
- dew point monitoring in rooms
- ventilation of residential rooms
- ventilation of pool hall (communication on MODBUS)
- integration of safety security system with unit Paradox EVO (communication on RS232)
- well water level monitoring
- error status monitoring of heat pump, ventilation system, CIB units
- data from control system are transferred by EPSNET to the system in-Home, that provides visualization and control with iPad tablet, and provides audio/video signal distribution
- data from control system are transferred by OPC server Teco into the SCADA system PULSE, this allows object management for complete building monitoring

The control system of the building has been designed by these companies: Insight Home, a.s.: inHome system, Audio/Video technologies, GEOVAP spol. s r.o.: delivery of hardware control system, control system application software, AFCON POWER & AUTOMATION s.r.o: project documentation, electro assembly.

### Powder coating line for telecommunication data center producer Conteg

Humpolec, Czech Republic, Implemented by: Ekol s.r.o., end user: Conteg spol. s r.o.

Company Ekol s.r.o. is Czech manufacturer and supplier of surface finishing plants. Ekol has a good position on the Czech and Slovak market and has successfully





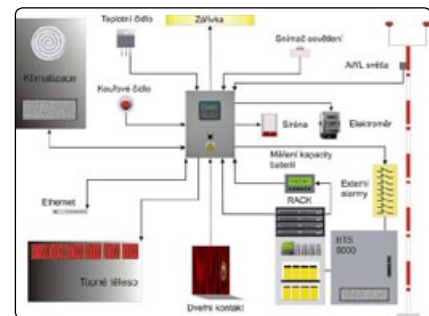
carried out deliveries for leading automotive companies abroad (among others DaimlerChrysler-Mercedes Benz, Tenneco Monroe, Hayes Lemmerz Autokola, Gial Sudan, Siemens Mohelnice, MAZ Minsk Belarus, SATURN Rybinsk Russia).

During 2011 Ekol implemented for company Conteg spol. s r.o. (manufacturer of switchboard cabinets) technology of powder coating line for manufacturing of cabinets for telecommunication data centers. Powder coating line is controlled by our control system Tecomat TC700. HMI control panel is ID-08.

### Smart House at railways

**Base Stations Monitoring of GSM-R system at Czech Railways,**  
*implemented by: Kapsch s.r.o.*

Time has progressed. The classic railway telephone, as we know it from the past, has become mobile. Company SŽDC (Railway administration company) is building the base stations of mobile network GSM-R around their core tracks. To call via this network, you cannot use the classic phone. The network is not designed for that. This network they use for operating voice calling through a special phones and for data connection with moving trains. SŽDC has chosen company Kapsch to deliver the system. Company Kapsch did many tests of functions and after they did choose Tecomat



Foxtrot as control system for technology monitoring of each base station.

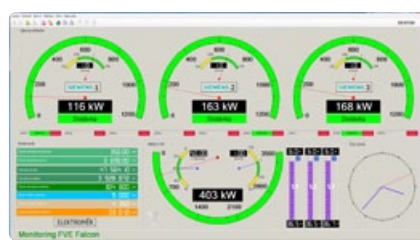
On the images below, we received from Kapsch company, you may see the typical objects of base stations. They have been building along the tracks in last years. You can also see the location of Foxtrot in the cabinet. We also got examples of local visualization on the internal web server integrated in each Foxtrot. At present there are equipped with Foxtrot all the base stations (houses) at First and Second National Railway Corridor. Under construction is the section from Česká Třebová to Přerov and from Ostrava to state border with Slovak Republic.

### Monitoring of solar power plants Kurivody and Falcon Mimon

**Czech Republic,**  
*Implemented by: LAMAL s.r.o.*

During 2010 and 2011, company Lamal implemented Tecomat Foxtrot for monitoring of solar power plants Kurivody and Falcon Mimon. In Kurivody, there are 3 inverters Satcon with total output power 1,5 MW. In Falcon Mimon, there are 3 inverters Siemens with total output power 4 MW. Monitoring of each power plant contains:

- Inverter status monitoring - via data communication OPC, there are monitored on-line operation data and error warning of each inverter



- Main high voltage protection monitoring - via data communication, operated by Foxtrot, there are on-line read data from high voltage protection about actual status of electrical network
- Electrical meter monitoring - via data communication operated by Foxtrot, there are on-line read data of manufacturing and consumption (kWh) and infertile parts (kVar).

With using Teco GSM module, which is a part of each power plant, there are provided early warnings of control room operator, who is informed about e.g. supply power failure from energetics, in case of inverter error. The system sends each day in the morning an e-mail report to investor, containing total daily power to be manufactured in kWh and status of operation failure rate.



Via HMI SCADA Reliance 4, the data from each solar power plants are concentrated to a central control room. Operator see on-line statuses of all devices. Control room is used as well as data storage, so the data may be at any time used for analyze by table or graphical sets.

### Control system of Cormen Training Center

**Bystřice nad Pernštejnem, Czech Republic,**  
*implemented by: Tecont s.r.o. a 2AService s.r.o.*

In 2012, company Cormen s.r.o., who is a leading Czech manufacturer of chemical cleaning detergents for industry and households, has built a modern training center. The training center has been placed in additional storey of Cormen administration center, close to the manufacturing plant.

They built more than 700 square meters of flat for trainings of industry cleaning and for examples of Cormen products efficiency.

Training center is fully automated by intelligent electrical installation controlled by system Tecomat Foxtrot from our company.

This technology controls and visualize complete lighting system (modern fluorescent tube lights), heating system containing two circuit gas boilers, supplying 25 radiators and floor heating

of other part of the building. Heating is controlled according to measurement of outside temperatures and temperatures in rooms. Each room is independent. To change temperature from preset and pre-programmed cycles, they use interior module RCM2-1.



Tecomat Foxtrot here controls as well HVAC system including recuperation and heat pumps for heating of air. Foxtrot is connected with electronic security and fire alarm system Honeywell, including fire alarm sensors.

There is also connected access system to Foxtrot. It is used for access to a part of the training center designated for accommodation of trainees.



Control of the system is possible by wall touch panels ID-18 and room interior modules RCM2-1. All processes are visualized and shared in training center control room via HMI SCADA software Reliance 4. Control and monitoring is shared also by web pages and authorised persons may control the system by phone, tablet and other mobile devices.

Control system will be soon expanded by control of a quarter hour maximum, control of heating system for the whole manufacturing plant and warehouse light system including measurement of savings and quantity of illumination.



### Sunhouse project - unconventional modern art in the middle of Hungary

**Csömör, Hungary,**  
*Implemented by: MODO Group Ltd.*



Interesting references of control system Tecomat Foxtrot we may find also in Hungary, where is very active our Hungarian distributor - company Home Intelligent System Ltd. (HIS) with its director Mr. Tibor Makos. He evaluates his 7 years experience in Home Automation business. Thanks to his practical experience from implementation and programming of control systems HIS is strongly supporting all integrators who implement Tecomat Foxtrot in Hungary.

Sunhouse project, interesting house from architect and energy point of view, has been implemented by company MODO Group Ltd. with support by HIS. MODO Group has interesting attitude: „We believe that by precise project designing and efficient constructing and scheduling we are able to save customers costs for house construction. And thanks



to this, customers may use saved costs for effective and comfortable home automation system, what gives them guaranty of energy cost-saving operation of the house for the future.”

In the house, there is implemented control system Tecomat Foxtrot with central module CP-1004, controlling the following technologies:

- Lighting control
- Shading control
- Ventilation control and recuperation
- Heat pump
- Floor heating
- DSC alarm system. Wall switches are used in design LOGUS90.

### Visualization and archiving of data from gas-volume conversion devices and chromatographs at Border Transfer Station of Gazela Gas Pipeline

**Brandov, Czech Republic,**  
*Implemented by: GEOVAP, spol. s r.o.*

During 2009, due to the gas crisis caused by the Ukraine-Russia gas disputes, gas deliveries to the Czech Republic were interrupted. Because of this, it was decided to build a new natural gas pipeline named Gazela. Building the gas pipeline ensures that the Czech Republic is no more de-



pendent on natural gas imports transported through Ukraine. Thanks to Gazela and OPAL, a natural gas pipeline in Germany, which are interconnected on the German-Czech border near the village of Brandov, the Nord Stream pipeline supplies the Czech Republic with natural gas from northern parts of Russia.

The entire transfer station, including the system of data collecting and archiving at Brandov, is operated by NET4GAS. This company operates more than 3600 kilometers of gas pipelines in the Czech Republic. For visualization purposes, the Reliance SCADA HMI system is used. On two touch panel PCs, Reliance communicates with a Tecomat Foxtrot CP-1000 PLC. This PLC is equipped with a SD memory card on which data is stored and archived for more than a period of one year. In addition, data for the last 14 days is stored in the PLC's retain memory so that no data loss occurs when removing the SD card.

Based on customer requirements, a user-defined program for peripherals operation and data management was suggested to





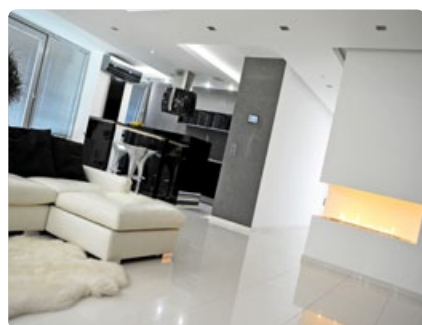
be used. The Reliance system enables the NET4GAS staff in Prague to remotely monitor the consumption of gas using the Reliance Web Client module.

A detailed description of the solution can be found at [www.reliance.cz](http://www.reliance.cz).

### Control system and visualization of luxury apartment in „Tri veze“ complex

*Bratislava, Slovakia,  
Implemented by: iQ House, s.r.o.*

In 2012, there has been built a luxury apartment in complex „Tri veze“ in Bratislava, Slovakia. Customer required not only modern interior design, but also comfortable home automation sys-



tem, that may control all technologies in the apartment including integration of audio/video multimedia system.

All these requirements has been fulfilled by our control system Tecomat Foxtrot, so the decision was easy. Implementation of Tecomat Foxtrot has been realized by our Slovak distributor, company iQ House, s.r.o.

Tecomat Foxtrot here controls lighting, combined hot water heating, shielding (interior jalousies), cooling, bio-fireplace and already mentioned integration with audio/video multimedia system Control4. All technologies are visualized and controlled also via TV screen and mobile devices (iPhone, iPad).

### Control system of galvanic line

*Šternberk, Czech Republic,  
Implemented by: AITEC s.r.o.*

Company AITEC s.r.o. is a traditional supplier of technologies since 1997 in these fields - surface treatment lines, chemical treatments, complete neutralization and wastewater treatment stations.

One of AITEC application implemented during 2012, is implementation of gal-



vanic line technology for commercial galvanic plant in Šternberk, Czech Republic. The whole process is controlled by our control system Tecomat TC700. As HMI is used control panel ID-18.

### Tecomat Foxtrot in Museum of Cypriot theater

*Limasol, Cyprus,  
Implemented by: Rhine Line Ltd.*

Museum of Cypriot theater has been opened for public by Cypriot president Dimitris Christofias on March 27th, 2012 during International Theater Day. The museum is located in Panos Solominides Culture Center in second largest Cypriot city Limasol, It is a property of Limasol city and Cypriot Theater Organization. Exposure of this unique museum presents main milestones in theater art history of Cyprus.

For delivery of complex lighting system has been chosen company Rhine Line Ltd. The task was to create typical theater semi-darkness with point emphasizing of presented costumes and other theater artefacts. For lighting of stage and presented models has been chosen halogen spotlights PAR36.

They has created combination of halogen and LED lights, what respects fragile nature of costumes and fabrics. To emphasize gentle lighting of precious costumes, they added LED spotlights.

Our control system Tecomat Foxtrot in connection with software NeoMatic from Rhine Line company controls 40 dimming halogen spotlights and LED ballasts 0-10 V and 16 switched outputs. Thanks to intelligent and flexible system with easy creation of light scenes, the requirements of architect and curator has been fulfilled in 100%.



Photo and text: Rhine Line Ltd., Nicosia

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