FLEA

flexible ideas

# ENERGY INSTRUMENTATION AND CONTROL

## Catalogue of elements for Internet of Things, remote meter readings, zone control and I&C


www.flea.cz

# CONTENT

## Discover the FLEA solutions

# COMPANY INTRODUCTION

## FLEA s.r.o. is a Czech company operating in the field of energy instrumentation and control.

We have been developing and manufacturing elements for energy remote reading and instrumentation and control since 2009. Apart from hardware, we also develop software to process and evaluate the measured data. Thanks to the employment of state-of-the-art technologies and to long-time experience in the field, we usually reach heating cost savings of 25 to 45 percent. Not only do our customers appreciate the cost savings and heating comfort, but also easy heating control by means of a computer, tablet or mobile phone.

### ADAM SLUKA

Adam has been interested in electronics and programming since secondary school, where he met Kamil teaching maths. While attending the Czech Technical University in Prague, he participated in the development and production of access control system electronic modules. Consequently, he set up FLEA with Kamil and Jan.

Adam is a mastermind of the algorithms and mathematical models that enable our software to reach great savings. Adam is FLEA's leader, blazing the trail forward in the business world.

Aside from work, Adam loves sports and travelling. He has visited Iran, Armenia, Georgia, Kyrgyzstan, Uzbekistan, the Ukraine, Romania and Morocco. Twice, he rose to the challenge of biking a 1,000-mile ultra-marathon across the Czech and Slovak mountains.

### KAMIL JIRKA

Kamil was able to solder before he could even write. He started his business when he was in secondary school.

He repaired TV sets, PC screens and other household electronics for his customers.

During his studies at the University of West Bohemia in Pilsen, Kamil set up KETNET, a company focused on the sales and service of IT devices, CCTV systems, web sites and e-shops. In 2006, he founded TaNET, the largest local internet provider. The establishment of FLEA was then the next logical step.

Apart from work, Kamil loves powered aviation, photography and hiking in the mountains. He visited the Indian Himalayas, Vietnam, Albania, Morocco and Greenland. His next biggest challenge is to drive a 43-year-old UAZ vehicle along the Mongol Rally, which is 17,000 km long.

### JAN STANĚK

Jan has been interested in computers since school; he was also a leader of the programming and computing club. After he finished grammar school, he studied software engineering at the Faculty of Applied Sciences in Pilsen. During his studies, he produced programmes for hardware developed by Kamil. He focused on software development in a large software company for more than 10 years and gained extensive experience. External co-operation with Kamil resulted in co-founding the FLEA Company.

Besides work, Jan is interested in many sports; he plays floorball and set up a floorball team. He is married and has 4 daughters.

# HOW IT WORKS


Wireless sensors collect the data from meters and transmit the data via wireless FLEA, Sigfox or LoRa networks to servers in order to be saved and processed.

The received data are automatically processed, sorted and evaluated by the FLEXIM server. When a water leak is detected, for instance, the server gives the command to shut off the pipeline and sends you a warning e-mail or SMS. You can also receive a call from our operator and, together, decide on how to solve the particular issue.

All functions run via the internet and are completely online. You can control the system using a computer, tablet or mobile phone; however, in case you have no such device available, you can just call us and our operator can make the changes on your behalf.

We keep the measured data in our archives forever; therefore, you can easily compare individual days, months or years.


Our control centre monitors the metered data, detects unusual situations and provides an appropriate response. In case of a water leak, for instance, our operator calls you and consults further actions with you.

The FLEA FLEXIM system identifies when your toiler or pipeline is leaking. It can also detect the points of energy waste, room overheating and other negative effects impacting excessive consumption of expensive commodities. The FLEA FLEXIM system sends you a report on a monthly basis and calculates the amount you waste every month.

The FLEXIM software is also an ideal solution for the boiler room and room heating control (so-called zone control). Thanks to advanced algorithms and connecting each room's needs directly to the boiler room, the system can usually save more than 25 % of heating costs.

# REFERENCES

## The FLEA FLEXIM system can save money both in small and large buildings

The FLEA FLEXIM system is suitable for both small and large buildings. It can be easily installed in existing boiler rooms and exchange stations. Using the wireless solution, installation is extremely clean and fast and can be executed under operation. You can start saving costs soon with no significant changes to the building.

The FLEA FLEXIM system controls various heat sources – exchange stations when connected to a central heating system, gas and electrical boilers, heat pumps, biomass boilers, etc. The system can be easily connected to your existing equipment; therefore, the initial investment is significantly reduced.

Take a look at several typical applications of the FLEA FLEXIM system.

### ELEMENTARY SCHOOL, ZÁREČNÁ STREET, TACHOV

Refurbishment of two exchange stations, zone control in every classroom and teacher workroom, Waterstop system for the entire school, FLEA FLEXIM system for efficient heating.

Execution: 2016

Scope: 83 rooms

Expenditures: CZK 1,500,000

**Annual savings: CZK 441,000, i.e. 40 % of heating costs**

### ELEKTROMETALL S.R.O. MARIÁNSKÉ LÁZNĚ

The FLEA FLEXIM system was installed to control the existing gas boiler room and zone control in the offices, production halls and warehouses.

Execution: 2014

Scope: 44 rooms

Expenditures: CZK 370,000

**Annual savings: CZK 479,000, i.e. 46 % of gas costs**

### ELEMENTARY SCHOOL AND KINDERGARTEN, STARÉ SEDLIŠTĚ

The existing gas boiler room was fitted with the FLEA FLEXIM control system, the classrooms and teacher workrooms were equipped with the wireless FLEA zone control.

Execution: 2014

Scope: 52 rooms

Expenditures: CZK 900,000

**Annual savings: CZK 229,000, i.e. 32 % of gas costs**

### DR. POPOV S.R.O.

The FLEA FLEXIM system was installed to control the electrical heating boilers and zone control of the production plant.

Execution: 2009

Scope: 14 rooms

Expenditures: CZK 118,000

**Annual savings: CZK 28,000, i.e. 26 % of electrical heating costs**

## BUILDING AND HOUSING COOPERATIVE, TACHOV

The typical application of the FLEA FLEXIM system to control two gas boilers and zone control of a small office building.

Execution: 2012

Scope: 13 rooms

Expenditures: CZK 270,000

**Annual savings: CZK 41,000, i.e. 25 % of gas costs**


## MUNICIPAL AUTHORITY BUILDING, STARÉ SEDLIŠTĚ

The office building fitted with electrical heaters was equipped with the FLEA FLEXIM control system and zone control in the offices. Execution: 2012

Scope: 16 rooms

Expenditures: CZK 240,000

**Annual savings: CZK 55,500, i.e. 28 % of electricity costs**


## ELEKTROMETALL S.R.O. MARIÁNSKÉ LÁZNĚ - WAREHOUSE

The FLEA FLEXIM system was installed to control the existing gas boiler room and zone control in the offices, production halls and warehouses.

Execution: 2015

Scope: 18 rooms

Expenditures: CZK 363,000

**Annual savings: CZK 112,000, i.e. 20 % of gas costs**


## UNIVERSITY OF WEST BOHEMIA, PILSEN

The university uses the wireless energy metering function and the FLEA FLEXIM application as an energy control portal.

Execution: 2015

Scope: 54 buildings across Pilsen, 370 various meters

Expenditures: CZK 1,500,000

## ELEMENTARY SCHOOL, BEZDRUŽICE

The FLEA FLEXIM system controls heat supply in two central heating control stations as well as the temperature in classrooms and teacher workrooms.

Execution: 2016

Scope: 39 rooms

Expenditures: CZK 600,000

**Annual savings: CZK 208,000, i.e. 21 % of heating costs**


## TACHOV CITY - KAT COMMUNITY CENTRE BUILDINGS

Two buildings intended for interest groups, irregular use of individual rooms. The system can be remotely controlled via the FLEA FLEXIM control system.

Execution: 2011

Scope: 13 rooms

Expenditures: CZK 100,000

**Annual savings: CZK 22,000, i.e. 37 % of gas costs**

# ENERGY INSTRUMENTATION AND CONTROL

## Impacts on efficient heating settings

The term “instrumentation and control” (also IC or I&C) includes the boiler, heating and thermostat system. The larger the building, the bigger the boilers, the larger the heating systems and the more the thermostats. The purpose of heating control consists in maintaining the required (convenient) temperature and, simultaneously, saving heating costs.

Formerly, a building’s temperature was controlled only in the boiler room where a boiler attendant tended a fire or controlled the pipeline valves. Later, boiler rooms were fitted with control devices. They automatically controlled the temperature of water flowing through the heating system. However, the water temperature had to be set manually.

The next move to heating automation consisted in so-called equithermal control when the radiator water temperature was controlled based on the temperature outside: the colder the weather was outside, the warmer the water. This is the most frequent way of boiler room control nowadays. However, it is enormously uneconomical. And this is the issue solved by our state-of-the-art FLEA technology.

Setting up a heating system properly is a complicated task even for skilled professionals. Adequate settings significantly impact the power consumption as well as the comfort of people in the building. The FLEA FLEXIM software can handle these issues on our behalf.

Factors impacting the building temperature continuously change (see the diagram on the following page):

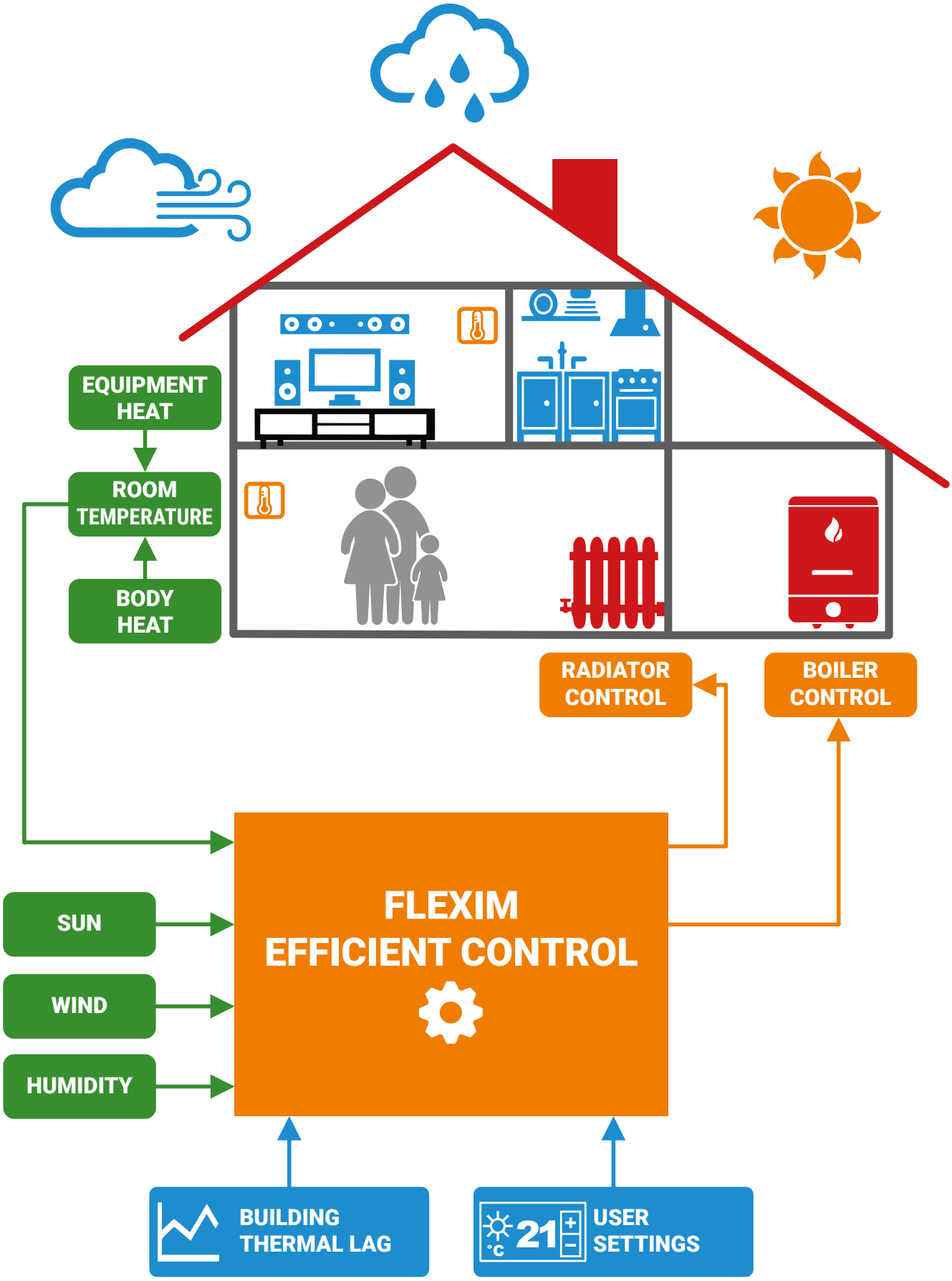
- Outdoor temperature
- Wind
- Air humidity
- Sun
- Number of people in building
- Equipment (computers, refrigerators, cookers, machines, etc.)
- Building thermal lag

Equithermal control takes into account the outdoor temperature. However, only the temperature; it does not respond to wind, sun and air humidity. The building walls and insulation systems behave just as a coat. If the temperature is plus four degrees, it is raining and windy, our perceived temperature is much lower compared to the temperature of minus five degrees with no wind and with sunshine. Equithermal control, which is based only on the outdoor temperature, is not able to respond to these phenomena.

Another factor which cannot be taken into account by equithermal control is people and equipment present in the building. People emit heat, so does the equipment, whether it is a cooker, refrigerator or computer.

*EXAMPLE: The power of a standard radiator placed in the classroom is 1.8 kW and there are usually three radiators in one classroom. That is 5.4 kW in total. Thirty pupils in the classroom correspond to heating power of approx. 2.4 kW, nearly one half of the radiator power.*

The core of our FLEA FLEXIM system includes a high-performance server that processes and evaluates all data from the building and its vicinity and learns from them. Based on the data, the server controls the boiler room and radiators. The FLEA FLEXIM control takes into account all impacts such as the outdoor temperature, sun, wind, humidity, number of people in building and building thermal lag. Thus, the FLEA FLEXIM system can save 20 to 45 % of heating costs. The system controls any exchange stations or boilers and no significant modifications to the existing boiler rooms are necessary.




*The FLEA FLEXIM control system can save 20 to 45 % of heating costs. It is the first control system that independently learns a building's behaviour; that is why it can be so cost-saving.*

# FLEA FLEXIM SOFTWARE

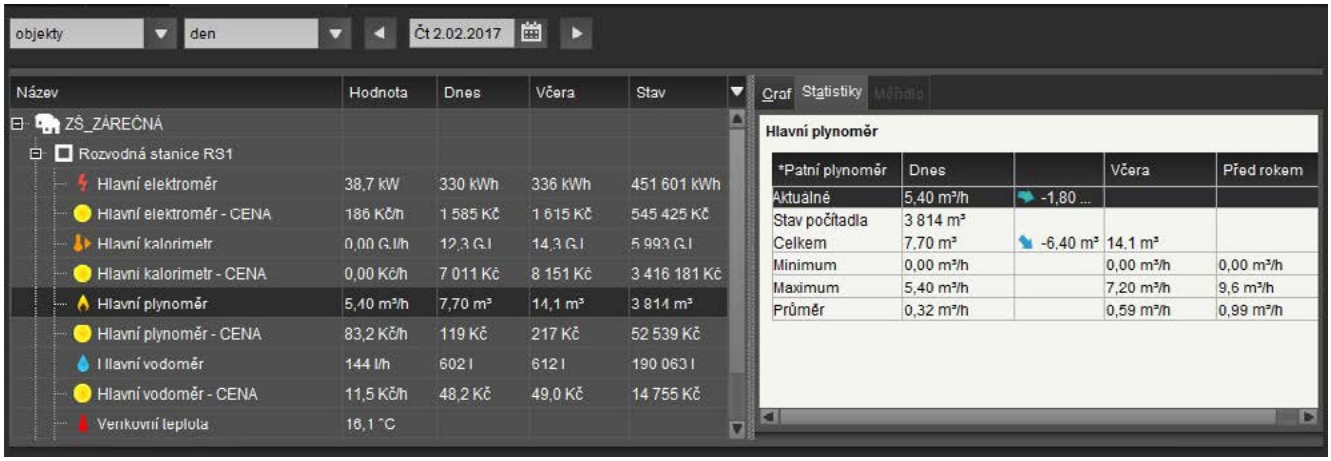
## Evaluates the measured data and controls the system based on a user's needs

The FLEA FLEXIM software can be used in two ways. Either on computers or on mobile devices. The software supports Windows, Mac OS and Linux operation systems installed on computers and notebooks. In the case of mobile phones and tablets, the software supports Android and iOS systems. Concerning other systems, the FLEA FLEXIM software is available as a web application adaptable to the size of the display.

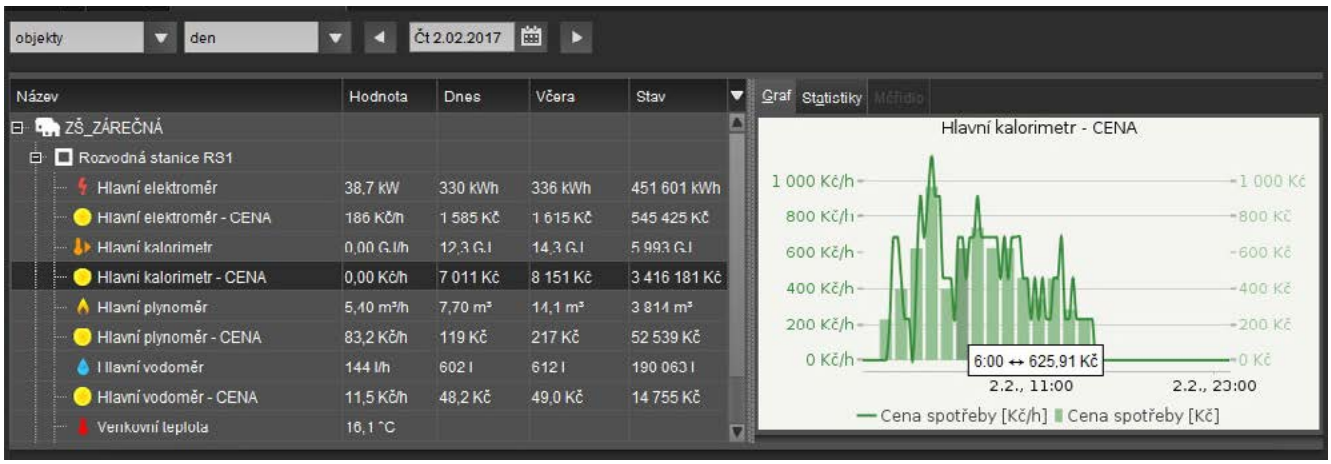
The software is divided into several modules so that it is intuitive and user-friendly. We can briefly introduce the Metering, Heating, Web and Supervision basic modules.

### METERING MODULE

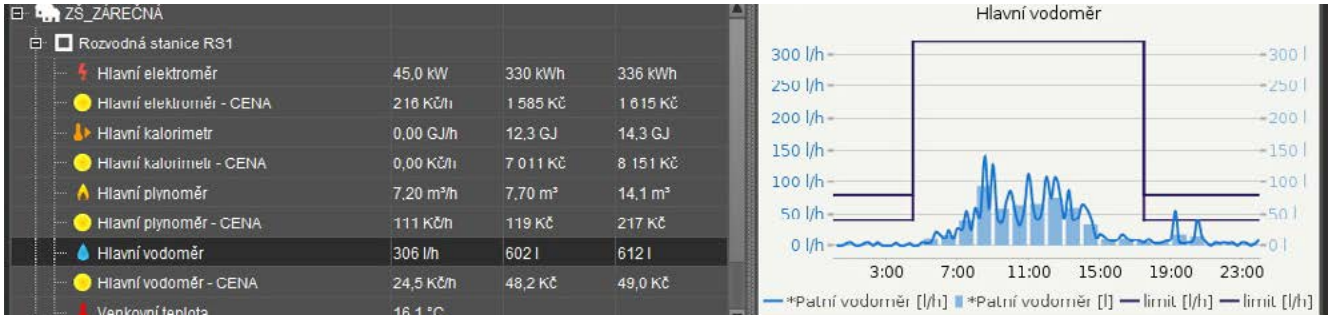
The Metering module is intended for remote measurement of temperature, humidity, pressure and consumption of water, electricity, gas, heat, etc. The measured values are shown in charts, they can be exported to files of various formats, used to divide the costs and to issue invoices. In case you are a landlord, the module will become your invaluable assistant.




*Here is an example of several meters and measured data. The measured data can be entered manually (in case of manual reading), or can be collected automatically by means of remote meter reading.*

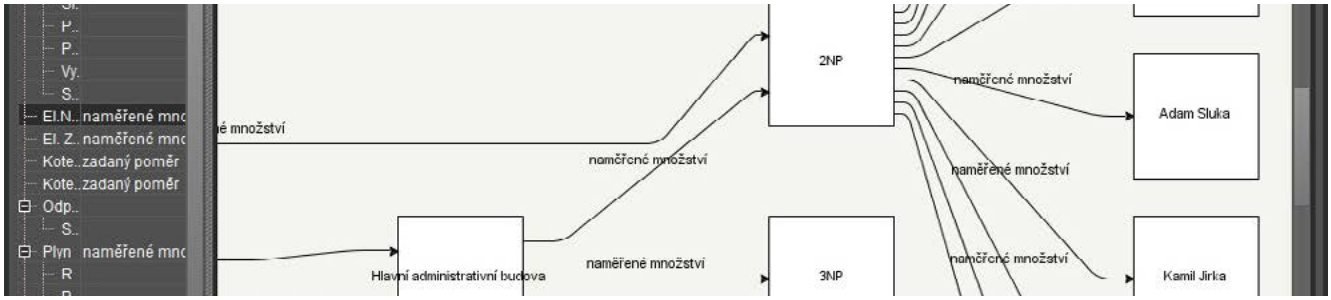



*Users appreciate the data presentation directly with respect to prices. When you find out that your house or school, for instance, consumes CZK 300 per hour when nobody is in, it may be a good time for some serious reflection. The charts say a lot, especially in the field of water and electricity consumption.*




*The chart shows remote water metering in combination with the Waterstop module. When the light-blue chart exceeds the dark-blue limit, it is a sign of an issue. If a pipeline breaks anywhere in the system, e.g. a toilet supply hose, we can detect a leak within 20 minutes, remotely close the water valve and send you an SMS with information of what happened.*

*The particular chart depicts the course of water consumption in an elementary school. Water is used by cooks in the kitchen in the morning, then by pupils and staff at breaks during the day, and by athletes in the hired gymnasia in the evening.*

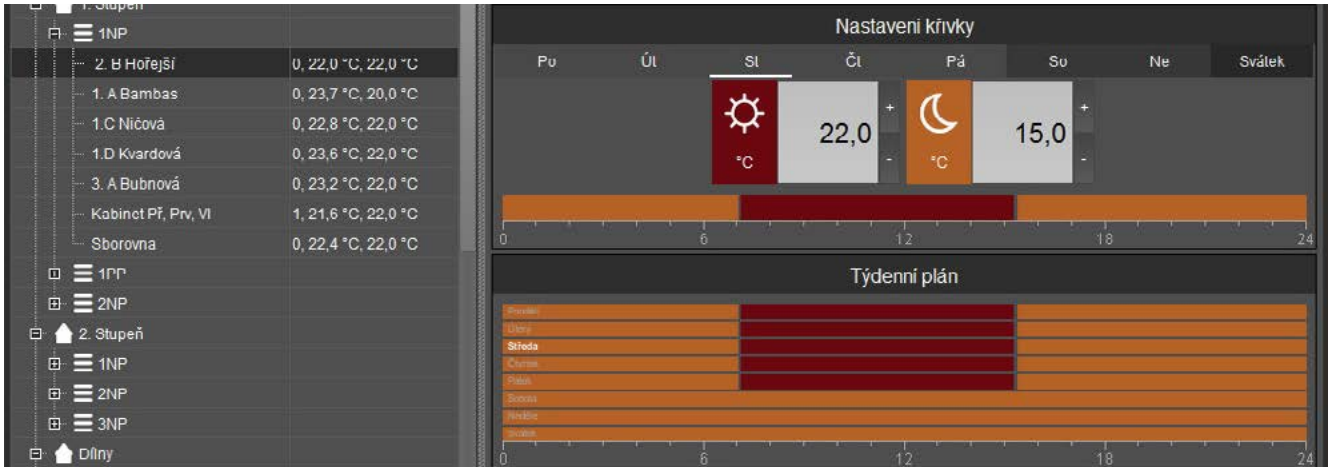



*The module also facilitates invoicing, e.g. for rented offices. The module can divide the costs for cleaning, waste disposal and water, electricity and heat consumption. You enter the cost division key once and then everything runs automatically.*

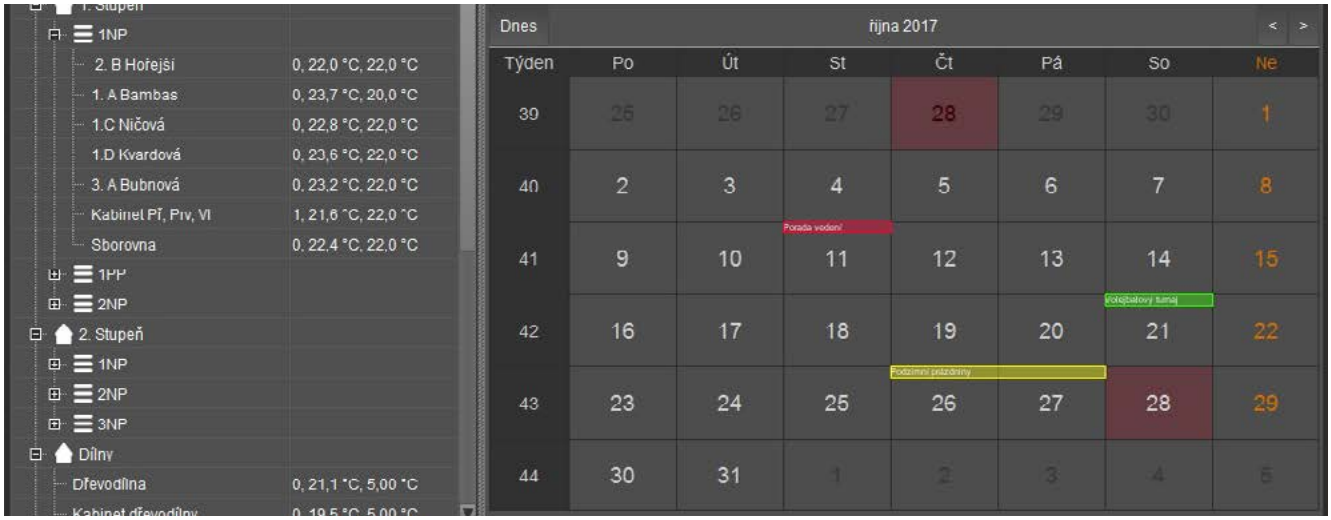
*The FLEA FLEXIM system also records the meter readings. The individual meter readings as at any date can be recalled later without a physical check of the particular meter. Energy consumption invoicing is then a piece of cake.*

## HEATING MODULE

The Heating module serves to control boiler rooms and heating in individual rooms. It controls both small buildings, such as family homes or small company premises, and large buildings with several boiler rooms and hundreds of rooms. The major module contribution consists in savings of 2 to 45 % of heating costs. You do not need to be interested in how complicated your boiler room operation is. You can just enter the required temperature set points in the individual rooms and the FLEA FLEXIM system can handle the rest.




*The temperature set point is the only value you have to enter to ensure efficient building heating control. A thermostat can control one room or a group of rooms depending on your operation. The temperature set points can be easily entered based on a calendar and can be adjusted anytime.*



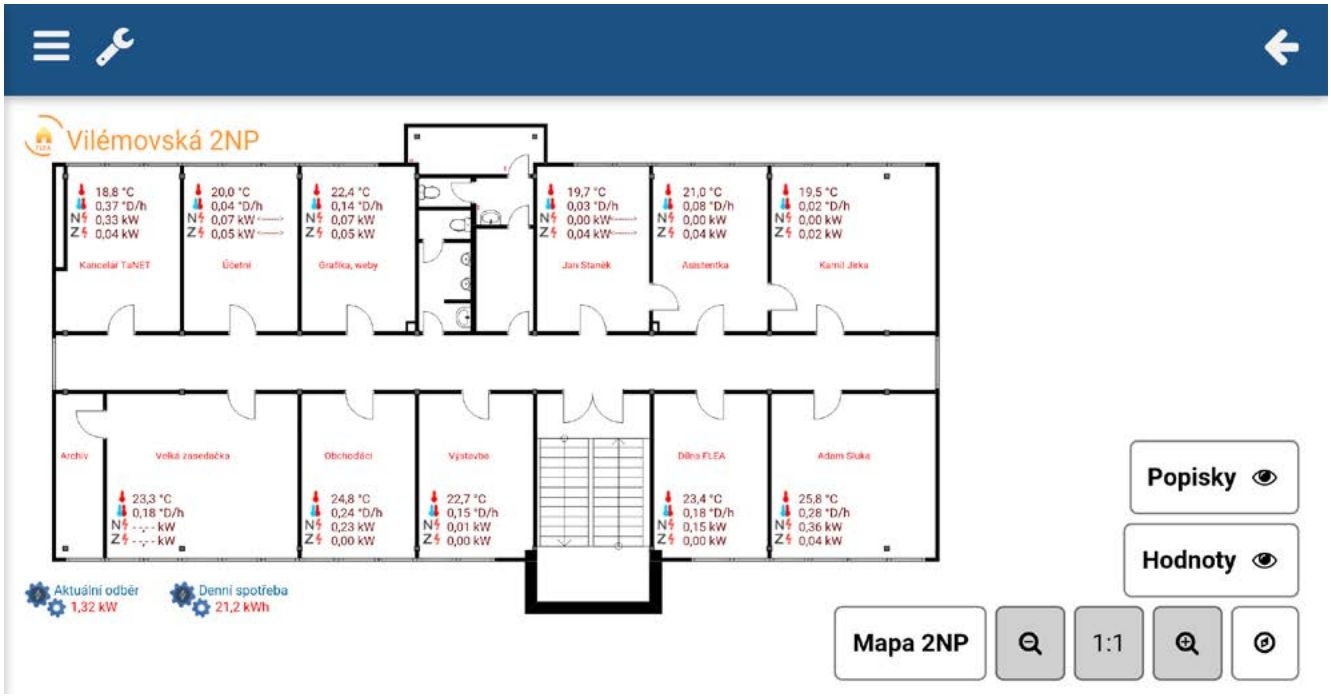

*You can enter exceptions to standard operation to the planner, such as holidays. While planning, the FLEA FLEXIM system also allows for weekends and bank holidays. You can easily control heating in large buildings with no need to set the individual rooms separately.*


*The FLEA FLEXIM system is designed for both small and large buildings. You can easily set values for each room, the whole building or various groups of premises (e.g. primary school rooms, gymnasia, sales department, headquarters, etc.). The system is user-friendly and saves you plenty of time.*

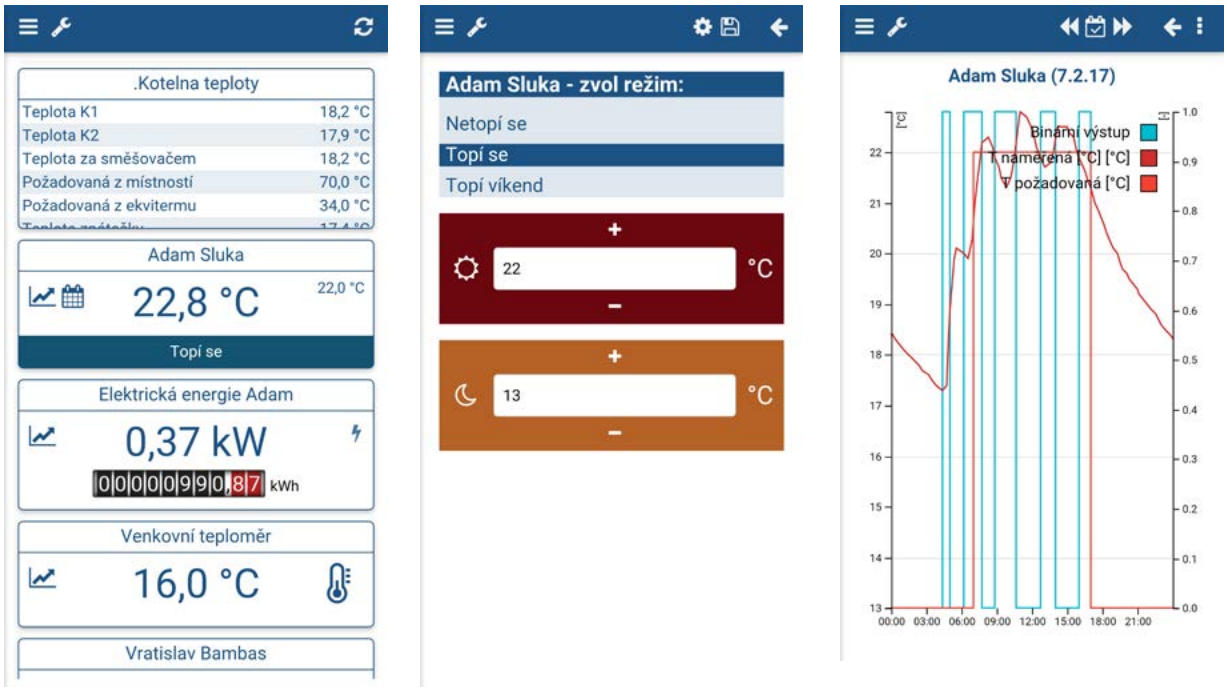
## WEB MODULE

The Web module makes the Metering and Heating modules accessible via mobile phone, tablet or notebook. You can have your flat, house, cottage or company with you at all times. You can remotely turn heating on or off, set the temperature, and switch the lights or garden watering on. You can easily check whether you forgot to switch the iron or another appliance off.


*You can control our entire software via your mobile phone. As the FLEA FLEXIM system has many features, you can move your favourite functions to the start-up section. You can have the office temperature or garage gate opening icon permanently on hand.*




*You can set an optional number of maps for each room, house or site. The map is a picture, photograph or drawing filled in with the values that interest you. It can include the room temperature, pipeline temperature, bulb icon, animated pump icon, price of electricity per each room, etc.*




*Heating control in one office*

## SUPERVISION MODULE

The Supervision module is intended for control centres and rooms. The module monitors hundreds of rooms and meters, and warns about anomalies to be consequently checked by an operator. In case of a leak, the module significantly reduces the damage caused by building flooding or heating system freezing.


*Higher water consumption, very low building temperature, basement flooding, door opening. You can easily set an alarm giving you a timely warning about an anomaly in your building. You can get your warning via e-mail, SMS or you can be contacted by our operator by phone.*

*The Supervision module is mostly used by larger companies running their own control room or having their own power engineering specialist. They can set several levels of alarms and warnings depending on their importance and assign delivery to selected user groups to be informed about the particular issue.*

# HARDWARE TERMINOLOGY

DI – Digital input, e.g. to connect a meter, push button, limit switch, etc.

DO – Digital output

AI – 0 … 10 V analogue input, e.g. to monitor a valve position or pump operation

AO – 0 … 10 V analogue output, e.g. to control valves or pumps

RS485 – Serial communication bus

REL – Relay

RF – User-selected radio frequency module

LAN – RJ45 Ethernet connector

OneWire – Bus for connection of OneWire sensors (e.g. thermometers)

230 V – Input for 230 V voltage detection

IC2 – Bus for connection of further extension modules

# HARDWARE

## Discover the FLEA FLEXIM hardware components

The FLEA elements are based on a simple text-oriented message protocol. It can be easily integrated into your existing or intended systems.

All elements are designed so that they can be installed and controlled simply. The system can indicate the battery power, signal power and status of the controlled or measured device at the push of a button. The solution is practical for both engineers and users.

Apart from the FLEA elements, the FLEA FLEXIM software supports other communication standards, e.g. SNMP, MBUS, W-MBUS or KNX and Z-WAVE. It is equipped with a communication API to be connected to other systems. We also support connection of elements by other manufacturers like Honeywell, WACO, INELS, etc.

All our elements support AES 128-bit data encryption. All data are safe and cannot be misused.

All elements are fully configurable. You can define whether the input should count pulses, respond to the logical level, measure the pulse length, etc. The outputs can be assigned to the ON/OFF mode, PWM, time pulses, etc. The features allow the modules to be easily integrated to the existing installations and to extend the existing systems with additional sensors.

The elements can be simply configured by using a USB connector or remotely via a configuration programme. The element firmware can be upgraded in the same way. The features are very useful. Thanks to these features, you can remotely adjust or upgrade all elements with no need to access them.

### RADIO FREQUENCY ELEMENTS

All wireless FLEA elements can be ordered together with the following radio frequency modules

| Module type | Band [MHz] | Number of Channels | RX response [dBm] | Transmitt cap. [dBm] | Coverage [km] | Battery life [year] | Purpose of module |
|---|---|---|---|---|---|---|---|
| FR1-HP | 169 | 10 | -118 | 27 | 20 | 6,5 | Remote meter reading, remote control |
| FR4 | 433 - 434 | 17 | -110 | 10 | 1,2 | 10 | Meter reading, instrumentation and control, remote control |
| FR8 | 868 - 870 | 18 | -110 | 10 | 0,4 | 10 | Indoor: instrumentation and control, meter reading |
| FR8-HP | 868 - 870 | 3 | -109 | 27 | 8 | 6,5 | In- and outdoor: instrumentation and control, meter reading |
| WMBUS | 169 | 10 | -119 | 27 | 5 | 6,5 | Meter reading in small and medium plants |
| Sigfox | 868 | - | -126 | 14 | 10 | 10 | Remote meter reading |
| LoRa | 868 | - | -126 | 14 | 15 | 10 | Remote meter reading |

FR1-HP, FR4, FR8 and FR8-HP is the FLEA communication standard that you can use to create your own IoT network. Something like Wi-Fi for the Internet of things. It is ideal to collect the data across the network and it is optimised for instrumentation and control. The FLEA system is equipped with bidirectional symmetrical communication with no message number limitations. Transmitted data are not subject to a fee.

WMBUS – the European standard for remote meter reading; the modules are ideal in case you want to connect the equipment to the existing network.

LoRa is an IoT network operated by České Radiokomunikace (Czech Radiocommunications).

Sigfox is a European network. It provides complete coverage of the Czech Republic

# WATERSTOP MODULE

Automatically shuts off the water in case of a leak, preventing large damage

## SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 WS |
| **INPUTS:** | 4 × DI, 1 × 230V |
| **OUTPUTS:** | 1 × REL |
| **COMMUNICATION:** | RF |
| **POWER SUPPLY:** | External 24 V |
| **DIMENSIONS:** | 90 × 36 × 60 mm, DIN 2M |

**APPROXIMATE PRICE: CZK 9,910 Kč** excl. VAT*

## RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## DESCRIPTION

Consequences of a water leak are mostly disastrous. Property damage is usually enormous. A broken toilet or tap hose can cause you big troubles. Thanks to continuous water flow monitoring, the Waterstop module can detect a leak and close water supply by means of a valve fitted with an actuator.

The Waterstop includes a module evaluating water consumption, a valve and an actuator. The valve with the actuator is installed on the building water supply line behind the water meter.

When the module detects a leak, it automatically closes the water supply line and sends a warning message. When a leak is small, it will send a warning message only. The evaluation limits can be configured.

The module is also capable of remotely opening and closing of a shut-off valve. It means that the valve can be remotely closed as a precaution in case the building is not in use.

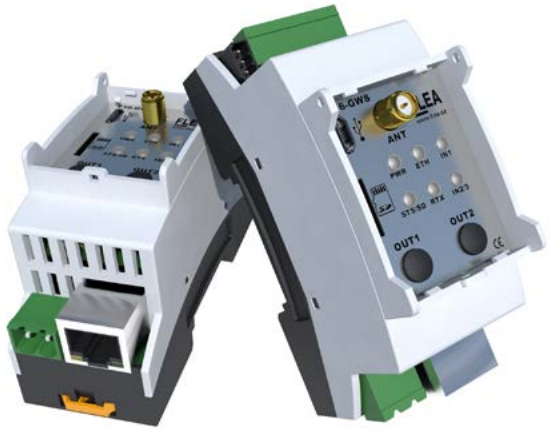
## APPLICATION

- Water consumption metering
- Automated water pipeline shut-off in case of a leak
- Water leak alarm - toilet leak, pipeline leak, etc.
- Remote closing of water shut-off valve at building inlet

** The price relates to the DN20 water meter, valve + actuator and Waterstop module assembly. The approximate price of a separate Waterstop module is 4,210 CZK excl. VAT. DN20 is the water pipeline diameter.*

# COMMUNICATION GATE

## Transmits data from the IoT wireless network to the internet




### SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 GW |
| **INPUTS:** | 2 × DI, 1 × 230V, 1 × OneWire |
| **OUTPUTS:** | 2 × REL |
| **COMMUNICATION:** | LAN, RF |
| **POWER SUPPLY:** | External 24 V, PoE |
| **DIMENSIONS:** | 90 × 36 × 60 mm, DIN 2M |

**APPROXIMATE PRICE:** **CZK 5,040** excl. VAT

### RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### DESCRIPTION

The GW module is primarily intended as a gate to transmit the wireless network to the Ethernet. Nevertheless, it can work as an I/O front-end element.

The module is fitted with two digital inputs, two digital outputs, expansion connector for other peripheral devices, USB port for the module configuration and monitoring. The module is also equipped with an SD card to store the configuration or measured data in case of an Ethernet communication failure.

The outputs can be used as counters or for detection of the state, pulse length measurement, state change indication, etc.

The outputs can be configured depending on the power supply value and, thus, the module can be used to monitor and control the internet nodes, e.g. in cases when the module disconnects less important devices in the event of a power supply failure or battery voltage drop.

The system also provides a feature of the power supply voltage and module temperature measurement.

The module can be supplied via PoE, 24 V or 48 V. The module can also be fed from a power source without the PoE feature.

### APPLICATION

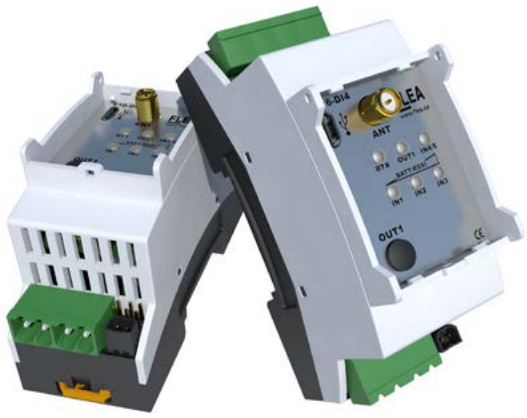
- Module can be used with or without a radio frequency module
- Communication between a wireless network and internet
- Energy consumption metering
- Monitoring and control of internet nodes (metering of consumption, battery voltage, space disruption, device disconnection/reset)
- Remote equipment control (watering, boiler, socket, contactor, etc.)
- Emergency warning
- Can be used together with single position sensors

# ENERGY METERIGN MODULE

Detects a leaking toilet or inefficiently set heating

## SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 DI4 |
| **INPUTS:** | 4 × DI, 1 × 230V |
| **OUTPUTS:** | 1 × REL |
| **COMMUNICATION:** | RF, I2C |
| **POWER SUPPLY:** | Battery, External 24 V |
| **DIMENSIONS:** | 90 × 36 × 60 mm, DIN 2M |



**APPROXIMATE PRICE:** **CZK 3,760** excl. VAT

## RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## BATTERY

| MODULE | LR03-1,2 | LS14500-2,6 | LS17500-3,6 | LSH14-5,8 | LS26500-7,7 | LSH20-13 | LS33600-17 |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✗ | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ |

## DESCRIPTION

The module is fitted with four inputs for pulse meters. All four inputs can be configured and, apart from the counter feature, can be programmed as inputs for state detection, pulse length measurement, state change indication, etc. The inputs can also be configured as outputs.

The fifth module input is intended for the detection of low and high electricity rates at electricity meters as it can detect both AC and DC from 24 V to 250 V. Thanks to the input, the module supports precise detection of the low electricity rate as well as precise distribution of the low and high electricity rates or 15-minute maximum.

The DI4 module is fitted with one output which can be used, for instance, to control the pipeline shut-off valve via the Waterstop feature.

The module can be remotely configured and provides many features for alarm and threshold settings.

The module is equipped with an expansion connector for the connection of other inputs.

## APPLICATION

- Electricity consumption metering
- Waterstop – an option to close the water shut-off valve when the water consumption limit in the building is exceeded
- 15-minute maximum metering
- Gas day measurement
- Distribution network monitoring (water companies, heating plants, etc.)
- Boiler control - wireless thermostat
- Emergency monitoring
- Can be used together with single position sensors
- Power supply failure monitoring

# ENERGY METERING MODULE

## Detects a leaking toilet or inefficiently set heating

### SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 DI4S |
| **INPUTS:** | 4 × DI, 1 × accelerometer |
| **OUTPUTS:** | |
| **COMMUNICATION:** | RF, I2C |
| **POWER SUPPLY:** | Battery, External 24 V |
| **DIMENSIONS:** | 92 × 92 × 122 mm |

**APPROXIMATE PRICE:** **CZK 2,650** excl. VAT

### RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### BATTERY

| MODULE | LR03-1,2 | LS14500-2,6 | LS17500-3,6 | LSH14-5,8 | LS26500-7,7 | LSH20-13 | LS33600-17 |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### DESCRIPTION

The module is fitted with four inputs for pulse meters. All four inputs can be configured and, apart from the counter feature, can be programmed as inputs for state detection, pulse length measurement, state change indication, etc. The inputs can also be configured as outputs.

The module can be remotely configured and provides many features for alarm and threshold settings.

The module is equipped with an expansion connector for the connection of other inputs.

The module is placed in an IP68 housing, so it is protected against flooding. The protection level is also enhanced by means of a bell-shaped housing preventing flooding even in the case of a loose bushing.

The module is fitted with a motion sensor to prevent tampering.

### APPLICATION

- Electricity consumption metering
- 15-minute maximum metering
- Gas day measurement
- Boiler control - wireless thermostat
- Emergency monitoring
- Can be used together with single position sensors
- Power supply failure monitoring

# TERMOMETER AND HUMIDITY METER

Control temperature in each room and reduce your heating costs

## SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 TH |
| **INPUTS:** | 1 × temperature and humidity, 1 × accelerometer |
| **OUTPUTS:** | |
| **COMMUNICATION:** | RF |
| **POWER SUPPLY:** | Battery, External 24 V |
| **DIMENSIONS:** | 80 × 80 × 20 mm |


**APPROXIMATE PRICE:** **CZK 2,370** excl. VAT

## RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## BATTERY

| MODULE | LR03-1,2 | LS14500-2,6 | LS17500-3,6 | LSH14-5,8 | LS26500-7,7 | LSH20-13 | LS33600-17 |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ |

## DESCRIPTION

The module measures temperature and humidity and is fitted with one input or output. The input can be used to connect a pulse meter (water meter, electricity meter, gas meter, etc.) or as a door contact. The output can be fitted with an IR diode and the module can control an air-conditioning unit, projector, TV set, etc. The module includes one push button with a tricolour indicator (green, red, yellow) which can be programmed for optional functions depending on the user's needs.

The module is also available as an outdoor version (F16-TH-Ext).

The module can be remotely configured and provides many features for alarm and threshold settings.

The module is fitted with a motion sensor to prevent tampering.

## APPLICATION

- Zone heating control in buildings
- Division of heating costs per degree days
- Threshold value monitoring in warehouses, server rooms, cooling and freezing boxes, etc.
- Anti-icing protection
- Monitoring of heating temperature courses, heating source setting efficiency
- Online temperature monitoring in shipping spaces
- Production temperature process evaluation
- Online temperature and humidity monitoring

# RADIATOR CONTROL MODULE

Saves 20 to 45 % of heating costs through efficient heating control


## SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 D86 |
| **INPUTS:** | 6 × DI, 4 × H |
| **OUTPUTS:** | 8 × DO |
| **COMMUNICATION:** | RF |
| **POWER SUPPLY:** | External 24 V |
| **DIMENSIONS:** | 90 × 72 × 60 mm, DIN 4M |

**APPROXIMATE PRICE:** **CZK 5,250** excl. VAT

## RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## DESCRIPTION

A digital I/O module intended for the control of radiator thermoelectric heads, electrical heater contactors, actuators, pumps, etc. It can be connected to pulse meters, e.g. electricity meters.

The D86 is fitted with eight digital outputs, six digital inputs, two analogue inputs for current measurement and two inputs for power supply voltage measurement. Digital outputs can be configured based on current needs, e.g. PWM for 0 - 100 % power control, contactor and relay control, time relay control, etc. Digital inputs can detect a logical level, its change, pulse length, pulse counter, etc.

Analogue inputs are primarily intended for state detection of a module and connected element power supply; the current measurement inputs can be used to monitor the number of thermoelectric heads (the module is capable of detecting theft or failure of the thermoelectric head connected to the module).

The module simultaneously operates as a mash network repeater. Thanks to this feature, the range of other elements is significantly extended.

FLEA FLEXIM reaches extensive heating cost savings by efficient control of heat supply to individual spaces. Typically 20 to 45 percent.

## APPLICATION

- Radiator electronic head control
- Electronic head disconnection detection
- Energy consumption metering
- Signal repeater
- Building heating cost savings
- Zone control in buildings

# BOILER ROOM MANAGEMENT

## Can save 20 to 45 % of heating costs through efficient boiler room control

### SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 CCU5 |
| **INPUTS:** | 8 × DI, 2 × AI, 7 ×PT, 6 ×OneWire |
| **OUTPUTS:** | 10 ×REL |
| **COMMUNICATION:** | MBUS, 2 × RF, RS485, LAN |
| **POWER SUPPLY:** | External 24 V |
| **DIMENSIONS:** | 90 × 161 × 60 mm, DIN 9M |

**APPROXIMATE PRICE:** **CZK 25,670** excl. VAT

### RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### DESCRIPTION

The CCU5 is a control unit primarily intended for boiler room and exchange station control. It can also be used as a communication bridge between wireless elements and cable bus elements. The CCU5 can be fitted with two radio frequency modules at the same time. It can also work as a converter between IoT networks of various frequencies or protocols.

To control pumps and three-point actuators,

the module is equipped with 10 relay outputs and eight digital inputs. Therefore, it can control three heating circuits in the three-point control system. To control analogue actuators and boilers, the module is fitted with two analogue inputs and two analogue outputs, always 0 ... 10 V.

For temperature measurement, it can be connected to six digital temperature probes (OneWire) and seven analogue temperature probes (PT 100, PT 1000, PT 10.000 and NTC) at the same time.

The model is fitted with an RS-485 expansion bus to be connected to additional digital and analogue inputs and outputs. It is also equipped with a full-size MBUS port to connect tens of MBUS meters to the bus in the length of up to 2 km.

The CCU5 unit combined with the FLEA software reaches significant heating cost savings. Typically 20 to 45 %.

### APPLICATION

- Boiler room and control station monitoring and control
- 15-minute maximum instrumentation and control
- Gas day instrumentation and control
- Communication gate with IoT elements
- Energy consumption monitoring
- Emergency warning
- Compatible with single position sensors
- Compatible with a pressure, temperature, flow or sound intensity probe
- Waterstop – an option to close the water shut-off valve when the water consumption limit in the building is exceeded
- Communication with MBUS meters and devices
- Building heating cost savings

# SMALL BOILER ROOM MANAGEMENT

## Can save 20 to 45 % of heating costs through efficient boiler room control

### SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 SCCU5 |
| **INPUTS:** | 6 × DI, 2 × AI, 4 × PT |
| **OUTPUTS:** | 6 × REL, 2 × AO |
| **COMMUNICATION:** | RF, RS485, LAN |
| **POWER SUPPLY:** | External 24 V |
| **DIMENSIONS:** | 90 × 108 × 60 mm, DIN 6M |

**APPROXIMATE PRICE:** **CZK 17,380** excl. VAT

### RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### DESCRIPTION

The SCCU5 is a control unit primarily intended for boiler room and exchange station control. It can also be used as a communication bridge between wireless elements and cable bus elements.

To control pumps and three-point actuators, the module is equipped with six relay outputs and six digital inputs. Therefore, it can control two heating circuits in the three--point control system.

To control analogue actuators and boilers, the module is fitted with two analogue inputs and two analogue outputs, always 0...10 V.

For temperature measurement, it can be connected to four analogue temperature probes (PT 100, PT 1000, PT 10.000 and NTC) at the same time.

The model is fitted with an RS-485 expansion bus to be connected to additional digital and analogue inputs and outputs.

The SCCU5 unit combined with the FLEA FLEXIM software can reach significant heating cost savings. Typically 20 to 45 per cent.

### APPLICATION

- Boiler room and control station monitoring and control
- 15-minute maximum instrumentation and control
- Gas day instrumentation and control
- Communication gate with IoT elements
- Energy consumption monitoring
- Emergency warning
- Compatible with single position sensors
- Compatible with a pressure, temperature, flow or sound intensity probe
- Waterstop – an option to close the water shut-off valve when the water consumption limit in the building is exceeded
- Building heating cost savings

# GENERAL PURPOSE METER

Can simultaneously monitor two quantities, e.g. pressure, temperature or flow

## SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 AI2 |
| **INPUTS:** | 2 × AI |
| **OUTPUTS:** | |
| **COMMUNICATION:** | RF |
| **POWER SUPPLY:** | Battery, External 24 V |
| **DIMENSIONS:** | 92 × 92 × 122 mm |

**APPROXIMATE PRICE:** **CZK 3,250** excl. VAT

## RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## BATTERY

| MODULE | LR03-1,2 | LS14500-2,6 | LS17500-3,6 | LSH14-5,8 | LS26500-7,7 | LSH20-13 | LS33600-17 |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## DESCRIPTION

The module is intended for the measurement of two various physical quantities. To measure the given quantity, a probe measuring the particular quantity must be connected to the module. Then the module can measure pressure, temperature, humidity, sound intensity, luminous intensity, voltage, etc.

The module can be remotely configured and provides many features for alarm and threshold settings.

The module is fitted with a motion sensor to prevent tampering.

The module is placed in an IP68 housing, so it is protected against flooding. The protection level is also enhanced by means of a bell-shaped housing preventing flooding even in case of a loose bushing.

## APPLICATION

- Pressure measurement in heating or watering systems
- Temperature measurement in warehouses and production plants
- Sound intensity measurement in transport
- Luminous intensity measurement in sports halls, warehouses, production plants, etc.
- Backup battery capacity measurement

# DOOR CONTACT

Informs about opening doors, windows, covers etc.

## SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 DW |
| **INPUTS:** | 1 × magnetic sensor, 1 × temperature and humidity |
| **OUTPUTS:** | |
| **COMMUNICATION:** | RF |
| **POWER SUPPLY:** | Battery, External 24 V |
| **DIMENSIONS:** | 80 × 80 × 20 mm |

**APPROXIMATE PRICE:** **CZK 2,590** excl. VAT

## RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## BATTERY

| MODULE | LR03-1,2 | LS14500-2,6 | LS17500-3,6 | LSH14-5,8 | LS26500-7,7 | LSH20-13 | LS33600-17 |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ |

## DESCRIPTION

The module in combination with a door magnet detects the opening of a window, door, switchboard, cover or a limit switch in the case of sliding systems.

## APPLICATION

- Alarm on the building
- Server room access monitoring
- Infringement of a monitored zone

# FLOOD SENSOR

## Sends an SMS in case the space is flooded

### SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 WL |
| **INPUTS:** | 1 × $H_2O$ cable, 1 × temperature and humidity |
| **OUTPUTS:** | 1 × REL |
| **COMMUNICATION:** | RF |
| **POWER SUPPLY:** | Battery, External 24 V |
| **DIMENSIONS:** | 80 × 80 × 20 mm |

**APPROXIMATE PRICE:** **CZK 2,590** excl. VAT

### RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### BATTERY

| MODULE | LR03-1,2 | LS14500-2,6 | LS17500-3,6 | LSH14-5,8 | LS26500-7,7 | LSH20-13 | LS33600-17 |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ |

### DESCRIPTION

The module is usually used in spaces where a water leak can cause unpleasant troubles. The installation is very easy; it can be stuck or screwed to the wall. A cable of any length (from 50 cm to 25 metres) sensitive to contact with water leads from the module. The cable runs through the places where we want to detect a water leak. For instance, along the walls of a boiler room, cellar, bathroom, etc. The cable is also often installed into suspended ceilings or on the wall under the air-conditioning units, e.g. in server rooms. If the cable comes into contact with water, the module detects it and sends a warning message. The message is then processed in the FLEA FLEXIM system and converted into an e-mail message, SMS or a phone call from our operator. The module is battery-supplied. The typical battery life cycle is two to five years. The module gives you a timely warning that the battery is low. The module is fitted with one output, e.g. connected to the fire alarm system of the building, which can be activated in case of a water leak, low battery or loss of communication between the module and the centre. All these options can be set in the module.

### APPLICATION

- Boiler room flooding
- Server room air-conditioning monitoring
- Break of a washing machine or toilet hose
- Basements of recreational facilities
- Bathrooms, kitchens
- Building flooding

# POWER SUPPLY SENSOR

## Monitors power supply of critical telecommunication systems


### SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 DC48 |
| **INPUTS:** | 2 × DC source -48 V |
| **OUTPUTS:** | 1 × load, 1 × backup ACCU |
| **COMMUNICATION:** | TTL series line |
| **POWER SUPPLY:** | External -48 V |
| **DIMENSIONS:** | 90 × 72 × 60 mm, DIN 3M |

**APPROXIMATE PRICE:** **CZK 3,940** excl. VAT

### DESCRIPTION

The module serves to monitor the power supply of telecommunication systems with the backed up 48 V DC supply.

The module is equipped with several indicators showing the monitored system state in real time. This is an ideal function for engineers dealing with an issue on site, often at night.

or monitoring two direct-current sources, backup batteries and a connected load. It measures one voltage parameter of 0 to 65 V (the load voltage), two current parameters 0 to 20 A (two sources)

and one current parameter -20 - +20 A (batteries).

The module must be connected to a communication gate, e.g. F16-GW; this allows it to gain the Ethernet interface in order to communicate with other elements.

The module can be manufactured for other monitored voltages, e.g. 12, 24 or 60 V upon request.

### APPLICATION

- Telecommunications
- Systems with critical power supply
- ISP

# EXTENSION MODULE - DIGITAL

Gives devices more digital inputs and outputs

## SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 D88 |
| **INPUTS:** | 8 × DI |
| **OUTPUTS:** | 8 × DO |
| **COMMUNICATION:** | RS485, RF |
| **POWER SUPPLY:** | External 24 V |
| **DIMENSIONS:** | 90 × 72 × 60 mm, DIN 4M |


**APPROXIMATE PRICE:** **CZK 4,080** excl. VAT

## RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## DESCRIPTION

An extension module with eight relay outputs and eight digital inputs that can be connected to the CCU5 or SCCU5 modules. The module can be used separately as a radio frequency element.

The digital outputs can be configured as needed, e.g. PWM for power control 0 - 100%, contactor and relay control, time relay, etc.

Digital inputs can detect a logical level, its change, pulse length, pulse counter, etc.

## APPLICATION

- Boiler room and gas control station control
- Energy consumption metering
- I/O unit
- Emergency warning
- Compatible with single position sensors

# EXTENSION MODULE - ANALOGUE

Gives devices more analogue inputs and outputs


## SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 A88 |
| **INPUTS:** | 8 × AI |
| **OUTPUTS:** | 8 × AO |
| **COMMUNICATION:** | RS485, RF |
| **POWER SUPPLY:** | External 24 V |
| **DIMENSIONS:** | 90 × 72 × 60 mm, DIN 4M |

**APPROXIMATE PRICE:** **CZK 4,180** bez DPH

## RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## DESCRIPTION

An extension module with eight analogue inputs and outputs that can be connected to the CCU5 or SCCU5 modules. The module can be used separately as a radio frequency element.

The analogue outputs can be used to control the power of a boiler or electric motor, settings of an actuator, or another element controllable via an analogue signal.

The analogue inputs can provide feedback

on the adjusted actuator or they can be connected to the physical quantity sensor as in the case of an AI2 module.

## APPLICATION

- Boiler room and gas control station control
- Energy consumption and physical quantity metering
- I/O unit
- Lighting control

# BOILER ROOM HEAT LOOP CONTROLLER

Saves 20 to 45 % of heating costs by efficient heating control

## SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 CR4 |
| **INPUTS:** | 8 × PT |
| **OUTPUTS:** | 12 × REL |
| **COMMUNICATION:** | RS485 |
| **POWER SUPPLY:** | External 24 V |
| **DIMENSIONS:** | 90 × 161 × 60 mm, DIN 9M |


**APPROXIMATE PRICE:** **CZK 7,490** excl. VAT

## DESCRIPTION

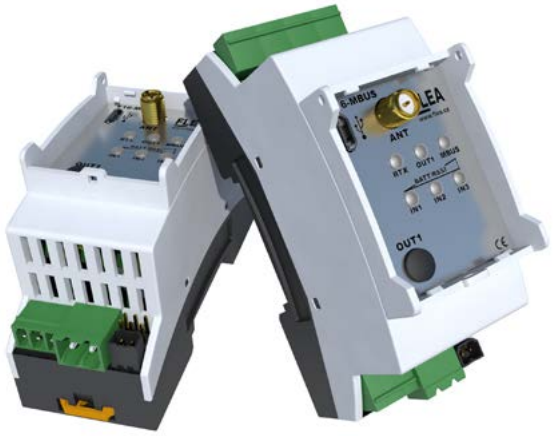
An extension module for CCU5 and SCCU5 modules. The module is fitted with 12 relay outputs to control three--way actuators and pumps and eight PTx analogue inputs. The module is therefore able to control four additional heating circuits. The outputs can be configured for other purposes.

## APPLICATION

- Boiler room and gas control station control

# ENERGY MONITORING MODULE

Records detailed energy consumption data when connected to a MBUS meter




## SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | F16 MBUS |
| **INPUTS:** | 4 × DI, 1 × MBUS |
| **OUTPUTS:** | 1 × REL |
| **COMMUNICATION:** | MBUS, RF, I2C |
| **POWER SUPPLY:** | Battery, External 24 V |
| **DIMENSIONS:** | 90 × 36 × 60 mm, DIN 2M |

**APPROXIMATE PRICE: CZK 4,970 Kč** excl. VAT

## RADIO MODULES

| MODULE | FR1-HP | FR4 | FR8 | FR8-HP | WMBUS | Sigfox | LoRa |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## BATTERY

| MODULE | LR03-1,2 | LS14500-2,6 | LS17500-3,6 | LSH14-5,8 | LS26500-7,7 | LSH20-13 | LS33600-17 |
|---|---|---|---|---|---|---|---|
| CONNECTABLE | ✗ | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ |

## DESCRIPTION

A module intended for connection to MBUS-protocol meters, i.e. calorimeters (measuring heat consumption) and electricity meters.

When connected to an MBUS protocol meter, you will be able to digitally read all data provided by the particular meter. Regarding a calorimeter, apart from the heat consumption, the module can also read the values of power, flowrate, and supply and return temperature; for an electricity meter, the module can read peak power, active and reactive power, consumption, etc.

The module can be connected to any equipment supporting the MBUS protocol.

## APPLICATION

- Division of costs
- Energy consumption monitoring
- Distribution network monitoring (water companies, heating plants, local distribution networks, etc.)

# INDEPENDENT CONTROL UNIT

## Can save 20 to 45 % of heating costs through efficient boiler room control

### SPECIFICATION

| | |
|---|---|
| **CAT. NUMBER:** | FLEXIM SERVER |
| **INPUTS:** | Multi-touch capacity display |
| **OUTPUTS:** | |
| **COMMUNICATION:** | LAN |
| **POWER SUPPLY:** | External 5 V |
| **DIMENSIONS:** | 194 × 110 × 20 mm, display 7“ |

**APPROXIMATE PRICE:** **CZK 26,990 Kč** excl. VAT

### DESCRIPTION

An independent control unit is used in installations requiring operation independent of communication with a central server; therefore, operation is not interrupted in the case of a communication failure.

The unit is fitted with the FLEA FLEXIM software intended for energy measurement, division of costs, efficient heat system control, etc.

The unit is connected to the central server via the internet and sends all measured data to web storage. The data are then securely saved and their quantity is unlimited.

The FLEA FLEXIM software features advanced algorithms and mathematical models that can efficiently control heat systems. FLEA FLEXIM usually reaches savings of 20 to 45 percent of heating costs per building.

The system can be used in small family homes as well as in large administration buildings, production sites or schools. The type of heat source is not limited; it can be a gas boiler, electrical boiler, exchange station, gas control station, heat pump, etc.

### APPLICATION

- Boiler room and gas control station management
- 15-minute maximum instrumentation and control
- Gas day instrumentation and control
- Division of costs
- Energy consumption and physical quantity monitoring
- ISP
- Telecommunications
- Heating cost savings of a building
- SmartCity
- Monitoring and control centres

# FLEA F16 SERIES MODULE BATTERIES

## List of suitable batteries, incl. specifications and prices

| Battery type | Housing type | Voltage [V] | Capacity [Ah] | Battery type | Pulse current [mA] | Dimensions [mm] | Price excl. VAT |
|---|---|---|---|---|---|---|---|
| **LR03** | AAA* | 1,5 | 1,2 | $Zn\text{-}MnSO_2$ | 3500 | 10,5 × 44,5 | CZK 43.50 |
| **LS14500** | R6-AA | 3,6 | 2,6 | $Li\text{-}SOCl_2$ | 250 | 14,6 × 50,3 | CZK 139.20 |
| **LS17500** | R23-A | 3,6 | 3,6 | $Li\text{-}SOCl_2$ | 250 | 17,1 × 50,9 | CZK 191.40 |
| **LSH14** | R14-C | 3,6 | 5,8 | $Li\text{-}SOCl_2$ | 2000 | 26,0 × 50,4 | CZK 435.00 |
| **LS26500** | R14-C | 3,6 | 7,7 | $Li\text{-}SOCl_2$ | 300 | 26,0 × 49,1 | CZK 382.80 |
| **LSH20** | R20-D | 3,6 | 13 | $Li\text{-}SOCl_2$ | 3000 | 33,4 × 61,6 | CZK 620.60 |
| **LS33600** | R20-D | 3,6 | 17 | $Li\text{-}SOCl_2$ | 400 | 33,4 × 60,2 | CZK 466.90 |

* AAA batteries must always be used as pairs

The HP power modules should be operated with batteries of pulse current equal to or higher than 300 mA.

### COMPARISON OF INDIVIDUAL BATTERY MODULE SIZES


AAA R6-AA R23-A R14-C R20-D

# BATTERY LIFE CYCLE

## The battery life cycle is a crucial issue in terms of technology selection and use

The battery life cycle of wireless modules is a crucial issue in terms of technology selection and the way it is used. Within the remote reading technologies, an ordinary transmission interval is once per day, i.e. a 24-hour period. Such an interval is completely sufficient for invoicing purposes. However, for other data monitoring, e.g. course of consumption, distribution network loading, etc., such an interval is no longer sufficient. In this case, an of a 20-minute interval or shorter is necessary. The data transmissions are more frequent and the battery life cycle is reduced.

Therefore, FLEA developed the unique VDT algorithm intended for transmission frequency calculation; the transmission frequency value is not set on a fixed period; it is calculated based on the current course of the measured quantity. The algorithm brings many advantages. It significantly extends the battery life cycle and instantly responds to changes of the measured quantity. The charts are real, undistorted with an error caused by fixed-period sampling (an issue of a serrated chart course).

The FLEA elements are also capable of quantising the measured values into one transmission interval. Thus, the system reaches other significant savings of data quantity and the battery life cycle. In practice, the values can be measured in 5-minute intervals and the data can be sent once every 20 minutes, when the last four measured values are transmitted.

### BATTERY LIFE CYCLE DEPENDING ON TRANSMITTING FREQUENCY AND BATTERY CAPACITY FOR FLEA, SIGFOX AND LORA RADIO FREQUENCY MODULES

| BATTERY CAPACITY<br>TRANSMITTING INTERVAL | 1,2 Ah | 2,5 Ah | 3,6 Ah | 5,8 Ah | 7,7 Ah | 13 Ah | 17 Ah |
|---|---|---|---|---|---|---|---|
| 5 min with VDT | 2 years | 4 years | 5 years | 7 years | 10 years | | |
| 20 min | 2 years | 4 years | 5 years | 7 years | 10 years | | |
| 1 hr | 4 years | 6 years | 8 years | 10 years | | | |
| 4 hrs | 4 years | 8 years | 10 years | | | | |
| 12 hrs | 4 years | 10 years | | | | | |
| 24 hrs | 4 years | 10 years | | | | | |

### BATTERY LIFE CICLE DEPENDING ON TRANSMITTING FREQUENCY AND BATTERY CAPACITY FOR FLEA POWER RADIO FREQUENCY MODULES

| BATTERY CAPACITY<br>TRANSMITTING INTERVAL | 1,2 Ah | 2,5 Ah | 3,6 Ah | 5,8 Ah | 7,7 Ah | 13 Ah | 17 Ah |
|---|---|---|---|---|---|---|---|
| 5 min with VDT | 1 years | 1 years | 2 years | 3 years | 5 years | 10 years | |
| 20 min | 0,5 years | 1 years | 1,5 years | 2 years | 4 years | 8 years | 10 years |
| 1 hr | 1 years | 2 years | 3 years | 5 years | 6,5 years | 10 years | |
| 4 hrs | 1 years | 4 years | 6 years | 10 years | | | |
| 12 hrs | 2 years | 8 years | 10 years | | | | |
| 24 hrs | 2 years | 10 years | | | | | |

VDT is the unique FLEA algorithm for the variable transmission speed of the measured values

The life cycle of the supplied SOCl2 batteries is approximately 10 years.

The life cycle of the supplied Zn-MnSO2 batteries is 4 years (AAA batteries).

# FLEA FLEXIM LICENCE PRICELIST

## FLEA FLEXIM software licensing with data cloud storage administration

In case you would like to enjoy the advantages of the FLEA FLEXIM system, there is nothing easier. You do not need any huge servers, you do not need to intricately install and set up any special software. FLEA FLEXIM is online; therefore, you can access it wherever and whenever. You can find it at www.flexim.cz.

### PRICE LIST OF THE FLEA APPLICATION, SERVER OPERATION AND DATA STORAGE

| **Item storage** | **FLEXIM software + data cloud** | | |
|---|---|---|---|
| Data historization (duration of data archived on server) | 3 months | 2 years | forever |
| Instalation licence | | CZK 299 | |
| Licence for installation element: **up to 10** elements | CZK 49 | CZK 54 | CZK 59 |
| Licence for installation element: **10 - 25** elements | CZK 44 | CZK 48 | CZK 52 |
| Licence for installation element: **26 - 50** elements | CZK 39 | CZK 42 | CZK 45 |
| Licence for installation element: **51 - 100** elements | CZK 37 | CZK 40 | CZK 43 |
| Licence for installation element: **101 - 250** elements | CZK 35 | CZK 37 | CZK 39 |
| Licence for installation element: **251 - 500** elements | CZK 33 | CZK 35 | CZK 37 |
| Licence for installation element: **over 500** elements | CZK 31 | CZK 33 | CZK 35 |

*The prices do not include VAT.*

*This is a monthly payment for a software licence and your data cloud operation.*

Installation means a logical group of elements. If you sell water and you manage 500 water meters in one village, the whole village will be considered one installation. In case you own a production facility with several buildings, all elements (meters, radiators, thermometers, boiler rooms, etc.) are considered one installation.

The element means the particular object, e.g. a water meter, gas meter, thermometer, boiler, etc.

Historization is a module archiving the measured data that can be further evaluated. You can use the archived data when communicating with authorities. Restaurants, for instance, are obliged to regularly measure the temperature of storage areas, freezers, etc.

FLEA

flexible ideas

# CONTACT US

## We are here for you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