

**BKT EMS – Environmental Monitoring System**
**Product description**


The BKT EMS (environmental monitoring system) is used to monitor parameters (such as temperature, humidity, etc.) in the IT cabinet and in small IT facilities. It is designed to warn a user about possible danger and to alert of failures occurred. The EC335t controller allows a user to connect up to 28 analogue sensors (using 3 additional EE321t modules), up to 68 sensors with voltage-free contacts (using 2 additional EE322 modules) and two signalling devices. In order to keep a satisfactory system performance, it is not recommended to connect more than 80 sensors to the controller.

**Technical specification of EC335t controller**
**HARDWARE**

Analogue Inputs	4 inputs A1-A4 (RJ12 sockets) for dedicated analogue sensors. Any combination of 4 sensors can be connected to the device. Some sensors can be connected in a chain. The type of the connected sensor is detected automatically.
Voltage-free Inputs	4 inputs IN1-IN4 (releasable terminal block) for any sensors with voltage-free contacts.
Outputs	2 outputs E1-E2 (releasable terminal block) with voltage 12V/250mA
CAN port	1 connector (RJ12 socket) for max 10 CAN devices ex. optional extension modules or CAN sensors.
Other ports	Ethernet port 10/100Mbps (RJ45 socket) Port USB 2.0 (Mini-B socket)
Other	SDXC 512GB card socket Optional GSM LTE modem
Power Supply	External power supply 12V/1A, power consumption ≤10W. Power backup from additional power source 12VDC/1A
Dimensions	190x92x34 (W x D x H) - controller 484x92x44 (W x D x H) - with 1U 19" bracket
Operating Conditions	Temperature: 0°C - 60°C Humidity: 0% - 90% RH (without condensation)
Weight	700g
Part number	122EC003354


**SOFTWARE**

Operating System	Linux v6.2
Configuration	Via web interface
Protocols that are used	HTTP, HTTPS, VPN, PING, DHCP, RADIUS, SYSLOG, FTP, SNTP, SMTP, SNMP (v1,v2,v3), MODBUS TCP
Alarm notifications	E-mail, SNMP trap, Internet SMS Gateway, SMS (optional via EA319t GSM modem)
Firmware update	Firmware update via website
Functionality	Please see the tables below

## BKT EMS – Environmental Monitoring System

### Functionality

#### MONITORING



Temperature



Humidity



Smoke



Flood



Vibration



Motion



Door opening



AC and DC voltage



Status of free-voltage contacts of other systems



Presence of other devices on the network using PING protocol



Parameters of other devices on the network using SNMP and MODBUS TCP protocols

#### NOTIFICATION



Alarm via email



Alarm via text message (sms)



Alarm via SNMP Trap message

#### CONTROL



Two 12V/250mA outputs to connect an optical or a sound alarm device or to control external devices via relay.

#### OTHER



WEB interface for system configuration and monitoring



Users with different access rights



Archiving data on SDHC card USB flash drive connected to the controller's USB port



Expansion modules to increase the number of available ports and extend the functionality of the system



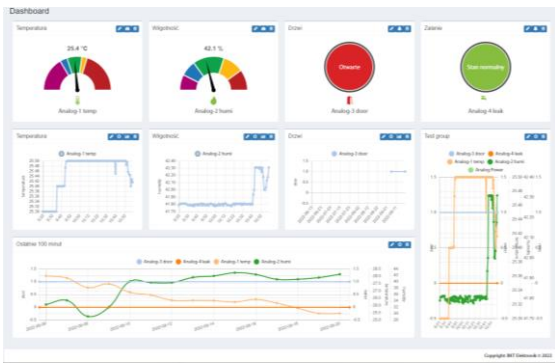
Programmable logic functions that enable linking the values read from the sensors to the device outputs and generating dedicated events



Programmable time functions to limit the generation of events to the specific time ranges

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Functionality continued



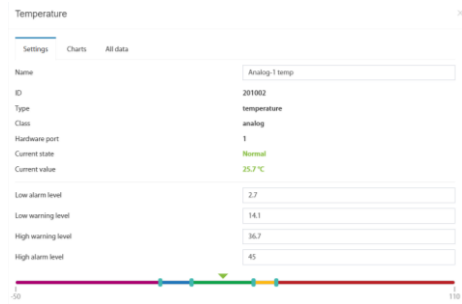
Configurable dashboard in the web interface displaying the status and the last parameter changes of selected sensors.



WEB interface for system configuration and monitoring

Autodetect		
	Analog-1 temp Normalny	25.40 °C
	Analog-2 humi Normalny	42.31 %
	Analog-3 door Alarm	
	Analog-4 leak Normalny	

Automatic detection of presence and type of analogue sensor.



4 alarm thresholds for the sensor, the exceeding of which can generate alarms. Possibility to set hysteresis.

Action	Element	State	Timeout (h:mm:ss)	Repeat/Duration	Operator
IF	Analog-1 temp	high alarm	not used	not used	OR
	Analog-2 humi	high alarm	not used	not used	THEN
THEN	mail_to_admin	send mail	none	once	END

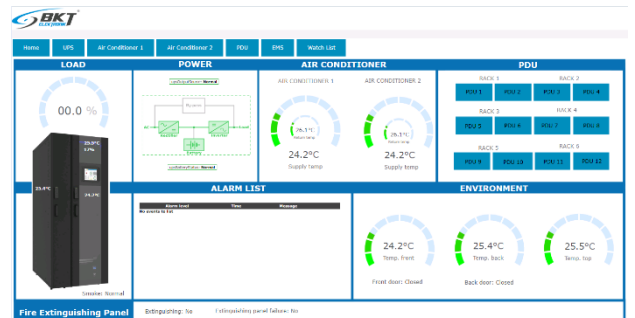
Configuring logical dependencies between inputs (sensors), outputs and generated alarms



Displaying a limited (100s, 100min, 100h, 100days) log of sensor measurements on graph.



Visualization of sensor states on site layout from the device's web interface







The ability to visualize device statuses with external software, such as BKT SM4DC, using SNMP protocol.

**BKT EMS – Environmental Monitoring System**
**Analogue sensors**

Any sensors from the table below can be connected to 4 analogue inputs (A1-A4) of the controller or inputs (A1-A8) in additional EE321t extension modules (extension module with additional 8 analogue inputs). One controller can support up to 28 analogue sensors, when connecting 3 additional EE321t modules. If longer than included cable is needed, it is a UTP Cat5e suggested.



Type	Description	Part number
	<b>ES350</b> - Temperature sensor Measurement range: -10°C - +100°C Dimensions: 60x18x18 Maximum cable length: 100m (2m included)	122ES003500
	<b>ES351</b> - Humidity sensor Measurement range: 0% -100% RH (±5% uncertainty for RH 10% - 95% RH) Dimensions: 60x18x18 Maximum cable length: 50m (2m included)	122ES003510
	<b>ES352</b> - AC Voltage monitor Measurement range: 90VAC - 250VAC Dimensions: 63x66x30 Maximum cable length: 100m (2m included)	122ES003520
	<b>ES353</b> - Door sensor (reed + magnet) Possibility to connect up to 10 sensors in a daisy chain Dimensions: 60x18x18 Maximum cable length: 150m (2m included)	122ES003530
	<b>ES354</b> - Vibration sensor Possibility to connect up to 10 sensors in a daisy chain Dimensions: 60x18x18 Maximum cable length: 150m (2m included)	122ES003540
	<b>ES356</b> - Optical smoke sensor Possibility to connect up to 10 sensors in a daisy chain Dimensions: φ100x45 Maximum cable length: 150m (2m included)	122ES003560
	<b>ES357</b> - PIR passive infrared detector Movement detection range: 100° x 12m Dimensions: 112x71x48 Maximum cable length: 50m (2m included)	122ES003570
	<b>ES358</b> - Outdoor temperature sensor Measurement range: -40°C - +100°C Dimensions: φ7x30 + 15m cable Maximum cable length: 100m (15m included)	122ES003580
	<b>ES359</b> - Leak sensor Sensor dimensions: 60x18x18; Detector dimensions: 37x20x9 Detection delay: 15s; Detector cable length: 1m Maximum cable length: 100m (2m included)	122ES003590

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**Analogue sensors continued**

Type	Description	Part number
	<b>ES360</b> - Leak sensor for water sensitive cable Requires water sensitive cable ES361 Dimensions: 60x18x18 Maximum cable length: 100m (2m included)	122ES003600
	<b>ES368</b> - Water sensitive cable, resistant to high humidity and dust Requires ES360 sensor Available length: 3m (122ES003680), 6m (122ES003685), 10m (122ES003682), 15m (122ES003683), 25m (122ES003684)	122ES003680 122ES003685 122ES003682 122ES003683 122ES003684
	<b>ES362</b> - 4-20mA sensor It enables to connect any 4-20mA sensors to the EC335t controller. It has 1kV galvanic isolation between the input and the output. Dimensions: 60x18x18 Maximum cable length: 50m (2m included)	122ES003620
	<b>ES363</b> - DC voltage monitor 0-75VDC It has 1kV galvanic isolation between the input and the output Measurement range: 0VDC - 75VDC Dimensions: 60x18x18 Maximum cable length: 50m (2m included)	122ES003630



**CAN digital sensors**

These sensors are connected to the CAN interface of the EC335t controller. The CAN interface is a serial bus and allows connecting devices in a daisy chain (from device to device). A maximum of 10 CAN devices can be connected to the controller via the CAN interface. The length of the CAN bus should not exceed 200m. It is a UTP Cat 5e suggested as a CAN bus cable.




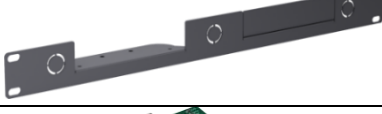

Type	Description	Part number
	<b>ES340</b> - Integrated smoke, humidity 0% -100% RH ( $\pm 3\%$ uncertainty for RH 10% - 95% RH), temperature -10...+85°C sensors; CAN bus. Possibility to connect up to 10 devices in a daisy chain. The sensor has 2 CAN ports for daisy chain connecting. Dimensions: $\phi 100 \times 45$ Maximum cable length: 200m (2m included)	122ES003400
	<b>ES341</b> - Integrated pressure 300-1100hPa, humidity 0% -100% RH ( $\pm 3\%$ uncertainty for RH 10% - 95% RH), temperature -40...+85°C sensors; CAN bus. Possibility to connect up to 10 devices in a daisy chain. The sensor has 2 CAN ports for daisy chain connecting. Dimensions: 78x66x27mm Maximum cable length: 200m (2m included)	122ES003410

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**Extension modules**

Extension modules increase the number of available ports for sensors connected to one controller. The EE321t and EE322 modules must be connected to the CAN interface of the EC335t controller. The CAN interface is a serial bus and allows connecting in a daisy chain (from device to device). A maximum of 10 devices can be connected to the controller via the CAN interface. The length of the CAN bus should not exceed 200m. It is a UTP Cat5e suggested as a CAN bus cable.

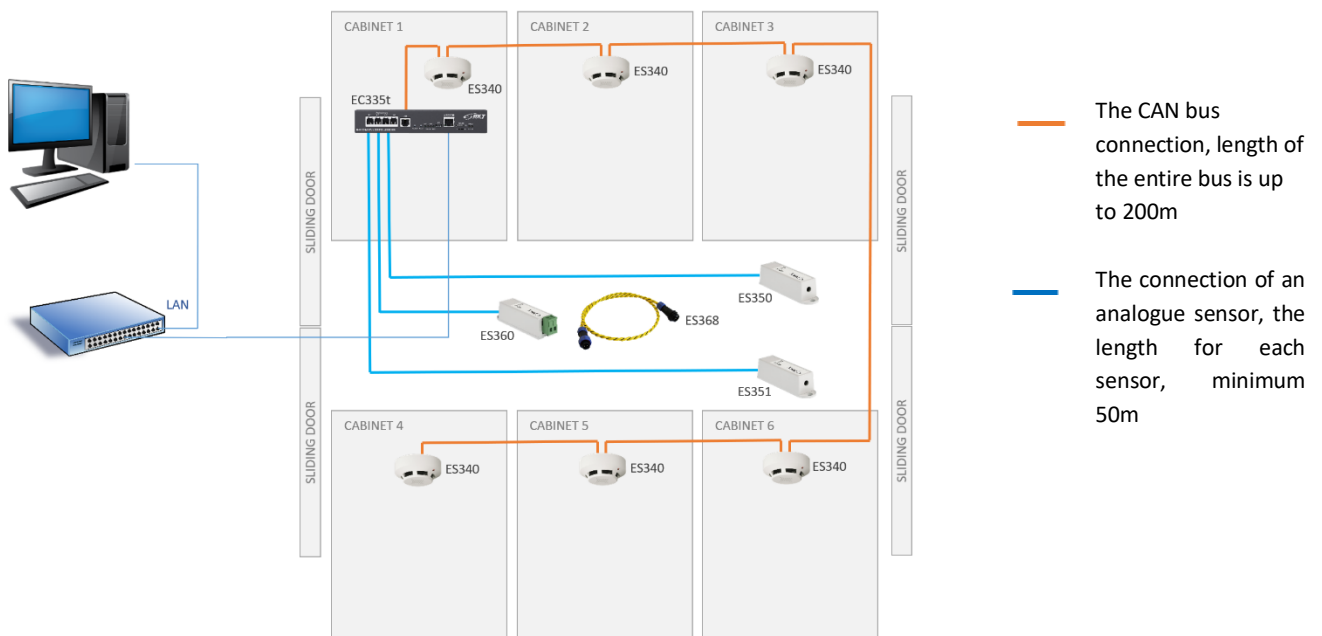
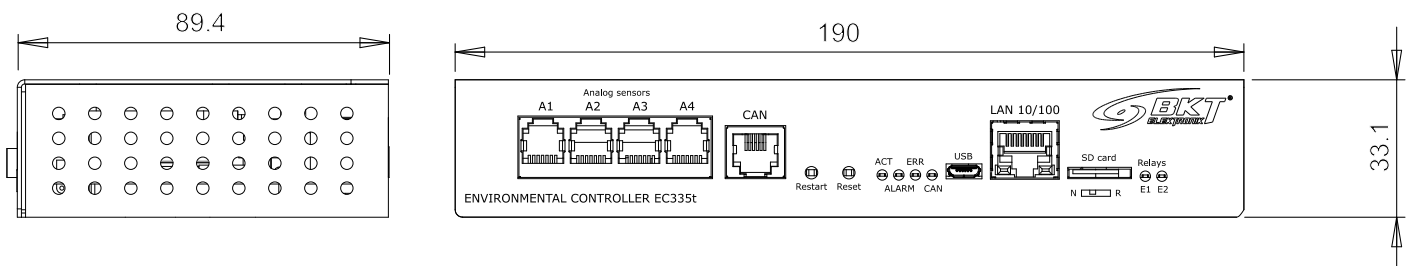
Type	Description	Part number
	<b>EE321t</b> – extension module of 8 analogue inputs (RJ12) The module must be connected to the controller CAN port. There are 2 CAN ports (RJ12) for daisy chain connecting. The controller can support up to 24 additional analogue sensors (3x EE321t units). There is no 19" bracket included. The power supply is included. Dimensions: 129x29x56. Maximum cable length of CAN bus: 200m (2m included)	122EE003211
	<b>EE322</b> – extension module of 32 dry contact inputs The module must be connected to the controller CAN port. There are 2 CAN ports (RJ12) for daisy chain connecting. The controller can support up to 64 additional dry contact inputs (2x EE322 units). There is 19" bracket included. Dimensions: 215x40x40. Maximum cable length of CAN bus: 200m (2m included)	122EE003220

**Accessories**

Type	Description	Part number
	<b>EA313</b> - 30VDC/5A relay Dimensions: 60x18x18	122EA003130
	<b>EA314t</b> - 19" 1U bracket for EC335t (index 122EC003354) and EE321t module (122EE003211) Dimensions: 484x44x80	122EA003144
	<b>EA315</b> - Light signal 12v/80mA Dimensions: $\phi$ 73x45	122EA003150
	<b>EA316t</b> - 19" 1U bracket for 2x EE321t Dimensions: 484x44x38	122EA003161
	<b>EA319t</b> – LTE modem for EC335t controller (part number 122EC003354) The modem is mounted in a dedicated controller slot. The modem has SMA connectors for antennas. 2 bayonet antennas are included.	122EA003194

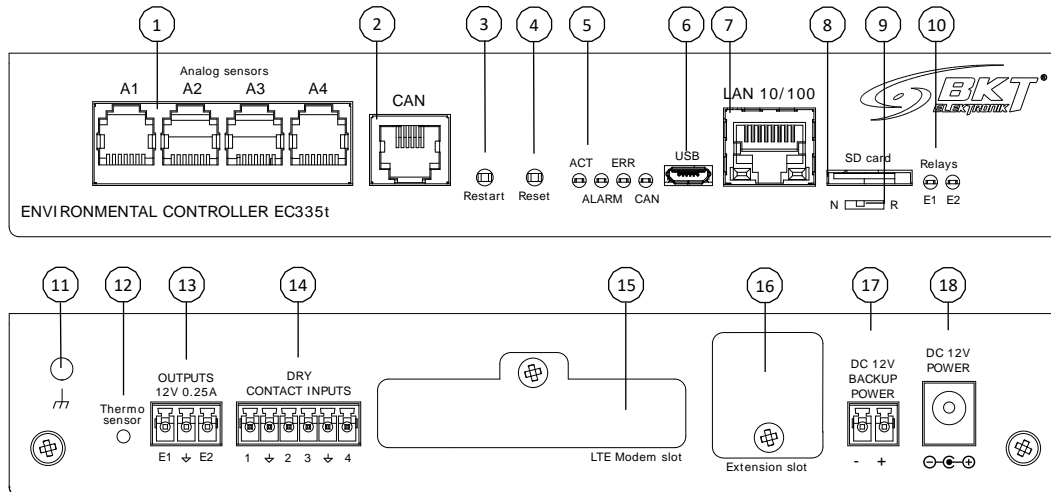
**BKT EMS – Environmental Monitoring System**
**System structure**

Example of an environmental conditions monitoring system in cold aisle containment built of 6 IT cabinets: temperature (ES350) and humidity (ES351) in the aisle, temperature, humidity and presence of smoke in cabinets (ES340). A flood detection sensor was placed under the raised floor (ES360 + ES368).


**Dimensions**

**Factory settings**
**DEFAULT FACTORY SETTINGS**

IP address	192.168.0.101
Subnet mask	255.255.255.0
Gateway	192.168.0.1
DNS	192.168.0.1
DHCP client	Turned off
Credentials	User: guest, password: guest



**BKT EMS – Environmental Monitoring System**
**Device view**


1. Analogue sensor inputs	6. Mini-B USB for pendrive or camera	16. RS485 module slot
2. CAN bus connector for extension units	7. RJ45 Ethernet connection	17. Power backup input for additional power source 12VDC/1A
3. Controller reboot button. Press and hold for 2s. Wait 60s for rebooting.	8. SD card socket for measurements storage	
4. Restore factory settings button. Press and hold for 5s. Wait 60s for rebooting.	9. Working mode switch: N-normal mode, R-factory programming (do not use)	18. Main power supply 12VDC/1A
5. Status LEDs ACT- device status LED ALARM – programmable LED, ERR – error LED, CAN – CAN bus status LED	10. Voltage output status LEDs	
	11. Enclosure earthing (M4 thread)	
	12. Local temperature sensor	
	13. Voltage outputs 12VDC 0.25A	
	14. Inputs for external voltage-free contacts	
	15. EA319t LTE modem slot	