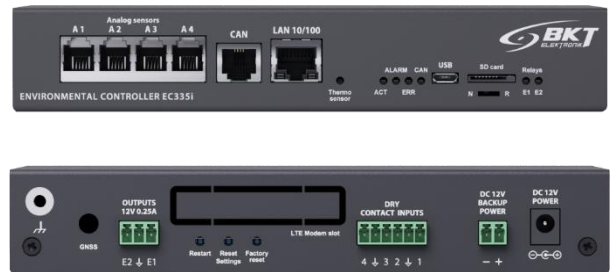


BKT EMS – Environmental Monitoring System
Product description


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 EC335i 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 60 sensors to the controller.

Technical specification of EC335i 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 8 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	SDHC 512GB card socket Optional GSM modem
Power Supply	External power supply 12V/1A, power consumption ≤10W. Power backup from additional power source 12VDC/1A
Dimensions	190x90x33 (W x D x H) - controller 482x90x44 (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	122EC003353


SOFTWARE

Operating System	Linux v5.40
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 EA319i GSM modem)
Firmware update	Firmware update via website
Functionality	Please see the tables below

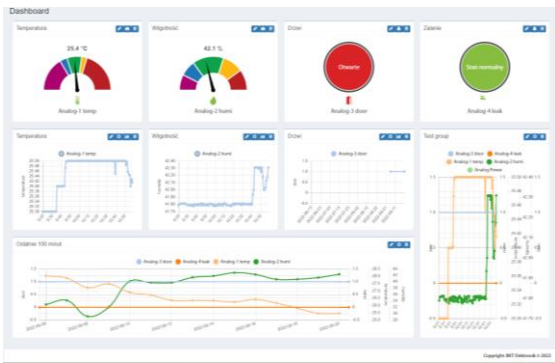
BKT EMS – Environmental Monitoring System

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	

BKT EMS – Environmental Monitoring System

Functionality continued



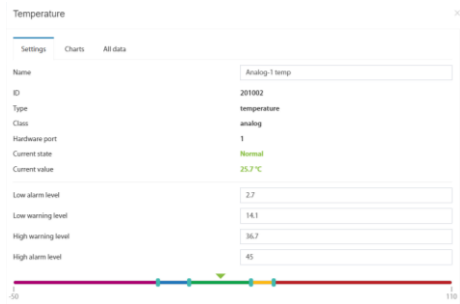
Configurable dashboard in the web interface displaying the status and the last parameter changes of selected sensors.



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
THEN	Analog-2 humi	high alarm	not used	not used	THEN
THEN	mail_to_admin	send mail	none	once	END

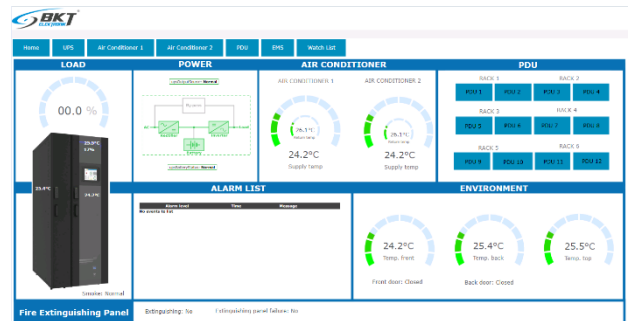
Configuring logical dependencies between inputs (sensors), outputs and generated alarms



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

BKT EMS – Environmental Monitoring System
Analogue sensors continued

Type	Description	Part number
	ES360 - Leak sensor for water sensitive cable Requires water sensitive cable ES361 Dimensions: 60x18x18 Maximum cable length: 100m (2m included)	122ES003600
	ES368 - 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
	ES362 - 4-20mA sensor It enables to connect any 4-20mA sensors to the EC335 controller. It has 1kV galvanic isolation between the input and the output. Dimensions: 60x18x18 Maximum cable length: 50m (2m included)	122ES003620
	ES363 - 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 EC335i 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
	ES340 - 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
	ES341 - 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

BKT EMS – Environmental Monitoring System
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 EC335i 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.

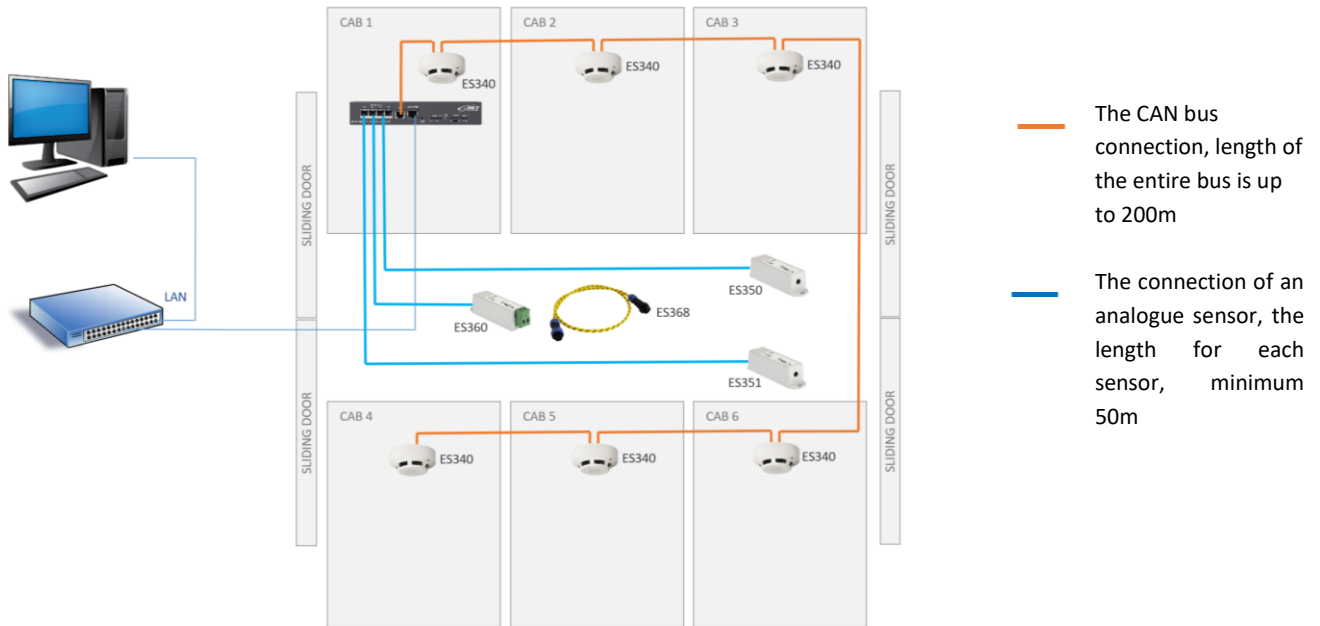
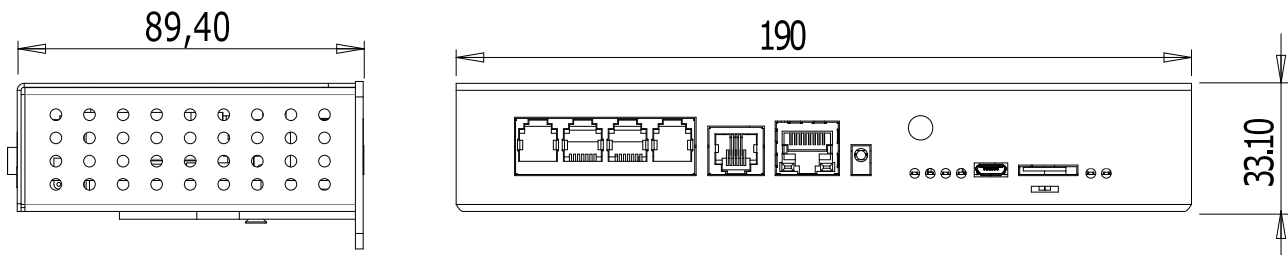
Type	Description	Part number
	EE321t – extension module of 8 analogue inputs (RJ12) The module must be connected to the controller CAN port. There are 2 CAN ports (RJ12) for daisy chain connecting. The controller can support up to 24 additional analogue sensors (3x EE321t units). There is no 19" bracket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

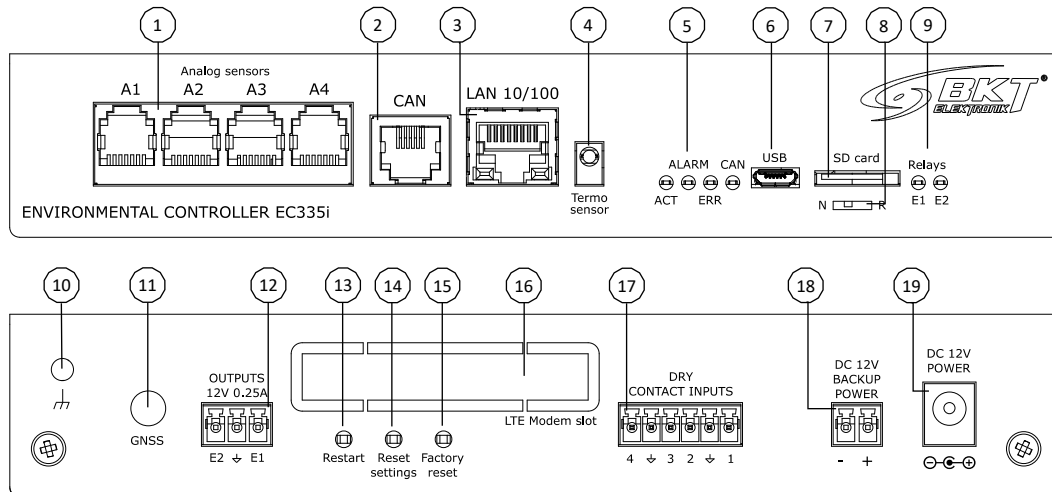
Type	Description	Part number
	EA313 - 30VDC/5A relay Dimensions: 60x18x18	122EA003130
	EA314i - 1U 19" bracket for EC335i (part number 122EC003353) Dimensions: 482x44x80	122EA003143
	EA315 - Light signal 12v/80mA Dimensions: ϕ 73x45	122EA003150
	EA316t - 19" 1U bracket for 2x EE321t Dimensions: 482x44x80	122EA003161
	EA319i – LTE modem for EC335i controller (part number 122EC003353) The modem is mounted in a dedicated controller slot. The modem has SMA connectors for antennas. 2 bayonet antennas are included.	122EA003193

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	14. Restore factory settings button. Press and hold for 5s
2. CAN bus connector for extension units	7. SD card socket for measurements storage	
3. RJ45 Ethernet connection	8. Working mode switch: N-normal mode, R-factory programming (do not use)	15. Unimplemented button (do not use)
4. Local temperature sensor		16. EA319i LTE modem slot
5. Status LEDs ACT- device status LED ALARM – programmable LED, ERR – error LED, CAN – CAN bus status LED	9. Voltage output status LEDs	17. Inputs for external voltage-free contacts
	10. Enclosure earthing (M4 thread)	18. Power backup input from additional power source 12VDC/1A
	11. Optional antenna cutout	19. Main power supply 12V 1A
12. Voltage outputs 12VDC 0.25A		
13. Controller reboot button		