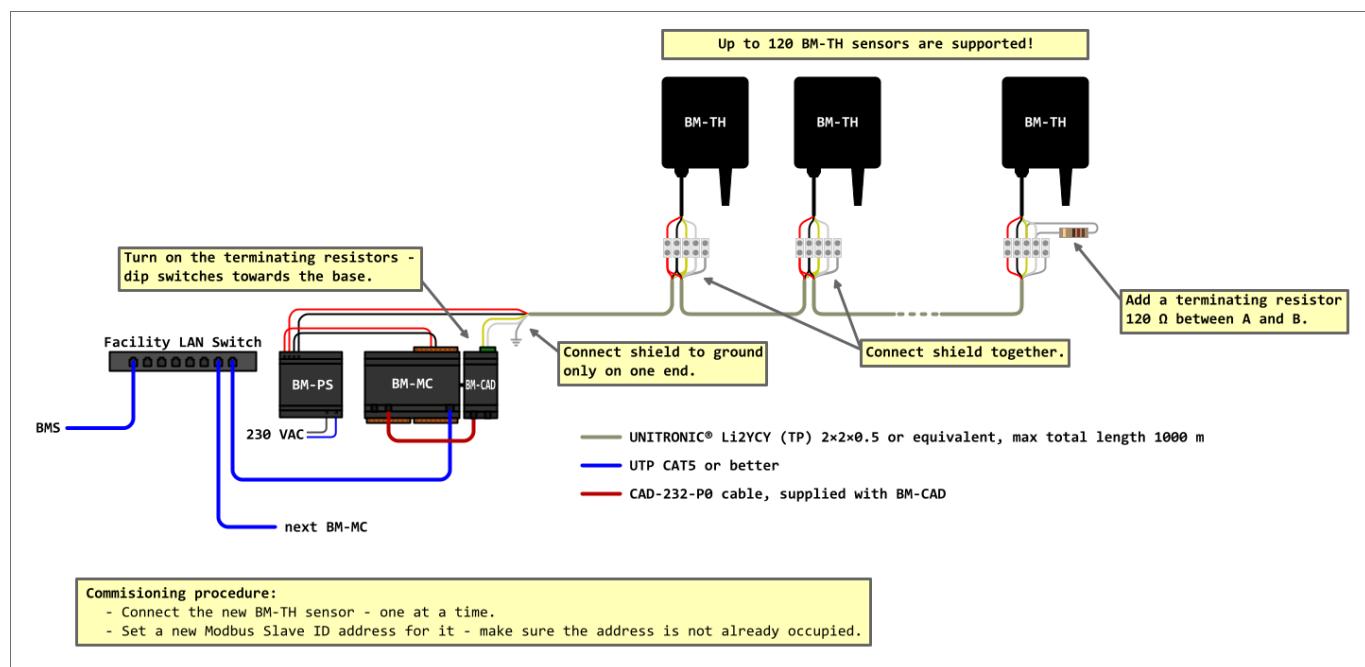


Temperature and humidity monitoring

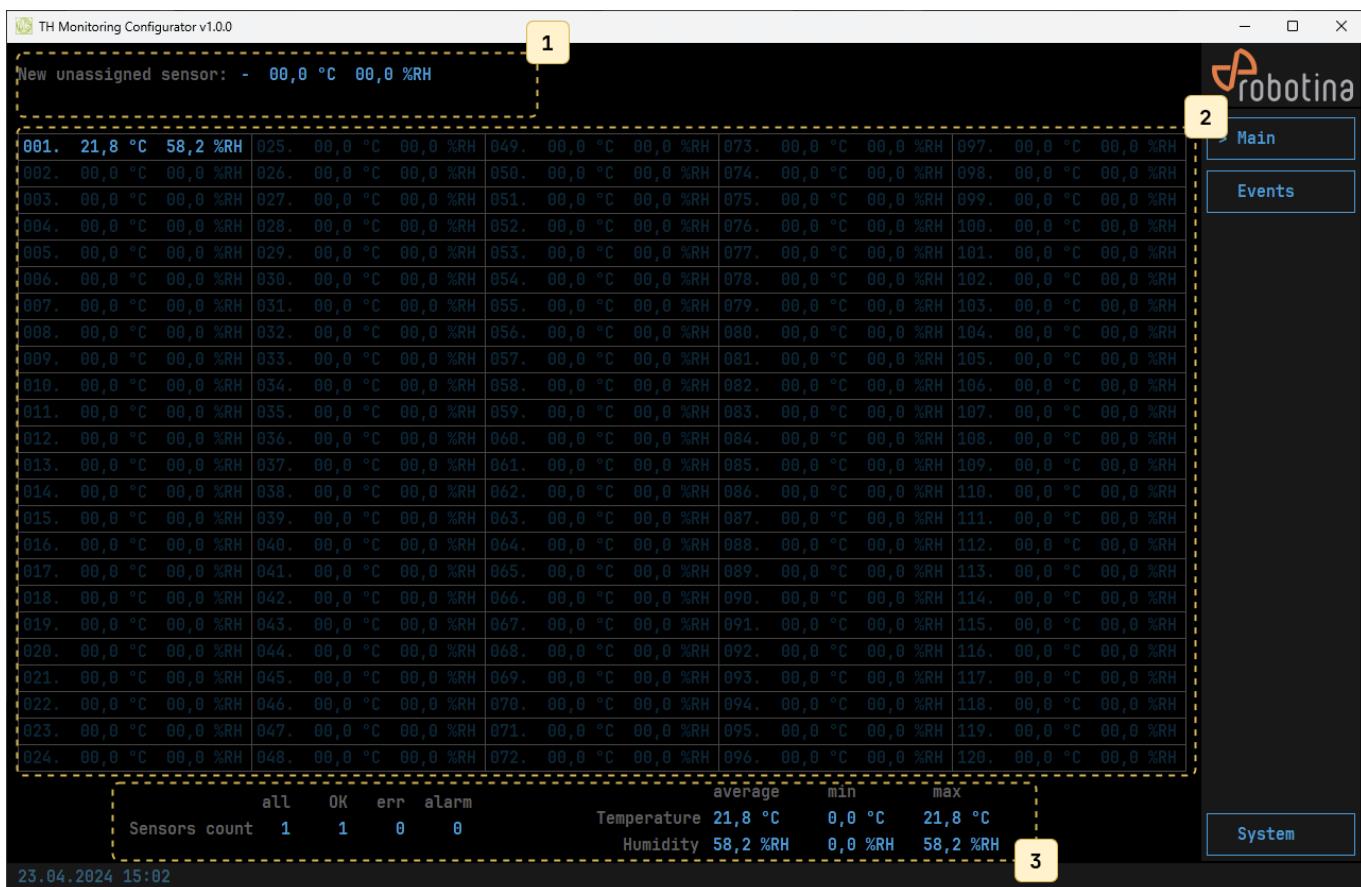
The system is intended for monitoring temperatures and relative humidity in rack cabinets of data centers. Allows connection of up to 120 sensors to one controller. The number of controllers per system is practically unlimited.

HW and wiring

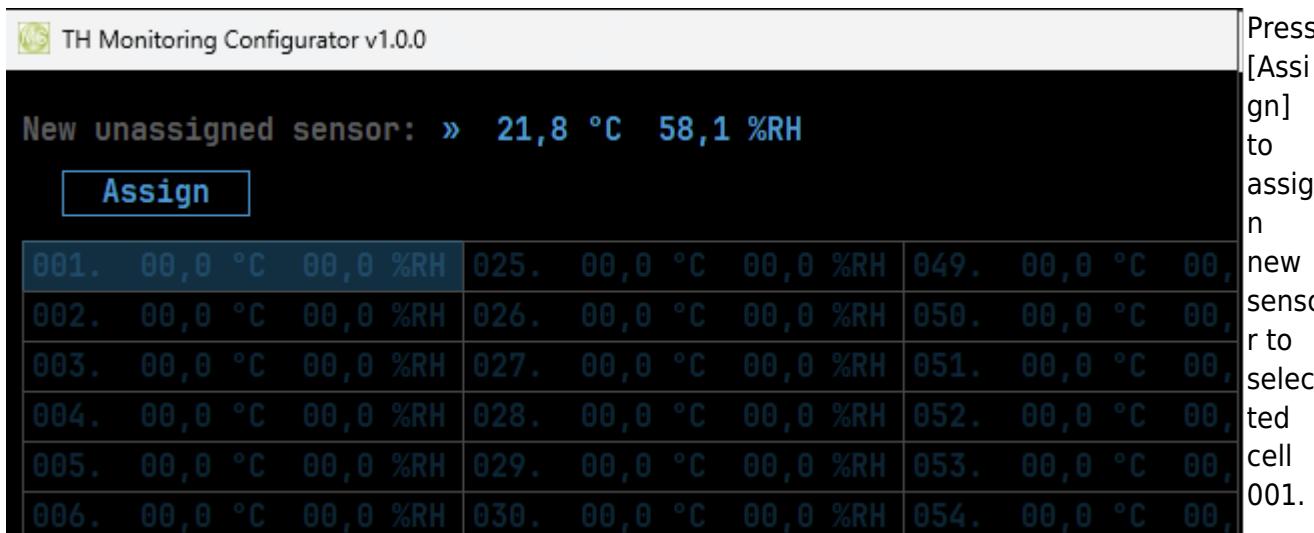


SW (TH-MC & Configurator)

Main page



1	New sensor
2	Sensor table - Select empty single cell to Assign new sensor to cell or select assigned sensor to un-assign (only if new sensor is empty)
3	Statistics of all sensors.



Press [Assign] to assign new sensor to selected cell.

Press [Unassign] to move selected

TH Monitoring Configurator v1.0.0

New unassigned sensor: - 00,0 °C 00,0 %RH

Unassign

001. 21,8 °C 58,1 %RH	025. 00,0 °C 00,0 %RH	049. 00,0 °C 00,
002. 00,0 °C 00,0 %RH	026. 00,0 °C 00,0 %RH	050. 00,0 °C 00,
003. 00,0 °C 00,0 %RH	027. 00,0 °C 00,0 %RH	051. 00,0 °C 00,
004. 00,0 °C 00,0 %RH	028. 00,0 °C 00,0 %RH	052. 00,0 °C 00,
005. 00,0 °C 00,0 %RH	029. 00,0 °C 00,0 %RH	053. 00,0 °C 00,
006. 00,0 °C 00,0 %RH	030. 00,0 °C 00,0 %RH	054. 00,0 °C 00,

TH Monitoring Configurator v1.0.0

New unassigned sensor: - 00,0 °C 00,0 %RH

Unassign**Clear alarm**

001. ▲21,8 °C 58,1 %RH	025. 00,0 °C 00,0 %RH	049. 00,0 °C 00,
002. 00,0 °C 00,0 %RH	026. 00,0 °C 00,0 %RH	050. 00,0 °C 00,
003. 00,0 °C 00,0 %RH	027. 00,0 °C 00,0 %RH	051. 00,0 °C 00,
004. 00,0 °C 00,0 %RH	028. 00,0 °C 00,0 %RH	052. 00,0 °C 00,
005. 00,0 °C 00,0 %RH	029. 00,0 °C 00,0 %RH	053. 00,0 °C 00,
006. 00,0 °C 00,0 %RH	030. 00,0 °C 00,0 %RH	054. 00,0 °C 00,

Press [Clear Alarm] to clear alarms from selected cell.

Multiple cells can be selected.

TH Monitoring Configurator v1.0.0

New unassigned sensor: - 00,0 °C 00,0 %RH

Clear error

001. ▲21,8 °C 58,1 %RH	025. 00,0 °C 00,0 %RH	049. 00,0 °C 00,
002. 00,0 °C 00,0 %RH	026. 00,0 °C 00,0 %RH	050. 00,0 °C 00,
003. 00,0 °C 00,0 %RH	027. 00,0 °C 00,0 %RH	051. 00,0 °C 00,
004. 00,0 °C 00,0 %RH	028. 00,0 °C 00,0 %RH	052. 00,0 °C 00,
005. 00,0 °C 00,0 %RH	029. 00,0 °C 00,0 %RH	053. 00,0 °C 00,
006. 00,0 °C 00,0 %RH	030. 00,0 °C 00,0 %RH	054. 00,0 °C 00,

Press [Clear error] to clear errors from selected cell.

ple
cells
can
be
selec
ted.

Events list

MC put all events (sensors move and alarms) in FIFO list (100 events in total). On Configurator page Events last 25 events are shown.

date	time	event	data
yyyy-mm-dd	hh:mm:ss.ddd	eeeeeeeiii	vvvvvvvvvv
2024-04-12	10:13:14.153	004006001	0000000648
2024-04-12	10:07:11.714	004005001	0000000649
2024-04-12	10:06:34.094	004010000	0000000001
2024-04-12	10:05:49.343	004010001	0000000000
2024-04-12	10:00:25.932	004010000	0000000001
2024-04-12	10:00:19.812	004010002	0000000000
2024-04-12	10:00:06.984	004010000	0000000002
2024-04-12	10:00:00.281	004010001	0000000000
2024-04-12	09:58:54.000	001001000	0000000010
2024-04-12	09:58:47.000	001001000	0000000009
2024-04-12	09:52:52.000	001001000	0000000008
2024-04-12	09:49:55.000	001001000	0000000007
2024-04-11	13:28:10.000	001001000	0000000006
2024-04-11	13:07:06.135	004008001	0000000645
2024-04-11	13:07:06.135	004006001	0000000645
2024-04-11	13:07:06.135	004004001	0000000227
2024-04-11	13:07:06.135	004002001	0000000227
2024-04-11	13:06:47.082	004007001	0000000645
2024-04-11	13:06:40.732	004005001	0000000645
2024-04-11	13:06:40.732	004003001	0000000227
2024-04-11	13:06:15.332	004001001	0000000227
2024-04-11	13:05:11.600	004010005	0000000001
2024-04-11	13:03:42.248	004010000	0000000005
2024-04-11	13:03:35.979	004010001	0000000000
2024-04-11	13:02:53.618	004010000	0000000001

Legend:

- YYYY year
- mm month
- dd date
- hh hour
- mm minute
- ss second
- ddd milisecond
- eeeeeeeiii event (001xxx=general, 004xxx=TH)
- iii sensor index (0..120)
- vvvvvvvvvv value

Events:

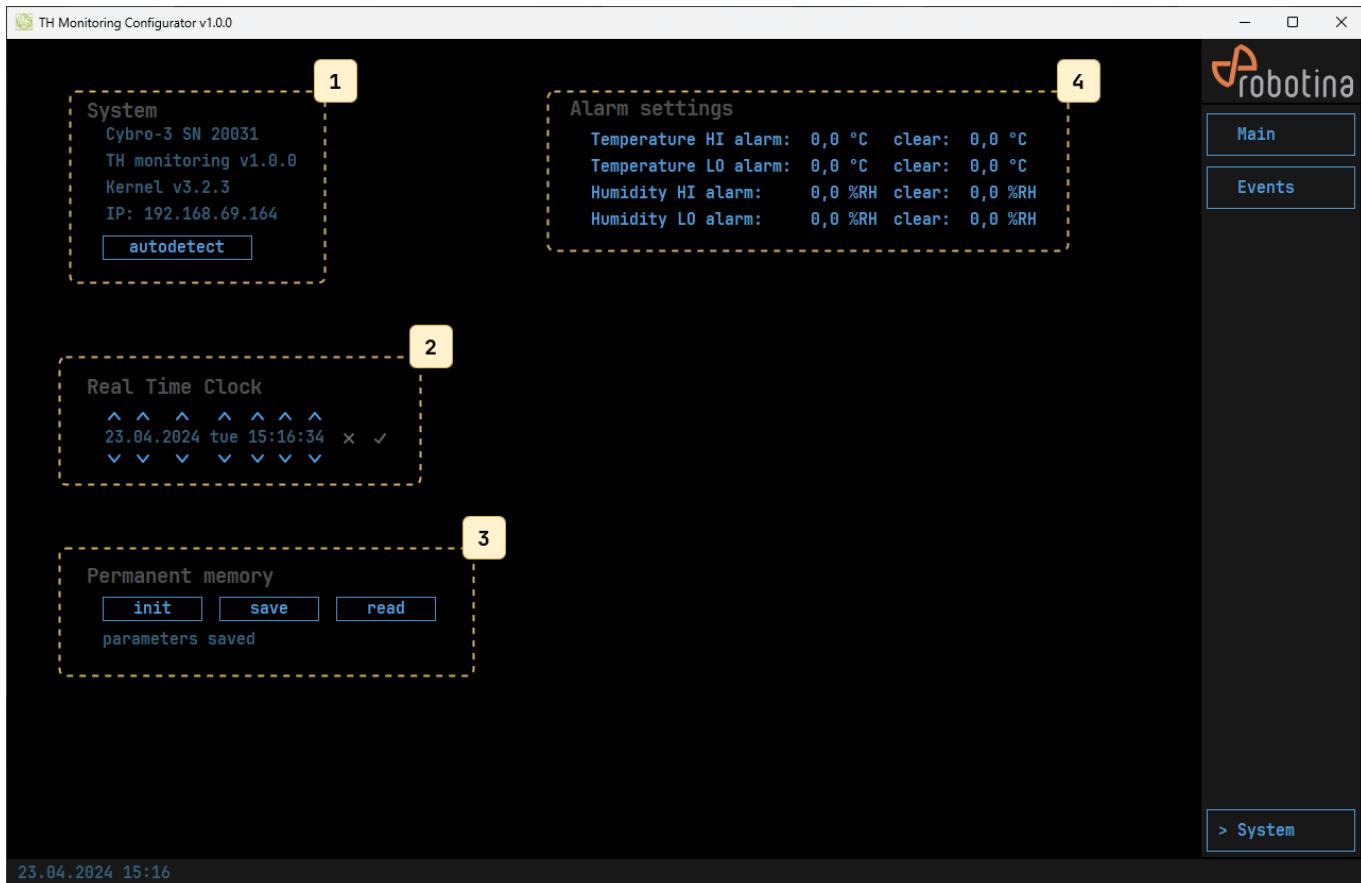
eeeeeeeiii vvvvvvvvvv	
001001 000 reset_cnt	system reset
001002 000 0	events array cleared
004001 iii temperature	Temperature HI alarm triggered
004002 iii temperature	Temperature HI alarm gone
004003 iii temperature	Temperature LO alarm triggered
004004 iii temperature	Temperature LO alarm gone
004005 iii humidity	Humidity HI alarm triggered
004006 iii humidity	Humidity HI alarm gone
004007 iii humidity	Humidity LO alarm triggered
004008 iii humidity	Humidity LO alarm gone
004010 iii new_index	Sensor moved

clear System

12.04.2024 10:13

System

System overview and settings.



1	System settings: - MC serial number - SW version - MC Kernel version - MC IP
2	MC RTC Important for event logger
3	Permanent memory management: Alarm settings are stored to permanent (EEPROM) memory
4	Alarm settings Set to 0 to disable alarm or alarm clear functionality.

Modbus TCP/IP

Unit ID: 1

Supported Modbus TCP/IP function codes:

- Read Holding Registers (0x03)
- Write Single Register (0x06)
- Write Multiple Registers (0x10)

Holding Registers

Variable	PLC variable	Address	Access	Data type	Description
Sensors (si=sensor index 0..120; 0=unassigned (new) sensor)					
Index	si	10 * si + 0	RW	I16	Sensor index (si); when changed sensor will be moved to new index, but only if new space is empty
Status	th_status[si]	10 * si + 1	RO	I16	Temperature sensor status 0 = no sensor, 1 = OK, 2 = Error, no response
Temperature	th_temperature[si]	10 * si + 2	RO	I16	Measured temperature in 0.1 °C (234 = 23,4 °C)
Humidity	th_humidity[si]	10 * si + 3	RW	I16	Measured relative humidity in 0.1 %RH (654 = 65,4 %RH)
Alarm Temperature HI	th_temperature_alarm_hi[si]	10 * si + 4	RW	I16	Measured temperature over set high limit 0 = idle 1 = alarm
Alarm Temperature LO	th_temperature_alarm_lo[si]	10 * si + 5	RW	I16	Measured temperature below set low limit 0 = idle 1 = alarm
Alarm Humidity HI	th_humidity_alarm_hi[si]	10 * si + 6	RW	I16	Measured humidity over set high limit 0 = idle 1 = alarm
Alarm Humidity LO	th_humidity_alarm_lo[si]	10 * si + 7	RO	I16	Measured humidity below set low limit 0 = idle 1 = alarm
Spare	0	10 * si + 8	RO	I16	0
Spare	0	10 * si + 9	RO	I16	0
Statistics					
Sensors count	th_count_all	1210	RO	I16	The number of all sensors that are configured
Sensors OK	th_count_ok	1211	RO	I16	The number of all sensors communicating correctly

Variable	PLC variable	Address	Access	Data type	Description
Sensors Error	th_count_err	1212	RO	I16	Number of all sensors not responding (not communicating)
Sensors Alarm	th_count_alarm	1213	RO	I16	The number of all sensors that are in alarm (temperature or humidity outside the set limits; if the limits are set)
Average temperature	th_temperature_avg	1214	RO	I16	Average temperature of all sensors communicating properly
Minimal temperature	th_temperature_min	1215	RO	I16	The minimum temperature of all sensors communicating properly
Maximal temperature	th_temperature_max	1216	RO	I16	The maximum temperature of all sensors that communicate correctly
Average humidity	th_humidity_avg	1217	RO	I16	Average relative humidity of all sensors communicating correctly
Minimal humidity	th_humidity_min	1218	RO	I16	Minimum relative humidity of all sensors communicating properly
Maximal humidity	th_humidity_max	1219	RO	I16	Maximum relative humidity of all sensors communicating correctly
Spare	0	1220-1229	RO	i16	0
General settings					
Temperature HI Limit	th_temperature_alarm_hi_limit	1230	RW	I16	Limit for temperature HI alarm in 0.1 °C (500 = 50,0 °C); 0 = No temperature HI alarm

Variable	PLC variable	Address	Access	Data type	Description
Temperature HI Clear	th_temperature_alarm_hi_clear	1231	RW	I16	Limit for clear of temperature HI alarm in 0.1 °C (450 = 45,0 °C), must be lower than Temperature HI Limit; 0 = No auto clear of temperature HI alarm
Temperature LO Limit	th_temperature_alarm_lo_limit	1232	RW	I16	Limit for temperature LO alarm in 0.1 °C (50 = 5,0 °C); 0 = No temperature LO alarm
Temperature LO Clear	th_temperature_alarm_lo_clear	1233	RW	I16	Limit for clear of temperature LO alarm in 0.1 °C (100 = 10,0 °C), must be higher than Temperature LO Limit; 0 = No auto clear of temperature LO alarm
Humidity HI Limit	th_humidity_alarm_hi_limit	1234	RW	I16	Limit for humidity HI alarm in 0.1 %RH (500 = 50,0 %RH); 0 = No humidity HI alarm
Humidity HI Clear	th_humidity_alarm_hi_clear	1235	RW	I16	Limit for clear of humidity HI alarm in 0.1 %RH (450 = 45,0 %RH), must be lower than Humidity HI Limit; 0 = No auto clear of humidity HI alarm
Humidity LO Limit	th_humidity_alarm_lo_limit	1236	RW	I16	Limit for humidity LO alarm in 0.1 %RH (50 = 5,0 %RH); 0 = No humidity LO alarm

Variable	PLC variable	Address	Access	Data type	Description
Humidity LO Clear	th_humidity_alarm_lo_clear	1237	RW	I16	Limit for clear of humidity LO alarm in 0.1 %RH (100 = 10,0 %RH), must be higher than humidity LO Limit; 0 = No auto clear of humidity LO alarm
Spare	0	1238	RO	I16	0
Spare	0	1239	RO	I16	0