iotec ab

RackMultiControl

User Manual

2012-12-24

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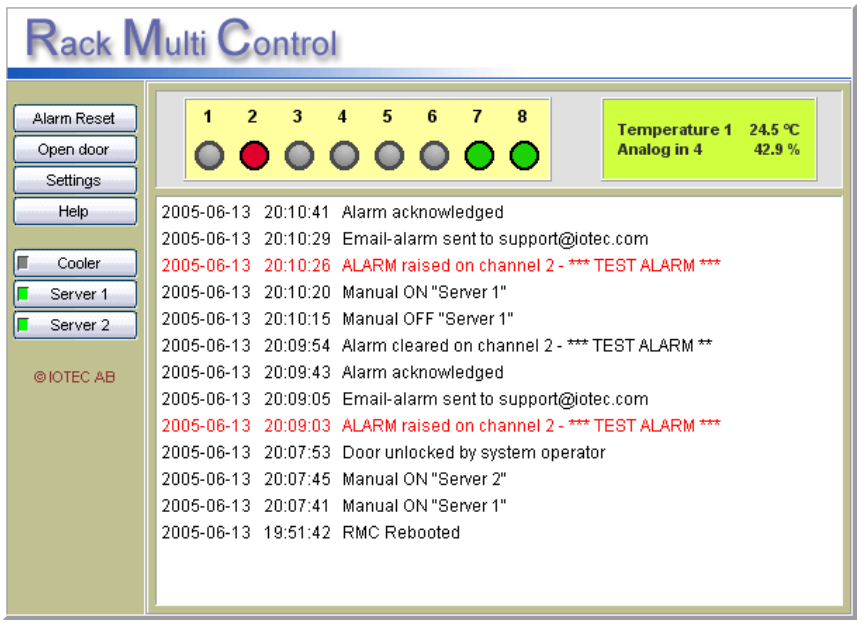
RMC – short intro

RackMultiControl - RMC - is a system for supervising network and server cabinets. You can monitor temperature, humidity, smoke, power supply or whatever you find suitable to protect your expensive equipment. You can of course use it to supervise any kind of equipment. It is basically an advanced and modern version of a traditional alarm panel.

When delivered, the RMC is set up to monitor one temperature, and to generate an alarm on channel 1 if the temperature reaches the high limit value. You can easily return to this factory setup. So there is no need to worry about messing things up by testing all the various settings.

RackMultiControl has an embedded web server. With a standard web browser, installed in all computers today, you can easily view the RMC web pages to monitor status and change settings. No software installation is required. On the main web page you get total overview of the present status and the fifteen latest events.



You can connect many types of sensors to RackMultiControl. There are three inputs for temperature sensors and one 4-20 mA current input for a humidity transmitter or anything with a similar current signal.

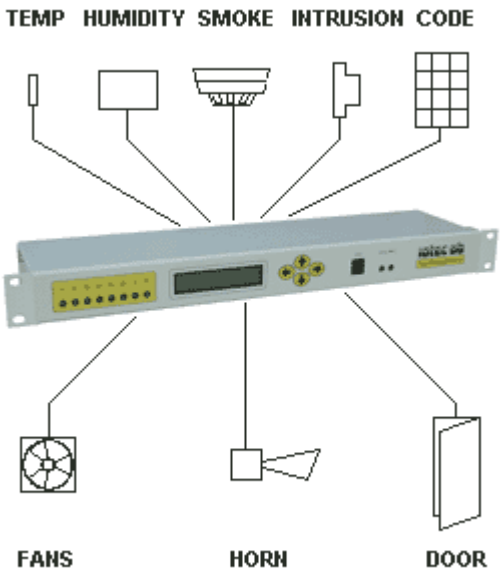
The eight digital opto isolated inputs are for on/off signals from a simple contact or any equipment that outputs a 24 volt DC signal. Smoke detectors, intrusion alarms and power loss signals are connected here.

There are three power relays for on/off control of fans, cooling system or heater, with built in thermostat functions, controlled by the temperature sensors and limit settings. The relays are also individually programmable for manual operation. You can use that to remotely recycle power to servers, routers etc.

One signal relay opens the door and one signal relay is for an external alarm in a reception or maybe a beacon/siren on the cabinet.

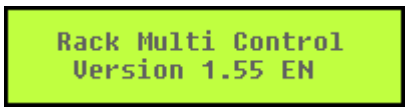
A numeric keypad can be connected for the code lock function, and a GSM-modem for sending SMS-alarms.

On the front of the RMC you can easily see the present status of up to eight function channels. If any channel shows a red light, an alarm event has occurred. A function channel can also act as a simple status indicator with a green light. When an alarm event occurs, an email message can be sent to any email address. These messages can of course be rerouted to a cellular phone as a SMS message through a suitable gateway or directly via the GSM accessory.



Install and learn the basics

When you for the first time get in contact with the RMC, it's supposed to be as smooth as possible. RackMultiControl is delivered with a setup for monitoring one temperature. This means that channel 1 raises an alarm if the temperature reaches 60 degrees Celsius. The only thing you need to do is to connect the power cord, and the temperature sensor to analog input 1.
When powered up it presents itself like this on the display:

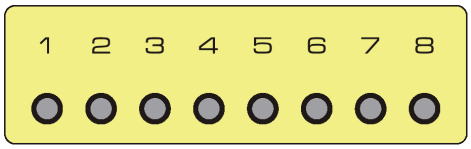


... and then turns all channel indicators on. First in a green color and then in red just to verify that all indicators are working ok. After a couple of seconds, the display shows the temperature on line 1.

If you instead get this message:

... the temperature sensor is probably not connected to analog input 1.
Analog input 2 and 3 is also used for temperature sensors, but if you only have one, it must be connected to input 1.
The display backlight is turned on at startup and when any of the buttons are pressed. It turns off automatically after five minutes. If you have the code lock accessory together with the Emka swinghandle, the backlight turns on when the door unlocks and turns off when locked.

The eight function channels:



... shows the present status at all times. A quick look is enough to see if anything is out of normal. If any function channel has a red indication, some error condition has occurred.

If a channel has turned a green indication on, it just shows the status of an output relay or any of the digital inputs. Each channel is freely programmable to be an alarm with red indication or simply a green status indicator.

Now let us say that the temperature around our first sensor reaches 60 degrees Celsius. The temp limit alarm will trigger channel number one and it starts to blink in red. A built in acoustic alarm is activated with the same interval as the blinking. The alarm relay activates.

If you press any of these buttons:

... the alarm becomes acknowledged and the channel shows a steady red light, if the alarm condition still exist. The acoustic alarm stops and the alarm relay returns inactive. When the temperature goes down below 60 degrees again, the alarm clears and the red light goes out.

A channel set up for status indication, maybe to see if the cooling fans are running, have only that simple function. Green light means that the fans are running.

If you just need a warning when the temperature reaches 60 degrees, then you are all set. We suspect though that you expect more.

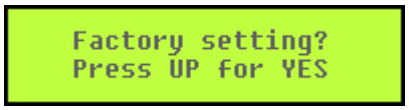
On the following pages, you will see how easy it is to add functions and change settings to suit your needs. Remember that you can get familiar with the system and test all settings without destroying anything. You can at any time, restore the factory settings as you will see next.

Factory setting

Let's begin by describing what we call the total factory restore:

- Pull the power plug to turn the RMC off. Wait a few seconds.
- Hold the left arrow button pressed:

... and reconnect the power plug. Keep the button pressed until you get this message on the display:



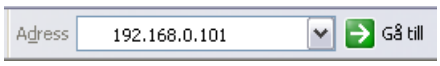
Now if you press and hold the up-arrow button, all settings will be restored to the ones set when delivered. If you change your mind before you press UP, you can press DOWN instead or just do nothing. After about 20 seconds, the function is cancelled and the RMC is starting up in a normal manner.

Network connection

With a standard patch cable and the Ethernet connector you hook up the RMC to your network.
If you, maybe when testing, prefer to connect directly to your computer, you will need a crossed cable. Remember in that case to specify fixed IP address and subnet mask in your computer.

Set the IP address

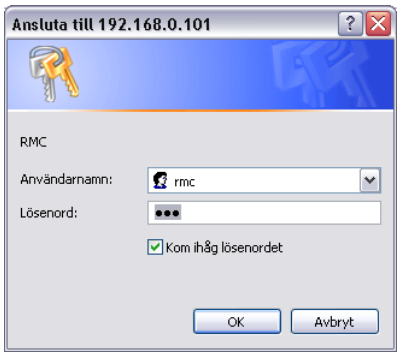
You can set the IP address in your RMC with the front panel display and arrow buttons. Step downwards in the menu with the down button until you see "Change IP address". Then you press the right button and begin setting the address group by group with the up and down buttons. When done, you can wait and let the RMC automatically return from the menu or step the same way backwards. This setting, and others, can also be entered with the PC cable and a terminal emulator.
This is the only thing you need to do to before you can browse the RMC web pages to change other settings.
Remember to check with your network administrator before you decide which address to use.
If you gave the RMC the address 192.168.0.101, you now enter that in the web browser address field:



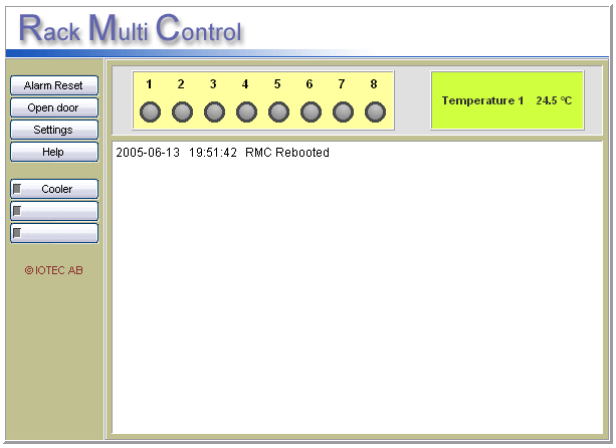
... and click "Go to" or press ENTER.

Main page

When you are connected to the RMC web server, you must log in. This assures that only you or your team can use the RMC.



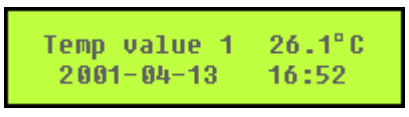
The factory setting for both Name and Password is rmc in lower case. Remember to change this for maximum security.
After clicking OK, you will receive the main page looking like this.



The present status is shown in the same manner as on the RMC front panel. The channel indicators will show red green or off. If there are unacknowledged alarms, these channels will blink in red and you will also hear an alert sound. On the “display”, you can see the temperatures and analog input 4 value for connected sensors. The page will be updated every 15 seconds and the alert sound is repeated. The list of events is emptied every time the RMC is restarted, and the event "RMC Rebooted" is registered. The fifteen latest events are always listed on the main page with the latest event on top. Alarm raised events are listed in red to have them stand out. All other events are listed in black.

Setting date & time

When the RMC starts up, the second row on the front panel display is empty. Now after the first login, row two shows the date and time.



For the sake of the environment and to avoid unnecessary service, we have made a calendar clock with no backup battery. Each time

the RMC starts up, the date and time is set to 1980-01-01 00:00:00 and begins counting. The date and time is not yet shown on the display. All events will be stored with this temporary date and time. After the first web server login, the date and time is set by the calling computer. The RMC calculates the time difference and adds that to all the stored events. Now the date and time is displayed on the display. At every new login, the date and time is set.

The time difference calculation occur only once after start-up. You never need to set the calendar clock manually. Remember though to check your computer clock as the accuracy of event listings depend on it. The RMC clock is also used for automatic reset of the temporary lock code when used.

Acknowledge alarms

When an alarm triggers, the channel indicator starts blinking in red, both on the RMC and on the main web page. If you press any of the front panel buttons the alarms will be acknowledged.
You can also acknowledge alarms with this button on the main web page:

When you acknowledged the alarm, the acoustic alarm and web alert signal turn silent and the channel indicator turns to steady red. Both on the RMC front panel and on the web page.

Open the door

RackMultiControl has a built in code lock function to unlock the cabinet door. You install a keypad, connected to the RMC, in the door. When entering a 4 to 8 digit code, the door unlocks.
The relay that controls the unlocking is activated a programmable amount of time. The time can be from 1 to 60 seconds. The unlocking can also be controlled by this button on the main web page:

If activated, the door immediately unlocks with the same programmed time.

Settings

If you click this button:

... you will be transferred to a web page with a menu where you select which settings you like to alter. Feel confident to test, as you don't risk anything. Everything about these settings will be explained further down the manual.

Help

The help button will transfer you to the web site **rmcsupport.com** where you can read the latest version of this manual and find other things to help you to use the RMC.

Power outputs

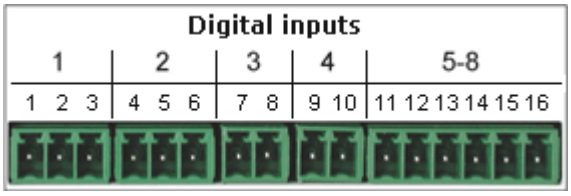
The power output buttons controls these relay outputs if set for manual mode or just shows the status if in thermostat mode.

After this "soft start" you can now continue with the following sections and learn how to connect additional sensors and to set up a local alarm.

Adding more sensors

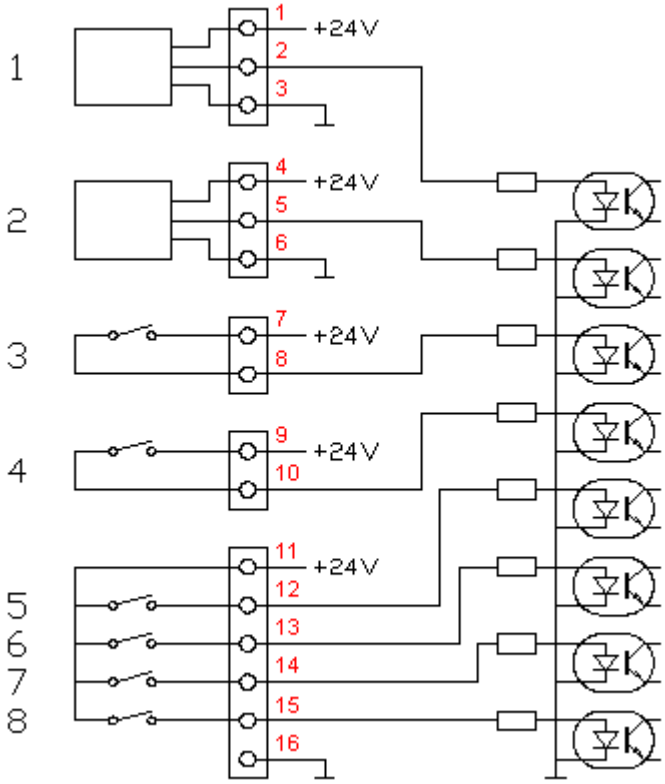
Digital inputs

There are a total of eight digital (on/off) inputs.



Inputs 1 and 2 have 3-way connectors and can supply the sensor with 24 volt DC. The smoke detector is connected here. The smoke detector comes ready with cable and plyg. Input 3 and 4 is used for free contact sensors like door contacts.
Inputs 5 to 8 has a common six-way connector but with the same flexibility as input 1 and 2 regarding 24 volt supply. The 24 volt supply is short circuit protected.

This schematic shows some examples to connect different kinds of sensors.

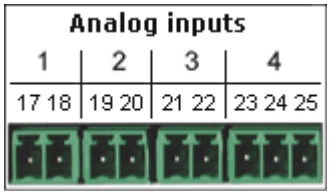


The important thing to remember is that when the RMC senses 24 volts at the input resistor, it is regarded as an ON condition. If ON

is the normal condition, you select "normally closed" in the channel setting.

Temp sensors

Analog inputs 1, 2 and 3 is made for temperature sensors only. The sensor is a temperature sensitive resistor called thermistor connected to one end of a two wire cable. The other end of the cable has a plug for easy installation.
If only one temperature sensor is used, it must be connected to input 1. Please observe that the RMC is programmed for a specific type of thermistor. If you like to make your own temperature sensor, use the Mitsubishi CH25 10k.



Humidity sensor

The analog input 4 is made for sensors that transmits a current signal of 4-20 mA. This could for example be a sensor for relative humidity RH. Analog input 4 has a three-way connector and can supply 24 volt DC to the sensor. The 24 volt supply is short circuit protected, and the 4-20 mA input is overcurrent protected.

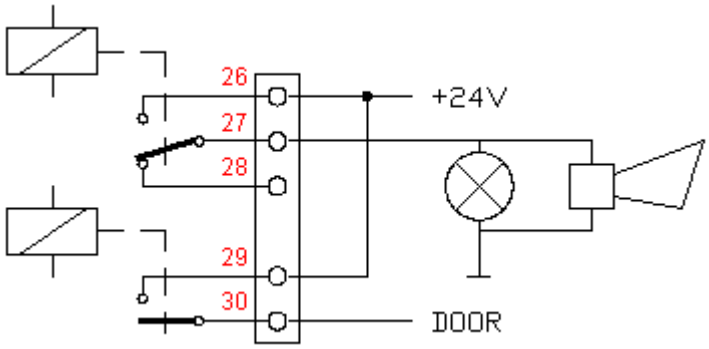
Connection input 4:

1 +24V
2 4-20 mA in
3 0V

Relay outputs

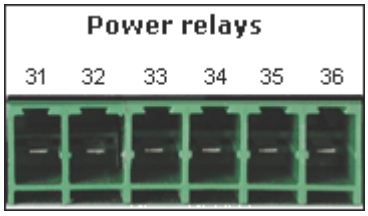
The alarm relay can be used to activate an acoustic alarm in a reception or a flashing beacon on top of the cabinet. In these cases, an acknowledge button to silence the alarm is recommended. One of the digital inputs can be used as external acknowledge.
This five-way terminal plug is used for the external alarm and to control a door lock.

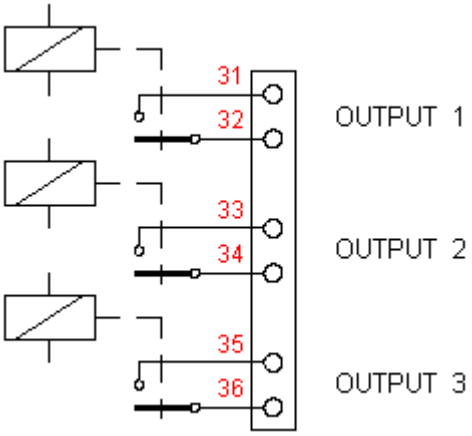
This schematic shows an example:



The door relay can release an electric door lock with the code lock function. Please observe, if the Emka swinghandle is used together with the RMC numeric keypad, leave the terminals 29 and 30 unconnected.

The power relays can control fans, cooling system or heater, with built in thermostat functions. The RMC measures the temperature and decides depending on the limit values what to do. The relays are also individually programmable for manual operation. You can use that to remotely recycle power to servers, routers etc.





Settings

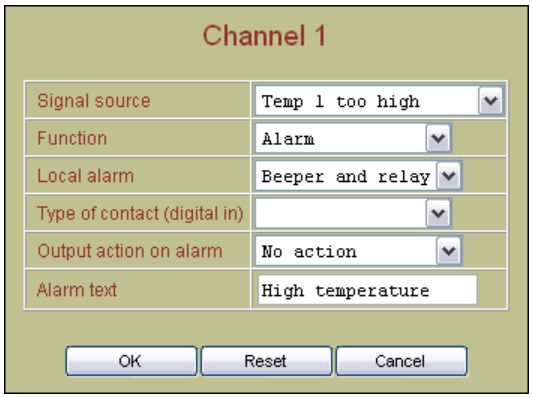
This section describes how to alter settings via the web pages. Click this button:

... and you will see this menu page where you can select the type of setting you wish to alter.

Alarm & Status

The eight function channels can be seen as the channel selector on your TV set. You choose freely where in this selector you put your alarm and status objects On delivery, only channel one is set up for raising an alarm when the temperature reaches 60 degrees. Click on the "Alarm & Status channels" button to get this menu where you select which channel to alter.

After selecting a channel, the actual channel settings form appears where you can alter the following:



Signal source selects which condition, or input signal, will affect this channel, to generate an alarm or simply show a status. In this example (the factory setting) the signal source is "Temp 1 too high" which means that this channel will raise an alarm when temperature 1 reaches the setting for "limit value HIGH temp 1".
Now suppose you have a smoke detector connected to digital input 1. Then you could for channel 2, select "Digital input 1" as signal source. You can also for a channel use a power relay status as signal source just to show if the cooling fans are running.

Function controls whether the channel should act as an alarm or a status indicator. There is also an option called "Alarm auto acknowledge". Normally when an alarm is raised, the channel indicator starts blinking in red. A memory function makes the channel go on blinking even if the alarm condition no longer remains. This makes it possible to observe intermittent error conditions.
If you select "Alarm auto acknowledge", the channel is automatically cleared when the alarm condition returns to normal.

Local alarm selects what local action should be taken on this alarm. "Acoustic alarm", "Alarm relay" or both.

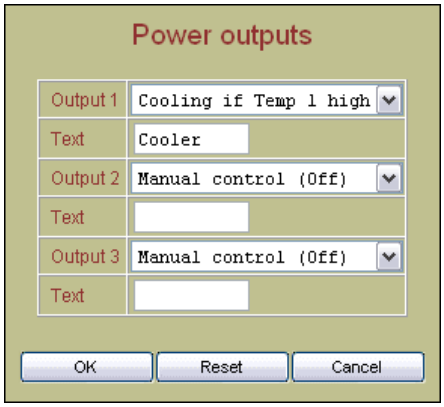
Type of contact can select whether the digital input is normally off (open) or normally on (closed).

Output action on alarm can turn the power outputs off and/or unlock the door automatically on an alarm condition. If smoke or fire is detected, then you probably don't want the fans to run.

Alarm text defines the text presented on the event list, on the front panel display, in mail messages and with SNMP traps.

Power outputs

If you select "Power outputs" from the settings menu, this form will be visible:



Here you can set how the three power outputs shall work. The three outputs has a corresponding button on the main web page. The button text can be defined here. The buttons also show the present on/off status of the outputs.

Output 1 can have:

- Thermostat function for cooling, controlled by temperature sensor 1.
- Manual control on the web page or by a SNMP management system.

Output 2 can have:

- Thermostat function for cooling, controlled by temperature sensor 1 if a second cooling pack is desired.
- Thermostat function for cooling of a second cabinet, controlled by temperature sensor 2.
- Manual control on the web page or by a SNMP management system.

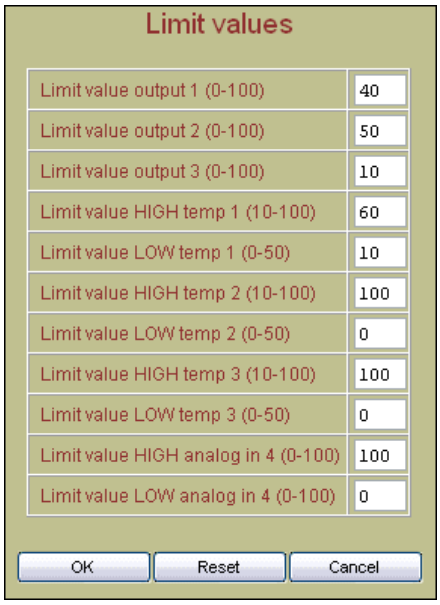
Output 3 can have:

- Thermostat function for heating, controlled by temperature sensor 1.
- Thermostat function for cooling a third cabinet, controlled by temperature sensor 3.
- Analog input 4 controlled. On if too high or too low. Maybe as a hygrostat function to control humidity.
- Manual control on the web page or by a SNMP management system.

A manually controlled output could be used to remotely reboot a computer. Manually controlled outputs can be set to start in ON condition. Useful if the RMC isn't powered by a UPS.

Limit values

The menu button "Limit values" takes you to this web page form:



This form probably does not need a detailed description. The descriptive text says it all. The first three limit values are for the thermostat control of the power outputs. The other eight limit values control limit alarms.

Alarm receivers

Here is where you enter the email addresses and phone numbers receiving the alarm and SMS messages. You can also define a digital input (1-8) to act as an external acknowledge.

Passwords & lock codes

Here are the access settings.

User name and Password, web pages controls access to all web pages. The factory settings shown here should be changed so only you or your team have access.

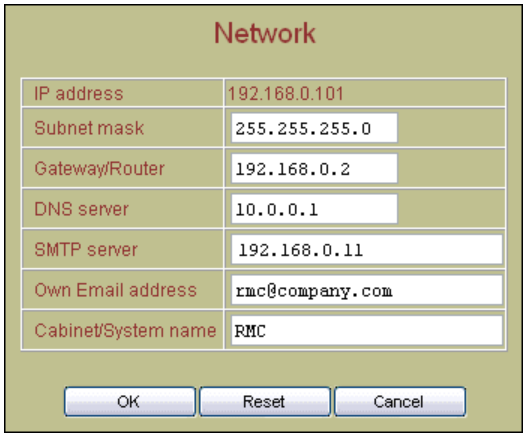
Lock codes controls what to enter on the keypad to open the door. The code must be 4 to 8 consecutive digits.

Valid until hour defines when the temporary lock code shall be removed.

Open time in seconds defines how many seconds the door relay will be activated. If the Emka swing handle is used, or any type of latching lock mechanism, set this to 1 second.

Network

All basic network settings are defined here:



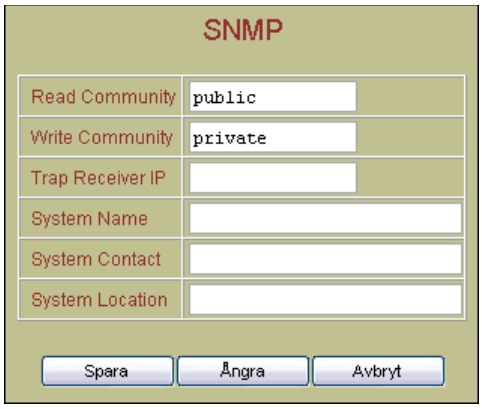
The first five settings is normally acquired from the network administrator. The RMC must have a unique IP address to identify itself on the network. The Subnet mask tells the RMC if outgoing traffic should go via the gateway/router or if the receiver is on the same segment.

Own Email address Many email servers require that the mail client sending mail has an own email address defined.

Cabinet or System name should be a unique name. The name will be included in the mail messages.

SNMP

Here you set the parameters to enable you to manage the RMC via SNMP and a management system:



If you do not want to receive traps from this RMC, leave "Trap receiver IP" blank.

Restore factory settings

Click on "**Restore**" if you are absolutely sure that you want to restore the factory settings. Otherwise you click "**Cancel**".

SNMP

Here we present the hard facts directly. If you use SNMP and a network management system NMS we think you will feel at home here.

Our enterprise number is **11072** (IOTEC AB).

The RMC supports the system group in the MIB-II

objects:
sysDescr
sysObjectID
sysUpTime
sysContact
sysName
sysLocation
sysServices

The private MIB presently contains the following objects:

rmcTemp-1
Integer value in degrees Celcius of temperature 1.

rmcTemp-2
Integer value in degrees Celcius of temperature 2.

rmcTemp-3
Integer value in degrees Celcius of temperature 3.

rmcAnalog-4
Value 0 - 100% of the current signal 4 - 20 mA at analog input 4.

rmcAlarmsExist
ALL-OK(0) or ALARMS-EXISTS(1). This can be seen as the sum of all alarms. You could have your management system read this object periodically to see if everything is ok and if not, check the main web page for a total overview.

rmcAlarm-1 -- rmcAlarm-8
Eight objects, one for each alarm channel, giving OK(0) or ALARM(1).

rmcOut-1 -- rmcOut-3
Status for the three power outputs. Can also be set on or off by the NMS.

rmcTrapMessage
When an alarm trap is sent, this object holds the alarm text string which are appended to the trap.

In the MIB-file there are eight traps defined. The MIB-file can be downloaded from this site.

Supervision with the RMC using SNMP can be configured in several ways.

A simple configuration could be to set up the eight function channels and limit values in the RMC and have your network management system read the single object **rmcAlarmsExist** periodically to see if everything is ok.

Set up your NMS to give an alarm event if rmcAlarmsExist returns 1, indicating that something is abnormal. When this happens, just browse the main web page in the RMC for a total overview and with its event list in plain English.

You could also read the analog values separately and define the limit values in your NMS. This way you can have all eight digital inputs for alarms and thus get a total of 12 monitored objects. Maybe the most common method is to use the traps, one for each alarm channel.

Technical specification

Enclosure	IP40, steel, powder coated RAL7035
Dimensions	1 U 482,6 mm (19”) rack mounted, 115 mm deep.
Temperature range	-5 to +45 °C
Operating voltage	230 V AC
Power consumption	20 VA
Max load 24 V	400 mA (for external equipment)
Network	Ethernet 10BaseT, IEEE 802,3 10MB
Protocols	TCP/IP - network protocol. HTTP – for web pages. SMTP – for sending email messages. SNMP – for network management systems.
Front PC-connection	RS232 for accessory cables.
Modem connection	RS232 type PC 9-pin d-sub with all control signals.
Analog inputs	3 for temperature sensors and 1 for 4-20 mA.
Digital inputs	8 opto isolated 24 V DC 10 mA.
Relay outputs	3 power relays 230 V AC - 5 A. 2 signal relays for alarm and door 24 V - 1 A.