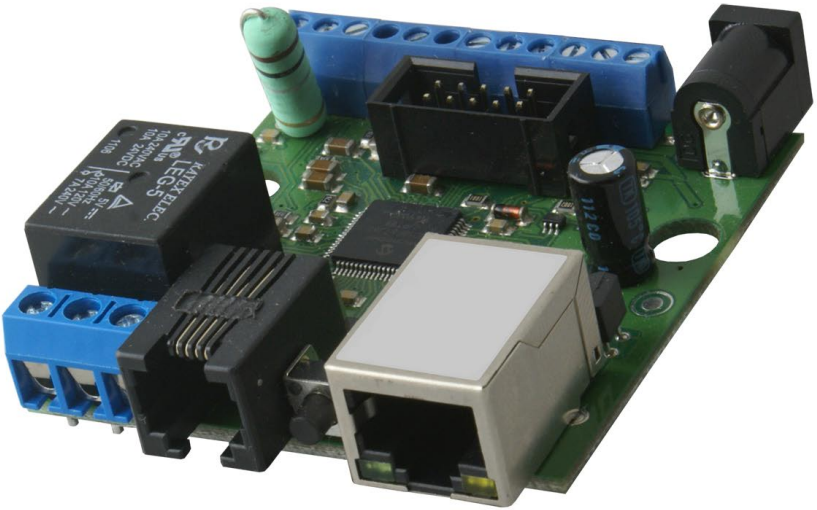
LAN Controller
manual



Firmware version 3.21 – „HOME”

LAN Controller

LAN controller is a simple, but innovative device which has long been lacking in the market network solutions. A small board serves as a web server which presents the various sensor readings and allows you to remotely control up to 5 outputs. Additionally Events Config feature allow you to program the appropriate action when sensor readings met certain conditions. ISP can use watchdog function, it check the ping up to 5 network devices, and if no response runs the relays. Useful for many applications can be a Scheduler, that allows the on / off the device at a specified time or for a specified period of time. There is also PWM output to control brightness of light or an electric motor speed. For far rom socket installation board could be powered by passive PoE. Few versions of firmware is available today, each is developed and after publication customer could upgrade it by preapred software. In Accessory are presented all sensors and upgrade kits compatible with Lan Controller.

Examples of applications

ISP

- temperature, supply voltage and person occupancy control in server rooms
- weather condition report on the occasion of IP cameras views

Home control

- home electric stove control (automatically or remote)
- turning on/off home lightening remote, by scheduler or by event, controlling intensity
- turning off TV box if remote is other person hands ;-)
- irrigation control - you don't need visit your garage to modify irrigation time or you can turn sprayer precisely in the moment when your favorite neighbor passes near ;-)

Home installations

- temperature controlling and simple automation in your heating system
- temperature and pressure controlling in solar thermal installations
- measurements of heat pump operation
- monitoring of grid voltage and automatic switching to backup with mail notification
- remote control (by LAN or wirelesslan) understands as forwarding command to one of output of Lan controller from input of other Lan controller

Renewable energy

- measurements of solar cells work
- measurements of wind turbines
- measurements of charging battery
- measurements of power consuming

RESTARTER, MONITOR, CONTROLLER

FEATURES:

- WWW or SNMP v2 management
- firmware upgrade via TFTP
- read data in real time without refreshing page
- possibility switch on/off to 5 relay direct from page WWW
- events panel to self-programming by user
- Scheduler (switch on/off output for definite time in week days)
- monitoring additional devices eg. PIR sensors
- environmental temperature and supply voltage on board measurement
- temperature and current measurement from connected sensors
- power measurement for DC voltage
- possibility to connecting of the additional boards: with 4 switched PoE ports or 4 relays
- set time manualy or by server NTP
- posisibility sensors calibration
- frequency and duty modified PWM output
- remote control: each output of Lan controller setup as server can be controlled remotelly by LAN network from inputs of others Lan controllers
- e-mail notification about programmed events
- SNMP TRAP notification about programmed events
- HTTP client: GET, POST notification
- automaticaly send state or value inputs to SNMP server
- implemented protocols: HTTP, SNMP, SMTP, SNTP, ICMP, DNS, DHCP
- supported temperature sensors: NTC10K B=3950, KTY-84, PT1000
- power measurement from pulse meters DTH22 humidity sensor support
- support for monostable/bistable wall switches for lighting control
- http client for send data to remote IoT servers like www.thingspeak.com
- no watchdog

Default user and password is „admin", IP adress is 192.168.1.100

TECHNICAL SPECIFICATIONS

- supply voltage: 8÷56V
- power consumption : about 1W
- PoE supply: YES, passive
- Protection from wrong supply polarization: YES
- interface: ethernet 10Mbit/s
- relay: 255VAC 10A
- operating temperature: –20 do +85 °C
- weight 45g (without casing)
- casing type Z-67 (not included)
- dimensions 57x67mm

INPUT/OUTPUT:

- **1 RELAY** to switch on/off another devices, available contact: NC and NO
- **4 OUTPUT** to switch relays, ports PoE or another devices;
- **1 CONFIGURABLE PWM OUTPUT** from 2,6 KHz to 4Mhz;
- **4 LOGICAL INPUT** (max 12V): to monitoring another devices, eg. bufor supply. collaboration with outputs: OC,NO, NC
- **5 ANALOG INPUT:**

  INP1: temperature measurement witch thermistor NTC 10K B=3950 (from –40 to +120 °C) or thermistor KTY-84-130 (from –40 to +300°C), accuracy 1°C (dependent on NTC)

  INP2: thermistor NTC 10K or voltage mesurement to 3,6V, with use additional divider increase range.

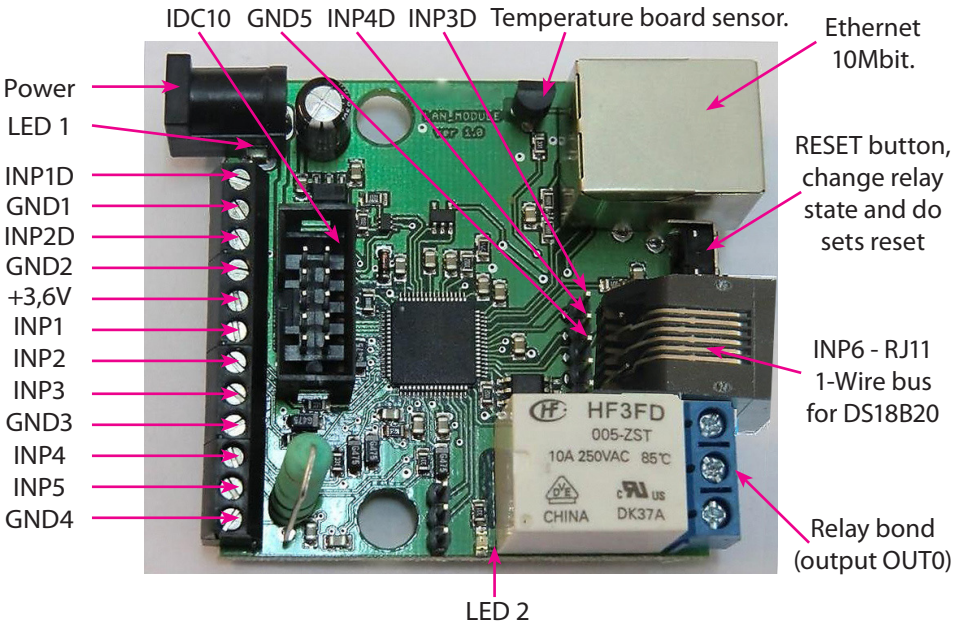
  INP3: voltage measurement to 35V, accuracy ± 0,1V;

  INP4: temperature measurement by PT1000 (from –20 to +350 °C) accuracy ± 2°C;

  INP5: measurment DC current to 3A, accuracy ± 10mA;

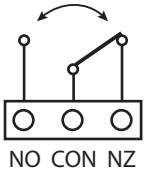
- **1-WIRE BUS (RJ11 connector)** to input sensor DS18B20 - max 6 sensors

PINS and COMPONENTS DESCRIPTION



PIN/Component	Description
Power	Power suplly 8V÷56VDC or via PoE
RELAY bond	To connect external device, ***detail description below***
LED1	Shine LED means Power on board
LED2	Shine LED means relay active
IDC10	To connect additional board, ***detail description below***
INP1D	Logical input 1
GND1	gnd for INP1D and INP2D or general gnd
INP2D	Logical input 2
GND2	general gnd
+3,6V	Supply for sensors NTC-10K and KTY-84 connected to INP1 or INP2
INP1	input for sensor NTC-10K or voltage measurement max (without divider) 3,6V
INP2	input for sensor NTC-10K or KTY-84-130
INP3	input for voltgae measuerment max 35V
GND3	general gnd
INP4	input for sensor PT1000 or connected the same sensor in solar controller
INP5	Input for current measurement
GND4	Gnd for current measurement Or general if don't measurement current
INP6	input for sensor DS18B20 (1-Wire bus on the connector RJ11)
INP3D	Logical input 3
INP4D	Logical input 4
GND5	gnd for INP3D and INP4D or general gnd

Relay Bond:

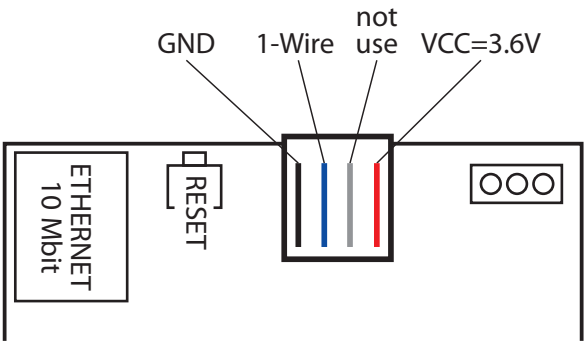


NO – contact normaly open
CON – common contact
NZ – contact normaly closed

ATTENTION: In spite of that relay can switch AC voltage 255 VAC 10A, board fail to comply with safety requirements (lack housing, earthing). Therefore that receiver connect with the assistance safety external relays eg. on DIN bus, controlled by relay on board.

IDC10 and 1-Wire:

1 – analog input not use	2 – analog input not use
3 – +3,6V	4 – OUT4
5 – GND	6 – OUT3
7 – PWM output	8 – OUT2
9 – VIN, vcc suplly	10 – OUT1



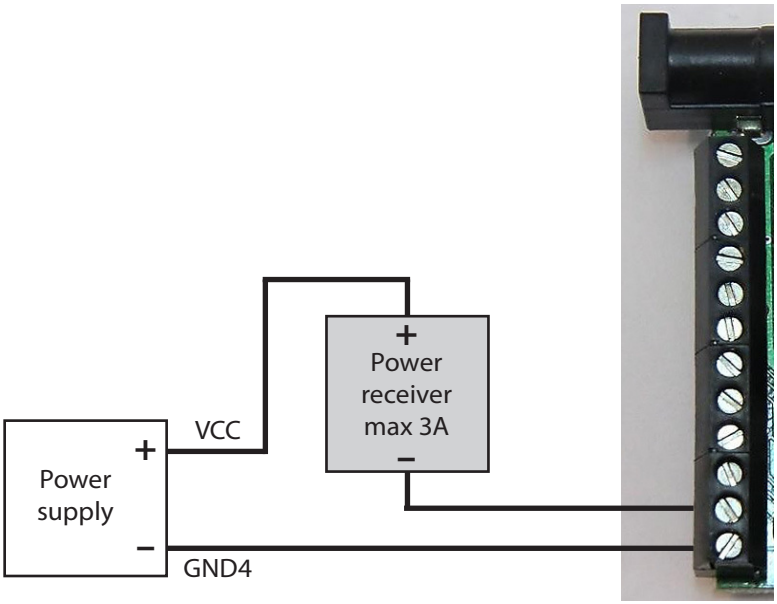
Reset button

Push about 0,5 second cause change relay state on opposite, push and keep longer about 5 second (if we not logged by WWW on modul) cause modul reset, next if you still keep button about 10 second cause set all settings to default. Set all settings to default confirmation is fast switch relay on/off (klik-klik), don't wrong this with change relay state about 0,5s and switch relay off after restart.

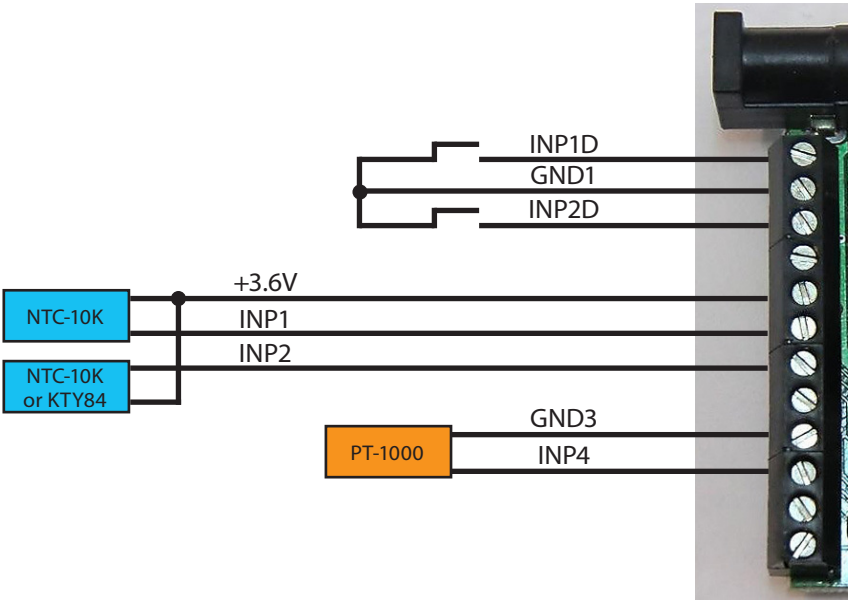
User and password: admin
IP: 192.168.1.100

SENSORS CONNECT

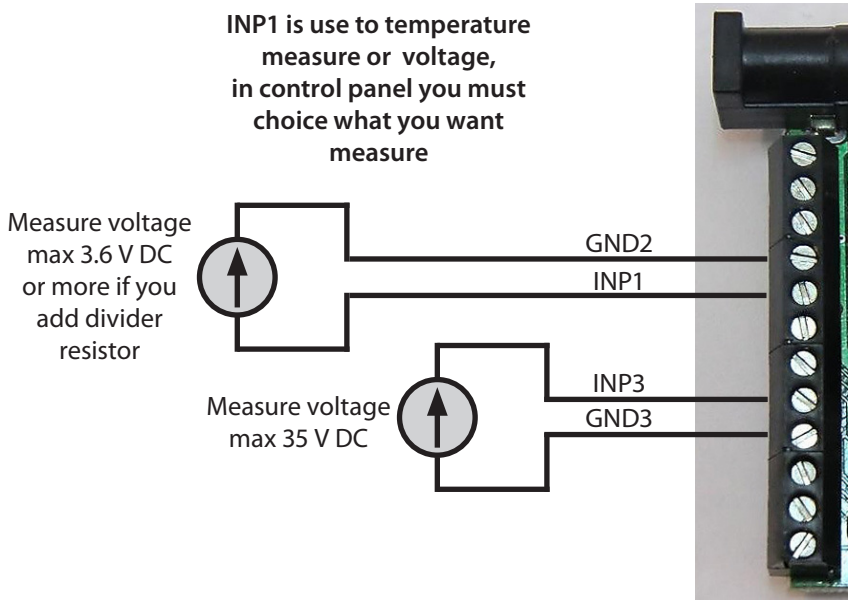
1. Current measurement



2. Temperature measurement and logical input



3. Voltage measurement

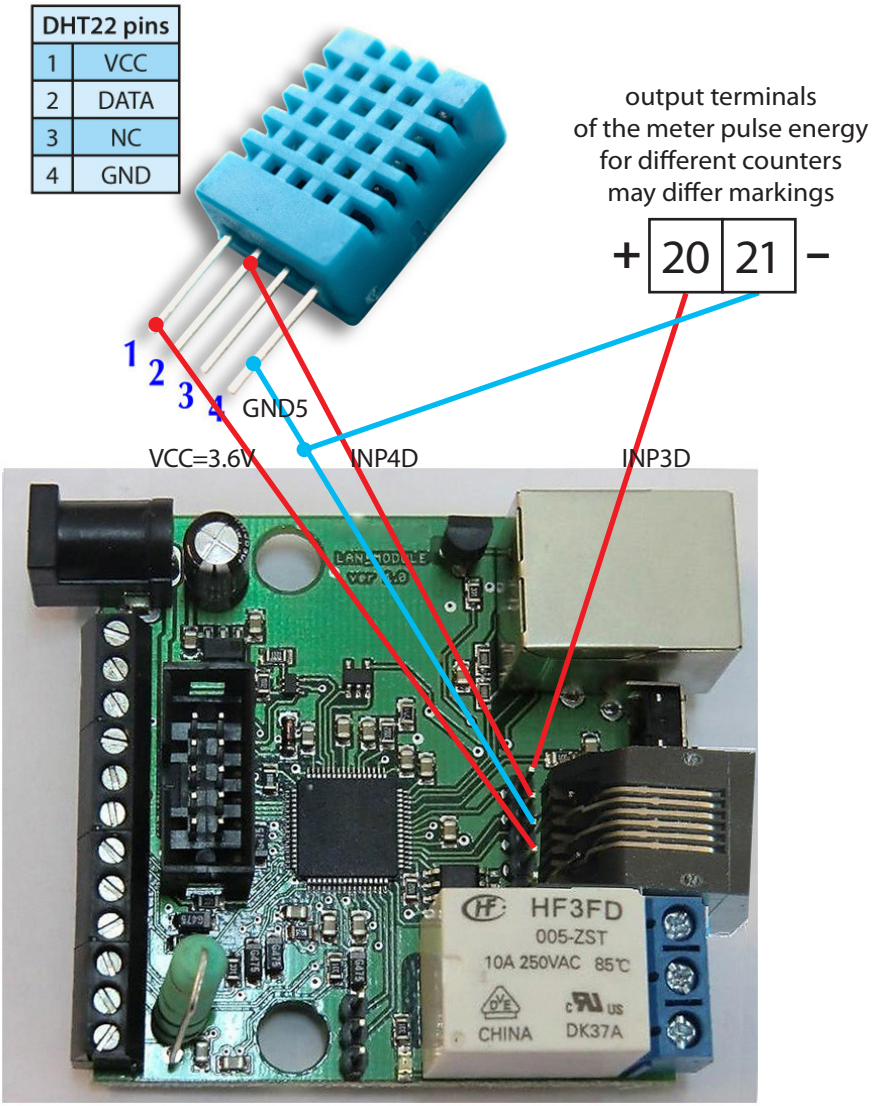


Additional resistor to increase measure range INP1

R = 10K increase range 2 (multiplier 2) that is 3.6V x 2 = 7.2V
R= 20 K increase range 3 (multiplier 3)
R= 30 K increase range 4 (multiplier 4) etc.

Add resistor must be connected with set proper multiplier in field VCC on control panel page.

4. DHT22 sensor and pulse output from the counter



Despite of connected sensors, inputs INP4D and INP3D can still be used as a standard digital inputs in an array of events, just for the DHT11 at INP4D closed to ground will not be correct read and the shorting INP4D will calculate extra impulses.

Management by WWW.

1. Control Panel

Reset time – „0" for normal outputs work (ON/OFF) , for time > 0 output change state and return to state before after the specified time in seconds (max 65534).

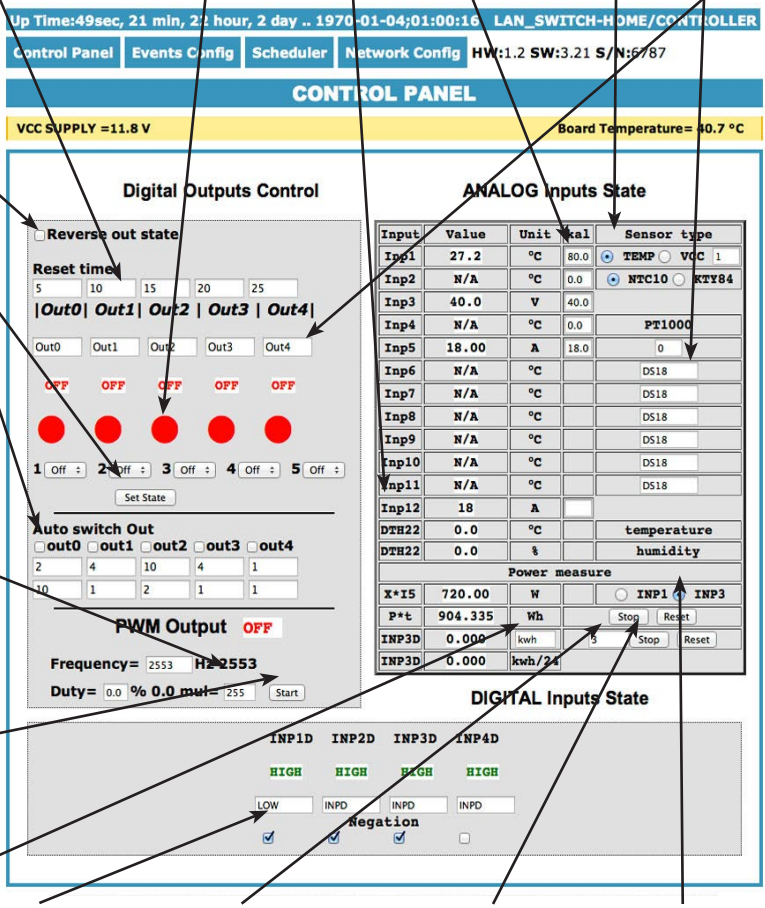
click cause change relay state on opposite (OUT0 relay on board)

Test input - in the current firmware version 3.21 - unused

Choice type connected sensor

Value of calibration - adds to or subtracts the desired value

Any text description, max 8 chars



Change outputs state display

Set State All output simultaneously according to combo box

automatic socket arming at fixed time (two panes: one - time arming, second - break time)

Multiplier of PWM duty used for INP1 Even Config table tripping.

Run PWM generator (when changing frequency or fill does not need to turn off the generator)

Any description of the measured physical quantity, such as kWh, L/min, etc.

Negation for digital input for Even Config tripping

Divider pulse counter - for example as ours energy meter sends 1000 pulses per 1 kWh is enter 1000, as it sends 1600 pulses enter 1600, etc.

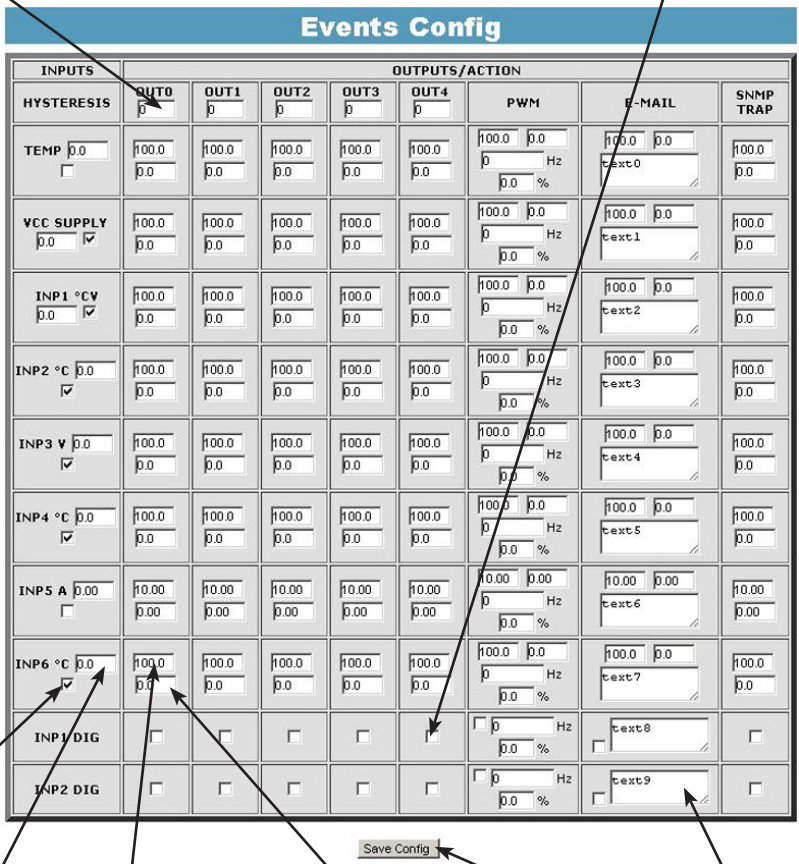
Run Power measure from INP3 (voltage) and INP5 (current)

Choice of voltage input for power calculation

2. Events Config

Delay of set outputs after occur events, in seconds max 65535

If checked it responds to a change of state, otherwise no reaction (off)



inclusion of an input

The hysteresis value for a given input.

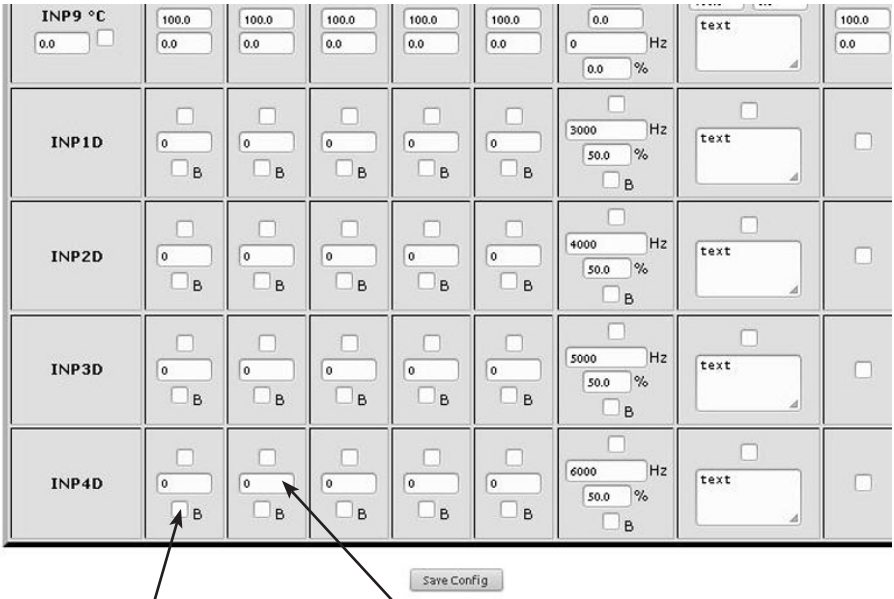
The value of the input beyond the upwards the the socket will be activated, send an e-mail or SNMP Trap

The value of the input, after crossing down that slot will be activated, send an e-mail or SNMP Trap

Save setings (ON/OFF input you don't must save)

Email text taht will be send if events occurance, max amount char is 79. **Chars „=" and „&" are not allowed**

For logical input INP1D and INP2D, e-mail and SNMP Trap notification are send when input level change from 1 to 0 or 0 to 1, additional to email text (at end) will be add value 1 or 0 mark actual input state.



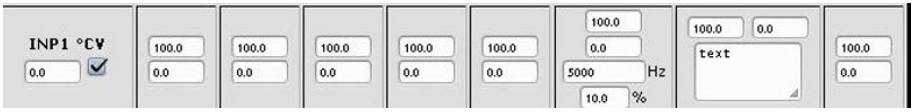
Bistable operation input - the first change at INPD to turn on output, the second amendment to disable output

If a value greater than 0, is at work bistable output is automatically switched off after this time, max 255 seconds

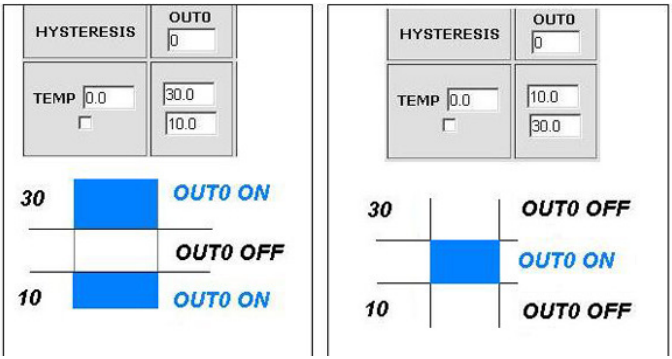
Auto-adjusting PWM voltage input works for INP1, its effect is to increase the PWM duty cycle at a specific step (multiplier filling), when the input signal exceeds a predetermined value INP1.

Example:

Set start filling at 10%, the frequency eg 5000 Hz, 100V switching threshold (to measure this voltage to INP1 need a divider, described in the general instructions). Now, when the output voltage exceeds 100V PWM starts with a preset frequency and damping, as long as the voltage is greater than 100V, the filling will be incremented 5 times per second by the value of the multiplier (multiplier 1 increases the filling of 0.1%), as the voltage drops below 100V PWM is turned off and the filling will fall at the same pace as growing.



Functional Description Event Table



With this change, you can flexibly define thresholds and intervals in which such slot is to be enabled / disabled.
If you have the proper checks the condition of a number of sensors is to force the state OUTX outputs and setting the PWM generator to be that was last registered event.

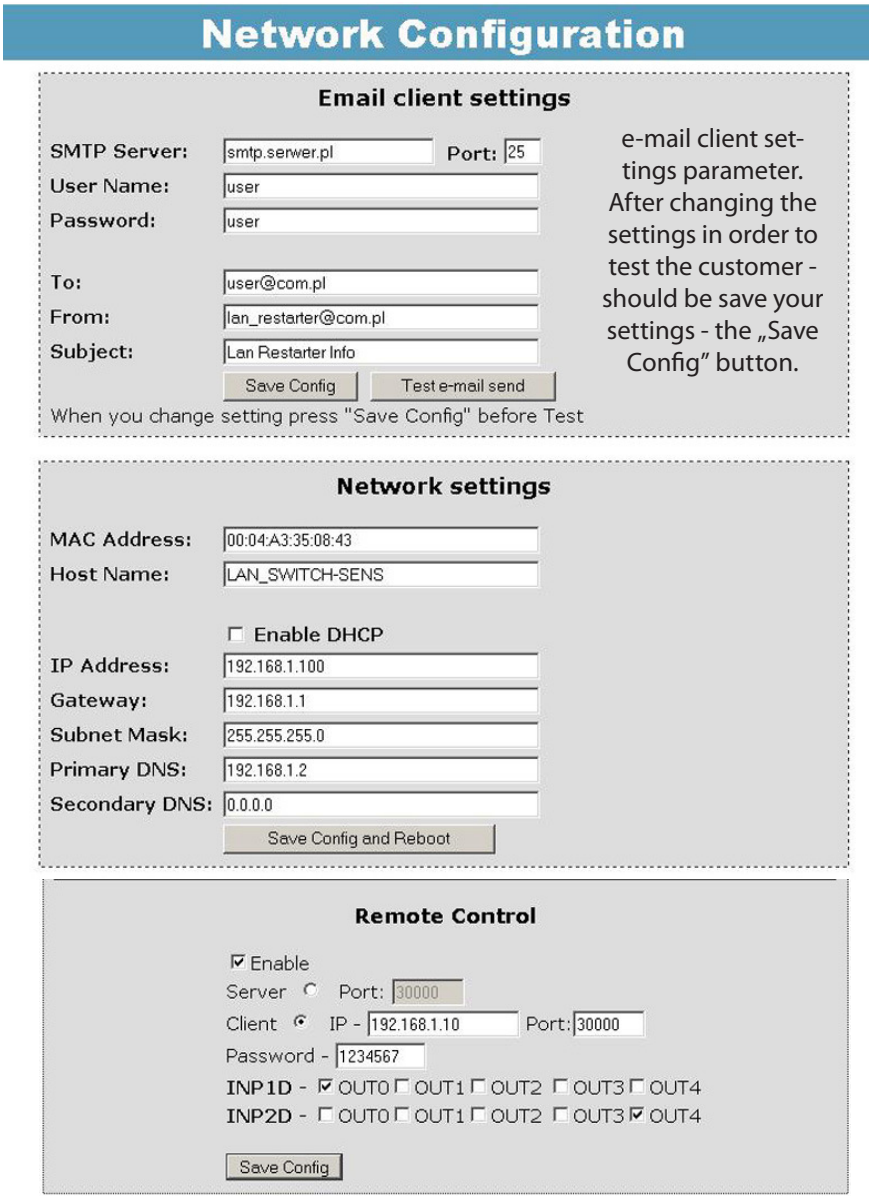
3. Scheduler

Format: number output (from 0 to 4),day1,day2,day3,day4,day5,day6, xx:xx:xx(time)
Week Day: Mo - Monday, Tu- Tuesday, We - Wednesday, Th - Thursday, Fi - Friday, Sa - Saturday, Su - Sunday, ## - all week day. Letter size is important.

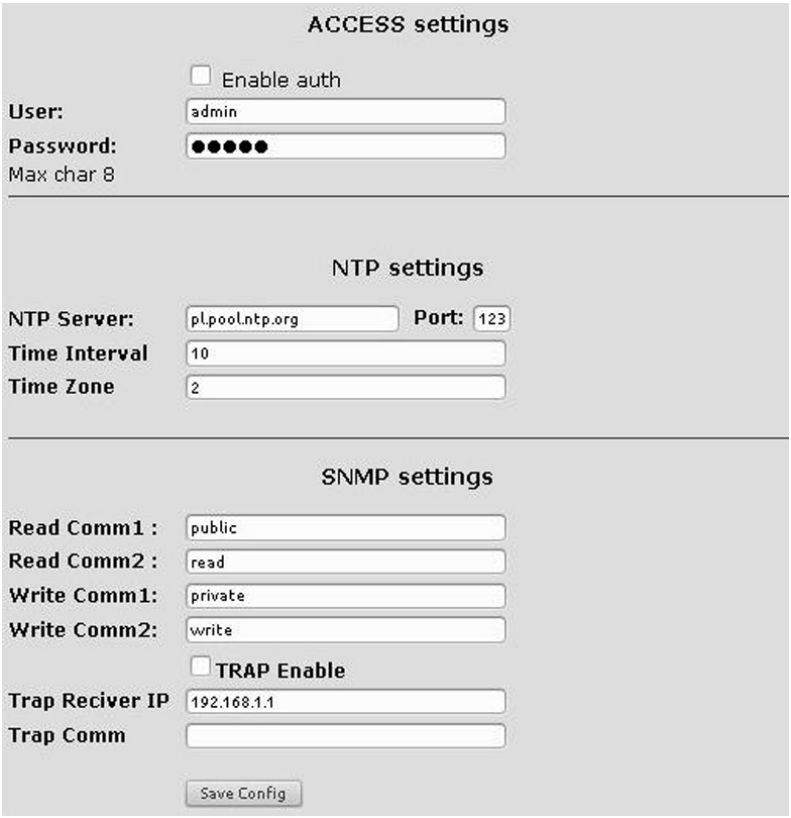
Example:

0,Mo,12:23:00 - sets out0 every Monday at 12:23:00
1,Sa;Fi,Mo,23:22:03 - sets out1 every Saturday, Friday and Monday at 23:22:03
1,Sa;Fi,Mo,Tu,Su,Th,23:22:03 - sets out1 every Saturday, Friday, Monday, Tuesday, Sunday and Thursday at 23:22:03
0,##,12:01:30 - sets out0 every week day at 12:01:30
The effect of this may be the inclusion of a relay, switched off or reset (turn on and off) for a limited period in seconds. (max 65535).

4. Network Configuration



Remote Control - working as a server (receiving packets and enables / disables the corresponding output) or client (send packets to the server status change to INP1D or INP2D). LK working as a server can be actuated from any number of clients, provided it is set to the same password. Change in INP1D or INP2D low can switch outputs selected in the state of „ON", return to enter the high state output switches to „OFF".



The user name and password to access the module. You can disable authorization.

NTP server settings. Time Interval - the interval in minutes between synchronizations.

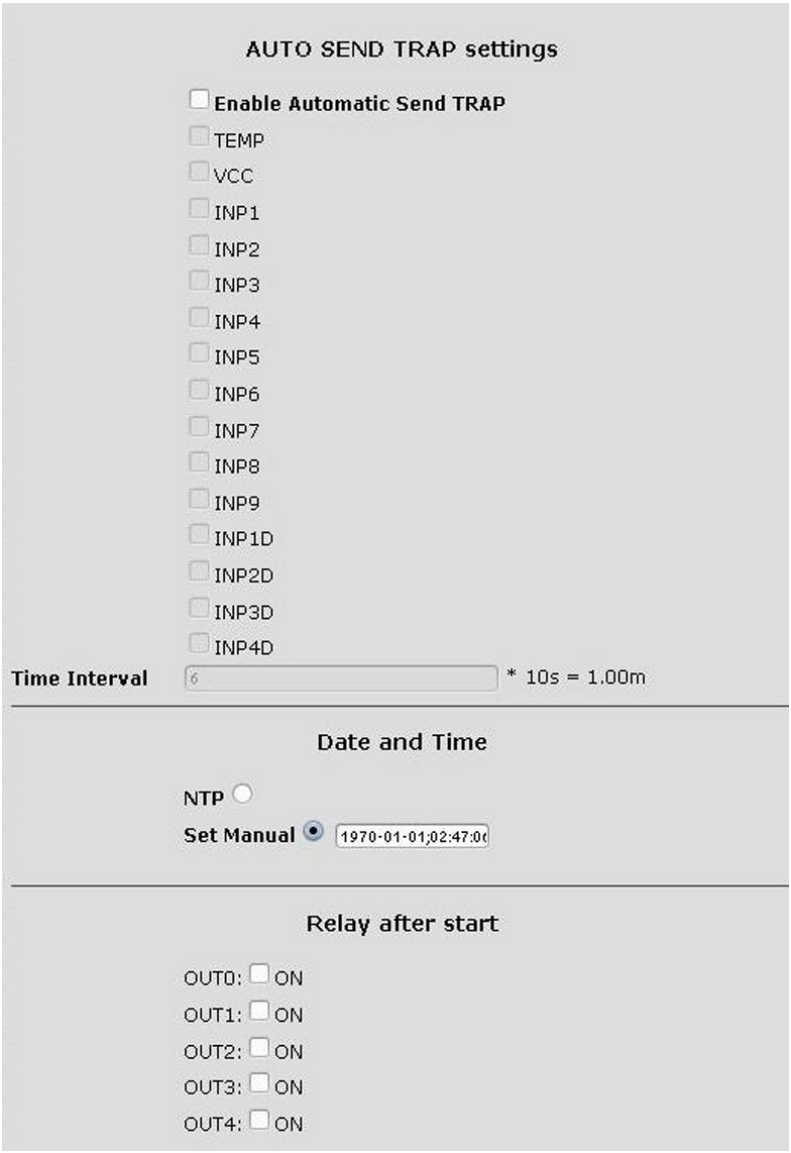
Fields community (password) for SNMP, must be the same in your queries in order to LK replied.

TRAP Enable – enabled send TRAP by SNMP.

HTTP Client Configuration - Below is a sample screenshot settings HTTP client to send data to the server **https://www.thingspeak.com**, (you can create an account and test) . To add a content query the value of a specific sensor or I/O , use the „# „ and enter the number (below the list of numbers for I/O). Said sample server requires a field name = value, you can type on a matter such as field = 12.4, then you will be sent a constant value 12.4 to the server. To send a specific value , enter the sensor field = # xx, where xx - a two--digit number of I/Os. (**NOTE! Record must be double digit**, as we enter „5" to write „05". How do we want to send data from several sensors that use the #xx several times).
Maximum server name is 31 characters, the maximum string RemouteURL is 127 characters. The time window, type frequency in seconds with which data will be sent to the server. In the following example, and for normal queries between „GET" and „/" is a space.

I/O TABLE NUMBERS (soft 3.15)

#define OUT0 (5)
#define OUT1 (6)
#define OUT2 (7)
#define OUT3 (8)
#define OUT4 (9)
#define TEMP (10)
#define VCC (11)
#define INP1 (12)
#define INP2 (13)
#define INP3 (14)
#define INP4 (15)
#define INP5 (16)
#define INP6 (17)
#define INP7 (18)
#define INP8 (19)
#define INP9 (20)
#define INP10 (21)
#define INP11 (22)
#define DTH11_1 (23)
#define DTH11_2 (24)
#define I3XI5 (30)
#define PXT (31)
#define PINP3D (32)
#define PINP3D_24H (33)
#define INP1D (41)
#define INP2D (42)
#define INP3D (43)
#define INP4D (44)



Enable Automatic Send TRAP – enable automatic send TRAP by SNMP (above TRAP Enable must be enable)

Time Interval (max value 10555) – period to send TRAP from given INPUT, accuracy 10 s

Time is set individually or with an NTP server. When set manually each time you reboot the machine need to set the time.

Output status when you turn on or reboot the LAN Controller

Reading XML data

Enter the IP address and the page name eg 192.168.1.100/st0.xml

The values of the sensors should be divided by 10

Control Panel:

- Dynamic data - st0.xml
- Static data - st2.xml

Events Config: s.xml

Scheduler: sch.xml

Network Config: board.xml

Working time: s_time.xml using the Timezone

Switching sockets http request

You can arm / switch set out without clicking on the buttons in the control panel, making use of the following commands :

IP / outs.cgi ? Out = xxxxx - switches set the output to the opposite of the current
IP / outs.cgi ? OUTX = x - disable or enable a specific output

when password authentication is enabled , the command of the following form :

user : password @ IP / outs.cgi ? out = xxxxx
user : password @ IP / outs.cgi ? OUTX = x

Examples:

192.168.1.100/outs.cgi ? Out = 0 - changes the output state to the opposite out0
192.168.1.100/outs.cgi ? Out = 2 - out2 output changes state to the opposite
192.168.1.100/outs.cgi ? Out = 02 - changes the output state out0 and out2 to the opposite
192.168.1.100/outs.cgi ? Out = 01234 - changes the state of the outputs of out0 to out4 the opposite
192.168.1.100/outs.cgi ? Out0 = 0 - turns out out0 (ON state)
192.168.1.100/outs.cgi ? Out0 = 1 - turns out out0 (OFF)
192.168.1.100/outs.cgi ? Out1 = 0 - turns out out1 (ON state)
192.168.1.100/outs.cgi ? Out1 = 1 - turns out out1 (OFF)
192.168.1.100/outs.cgi ? Out4 = 0 - turns out out4 (ON state)
192.168.1.100/outs.cgi ? Out4 = 1 - turns out out4 (OFF)

Managing PWM by HTTP GET:

change frequency **http://192.168.1.100/ind.cgi?pwmf=9777** setup frequency to 9777

change duty **http://192.168.1.100/ind.cgi?pwmd=855** setup duty to 85,5%

turn off/on PWM **http://192.168.1.100/ind.cgi?pwm=0** or 1 on the end.

NUMBERS OID for SNMP

```
#define SYS_DESCR (99)          // iso.3.6.1.2.1.1.1.0: READONLY ASCII_STRING.
#define SYS_UP_TIME (97)        // iso.3.6.1.2.1.1.3.0: READONLY TIME_TICKS.
#define SYS_NAME (98)           // iso.3.6.1.2.1.1.4.0: READWRITE ASCII_STRING.
#define TRAP_RECEIVER_ID (1)          // iso.3.6.1.4.1.17095.2.1.1.1.0: READWRITE BYTE.
#define TRAP_RECEIVER_ENABLED (2)     // iso.3.6.1.4.1.17095.2.1.1.2.0: READWRITE BYTE.
#define TRAP_RECEIVER_IP (3)          // iso.3.6.1.4.1.17095.2.1.1.3.0: READWRITE IP_ADDRESS.
#define TRAP_COMMUNITY (4)      // iso.3.6.1.4.1.17095.2.1.1.4.0: READWRITE ASCII_STRING.
#define OUT0 (5)          // iso.3.6.1.4.1.17095.3.1.0: READWRITE BYTE.
#define OUT1 (6)          // iso.3.6.1.4.1.17095.3.2.0: READWRITE BYTE.
#define OUT2 (7)          // iso.3.6.1.4.1.17095.3.3.0: READWRITE BYTE.
#define OUT3 (8)          // iso.3.6.1.4.1.17095.3.4.0: READWRITE BYTE.
#define OUT4 (9)          // iso.3.6.1.4.1.17095.3.5.0: READWRITE BYTE.
#define ALL (90)          // iso.3.6.1.4.1.17095.3.100.0: READONLY OCTET_STRING.
#define TEMP (10)         // iso.3.6.1.4.1.17095.4.1.0: READONLY ASCII_STRING.
#define VCC (11)          // iso.3.6.1.4.1.17095.4.2.0: READONLY ASCII_STRING.
#define INP1 (12)         // iso.3.6.1.4.1.17095.4.3.0: READONLY ASCII_STRING.
#define INP2 (13)         // iso.3.6.1.4.1.17095.4.4.0: READONLY ASCII_STRING.
#define INP3 (14)         // iso.3.6.1.4.1.17095.4.5.0: READONLY ASCII_STRING.
#define INP4 (15)         // iso.3.6.1.4.1.17095.4.6.0: READONLY ASCII_STRING.
#define INP5 (16)         // iso.3.6.1.4.1.17095.4.7.0: READONLY ASCII_STRING.
#define INP6 (17)         // iso.3.6.1.4.1.17095.5.1.0: READONLY ASCII_STRING.
#define INP7 (18)         // iso.3.6.1.4.1.17095.5.2.0: READONLY ASCII_STRING.
#define INP8 (19)         // iso.3.6.1.4.1.17095.5.3.0: READONLY ASCII_STRING.
#define INP9 (20)         // iso.3.6.1.4.1.17095.5.4.0: READONLY ASCII_STRING.
#define INP10 (21)        // iso.3.6.1.4.1.17095.5.5.0: READONLY ASCII_STRING.
#define INP11 (22)        // iso.3.6.1.4.1.17095.5.6.0: READONLY ASCII_STRING.
#define DTH22_1 (23)      // iso.3.6.1.4.1.17095.6.1.0: READONLY ASCII_STRING.
#define DTH22_2 (24)      // iso.3.6.1.4.1.17095.6.2.0: READONLY ASCII_STRING.
#define I3XI5 (30)        // iso.3.6.1.4.1.17095.7.1.0: READONLY ASCII_STRING.
#define PXT (31)          // iso.3.6.1.4.1.17095.7.2.0: READONLY ASCII_STRING.
#define PINP3D (32)       // iso.3.6.1.4.1.17095.7.3.0: READONLY ASCII_STRING.
#define PINP3D_24H (33)   // iso.3.6.1.4.1.17095.7.4.0: READONLY ASCII_STRING.
#define INP1D (41)        // iso.3.6.1.4.1.17095.10.1.0: READONLY BYTE.
#define INP2D (42)        // iso.3.6.1.4.1.17095.10.2.0: READONLY BYTE.
#define INP3D (43)        // iso.3.6.1.4.1.17095.10.3.0: READONLY BYTE.
#define INP4D (44)        // iso.3.6.1.4.1.17095.10.4.0: READONLY BYTE.
```

Firmware Upgrade

In the event that there is a new version of the software or special version for application, it is possible to load such software to the device. This can be done remotely over the network using TFTP.

You my upgrade firmware on two way:
1. By dedicate software „LAN Controler Tools" (find controler or put IP and click „Upgrade Firmware").
2. By any TFTP client, description below.

Send firmware file by TFTP, you have 5 second (Green LED on RJ45 socket blink) to start send firmware when modul run after reset (you my casus reset by click button „Save config and Reboot" in Network configuration or „Reset" button on board or dedicate software „LAN Controler Tools"). If start transmision not happen that device start work normal. If tftp transmision will start than wait about 90 second to finish upload firmware. After upload device will be reset and start normal. If you want to upload upgrade file chose „Save config and Reboot" in Network configuration or power OFF and power ON device . **The file must be send in binary mode** eg. In Windows XP tftp client
tftp –i 192.168.1.100 put „file_upgrade.bin".

After successful loading, the device will reboot and will be ready to go.

If you try to send the wrong file get an error message „invalid file"

Contents of the instructions is regularly checked and if necessary corrected. If the observations errors or inaccuracies, please contact us. It can not be ruled out that, despite best efforts, however, some discrepancies arose. To get the latest version, please contact us or distributors.

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