SUN-24

1. Introduction

SUN-24 is an Ethernet IO module, the right choice for factory automation and distributed process control. It has 4 digital inputs, 4 analog inputs and 4 relays with normally open and normally closed contacts.

Ethernet I/O module supports up to eight 1-Wire sensors

The relays can be activated either remotely (WEB, SNMP, HTTP API, MODBUS/TCP, etc.) or locally – from the status of a monitored parameter (1 Wire sensor, analog voltage, and dry contact).

For every parameter email and SNMP traps for up to 5 recipients can be sent.

An embedded real time clock provides scheduled time control of selected outputs: the tasks can be either single or with weekly repetition.

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2. Features

- 10/100 Mb Ethernet connectivity;
- Password protected, web-based configuration and control;
- 4 digital "dry contact" inputs;
- 4 analog inputs with 0 to 60VDC range;
- Multiplier and offset for analog inputs
- 4 relays with NO and NC contacts;
- 1-Wire interface for up to 8 temperature
- SNMP v.2 support;
- SNMP traps and/or e-mail sending for alert conditions;
- SMTP with SSL/TLS security;
- TLS 1.0, TLS 1.1 and TLS 1.2 support;
- HTTP and SNMP port changing;
- HTTP API commands;
- Periodical HTTP Post of XML/JSON status files for client-server systems;
- MODBUS TCP/IP support;
- Dynamic DNS with DynDNS, No-IP and DNS-O-Matic support;
- NTP protocol support;
- Real-time clock for scheduled control;
- Extended working temperature range;
- Wide power supply voltage range;
- Remote firmware update.

3. Applications

SUN-24 is suitable for environmental monitoring and local control of an electrical and non-electrical parameter, industrial and building automation, data acquisition systems, general remote control, and monitoring.

It works very well as a standalone device that can be controlled using a web browser or as a part of small and medium industrial control systems for SCADA (supervisory control and data acquisition).

A few example applications include:

- Temperature and humidity control in data centers;
- A building management system;
- Industrial cooling/heating control;
- Home automation;
- Alarm systems;
- Process monitor.

4. Specifications

- Physical characteristics

  Dimensions: 130 x 90 x 50 mm.
  Weight: 820 g

- Environmental limits

  Operating temperature range: -20 to 55°C
  Storage temperature range: -40 to 85°C
  Operating relative humidity range: 5 to 85% (non-condensing)

- Warranty

  Warranty period: 2 years

- Power requirements

  Input Voltage: 10 to 32 VDC
  Input Current: 350 mA @ 12 VDC (with all relays ON)

- Digital inputs

  Isolation: Non isolated
  Mode: Dry contact or Logic level
  Maximum input voltage: +5.5VDC
  Minimum input voltage for high logic level: +2.5VDC
  Maximum input voltage for low logic level: +0.8VDC
  Sampling rate: 10mS
  Digital filtering time interval: 30mS

- Analog inputs

  Isolation: Non isolated
  Type: Single ended
  Resolution: 10 bits
  Mode: Voltage
  Input Range: 0 to 60 VDC
  Accuracy: ±1%
  Sampling Rate: 500mS per channel (averaged value of 250 samples)
  Input Impedance: 1 mega-ohms (min.)

- Relay outputs

  Type: Form C (N.O. and N.C. contacts)
  Contact current rating: 2 A @ 60 VDC/42 VAC (resistive load)
  Initial insulation resistance: 100 mega-ohms (min.) @ 500 VDC
  Mechanical endurance: 10 000 000 operations
  Electrical endurance: 100 000 operations @ 2 A resistive load
  Contact resistance: 50 milli-ohms max. (initial value)
  Minimum pulse output: 1 Hz at rated load

- 1-Wire interface

  Output voltage (+VW): 5.0 ± 0.3 VDC
  Maximum output current (+VW): 0.2 A

- Internal FLASH memory

  Endurance: 100 000 cycles (Every settings change is a memory cycle.)

5. LED indicators

The following indicators show the status of the controller:

- Relay1-Relay4 (green) – these LEDs are illuminated whenever the corresponding relay is activated (the NO contact is closed and the NC contact is open);
- PWR (red) – in working mode shines, blinks together with STS if there is a hardware error;
- STS (yellow) – flashes when the main program of the controller is executed;
- NET (orange) – network status - ON when a link is established, blinks if there is an activity.

6. Installation and setup

This device must be installed by qualified personnel.

This device must not be installed directly outdoors.

The Installation consists of mounting the device, connecting to an IP network, connecting inputs and outputs, providing power and configuring via a web browser.

6.1. Mounting

SUN-24 should be mounted in a clean and dry location on a not flammable surface. Ventilation is recommended for installations where the ambient air temperature is expected to be high.

You can use the Rack 1U bracket provided for rack mounting.

6.2. Connection

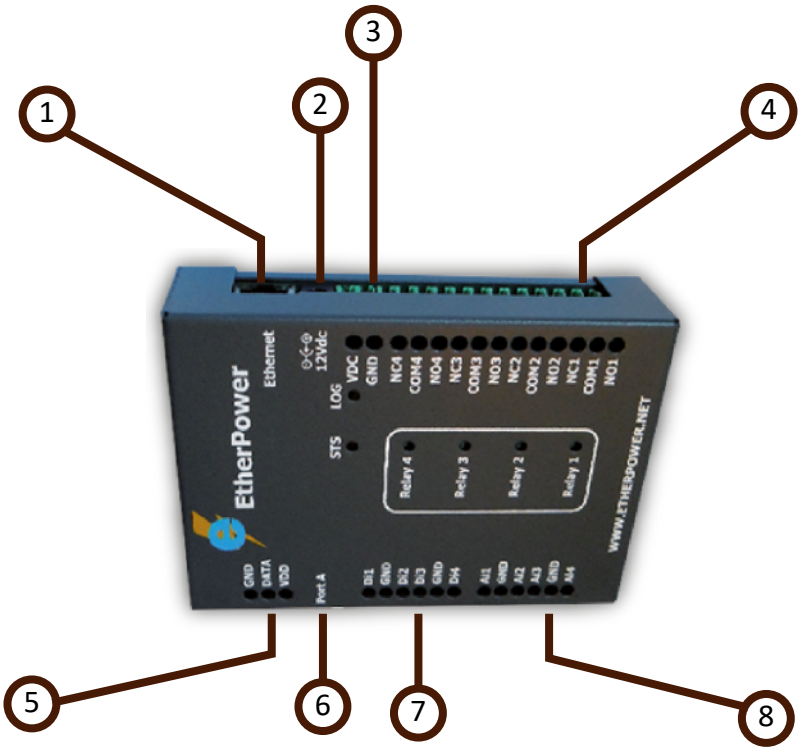
Attention! Disconnect power supply before wiring.

The correct wiring procedure is as follows:

- Make sure power is turned off;
- Make wiring connections to the terminals;
- Apply power.

It is recommended to test and configure SUN-24 without any controlled device. In this case, unexpected turn on will be avoided.

Make sure that the wires are properly attached to the terminals and that the terminals are tightened. Not the proper wiring and configuration can cause permanent damage to SUN-24 or the equipment to which it is connected or both.

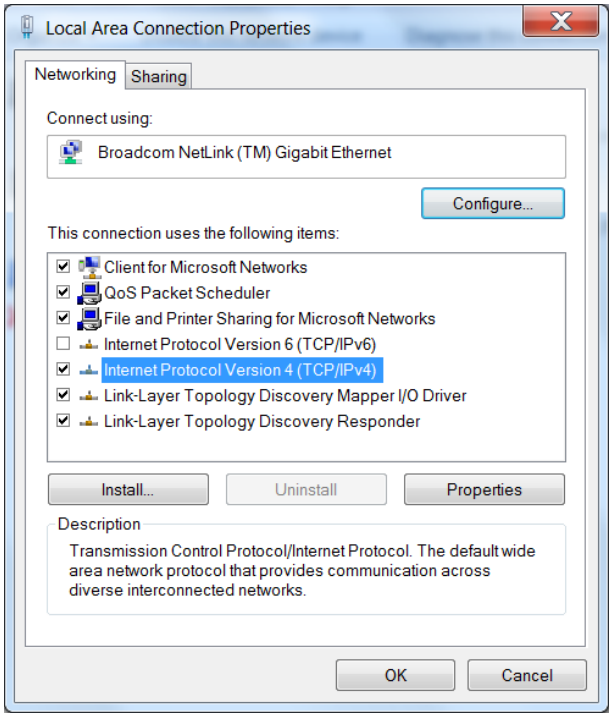


Connector 1	Ethernet - RJ45
Connector 2	Power - 2.1x5.5mm connector, central positive
Connector 3	Pin1 – Power positive
	Pin2 – Power negative
Connector 4	Pin1 – NC Relay4
	Pin2 – COM Relay4
	Pin3 – NO Relay4
	Pin4 – NC Relay3
	Pin5 – COM Relay3
	Pin6 – NO Relay3
	Pin7 – NC Relay2
	Pin8 – COM Relay2
	Pin9 – NO Relay2
	Pin10 – NC Relay1
	Pin11 – COM Relay1
	Pin12 – NO Relay1
Connector 5	Pin1 – 1-Wire GND
	Pin2 – 1-Wire Data
	Pin3 – 1-Wire +VDD
Connector 6	Pin1 – GND (most left)
	Pin2 – GND
	Pin3 – 1-Wire Data
	Pin4 – 1-Wire GND
	Pin5 – 1-Wire +VDD
	Pin6 – 1-Wire +VDD (most right)
Connector 7	Pin1 – Digital In 1
	Pin2 – GND
	Pin3 – Digital In 2
	Pin4 – Digital In 3
	Pin5 – GND
	Pin6 – Digital In 4
Connector 8	Pin1– Analog In 1
	Pin2 – GND
	Pin3 – Analog In 2
	Pin4 – Analog In 3
	Pin5 – GND
	Pin6 – Analog In 4

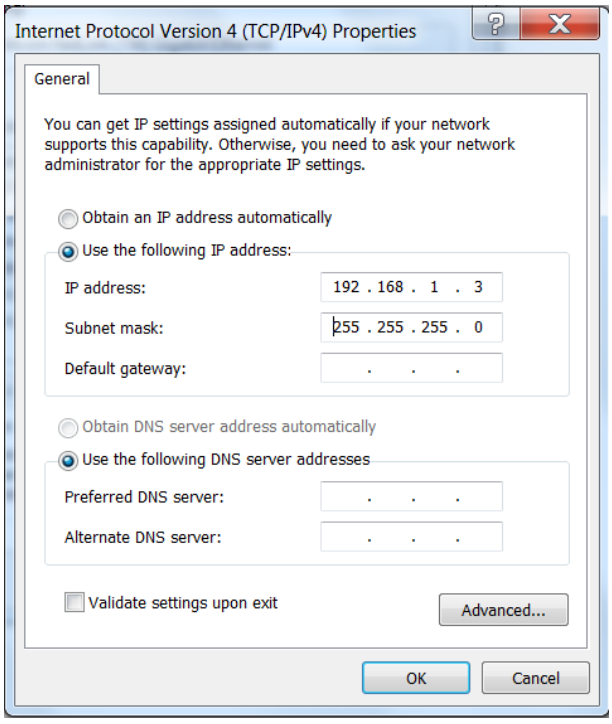
6.2.1. Power supply connection

SUN-24 is designed to be supplied by 12 VDC 1A Power Adapter.

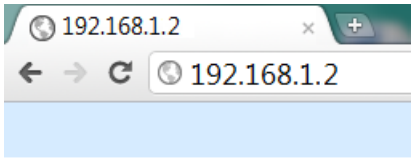
6.3. Access for configuration



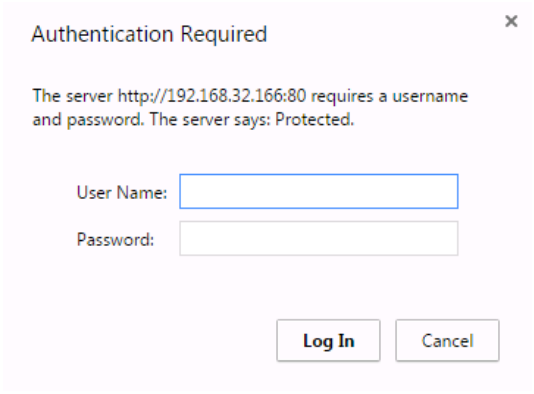
This address should be on the same network - for example 192.168.1.3:



To get access to the web interface, you should type http://192.168.1.2 into the browser.



If the network settings are correct, the login pop-up window will appear:



7. Web interface

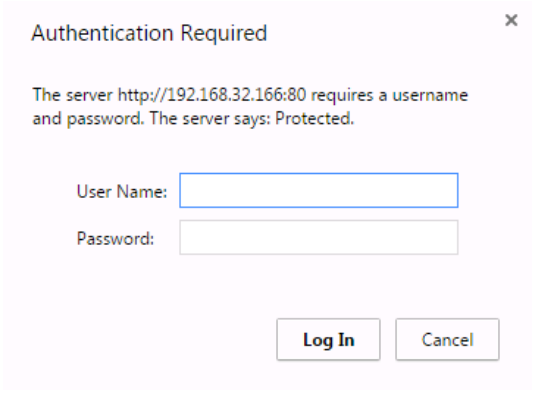
The web interface allows configuration, monitoring, and control.

All pages are UTF-8 encoded.

If the controller is properly addressing, login pop-up window appears.

Authorization data must be entered (by default username=admin, password=admin).

It is recommended to change the username and password to prevent unauthorized access to the controller.



The controller supports a few active session.

7.1. Monitoring page

The page has 4 sections – “Sensors”, “Digital inputs”, “Analog inputs” and “Relays”. All they can be added/removed from monitoring page independently by appropriate setup - see “Setup-System-Display” section.

For every parameter (sensor, input, relay) there is a description of up to 15 characters. Default ones can be changed in “Setup-Input/Output”.

The Monitoring page can be automatically refreshed on an interval of 0 to 253 seconds. Zero means no automatic refresh. This parameter is set in section “Setup-System-Monitoring page automatic refresh”. By default, it is 1 second.

7.1.1. Data - sensors section

All detected 1-Wire sensors are shown in this section.

Detection is made either after power on or by button “Scan for new sensors”. All found sensors are shown in ascending order refer their unique ID number.

For every sensor, there are a description, value, and ID information.
It is possible to lock sensors in a specific position. To do this all sensors should be added one by one. After every addition, a new scan should be made and newly found sensor should be locked in its position. If all sensors are locked, removing one “in the middle” will not change the positions of other sensors after reset.

For some sensors “Unit”, “Multiplier” and “Offset” can be set in section “Setup-Input/Output”.

Pos	Description	Value 1	Value 2	ID	Lock
1	S1:TST1xx	28.9°C	------	[2819D009030000FA]	☑
2	S2:TSH2xx	29.8°C	40.5%RH	[015225B71700FF45]	☑
3	S3:TST1xx	29.2°C	------	[28C4C109030000C5]	☑
4	S4:TST1xx	29.4°C	------	[2867895F07000058]	☑
5	S5:TSA2xx	9.90mA	------	[01B41FB71700EC98]	☑
6	S6:TSV2xx	31.3V	------	[0182B65A1800F20E]	☑
7	S7:TSC2xx	0.00Aac	------	[016E1FB71700FB8D]	☑
8	S8:TSG2xx	1090ppm	------	[0123DEB61700FEED]	☑

Scan for new sensors

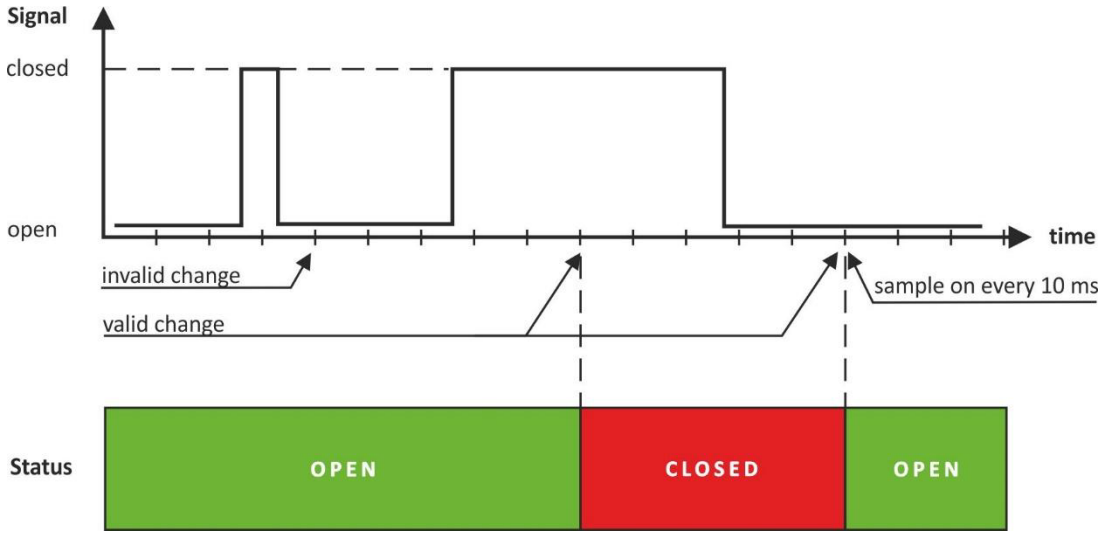
7.1.2. Data - digital inputs section

Digital inputs can be used for monitoring the state of discrete devices – motion sensor, door contact, relay contact, alarm output etc. All digital inputs are not galvanic isolated.

One side of the contact is connected to “Digital In” and another side is connected to “GND” pins.

Digital inputs are sampled every 10mS. The change of input status is considered valid if the same value is read in 3 consecutive samples (30mS) and low-to-high/high-to-low delays

(Setup->Conditions) are zero.



Status of every input is shown by text and by color. The color is red if the input is in an alarm condition.

Digital input	Status	Digital input	Status
Digital Input 1	CLOSED	Digital Input 2	OPEN
Digital Input 3	OPEN	Digital Input 4	OPEN

Default descriptions can be changed on “Setup->Input/Output” page.

7.1.3. Data - analog inputs section

Analog inputs can be used for monitoring of analog sensors with 0-60 voltage outputs.

All analog inputs are not galvanic isolated.

Analog input	Value	Analog input	Value
Analog Input 1	5.00V	Analog Input 2	4.85V
Analog Input 3	12.28V	Analog Input 4	12.05V

For every analog input 3 variables – “Unit”, “Multiplier” and “Offset” can be set in section “Setup-Input/Output”.

7.1.4. Relay section

The section displays the current state of relays and presents buttons that can be used to change their status.

Relay	Status	Control			En
Relay 1	ON	controlled by S1:TST1xx Temperature			☑
Relay 2	OFF	ON	OFF	Pulse	☐
Relay 3	ON	ON	OFF	Pulse	☐
Relay 4	OFF	ON	OFF	Pulse	☐
		All On	All Off	Pulse All	

Each relay can be activated either remotely by the WEB interface, HTTP API, and SNMP or locally, from the status of a monitored parameter (1 Wire sensor, analog voltage, and dry contact).

The local control of relay can be arranged either by one parameter or by “any alarm” condition.

For WEB control every relay has “On”, “Off” and “Pulse” buttons. There are also “All On”, “All Off” and “Pulse All” for common control of relays. Pulse duration in seconds can be set separately for each relay in “Setup-Input/Output-Relay Outputs”.

For locally activated relays a text description of the controlling parameter is displayed rather than buttons. Parameters for local relay activation can be set in “Setup-Input/Output-Relay Outputs”. Control of relays follows conditions set in “Setup-Alarm conditions”.

For every locally activated relay, there is checkbox “En”. It allows temporarily то turn off the automatic control, make manual changes by buttons and then again return to automatic control. By default, this checkbox is turned off.

7.2. Setup page

7.2.1. Network

The network parameters are set in this section.

Network Setup	
Host name	
Static/DHCP	Static
IP address	192.168.32.183
Subnet mask	255.255.255.0
Default gateway	192.168.32.1
DNS	8.8.8.8
MAC Address	D8:80:39:8E:2F:94

The controller supports static and dynamic IP addresses.

It is good practice to change the default IP address of controller immediately after first power-on. This will avoid collisions if many devices are used on the same network.

It may be necessary to clear the arp cache, each time you connect a new device to the network. This is done by typing arp -d in the command prompt window of the computer.

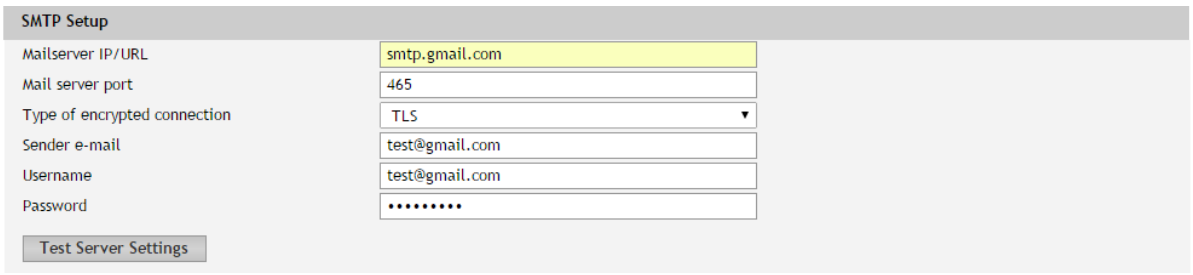
The “Hostname” is up to 15 characters.

It is recommended to use public DNS server (8.8.8.8, 8.8.4.4 etc.) rather than default gateway.

7.2.2. SMTP

This page is used to enter valid SMTP settings for email alerts and recipients' addresses.

7.2.2.1. SMTP setup



Mail server address can be set either by hostname (www.gmail.com) or IP address.

By default, without encrypted connection, SMTP port is 25. Ask ISP if default port doesn't work.

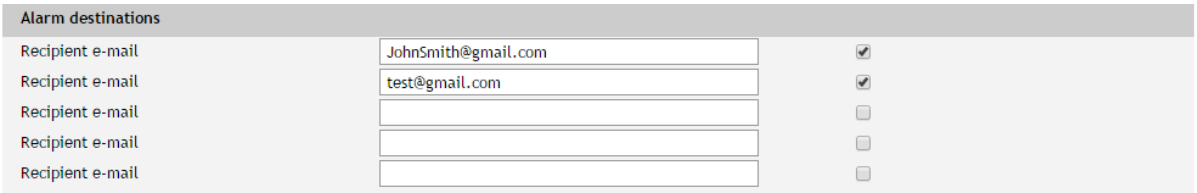
Sender e-mail, username, and password are standard authentication details. For most SMTP servers, sender e-mail and username are the same.

There is a button for server settings test with a feedback. In this test sender and recipient of the e-mail is the same.

Transport Layer Security protocol is used for secure communication with public mail servers. supports – TLS 1.0, TLS 1.1 and TLS 1.2 with RSA_WITH_AES_128_GCM_SHA256 and RSA_WITH_AES_128_CBC_SHA cipher suites. This ensures successful operation with almost all public servers

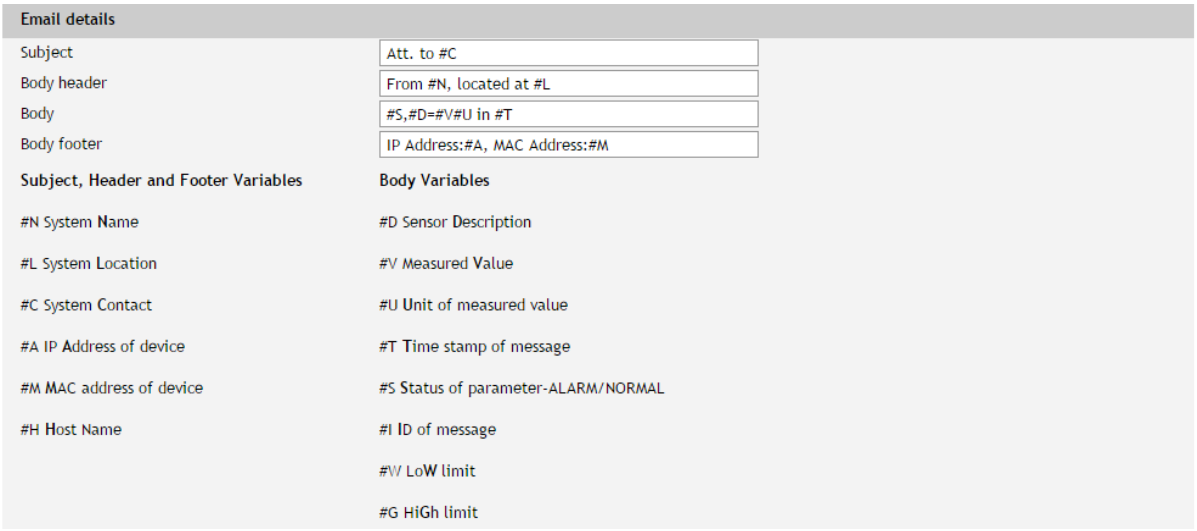
7.2.2.2. Alarm destination

Up to 5 mail recipients can be set. All they can be activated independently by a checkbox.



7.2.2.3. E-mail details

The subject, body header, body and body footer can be customized. For this customization, a set of keys is used. All they are described on the page.



Email details

Subject	Att. to #C
Body header	From #N, located at #L
Body	#S,#D=#V#U in #T
Body footer	IP Address:#A, MAC Address:#M

Subject, Header and Footer Variables	Body Variables
#N System Name	#D Sensor Description
#L System Location	#V Measured Value
#C System Contact	#U Unit of measured value
#A IP Address of device	#T Time stamp of message
#M MAC address of device	#S Status of parameter-ALARM/NORMAL
#H Host Name	#I ID of message
	#W LoW limit
	#G HiGh limit

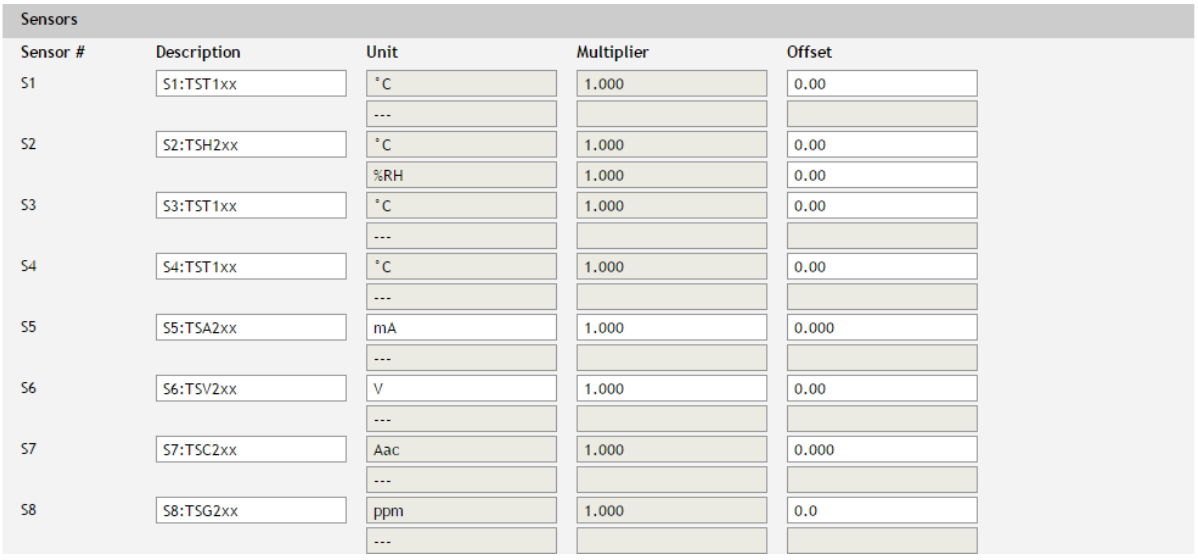
7.2.3. Input/Output

7.2.3.1. 1-Wire sensors

For every 1-Wire sensor, a description up to 15 characters can be set.

For all sensors “Offset” field is enabled. Number from this field is used for simple correction of displayed value.

For some specific sensor, fields “Unit” and “Multiplier” are also available.



Sensors

Sensor #	Description	Unit	Multiplier	Offset
S1	S1:TST1xx	°C	1.000	0.00

S2	S2:TSH2xx	°C	1.000	0.00
		%RH	1.000	0.00
S3	S3:TST1xx	°C	1.000	0.00

S4	S4:TST1xx	°C	1.000	0.00

S5	S5:TSA2xx	mA	1.000	0.000

S6	S6:TSV2xx	V	1.000	0.00

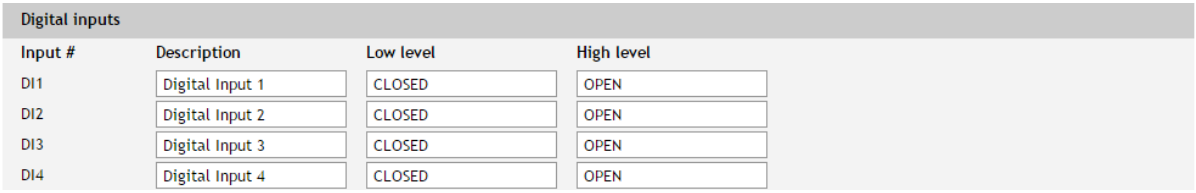
S7	S7:TSC2xx	Aac	1.000	0.000

S8	S8:TSG2xx	ppm	1.000	0.0

7.2.3.2. Digital inputs

For every digital input, a description up to 15 characters can be set.

Text, written in “Low level” and “High level” is displayed on monitoring page for this input. These fields accept up to 15 characters.

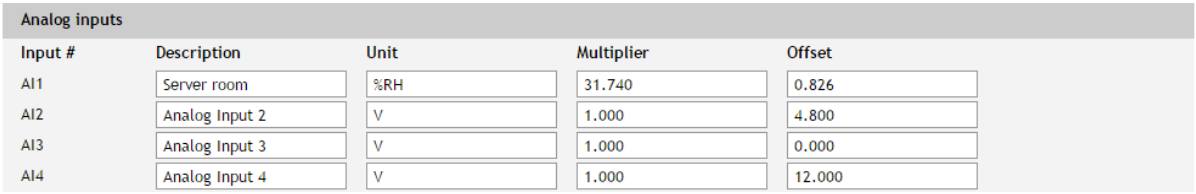


Digital inputs

Input #	Description	Low level	High level
DI1	Digital Input 1	CLOSED	OPEN
DI2	Digital Input 2	CLOSED	OPEN
DI3	Digital Input 3	CLOSED	OPEN
DI4	Digital Input 4	CLOSED	OPEN

7.2.3.3. Analog inputs

For every analog input, a description up to 15 characters can be set.



Analog inputs

Input #	Description	Unit	Multiplier	Offset
AI1	Server room	%RH	31.740	0.826
AI2	Analog Input 2	V	1.000	4.800
AI3	Analog Input 3	V	1.000	0.000
AI4	Analog Input 4	V	1.000	12.000

For every analog input, fields “Unit”, “Multiplier” and “Offset” are available. They can be used to convert the raw voltage input to meaningful engineering units if required. The shown value is calculated by:

DV[Un] = (AV – OF) * MU

Where:

DV – displayed value;

Un – unit;

AV – real analog voltage from source;

MU – multiplier in dimension [parameter/Volt];

OF – offset.

Example:

For humidity sensor HIH-4000-003 following parameter (coming from datasheet) should be set for fine work:

Unit - %RH

Offset - 0.826

Multiplier - 31.74, the value is inverted of slope parameter (1/0.0315);

If the output voltage of this sensor is 3.198V on the monitoring page will be shown 75.28% RH:

75.28 = (3.198 – 0.826) * 31.74

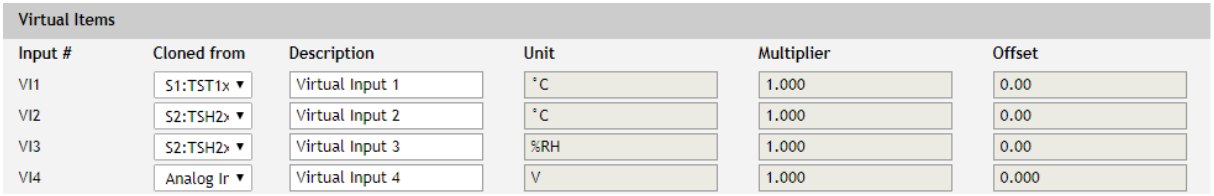
By default and after “Factory default settings” procedure:

Unit - V

Offset - 0.00

Multiplier - 1.00

7.2.3.5. Virtual items



Virtual item is an additional feature that gives the ability to clone a monitored parameter - analog input or 1 Wire sensor.

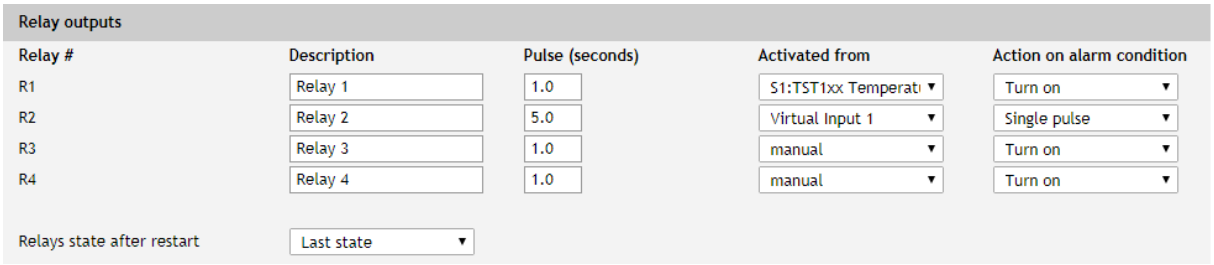
For the virtual item, different alarm borders from the original can be set. In this way, more alarm borders (alarm notifications) can be organized for the same parameter.

The values of Unit, Multiplier, and Offset are presented for information only. They are inherited from the original parameter and can't be edited.

Virtual items can be used for alarm notifications, in Functions, and for local relay activation.

7.2.3.6. Relay outputs

For every relay, a description up to 15 characters can be set.



For every relay different time for pulse duration can be set. The resolution is 0.1 second.

Every relay can be activated remotely or locally – by a value of the monitored parameter.

By default, all relays are activated remotely and in the field "Activated from" is written "manual".

For local activation, alarm conditions for different sources are used. They are set up in section "Setup-Alarm conditions". To assign a parameter to relay, following choices are possible:

- Sxy – "S" stands for "Sensor 1-Wire", "x" is a number from 1 to 8, "y" is a number from 1 to 2. The relay is activated from the value measured from specified 1-Wire sensor and rules for ranges specified in "Setup->Alarm conditions";
- "Analog input z" - the relay is activated from the value measured from the specified analog input and rules for ranges specified in "Setup->Alarm conditions"; z is number from 1 to 4;
- "Virtual input z" - the relay is activated from the value from specified virtual item (cloned analog input or 1-Wire sensor) and rules for ranges specified in "Setup->Alarm conditions"; z is number from 1 to 4;
- "Digital input z" - the relay follows the state of specified digital input; z is number from 1 to 2;
- Any alarm - the relay is activated from any of set alarm conditions.

7.2.4. Conditions

This section is used for parameterization of the trigger and alert conditions for 1-Wire sensors, analog, and digital inputs.

7.2.4.1. 1-Wire sensors, analog inputs, and virtual items

For every sensor two type of fields are presented – one to set trigger conditions (“Min”, “Max” and “Hys.”) and another one for alert notification (“If out of range”).

Sensors

#	Description	Type	Min.	Max.	Hys.	If out of range: mail	trap	post
1	S1:TST1xx	Temperature, °C	-40.0	85.0	0.5	☑	☑	☐
		---	---	---	---	☐	☐	☐
2	S2:TSH2xx	Temperature, °C	-40.0	85.0	8.5	☑	☑	☐
		Humidity, %RH	0.0	100.0	10.0	☑	☑	☐
3	S3	---	---	---	---	☐	☐	☐
		---	---	---	---	☐	☐	☐
4	S4	---	---	---	---	☐	☐	☐
		---	---	---	---	☐	☐	☐
5	S5	---	---	---	---	☐	☐	☐
		---	---	---	---	☐	☐	☐
6	S6	---	---	---	---	☐	☐	☐
		---	---	---	---	☐	☐	☐
7	S7	---	---	---	---	☐	☐	☐
		---	---	---	---	☐	☐	☐
8	S8	---	---	---	---	☐	☐	☐
		---	---	---	---	☐	☐	☐

Return notification ☐ Notification delay (seconds) 0 (0-3600)

Analog inputs

#	Description	Dimension	Min.	Max.	Hys.	If out of range: mail	trap	post
1	Analog Input 1	V	0.00	60.00	1.00	☑	☐	☐
2	Analog Input 2	V	0.00	60.00	1.00	☐	☐	☐
3	Analog Input 3	V	0.00	60.00	1.00	☐	☐	☐
4	Analog Input 4	V	0.00	5.00	0.10	☐	☐	☐

Return notification ☐ Notification delay (seconds) 0 (0-3600)

Virtual items

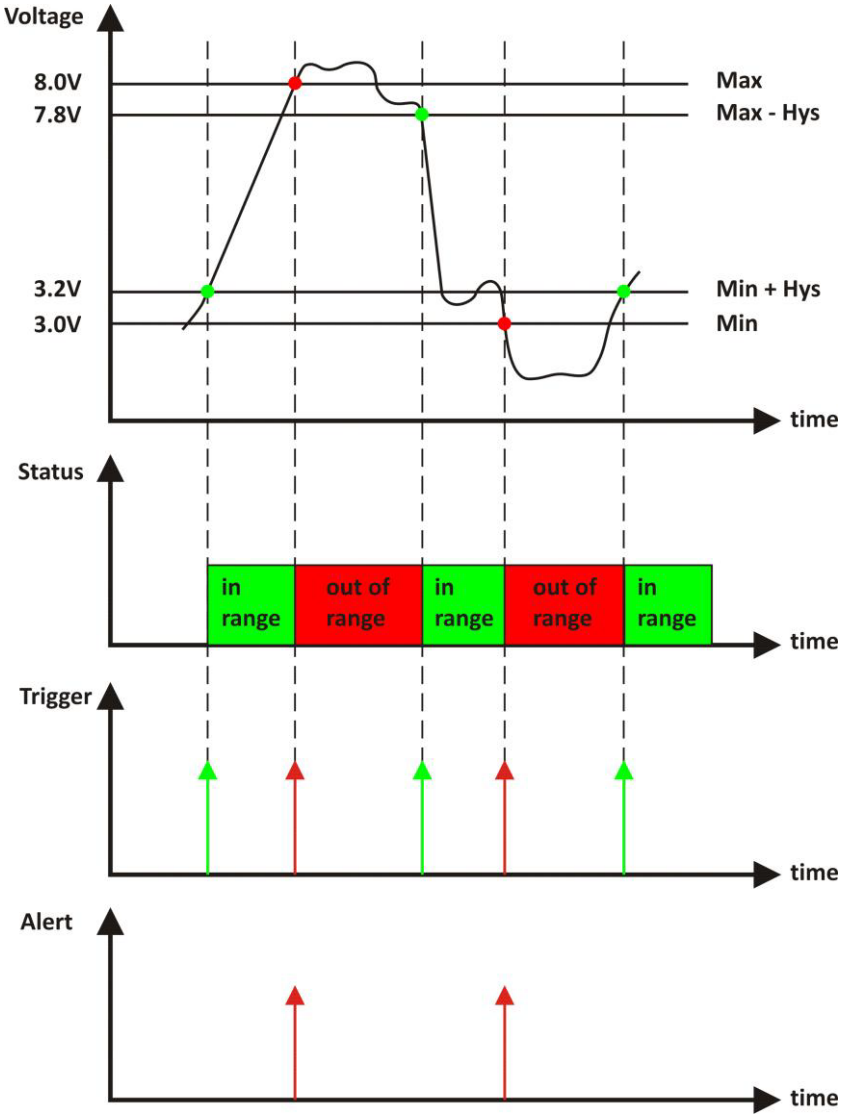
#	Description	Dimension	Min.	Max.	Hys.	If out of range: mail	trap	post
1	Virtual Input 1	V	0.00	5.00	0.10	☑	☑	☐
2	Virtual Input 2	°C	-10.0	42.0	1.0	☑	☑	☐
3	Virtual Input 3	°C	0.0	50.0	1.0	☐	☑	☑
4	Virtual Input 4	%RH	0.0	65.0	1.0	☑	☑	☐

Return notification ☑ Notification delay (seconds) 5 (0-3600)

“Min” and “Max” indicate the border of working range for the observed parameter.

A “Max” trigger condition occurs when the value exceeds the trigger set point. A “Min” trigger condition occurs when the value is lower than the trigger set point. In both cases, the monitored parameter goes out of range.

Coming back in range for the observed parameter is considered when the value goes higher than (Min + Hys) or lower than (Max – Hys). Hysteresis (“Hys”) is used to prevent excessively triggering when the value vacillates around trigger point.



Example:

SUN-24, TST100 , and appropriate heater are used to control the room temperature. The wanted minimum temperature is 19°C. The initial temperature is 17°C.

TST100 is assigned to the first position for 1-Wire sensors.

For Relay1 local activation from Sensor1 is set.

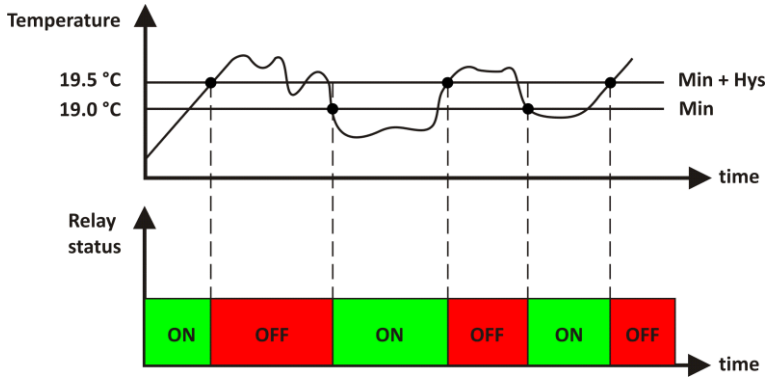
Following parameters are set for Sensor1: Min=19, Max=85 and Hys=0.5.

Sensors						If out of range		
#	Description	Type	Min.	Max.	Hys.	mail	trap	post
1	S1:TST1xx	Temperature, °C	19.0	85.0	0.5	☑	☑	☑

When the controller is switched on, Relay1 is immediately activated because the monitored temperature is out of range. This switches the heater on. The temperature is going higher.

When temperature reaches 19.5°C (19.0 + 0.5) it goes in range (trigger condition) and Relay1 is deactivated. The heater is switched off.

The temperature falls and when it reached 19°C it goes out of range (trigger and alert conditions). The relay is activated (heater is switched on) and e-mail is sent.

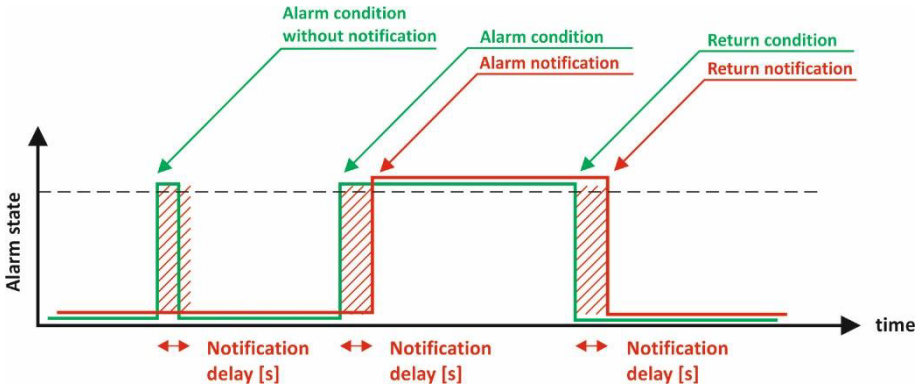


The “Max” value is set far enough from the wanted temperature to avoid trigger/alert conditions around it.

For every sensor or analog input, there are 3 independent ways of alert when there is an alarm condition – e-mail, SNMP trap and push (HTTP post of XML file). Each alarm notification method is activated by a checkbox.

Globally for all sensors and for all analog inputs, there is a checkbox “Return notification”. If this option is chosen there will be notification also when parameter returns in range.

Globally for all sensors and for all analog inputs, there is “Notification delay” parameter. It is very useful like a filter for short alarm conditions.



7.2.4.2. Digital inputs

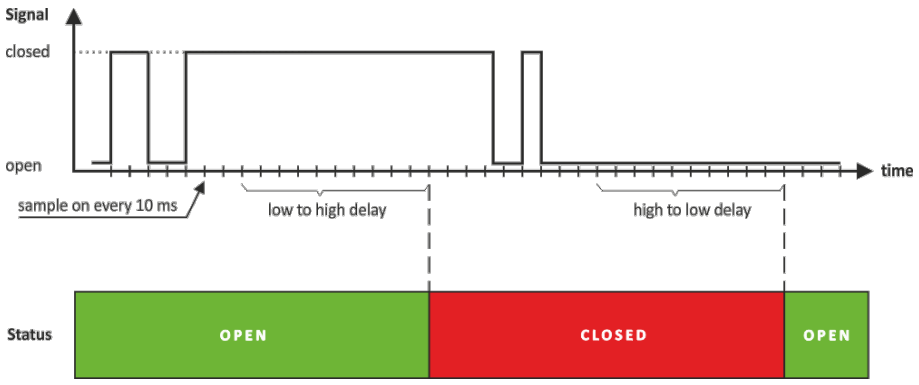
For every digital input, alarm state should be chosen – Open or Close. When the input goes in alarm state 3 independent way of alert are possible – e-mail, SNMP trap, and post (HTTP post of XML file). Globally for all digital inputs, there is a checkbox “Return notification”. If this option is chosen there will be notification also when parameter returns in range.

Globally for all digital inputs, there is “Notification delay” parameter. It is very useful like a filter for short alarm conditions.

Digital inputs						On active alarm		
#	Description	Current state	Select alarm state	Low to high delay	High to low delay	mail	trap	post
1	Digital Input 1	OPEN	CLOSED	0.1 (0-3600)	0.1 (0-3600)	☑	☐	☐
2	Digital Input 2	OPEN	CLOSED	0.0 (0-3600)	0.0 (0-3600)	☑	☐	☐
3	Digital Input 3	OPEN	CLOSED	0.0 (0-3600)	0.0 (0-3600)	☑	☐	☐
4	Digital Input 4	OPEN	CLOSED	0.0 (0-3600)	0.0 (0-3600)	☑	☐	☐
Return notification		☑		Notification delay (seconds)		0 (0-3600)		

In the time when the input is in an alarm state, on Monitoring page appropriate input will be colored in red.

There are two delays - low-to-high and high-to-low for digital input change. These delays are added to the standard delay of 30mS. They have 100mS resolution and by default are zero. These options can be used for additional debouncing.



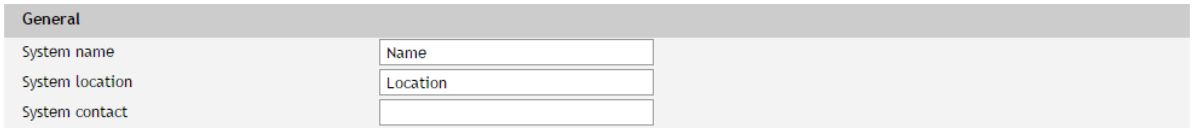
On the picture above low-to-high and high-to-low delays are set to 0.1 seconds.

7.2.5. System

On this page, some general settings can be made.

7.2.5.1. General

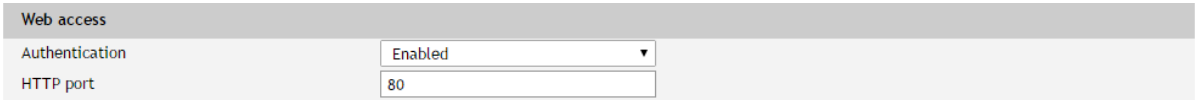
In this section, some general parameter for identification of device can be set.



7.2.5.2. WEB access

In this section, WEB access authentication can be deactivated. By default, it is activated with admin/admin authentication details.

HTTP port for WEB access can be changed. This is useful for some routers which don't support different outside/inside ports for port forwarding. By default HTTP port is 80.



7.2.5.3. HTTP API

In this section, HTTP API access authentication can be activated/deactivated. By default it is active.

Authentication details are same as WEB access. The controller support two types of authentication – see the explanation for HTTP API below.

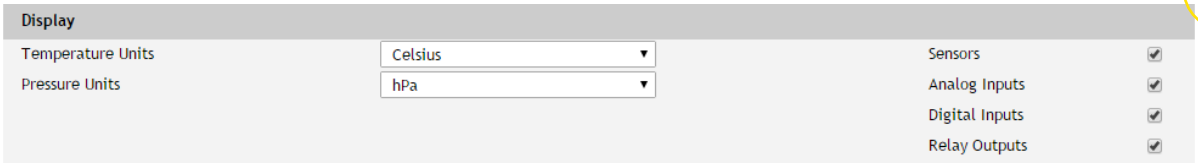
7.2.5.4. Monitoring page automatic refresh

Monitoring page refresh interval can be set between 0 and 253 seconds. Zero means no automatic refresh.

7.2.5.5. Display

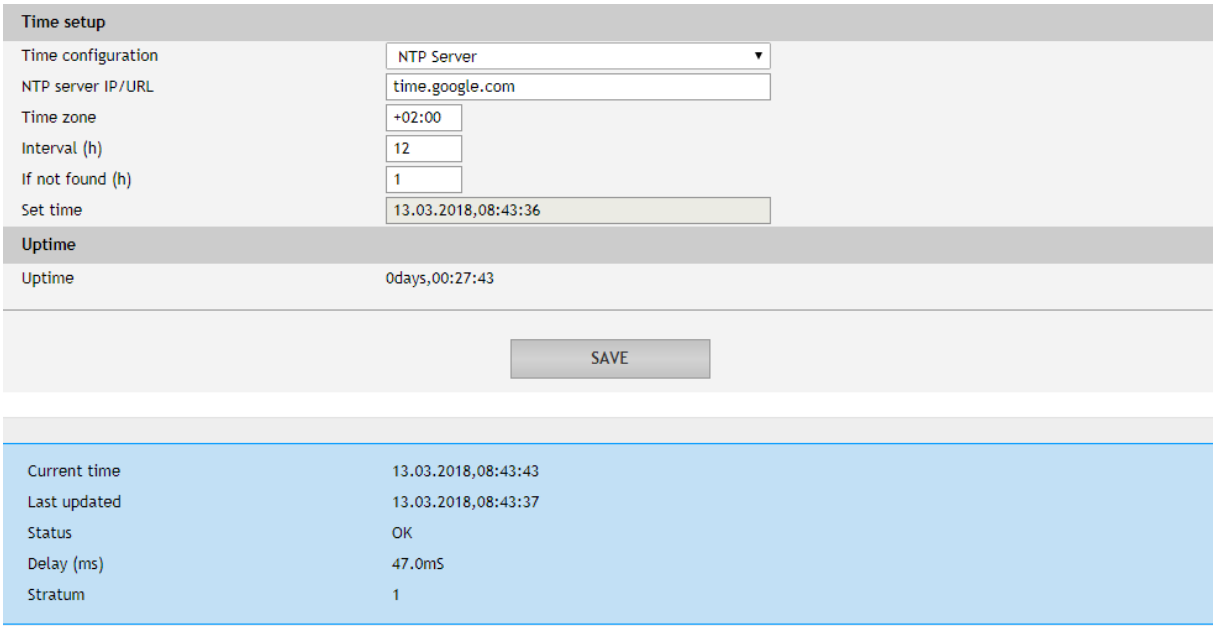
The unit for observed temperatures can be selected from different scales.

All four sections on "Monitoring page" can be added or removed independently by appropriate setup here.



7.2.6. NTP

Internal RTC (real-time clock) of the controller can be set either manually or automatically.



For automatic clock synchronization, the controller supports NTP (Network Time Protocol) and all necessary parameters for automatic synchronization are available in this section.

By default NTP synchronization is disabled, server – time.google.com, Time zone +00:00 and interval of 12 hours.

7.3. Services

7.3.1. MODBUS

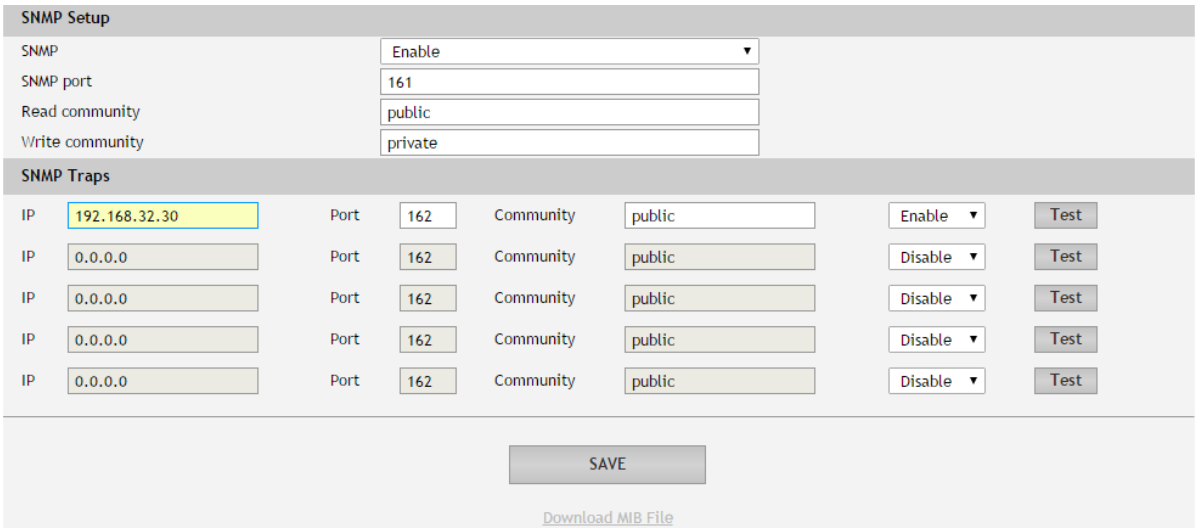
SUN-24 supports MODBUS TCP/IP.

By default, Modbus is disabled. Standard port for this protocol is 502. More about this functionality can be read at MODBUS section.

7.3.2. SNMP

The SUN-24 supports SNMP V2. This enables the device to be part of monitoring and control systems over SNMP protocol.

In this section, all necessary parameters for proper operation of SNMP can be set.



By default SNMP is disabled, the port is 161, read community is public and write community is private.

In an alarm condition, SNMP trap can be sent up to 5 independent recipients. All they can be with different port and community. There is an independent button for trap test.

SNMP traps can be sent if:

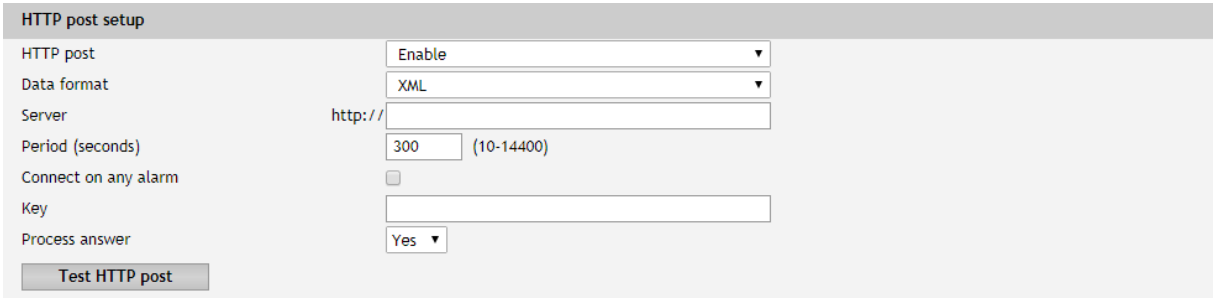
- event occurs (status change) on Digital Inputs;
- measured parameter on Analog Inputs goes outside the range;
- measured parameter on the 1-Wire bus goes outside the range;
- restart condition;

SNMP trap is sent after reset.

Actual MIB file can be downloaded from here.

7.3.3. HTTP post

SUN-24 can periodically upload a file to a dedicated server, using HTTP Post. The posting period is between 10 and 14400 seconds. The file format can be XML or JSON.



In addition to the periodical post, the file can be uploaded at any alarm condition. In this case “Connect on any alarm” should be checked.

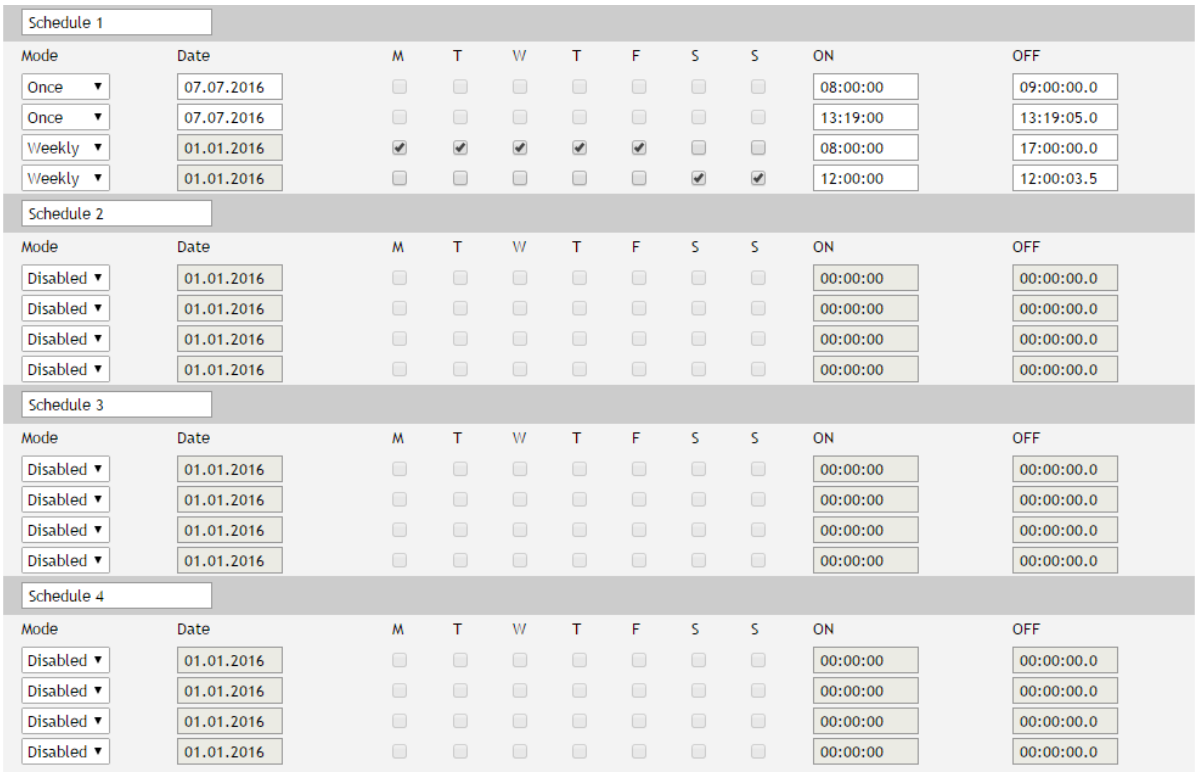
The “Key” field value is sent in the XML/JSON and can be used for device identification.

If “Process Answer” option is enabled, the SUN-24 will process the answer of the remote se rver. List of valid commands is described in section “HTTP API commands”.

7.3.4. Schedule

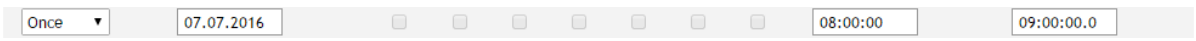
SUN-24 supports four schedules. In every schedule, up to four different tasks can be set.

The schedules are useful for creating tasks that vary with calendar dates. It is possible to combine two relays in control of one device - one relay follows monitored parameter and other follows the schedule. In this case, more complex control can be arranged.



There are two types of schedule depending on repetition and duration:

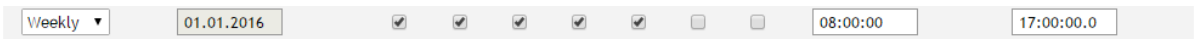
- Single task for a time period:



With above setting, there will be an event on 07.07.2016 starts in 08:00 and ends in 09:00.

The resolution for “OFF time” is 0.1 seconds, which gives a possibility for very short pulses support.

- Weekly task for a time period:

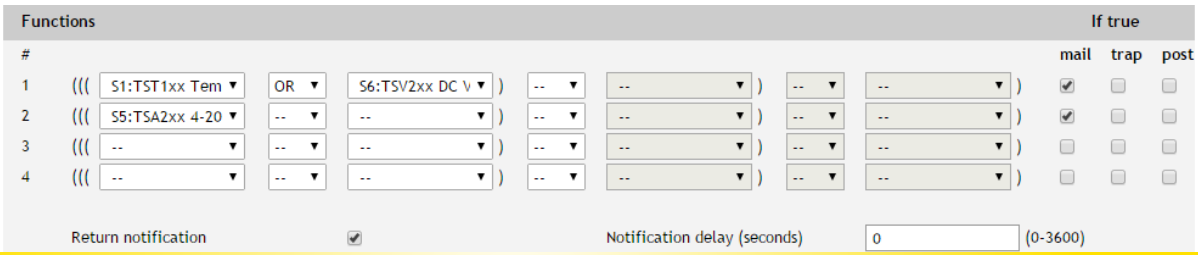


With above setting, there will be an event every working day of the week starts in 08:00 and ends in 17:00.

7.3.5. Functions.

In this section, four independent functions can be arranged. In every function, up to four monitored parameters can be logically combined with AND and OR operators. The brackets determine the order of execution.

These functions are available in a drop-down menu for local relays activation.



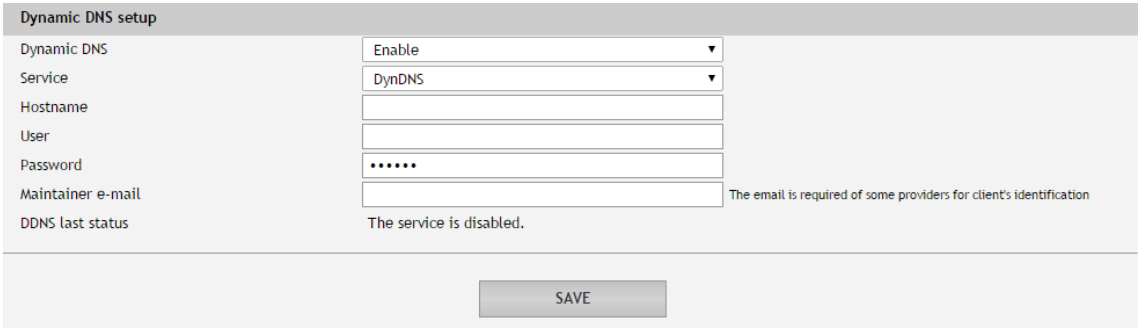
The functions can be used also for notifications.

Globally for all functions, there are “Notification delay” and “Return notification” parameters.

7.3.6. Dynamic DNS

With dynamic DNS, SUN-24 can be accessed from the public Internet without investing in a broadband account that has a static IP address.

SUN-24 supports the following DNS services – DynDNS, No-IP, and DNS-O-Matric.

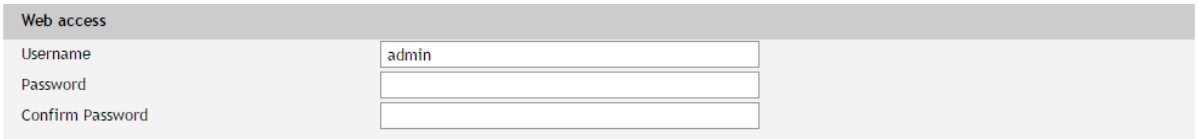


7.4. Administration

7.4.1. User/Pass

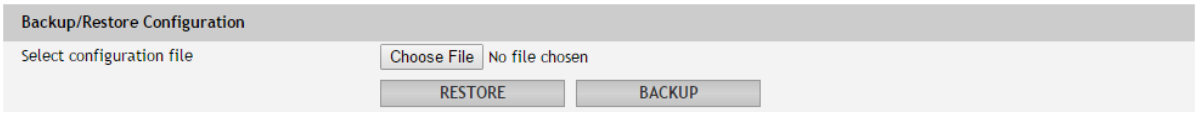
The SUN-24 supports one user only. It has administrative rights.

The username and password can be up to 31 characters long.



7.4.2. Backup/Restore

The SUN-24 supports backup and restore of all user setting. All settings are saved in XML backup file. This file can be used after this for restore on many devices. This is very useful for multiplying similar settings to a batch of controllers.



7.5. Logout

The SUN-24 support multisession, but the good practice is to log out after finishing the work.

8. Protocols and API

8.1. SNMP

Simple Network Management Protocol (SNMP) is a standard internet protocol for managing devices on IP networks. In typical uses of SNMP, one or more administrative computers, called managers, monitor and control devices on LAN. Each controlled device, at all times, executes a software component called an agent which reports information via SNMP to the manager.

The SUN-24 can be configured and monitored through SNMP.

This could be done using every SNMP v.2 compatible program. Parameters that can be changed, are grouped according to their functions in the tables below. To obtain a valid OID number it is necessary to replace the “x” symbol with ”1.3.6.1.4.1.38783”.

To save the changes configurationSaved (OID x.2.3.5.0) should be set to "1".

product

OID	Name	Access	Description	Syntax
x.3.1.1.0	name	read-only	Device name	DisplayString
x.3.1.2.0	version	read-only	Firmware version	DisplayString
x.3.1.3.0	date	read-only	Release date	DisplayString

setup -> network

OID	Name	Access	Description	Syntax
x.3.2.1.1.0	deviceID	read-only	Device ID (default MAC address)	MacAddress
x.3.2.1.2.0	hostName	read-only	Hostname	DisplayString
x.3.2.1.3.0	deviceIP	read-only	Device IP address	IpAddress

setup -> io -> sensorsSetup -> sensor1setup

OID	Name	Access	Description	Syntax
x.3.2.2.1.1.1.0	s1description	read-write	Sensor 1 description	DisplayString
x.3.2.2.1.1.2.1.0	s11MAXInt	read-write	S11 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.1.2.2.0	s11MINInt	read-write	S11 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.1.2.3.0	s11HYSTInt	read-write	S11 hysteresis value x1000 in Integer format	Integer32
x.3.2.2.1.1.3.1.0	s12MAXInt	read-write	S12 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.1.3.2.0	s12MINInt	read-write	S12 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.1.3.3.0	s12HYSTInt	read-write	S12 hysteresis value x1000 in Integer format	Integer32

setup -> io -> sensorsSetup -> sensor2setup

OID	Name	Access	Description	Syntax
x.3.2.2.1.2.1.0	s2description	read-write	Sensor2 description	DisplayString
x.3.2.2.1.2.2.1.0	s21MAXInt	read-write	s21 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.2.2.2.0	S21MINInt	read-write	S21 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.2.2.3.0	S21HYSTInt	read-write	S21 hysteresis value x1000 in Integer format	Integer32
x.3.2.2.1.2.3.1.0	S22MAXInt	read-write	S22 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.2.3.2.0	S22MINInt	read-write	S22 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.2.3.3.0	S22HYSTInt	read-write	S22 hysteresis value x1000 in Integer format	Integer32

setup -> io -> sensorsSetup -> sensor3setup

OID	Name	Access	Description	Syntax
x.3.2.2.1.3.1.0	S3description	read-write	Sensor 3 description	DisplayString
x.3.2.2.1.3.2.1.0	S31MAXInt	read-write	S31 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.3.2.2.0	S31MINInt	read-write	S31 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.3.2.3.0	S31HYSTInt	read-write	S31 hysteresis value x1000 in Integer format	Integer32
x.3.2.2.1.3.3.1.0	S32MAXInt	read-write	S32 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.3.3.2.0	S32MINInt	read-write	S32 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.3.3.3.0	S32HYSTInt	read-write	S32 hysteresis value x1000 in Integer format	Integer32

setup -> io -> sensorsSetup -> sensor4setup

OID	Name	Access	Description	Syntax
x.3.2.2.1.4.1.0	S4description	read-write	Sensor 4 description	DisplayString
x.3.2.2.1.4.2.1.0	S41MAXInt	read-write	S41 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.4.2.2.0	S41MINInt	read-write	S41 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.4.2.3.0	S41HYSTInt	read-write	S41 hysteresis value x1000 in Integer format	Integer32
x.3.2.2.1.4.3.1.0	S42MAXInt	read-write	S42 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.4.3.2.0	S42MINInt	read-write	S42 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.4.3.3.0	S42HYSTInt	read-write	S42 hysteresis value x1000 in Integer format	Integer32

setup -> io -> sensorsSetup -> sensor5setup

OID	Name	Access	Description	Syntax
x.3.2.2.1.5.1.0	S5description	read-write	Sensor 5 description	DisplayString
x.3.2.2.1.5.2.1.0	S51MAXInt	read-write	S51 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.5.2.2.0	S51MINInt	read-write	S51 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.5.2.3.0	S51HYSTInt	read-write	S51 hysteresis value x1000 in Integer format	Integer32
x.3.2.2.1.5.3.1.0	S52MAXInt	read-write	S52 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.5.3.2.0	S52MINInt	read-write	S52 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.5.3.3.0	S52HYSTInt	read-write	S52 hysteresis value x1000 in Integer format	Integer32

setup -> io -> sensorsSetup -> sensor6setup

OID	Name	Access	Description	Syntax
x.3.2.2.1.6.1.0	S6description	read-write	Sensor 6 description	DisplayString
x.3.2.2.1.6.2.1.0	S61MAXInt	read-write	S61 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.6.2.2.0	S61MINInt	read-write	S61 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.6.2.3.0	S61HYSTInt	read-write	S61 hysteresis value x1000 in Integer format	Integer32
x.3.2.2.1.6.3.1.0	S62MAXInt	read-write	S62 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.6.3.2.0	S62MINInt	read-write	S62 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.6.3.3.0	S62HYSTInt	read-write	S62 hysteresis value x1000 in Integer format	Integer32

setup -> io -> sensorsSetup -> sensor7setup

OID	Name	Access	Description	Syntax
x.3.2.2.1.7.1.0	S7description	read-write	Sensor 7 description	DisplayString
x.3.2.2.1.7.2.1.0	S71MAXInt	read-write	S71 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.7.2.2.0	S71MINInt	read-write	S71 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.7.2.3.0	S71HYSTInt	read-write	S71 hysteresis value x1000 in Integer format	Integer32
x.3.2.2.1.7.3.1.0	S72MAXInt	read-write	S72 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.7.3.2.0	S72MINInt	read-write	S72 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.7.3.3.0	S72HYSTInt	read-write	S72 hysteresis value x1000 in Integer format	Integer32

setup -> io -> sensorsSetup -> sensor8setup

OID	Name	Access	Description	Syntax
x.3.2.2.1.8.1.0	S8description	read-write	Sensor 8 description	DisplayString
x.3.2.2.1.8.2.1.0	S81MAXx10Int	read-write	S81 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.8.2.2.0	S81MINx10Int	read-write	S81 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.8.2.3.0	S81HYSTx10Int	read-write	S81 hysteresis value x1000 in Integer format	Integer32
x.3.2.2.1.8.3.1.0	S82MAXx10Int	read-write	S82 maximum value x1000 in Integer format	Integer32
x.3.2.2.1.8.3.2.0	S82MINx10Int	read-write	S82 minimum value x1000 in Integer format	Integer32
x.3.2.2.1.8.3.3.0	S82HYSTx10Int	read-write	S82 hysteresis value x1000 in Integer format	Integer32

setup -> io -> analogSetup-> analog1setup

OID	Name	Access	Description	Syntax
x.3.2.2.2.1.1.0	voltage1description	read-write	Voltage 1 description	DisplayString
x.3.2.2.2.1.2.0	voltage1max	read-write	Voltage 1 maximum	Integer32
x.3.2.2.2.1.3.0	voltage1min	read-write	Voltage 1 minimum	Integer32
x.3.2.2.2.1.4.0	voltage1hyst	read-write	Voltage 1 hysteresis	Integer32

setup -> io -> analogSetup-> analog2setup

OID	Name	Access	Description	Syntax
x.3.2.2.2.2.1.0	voltage2description	read-write	Voltage 2 description	DisplayString
x.3.2.2.2.2.2.0	voltage2max	read-write	Voltage 2 maximum	Integer32
x.3.2.2.2.2.3.0	voltage2min	read-write	Voltage 2 minimum	Integer32
x.3.2.2.2.2.4.0	voltage2hyst	read-write	Voltage 2 hysteresis	Integer32

setup -> io -> analogSetup-> analog3setup

OID	Name	Access	Description	Syntax
x.3.2.2.2.3.1.0	voltage3description	read-write	Voltage 3 description	DisplayString
x.3.2.2.2.3.2.0	voltage3max	read-write	Voltage 3 maximum	Integer32
x.3.2.2.2.3.3.0	voltage3min	read-write	Voltage 3 minimum	Integer32
x.3.2.2.2.3.4.0	voltage3hyst	read-write	Voltage 3 hysteresis	Integer32

setup -> io -> analogSetup-> analog4setup

OID	Name	Access	Description	Syntax
x.3.2.2.2.4.1.0	voltage4description	read-write	Voltage 4 description	DisplayString
x.3.2.2.2.4.2.0	voltage4max	read-write	Voltage 4 maximum	Integer32
x.3.2.2.2.4.3.0	voltage4min	read-write	Voltage 4 minimum	Integer32
x.3.2.2.2.4.4.0	voltage4hyst	read-write	Voltage 4 hysteresis	Integer32

setup -> io -> digitalSetup

OID	Name	Access	Description	Syntax
x.3.2.2.3.1.0	digitalInput1description	read-write	Digital Input 1 description	DisplayString
x.3.2.2.3.2.0	digitalInput2description	read-write	Digital Input 2 description	DisplayString
x.3.2.2.3.3.0	digitalInput3description	read-write	Digital Input 3 description	DisplayString
x.3.2.2.3.4.0	digitalInput3description	read-write	Digital Input 4 description	DisplayString

setup -> io -> relaysSetup -> relay1setup

OID	Name	Access	Description	Syntax
x.3.2.2.4.1.1.0	relay1description	read-write	Relay 1 description	DisplayString
x.3.2.2.4.1.2.0	relay1pulseWidth	read-write	Relay1 Pulse x100ms	Integer32
x.3.2.2.4.1.3.0	relay1controlledBy	read-write	Relay1 control logic	INTEGER { manual(0),sensor11(1), sensor21(2),sensor31(3),sensor41(4),sensor51(5),sensor61(6),sensor7 1(7),sensor81(8),sensor 12(9),sensor22(10),sens or32(11),sensor42(12),s ensor52(13),sensor62(1 4),sensor72(15),sensor 82(16),analog1(17),anal og2(18),analog3(19),an alog4(20),digital1(21),di gital2(22),digital3(23),di gital4(24),anyAlarm(25) ,anySensor(26),anyAnal og(27),anyDigital(28),fu nc1(29), func2(30), shedule1(31),shedule2(32),shedule3(33),shedu le4(34) }

setup -> io-> relaysSetup -> relay2setup

OID	Name	Access	Description	Syntax
x.3.2.2.4.2.1.0	relay2description	read-write	Relay 2 description	DisplayString
x.3.2.2.4.2.2.0	relay2pulseWidth	read-write	Relay 2 Pulse x100ms	Integer32
x.3.2.2.4.2.3.0	relay2controlledBy	read-write	Relay 2 control logic	INTEGER { manual(0),sensor11(1), sensor21(2),sensor31(3),sensor41(4),sensor51(5),sensor61(6),sensor7 1(7),sensor81(8),sensor 12(9),sensor22(10),sens or32(11),sensor42(12),s ensor52(13),sensor62(1 4),sensor72(15),sensor 82(16),analog1(17),anal og2(18),analog3(19),an alog4(20),digital1(21),di gital2(22),digital3(23),di gital4(24),anyAlarm(25) ,anySensor(26),anyAnal og(27),anyDigital(28),fu nc1(29), func2(30), shedule1(31),shedule2(32),shedule3(33),shedu le4(34) }

setup -> io-> relaysSetup -> relay3setup

OID	Name	Access	Description	Syntax
x.3.2.2.4.3.1.0	relay3description	read-write	Relay 3 description	DisplayString
x.3.2.2.4.3.2.0	relay3pulseWidth	read-write	Relay 3 Pulse x100ms	Integer32
x.3.2.2.4.3.3.0	relay3controlledBy	read-write	Relay 3 control logic	INTEGER { manual(0),sensor11(1), sensor21(2),sensor31(3),sensor41(4),sensor51(5),sensor61(6),sensor7 1(7),sensor81(8),sensor 12(9),sensor22(10),sens or32(11),sensor42(12),s ensor52(13),sensor62(1 4),sensor72(15),sensor 82(16),analog1(17),anal og2(18),analog3(19),an alog4(20),digital1(21),di gital2(22),digital3(23),di gital4(24),anyAlarm(25) ,anySensor(26),anyAnal og(27),anyDigital(28),fu nc1(29), func2(30), shedule1(31),shedule2(32),shedule3(33),shedu le4(34) }

setup -> io-> relaysSetup -> relay4setup

OID	Name	Access	Description	Syntax
x.3.2.2.4.4.1.0	relay4description	read-write	Relay 4 description	DisplayString
x.3.2.2.4.4.2.0	relay4pulseWidth	read-write	Relay 4 Pulse x100ms	Integer32
x.3.2.2.4.4.3.0	relay4controlledBy	read-write	Relay 4 control logic	INTEGER { manual(0),sensor11(1), sensor21(2),sensor31(3),sensor41(4),sensor51(5),sensor61(6),sensor7 1(7),sensor81(8),sensor 12(9),sensor22(10),sens or32(11),sensor42(12),s ensor52(13),sensor62(1 4),sensor72(15),sensor 82(16),analog1(17),anal og2(18),analog3(19),an alog4(20),digital1(21),di gital2(22),digital3(23),di gital4(24),anyAlarm(25) ,anySensor(26),anyAnal og(27),anyDigital(28),fu nc1(29), func2(30), shedule1(31),shedule2(32),shedule3(33),shedu le4(34) }

setup -> io -> virtualSetup -> virtual1setup

OID	Name	Access	Description	Syntax
x.3.2.2.5.1.1.0	virtualInput1description	read-write	Virtual input 1 description	DisplayString
x.3.2.2.5.1.2.0	virtualInput1max	read-write	Virtual input 1 maximum	Integer32
x.3.2.2.5.1.3.0	virtualInput1min	read-write	Virtual input 1 minimum	Integer32
x.3.2.2.5.1.4.0	virtualInput1hyst	read-write	Virtual input 1 hysteresis	Integer32
x.3.2.2.5.1.5.0	virtualInput1Parent	read-write	Virtual input 1 parent	INTEGER{ none(0),sensor11(1),se nsor21(2),sensor31(3),s ensor41(4),sensor51(5), sensor61(6),sensor71(7),sensor81(8),sensor12(9),sensor22(10),sensor 32(11),sensor42(12),se nsor52(13),sensor62(14),sensor72(15),sensor8 2(16),analog1(17),analo g2(18),analog3(19),anal og4(20) }

setup -> io -> virtualSetup -> virtual2setup

OID	Name	Access	Description	Syntax
x.3.2.2.5.2.1.0	virtualInput2description	read-write	Virtual input 2 description	DisplayString
x.3.2.2.5.2.2.0	virtualInput2max	read-write	Virtual input 2 maximum	Integer32
x.3.2.2.5.2.3.0	virtualInput2min	read-write	Virtual input 2 minimum	Integer32
x.3.2.2.5.2.4.0	virtualInput2hyst	read-write	Virtual input 2 hysteresis	Integer32
x.3.2.2.5.2.5.0	virtualInput2Parent	read-write	Virtual input 2 parent	INTEGER{ none(0),sensor11(1),se nsor21(2),sensor31(3),s ensor41(4),sensor51(5), sensor61(6),sensor71(7),sensor81(8),sensor12(9),sensor22(10),sensor 32(11),sensor42(12),se nsor52(13),sensor62(14),sensor72(15),sensor8 2(16),analog1(17),analo g2(18),analog3(19),anal og4(20) }

setup -> io -> virtualSetup -> virtual3setup

OID	Name	Access	Description	Syntax
x.3.2.2.5.3.1.0	virtualInput3description	read-write	Virtual input 3 description	DisplayString
x.3.2.2.5.3.2.0	virtualInput3max	read-write	Virtual input 3 maximum	Integer32
x.3.2.2.5.3.3.0	virtualInput3min	read-write	Virtual input 3 minimum	Integer32
x.3.2.2.5.3.4.0	virtualInput3hyst	read-write	Virtual input 3 hysteresis	Integer32
x.3.2.2.5.3.5.0	virtualInput3Parent	read-write	Virtual input 3 parent	INTEGER{ none(0),sensor11(1),sensor21(2),sensor31(3),sensor41(4),sensor51(5),sensor61(6),sensor71(7),sensor81(8),sensor12(9),sensor22(10),sensor32(11),sensor42(12),sensor52(13),sensor62(14),sensor72(15),sensor82(16),analog1(17),analog2(18),analog3(19),analog4(20) }

setup -> io -> virtualSetup -> virtual4setup

OID	Name	Access	Description	Syntax
x.3.2.2.5.4.1.0	virtualInput4description	read-write	Virtual input 4 description	DisplayString
x.3.2.2.5.4.2.0	virtualInput4max	read-write	Virtual input 4 maximum	Integer32
x.3.2.2.5.4.3.0	virtualInput4min	read-write	Virtual input 4 minimum	Integer32
x.3.2.2.5.4.4.0	virtualInput4hyst	read-write	Virtual input 4 hysteresis	Integer32
x.3.2.2.5.4.5.0	virtualInput4Parent	read-write	Virtual input 4 parent	INTEGER{ none(0),sensor11(1),sensor21(2),sensor31(3),sensor41(4),sensor51(5),sensor61(6),sensor71(7),sensor81(8),sensor12(9),sensor22(10),sensor32(11),sensor42(12),sensor52(13),sensor62(14),sensor72(15),sensor82(16),analog1(17),analog2(18),analog3(19),analog4(20) }

monitorNcontrol -> sensors -> sensor1

OID	Name	Access	Description	Syntax
x.3.3.1.1.1.0	s11Int	read-only	S11 value x1000 in Integer format	Integer32
x.3.3.1.1.2.0	s12Int	read-only	S12 value x1000 in Integer format	Integer32
x.3.3.1.1.3.0	s1ID	read-only	S1 ID value	Mac Address

monitorNcontrol -> sensors -> sensor2

OID	Name	Access	Description	Syntax
x.3.3.1.2.1.0	s21Int	read-only	S21 value x1000 in Integer format	Integer32
x.3.3.1.2.2.0	s22Int	read-only	S22 value x1000 in Integer format	Integer32
x.3.3.1.2.3.0	s2ID	read-only	S2 ID value	OCTET STRING (SIZE (16))

monitorNcontrol -> sensors -> sensor3

OID	Name	Access	Description	Syntax
x.3.3.1.3.1.0	s31Int	read-only	S31 value x1000 in Integer format	Integer32
x.3.3.1.3.2.0	s32Int	read-only	S32 value x1000 in Integer format	Integer32
x.3.3.1.3.3.0	s3ID	read-only	S3 ID value	OCTET STRING (SIZE (16))

monitorNcontrol -> sensors -> sensor4

OID	Name	Access	Description	Syntax
x.3.3.1.4.1.0	s41Int	read-only	S41 value x1000 in Integer format	Integer32
x.3.3.1.4.2.0	s42Int	read-only	S42 value x1000 in Integer format	Integer32
x.3.3.1.4.3.0	s4ID	read-only	S4 ID value	OCTET STRING (SIZE (16))

monitorNcontrol -> sensors -> sensor5

OID	Name	Access	Description	Syntax
x.3.3.1.5.1.0	s51Int	read-only	S51 value x1000 in Integer format	Integer32
x.3.3.1.5.2.0	s52Int	read-only	S52 value x1000 in Integer format	Integer32
x.3.3.1.5.3.0	s5ID	read-only	S5 ID value	OCTET STRING (SIZE (16))

monitorNcontrol -> sensors -> sensor6

OID	Name	Access	Description	Syntax
x.3.3.1.6.1.0	s61Int	read-only	S61 value x1000 in Integer format	Integer32
x.3.3.1.6.2.0	s62Int	read-only	S62 value x1000 in Integer format	Integer32
x.3.3.1.6.3.0	s6ID	read-only	S6 ID value	OCTET STRING (SIZE (16))

monitorNcontrol -> sensors -> sensor7

OID	Name	Access	Description	Syntax
x.3.3.1.7.1.0	s71Int	read-only	S71 value x1000 in Integer format	Integer32
x.3.3.1.7.2.0	s72Int	read-only	S72 value x1000 in Integer format	Integer32
x.3.3.1.7.3.0	s7ID	read-only	S7 ID value	OCTET STRING (SIZE (16))

monitorNcontrol -> sensors -> sensor8

OID	Name	Access	Description	Syntax
x.3.3.1.8.1.0	s81Int	read-only	S81 value x1000 in Integer format	Integer32
x.3.3.1.8.2.0	s82Int	read-only	S82 value x1000 in Integer format	Integer32
x.3.3.1.8.3.0	s8ID	read-only	S8 ID value	OCTET STRING (SIZE (16))

monitorNcontrol -> analog

OID	Name	Access	Description	Syntax
x.3.3.2.1.0	voltage1Int	read-only	Voltage1 x1000 in Integer format	Integer32
x.3.3.2.2.0	voltage2Int	read-only	Voltage2 x1000 in Integer format	Integer32
x.3.3.2.3.0	voltage3Int	read-only	Voltage3 x1000 in Integer format	Integer32
x.3.3.2.4.0	voltage4Int	read-only	Voltage4 x1000 in Integer format	Integer32

monitorNcontrol -> digital

OID	Name	Access	Description	Syntax
x.3.3.3.1.0	digitalInput1State	read-only	Digital1 Input State	INTEGER {closed(0), open(1)}
x.3.3.3.2.0	digitalInput2State	read-only	Digital2 Input State	INTEGER {closed(0), open(1)}
x.3.3.3.3.0	digitalInput3State	read-only	Digital3 Input State	INTEGER {closed(0), open(1)}
x.3.3.3.4.0	digitalInput4State	read-only	Digital4 Input State	INTEGER {closed(0), open(1)}

monitorNcontrol -> relays -> relay1

OID	Name	Access	Description	Syntax
x.3.3.4.1.1.0	relay1State	read-write	Relay1 State	INTEGER {off(0), on(1)}
x.3.3.4.1.2.0	relay1Pulse	read-write	Relay1 Pulse	INTEGER {off(0), on(1)}

monitorNcontrol -> relays -> relay2

OID	Name	Access	Description	Syntax
x.3.3.4.2.1.0	relay2State	read-write	Relay2 State	INTEGER {off(0), on(1)}
x.3.3.4.2.2.0	relay2pulse	read-write	Relay2 pulse length	INTEGER {off(0), on(1)}

monitorNcontrol -> relays -> relay3

OID	Name	Access	Description	Syntax
x.3.3.4.3.1.0	relay3State	read-write	Relay3 State	INTEGER {off(0), on(1)}
x.3.3.4.3.2.0	relay3pulse	read-write	Relay3 pulse length	INTEGER {off(0), on(1)}

monitorNcontrol -> relays -> relay4

OID	Name	Access	Description	Syntax
x.3.3.4.4.1.0	relay4State	read-write	Relay4 State	INTEGER {off(0), on(1)}
x.3.3.4.4.2.0	relay4pulse	read-write	Relay4 pulse length	INTEGER {off(0), on(1)}

monitorNcontrol

OID	Name	Access	Description	Syntax
x.3.3.5.0	configurationSaved	read-write	Configuration save status SAVED/UNSAVED	INTEGER { unsaved(0), saved(1) }
x.3.3.6.0	restartDevice	read-write	Restart Device	INTEGER { cancel(0), restart(1) }
x.3.3.7.0	temperatureUnit	read-only	Unit of the all temperature values	INTEGER { celcius(0), fahrenheit(1) }
x.3.3.8.0	hardwareErr	read-only	Hardware Error	INTEGER { noErr(0), owErr(1), hwErr(2) }
x.3.3.9.0	pressureUnit	read-only	Unit of the pressure value	INTEGER { hPa(0), mbar(1), mmhg(2)}

monitorNcontrol -> functions

OID	Name	Access	Description	Syntax
x.3.3.10.1.0	func1State	read-only	Funtion 1 State	INTEGER { false(0), true(1) }
x.3.3.10.2.0	func2State	read-only	Funtion 2 State	INTEGER { false(0), true(1) }
x.3.3.10.3.0	func3State	read-only	Funtion 3 State	INTEGER { false(0), true(1) }
x.3.3.10.4.0	func4State	read-only	Funtion 4 State	INTEGER { false(0), true(1) }

monitorNcontrol -> virtual

OID	Name	Access	Description	Syntax
x.3.3.11.1.0	virtualInput1Int	read-only	Virtual input 1 x1000 in Integer format	Integer32
x.3.3.11.2.0	virtualInput2Int	read-only	Virtual input 2 x1000 in Integer format	Integer32
x.3.3.11.3.0	virtualInput3Int	read-only	Virtual input 3 x1000 in Integer format	Integer32
x.3.3.11.4.0	virtualInput4Int	read-only	Virtual input 4 x1000 in Integer format	Integer32

9. Factory default settings

SUN-24 can be restored to its original factory default settings in 3 different ways.

9.1. Factory default from the WEB interface

If the button “Factory default” from Administration->Backup/Restore is pressed, all parameters return to factory default except Network settings.

9.2. Factory default with the reset button

If the reset button is pressed for more than 5 seconds, while the device is working, all Network settings go to factory default.

9.3. General factory default with the reset button

For factory default reset of all parameters following steps should be executed:

- Press and hold the RESET button, then turn on the power supply;
- Yellow LED shines and red LED blinks about 5 times on a second;
- After about 5 seconds red LED will turn off, the button can be released;
- Yellow LED flashes on 1 second and red LED shines – the device is in working mode, with factory default settings.

The factory default settings are:

Username	admin
Password	admin
IP Address	192.168.1.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
SNMPConfiguration	disabled
readCommunity	public
writeCommunity	private
Analog inputs unit	voltage
Analog inputs multiplier	1.000
Analog inputs ofset	0.000