Monitoring
Air Temperature and Humidity

Large-size LED Displays
NDA 100/3-2 TH(S) RG L30 230AC(PoE) LAN

User Manual (version 1.06)

ELEN

1. Brief Description

The NDA 100/3-2 TH(S) series systems are electronic devices designed to monitor air temperature and relative humidity. The measurements are made by a high-precision digital sensor, which can be internal plug-in type (version THS) or external wired (version TH). Measured values are displayed on a large size LED display, or can also be viewed remotely on a PC and logged in a database for later review. For this purpose various communication interfaces are offered: USB, RS485, LAN or PoE LAN and DataLoggerTH software application is available for download. In case of LAN interface, user can monitor the measured temperature and humidity on the local Intranet as well, assuming his PC is located on the same LAN network.

2. Models Available

There are eight different display and four sensor types available. Their selection depends on intended application. Some applications require displaying temperature and humidity values without a need of logging measured values. Other may require remote connection to a PC and data logging.

List of available display product types:

1. NDA 100/3-2 **THS R** L30 230AC **USB**
2. NDA 100/3-2 **TH R** L30 230AC **USB**
3. NDA 100/3-2 **THS RG** L30 230AC **RS485**
4. NDA 100/3-2 **TH RG** L30 230AC **RS485**
5. NDA 100/3-2 **THS RG** L30 230AC **LAN**
6. NDA 100/3-2 **TH RG** L30 230AC **LAN**
7. NDA 100/3-2 **THS RG** L30 **PoE LAN**
8. NDA 100/3-2 **TH RG** L30 **PoE LAN**

Meaning of the letter code:

NDA	Numerical Displays for Air quality.
100/3-2	Digit height 100 mm, 3 digits temp., 2 digits humidity.
THS	Display includes internal plug-in temp./humidity sensor.
TH	Display has connection for external sensor.
R	Red color LEDs.
RG	Multi color LEDs (red/green/yellow).
USB/RS485/LAN/PoE LAN	Display interface used for data logging and setting display parameters.

List of available temperature and humidity sensor product types:

1. THS Sensor 52 12DC RS485
2. THS Sensor 52 24DC RS485-GI
3. THS Sensor 40 12DC LAN
4. THS Sensor 40 PoE LAN

Meaning of the letter code:

THS Sensor	Temperature and Humidity Sensor.
52 or 40	Enclosure protection rating, IP 52 / IP 40.
12DC/24DC/PoE	Power supply voltage.
RS485/LAN/PoE	Communication interface.

3. Technical Specifications – LED Display

The large-size LED display consists of super-bright single color (version R) or multi-color (version RG) 7-segment LED modules with 100 mm digit height and 120° wide viewing angle. These parameters ensure excellent readability even from a far distance. Its mechanical construction is made of aesthetic platinum color anodized aluminium frame and gray tinted non-glare front glass. Back panel is made of steel, painted with black powder paint. Display's enclosure is suitable for use in indoor environment only. Flexible power supply cable for connecting to power mains is attached to back panel of display via cable gland. In case of product model with PoE interface, device is powered directly from PoE LAN.

Display Parameters

- Number of viewing sides: 1
- Digit height: 100 mm
- Format of digits: 88,8 °C + 88 %RH
- Fixed units label: °C (°F), %RH (%HR, %r.F.) as required. White letters on black background.
- LED elements: Super-bright 7-segment LED modules, suitable for indoor light conditions, AlInGaP LED chips with long lifetime.
- LED color: Red or multi-color Red/Green/Yellow. Depends on product type ordered.
- Readability range: Up to 40 meters.
- Enclosure protection class: IP 30, indoor use only.
- Frame construction: Anodized aluminium frame, steel back panel coated with black powder paint.
- Frame color: Platinum grey.
- Front cover: Non-glare PMMA glass, grey tinted, 3 mm thick.
- Brightness control: Automatic, depending on ambient light conditions, or direct control of brightness level set by user.
- Power supply: 100-240 VAC, 50/60Hz, flexible power cord 2m.
- Data connections: Depends on product type purchased: USB, RS485 (for data logging), RS485 (for external sensor), LAN, PoE
- Dimensions: 470 x 350 x 59 mm
- Weight: 4,4 kg
- Operating temperature: 0°C to +50°C
- Mounting: Wall installation bracket included.

4. Technical Specifications – Temperature / Humidity Sensor

The measurements of air temperature and humidity are performed by a high-accuracy and precision digital sensor. The sensor device can be internal plug-in type (version THS) or external wired (version TH).

Sensor Parameters

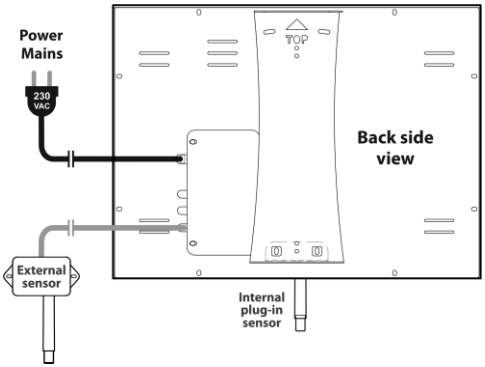
• Sensor type	Sensirion SHT31-DIS
• Temperature range	-40°C to +80°C
• Temperature accuracy	±0,3°C typical (±0,2°C for T > 0°C)
• Temperature resolution	0,1°C
• Relative humidity range	0% to 100% RH (displays up to 99%)
• Relative humidity accuracy	+/-2% RH typical (more)
• Relative humidity resolution	1% RH
• Connection, version THS	Internal plug-in sensor. 3,5 mm Jack connector, sensor unit plugs into bottom side of display frame.
• Connection, version TH	External wired sensor. Cable with preinstalled connector. Cable length 5 m. Other lengths possible on request.

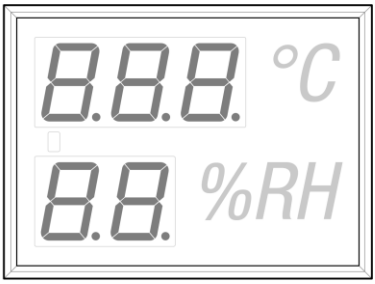
5. Connections

Power Supply Connection

Important! - Powering of display should be performed after the sensor (internal or external) and data line cables (if applicable) have been connected.

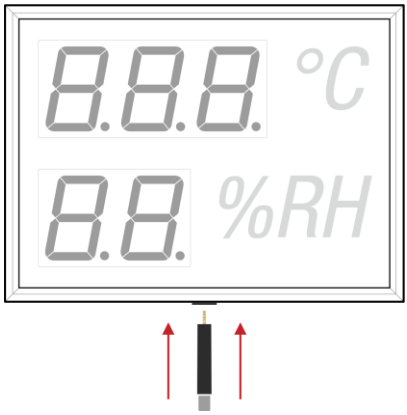
All display models, except for the version with PoE interface, are designed for input power 100–230 VAC, 50 / 60 Hz. Flexible power supply cable with EU type 2-prong plug is attached directly to display from the back panel. To apply power, insert the power cable plug into the power mains socket.





Internal Plug-in Sensor Connection (NDA…THS version)

If your display delivery includes internal plug-in temperature and humidity sensor (NDA…THS version) insert the sensor device into the opening hole in the bottom side of display frame. To ensure proper electrical connection the connector of the sensor must be inserted all the way in. The connector type is 3,5 mm Jack.



External Sensor Connection (NDA…TH version)

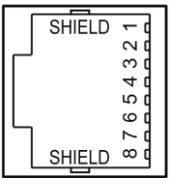
If you purchased external sensor “THS Sensor 52 12DC RS485” as an optional accessory, your display includes input connector for this sensor.
External sensor has a 4-wire cable with EUROCLAMP connector already preinstalled. Plug this connector into its corresponding connector “P1” (green color connector) located on the PCB board. All PCB connectors are accessible on the back panel of large size LED display under a small door plate. The door plate is secured by two screws which must be removed first. Once you remove the door plate, attach the sensor cable connector into its corresponding PCB connector. Then insert and screw the door plate back again. Use the slots in the door plate to route the cable. External temperature/humidity sensor is powered directly from the large size LED display. No additional external power supply is necessary.

LAN Ethernet TCP/IP Communication Connection

LAN communication is performed via standard Ethernet TCP/IP protocol. Socket RJ45 is located on the PCB board under a small cover door plate on the back panel of large size LED display. The door plate is secured by two screws which must be removed first. Once you remove the door plate, attach the LAN cable connector into its corresponding PCB connector. Then insert and screw the door plate back again. Use the slots in the door plate to route the cable.
You can plug standard CAT5 type LAN cable from LAN network port (e.g. switch or hub) directly into this socket. Please see table below for pinout description.

LAN Interface Connector – P9

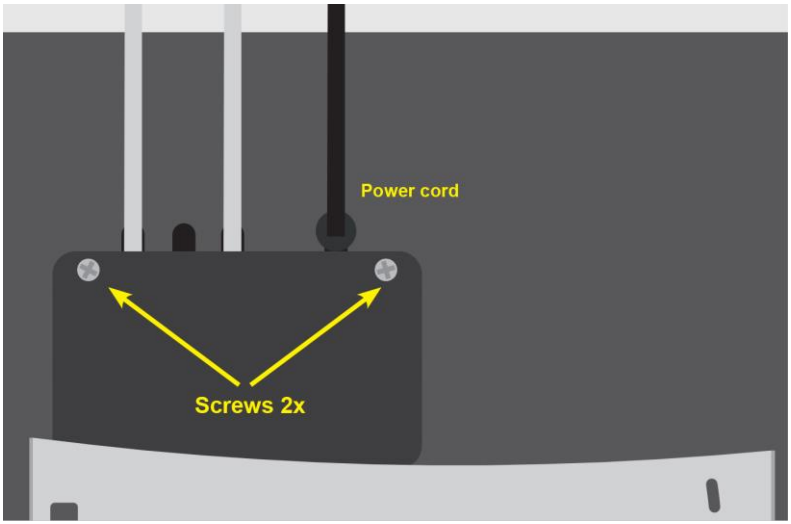
Ethernet 10/100 RJ45 shielded connector is used.

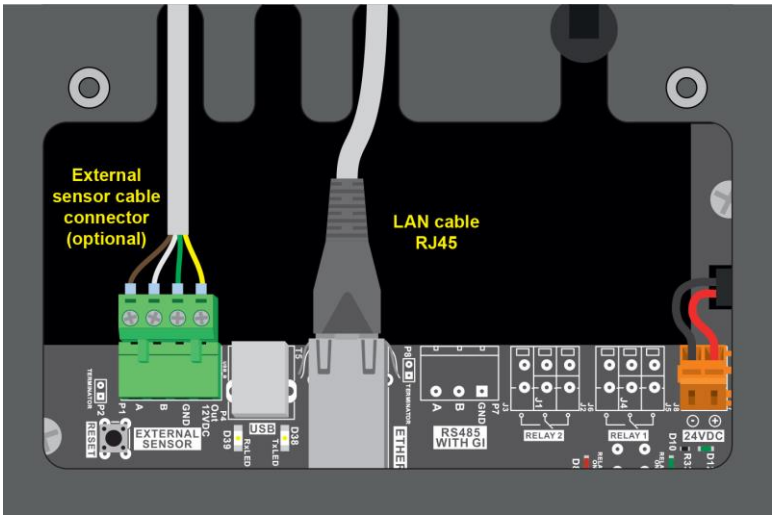
Connector view		Signal	Direction
CONNECTOR RJ45 VIEW TO HOLE  	1	TX+	output
	2	TX-	output
	3	RX+	input
	4	NC (LAN), +Vdc (PoE)	
	5	NC (LAN), +Vdc (PoE)	
	6	RX-	input
	7	NC (LAN), -Vdc (PoE)	
	8	NC (LAN), -Vdc (PoE)	
		shield	

The IP address, SubNet Mask and Gateway of display have been programed at factory. These values are printed on a label located on the back side of display. Factory default IP address is **192.168.0.69**.

You can change the factory set IP address, Subnet mask and Gateway via web browser as described later in this manual.

Details of Cable Connections:

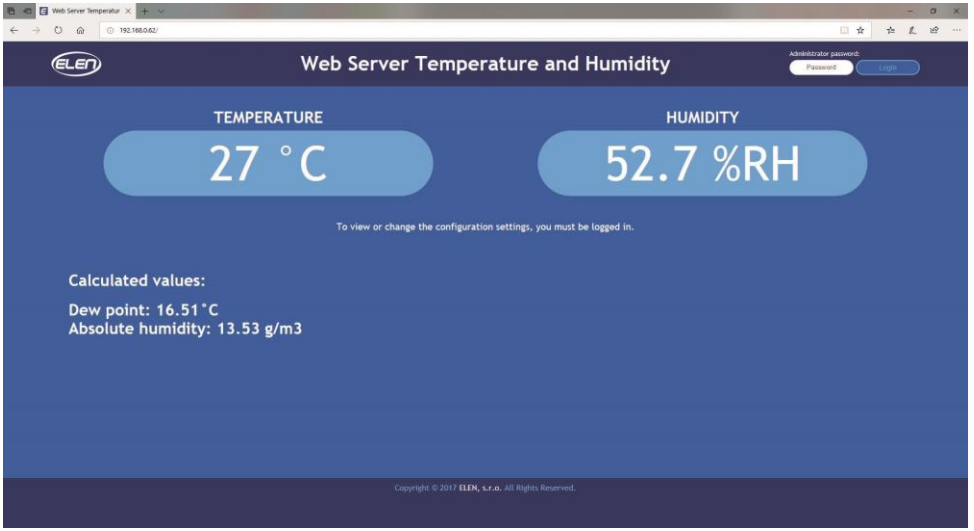




6. Internet Web Browser Connection

Reading Measured Values

Display has a programmed web server. This feature allows remote connection with display using a standard PC based Internet web browser (Internet Explorer, Mozilla Firefox, etc.) Simply enter the numeric IP address of display into browser's URL field (For example: "192.168.0.69"). Browser will connect with the correspond display and will show its displayed values. See screenshot below.



You can view more displays at the same time by opening several tabs on your browser and entering their corresponding IP addresses into each tab's URL field.

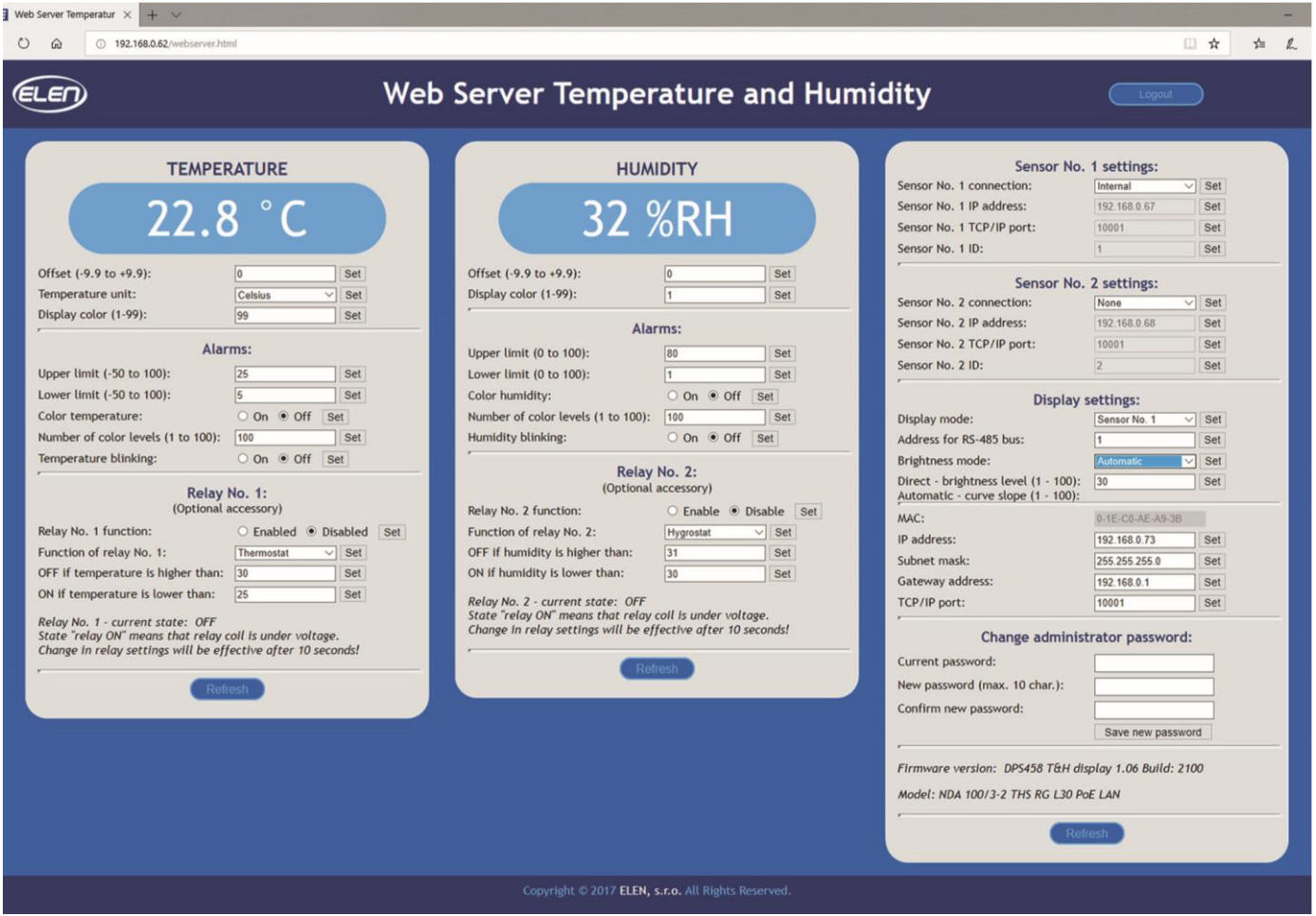
Configuring Display

When connected with display via its IP address in the web browser, you can enter the **Administrator** menu. This can be done by entering the **Password** in top right field of the browser window. Default password is "**admin**". The password can be changed later in the administrator menu.

Press **Login** button or Enter to access the web server configuration menu. The web server configuration menu will appear in the browser's window. See screenshot on the next page.

The configuration menu provides many options to the user. Following is a short description of each option.

*Note: Do not forget to press the **Set** button after making each change. Otherwise the change will be discarded.*


Web Server Temperatur
192.168.0.62/webserver.html
Web Server Temperature and Humidity
Logout
TEMPERATURE
22.8 °C
Offset (-9.9 to +9.9): 0 Set
Temperature unit: Celsius Set
Display color (1-99): 99 Set
Alarms:
Upper limit (-50 to 100): 25 Set
Lower limit (-50 to 100): 5 Set
Color temperature: On Off Set
Number of color levels (1 to 100): 100 Set
Temperature blinking: On Off Set
Relay No. 1:
(Optional accessory)
Relay No. 1 function: Enabled Disabled Set
Function of relay No. 1: Thermostat Set
OFF if temperature is higher than: 30 Set
ON if temperature is lower than: 25 Set
Relay No. 1 - current state: OFF
State "relay ON" means that relay coil is under voltage.
Change in relay settings will be effective after 10 seconds!
Refresh
HUMIDITY
32 %RH
Offset (-9.9 to +9.9): 0 Set
Display color (1-99): 1 Set
Alarms:
Upper limit (0 to 100): 80 Set
Lower limit (0 to 100): 1 Set
Color humidity: On Off Set
Number of color levels (1 to 100): 100 Set
Humidity blinking: On Off Set
Relay No. 2:
(Optional accessory)
Relay No. 2 function: Enable Disable Set
Function of relay No. 2: Hygrostat Set
OFF if humidity is higher than: 31 Set
ON if humidity is lower than: 30 Set
Relay No. 2 - current state: OFF
State "relay ON" means that relay coil is under voltage.
Change in relay settings will be effective after 10 seconds!
Refresh
Sensor No. 1 settings:
Sensor No. 1 connection: Internal Set
Sensor No. 1 IP address: 192.168.0.67 Set
Sensor No. 1 TCP/IP port: 10001 Set
Sensor No. 1 ID: 1 Set
Sensor No. 2 settings:
Sensor No. 2 connection: None Set
Sensor No. 2 IP address: 192.168.0.68 Set
Sensor No. 2 TCP/IP port: 10001 Set
Sensor No. 2 ID: 2 Set
Display settings:
Display mode: Sensor No. 1 Set
Address for RS-485 bus: 1 Set
Brightness mode: Automatic Set
Direct - brightness level (1 - 100):
Automatic - curve slope (1 - 100): 30 Set
MAC: 0-1E-C0-AE-A9-3B
IP address: 192.168.0.73 Set
Subnet mask: 255.255.255.0 Set
Gateway address: 192.168.0.1 Set
TCP/IP port: 10001 Set
Change administrator password:
Current password:
New password (max. 10 char.):
Confirm new password:
Save new password
Firmware version: DPS458 T&H display 1.06 Build: 2100
Model: NDA 100/3-2 THS RG L30 PoE LAN
Refresh
Copyright © 2017 ELEN, s.r.o. All Rights Reserved.

TEMPERATURE

Temperature	Displays temperature value currently on display.
Offset	**-9,9°C to +9,9°C**. Allows user to implement offset correction to measured values from -9,9°C to +9,9°C. Default value is 0. Please be cautious when using this feature because sensors are already calibrated from factory. Under normal circum-stances there should be no need to change it.
Temperature Units	Celsius / Fahrenheit
Display color	Sets the color of display's LEDs to red/green/yellow. Valid for displays with color LEDs only (version RG).
Alarms - Upper limit - Lower limit	Allows signalization when values exceed limit values. Sets the upper limit value for the alarm. Sets the lower limit value for the alarm.
Color temperature	**On/Off**, special feature used with color LEDs. Display's LED color will change automatically in dependence on displayed temperature value.
Blinking display	When the alarm's upper or lower limits are exceeded display will be blinking.
Thermostat Relay	Allows to set the thermostat on/off when exceeding upper/lower temperature limits. Used in special applications (displays with built-in relays).

HUMIDITY

Humidity	Similar options as described for the temperature menu above are possible for humidity as well.

Sensor No. 1 settings:

This menu allows user to configure the type of sensor used and its parameters.
*Note: Do not forget to press the **Set** button after making each change. Otherwise the change will be discarded. When finished with settings, click the **Refresh** button.*

Sensor No.1 connect	Internal / RS485 / Ethernet / None Select what type of sensor should be paired with display. Internal – display is equipped with plug-in internal sensor. RS485 – external sensor is attached to display via cable. Ethernet – LAN type sensor is paired with display.

Sensor No. 1 IP address Valid for Ethernet LAN type external sensors only.
Enter corresponding sensor IP address.
This sensor's IP address will be paired with display's IP address. Measured values from the sensor with this IP address will be displayed on the large size display.
(Display's IP address is in the URL field of the browser.)
If external RS485 sensor is used, IP address is not used.

Sensor No. 1 TCP/IP port Valid for Ethernet LAN type external sensors only.
Enter corresponding sensor port number.
Default port number is 10001.
If external RS485 sensor is used, IP Port is not used.

Sensor No. 1 ID **1 - 255**
Enter sensor RS485 bus ID number.

Sensor No. 2 settings

Sensor No.2 connect **RS485 / Ethernet / None**.
Select what type of sensor should be paired with display.
RS485 – external sensor is attached to display via cable.
Ethernet – LAN type sensor is paired with display.

Sensor No. 2 IP address Valid for Ethernet LAN type external sensors only.
Enter corresponding sensor IP address.
This sensor's IP address will be paired with display's IP address. Measured values from the sensor with this IP address will be displayed on the large size display.
(Display's IP address is in the URL field of the browser.)
If external RS485 sensor is used, IP address is not used.

Sensor No. 2 TCP/IP port Valid for Ethernet LAN type external sensors only.
Enter corresponding sensor port number.
Default port number is 10001.
If external RS485 sensor is used, IP Port is not used.

Sensor No. 2 ID **1 - 255**
Enter sensor RS485 bus ID number.

Display settings

Display mode	**Sensor No. 1 / Sensor No. 2 / Average from 2 sensors**
Sensor No. 1	Display will show measured value from sensor No. 1 as configured above.
Sensor No. 2	Display will show measured value from sensor No. 2 as configured above.
Average from 2 sensors	Display will show average value from 2 sensors.
Address for RS485 bus	**1 – 255** Designates internal RS485 address ID number of display.
Brightness mode	**Automatic** / **Direct**
Automatic	Automatic control of brightness according to ambient light conditions, via built-in light sensor.
Direct	Direct control of brightness via fixed brightness level entered by user. Default factory setup is automatic.
Brightness level / curve slope	**1 – 100** If **Direct** mode is selected above, this value sets fixed LED brightness level from 1 to 100. If **Automatic** mode is selected above, this value sets the slope of brightness regulation curve. Default factory value is **90**.
MAC address	Shows MAC address of connected display. User cannot change this field.
IP address	Shows IP address of display (same IP address as in the URL field of the browser). Factory default IP address is on the label located on the back panel of display. Enter new IP address according to your LAN setting.
Subnet mask	Shows factory default Subnet mask of connected display. Enter new Subnet mask according to your LAN.
Gateway address	Shows factory default Gateway address of connected display. Enter new Gateway address according to your LAN.
TCP/IP port	Shows factory default TCP/IP port: **10001**

*Note: Do not forget to press the **Set** button after making each change. Otherwise the change will be discarded. When finished with settings, click the **Refresh** button.*

It is possible to reset the IP address back to factory default value by pressing and holding the RESET button for **5** seconds. The RESET button is located near the external sensor connector P1 on the back panel.

Change administrator password

Enter new password if you want to change it.
Default password is "**admin**".
Click on the "**save new password**" button when finished.

Current password	Enter current password.
New password	Enter new password, max. 10 characters.
Confirm new password	Re-enter new password.