Monitoring
Air Temperature and Humidity

Large-size LED Displays
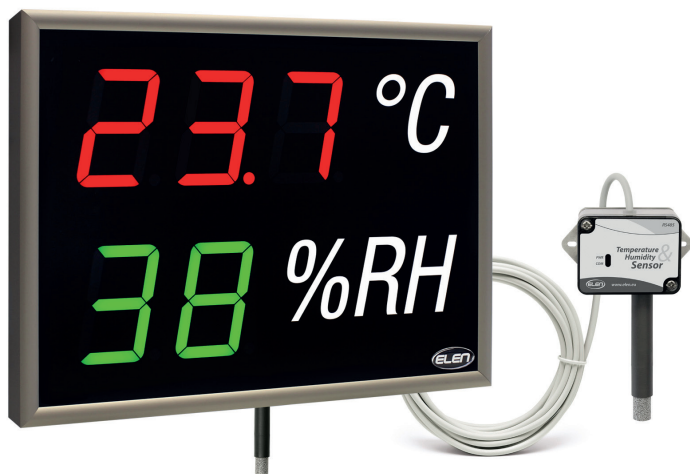
NDA 100/3-2 THS R L20 230AC USB
NDA 100/3-2 TH R L20 230AC USB
NDA 100/3-2 THS RG L20 230AC RS485
NDA 100/3-2 TH RG L20 230AC RS485

User Manual (FW ver. 2.02 - MODBUS)

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** L20 230AC **USB**
2. NDA 100/3-2 **TH R** L20 230AC **USB**
3. NDA 100/3-2 **THS RG** L20 230AC **RS485**
4. NDA 100/3-2 **TH RG** L20 230AC **RS485**
5. NDA 100/3-2 **THS RG** L20 230AC **LAN**
6. NDA 100/3-2 **TH RG** L20 230AC **LAN**
7. NDA 100/3-2 **THS RG** L20 **PoE LAN**
8. NDA 100/3-2 **TH RG** L20 **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, AllnGaP 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 20, 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	4,5 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

⚠️ 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.

⚠️ The display plugs into an electrical outlet that must be easily accessible.

⚠️ The electrical outlet to which the display is connected must be protected by an overcurrent protection element, which must be part of the building installation.
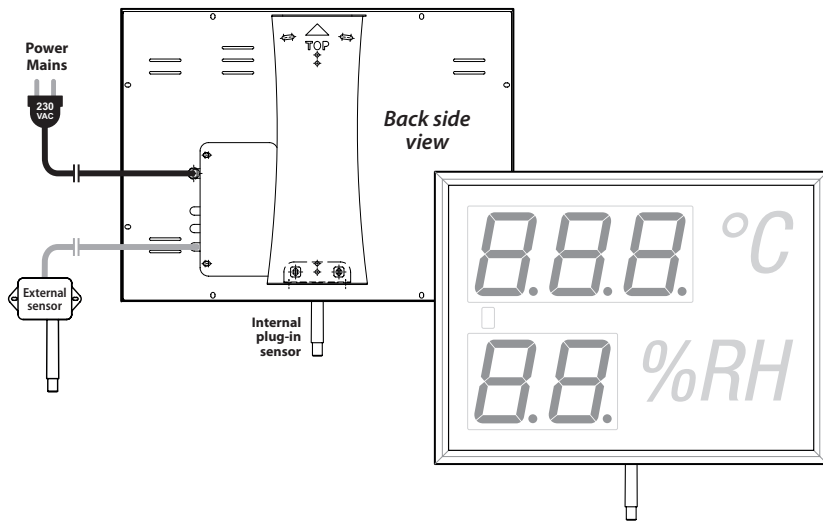
Internal Plug-in Sensor Connection (NDA…THS version)

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.
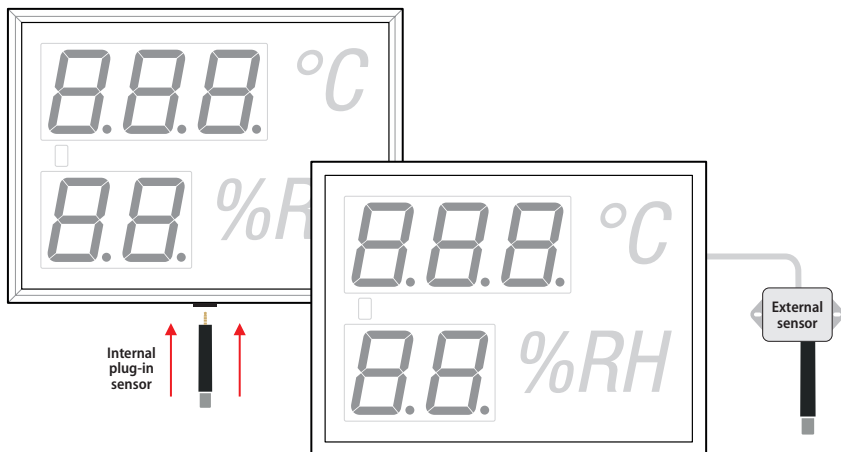
External Sensor Connection (NDA…TH version)

If you purchased external sensor "THS Sensor 52 12DC RS485" as an optional accessory, your display includes input connector for this sensor.
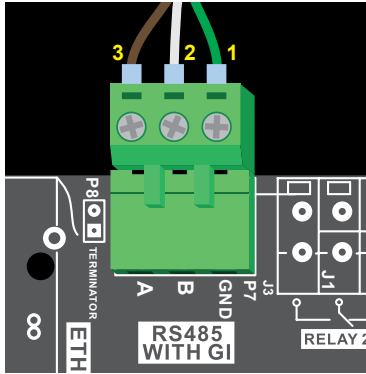
External sensor has a 4-wire cable with EUROCLAMP connector already preinstalled. Plug this connector into its corresponding connector "P1" (green color connector) located on the PCB board. All PCB connectors are accessible on the back panel of large size LED display under a small door plate. The door 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.

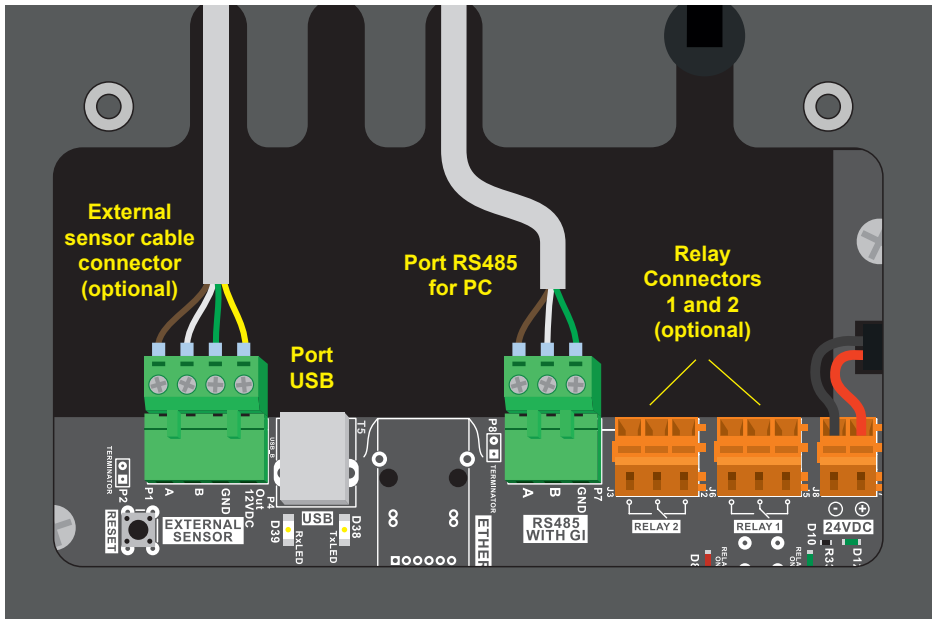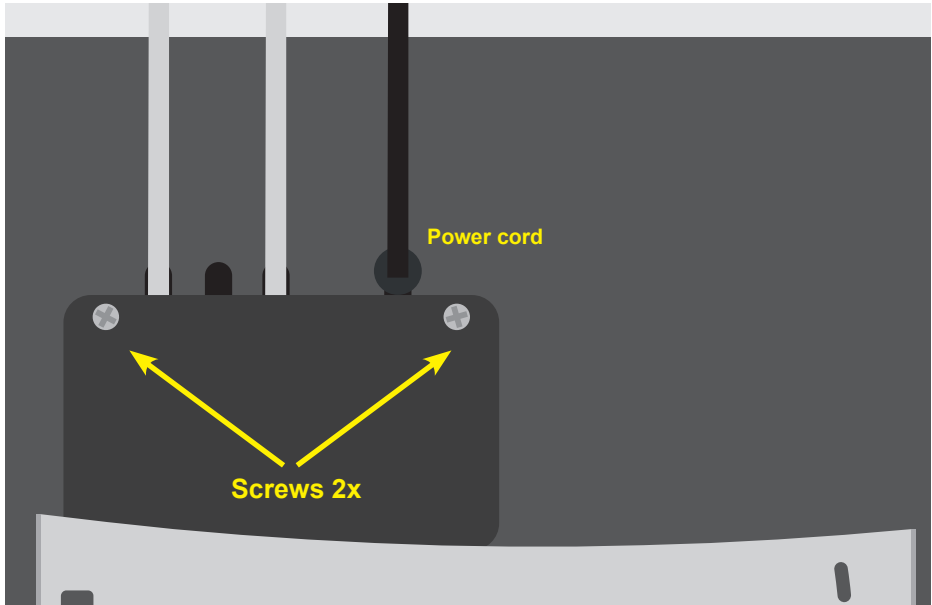## RS485 Communication Interface – Data Logging to PC

If you purchased display with RS485 data logging interface, communication with PC for data logging is performed via 3-terminal connector P7. This connector 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 your RS485 data cable to the corresponding 3-terminal RS485 connector P7. Then replace the door plate with its screws. Use the slots in the door plate to route the cable. Note, the RS485 data logging interface is galvanically isolated.

RS485 Data Logging Connector – P7

3-pin green connector with mating cable connector is preinstalled.

Connector view Port RS485 for Data Logging to PC		Signal
	1	GND
	2	B
	3	A

Details of Cable Connections

Power cord

Screws 2x

External sensor cable connector (optional)

Port RS485 for PC

Relay Connectors 1 and 2 (optional)

Port USB

TERMINATOR
PP2
P1   A   B   GND
RESET
EXTERNAL
SENSOR
P4
Out
12VDC
USB-B
USB
D39 RxLED
D38 TxLED
T5
P8
TERMINATOR
A   B   GND
P7
ETHER
RS485
WITH GI
J3   J6   J2
RELAY 2
J5
RELAY 1
J8
RELAY 3
D4
RELA
Y2
D10
R3:
RELA
Y1
24VDC
D1:

USB Communication Interface – Data Logging to PC

The communication with PC for data logging can be performed via the USB interface.
Use standard USB-A(M) to USB-B(M) type interconnection cable (also used for printers). USB connector P4 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 USB data cable to the corresponding USB connector. Then replace the door plate with its screws. Use the slots in the door plate to route the cable.

Relay connection (optional)

NDA series displays can be equipped with two relays, which are available as optional accessories. The relay can be used to connect and control various external devices (e.g. visual or acoustic signalization). By connecting the power supply to these devices via the relay connectors, these devices can be turned on or off. The relay is switched on or off according to the settings of the measured values in the Web Server - Relay No.1 / Relay No.2 menu.
The relay contact circuit must be protected by overcurrent protection (fuse, circuit breaker ...) with a tripping current of 6A max. or lower.
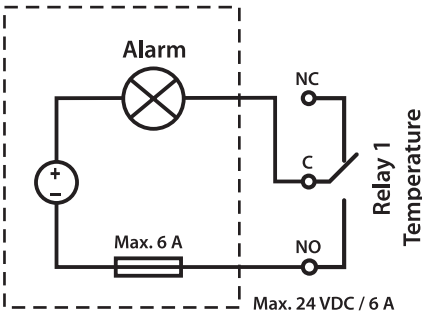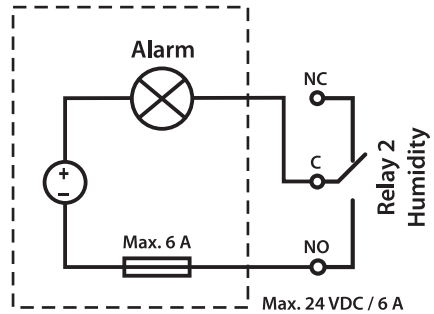
6. Configuring Display Parameters

NDA displays contain many features, which can be configured using one of the following options:

1. IR remote control
2. USB interface
3. RS485 interface

Configuration and usage of these features depend on display's model version.

7. Configuring Display Parameters using Remote Control IR

Operating Instructions

NDA displays contain many features, which can be configured via IR remote control or Internet web browser (in case of display with LAN interface). The IR remote control is offered as optional accessory. Configuration and usage of these features depend on display's model version (e.g. color or one-color LED, etc.).

The IR remote control has function buttons **SELECT**, **F1**, **F2**, **F3**, **MENU**, which are used to call the menu items of different display parameters. To set these parameters, simply aim the remote control toward front side of display and press the function buttons according to desired parameter which you want to change. Once in the function menu, use the **Upp arrow** / **Down arrow** to select item to change and confirm your selection with **OK** button (located in the middle of arrows).

The following manual describes the function of each function button and its usage.

SELECT   Temperature digits will start flashing, meaning it has entered the configuration menu.
In case of 3-color LED display model, color of digits will change to amber color indicating it is in the configuration mode. 1-color display will only change brightness of value.

You can use "**Upp arrow** / **Down arrow**" buttons to select which line, temperature or humidity you want to configure. The line, which is flashing is in the configuration mode.

Temperature Configuration

F1

⬛ **OFS**   Correction offset of measured value. Using the Up/Down arrows set the value of desired offset correction for temperature. Default factory setting is 0,0°C.
Correction offset is normally not needed as the sensor chip is already calibrated in factory.

⬛ **tU**   Temperature units. Select °C or °F for desired units to be displayed.
Please note, change of units will require label foil change as well.

F2

⬛ **CoL**   LED color setting. ***Feature valid for 3-color (red/green/yellow) LED displays only.*** Select desired color by pressing and holding "**Upp arrow** / **Down arrow**" buttons, to change LED color and confirm your selection with **OK** button.
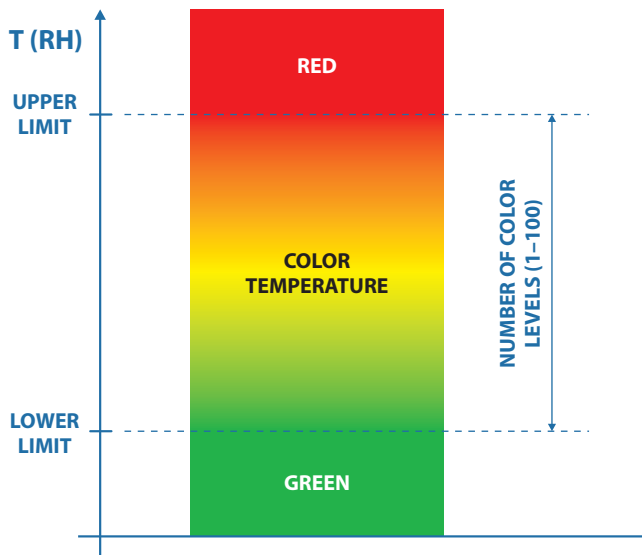
F3

⬛ **Lou**   Sets the lower limit. When this limit is exceeded:
Value on display will be blinking when blinking function "**bOL**" is ON. Select desired value with "**Upp arrow** / **Down arrow**" buttons and confirm your selection with **OK** button.
Value on display will change color to green if color temperature function "**Ct**" is ON.

UPP   Sets the upper limit. When this limit is exceeded:

Value on display will be blinking when blinking function "**bOL**" is ON.

Select desired value with "**Upp arrow** / **Down arrow**" buttons and confirm your selection with **OK** button. Value on display will change color to red if color temperature function "**Ct**" is ON.

bOL   Blinking (flashing) of display **ON** / **OFF**.

Sets the blinking of display after exceeding the upper or lower limit. Select **oFF** or **on**.

Select desired option with "**Upp arrow** / **Down arrow**" buttons and confirm your selection with **OK** button.

Ct   Color temperature function **ON** / **OFF**. ***Feature valid for 3-color LED displays only.*** Displayed value will gradually change color according to measured temperature from Lou to UPP limit. Select "**oFF**" or "**on**" with arrow buttons and confirm your selection with **OK**.

LEU   Sets the number of color levels between lower and upper limits. Select desired value with "**Upp arrow** / **Down arrow**" buttons and confirm your selection with **OK** button.

Relative Humidity Configuration

Press **SELECT** and "**Down arrow**" to enter the configuration mode for relative humidity. Its value will be flashing.

F1 F2 F3

The same analogous functions as described above for temperature, except for tU function for units change is not present.

Display Configuration

MENU

Select desired function with "**Upp arrow** / **Down arrow**" and confirm with **OK**.

br Brightness control - manual or automatic.
Select desired option with "**Upp arrow** / **Down arrow**", confirm with **OK**.

di Direct control of fixed brightness level by user.

Au Automatic control of brightness according to ambient light.

bL Brightness Level.
Set direct brightness level from 1 to 100 when manual (**di**) option is selected.
Set slope of brightness regulation curve when automatic (**Au**) option is selected.
Select desired option with "**Upp arrow** / **Down arrow**", confirm with **OK**.

Adr Sets display's bus address RS485.
Used only when more displays are connected on serial RS485 network bus.

Mod Sets different modes of displaying values from connected sensors.
Select desired option with "**Upp arrow** / **Down arrow**", confirm with **OK**.

1.SE Displayed are values from the first sensor.

2.SE Displayed are values from the second sensor.

AUG Displayed is the average value from both, first and second sensor.

MODBUS RTU parameters settings for communication interfaces with MODBUS RTU protocol.

USb USB communication parameters settings of display.
Select desired option with "**Upp arrow** / **Down arrow**", confirm with **OK**.

bdr Baud rate for USB communication interface of display (default: 19200 Bd)
Possible values: 1200 Bd, 2400 Bd, 4800 Bd, 9600 Bd, 14400 Bd, 19200 Bd, 38400 Bd, 57600 Bd, 115200 Bd.

PAr Parity type for USB communication interface of display (default: EVEN).

EUE Even parity.

odd Odd parity.

non No parity.

485 RS485 communication parameters settings of display.
Select desired option with "**Upp arrow** / **Down arrow**", confirm with **OK**.

bdr Baud rate for RS485 communication interface of display (default: 19200 Bd)
Possible values: 1200 Bd, 2400 Bd, 4800 Bd, 9600 Bd, 14400 Bd, 19200 Bd, 38400 Bd, 57600 Bd, 115200 Bd.

PAr Parity type for RS485 communication interface of display (default: EVEN).

EUE Even parity.

odd Odd parity.

non No parity.

1.SE **Sensor No. 1** - communication type and MODBUS parameters settings.
Select desired option with "**Upp arrow** / **Down arrow**", confirm with **OK**.

Con Connection type between sensor No. 1 and display (default: as manufactured)

485 External sensor, connected to display via RS485 connector on the back side.

Ndb MODBUS slave. Display has no temperature and humidity sensor connected. Temperature and humidity data are sent to display via some communication interface using MODBUS communication protocol from a MODBUS master device, e.g. from PC, PLC etc. Values are written into registers using function **"write single register" 0x06**.
Temperature: Address 0, signed int in tenths of °C
Humidity: Address 10, signed int in tenths of %RH

non No sensor is connected.

Int Internal (plug-in) sensor.

Eth External sensor, connected to Ethernet LAN network.

1.id ID number of sensor No. 1 (MODBUS slave address, default ID: 1).
Possible values: 1 to 247

bdr Baud rate for communication with sensor No. 1 (default: 19200).
Possible values: 1200 Bd, 2400 Bd, 4800 Bd, 9600 Bd, 14400 Bd, 19200 Bd, 38400 Bd, 57600 Bd, 115200 Bd.

PAr Parity type for communication with sensor No. 1 (default: EVEN).

EUE Even parity.

odd Odd parity.

non No parity.

Fnc MODBUS function number, used for reading value of temperature and humidity from sensor No. 1 (Default: 4).

AtE MODBUS address register of sensor No. 1, which contains temperature value in format signed int, for example 256 is 25,6 °C (Default: 0)

AHU MODBUS address register of sensor No. 1, which contains humidity value in format signed int, for example 458 is 45,8 %RH (Default: 10).

2.SE **Sensor No. 2** - communication type and MODBUS parameters settings.
Select desired option with "**Upp arrow** / **Down arrow**", confirm with **OK**.

Con Connection type between sensor No. 2 and display (default: as manufactured)

non No sensor is connected.

Eth External sensor, connected to Ethernet LAN network.

485 External sensor, connected to display via RS485 connector on back side.

I.id ID number of sensor No. 2 (MODBUS slave address, default ID: 2).
Possible values: 1 to 247

bdr Baud rate for communication with sensor No. 2 (default: 19200).
Possible values: 1200 Bd, 2400 Bd, 4800 Bd, 9600 Bd, 14400 Bd, 19200 Bd, 38400 Bd, 57600 Bd, 115200 Bd.

PAr Parity type for communication with sensor No. 2 (default: EVEN).

EUE Even parity.

odd Odd parity.

non No parity.

Fnc MODBUS function number, used for reading value of temperature and humidity from sensor No. 2 (Default: 4).

AtE MODBUS address register of sensor No. 2, which contains temperature value in format signed int, for example -1 is -0,1 °C (Default: 0)

AHU MODBUS address register of sensor No. 2, which contains humidity value in format signed int, for example 540 is 54,0 %RH (Default: 10).

Stop bits are set automatically according to parity settings as per MODBUS protocol specifications. (Valid for all communication interfaces of display.)

RESET It is possible to recover default factory settings of display by pressing **RESET** button and confirming this selection by pressing **OK** button within 3 seconds. If the **ESC** button or nothing is pressed within 3 seconds, parameters will not change. In case of display with LAN interface, IP address will not be affected. IP address can be reset to factory default value only by hardware reset – pressing and holding the **RESET** button for 5 seconds. It is located on the back side of display, near the LAN RJ45 socket.

8. Configuration of display parameters using software and PC

Connecting the NDA display to a computer via USB or RS485

Disconnect the NDA display from the electrical power outlet. Using the USB A-B type cable connect the NDA display to a computer. (USB and RS485 ports are located on the back side of display, under small door.) Then reapply the electrical power again.

If the display is connected to a computer for the first time directly via USB port, and the USB driver is not installed automatically, you need to install the **CDM21228_Setup.exe** driver to create a serial port using the FTDI chip. This file can be downloaded from the Internet. If the display is connected to a computer via the RS485 interface on the display, it is necessary to use the RS485 / USB converter on the computer side (the converter is available as an optional accessory or can be purchased from other suppliers). The **RS485 / USB converter** driver is on the enclosed CD from the manufacturer, or it will be installed automatically. After successfully connecting and detecting the USB device under Windows OS, run the **Config_NDA.exe** application.
The application is available at: ***https://www.elen.sk/sk/podpora/Software/Config-NDA.html***.

SW will start searching for all connected displays automatically.
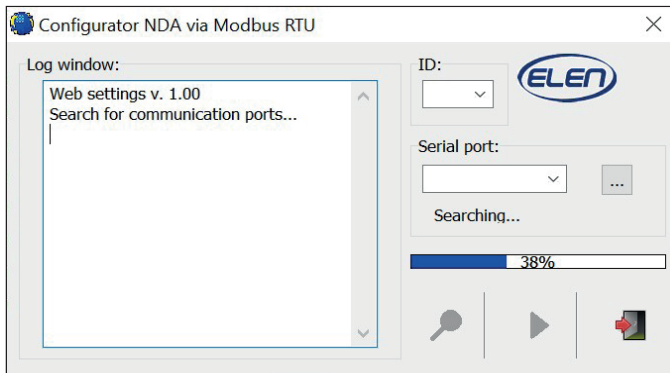

When the search is complete, select the appropriate serial communication port from the list and, if necessary, set the serial transmission parameters by clicking on the "**...**" button.
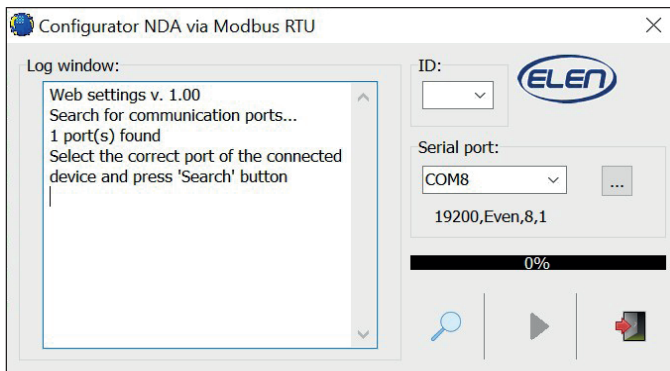
The COM8 port is selected in the previous figure, but if other external ports are found, those ports will be listed as well. It is necessary to carefully select the correct port. The correct USB / COM port can be found in the Device Manager section on the PC.

If display's port parameters are different, they must be set in the **Serial** dialog box according to the currently used NDA display.
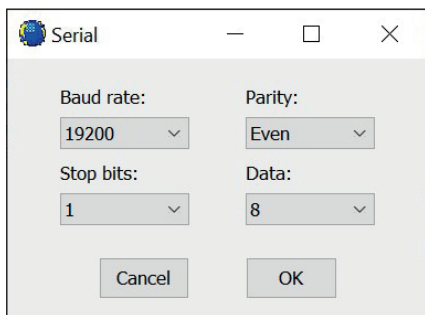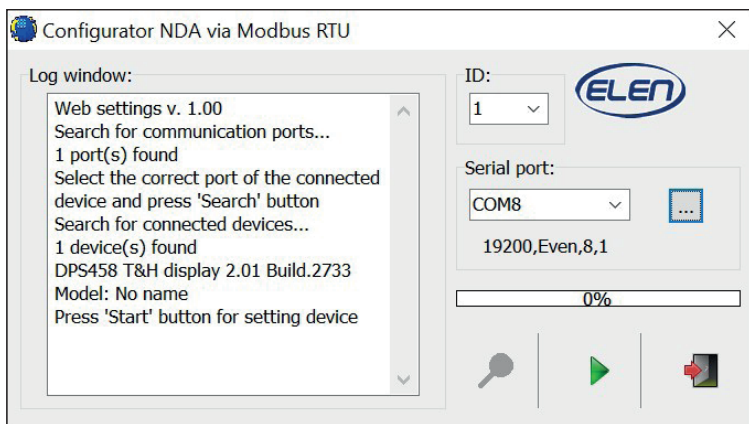

If you do not know these parameters, exit **Config_NDA.exe** and reset the NDA display to factory defaults. Then run **Config_NDA.exe** again and follow all the steps so far.

Searching for Display's ID

Click the **Search** button to locate the display that is connected to PC. The log window displays its version and model, and the **ID** field shows its number.
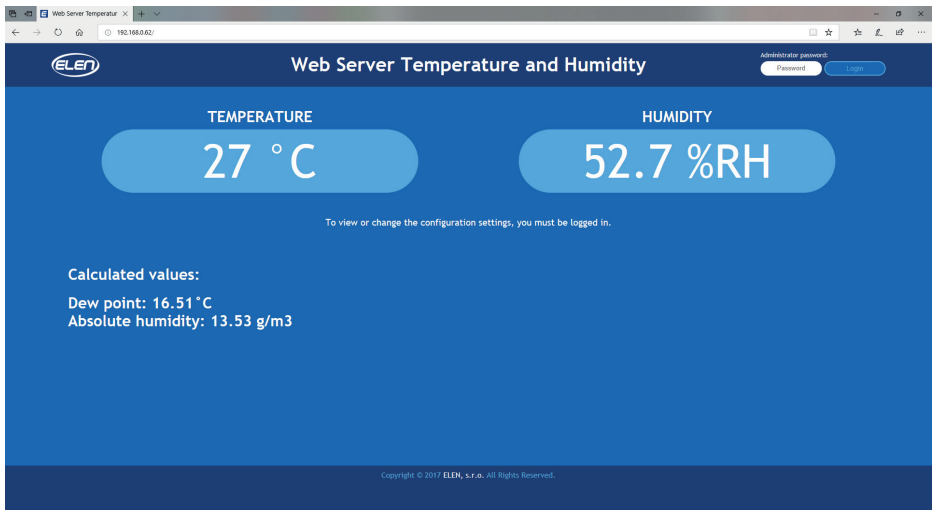

If the application does not find any connected display, the **Start** button will not be available. The display's power supply and / or USB cable connection must be checked.

Starting the Web Server

Clicking the **Start** button launches the web server in the default Internet web browser on the PC. Currently measured values will be displayed.

The default password „**admin**" in the upper right corner is used to enter the configuration parameter settings.

When the web server starts, **Config_NDA.exe** application minimizes to the notification area (the notification area is usually located in the lower-right corner of the Windows screen) and communicates with display in the background.

The configuration settings menu provides the user with many options. Here is a brief description of each option.

Note: Be sure to click the Set button each time you make a change. Otherwise the change will be discarded.

ture and Humidity

Logout

Y

RH

[ ] Set
[ ] Set

[ ] Set
[ ] Set
On ○ Off Set
[ ] Set
On ◉ Off Set

2:
sory)

Enable ○ Disable Set
midity Alarm [ ] Set
[ ] Set
[ ] Set

s under voltage.
ffect in 10 seconds!

| Display | Sensor No.1 | Sensor No.2 | Info |

Display settings:

Display mode: | Sensor No. 1 ▾ | Set
Brightness mode: | Automatic ▾ | Set
Curve slope (1 - 100): | 90 | Set

Display ID: | 1 | Set

USB virtual serial COM port settings:

Baud Rate: | 19200 ▾ | Set
Parity: | Even ▾ | Set

8 data bits, 1 stop bit

MODBUS RS-485 Serial Settings:

Baud Rate: | 19200 ▾ | Set
Parity: | Even ▾ | Set

8 data bits, 1 stop bit

MODBUS TCP/IP Settings:

MAC: | No Use |
IP address: | No Use | Set
Subnet mask: | No Use | Set
Gateway address: | No Use | Set
TCP/IP port for MODBUS: | 0 | Set
TCP/IP port for factory services: | 0 | Set

. All Rights Reserved.

~ure and Humidity

Logout

~TY

%RH

| | Set |
| | Set |

| | Set |
| | Set |
On ◯ Off | Set |
| | Set |
On ◉ Off | Set |

~2:
~sory)

~Enable ◯ Disable | Set |
~midity Alarm ▾ | Set |
| | Set |
| | Set |

~s under voltage.
~ffect in 10 seconds!

| Display | Sensor No.1 | Sensor No.2 | Info |

Sensor No. 1 settings:

Sensor No. 1 connection: [RS-485 ▾] Set
Sensor No. 1 ID: [1] Set

If MODBUS TCP/IP External Sensor is Connected:

Sensor No. 1 IP address: [No Use] Set
Sensor No. 1 TCP/IP port: [0] Set

If MODBUS RS485 External Sensor is Connected:

Baud Rate: [19200 ▾] Set
Parity: [Even ▾] Set

8 data bits, 1 stop bit

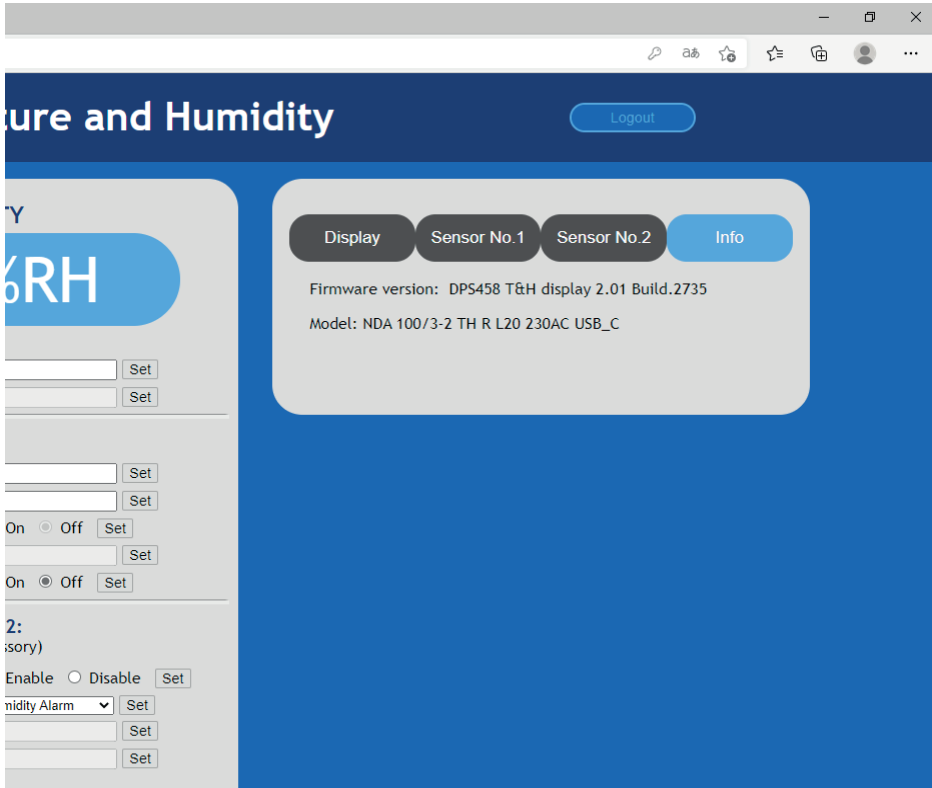Connection settings are the same as for sensor No. 2.

MODBUS Settings for Sensor No.1:

Sensor No. 1 Function: [4] Set
Sensor No. 1 Register address for temperature: [0] Set
Sensor No. 1 Register address for humidity: [10] Set

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
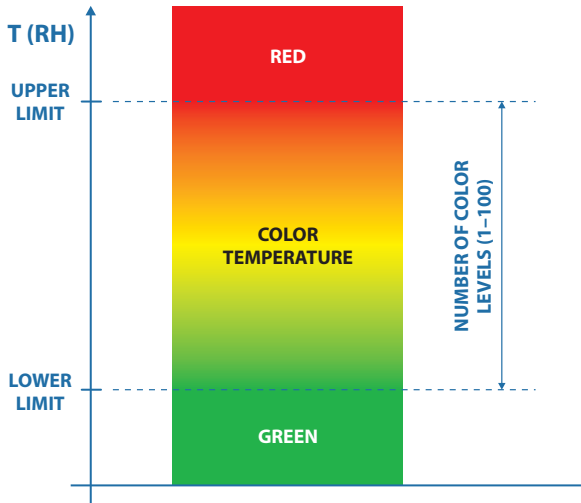Allows visual signalization when values exceed limit values.

Upper limit
Sets the upper limit value for the alarm.

Lower limit
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.

Number of color levels (1 to 100)

Sets the number of color levels during transition from lower limit (green) to upper limit (red) and wise versa when color temperature function is ON.

Temperature blinking   **On/Off**, enables or disables blinking (flashing) of display when the upper or lower limit is exceeded.

Relay No. 1   Display can be equipped with two optional relays offered as optional accessory.

Relay No. 1 function   **Enabled / Disabled**
Enables or disables Relay No. 1.

Function of relay No. 1 **Thermostat / Hygrostat / Temperature Alarm**
Sets the function of relay No. 1 according to your application.

OFF if temperature is higher than
Relay No. 1 is OFF when temperature is above than this value.

ON if temperature is lower than
Relay No. 1 is ON when temperature is below this value.

HUMIDITY

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

Display settings

Display mode

> **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, if two sensors are connected.

Brightness mode

> **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 (1 – 100)

> If **Direct** mode is selected above, this value sets fixed LED brightness level from 1 to 100.

Curve slope (1 – 100)

> If **Automatic** mode is selected above, this value sets the slope of brightness regulation curve.

Display ID **1 – 247**
Designates internal RS485 address ID number of display.
(MODBUS slave address.)

USB virtual serial COM port settings

Baud Rate 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200.
Baud rate for USB communication interface (default: 19200 Bd)

Parity None, Even, Odd
Parity type settings for USB interface (default: EVEN)

MODBUS RS-485 Serial Settings

Baud Rate 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200.
Baud rate for RS485 communication interface (default: 19200 Bd)

Parity None, Even, Odd
Parity type settings for RS485 interface (default: EVEN)

MODBUS TCP/IP Settings

MAC Not applicable.
Applicable for displays with LAN interface only.

IP address Not applicable.
Applicable for displays with LAN interface only.

Subnet mask	Not applicable. Applicable for displays with LAN interface only.
Gateway address	Not applicable. Applicable for displays with LAN interface only.

TCP/IP port for MODBUS

Not applicable.
Applicable for displays with LAN interface only.

TCP/IP port for factory services

Not applicable.
Applicable for displays with LAN interface only.

Sensor No. 1 settings

This menu allows user to configure the type of sensor used and its parameters.

Sensor No.1 connection

Internal, RS-485, Ethernet, MODBUS slave, None
Select what type of sensor is paired with display.
Internal – display is equipped with plug-in internal sensor.
RS485 – external sensor is attached to display via cable.
Ethernet – not applicable. Applicable for displays with LAN interface only.
MODBUS slave – LED display is used as a displaying unit for a control system
(e.g. PC, PLC, etc.), which sends it's temperature and humidity data.
None – no sensor is connected

Sensor No. 1 ID   Sensor No. 1 ID number or MODBUS slave address.

If MODBUS TCP/IP External Sensor is Connected

Sensor No. 1 IP address

Not applicable. Applicable for displays with LAN interface only.

Sensor No. 1 TCP/IP port

Not applicable. Applicable for displays with LAN interface only.

If MODBUS RS485 External Sensor is Connected

Baud Rate	**1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200** Baud rate for sensor No. 1, if Sensor No. 1 connection: is set to RS-485. Default: 19200. (MODBUS standard default.)
Parity	**None, Even, Odd** Parity type of sensor No. 1, if Sensor No. 1 connection: is set to RS-485. Default: EVEN. (MODBUS standard default.)

Baud rate and Parity of sensor No. 1 and No. 2 have the same settings because they are on the same RS485 bus.

MODBUS Settings for Sensor No.1

Sensor No. 1 Function
> **3, 4**
> Function number, which is used for reading temperature and humidity values.
> Default: 4. (Default for ELEN sensors.)

Sensor No. 1 Register address for temperature
> **0 to 65535**
> Address of register, which contains temperature value.
> The temperature value must be signed int and in tenths of °C.
> Default: 0. (Default for ELEN sensors.)

Sensor No. 1 Register address for humidity
> **0 to 65535**
> Address of register, which contains humidity value.
> The humidity value must be signed int and in tenths of %RH.
> Default: 10. (Default for ELEN sensors.)

Sensor No. 2 settings

This menu allows user to configure the type of sensor used and its parameters.

Sensor No.2 connection
> RS-485, Ethernet, None
> Select what type of sensor is paired with display.
> RS485 – external sensor is attached to display via cable.
> Ethernet – not applicable. Applicable for displays with LAN interface only.
> None – no sensor is connected

Sensor No. 2 ID   Sensor No. 2 ID number or MODBUS slave address.

If MODBUS TCP/IP External Sensor is Connected

Sensor No. 2 IP address
> Not applicable. Applicable for displays with LAN interface only.

Sensor No. 2 TCP/IP port
> Not applicable. Applicable for displays with LAN interface only.

If MODBUS RS485 External Sensor is Connected

Baud Rate   **1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200**
> Baud rate for sensor No. 2, if Sensor No. 2 connection: is set to RS-485.
> Default: 19200. (MODBUS standard default.)

Parity   **None, Even, Odd**
> Parity type of sensor No. 2, if Sensor No. 2 connection: is set to RS-485.
> Default: EVEN. (MODBUS standard default.)

Baud rate and Parity of sensor No. 1 and No. 2 have the same settings because they are on the same RS485 bus.

MODBUS Settings for Sensor No.2

Sensor No. 1 Function
> **3, 4**
> Function number, which is used for reading temperature and humidity values.
> Default: 4. (Default for ELEN sensors.)

Sensor No. 2 Register address for temperature
> **0 to 65535**
> Address of register, which contains temperature value.
> The temperature value must be signed int and in tenths of °C.
> Default: 0. (Default for ELEN sensors.)

Sensor No. 2 Register address for humidity
> **0 to 65535**
> Address of register, which contains humidity value.
> The humidity value must be signed int and in tenths of %RH.
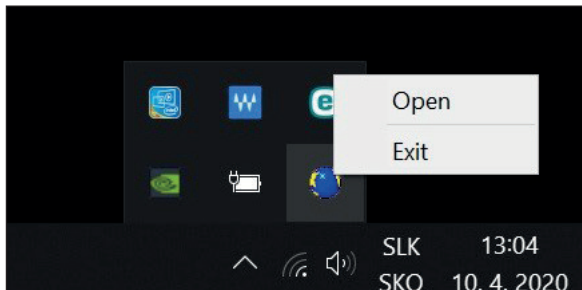> Default: 10. (Default for ELEN sensors.)

*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.*

Stop bits are set automatically according to parity settings as per MODBUS protocol specifications. (Valid for all communication interfaces of display.)

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.
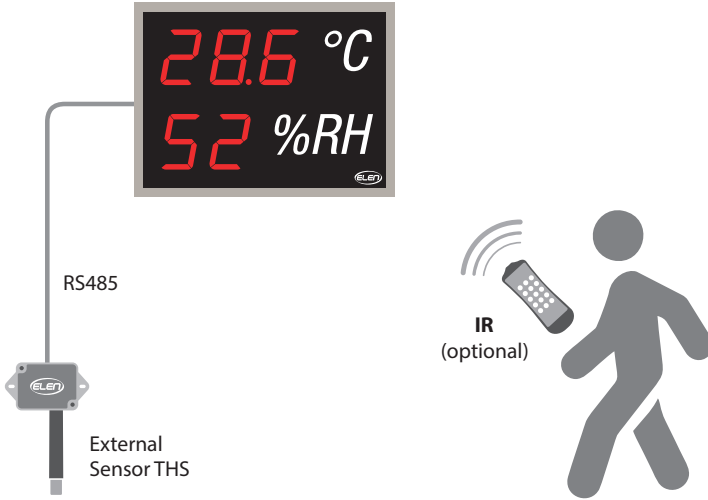
9. Exiting the Program

To complete the setup be aware that there are two software applications running in parallel on the computer. First application is the **Config_NDA.exe** and the second application is the default Internet browser. To complete the setup, it is therefore necessary to first close the Internet browser window, in which the setup web server itself is running. Then, right-click the icon in the notification area, which is usually located in the lower-right corner of the Windows screen. Select "**Exit**" from the menu to end the program.
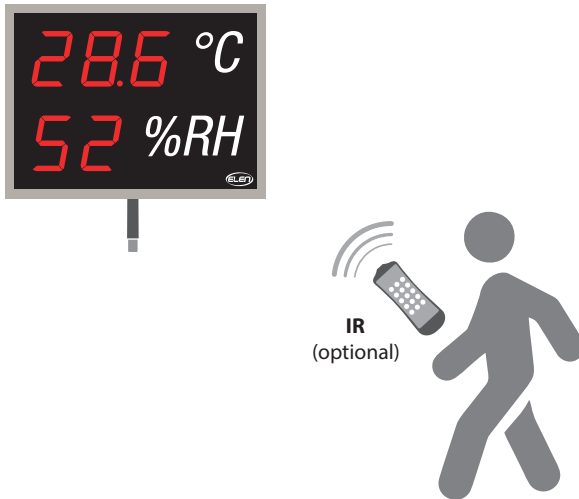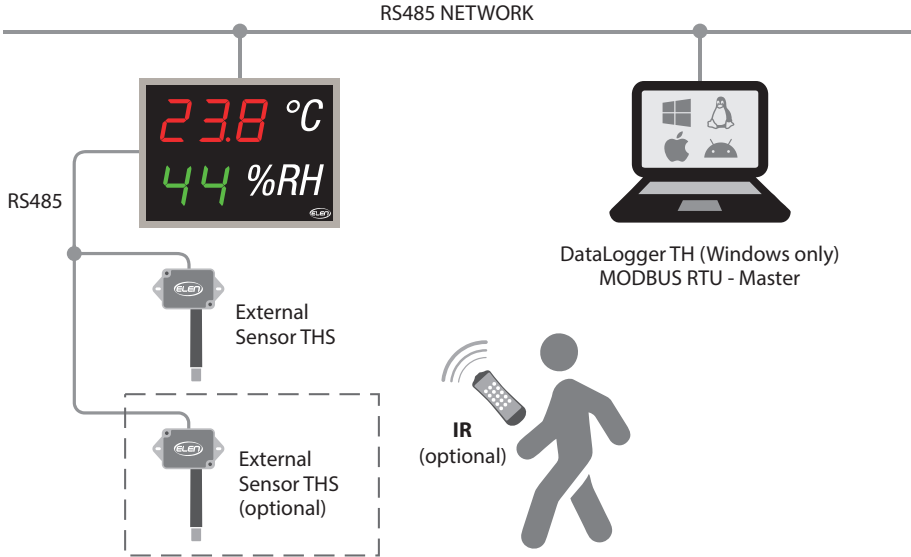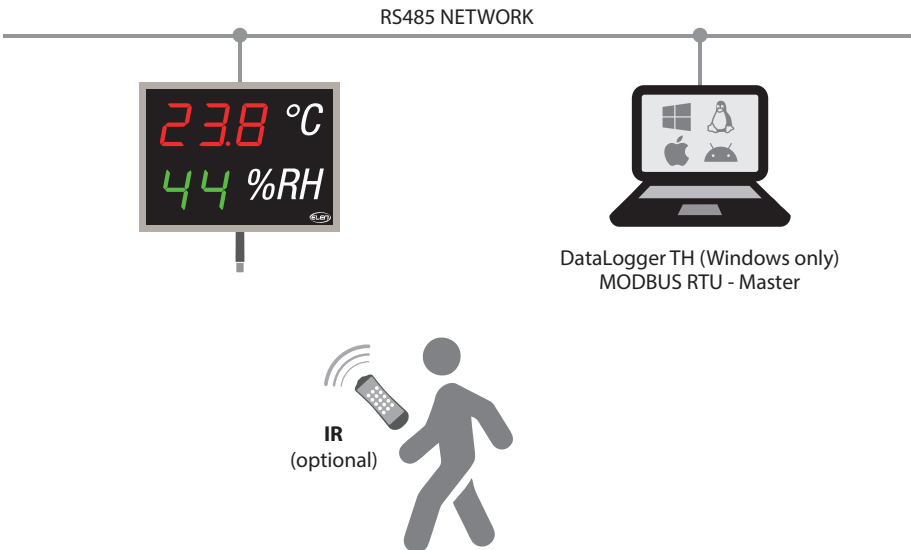
Application diagram

NDA 100/3-2 TH R L20 230AC USB

RS485

IR
(optional)

External
Sensor THS

NDA 100/3-2 THS R L20 230AC USB

IR
(optional)

NDA 100/3-2 TH RG L20 230AC RS485

RS485 NETWORK

RS485

23.8 °C
44 %RH

External
Sensor THS

External
Sensor THS
(optional)

IR
(optional)

DataLogger TH (Windows only)
MODBUS RTU - Master

NDA 100/3-2 THS RG L20 230AC RS485

RS485 NETWORK

23.8 °C
44 %RH

DataLogger TH (Windows only)
MODBUS RTU - Master

IR
(optional)

NDA 100/3-2 THS RG L20 PoE LAN

28.6 °C
52 %RH

PoE LAN

THS Sensor 40 PoE LAN

230AC

Power
adapter

PoE Switch

PoE LAN

LAN

Ethernet

Web Browser
DataLogger TH (Windows only)
MODBUS TCP/IP - Master

USB

Converter
USB-RS485

NDA 100/3-2 TH RG L20 230AC RS485

230AC

23.8 °C
44 %RH

RS485

External sensor
THS Sensor 52 12DC RS485

EC DECLARATION OF CONFORMITY
No. 19102107 / No. 19102108

Manufacturer: ELEN, s.r.o.
Lubochnianska 16
080 06 Lubotice
Slovak Republic

The undersigned, representing the manufacturer above herewith declares that the following products are in conformance with the EMC Directive 2014/30/EU, LVD Directive 2014/35/EU and RoHS Directive 2011/65/EU and are CE marked accordingly.

Name of Product: Large size numerical display
Types: NDA 100/3-2 THS R L20 230AC USB
NDA 100/3-2 TH R L20 230AC USB
NDA 100/3-2 THS RG L20 230AC RS485
NDA 100/3-2 TH RG L20 230AC RS485

Description: This product is an electronic device used to display numerical information – air temperature and humidity.

Harmonised standards used:

Safety: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013

EMC: EN 55032:2012/AC:2013
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 61000-4-2:2009
EN 61000-4-3:2006 + A1:2008 + A2:2010
EN 61000-4-4:2012
EN 61000-4-5:2014
EN 61000-4-6:2014
EN 61000-4-8:2010
EN 61000-4-11:2004

RoHS: EN 50581:2012

Year when the CE mark was assigned: 2019

Representative: Ing. Ladislav Schichman
Title: Managing Director

Signature:
Date: October 21, 2019