

NORDcanopy

UV-S 1.2 Control Unit and UV Cleaning System Installation Guide



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1. General

This guide contains information for the safe installation of the ETS NORD UV-S 1.2 control unit and UV cleaning system. The UV-S 1.2 control unit can be installed in one UV cleaning system together with UV-S 1.1 and UV-L 1.1 control units. The installation guide for UV-S 1.1 and UV-L 1.1 control units can be found on the ETS NORD website.

UV-S 1.2 control unit can be used with both UV-900 and UV-1200 lamps. Additionally, it is possible to use an LED notification panel with the UV-S 1.2 control unit for visual monitoring of system statuses.

Read the guide carefully before installing or setting up the device!

All activities described in the installation guide must be carried out in accordance with <u>UV Pre-commissioning</u> <u>checklist</u> before an ETS NORD technician comes to the site to carry out system commissioning. ETS NORD reserves the right to issue an additional invoice if the confirmed tasks have not been completed.

2. Checking the product

Check that the packaged products do not have visible damage. Immediately notify the supplier and manufacturer of the products of damage or missing components.

Make sure that all components are received, matching both the order and delivery confirmation letters. Incorrect delivery and transport damage must be immediately reported to both the cargo carrier and ETS NORD Customer Service.

The time for filing a complaint or shipment discrepancy is 5 days after delivery. ETS NORD is not responsible for defects that have occurred after goods have been handed over to the buyer.

If goods purchased from ETS NORD have defects for which ETS NORD is responsible, ETS NORD will repair or replace the defective goods. If the goods cannot be repaired or replaced, ETS NORD will refund to the buyer all fees for such items resulting from the sales contract.

If you have any problems, please contact ETS NORD Customer Service!

UV-S 1.2 control unit package includes:

- Control unit,
- Power cable IEC C13 with plug (3 m),
- User manuals (EST, ENG, FIN, SWE).









The LCD control panel and M-Link package includes:

- LCD control panel with wall mount
- IoT device M-Link
- LAN cable for connection between M-Link and LCD control panel (0,5 m)
- DIN rail + 2 × M5 bolts for mounting M-Link
- Canopy section marking stickers
- Termination resistors 120 ohm 0,5W (2 pcs)
- Installation guide



A maximum of 6 different control units (UV-S 1.1, UV-S 1.2 or UV-L 1.1) can be combined under one LCD control panel.

Optional extras:

- LED notification panel
- Relay box (for duplicating the status signals to LED notification panel and to building automation)







3. Product safety

Failure to comply with the instructions for the use and safety of the UV (ultraviolet) device or improper use may cause bodily injury.

The UV cleaning system is designed to treat air with UV-C radiation and ozone only as described in this manual. UV reduces odours and breaks down grease, mould and bacteria. ETS NORD AS assumes no liability if the product is not used in accordance with the instructions contained in this guide.

The installation of the integrated control unit may only be carried out by persons trained and authorized by ETS NORD in accordance with international standards and regulations.

Only UV lamps and spare parts supplied by ETS NORD AS may be used in the system.

Ultraviolet radiation and ozone are harmful to health. Prolonged exposure can cause the following damage:

- Skin rashes and burns
- Eye irritation, retinal burn and loss of vision
- · Respiratory irritation and breathing problems

Remove canopy grease filters only after the UV lamps have been powered off from the LCD control panel.

When installing the lamp, always wear goggles and protective gloves to protect against quartz fragments in case of UV lamp breakage.

WARNINGS!



This device emits ultraviolet radiation and ozone! Prolonged exposure to ozone and ultraviolet radiation can cause bodily injury.



When removing grease filters, make sure that the lamps are not turned on!



Risk of falling! Make sure installation and service personnel have stable work platforms when installing the device.



Use protective glasses and gloves during installation and maintenance!



Risk of electric shock!

Electrical connections to the system may only be made by an authorized electrician.



Always power off the system and disconnect (by the plug) from the mains before any maintenance work!



Only original spare parts and UV lamps purchased from ETS NORD may be used in the UV 1.1 control unit!

UV lamps can be ordered from the sales office.



4. System overview



UV canopy components:

- 1 UV-lamp
- 2 HFK grease filter
- 3 UV protection shield
- 4 UV-lamp socket
- 5 Safety switch socket
- 6 Pressure measurement tip
- 7 LED light
- 8 Pressure sensor
- 9 UV control unit
- 10 LCD control panel

Control unit components:

- 11 UV-lamp power supply socket
- 12 Control unit X1 socket
- 13 M-Link socket
- 14 LCD socket
- 15 M-Link (ETS NORD IoT device)
- 16 Control unit power supply socket



5. UV-S 1.2 control unit installation





6. UV-lamp installation



Use protective glasses and gloves when installing UV-lamp!

6.1 Removing UV protective shields and grease filters

Under the protective shields are located canopy safety switches. When removing the protective shield make sure that the switch is not damaged.



6.2 Mounting UV-lamp to exhaust chamber





6.3 Restoring UV protective shields and grease filters



NB! When restoring the UV protective shields make sure that they are fixed properly, and that the safety switch is pressed down.

7. Electrical installation



Electrical connections to the system may only be made by an authorized electrician.

All the cablings and electrical installations indicated in the following chapters must be compiled by an electrician of the site.

7.1 Control unit power supply

The table indicates the quantities of UV control units per corresponding circuit breaker.

Circuit breaker type	Cable	UV-L* control unit max. quantity	UV-S** control unit max. quantity	Possible combina- tions of control units
C6	3G 0,75 mm² or 3G 1,5 mm²	1	3	-
C10	3G1,5 mm ²	1	6	1 UV-L* + 3 UV-S**
C13	3G 1,5 mm ² or 3G 2,5 mm ²	2	-	1 UV-L* + 3 UV-S** 2 UV-L* + 1 UV-S**
C16	3G 2,5 mm²	3	-	1 UV-L* + 5 UV-S** 2 UV-L* + 3 UV-S**

* UV-L 1.1 control unit

** UV-S 1.1 or UV-S 1.2 control unit



After connecting the power to the control unit, leave the power switch to "OFF" position.

7.2 Canopy lighting electrical connections and removal of ceiling panel transport screws





7.3 Connecting UV-lamp to control unit

Both types of lamps (UV-900 or UV-1200) can be connected to the control unit.



7.4 External control unit connections to X1 socket





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X1 socket	I/O grouping	I/O name
1		А
2	Wodbus RIU for connection between control	В
3	units	GND
4	Work permission FAS/BMS/AHU	Work permission +
5	Work permission FAS/BMS/AHU	Work permission -
6		Operation status
7	Status signals for building automation and LED	Critical error
8	notification panel from relay outputs	Service + fault status
9		COM (24 VDC relays)
10	LED notification panel power supply	+24 VDC
11	LED notification parlet power supply	-0 VDC (GND)
12	Capapy safety switch 1	Safety switch +
13	Canopy safety switch 1	Safety switch -
14	Canopy pressure sensor 1	+24 VDC
15		-0 VDC (GND)
16		Pressure sensor measuring Y

7.5 Connecting the safety switches of canopy sections

The safety switch cable 2x0,5mm² is ready on the ceiling of the canopy and needs to be connected to the UV control unit X1 connector as follows:

X1 socket	I/O grouping	I/O name	Cable core colours
12	Canopy safety switch	Canopy safety switch 1	Brown
13		Canopy safety switch 1	Blue





7.6 Connecting the pressure sensors of canopy sections

The UV canopy pressure sensor cable is connected to the pressure sensor that is located on the canopy ceiling. Connect the pressure sensor cable to the X1 connector on the UV control unit as follows:

X1 socket	I/O grouping	I/O name	Cable core colours
14	Canopy pressure sensor 1	+24 VDC	Brown
15		-0 VDC	White
16		Pressure sensor 1 measuring Y	Green

The pressure sensor cable and hose are already in place on the ceiling of the UV canopy's air inlet chamber and ready for connection.

If the pressure sensor hose has become disconnected from the measuring point during transport or installation, it must be reconnected.







7.7 Modbus data communication connection for control units

If there is more than one UV control unit in the kitchen then they must be connected in parallel with the next UV control unit.

The first control unit from which the cable continues to the next device must be the Master control unit, i.e. both the LCD control panel and the IoT device M-Link must be connected to this device in the future.

Use a $2 \times 2 \times 0,25$ mm² twisted pair cable for Modbus connection between devices. A specific type of cable characterized by the following characteristics:

1. Number and size of twisted pairs:

- 2×2 Means that the cable contains two pairs of wires, for a total of four wires.
- 0,25 mm² Each wire has a cross-sectional area of 0.25 mm², which refers to the dimensions
 of the wires and usually refers to the diameter of the wires and their ability to carry electrical
 current.
- 2. Twisting:
 - Twisted pair cable consists of wires twisted in pairs, where each pair is tightly twisted to avoid electromagnetic interference and suitable signal integrity.
- 3. Connecting:
 - First twisted pair connect to X1 slot input connector numbers 1(A) and 2 (B).
 - Second twisted pair connect X1 slot to input connector number 3 (GND).
- 4. Recommended cable options:
 - CAT5E; CAT6; NOMAK 2×2×0,5+0,5; JAMAK 2×(2+1)×0,5).
 - In the case of a cable with more twisted pairs, isolate the free twisted pairs no application can be found (e.g. CAT5E). When choosing a cable, strictly use a fiber cable!

X1 socket connections:

X1 socket	I/O grouping	I/O name
14	Modbus RTU for connection between control units	А
15		В
16		GND

UV control unit 1





Termination resistors must be added to the beginning and end of the Modbus network to get a stronger signal. Resistors can be found from the package of LCD control panel and M-Link. Size of the termination resistors is 120 ohms 0,5 W.



Note 1. Termination resistors must be added to the both ends of the network.

8. LCD control panel installation

NB! To install the control panel, choose a location in the kitchen or its immediate vicinity that is visible and easily accessible only to the staff. Avoid placing the control panel above kitchen appliances.

8.1 Attaching the mounting frame and connecting the LAN cable





Connect the LCD control panel to Master UV control unit using LAN cable.



8.2 Fixing the control panel to the wall without a metal case

If you want to install the control panel on the wall so that its LAN cable comes from the back and remains inside the wall, the metal housing of the control panel must be dismantled and the plastic mounting frame attached to the wall.





Attach the mounting frame to the wall so that the LAN cable can come through the wall from the back. The drawing shows the mounting holes in the mounting frame.





Place the screen back on the mounting frame and connect the LAN cable to the control unit "LCD" socket.







9. Connecting the IoT device M-Link

IoT device M-Link must be connected to the Master UV control unit, which also is connected to the LCD control panel.

To install the M-Link, attach the DIN rail to the bottom of the control unit and attach the M-Link to the DIN rail.



Connect the LAN cable from the router or directly from the local network to the M-Link ethernet port. From the upper C port of the M-Link, connect the LAN cable included in the package to the "M-LINK" connector of the UV control unit.



1 - M-LINK socket on UV control unit.

2 – Internet connection between local network or router and M-Link.

ETH – Ethernet port of M-Link for network connection.

C – The connection port between the M-Link and the control unit.

A local network is required, and it must be possible to connect the M-Link to it. If the customer does not want to connect the remote access device to their local network, there is also the option of using a 4G router. The router can be purchased through the ETS NORD sales department, and additional costs are incurred.

When using a router, an electrical connection must be provided by an electrician via an additional plug so that the router can be connected to the mains.

Without the IoT device, it is not possible for ETS NORD to provide the customer with a maintenance service, during which the customer is informed of the malfunctions and the UV lamp is replaced in time.

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10. LED notification panel installation

NB! To install the LED panel, choose a location in the kitchen that is highly visible to the staff. Avoid placing the LED panel above kitchen appliances.

The LED notification panel can only be used with the UV-S 1.2 control unit. If the UV cleaning system includes Slave devices (including UV-L 1.1), the UV-S 1.2 control unit must be the Master.

The LED notification panel is an optional accessory and is supplied if the user wants to quickly and easily understand the status of the UV cleaning system.

One LED notification panel is used per UV cleaning system, and it must be connected to the Master UV-S 1.2 control unit (the one with the LCD control panel connection).

The device can be installed in the kitchen either on the wall or on the canopy if the walls of the canopy allow it. For wall mounting you will need to use a 68 mm junction box. For the connection between the LED notification panel and the control unit, it is necessary to use a cable min. 4x0.25 mm².

Connection between the UV-S 1.2 control panel and the LED notification panel:

LED notification panel connector	UV-S 1.2 control unit X1 connector	I/O name	
1	6	Operation status	
2	7	Critical error	
3	8	Service + fault status	
	9	COM	Bridgod togother with a wire
	10	+24 VDC	Bhaged together with a wire
4	11	-0 VDC	

Connection diagram





LED notification panel installation











Images are for illustrative purposes. We reserve the right to make changes.



11. Marking the canopy with section stickers

Canopy marking stickers are delivered in the package of the LCD control panel and M-Link. Stickers should be installed on the sections of the canopies where the UV lamps are located.

The stickers are numerically 1.1-1.4 ... 6.1-6.4.

The first number on the sticker displays the unit's Modbus address, where on the Master units only the sticker 1.X is used and on Slave units the rest of the numbers $2.X \dots 6.X$.

The second number on the sticker displays the section in the canopy where the UV-lamps are located. With UV-S control unit only the sticker X.1 is used despite whether it is a Master or Slave unit.



An example of using the stickers: There are four UV lamps under the Master control panel, and they are divided between two sections. There are two UV-lamps in each section. In this case, use sticker 1.1 on the first section and sticker 1.2 on the second section.

If there are other UV control units (Slave units) in the same system, use stickers according to control units Modbus addresses and sections.

12. Building automation system (BMS)

The ETS NORD UV cleaning system can be connected to building automation via I/O status signals, Modbus TCP/IP or by giving the system a work permission from the building management system (BMS), ventilation unit (AHU) or fire alarm system (FAS) through potential free NO/NC contact.

To use building automation via Modbus, you can find the <u>"UV Cleaning System Guide for Automatics"</u> under UV cleaning system on the ETS NORD website.

12.1 Compatibility with building automation through I/O status signals

I/O status signals indicate the system's operational status, system critical errors and maintenance need.

To integrate building automation via I/O status signals, the connection must be made to the X1 connector of the Master UV-S 1.2 control unit.

If the system also uses a LED notification panel, then both the I/O status signals and the LED notification panel must be connected through a relay box which is an optional extra accessory.

Status table:

I/O name	Value 0	Value 1
Operation status	Status – Off (UV-lamps are off)	Status – On (UV-lamps are on)
Critical error	Status – Normal (UV-system does not have errors)	Status – Alarm (UV-system has active errors)
Service + fault status	Status – Normal (UV-system does not have maintenance need or faults)	Status – Alarm (UV-system requires maintenance or has faults)



Connecting status signals via X1 connector:

X1 connector	I/O grouping	I/O name
6	Status signals for building automation	Operation status
7		Critical error
8		Service + fault status
9		COM (24 VDC relays)

Connection diagram



If, in addition to the building automation I/O status signals the LED notification panel is used, then both must be connected through a relay box.

Connection between the UV-S 1.2 control unit and relay box:

UV-S 1.2 control unit X1 connector	Relay box terminal	I/O name
6	1	Operation status
7	2	Critical error
8	3	Service + fault status
9	+	COM
10	+	+24 VDC
11	-	-0 VDC



Connection diagram



Note. Remove the bridge on connector X1 between terminals 9 and 10 for connection of cable between control unit and relay box.



12.2 Compatibility with building automation through Modbus TCP/IP

To integrate building automation via Modbus TCP/IP, the connection must be made to the Master control unit M-Link Ethernet port.

To use building automation via Modbus, you can find the <u>"UV Cleaning System Guide for Automatics"</u> under UV cleaning system on the ETS NORD website.

Connection diagram



12.3 Work permission compatibility

It is possible to give a work permission to the UV cleaning system through NO or NC potential free contact. The work permission signal can either come from FAS, building automation centre or a ventilation unit.

X1 connector connections:

X1 connector	I/O grouping	I/O name
4	Work permission	Work permission +
5	FAS/BMS/AHU	Work permission -



Connection diagram





13. UV cleaning system functional scheme





14. Facts about UV and ozone

UV radiation is radiation invisible to the eye, consisting of several sub-rays divided by wavelength. The most dangerous of these are VUV and UVC, which are blocked by the Earth's ozone layer. Only UVB and UVA can escape the ozone layer, the dangerous effects of which are manifested by prolonged exposure.

In the case of UV radiation, according to EN 16282-8:2017, the maximum effective radiation intensity is 0.5 mW/m^2 measured at 10 cm from the separator. In Estonia, the limit of effective radiation intensity in the working environment is 30 J/m² for 8 hours of exposure or 1 mW/m² in Annex 1 of VV Regulation No. 47.

Prolonged exposure to UV radiation can cause the following injuries:

- On the skin: irritation and burning sensation
- In the eyes: severe irritation, burns and decreased vision

Ozone is a colorless gas whose sharp smell can be recognized by a person at a concentration of 0.02 ppm $(0,4 \text{ mg/m}^3)$.

Ozone smells similarly to chlorine used in swimming pools.

When using ozone, the current legislation must be observed. In Estonia, the following hygienic limits for ozone have been provided:

- 0,05...0,2 ppm (during working hours, 8 hours)
- 0,3 ppm (15 minutes).

Acute exposure to ozone can cause the following injuries:

- On the skin: irritation and burning sensation
- In the eyes: severe irritation, burns and decreased vision
- Lungs: irritation in the respiratory organs and breathing problems

If ozone is detected indoors, precautions should be taken.

ETS NORD

ETS NORD AS

Address:	Peterburi tee 53
	11415 Tallinn
	Estonia
Phone:	+372 680 7360
	info@etsnord.ee www.etsnord.ee

ETS NORD Finland

Address:	Pakkasraitti 4 04360 Tuusula Finland
Phone:	+358 401 842 842
	info@etsnord.fi www.etsnord.fi

ETS NORD Sweden

Address:	Järsjögatan 7 69235 Kumla Sweden
Phone:	+46 19 554 20 50
Address:	Pinjegatan 5 21363 Malmö Sweden
Phone:	+46 40-94 68 70
Address:	Förrådsvägen 5 151 58 Södertälje Sweden
Phone:	+46 8 550 301 40
	infa@atanard.ca

info@etsnord.se www.etsnord.se

ETS NORD International

info@etsnord.com www.etsnord.com

ETS NORD Ventilation Manufacturing LLC UAE

Sepin Rayo sepin.rayo@etsnord.com +971 5257 02916

Let's move the air together!

