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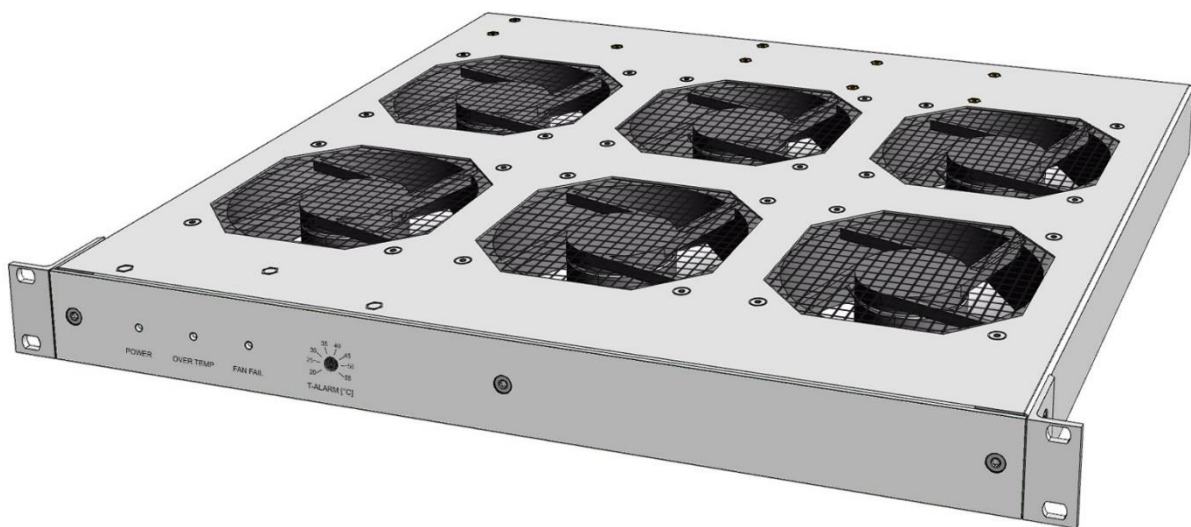
# SCHROFF SFT Fan Tray 1 U/19" with remote control

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## User Manual

Release 1.1

07.11.2021



Doc-No.: 63972-410

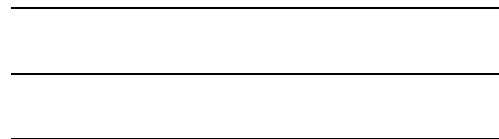


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## **1 Safety**

### **1.1 Intended Use**

The nVent SCHROFF 1 U/19" fan tray is intended to be installed into the 19" plane or under the roof of electronics cabinets to provide ventilation and heat dissipation.

Intended use includes compliance with the terms and conditions for assembly, disassembly, commissioning, operation and maintenance specified by the manufacturer.

### **1.2 Safety instructions of the manufacturer**

#### **1.2.1 Disclaimer**

Schroff accepts no liability for any errors in this documentation. To the maximum extent permissible by law, any liability for damage, direct or indirect, arising from the supply or use of this documentation is excluded.

Schroff retains the right to modify this document, including the liability disclaimer, at any time without notice and accepts no liability for any consequences of such alterations.

### 1.3 Safety symbols used in this manual

In these original operating instructions, warning notices point out residual risks that cannot be avoided by constructive means when installing or operating the fan tray. The warning notices are classified according to the severity of the damage occurring and the probability of its occurrence.

<b>⚠ DANGER</b>	
Symbol	<b>Short description of the danger</b> The signal word DANGER indicates an immediate danger. Non-observance will result in severe injuries or death.

<b>⚠ WARNING</b>	
Symbol	<b>Short description of the danger</b> The signal word WARNING indicates a possible danger. Non-observance can lead to serious injury or death.



<b>⚠ CAUTION</b>	
Symbol	<b>Short description of the danger</b> The signal word CAUTION indicates a possible danger. Non-observance can lead to injuries.

<b>ATTENTION</b>	
<b>Short description</b> The signal word ATTENTION indicates possible damages to equipment. Non-observance can lead to damage to the device.	


	<b>Important information</b>
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### 1.4 Safety Information for the Operator

Only trained specialists are authorized to carry out assembly, commissioning, completion, maintenance and service of the fan tray. The nationally applicable health and safety regulations must also be adhered to.

 <b>WARNING</b>	
	<p><b>Risk of injury due to insufficient personal protective equipment</b></p> <p>If you use the wrong protective equipment or no protective equipment at all, you could be seriously injured.</p> <ul style="list-style-type: none"> <li>- Wear protective equipment adapted to the work processes.</li> <li>- Check the protective equipment before each use to ensure that it is intact!</li> <li>- Use only approved protective equipment.</li> </ul>

 <b>WARNING</b>	
	<p><b>Risk of injury</b></p> <p>This equipment is not suitable for use in locations where children are likely to be present.</p>

	<p><b>Read manual</b></p> <p>The nVent SCHROFF 1 U/19" fan tray intended to be installed and maintained by qualified and trained personnel in compliance with local and national electrical codes and safety regulations.</p>
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## 2 Fan Tray Overview

### Features:

- 6 high power fans providing 1089 m<sup>3</sup>/h @ ΔP 78 Pa
- Fan speed controlled by fan control module
- Temperature threshold for the fan control adjustable on the front panel or via Modbus
- Signaling of fan failure and over temperature by 2 LEDs and potential-free relay outputs and Modbus
- Integrated power supply with wide range input (100 V AC– 240 V AC)
- Connector for 2 NTC temperature sensors
- RJ45 connectors for control and monitoring via Modbus RTU (RS485)

The fan tray is equipped with six speed-controlled fans and a Fan Control Module (FCM). The fan speed is controlled by the FCM, there are 3 control modes available:

- Auto Mode 1: The FCM adjusts the fan speed according to temperature setting by a potentiometer at the front panel.
- Auto Mode 2: The FCM adjusts the fan speed according to temperature setting by Modbus.
- Manual Mode: The fan speed is set by Modbus from 20 % to 100 %

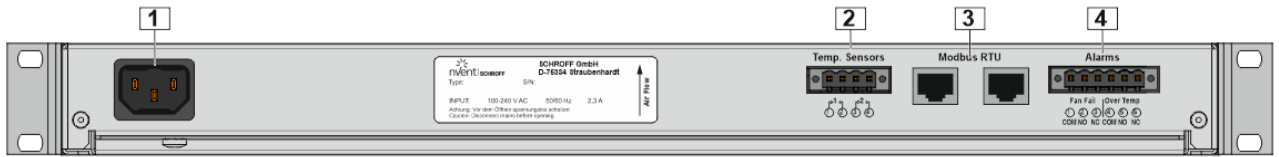
The temperature control in Auto Mode 1 & 2 is based on the reading of two NTC temperature sensors which can be connected onto a connector at the rear side (highest value of the two NTC sensors is the reference). When the fan tray is powered up, all fans are rotating for a few seconds with 30% speed until the speed is adjusted according to the selected temperature/alarm threshold.

### Front View



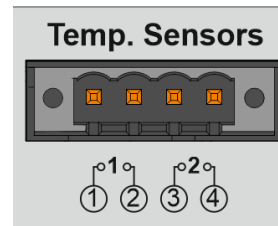
## 2.1 Rear panel

On the rear panel are the IEC320-C14 AC power input (1), the connector for the NTC temperature sensors (2), the RJ45 connectors for Modbus (3) and the connector for the Fan Fail and Over Temp alarms (4).



## 2.2 Temperature Sensors

The fan tray supports two NTC temperature sensors, which can be connected to a connector at the rear side. The highest value of the two NTC sensors is the reference for the temperature control.



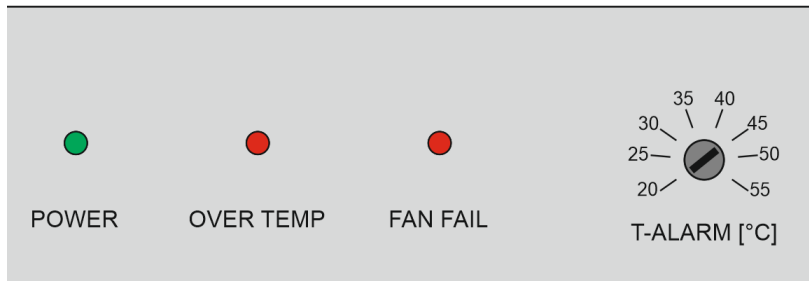
	<p><b>By default both temperature sensors are required to be connected, otherwise a temp fail alarm is triggered and the fans rotate at full speed.</b></p> <p><b>The fan tray can be configured to use only one temperature sensor.</b></p>
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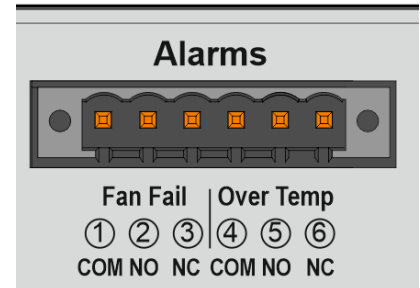
### 3 Alarms and Fan Curve

On the right front panel are besides the Power LED, an Over Temperature LED and a Fan Fail LED as well as a potentiometer for setting the temperature alarm threshold resp. the fan curve.

Front panel




Rear panel



The alarm connector is Phoenix Contact MSTB 2,5/ 6-GF-5,08 – P/N 1776540.

A mating connector is for example Phoenix Contact MSTB 2,5/ 6-STF-5,08 – P/N 1778027


	<p><b>If no error exists, the relay contacts are energized, NO = Closed, NC = Open.</b>  <b>In case of error NO = open, NC = closed.</b></p>
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#### 3.1.1 Over temperature alarm

If the alarm threshold is exceeded, an alarm is triggered, i.e. the red OVER TEMP LED lights up and the relay contact NO on the alarm connector will be opened.

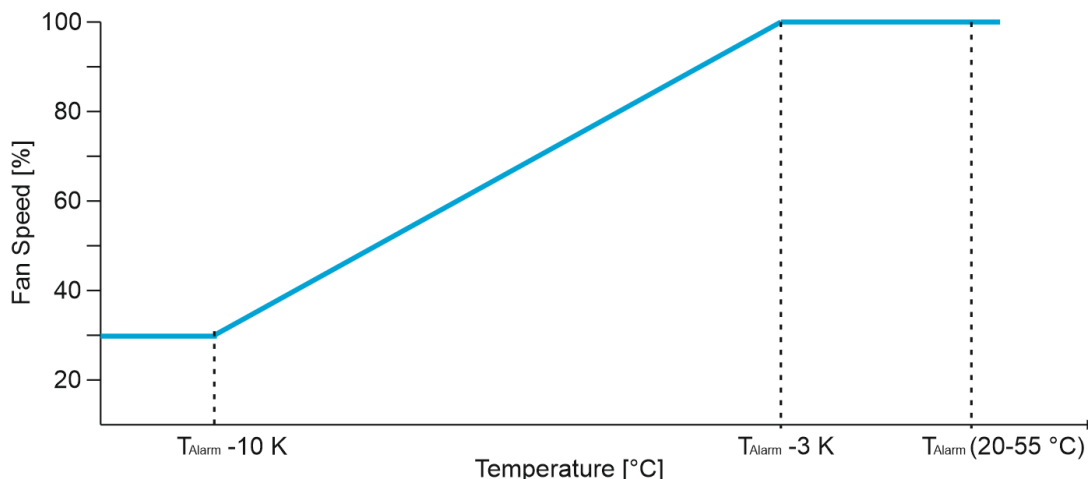
#### 3.1.2 Fan fail alarm

Fan fail alarm is triggered if a fan or a NTC temperature sensor is defective or missing, i.e. the red FAN FAIL LED lights up and the NO relay contact on the alarm connector will be opened.

	<p><b>The fan fail alarm raises the fan speed to full speed.</b>  <b>Both temperature sensors are required to be connected, otherwise a temp fail alarm is triggered and the fans rotate at full speed.</b></p>
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### 3.2 Fan curve

The fan curve depends on the setting of the alarm threshold, i.e. it shifts with the threshold. When the Fan tray is powered up, the fans are rotating immediately with 30 % speed.



### 3.3 Control and monitoring via Modbus

If required, the fan tray can be completely controlled and monitored via Modbus.

When the fan tray is connected via Modbus, 3 operation modes are available:

- **Auto Mode 1:** The FCM adjusts the fan speed according to temperature setting by a potentiometer at the front panel. The operating parameters are **only** monitored via Modbus.
- **Auto Mode 2:** The FCM adjusts the fan speed according to temperature setting by Modbus. The operating parameters are controlled **and** monitored via Modbus.
- **Manual Mode:** The fan speed is set by Modbus from 20 % to 100 %. The internal fan control is deactivated, but the operating parameters are still monitored.



**By default, if no Modbus is connected, the fan tray operates in Auto Mode 1, i.e. the alarm threshold and the fan curve are selected via the potentiometer on the front panel.**

**In Auto Mode 2 or Manual Mode, and the Modbus connection is interrupted the fans are set to full speed after 30 seconds.**

The following parameters can be set via Modbus:

- Fan tray operation mode
- Tmax Setpoint via Modbus
- Manual Setpoint Fan Speed
- Max Cooling ON/OFF
- Temp Sensor T1 Alarm Threshold
- Temp Sensor T2 Alarm Threshold


The following parameters can be monitored via Modbus:

- Speed fan 1 – 6
- Temperature Sensor T1
- Temperature Sensor T2
- Tmax setting from potentiometer at front plate
- Fan Tray Alarm State
- Max Cooling ON/OFF
- Operating hours
- Fan 1 – 6, speed under 60 % of requested value
- Temp Sensor T1 Alarm Limit
- Temp Sensor T2 Alarm Limit
- Temp Sensor T1 broken
- Temp Sensor T2 broken
- Temp Alarm in Auto Mode

### 3.4 Modbus connectors and settings

On the rear of the fan tray there are 2 RJ45 sockets via which the fan tray can be connected to a Modbus-capable device such as the Schroff Guardian Management Gateway.

Both sockets are connected in parallel to the bus, via the second socket several fan trays can be connected via daisy chain. If the second socket is not used, a 120 Ohm resistor must be connected to terminate the bus.

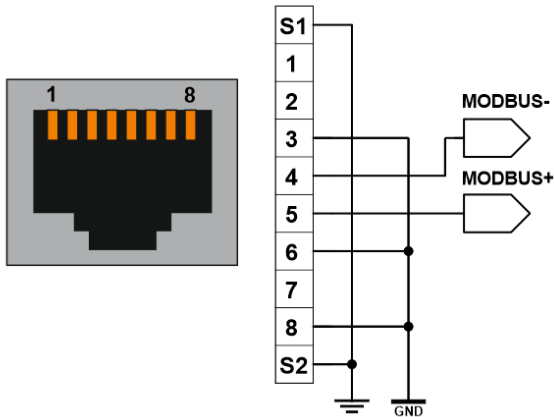


**The SFT communicates on a Modbus RS485 serial line using the RTU (Remote Terminal Unit) mode. The format is:**

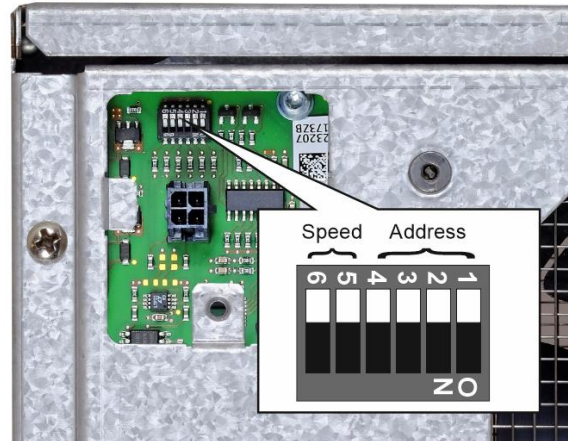
- 1 start bit
- 8 data bits
- Even parity
- 1 stop bit

**Modbus address and speed can be set via a DIP switch on the left bottom side of the fan tray. Default address = 11, default speed = 19200 bit/s**

Modbus connector pinout



DIP Switch



#### Dip 1 ... Dip 4

Dip Switch	Modbus Address	Dip Switch	Modbus Address
0000	11	1000	19
0001	12	1001	20
0010	13	1010	21
0011	14	1011	22
0100	15	1100	23
0101	16	1101	24
0110	17	1110	25
0111	18	1111	26

#### Dip 5 ... Dip 6

Dip Switch	Speed
00	19200
01	9600
10	38400
11	57600



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### 3.5 Modbus Register

Discrete  
Inputs  
(0x02)

Reg-No.	Description	Resolution	Units	Range
0	Fan Tray Alarm State			0/1
1	Max Cooling			0/1
100	Fan 1 Speed too low			0/1
101	Fan 2 Speed too low			0/1
102	Fan 3 Speed too low			0/1
103	Fan 4 Speed too low			0/1
104	Fan 5 Speed too low			0/1
105	Fan 6 Speed too low			0/1
106	Fan 7 Speed too low			0/1
107	Fan 8 Speed too low			0/1
108	Fan 9 Speed too low			0/1
109	Fan 10 Speed too low			0/1
110	Fan 11 Speed too low			0/1
111	Fan 12 Speed too low			0/1
112	Temp Sensor T1 Alarm			0/1
113	Temp Sensor T2 Alarm			0/1
114	Temp Sensor T1 broken			0/1
115	Temp Sensor T2 broken			0/1
116	Temp Alarm in Auto Mode			0/1

Input  
Register  
(0x04)

Reg-No.	Description	Resolution	Units	Range
0	Controller PN High Byte			
1	Controller PN Low Byte			
2	Controller SN High Byte			
3	Controller SN Low Byte			
4	Firmware PN High Byte			
5	Firmware PN Low Byte			
6	Firmware Revision			
7	Requested Fan Speed	1	%	0-100
8	Speed Fan 1	1	%	0-100
9	Speed Fan 2	1	%	0-100
10	Speed Fan 3	1	%	0-100
11	Speed Fan 4	1	%	0-100
12	Speed Fan 5	1	%	0-100
13	Speed Fan 6	1	%	0-100

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14	Speed Fan 7	1	%	0-100
15	Speed Fan 8	1	%	0-100
16	Speed Fan 9	1	%	0-100
17	Speed Fan 10	1	%	0-100
18	Speed Fan 11	1	%	0-100
19	Speed Fan 12	1	%	0-100
20	Temperature Sensor T1	1	°C	-128.....+128
21	Temperature Sensor T2	1	°C	-128.....+128
22	Tmax setting at front plate	1	°C	
23	Number of fans learned	1		0-12
24	Number of temp. sensors learned	1		0-2
25	Operating Hours High Byte	1		
26	Operating Hours Low Byte	1		

Holding Register (0x03)

Reg-No.	Description	Resolution	Units	Range
0	Fan Control Mode			0: Auto 1 (Set Tmax at front panel) 1: Auto 2 (Set Tmax via Modbus) 2: Manual
1	Tmax Setpoint via Modbus	1	°C	20-55
2	Manual Setpoint Fan Speed	1	%	20-100
3	Max Cooling ON/OFF			0/1
4	Temp Sensor T1 Alarm Threshold	1	°C	20-60
5	Temp Sensor T2 Alarm Threshold	1	°C	20-60
6	Learn Mode ON/OFF			0/1

### 3.6 Control and Monitoring via the Schroff Guardian Management Gateway

The nVent SCHROFF Guardian Management Gateway is an environmental monitoring device designed to sense, track, store and alarm health and security parameters in an IT-datacenter infrastructure.

The Guardian Management Gateway offers three management ports with each port being able to monitor up to 16 sensor or Modbus devices with a total cable length of 40 meters per port

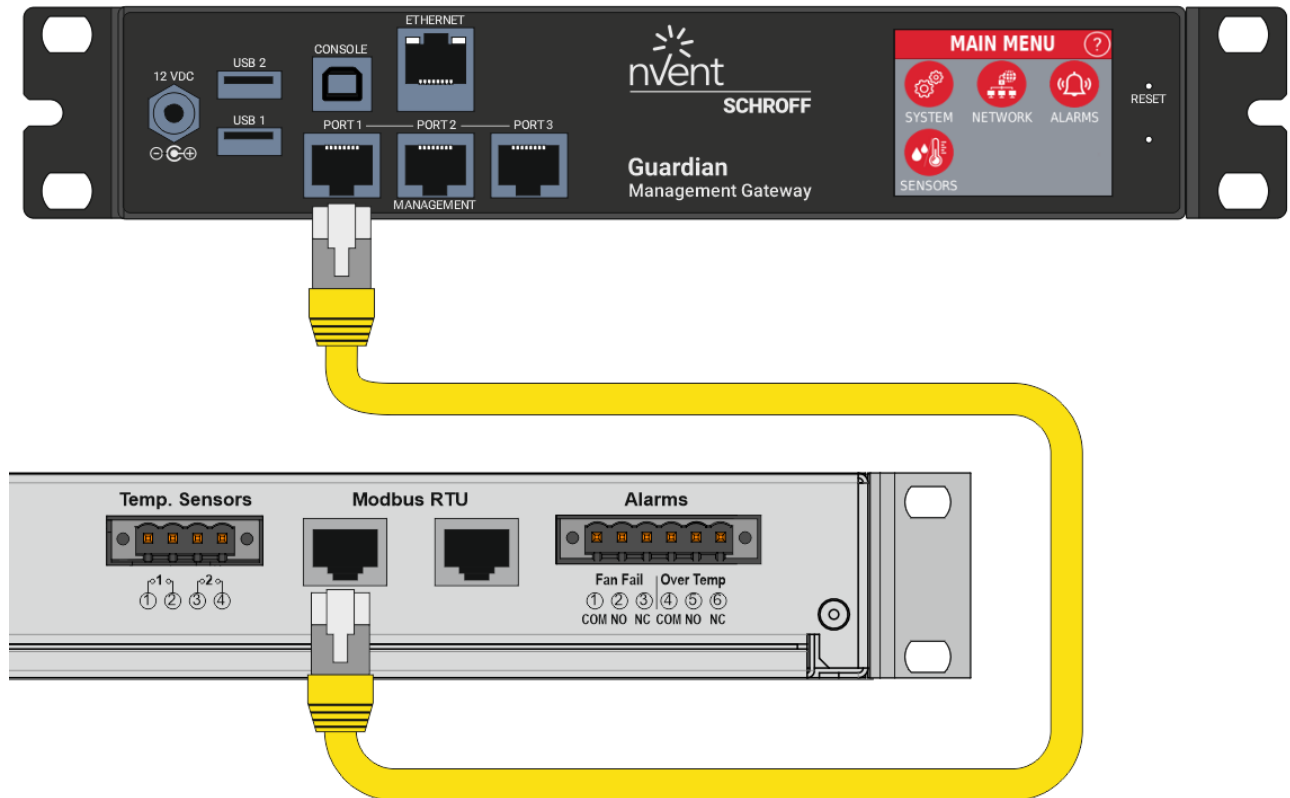
Besides monitoring physical parameters like temperature, humidity, or door status, the Guardian Management Gateway can also monitor and control the Schroff SFT – with an easy plug and play installation.

Set-up of the Guardian Management Gateway can be easily done through a built in Web Interface.

For further information, see the user manual 63972-383 which can be downloaded at [schroff.nvent.com](http://schroff.nvent.com).

#### 3.6.1 Connecting the SFT

The SFT can be connected to the Guardian Management Gateway via Modbus. In order to do this, the SFT must be connected to one of the 3 ports, labeled "Management", using an Ethernet cable.



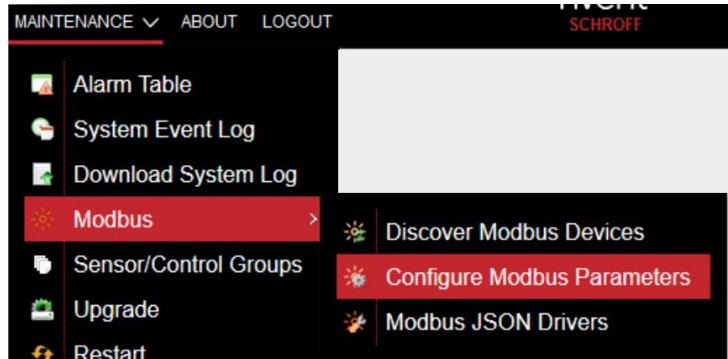
	<p><b>SFT Modbus address and speed can be set via a DIP switch on the left bottom side of the fan tray. Default address = 11, default speed = 19200 bit/s, Parity = E</b></p> <p><b>See Chapter 3.4</b></p>
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### 3.6.2 Configuring the Guardian Management Gateway Modbus Parameters

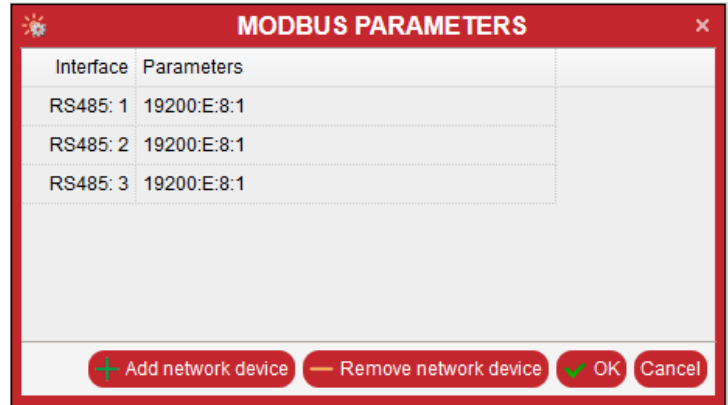
Connect to the Guardian Management Gateway web interface. Instructions can be found in the Quick Start Guide or in the User Manual at:

<https://schroff.nvent.com/en-gb/solutions/schroff/applications/guardian-management-gateway>

In the web interface, go to “Maintenance” -> “Modbus” -> “Configure Modbus Parameters”



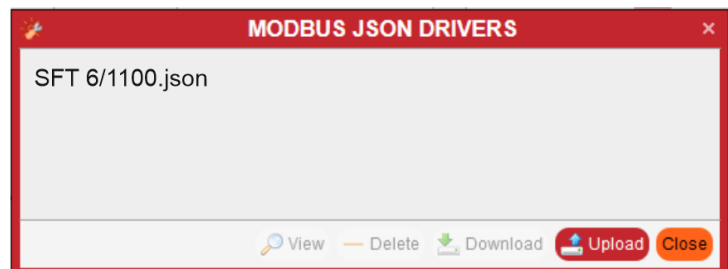
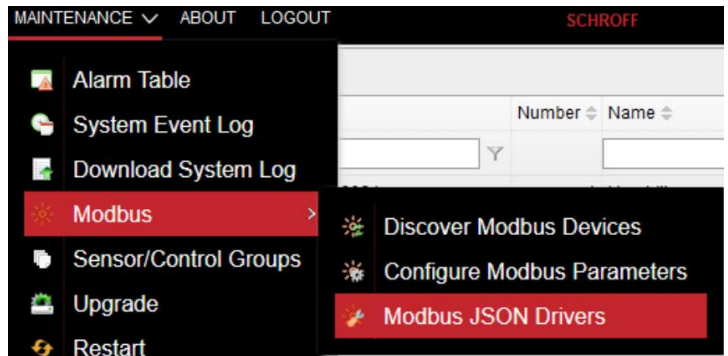
Set the parameters for the selected port (see chapter 3.4).



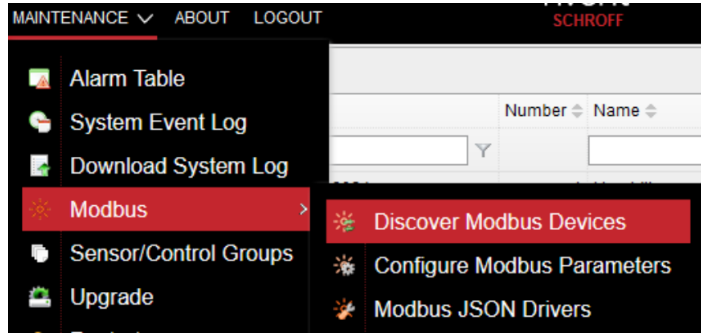
Go to “Maintenance” -> “Modbus” -> “Modbus JSON Drivers” and upload the JSON driver for the SFT.

The JSON driver you can download at:

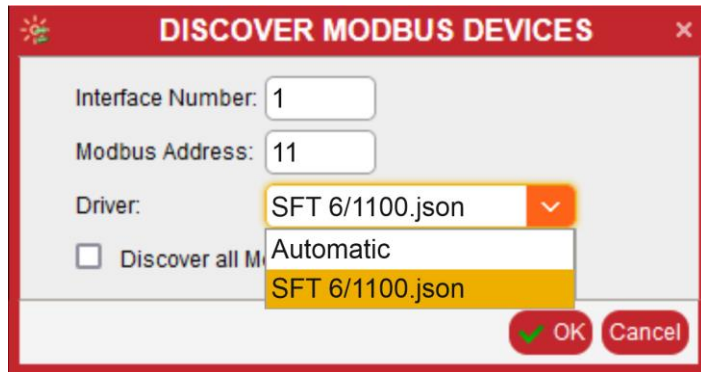
<https://schroff.nvent.com/en-gb/solutions/schroff/applications/guardian-management-gateway>



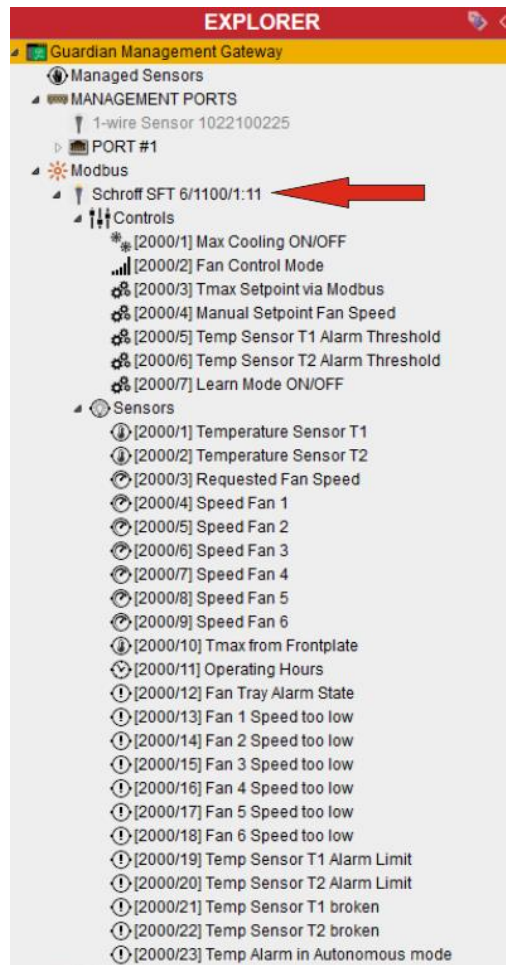
Go to "Maintenance" -> "Modbus" -> "Discover Modbus Devices"



Enter the interface (port) number, the Modbus address (default = 11) and select the JSON driver for the SFT.



When the discovery was successful, the SFT appears in the tree pane of the Web interface.





## 4 Power

### **WARNING**



#### **Power cable rating**

If the system was not supplied with AC power cables, purchase AC power cables approved for use in your country. The AC power cables must be rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cable should be greater than the ratings marked on the product.

### **WARNING**



The fan tray has no internal fuse and must therefore be fused on site level.

The fan tray is powered by a power supply with wide range input (100 - 240 VAC).

An IEC 320-C14 connector at the rear side provides the power input.

## 5 Rack Mounting

### **WARNING**

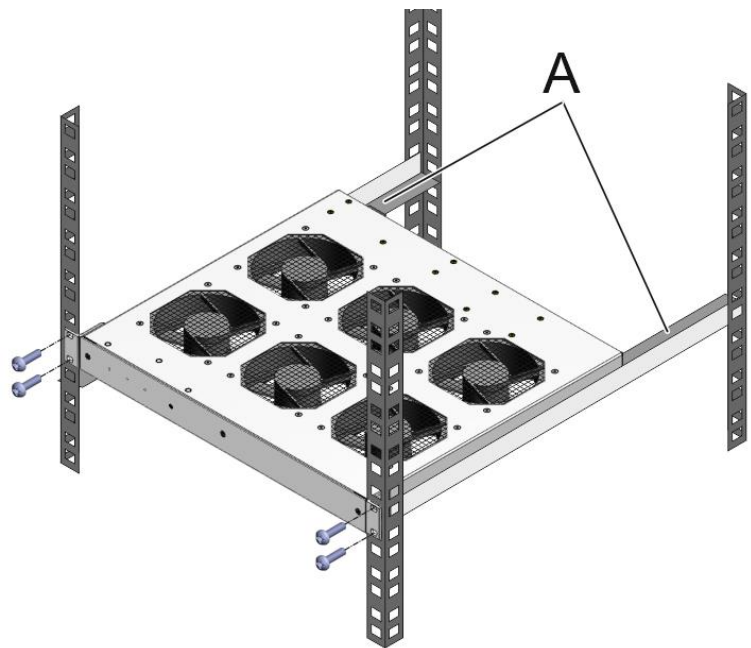


**Risk of injury and accidents due to insufficiently qualified personnel!**

- The installation may only be carried out by qualified personnel who are authorized to do so according to the valid safety regulations, e.g. by authorized specialized companies or authorized departments of the company.
- It is mandatory to mount the fan tray with slide rails (A).


The fan tray can be installed into the 19" plane of electronics cabinets.


1. Install slide rails (A) at the corresponding position
2. Install cage nuts at the 19" posts
3. Slide in the fan tray
4. Fix the fan tray with 4 screws at the 19" posts




## 5.1 Initial Operation


<b>⚠ WARNING</b>	
	<p><b>Risk of injury and accidents due to insufficiently qualified personnel!</b></p> <ul style="list-style-type: none"> <li>The installation may only be carried out by qualified personnel who are authorized to do so according to the valid safety regulations, e.g. by authorized specialized companies or authorized departments of the company.</li> </ul>

<b>⚠ WARNING</b>	
	<p><b>Power cable rating</b></p> <p>If the system was not supplied with AC power cables, purchase AC power cables approved for use in your country. The AC power cables must be rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cable should be greater than the ratings marked on the product.</p>

<b>⚠ WARNING</b>	
	<p><b>Protective earth/GND connection</b></p> <p>This equipment is designed in accordance with protection class 1!</p> <p>The fan tray must be operated with protective earth/GND connection. Use only a three conductor AC power cable with a protective earth conductor that meets the IEC safety standards!</p>

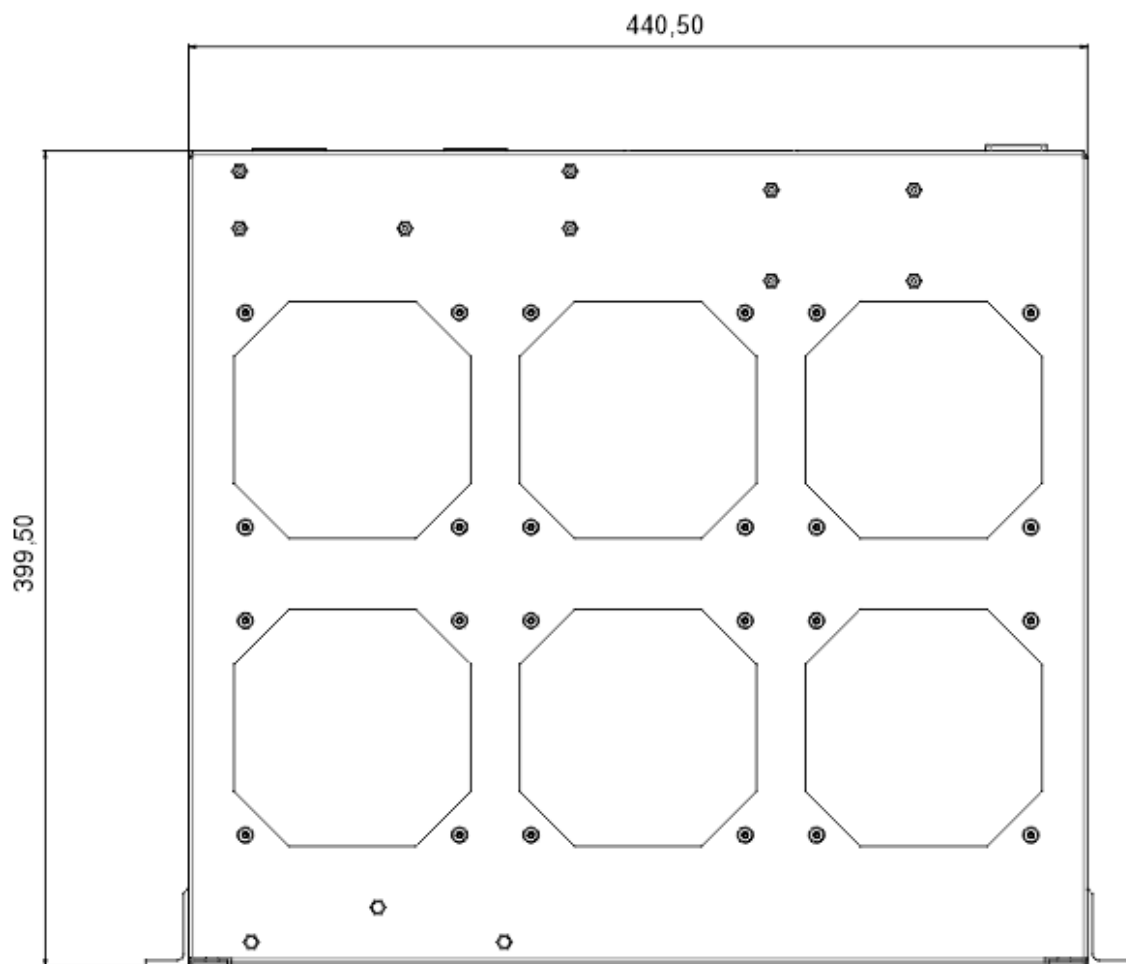
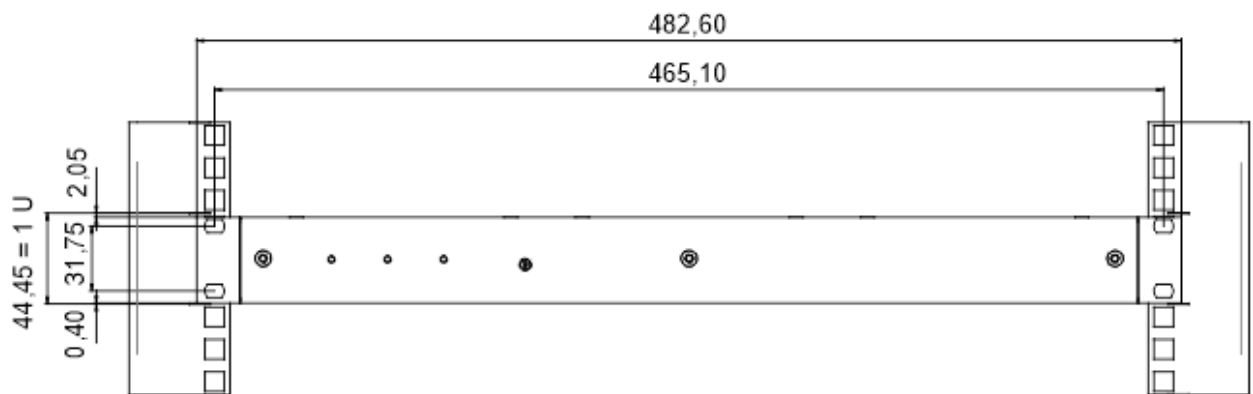
<b>⚠ WARNING</b>	
	<p><b>Risk of injury and accidents due to turning fans</b></p> <ul style="list-style-type: none"> <li>The fan tray has no power switch.</li> <li>When the power cord is plugged in, the fans start to turn immediately..</li> </ul>

- Ensure that the fan tray has not been damaged during transport, storage or assembly
- Install the temperature sensors in a location suitable for measuring the control temperature
- Connect the NTC temperature sensors at the connector at the rear side

	<p><b>Both temperature sensors are required to be connected, otherwise a temp fail alarm is triggered and the fans rotate at full speed.</b></p>
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- If necessary, connect your equipment for signaling/detection of the Fan Fail or Over Temp alarm to the corresponding connector on the rear panel
- Connect the power cable
- Set the appropriate alarm threshold and fan control characteristics at the potentiometer on the front panel

## 6 Dimensions



## 7 Technical Data

TECHNICAL DATA	
Height/Width/Depth	44 mm (1 U) / 19" / 399,5 mm
Weight	4,3 kg
Ambient Temperature	-10 °C - +70 °C
Humidity	20 – 90 % RH non-condensing
Air Flow	1089 m <sup>3</sup> /h @ ΔP 78 Pa
Noise Emissions (Full speed)	59,5 dB(A)
Load capacity alarm relay contacts	30 VDC / 1 A
Power	100-240 V AC, 50/60 Hz, 2,3 A
Emissions	EN 61000-6-3 including EN 55032 level B
Immunity	EN 61000-6-2 (industrial environment)
Safety	EN 62368-1

### 7.1 Scope of Delivery

ITEM
SCHROFF SFT Fan Tray 1 U/19"
2 NTC Temp Sensors with 1500 mm cable and connector