



Complete TITANUS PRO-SENS TP-1 with DM-TP-80 detector module

Order number

664998143287

Introduction

The TITANUS smoke extraction systems are active fire detection systems that can be connected directly to the local security network LSN for early fire detection in area and equipment monitoring, as well as for the monitoring of air conditioning units or ducts.

Their resistance to contamination, temperature-compensating sensor signals and the air-pressure dependent initialization ensure secure operation, even under difficult environmental conditions.

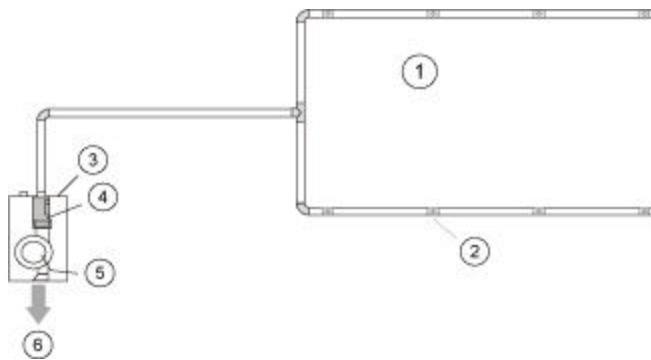
The two TITANUS models PRO · SENS® and TITANUS TOP · SENS® have the newest detection technology. Each of them can be equipped with one or two detector modules.



Features

- High security against false alarms with intelligent signal processing LOGIC · SENS
- Innovative airflow monitoring including single-hole monitoring detects obstruction and breakage
- Automatic initialization for simple initial set-up
- Easy diagnosis through flash code on the detector module or by using DIAG2 diagnostic software
- Simple implementation of the pipe system planning through patented suction reducing film sheets

System Overview



Pos.	Description
1	Pipe system/air intake
2	Suction openings
3	Case
4	Detector module incl. airflow sensor
5	Suction unit
6	Air outlet

Functions

The suction unit takes air samples from the monitoring area through a pipe system with defined suction holes

and passes the samples to the detector module.

Depending on the response sensitivity of the installed detector module, the TITANUS smoke extraction system issues an alarm, which is displayed on the device via the alarm LED and also transmitted to a fire panel, when light obscuration reaches the specified level.

An airflow sensor checks the connected pipe system for breaks and obstructions.

Intelligent signal processing LOGIC · SENS makes a comparison of the measured smoke level with known disturbance values and decides between alarm and deception. The alarm thresholds and the display and transmission of malfunctions can be allocated different delay times.

Each detector module is monitored for contamination, signal malfunction, and removal. Malfunctions and particular device statuses are displayed on the electronics board of the detector module through various flash codes of an LED.

The resetting of a malfunction message occurs via the connected fire panel. The integrated interfaces (NSB 100 LSN/NBK 100 LSN) ensure that alarm and malfunction messages on the device are reset at the same time as the zone.

There are three different detector modules available for the TITANUS PRO · SENS[®] and the TITANUS TOP · SENS[®]. These modules have different response sensitivities:

Detector module (PRO · SENS [®] / TOP · SENS [®])	Max. sensitivity (light obscuration)	Selectable levels
DM-TP-80/DM-TT-80	0.8%/m	2
DM-TP-25/DM-TT-25	0.25%/m	4
DM-TP-05/DM-TT-05	0.05%/m	4

In the TITANUS PRO · SENS[®] TP-2 and the TITANUS TOP · SENS[®] TT-2 two detector modules are built in. Two suction pipe systems can be connected for the monitoring of two areas. Where only one area is monitored with two pipe systems, two-detector dependency can be implemented.

Model variants PRO · SENS[®] and TOP · SENS[®]

The TITANUS PRO · SENS[®] is the cost-effective smoke extraction system for universal use with LED displays for operation, malfunction, and alarm (two alarm displays on the PRO · SENS[®] TP-2).

The TITANUS TOP · SENS[®] offers differentiated alarm displays (info, pre, and main alarm) as well as a smoke level display in 10 levels (with the TOP · SENS[®] TT-2 all alarm and smoke level displays are doubled).

Parts Included

Type of device	Qty.	Components
TITANUS full model Prosens TP-1 full model with DM-TP-80 detector module	1	Full model comprising a TITANUS Prosens TP-1 basic unit plus a DM-TP-80 detector module
TITANUS basic unit Prosens TP-1	1	TITANUS Prosens TP-1 basic unit, for connecting a pipe system
TITANUS basic unit Prosens TP-2	1	TITANUS Prosens TP-2 basic unit for connecting two pipe systems or for one pipe system with two-detector dependency
TITANUS basic unit Topsens TT-1	1	TITANUS Topsens TT-1 basic unit for connecting a pipe system
TITANUS basic unit Topsens TT-2	1	TITANUS Topsens TT-2 basic unit for connecting two pipe systems or for one pipe system with two-detector dependency

Note: One or two detector modules must be ordered

separately for the basic units (see table):

For type of device	Qty.	Required detector modules
TITANUS basic unit Prosens TP-1	1	Either DM-TP-80, DM-TP-25 or DM-TP-05
TITANUS basic unit Prosens TP-2	2	Either DM-TP-80, DM-TP-25 and/or DM-TP-05
TITANUS basic unit Topsens TT-1	1	Either DM-TT-80, DM-TT-25 or DM-TT-05
TITANUS basic unit Topsens TT-2	2	Either DM-TT-80, DM-TT-25 and/or DM-TT-05

Qty. Components

- 1 Complete device comprised of a TITANUS basic unit
PRO·SENS[®] TP-1 incl. a DM-TP-80 detector module

Certifications and Approvals

VdS approval numbers:

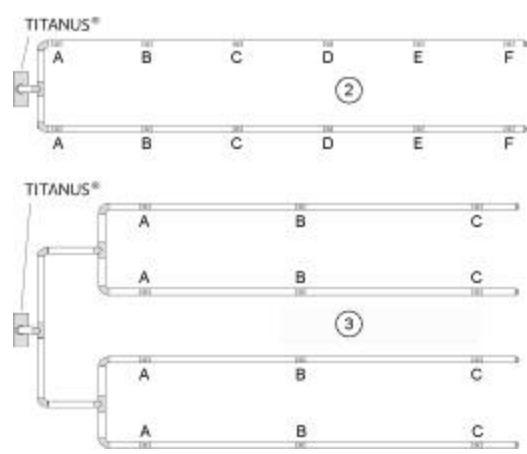
TITANUS PRO · SENS[®] : **G 204 082**

TITANUS TOP · SENS[®] : **G 204 083**

Installation/Configuration Notes

- Can be connected directly to the local security network through integrated interfaces
- In the TITANUS PRO · SENS[®] an external detector alarm display can be connected. For the TITANUS TOP · SENS[®] the connection of the external detector alarm display is not possible!
- During planning, a distinction is made between area monitoring and equipment monitoring.
- PVC and halogen-free pipes can be used for the suction pipe.
- In the case of equipment monitoring, halogen-free pipes should be used.
- The suction pipe system must be designed so that whenever a fire occurs, it is detected at an early stage.
- The suction pipe system including suction holes must always be symmetrical in design ($\pm 10\%$ deviation).
- If the symmetry cannot be maintained due to constraints imposed by the building, the following provisions apply:
 - The number of the respective suction openings and the length of the shortest and longest pipe branch of the pipe system may not exceed a ratio of 1:2.
 - The distance between neighboring suction openings on the smoke extraction pipe must be equal (should not exceed $\pm 20\%$ deviation).
 - The diameter of the suction openings are determined separately for each pipe branch. They depend on the total number of suction openings on the respective pipe branch.
- Where distances between the smoke extraction system and suction pipe are greater, pipe feed lines of $\varnothing 40$ mm are used.
- Depending on the geometry of the area, the suction pipe is planned as an I-, U- or double U-pipe system.





Pos. Designation

- 1 I-pipe system
- 2 U-pipe system
- 3 Double U-pipe system

- To facilitate prompt detection, it is better to select more short branches rather than a few longer ones (preferably U- and double U-pipe systems).
- Use bends instead of elbows when changing direction.
- In order to increase the transport speed in critical application areas, the blower voltage can be increased from 6.9 V to 9 V.

Specifying the Sensitivity

- The response sensitivity at the individual detection points (suction openings) S_{DP} depends on:
 - the detector module used
 - the selected sensitivity level $S_{TITANUS}$ on the detector module
 - the number of all planned detection points in the system per detector module $N_{proj. DP}$.
- The sensitivity of the individual detection point S_{DP} is calculated from: $S_{DP} = S_{TITANUS} \times N_{proj. DP}$
- The detector modules have the following selectable sensitivity levels $S_{TITANUS}$ (specification in % light obscuration/m):

Detector module	Detector module	Detector module
Type DM-TP-05	Type DM-TP-25	Type DM-TP-80
Type DM-TT-05	Type DM-TT-25	Type DM-TT-80
0.4 %/m	2 %/m	not occupied
0.2 %/m	1 %/m	not occupied
0.1 %/m	0.5 %/m	1.6 %/m
0.05 %/m	0.25 %/m	0.8 %/m

- The planning always occurs according to the instructions for point-type smoke detectors.
- Here it must be ensured that the sensitivity of the individual detection point S_{DP} achieves at least a value of $\approx 3,5$ %/m light obscuration.
- When monitoring several areas with a smoke extraction system, the total sensitivity of the suction openings within a closed area must amount to $\approx 3,5$ %/m light obscuration. If this value is not reached, it is recommended that a higher sensitivity be set.
- Depending on the course of the fire and environmental conditions, the actual response sensitivity is generally higher than the calculated sensitivity S_{DP} of a detection point since it can be assumed that several suction openings will always be filled with smoke (collective effect).

Planning limits

- Minimum pipe length between 2 suction openings: 0.1 m
- Maximum pipe length between 2 suction openings: 12 m
- Maximum monitoring area per suction opening:
 - 120 m² for the DM-TP-05 and DM-TP-25 detector modules
 - 60 m² for the DM-TP-80 detector module
- Maximum 24 suction openings per pipe system
- Max. pipe length/max total monitoring area per pipe system (doubled where two detector modules are used):
 - **180 m / 2880 m²** (VdS-compliant)
 - With single-hole monitoring: **140m/1680m²**

Standard planning according to VdS

	I-pipe system	U-pipe system	Double U-pipe system
min. distance RAS - 1st SO ¹⁾	4m	4m	4m
max. distance RAS - 1st SO	20m	20m	20m
max. branch length	60m	60m	30m
- blower voltage 6.9 V	80m	70m	40m
- blower voltage 9 V			
max. total pipe length ²⁾	80m	140 m	140 m
- blower voltage 6.9 V	100m	160 m	180 m
- blower voltage 9 V			
min. distance between 2 SO	4m	4m	4m
max. distance between 2 SO	12 m	12 m	12 m
max. no. of SO ²⁾	16	18	24

¹⁾ SO = suction opening

²⁾ per pipe system, that is with the TITANUS PRO · SENS[®]

TP-2 and TITANUS TOP · SENS[®] TT-2 doubling of the values

- The suction opening diameters (Ø in mm) listed in the tables are implemented through suction reducing film sheets with the corresponding punch diameters.

I-pipe system

Ø in mm	Number of suction openings							
	2	3	4	5	6	7	8	9
A	6.0	5.0	4.2	3.8	3.2	3.0	2.5	2.5
B	6.8	5.2	4.4	3.8	3.2	3.0	2.5	2.5
C	-	5.2	4.6	4.0	3.6	3.0	3.0	2.5

D	-	-	4.6	4.0	3.6	3.4	3.0	3.0
E	-	-	-	4.4	4.0	3.4	3.4	3.0
F	-	-	-	-	4.0	3.8	3.4	3.4
G	-	-	-	-	-	3.8	3.8	3.4
H	-	-	-	-	-	-	3.8	3.8
I	-	-	-	-	-	-	-	3.8
J	-	-	-	-	-	-	-	-
K	-	-	-	-	-	-	-	-
L	-	-	-	-	-	-	-	-
M	-	-	-	-	-	-	-	-
n	-	-	-	-	-	-	-	-
O	-	-	-	-	-	-	-	-
P	-	-	-	-	-	-	-	-

I-pipe system (continued)

Ø in mm	Number of suction openings						
	10	11	12	13	14	15	16
A	2.0	2.0	2.0	2.0	2.0	2.0	2.0
B	2.0	2.0	2.0	2.0	2.0	2.0	2.0
C	2.5	2.0	2.0	2.0	2.0	2.0	2.0
D	2.5	2.5	2.5	2.0	2.0	2.0	2.0
E	3.0	2.5	2.5	2.5	2.5	2.5	2.5
F	3.0	3.0	2.5	2.5	2.5	2.5	2.5
G	3.4	3.0	3.0	2.5	2.5	2.5	2.5
H	3.4	3.4	3.0	3.0	2.5	2.5	2.5
I	3.6	3.4	3.0	3.0	3.0	3.0	3.0
J	3.6	3.6	3.4	3.0	3.0	3.0	3.0
K	-	3.6	3.4	3.4	3.0	3.0	3.0
L	-	-	3.4	3.4	3.4	3.0	3.0
M	-	-	-	3.4	3.4	3.4	3.4
n	-	-	-	-	3.4	3.4	3.4
O	-	-	-	-	-	3.4	3.4
P	-	-	-	-	-	-	3.4

A-P = designation of the suction openings

U-pipe system

Ø in mm	Number of suction openings per pipe system								
	2	4	6	8	10	12	14	16	18
A	5.2	3.6	3.4	3.2	2.5	2.5	2.0	2.0	2.0
B	-	4.0	3.4	3.2	3.0	2.5	2.0	2.0	2.0
C	-	-	3.6	3.4	3.0	2.5	2.5	2.0	2.0
D	-	-	-	3.4	3.2	3.0	2.5	2.5	2.0
E	-	-	-	-	3.2	3.0	3.0	2.5	2.5
F	-	-	-	-	-	3.2	3.0	3.0	2.5
G	-	-	-	-	-	-	3.2	3.0	2.5

H	-	-	-	-	-	-	3.0	3.0
I	-	-	-	-	-	-	-	3.0

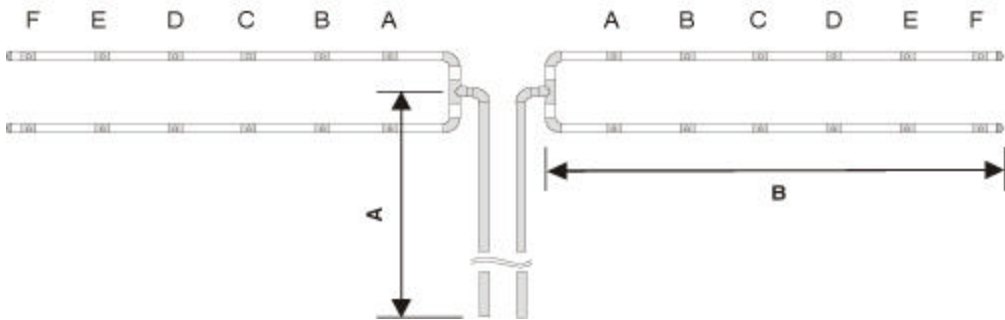
A-I = designation of the suction openings

Double U-pipe system

Ø in mm	Number of suction openings per pipe system					
	4	8	12	16	20	24
A	4.0	3.0	2.5	2.0	2.0	2.0
B	-	3.4	3.0	2.5	2.0	2.0
C	-	-	3.0	3.0	2.5	2.0
D	-	-	-	3.0	2.5	2.5
E	-	-	-	-	3.0	2.5
F	-	-	-	-	-	3.0

A-F = designation of the suction openings

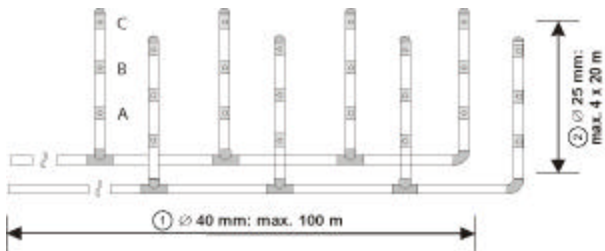
Planning with long pipe feed lines



- For planning, pipes with a diameter of 40 mm are used. This applies for the previously-illustrated pipe configurations.
- In the case of a pipe system for area monitoring, the following limits apply:

Pipe diameter	25mm	40mm
Max. length A		
- blower voltage 6.9 V	20 m	60 m
- blower voltage 9 V	20 m	60 m
Max. length B		
- blower voltage 6.9 V	60 m	60 m
- blower voltage 9 V	80 m	80 m

The planning of high-board warehouses



Pos.	Designation
1	Basic pipe

2 Branches

- For planning high-board warehouses, a basic pipe can be installed from which suction pipes branch off in the form of tee-offs.
- The following limits apply:
 - max. pipe length 180 m (4 x 20 m branches + 100 m basic pipe)
 - max. basic pipe length 100 m, basic pipe diameter 40 mm

Simplified Planning

- The simplified planning is used for equipment protection and in small premises. The advantage of this planning is the uniform diameter of the suction openings.

	I-pipe system	U-pipe system	Double U-pipe system
min. distance RAS - 1st SO ¹⁾	2 m	2 m	2 m
max. distance RAS - 1st SO	20 m	20 m	20 m
max. branch length	20 m	20 m	20 m
max. total pipe length ²⁾ 25 mm Ø	40m	60 m	100m
min. distance between 2 SO (d)	0.1m	0.1m	0.1m
max. distance between 2 SO (d)	4 m	4 m	4 m
max. no. of SO ²⁾	18	18	20

¹⁾ SO = suction opening

²⁾ per pipe system, that is with the TITANUS PRO · SENS[®]TP-2 and TITANUS TOP · SENS[®] TT-2 doubling of the values

I-pipe system

Ø in mm Number of suction openings (SO)

	2	3	4	5	6	7	8	9	10
all SO	6.0	5.0	4.4	4.0	3.6	3.4	3.2	3.0	3.0

I-pipe system (continued)

Ø in mm Number of suction openings (SO) per pipe system

	11	12	13	14	15	16	17	18
all SO	3.0	3.0	2.5	2.5	2.5	2.5	2.5	2.5

U-pipe system

Ø in mm Number of suction openings (SO) per pipe system

	2	4	6	8	10	12	14	16	18
all SO	6.0	4.4	3.6	3.2	3.0	3.0	2.5	2.5	2.5

Double U-pipe system

Ø in mm Number of suction openings (SO) per pipe system

	2	8	12	16	20
all SO	4.0	3.4	3.0	2.5	2.0

Planning with single-hole monitoring

	I-pipe system	U-pipe system	Double U-pipe system
min. distance RAS - 1st SO ¹⁾	4 m	4 m	4 m
max. distance RAS - 1st SO	20 m	20 m	20 m
max. branch length	40 m	40 m	20 m
- blower voltage 6.9 V	60 m	50 m	30 m
- blower voltage 9 V			
max. total pipe length ²⁾	60 m	100 m	100 m
- blower voltage 6.9 V	80 m	120 m	140 m
- blower voltage 9 V			
min. distance between 2 SO	4 m	4 m	4 m
max. distance between 2 SO	12 m	12 m	12 m
max. no. of SO ²⁾	10	14	12

¹⁾ SO = suction opening

²⁾ per pipe system, that is with the TITANUS

PRO · SENS[®]TP-2 and TITANUS TOP · SENS[®]TT-2 doubling of the values

- The activation threshold of the airflow monitoring is set via a DIP switch on the detector module.

I-pipe system

Ø in mm	Number of suction openings									
	2	3	4	5	6	7	8	9	10	
A	6.0	5.0	4.2	3.8	3.2	3.0	2.5	2.5	2.0	
B	6.8	5.2	4.4	3.8	3.2	3.0	2.5	2.5	2.0	
C	-	5.2	4.6	4.0	3.6	3.0	3.0	2.5	2.5	
D			4.6	4.0	3.6	3.4	3.0	3.0	2.5	
E				4.4	4.0	3.4	3.4	3.0	3.0	
F					4.0	3.8	3.4	3.4	3.0	
G						3.8	3.8	3.4	3.4	
H							3.8	3.8	3.4	
I								3.8	3.6	
J									3.6	

A-J = designation of the suction openings

Activation thresholds I-pipe system

Setting level	Number of suction openings									
	2	3	4	5	6	7	8	9	10	
1*	III	III	II	I	I	-	-	-	-	

2*	O	O	III	III	II	I	I	-	-
3*	O	O	O	O	III	III	II	I	I
4*	O	O	O	O	O	O	III	II	I
5*	O	O	O	O	O	O	O	O	II

* Number of obstructed openings that are detected at level X

- not possible/O not practical

- Example for setting the trigger thresholds: if it is detected that 3 suction openings of a total of 8 are obstructed, set the airflow monitoring switch to Level II.

U-pipe system

Ø in mm Number of suction openings per pipe system

	2	4	6	8	10	12	14
A	5.2	3.6	3.4	3.2	2.5	2.5	2.0
B	-	4.0	3.4	3.2	3.0	2.5	2.5
C	-	-	3.6	3.4	3.0	2.5	2.5
D	-	-	-	3.4	3.2	3.0	2.5
E	-	-	-	-	3.2	3.0	3.0
F	-	-	-	-	-	3.2	3.0
G	-	-	-	-	-	-	3.2

A-G = designation of the suction openings

Activation thresholds of U-pipe system

Setting level Number of suction openings per pipe system

	2	4	6	8	10	12	14
1*	III	II	I	-	-	-	-
2*	O	III	II	I	-	-	-
3*	O	O	III	II	I	-	-
4*	O	O	O	III	II	I	-
5*	O	O	O	O	III	II	I
6*	O	O	O	O	O	III	II
7*	O	O	O	O	O	O	III

* Number of obstructed openings that are detected at level X

- not possible/O not practical

Double U-pipe system

Ø in mm Number of suction openings per pipe system

	4	8	12
A	4.0	3.0	2.5
B	-	3.4	3.0
C	-	-	3.0

A-C = designation of the suction openings

Activation thresholds of double U-pipe system

Setting level Number of suction openings per pipe system

	4	8	12
1*	I	-	-

2*	II	I	-
3*	O	II	I
4*	O	III	II
5*	O	O	III
6*	O	O	III

* Number of obstructed openings that are detected at level X

- not possible/O not practical

Planning for forced airflow

- The TITANUS smoke extraction systems can be used in low-speed units (flow speed max. 10 m/s).
- The pipe system is installed in the exhaust duct as far away as possible from sound dampers, air baffles and bends. The distance from such "hurdles" should be at least three times the smallest duct diameter.
- If it is absolutely necessary to mount the pipe system directly behind air baffles, sound dampers or bends, the high-speed areas must be monitored
- The pipe entries into the duct as well as the part of the pipe system outside the duct must be airtight.
- An air return must be provided to allow for the different pressure areas in the smoke extraction and pipe systems.
- The distance between the air return and the intake must be at least 2 m. The open end of the return should be sloped at a 45° angle.
- If the distance of 2 m cannot be maintained, the pipes must be offset so that a pressure drop is achieved between intake and exhaust through the different speed areas.
- The suction openings must be arranged counter to the airflow.
- The pipe end is constructed with an end cap without hole.
- The diameters of the suction openings are chosen depending on the number of suction openings, as in the case of the "simplified planning".
- The following limit values apply regarding the distance of the suction openings to each other and to the duct wall:

	Duct cross-section= 0.5 m ²	Duct cross-section> 0.5 m ²
Distance SO - wall	100 to 200mm	200 to 300mm
Distances between SOs	100mm	150mm

¹⁾ SO = suction opening

Technical Specifications

TITANUS PRO · SENS®TP-1 / PRO · SENS® TP-2).

Electrical

operating voltage	24 V DC (14 - 30 V DC)
Starting current (at 24 V)	300 mA/320 mA
Current consumption (at 24 V)	
- in standby, blower voltage 6.9 V	230 mA / 260 mA
- in standby, blower voltage 6.9 V	280 mA / 320 mA
- on alarm, blower voltage 6.9 V	240 mA / 310 mA
- on alarm, blower voltage 6.9 V	300 mA / 370 mA

Contact load of alarm and fault relay
 Breaking capacity 1 A, 30 V DC
 max. 24 W

Mechanics

Displays on the device
 - In operation green LED
 - Malfunction yellow LED
 - Alarm 1 red LED/2 red LEDs

Conical duct connections for Ø 25 mm
 - Suction pipe 1 pipe/2 pipes
 - Air return 1 pipe

Cable bushings 5 x M 20 and 2 x M 25

Dimensions (H x W x D) 113 x 200 x 292mm

Weight 1.5kg/1.6kg

Case
 - Material- Color Plastic (ABS)
 papyrus white, RAL 9018

Environmental conditions

Protection category as per EN 60529 IP 20

Permissible temperature range
 - TITANUSPRO · SENS® / 0 °C - +50 °C
 - Pipe system 20 °C - +60 °C

Permissible relative humidity (non-condensing) 10 - 95%

Special features

Acoustic power level 45 dB(A)

Response sensitivity max. light obscuration
 - Detector module DM-TP-80 0.8 %/m
 - Detector module DM-TP-80 0.25 %/m
 - Detector module DM-TP-05 0.05 %/m

Service life of the blower (12V) 43,500 hrs at 24 °C

TITANUS TOP · SENS®TP-1 / TOP · SENS® TP-2).

Electrical

operating voltage 24 V DC (14 - 30 V DC)

Starting current (at 24 V) 300 mA / 330 mA

Current consumption (at 24 V)
 - in standby, blower voltage 6.9 V 230 mA / 275 mA
 - in standby, blower voltage 6.9 V 300 mA / 340 mA
 - on alarm, blower voltage 6.9 V 300 mA / 350 mA
 - on alarm, blower voltage 6.9 V 360 mA / 430 mA

Contact load of alarm and fault relay
 Breaking capacity 1 A, 30 V DC
 max. 24 W

Mechanics

Displays on the device
 - In operation green LED
 - Malfunction yellow LED
 - Level display 1 x/2 x
 Smoke level display, each with 10

	segments (1 - 10)
	1 x 3/2 x 3 red LEDs
- Alarm	- Info alarm
	- Pre alarm
	- Main alarm
Conical duct connections	for Ø 25 mm
	1 pipe/2 pipes
- Suction pipe	1 pipe
- Air return	
Cable bushings	5 x M 20 and 2 x M 25
Dimensions (H x W x D)	113 x 200 x 292mm
Weight	1.5kg/1.6kg
Case	
- Material	Plastic (ABS)
- Color	papyrus white, RAL 9018

Environmental conditions

Protection category as per EN 60529	IP 20
Permissible temperature range	
- TITANUS TOP · SENS® /	0 °C - +50 °C
- Pipe system	20 °C - +60 °C
Permissible relative humidity (non-condensing)	10 - 95%

Special features

Acoustic power level	45 dB(A)
Response sensitivity	max. light obscuration
- Detector module DM-TT-80	0.8 %/m
- Detector module DM-TT-25	0.25 %/m
- Detector module DM-TT-05	0.05 %/m
Service life of the blower (12V)	43,500 hrs at 24 °C

Hardware Accessories

▶ MT-1 device mounting

Order number 664998143410

▶ DIAG 2 diagnostic software incl. connection cable

Order number 664998143412

▶ Test pipe

Order number 664998148848

▶ Test Adapter

Order number 664998148849

- ▶ AF-BR marking tapes for suction reducing film sheets

Order number 664998143413

- ▶ AF-2.0 suction reducing film sheets 2.0 mm

Order number 664998143416

- ▶ AF-2.5 suction reducing film sheets 2.5 mm

Order number 664998143417

- ▶ AF-3.0 suction reducing film sheets, 3.0mm

Order number 664998143418

- ▶ AF-3.2 suction reducing film sheets, 3.2mm

Order number 664998143419

- ▶ AF-3.4 suction reducing film sheets, 3.4mm

Order number 664998143420

- ▶ AF-3.6 suction reducing film sheets, 3.6mm

Order number 664998143422

- ▶ AF-3.8 suction reducing film sheets, 3.8mm

Order number 664998143423

- ▶ AF-4.0 suction reducing film sheets, 4.0mm

Order number 664998143424

- ▶ AF-4.2 suction reducing film sheets, 4.2mm

Order number 664998143425

- ▶ AF-4.4 suction reducing film sheets, 4.4mm

Order number 664998143426

- ▶ AF-4.6 suction reducing film sheets, 4.6mm

Order number 664998143427

- ▶ AF-5.0 suction reducing film sheets, 5.0mm

Order number 664998143428

- ▶ AF-5.2 suction reducing film sheets,
5.2mm

Order number 664998143429

- ▶ AF-5.6 suction reducing film sheets,
5.6mm

Order number 664998143430

- ▶ AF-6.0 suction reducing film sheets,
6.0mm

Order number 664998143431

- ▶ AF-6.8 suction reducing film sheets,
6.8mm

Order number 664998143432

- ▶ AF-7.0 suction reducing film sheets,
7.0mm

Order number 664998143433

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