SECURITON

ADW 535

Line Type Heat Detector

Mounting and installation

As of FW version 01.01.14

Imprint

Notice

This documentation, T 140 360, is valid only for the product described in Section 1.

The names and specifications of the **EN 54-22** product standard contained in this documentation relate to the draft issue **prEN 54-22**.

In this document, T 140 360, only the points necessary for mounting and installing the ADW 535 are described. The general specifications of the ADW 535 aspirating smoke detector can be found in technical description T 140 358.

This document, T 140 360[1], is available in the following languages:

German	T 140 360 de
English	T 140 360 en
French	T 140 360 fr

Current edition: Index a 15.12.2015 Po/ksa

Notice

Validity for production version and firmware version

The following documentation is applicable only to the ADW 535 line type heat detector with the following production version and firmware version:

Production version	**Firmware version**
from 151215	from 01.01.14

Other documents

Technical description ADW 535		T 140 358	de / en / fr / sv
Data sheet ADW 535		T 140 359	de / en / fr / sv
Technical description ADW 535HDx (ATEX)		T 140 458	de / en / fr / sv
Operating instructions ADW 535HDx (ATEX)		T 140 459	de / en / fr / sv
Material for sensing tube		T 140 362	multilingual (ED / FI)
Commissioning protocol		T 140 363	multilingual (EDFI)
Data sheets	XLM 35	T 140 088	de / en / fr / it / es / pt / sv
	RIM 36	T 140 364	de / en / fr / it / es / pt / sv
	SIM 35	T 140 011	de / en / fr / it / es / pt / sv
	SMM 535	T 140 010	de / en / fr / it / es / pt / sv
Installation instructions for supervising unit LSU 35		T 140 365	multilingual (EDFI)

[1] Reference document: T 140 358

Safety information

Provided the product is deployed by trained and qualified persons in accordance with this documentation T 140 360 and the danger, safety and general information notices in this technical description are observed, there is no danger to persons or property under normal conditions and when used properly.
National and state-specific laws, regulations and directives must be observed and adhered to in all cases.

Below are the designations, descriptions and symbols for danger, safety and general information notices as found in this document.

Danger

Danger to persons and/or property may result from the product and any system parts if danger notices are not heeded. If the product and/or its parts become damaged and cause malfunctions there is also the risk of injury to persons and damage to property.

- Description of which dangers may occur
- Measures and preventative actions
- How dangers can be averted
- Any other safety-related information

Warning

The product may be damaged if the safety information is not heeded.

- Description of which damage can occur
- Measures and preventative actions
- How dangers can be averted
- Any other safety-related information

Caution

Notice about a dangerous situation which, if not avoided, could possibly lead to minor to moderate injuries.

Notice

The product may malfunction if this notice is not observed.

- Description of the notice and which malfunctions can be expected
- Measures and preventative actions
- Any other safety-related information

Electrostatic discharge (ESD)

ESD bands for preventing electrostatic discharge are used for grounding persons and for equipotential bonding. They are always required when electronic systems and electronic components are handled or mounted. Active electronic components and integrated electrical circuits are at risk if they are improperly handled, transported or mounted or if their assemblies are touched.

Environmental protection

The products described in this technical documentation, T 140 360, comply with the relevant requirements to ensure that operation does not endanger the environment or pose a health risk to people and animals. During mounting, installation, maintenance, repair work and decommissioning of the products, there may be waste which poses a danger to persons and animals.
There is normally no danger to the environment, persons or animals if the work is performed by trained specialists and the notices in this technical documentation is observed concerning “Environmental protection / Recycling” and “Batteries” and if the products are used properly.
National and state-specific laws, regulations and directives must be observed and adhered to in all cases.

Below are the designations, content and symbols for “Environmental protection / Recycling” and “Batteries” in this document.

Environmental protection / recycling

Neither the product nor its components present a hazard to the environment provided they are handled properly.

- Description of which parts have environmental protection issues
- Description of how devices and their parts have to be disposed of in an environmentally-friendly way
- Description of the recycling possibilities

Batteries

It is not permitted to dispose of batteries in the domestic rubbish. As the end user you are legally obliged to return used batteries. Used batteries can be returned to the seller or taken to a designated recycling centre (e.g. a community collection point or dealer) at no cost. You may also send them back to the seller by post. The seller will refund the postage when you return your old batteries.

Document history

First edition **Date 19.06.2015**

Index „a“ **Date 15.12.2015**

Most important changes compared with previous issue:

Section	New (n) / changed (c) / deleted (d)		What / Reason
• 1.1 / 4.1 / 5	c / n	Application UL/ULC for ADW 535HDx and SIM 35 / SMM 535	Extension
• 1.2 / 5	c / n	Response behaviour according to EN 54-22, class A1l to GI	Extension

Contents

1 General

1.1 Purpose

The ADW 535 is an integrated line type heat detector with a response behaviour based on heat differential and/or maximum heat. Thanks to its self-check feature and the periodic, automatic test, the ADW 535 is particularly suitable for use in applications where the legally prescribed functional and maintenance checks cannot be performed due to the given ambient conditions or only with difficulty.

The ADW 535 line type heat detector is available in four versions.

In the thermoplastic housing for normal applications:

- ADW 535-1 for one sensing tube, two relays/OCs
- ADW 535-2 for two sensing tubes, four relays/OCs

In the housing for difficult ambient conditions and Ex applications (ATEX) ➔ see **T 140 458** and **T 140 459**:

- ADW 535-1HDx for one sensing tube, two relays/OCs
- ADW 535-2HDx for two sensing tubes, four relays/OCs

The ADW 535 line type heat detector has three connections (four expansion slots) for expansion modules. The following modules can be fitted:

- XLM 35 SecuriLine eXtended Line Module (**not tested to UL/ULC**)
- RIM 36 Relay Interface Module with 5 relays (2 units)
- SIM 35 Serial Interface Module
- Other

With the installation of an **XLM 35** SecuriLine eXtended line module, the ADW 535 line type heat detector can be easily connected to the SecuriFire (SecuriLine eXtended) and Integral (X-Line) fire alarm systems via the addressable loop. Control operations and changes to the ADW device configuration can be carried out directly from the FACP. For this purpose the FACP configuration software “SecuriFire Studio” and “Integral Application Center” are used to start the “ADW Config” configuration software for access to the ADWs; the configuration software is then used to make changes to the ADW 535.

A further expansion option is the **RIM 36** relay interface module. This module makes the individual alarms and the pre-signals “Diff” and “Max” available via relay contacts. The relays are also freely programmable via the “ADW Config” configuration software.

The **SIM 35** serial interface module is for networking multiple ADW 535s via RS485 bus. Using the “ADW Config” configuration software, all ADW 535 units present in the network can be configured, visualised and operated from a PC. The SMM 535 is required as the master module in the network and enables connection to a PC.

Notice

The normative alarm transmission of the ADW 535 to the superordinate centre does not take place via the ADW network. For that purpose the “Alarm” / “Fault” relays in the ADW, or the SecuriPro / SecuriFire / Integral addressable loop are to be used from the XLM 35.

The present technical description contains all information essential for trouble-free operation. For obvious reasons only those details specific to individual countries and companies or special applications can be discussed if they are of general interest.

1.2 Uses and applications

Thanks to its excellent properties under severe ambient conditions, the ADW 535 is used wherever problems are to be expected owing to latent disturbance variables during operation such that optimal protection can no longer be guaranteed with conventional point detectors. This includes:

- Road tunnels, railway tunnels and underground railway tunnels, underground mining;
- Car park halls, car decks on ships, loading platforms;
- Paint spray and paint shops (see also T 131 358, Sec. 4.9);
- Chemical industry, tank storage, (Ex zones see also T 131 358, Sec. 4.9 and 11.1 such as **T 140 458** and **T 140 459**).

The ADW 535 can also be deployed in areas where conventional point detectors are used. Local regulations and provisions must be observed from case to case.

The response behaviour of the ADW 535 is tested in compliance with (see also T 131 358, Sec. 4.1.1):

- **EN 54-22** = class **A1I** to **GI**;
- **UL/ULC** = according EN 54-22 class **A1I** to **GI**.

When control-unit-specific alarm transmitters, line monitoring elements etc. are used, the ADW can be connected via its potential-free change-over contacts to all common fire alarm systems virtually without restrictions.

1.3 Abbreviations, symbols and terms

The following abbreviations, symbols and terms are used in the Technical Description T 140 360. Other abbreviations can be found in T 131 358, Sec. 8.5.3.2 (status abbreviations on SD memory card). The abbreviations for tube material and accessories are listed in a separate document: T 140 362 (see also Sec. 2.3).

µC	=	Microcontroller / microprocessor
ABS	=	Acrylonitrile-butadiene styrene (plastic)
ADW	=	Line type heat detector
ADW Config	=	Configuration software for ADW 535
ADW HeatCalc	=	Calculation software for the sensing tube, “ADW HeatCalc”
Al	=	Alarm
ART 535	=	External reference temperature sensor (ADW reference temperature-sensor)
ATEX	=	**AT**mosphères **EX**plosibles
CE	=	Communauté Européenne (European Community)
Cu	=	Copper
Default	=	Preset values / settings
DIN	=	Deutsche Industrie Norm (German industry standard)
EasyConfig	=	Commissioning procedure without the “ADW Config” configuration software
EDP	=	Electronic data processing
EEPROM	=	Memory component for system data and ADW configuration
EMC	=	Electromagnetic compatibility
EN 54-22	=	European product standard about line type heat detectors
Ex-zone	=	Area subject to explosion hazards
FACP	=	Fire alarm control panel
FAS	=	Fire alarm system
Fault / Flt	=	Fault
Flash PROM	=	Memory component for firmware
FW	=	Firmware
GND	=	Supply ground (minus (-) pole)

➔➔

Continuation:

H-Al	=	Main alarm
HF	=	High frequency
HW	=	Hardware
IEC	=	International Electrotechnical Commission
Initial reset	=	Acquiring sensing tube basic data when commissioning the ADW 535
LEB 35	=	Expansion units for second sensing tube (LTHD extension board)
LED	=	Light-emitting diode (indicator)
LMB 35	=	ADW main board (LTHD main board)
LSU 35	=	Supervising unit (LTHD supervising unit)
Manufacturer	=	Securiton
mbar	=	Unit for pressure
NO / COM / NC	=	Relay contacts: NO (normally open), COM (common), NC (normally closed)
OC	=	Open collector output
OEM	=	Original Equipment Manufacturer (reseller)
PA	=	Polyamide (plastic)
PC	=	Personal computer
PC	=	Polycarbonate (plastic)
PMR 81	=	Semi-conductor relay
PSB 35	=	Pressure sensor unit in supervising unit (Pressure Sensor Board)
PTFE		Teflon (plastic)
PWR	=	Power input / power display (power)
PWR-R	=	Redundant power input
RAM	=	Memory component
ResExt	=	Reset external (state reset via input)
RIM 36	=	Relay interface module
RoHS	=	Restriction of Certain Hazardous Substances (eco-friendly manufacturing processes)
RPM 535	=	Remote pressure-sensor module RPS 535 (in preparation)
RPS 535	=	Remote pressure sensor (in preparation)
Rst	=	Hardware reset (restart)
SecuriFire	=	FAS system
SecuriLine	=	Fire detector addressable loop
SecuriPro	=	FAS system
SIM 35	=	Serial Interface Board
SMM 535	=	Serial Master Module
St	=	Stainless steel (VA)
SW	=	Software
Te.	=	Terminal
UMS 35	=	Universal Module Support
uP / aP	=	Flush mounted, surface mounted
Update / Release	=	Renewal / update of the firmware
V-Al	=	Pre-alarm
VDC	=	Direct current voltage
VdS	=	Verband der Schadenversicherer (Association of Indemnity Insurers, Germany)
VKF	=	Vereinigung Kantonaler Feuerversicherungen (Cantonal Fire Insurance Union, Switzerland)
VS	=	Pre-signal
Watchdog	=	Monitoring of the microcontroller
XLM 35	=	SecuriLine eXtended module

2 Mounting

2.1 Mounting guidelines

Notice

Material and products. When the system is set up, only the following supplied, approved and listed materials may be used:

- Evaluation unit, expansion modules
- Sensing tube material and accessory materials (acc. to T 140 362).

Materials from other sources do not conform to EN 54-22 approval and may only be used if the manufacturer's written consent has been obtained.

Installation materials such as cables, intermediate distributors and fastening materials are usually supplied by the customer. Rust-proof screws are to be used for system parts (V4A).

Tools for handling the evaluation unit. The tools listed below are required for mounting and installation (sorted in the sequence in which they are used in this document):

• Opening the evaluation unit	Torx screwdriver T20
• Module holder for expansion modules	Torx screwdriver T15
• Terminals	flat-blade screwdriver no. 1 (3.5 mm)
• Replacing LMB main board	Torx screwdriver T10
• Replacing LMB main board on ADW 535-2 (additional)	Fork wrench no. 5.5
• Replacing LEB extension board	Phillips-head screwdriver no. 1
• Replacing LSU supervising unit	Torx screw driver T10
• Replacing LSU supervising unit	Fork wrench no. 12
• Sensing tube connection to the evaluation unit	Fork wrench no. 10
• Sensing tube screw junction for copper and stainless steel tube	Fork wrench no. 10
• Sensing tube screw connection for Teflon tube	Fork wrench no. 10 and 12

2.2 ADW 535-2 (-1) dimensioned drawing & drilling plan for evaluation unit

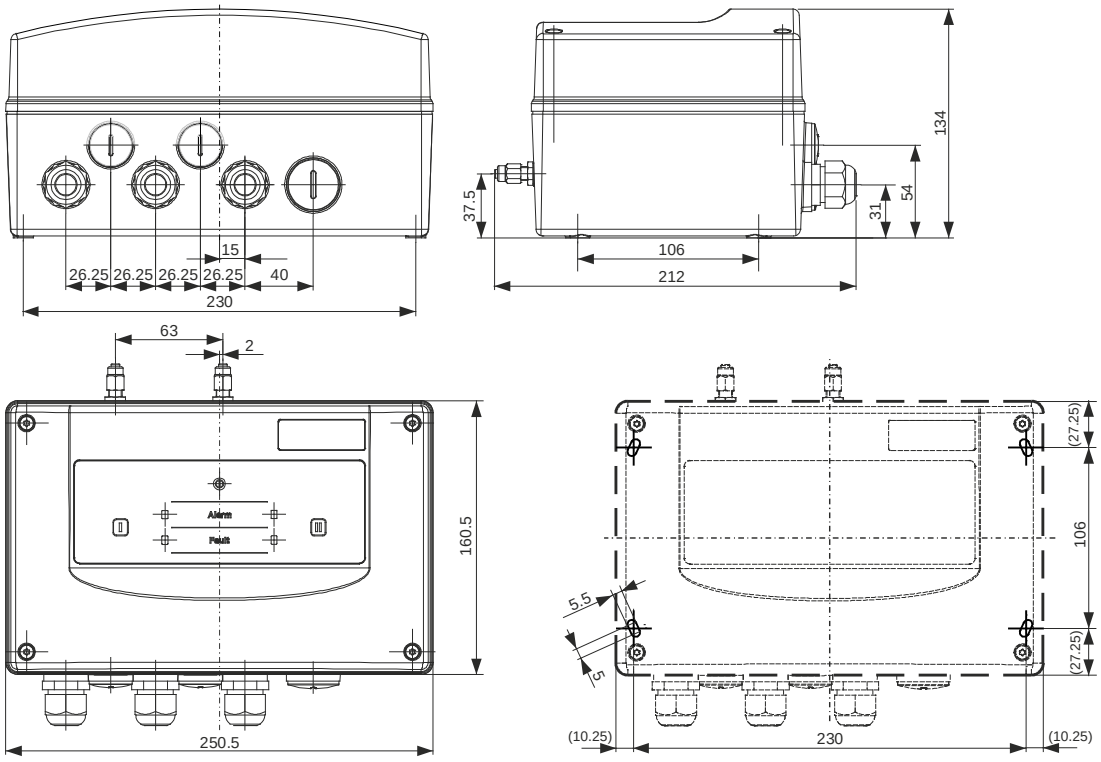


Fig. 1 Dimensioned drawing, drilling plan for evaluation unit

2.3 Material for the sensing tube

If the sensing tube is to be used in extremely corrosive environments, provide for sufficiently resistant tube materials. The available sensing tube materials and their application are listed below:

Material	Application
Copper (Cu)	Standard sensing tube for applications with normal ambient temperatures: • –40 – +180°C ➔ ① (When used at 100°C and above, use metal pipe clamps).
Stainless steel (St) ②	Sensor tube for applications in corrosive environments, especially in the food industry for hygienic reasons: • –40 – +300°C (when used at 100°C and above, use metal pipe clamps).
Teflon (PTFE)	Sensor tube for applications in very corrosive and aggressive environments: • –40 – +260°C (when used at more than 100°C, metal pipe clamps and brass screw-junction pieces must be used; if more than 180 C the screw-junction pieces must be outside of the monitored area ➔ ①).

Danger

Pipe materials other than those listed above may be used only after consulting with the manufacturer of the ADW 535 and with the manufacturer's written consent.

Use only tubing materials (material, supplier, dimensions) that have been tested and approved by the manufacturer of the ADW 535.

Notice

① Higher temperatures are possible after consulting with the manufacturer.

② When using stainless steel sensing tubes in corrosive environments, a PS TU 5/4 St protective screw-junction piece must be used in order to protect the brass sensing tube connection on the ADW map case (see T 140 362). Details for handling this protective screw-junction piece can be seen on the instruction sheet.

A list of the available **materials for the sensing tubing** (pipes, screw-junction pieces etc.) for the ADW 535 is available in a separate document (**T 140 362**).

2.4 Types of mounting

Notice

The mounting types described in the following Sec. 2.4 are decisive for the proper functioning of the ADW 535. The specifications must therefore be strictly adhered to. Deviations are permitted only with the written consent of the manufacturer.

2.4.1 Evaluation unit

The evaluation unit can be mounted in the X, Y or Z axis. An easily accessible location should be chosen so that the detector box can be worked on without aides such as ladders and scaffolding.

The evaluation unit must not be exposed to direct sunlight.

For applications such as in tunnels or when outdoor mounting is necessary, the evaluation unit must be installed in an additional protective box (e.g. SOS alarm boxes in road tunnels).

On the sensor cable entry side, a minimum distance of 10 cm to customer-side parts must be observed (protective boxes, niches etc.).

The evaluation unit is generally to be installed in an area where the relevant conditions for the evaluation unit apply as specified in Sec. 5 (also valid for use in high ambient temperature areas).

2.4.2 Sensing tube

2.4.2.1 Overview of sensing tube design

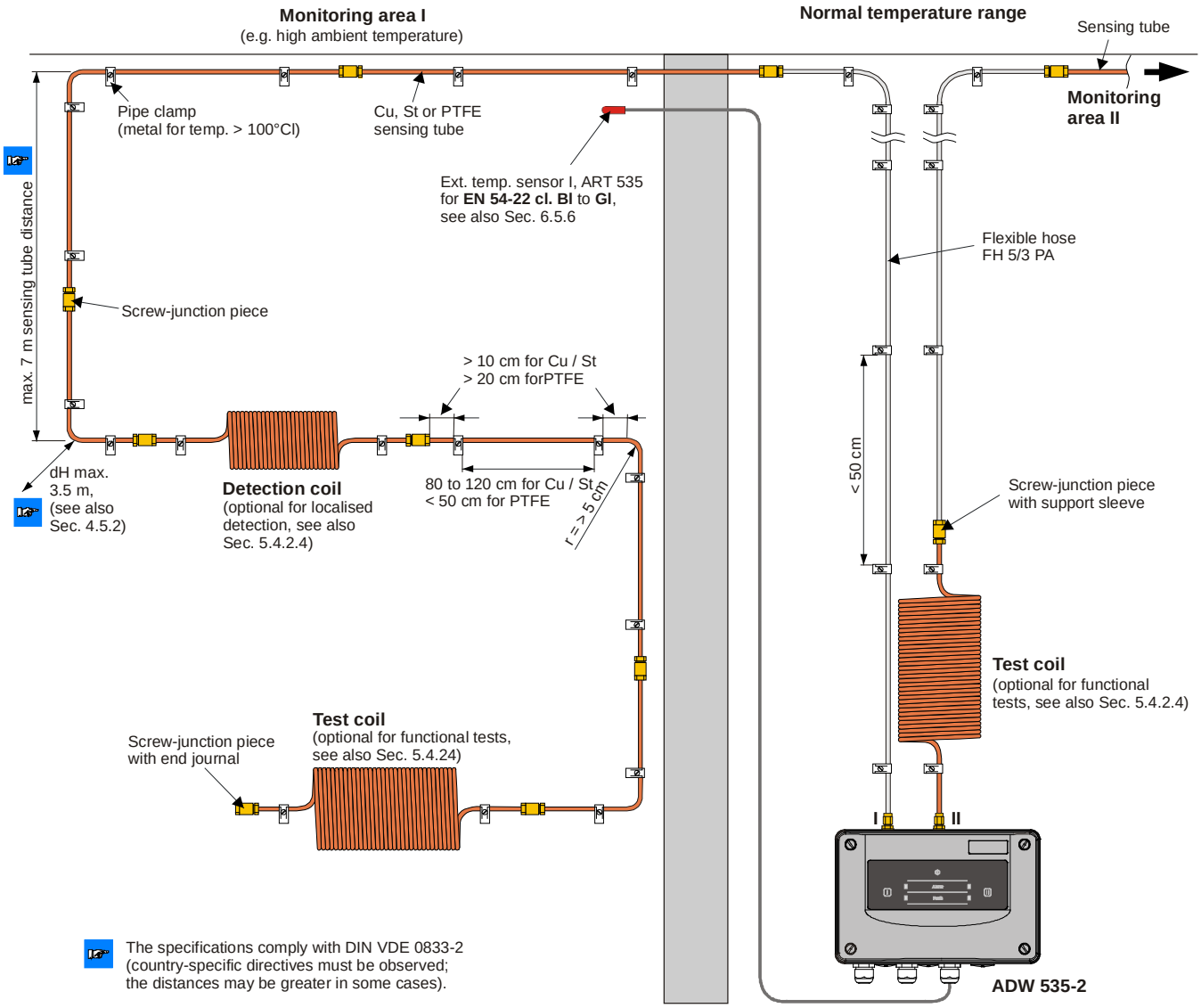


Fig. 2 Overview of sensing tube design

2.4.2.2 Sensing tube ascent and mounting

Connection of the evaluation unit to the sensing tube is usually by means of the flexible hose. The flexible hose must be mechanically protected with suitable means (protective pipe). The sensing tube can also be connected directly to the evaluation unit (e.g. for industrial applications).

The following example illustrates two options for sensing tube ascent in tunnels.

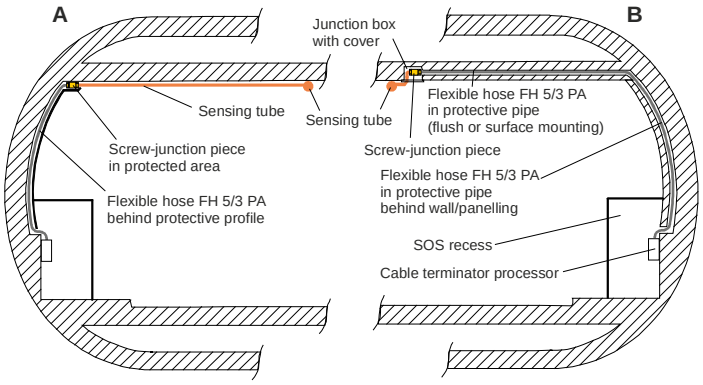


Fig. 3 Example of sensing tube ascent in tunnels

- **A**. The sensing tube (here copper) traverses from the centre of the tunnel to the side wall. There a screw-junction piece connects the sensing tube to the flexible hose. The flexible hose is conducted behind a protective profile into the SOS recess to the evaluation unit. **Important**: the transition from tunnel ceiling to the side wall and from the sensing tube to the flexible hose should be in the protected area if at all possible (covering).

or:

- **B**. Flexible hose which is drawn through a flush or surface mounted protective pipe traverses the tunnel. The flexible hose is conducted in the protective pipe behind the tunnel wall panelling into the SOS recess to the evaluation unit.

The sensing tube ascent can also be a combination of **A** and **B**.

2.4.2.3 Handling sensing cable in general

When arranging and mounting the sensing tube, the points below must be observed and adhered to:

- The sensing tube must be routed in a way that does not impact the lateral visual angle (**Fig. 4**).
- Avoid routing the sensing tube next to, beneath or above the lighting bands. A minimum distance of 0.5 m must be observed.
- For applications in tunnels, the sensing tube must generally be mounted in the centre of the tunnel, with a lateral tolerance of 0.5 m (for exceptions see T 131 358, Sec. 4.5.1).
- To bypass hindrances in the ceiling construction (ceiling openings, beams, etc.), you can deviate from the basic rules above. Ensure that the directional changes required to bypass hindrances in tunnels do not deviate more than 45° from the normal tube routing axis. If a change of direction or a crossing at an angle of 90° is absolutely necessary, these tube sections must be mechanically protected.
- The sensing tube is mounted directly onto the ceiling with plastic pipe clamps. In tunnels it is also possible to mount on the underside of cable ducts as long as the ducts are no farther than 0.5 m to the ceiling.
- A distance of 25 m must be maintained from the end of the sensing tube to the portal in the portal areas of tunnels.

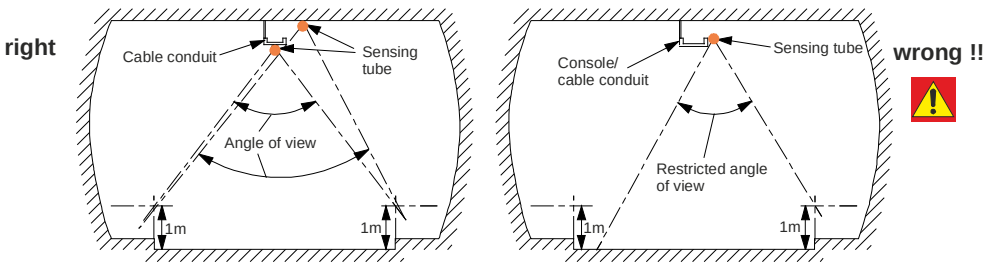


Fig. 4 Angle of view for sensing tube mounting in tunnels

- It is absolutely essential to maintain the maximum sensing tube lengths as described in Sec. T 131 358, 4.5.1 to 4.5.3 (incl. ascent to ceiling). Other sensing tube lengths mean that special sensing tubes have to be selected (see also Sec. 2.3).
- The sensing tube is fastened with the special plastic pipe clamps. Exception: when used in an environment with high ambient temperatures, use metal pipe clamps.
- Pipe clamp distance is 0.8 m to 1.2 m for copper and stainless steel sensing tube and 0.5 m for Teflon sensing tube.
- Only rust-free screws may be used for fastening.
- Ensure that the pipe clamps and the sensing tube are laid in a straight line (plumb line) so that the tube can slide into the pipe clamps in the case of linear expansion due to temperature fluctuations.
- The tube pieces are connected to each other with screw-junction pieces. Make sure that the tube ends are cut at a right-angle and do not have protruding metal splinters (burrs) (**Fig. 5**).
- Use a screw-junction piece with end journals at the end of the sensing tube (**Fig. 5**). Mount these only after blowing out the sensing tube.
- The distance between the end piece of one sensing tube and the end piece of the following sensing tube must not be less than 0.5 m (length expansion).
- A support sleeve must always be used for the screw-junction pieces connecting the sensing tube to the flexible hose (**Fig. 5**).
- A safety distance of min. 10 cm (copper and stainless steel sensing tube) or 20 cm (Teflon sensing tube) must be maintained between pipe clamps and screw-junction pieces & bends (due to length expansion of the sensing tube).
- The ascent to the ceiling should be realised only with a flexible hose if possible. The flexible hose must be conveyed in a protective tube for mechanical protection.
- A minimum bending radius of 5 cm of the sensing tube and flexible hose must be observed (danger of crushing). Furthermore, ensure that any existing bends in the flexible hose cannot be crushed later on (fasten before and after the bend).
- Upon completing the mounting, the entire sensing tube including ascent towards the end piece must be blown out (cleaned) with oil-free compressed air or nitrogen. The instructions for this procedure are described in Sec. 2.4.2.5.

Warning

The evaluation unit must not yet be connected at this time under any circumstances.

- If it is still not possible to connect the sensing tube to the evaluation unit after being blown out, the concerned end must be terminated using appropriate means in a way that does not allow dust or moisture to penetrate.

Notice

- A screw-junction piece can be used only once!
- The screw-junction piece must be tightened only to the point at which the thread is no longer visible.

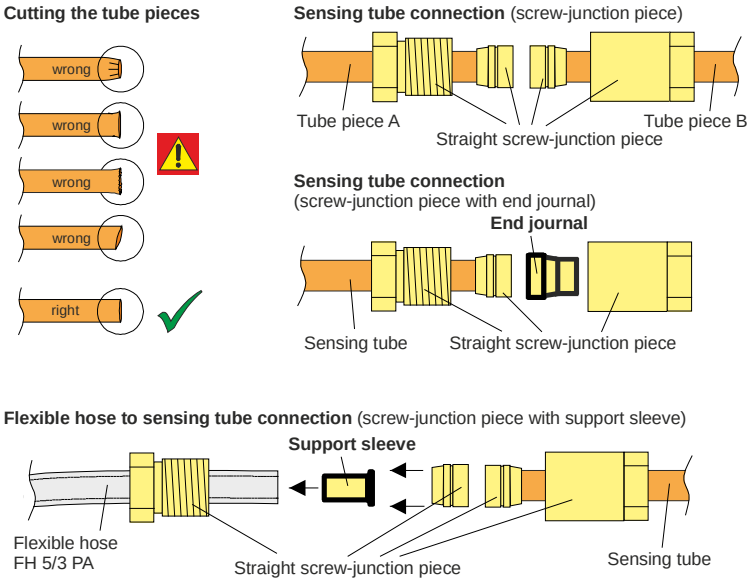


Fig. 5 Sensing tube connections

2.4.2.4 Deployment and mounting of detection coils and test coils

Detection coils can be built into the sensing tube. They provide optimal monitoring of, for example, localised danger sources (equipment and object monitoring). Detection coils correspond to a sensing tube length of 5 m.

If needed, a **test coil** can be built in when object-specific functional tests (alarm releases) are required. Test coils correspond to a sensing tube length of 10 m.

See also **Fig. 2** concerning detection and test coils. When two test coils are used directly on the evaluation unit (for ADW 535-2), they must be arranged in an offset manner to prevent both test coils from being simultaneously subjected to heat testing (hot air blower). It may be necessary to place an isolator between the test coils during testing.

Notice

The following rules must be observed when mounting detection and test coils:

- The volume of the detection and test coils corresponds to a certain sensing tube length. Thus, when calculating the overall length of the sensing tube, for each used **detection coil 5 m** of sensing tube must be taken into account and for each **test coil 10 m** of sensing tube must be taken into account. For this reason, detection coils and test coils must be taken into account during system planning in the project planning phase.
- Detection and test coils must not be exposed to direct sunlight.
- The local influence of temperature fluctuations may trigger false alarms on the detection and test coils.
- Heat impingement in the area of the detection coils may not comply with the requirements of EN 54-22 (the ADW may react more sensitively).
- Detection coils are always to be used only with equipment monitoring and object monitoring. They can be used for space surveillance if the available mounting length of the sensing tube is limited to less than 10 m.
- The test coil can be positioned at the ADW 535 evaluation unit or at the end of the sensing tube.
- The test coil should never be located in the monitored area.
- It may be necessary to install the test coil in a lockable box (protection against vandalism).

2.4.2.5 Testing the sensing tube

After the sensing tube is mounted, dust and moisture must be removed from the entire sensing tube. Also at this time a first sealing test can be performed.

Warning

Under no circumstances may the evaluation unit be connected for cleaning and sealing check work.

Moisture-free air (oil-free compressed air or nitrogen) must be used for the cleaning and sealing check. For this purpose the manufacturer of the ADW 535 can provide the **ACMS 535** "**mini-compressor**" for testing. Using a special adapter hose from the manufacturer (**AD ADW Air**), cleaning is also possible with on-site **oil-free compressed air**. A cleaning and sealing check with the "**Nitrogen set**" is of course also possible (for handling see Technical Documentation ADW 511A, T 139 420, Sec. 5.3.2.2).

Test procedure

Testing takes place at the beginning of the sensing tube where the evaluation unit is connected (**Fig. 6**).

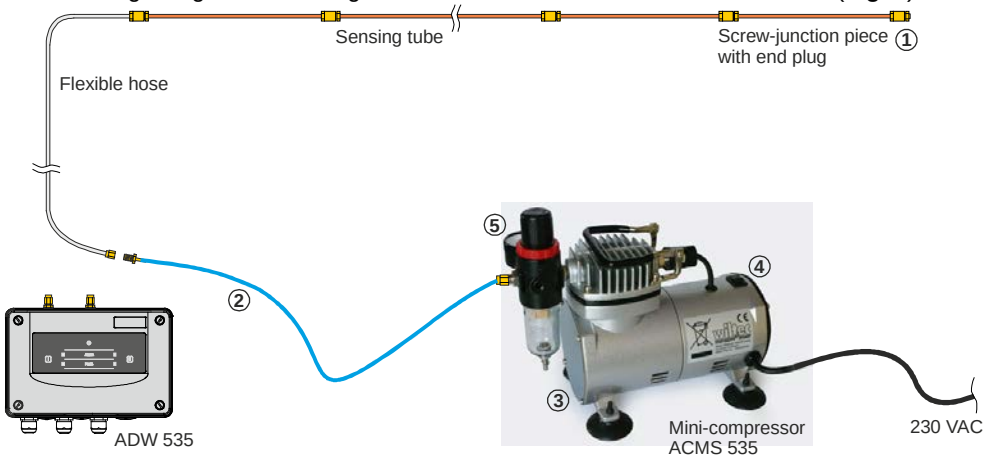


Fig. 6 Mini-compressor connection

Warning

- Before using the mini-compressor, check whether condensation is in the water filter. If this is the case, the collected water must be drained out using the drain valve. It is imperative to prevent moisture from entering the sensing tube.
- If water collects in the water filter during cleaning (point (8)), this indicates that moisture or water residues are in the sensing tube. In this case the nitrogen set must be used for cleaning the concerned sensing tube.

Sealing check	
(1)	The end journal must be used at the end of the sensing tube ① (in the sensing tube termination).
(2)	Connect the sensing tube (flexible hose) via the connection hose ② to the mini-compressor ③.
(3)	Switch on the mini-compressor at the main switch ④ and wait until a pressure of **4 bar** is generated ➔ check on the manometer ⑤. The mini-compressor switches off automatically when this pressure is reached.
(4)	The pressure on the manometer ⑤ must be observed for **3 min ➔ there must not be any recognisable drop in pressure!!** ☞ If a pressure drop occurs, use leak spray to easily find leaks (spay all connection points including termination). After a repair, repeat points **(1)** to **(4)**.
(5)	Switch off the mini-compressor on the mains switch ④.
Cleaning	
(6)	Pressure is still present in the sensing tube from the preceding sealing check.
(7)	Quickly unscrew the screw-junction piece at the end of the sensing tube ① (sensing tube termination) with a fork wrench and completely remove the outer part. **Make sure the end journal does not become lost!**
(8)	The overpressure in the sensing tube escapes quickly; any dust and remaining moisture are removed ➔ wait about **3 min** until the air has completely escaped from the sensing tube.
(9)	Completely close the sensing tube termination ① at the end of the sensing tube (mount end journal).
(10)	Log the test.

3 Installation

3.1 Regulations

Danger

The electrical installation is to be carried out in accordance with the applicable country-specific regulations, standards and guidelines. Likewise, the local provisions must also be observed.

Notice

Besides country-specific regulations and guidelines, the specifications concerning the requirements for installation cables and conductor cross-sections as described in T 131 358, Sec. 4.8 must be observed and implemented.

3.2 Cable entry

Danger

Make sure the power is disconnected for all connection and wiring work on the ADW 535.

There are three M20 cable screw unions in the evaluation unit for feeding in the electrical installation. If needed, an additional three cable screw unions (2 x M20, 1 x M25) can be fitted in three reserve holes (blind plugs).

The cable screw unions are suitable for cables with external diameters ranging between 5 and 12 mm (M20) or 9 and 18 mm (M25).

Notice

- The device ships with the cable screw unions sealed with a dust-protection insert; remove the inserts before feeding in the cables. The dust-protection inserts merely prevent the ingress of any dust and/or dirt during the mounting of the device and do not provide any mechanical protection. Any cable screw unions that are not in use must be replaced with blind plugs to maintain the IP65 protection class.
- **Use in compliance with UL 521**: When using the ADW 535 in compliance with UL 521, special **1/2”** and **3/4”** cable screw unions are to be used (customer-side). To be able to use them in the ADW map case, the existing M20 and M25 screw-junction pieces must be removed and replaced by 1/2” M20 adapters and 3/4” M25 adapters. The adapters are available from the manufacturer in the **AD US M-inch** range of accessories.

3.3 Installing expansion modules XLM 35, RIM 36, SIM 35

There are four expansion slots for fitting the evaluation unit with optional expansion modules. Given the modular assignment of ribbon cable connectors on the LMB 35 main board (see also T 131 358, Sec. 2.2, Fig. 6), it is recommended to observe the arrangement shown in **Fig. 7**.

The mounting set of each module comprises a module holder, mounting screw and the connecting cable (ribbon cable) for connecting to the LMB 35. Use a **Torx screwdriver T15** to tighten the mounting screw. The module can be removed from the module holder for mounting in the evaluation unit and for the subsequent electrical installation.

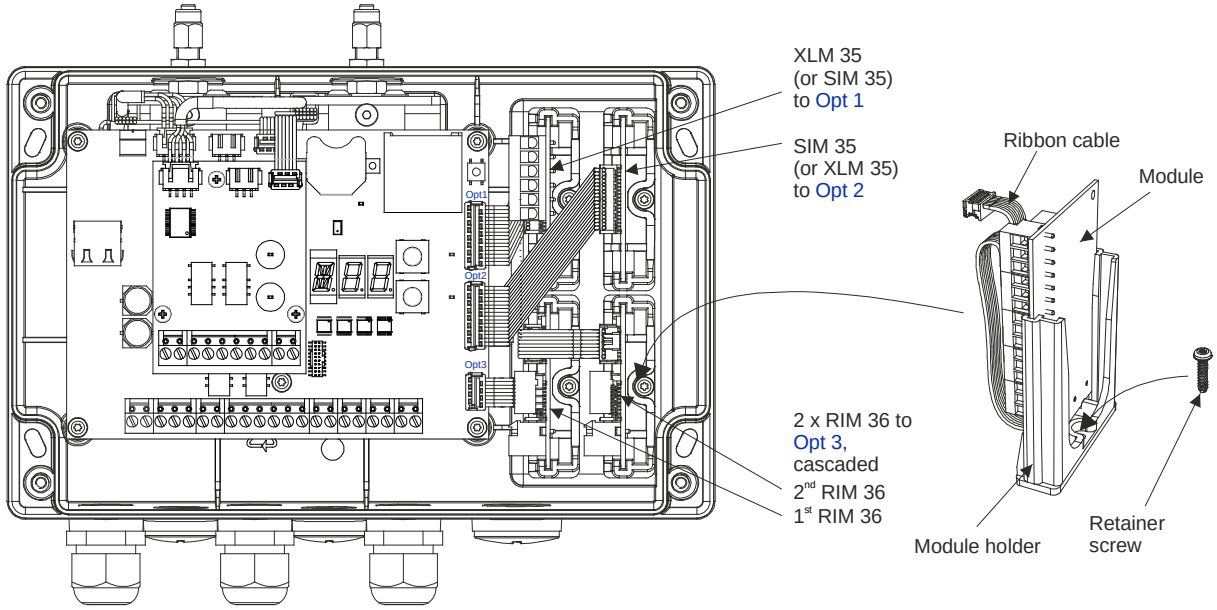


Fig. 7 Installing expansion modules

Notice

The expansion modules are automatically detected when the device is switched on, from which point on they are monitored and functional. When subsequently removing an expansion module (e.g. because it is not being used), the expansion modules must first be logged off via operation on the LMB 35 main board (***o*** switch position, see T 131 358, Sec. 7.3.7).

The UMS 35 universal module holder is available for installing modules other than XLM, RIM or SIM. It is fastened in the evaluation unit instead of the above described module holder and requires two expansion slots one above the other (directly next to the LMB 35). The UMS 35 consists of an angled sheet metal plate with various fastening options for expansion modules.

3.4 Electrical connection

The electrical connection is implemented by means of plug-in screw terminals. Use a **flat-blade screwdriver no. 1** (3.5 mm) to tighten the screw terminals. Individual terminal blocks are fitted for the supply voltage, relay contacts, inputs, outputs, etc.

Danger

- Inside the evaluation unit the lines should be routed to the terminals using the shortest possible path. Reserve loops via the main board are to be avoided (EMC).
- **Caution**: For monitoring the automatic fire detector, **no looped lines** may be connected to terminals "**Alarm I**", "**Fault I**", "**Alarm II**" or "**Fault II**". The looped line must be interrupted to enable connection monitoring.

3.4.1 Terminal assignment for the LMB 35 main board

LMB terminal	Signal		Wiring
1	PWR +	+9 to +30 VDC ①	Main supply line from FACP or external according to **Fig. 8**
2	PWR –	0 V	
3	PWR-R +	+9 to +30 VDC ①	Redundant supply line from FACP or external according to **Fig. 8**
4	PWR-R –	0 V	
5	+OC	+ power supply	Connection of feedback loop signals according to **Fig. 15**
6	Flt OC Out1	OC output Fault I	
7	Al OC Out1	OC output Alarm I	
8	Rel Flt1 (“NO”) ②	Fault I	Connection of the line acc. to **Fig. 12** or **Fig. 13** and specifications of the used line
9	Rel Flt1 (“NO”)		
10	Rel Flt1 “COM” ②		
11	Rel Al1 “NO”	Alarm I	
12	Rel Al1 “NC”		
13	Rel Al1 “COM”		
14	TempSens1 +	External temperature sensor I	Connection according to **Fig. 16**
15	TempSens1 –		
16	ResExt +	Reset external input (opto-isolator input)	Connection according to **Fig. 9** and **Fig. 11**
17	ResExt –		
18	InPrg1 +	Day/night control from FACP (opto-isolator input)	Connection acc. to schematic **Fig. 9**
19	InPrg1 –		
20	InPrg2 +	Reserve, no function (opto-isolator input)	
21	InPrg2 –		

Notice

① UL/FM = +10.6 to +27 VDC.

② The relay “Flt1” (fault) is picked up in the quiescent state ➔ Contact terminal 10/8 closed, 10/9 open (ADW 535 under voltage; no fault event present).

3.4.2 Terminal assignment of LEB 35 extension board

LEB terminal	Signal		Wiring
22	Flt OC Out2	OC output Fault II	Connection of feedback loop signals, acc. to **Fig. 15**
23	Al OC Out2	OC output Alarm II	
24	Rel Flt2 (“NO”) ①	Fault II	Connection of the line acc. to **Fig. 12** or **Fig. 13** and specifications of the used line
25	Rel Flt2 (“NC”)		
26	Rel Flt2 “COM” ①		
27	Rel Al2 “NO”	Alarm II	
28	Rel Al2 “NC”		
29	Rel Al2 “COM”		
30	TempSens2 +	External temperature sensor II	Connection according to **Fig. 16**
31	TempSens2 –		

Notice

① The relay “Flt2” (fault) is picked up in quiescent state ➔ Contact terminal 26/24 closed, 26/25 open (ADW 535 under voltage; no fault event present).

3.4.3 Terminal assignment for SecuriLine eXtended line module XLM 35

Terminal XLM	Signal	Wiring
L1	Data A	Addressable loop acc. to **Fig. 11** or **Fig. 14** (see also T 131 358, Sec. 8.5.5)
C1	GND A	
G1	Screen	
L2	Data B	Addressable loop acc. to **Fig. 11** or **Fig. 14** (see also T 131 358, Sec. 8.5.5)
C2	GND B	
G2	Screen	

3.4.4 Terminal assignment for RIM 36 relay interface module

RIM terminal		Signal ①		Wiring
1	Rel. 1	"NO"	Diff alarm of sensing tube I (II) or freely programmable	Local info or connection to input of FACP
2		"NC"		
3		"COM"		
4	Rel. 2	"NO"	Max alarm of sensing tube I (II) or freely programmable	
5		"NC"		
6		"COM"		
7	Rel. 3	"NO"	Pre-signal Diff alarm of sensing tube I (II) or freely programmable	
8		"NC"		
9		"COM"		
10	Rel. 4	"NO"	Pre-signal Max alarm of sensing tube I (II) or freely programmable	
11		"NC"		
12		"COM"		
13	Rel. 5	"NO"	Alarm temperature sensor LMB or freely programmable	
14		"NC"		
15		"COM"		

Notice

① Depending on the device version, the assigned criteria (signals) upon product delivery apply to sensing tube I on the first RIM 36 (connected to LMB 35) and sensing tube II on the second RIM 36 (connected to the first RIM 36, cascaded). The assignment of individual or all relays can be changed with the "ADW Config" configuration software.
If two RIM 36 devices are used on the ADW 535-1, the relays of the second RIM 36 are not configured with any default criteria. The required programming must be performed with the "ADW Config" configuration software.

3.4.5 Terminal assignment of an SIM 35 serial interface module

SIM terminal	Signal	Wiring / installation (see also Sec. T 131 358, 8.5.6)		
1	GND	Input	1st conductor of wire pair 2	
2	D +		1st conductor of wire pair 1	twisted
3	D –		2nd conductor of wire pair 1	
4	GND	Output	1st conductor of wire pair 2	
5	D +		1st conductor of wire pair 1	twisted
6	D –		2nd conductor of wire pair 1	

3.5 Connection variants

Notice

The connection variants are determined by the possible line and FACP technologies used. For more information on connecting alarm transmitters, line monitoring elements, etc., please contact the manufacturer and/or supplier of the fire alarm system.

In all cases the ADW 535 must have an emergency power supply compliant with EN 54-4.

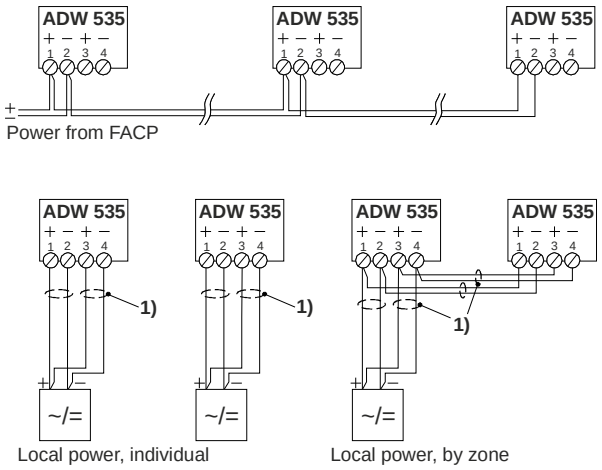
3.5.1 Power supply

The ADW 535 must always have an emergency power supply. Depending on the output current available at the fire alarm control panel (FACP) and the number of ADW 535 units to be connected, the power supply can be provided by the FACP; alternatively, an additional power supply must be provided locally.

The supply is via terminals 1 and 2. In applications which stipulate a redundant power supply line (country-specific), it is routed to terminals 3 and 4 (**Fig. 8**).

Notice

- The supply inputs are not connected internally in the ADW and therefore cannot be used for direct forwarding to neighbouring systems.
- The terminals of the ADW 535 are designed for maximum 2.5 mm². For forwarding the supply line to a neighbouring ADW it may therefore be necessary to install additional distributor or support terminals.



1) redundant power supply line (optional, country-specific)

Fig. 8 Types of power supply

Danger

To determine the required power supply and cable cross-section, the calculations set out in T 131 358, Sec. 4.8.2 must be carried out in all cases. For applications with redundant power supply, the calculations must be performed for both supply lines individually.

3.5.2 Reset input

The reset input is potential-free (opto-isolator) and can be actuated on both the “plus” side and the “minus” side (**Fig. 9**). The input operates in the range of 5 to 30 VDC and in an impulse bandwidth of 0.5 to 10 s. Thanks to the continuous current consumption of approx. 3 mA across the entire operating range, actuation can be carried out directly via an OC output.

When a continuous signal is applied for longer than 20 s, the ADW 535 is switched inactive and the fault relay on the LMB 35 (on ADW 535-2 also the LEB 35) becomes active (triggers). Once the continuous signal is switched off, the ADW is re-armed. Switching inactive via the “Reset external” input works only if the ADW 535 is not equipped with an XLM 35.

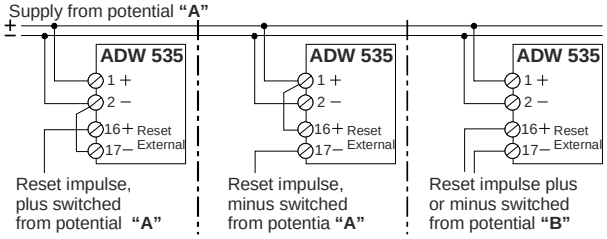


Fig. 9 Reset input

3.5.3 Control

The ADW 535 units connected to a FACP are controlled according to the detection zone mapping using the FACP states “Zone ON/OFF” and “Reset”. Two possibilities are available:

- Control via supply voltage (auxiliary relays in the ADW power supply line)
- Control via the “Reset external” input

3.5.3.1 Control via supply voltage by means of auxiliary relay

Depending on the location of the ADW supply, the auxiliary relay may be placed in the FACP or directly in the ADW 535.

The auxiliary relay can be actuated in the following ways (see **Fig. 10**):

A. line plus or minus
B. SW output of the FACP
C. SW output or function of a control module

The function types described above are determined by the FACP technology used; it is therefore essential to contact the manufacturer and/or the supplier of the FACP for details before implementing.

Danger

- The EMC protective elements at the input of the ADW electronics cause a brief current peak (5 A / 1 ms) when the supply voltage is applied. When using auxiliary relays with a maximum contact rating of 1 A, this may lead to the relay contact sticking. For this reason auxiliary relays with a contact load of over **1 A** should **always** be used, e.g. PMR 81 semiconductor relay (see **Fig. 10C**).
- The ADW supply path via the auxiliary relay contact must be short-circuit-proof or conducted through a fuse component (circuit-breaker card).

Notice

- When using a PMR 81 semi-conductor relay, it may be necessary to invert the actuation signal (PMR only has a normally open (NO) contact function).
- To guarantee comprehensive emergency running properties, the connection must in all cases be implemented in such a way that if there is an FACP computer failure the ADW will continue to function (reset input not actuated).

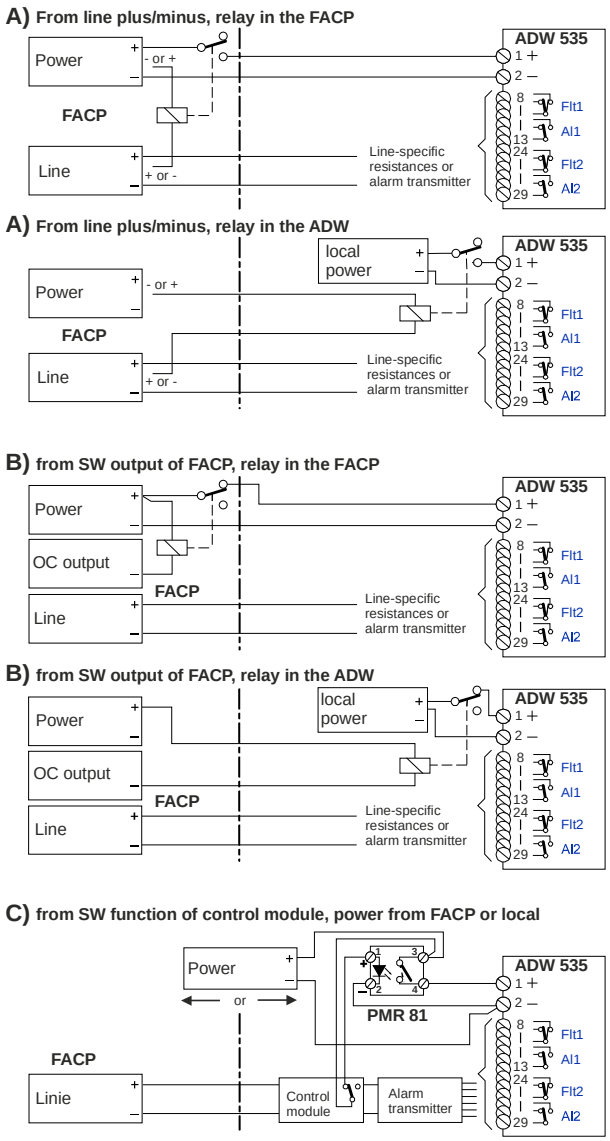


Fig. 10 Control via supply with relay

3.5.3.2 Control via input “Reset external”

The following options are available for control via the reset input (see **Fig. 11**):

A. Control via auxiliary relay from line plus

B. Control via auxiliary relay or semi-conductor relay (PMR 81) from control output (open collector)

C. Control without auxiliary relay, directly from control output (relay contact or open collector)

D. Control via addressable loop when using the XLM 35. The control is then not by means of the reset input but rather directly with the corresponding command entry via the XLM 35 on the ADW 535.

The function types described above are determined by the FACP technology used; it is therefore essential to contact the manufacturer and/or the supplier of the FACP for details before implementing.

Notice

- When using a PMR 81 semi-conductor relay, it may be necessary to invert the actuation signal (PMR only has a normally open (NO) contact function).
- To guarantee comprehensive emergency running properties, the connection must **in all cases** be implemented in such a way that if there is an FACP computer failure the ADW will continue to function (reset input not actuated).

Warning

Caution: When control is via the “Reset external” input, the ADW 535 is supplied with voltage even if the zone (FACP) is switched off.

For this reason the power supply line to the ADW must be disconnected to carry out any repair work (e.g. unplug terminals 1 and 2 on the ADW; also 3 and 4 in the case of a redundant supply).

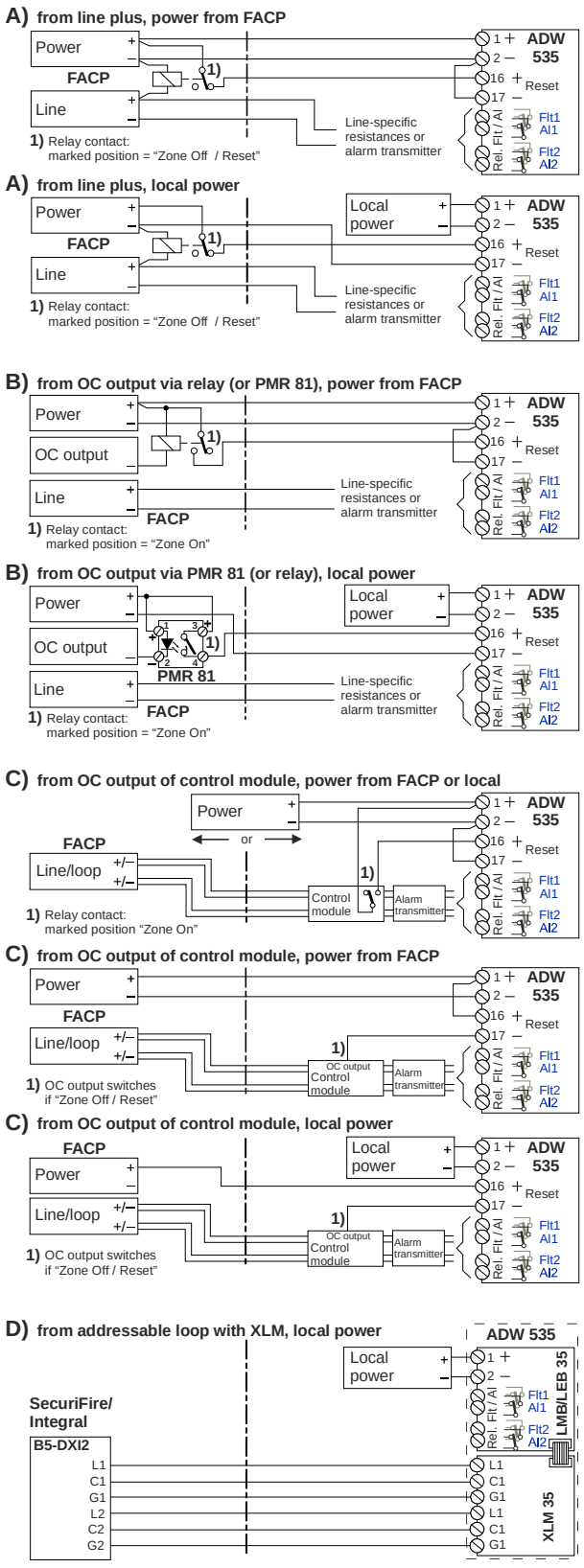


Fig. 11 Control via the “Reset external” input

3.5.4 Connection to the FACP line

Each of the following examples illustrates the control via reset input according to Sec. 3.5.3.2. If connection with the control via the voltage supply is required, the control circuit in the figures below can be implemented as described in Sec. 3.5.3.1.

3.5.4.1 Connection to zone detection via relay alarm / fault

- For connection to zone detection lines, the control relay is usually actuated from the line plus. A condition for this, however, is that the line plus also switches for “Zone ON/OFF” and “Reset” (see **Fig. 12**, **C)**, for exception).
- Connection as shown in **Fig. 12**, **B)**, is used exclusively when the FACP line is to operate with **2-detector dependency** (V-Al / H-Al) from sensing tube I and II. For that purpose the FACP line is programmed for 2-detector dependency. Both sensing tubes of the ADW then cover the **same monitored area**.
- When connecting as shown in **Fig. 12**, **C)**, Alarm I and Alarm II can be evaluated in the FACP as independent zones from two independent monitoring areas. A **2-line dependency** can also be programmed in the FACP. Then the same applies as under **B)**: both sensing tubes from a monitored area.
- If the connection as in **Fig. 12**, **C)** is used, the control signal for the reset input can no longer be picked up from the line plus; instead, a software output has to be created with the following programming:
  Output switches when:
  Line/zone A or B “Reset”
  or:
  Line/zone A and B “Off”

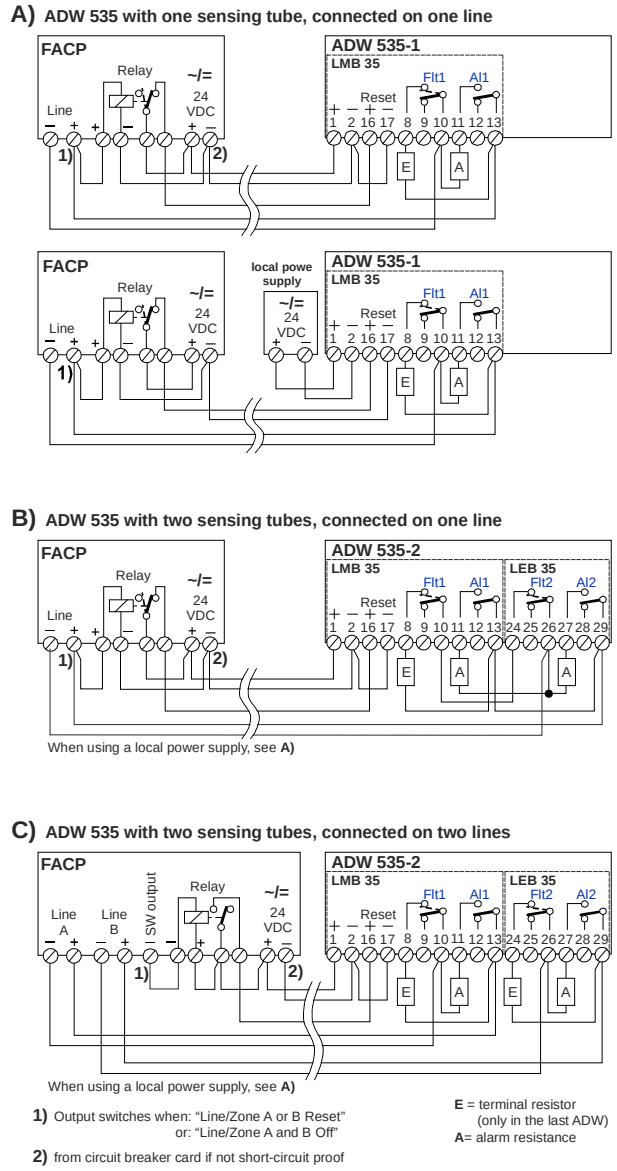


Fig. 12 Connection to zone detection

3.5.4.2 Connection to selective identification or addressable loop via relay alarm / fault

- With line technologies such as selective identification lines and addressable loops, the control relay is actuated from a software-controlled output (output card or control module). The output is programmed via the FACP software using the “Zone Off” and “Reset” functions.
- If Alarm I and Alarm II are evaluated in the FACP as individual zones (also 2-line dependency), programming of the SW output is as follows:
  Output switches when:
  Zone A or B “Reset”
  or:
  Zone A and B “Off”

A normal relay or PMR 81 semi-conductor relay can be used as the control relay.

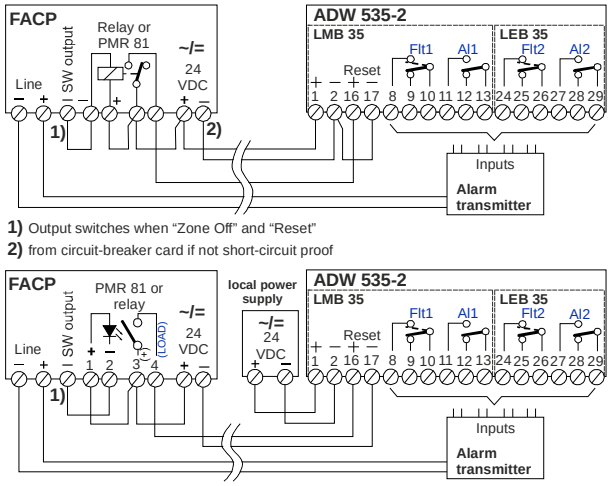


Fig. 13 Connection on selective identification or addressable loop

3.5.4.3 Connection to SecuriPro / SecuriFire / Integral addressable loop from XLM 35

- For the connection to SecuriFire / Integral addressable loop from the XLM 35 no additional control relay is needed. Likewise, the alarm and fault relays of the ADW 535 are not used. The state query and the control of the ADW 535 take place directly between the XLM 35 and the addressable loop.
- When using an ADW 535 with two sensing tubes and XLM 35 (ADW 535-2), a 2-detector dependency (V-Al / H-Al) can be programmed on the FACP. Evaluation of the individual zones (Al I and Al II) in the FACP is also possible.

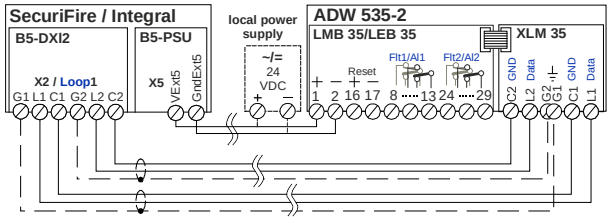


Fig. 14 Connection from XLM 35

Maximum connectible XLM 35 units**:**
(See also notice below.)
For each SecuriFire / Integral addressable loop 32 units

Notice

- The installation of the SecuriFire / Integral addressable loop must be shielded.
- The connection and line routing between **XLM 35** and the SecuriFire and Integral FACP is to be carried out in accordance with **Fig. 14** (L1 to L1, C1 to C1, etc.).

3.5.5 Open collector outputs

The ADW criteria “alarm I”, “alarm II”, “fault I” and “fault II” are available as OC outputs.

Parallel and feedback indicators or other consumers (e.g. relays) can be connected to the OC outputs.

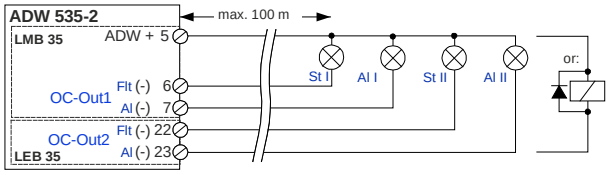


Fig. 15 Connecting the OC outputs

Danger

When connecting inductive consumers (e.g. relays), a free-wheeling diode is to be installed directly at the consumer (**Fig. 15)**.

Notice

The outputs are 0-volt switched and have a loading capacity of max. **100 mA** per output. All outputs together cannot switch more than **200 mA**. The dielectrical strength per output is 30 VDC. The outputs are not short-circuit-proof and not potential-free. Connection to the outputs affects the overall power consumption of the ADW 535.

3.5.6 External temperature sensor

The ART 535 external temperature sensor is to be used in the following cases (see also T 131 358, Sec. 2.2.12):

- Applications compliant with EN 54-22, Class CI to GI;
- Always (for all response grades), as soon as the application temperature in the monitored area deviates more than 20°C from the temperature of the evaluation unit.

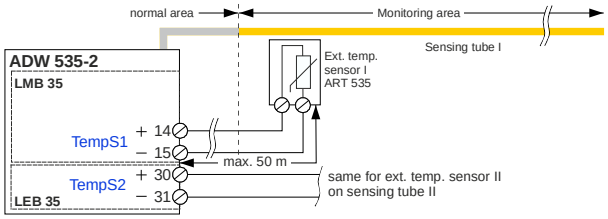


Fig. 16 Connection of external temperature sensor

The ART 535 can be remotely located a maximum of 50 m. The ART 535 has a pre-fabricated connection cable with a length of 10 m and is heat proof up to 200°C.

Warning

- The ART 535 is to be introduced to the monitored area and positioned so that it is optimally exposed to the local ambient temperatures.
- Position the ART 535 so that it is not exposed to direct sunlight.
- A special design of the ART 535 in accordance with the manufacturer's specifications has to be used for temperature ranges above 200 °C.

Notice

- The feed line to the ART 535 can be a commercially available installation cable with a cross-section of 0.5 mm^2. As soon as the feed line is routed into the increased temperature area, a heat resistant cable may have to be used, depending on the response grade.
- The polarity (+ /–) of the connection must be observed.
- If both sensing tubes are located in the same climate zone (identical application temperature in both monitored areas), **one** external temperature compensation is sufficient (can be parameterised via “ADW Config” configuration software).

4 Article numbers and spare parts

4.1 Evaluation unit and accessories

Designation	Article no.
ADW 535-1 line type heat detector, for one sensing tube	11-1000000-01-XX
ADW 535-2 line type heat detector, for two sensing tubes	11-1000000-02-XX
ADW 535-1HDx line type heat detector, for one sensing tube, (ATEX, see T 140 458 and T 140 459)	11-1000001-01-XX
ADW 535-2HDx line type heat detector, for two sensing tubes, (ATEX, see T 140 458 and T 140 459)	11-1000001-02-XX
SecuriLine eXtended line module XLM 35 incl. mounting set ①	11-2200003-01-XX
RIM 36 relay interface module incl. mounting set	11-2200005-01-XX
SIM 35 serial interface board incl. mounting set	11-2200000-01-XX
SMM 535 serial master module	11-2200001-01-XX
ART 535-10 external temperature sensor	11-1000002-10-XX
Ethernet cable 3.0 m	30-6800006-02-XX
SD memory card (industrial version)	11-4000007-01-XX
Printed LMB 35 main circuit board (for ADW 535-1 / -2)	11-1200001-01-XX
Printed LEB 35 extension board (for ADW 535-2)	11-1200002-01-XX
Complete LSU 35 supervising unit	11-1200003-01-XX
Lithium battery BR 2032	11-4000008-01-XX
M20 cable screw union (set of 10)	11-4000006-01-XX
M25 cable screw union (set of 10)	11-4000005-01-XX
Adapter for US cable screw union AD US M-inch	11-2300029-01-XX
UMS 35 universal module support	4301252.0101

① not tested to UL/ULC

4.2 Sensing tube and accessories

The article numbers of all the available parts for the sensing tube (tubes, screw-junction pieces, etc.) are listed in a separate document (T 140 362).

5 Technical data

Type				ADW 535	
Voltage supply range				9 to 30 (**UL/FM = 10.6 to 27**)	VDC
Maximum power consumption,		**in 12 VDC operation**	**in 24 VDC operation**	**typical**	
measured at ➔		9 VDC ①	18 VDC ①	24 VDC	
ADW 535-1	Quiescent/fault	approx. 75	approx. 45	approx. 35	mA
	Alarm I	approx. 90	approx. 52	approx. 42	mA
	Test	approx. 660	approx. 270	approx. 210	mA
	Heated below –20 °C	approx. 775	approx. 360	approx. 275	mA
ADW 535-2	Quiescent/fault	approx. 95	approx. 53	approx. 43	mA
	Alarm I + II	approx. 125	approx. 71	approx. 57	mA
	Test	approx. 660	approx. 290	approx. 230	mA
	Heated below –20 °C	approx. 775	approx. 375	approx. 290	mA
Additionally with 1x RIM 36		approx. 48	approx. 23	approx. 15	mA
Additionally with 2x RIM 36		approx. 96	approx. 46	approx. 30	mA
Additionally with XLM 35 (not tested to UL/ULC)		approx. 20	approx. 10	approx. 5	mA
Additionally with SIM 35		approx. 20	approx. 10	approx. 5	mA
SMM 535 (not from ADW but rather from PC via USB connection)				max. 100	mA
Switch-on current peak ② (caused by EMC protection elements on the ADW supply input)				approx. 5	A
				for max. 1	ms
Sensing tube length				See Sec. T 131 358, Sec. 4.6	
Sensing tube diameter, copper (Cu), steel (VA) (outer / inner)				Ø 5 / 4	mm
Sensing tube diameter, PTFE (outer / inner)				Ø 6 / 4	mm
Response range			EN 54-22, class A1l – Gl (**UL/ULC, according class A1l – Gl**)		
Protection type acc. to IEC 529 / EN 60529 (1991)				65	IP
Ambient conditions acc. to IEC 721-3-3 / EN 60721-3-3 (1995)				3K5 / 3Z1	Class
Environmental group acc. EN 54-22				III	Group
Extended ambient conditions:					
• Temperature range evaluation unit				–30 – +70	°C
• Sensing tube temperature range				–40 – +180 ③	°C
• Max. permissible storage temperature for evaluation unit (without condensation)				–30 – +70	°C
• Humidity ambient condition of evaluation unit (continuous, IP65)				95	% rel. humidity
• Humidity ambient condition of sensing tube (continuous)				100	% rel. humidity
Max. loading capacity, relay contact				50 (**UL max. 30**)	VDC
				1	A
				30	W
max. loading capacity per OC output (dielectrical strength 30 VDC)				100	mA
Plug-in terminals				2.5	mm²
Cable entry for cable Ø				Ø 5 – 12 (M20) / Ø 9 – 18 (M25)	mm
Housing material				ABS-Blend, UL 94-V0	
Housing colour				Grey 280 70 05 / anthracite violet 300 20 05	RAL
Approvals				EN 54-22 / (FM 3210 / UL521)	
Dimensions ADW 535-1 / -2 (W x H x D, with/without packaging)				250 x 212 x 134 / 262 x 238 x 170	mm
Weight ADW 535-1 (without/with packaging)				1,500 / 17,80	g
Weight ADW 535-2 (without/with packaging)				1,970 / 2,250	g

Notice

① Power consumption at maximum permitted voltage drop in the electrical installation (decisive value for calculating the conductor cross-section).

① May cause the protective circuit to trigger immediately in the case of power supplies with overload protective circuits (primarily in devices with no emergency power supply and output current of < 1.5 A).

③ Lower or higher temperature ranges are also possible subject to consultation with the manufacturer. When using the sensing tube at 100°C and above, use metal pipe clamps.

6 List of figures