

## Heated lines types WAL + WAH

$T_{Max} = 65^{\circ}C \mid 120^{\circ}C$

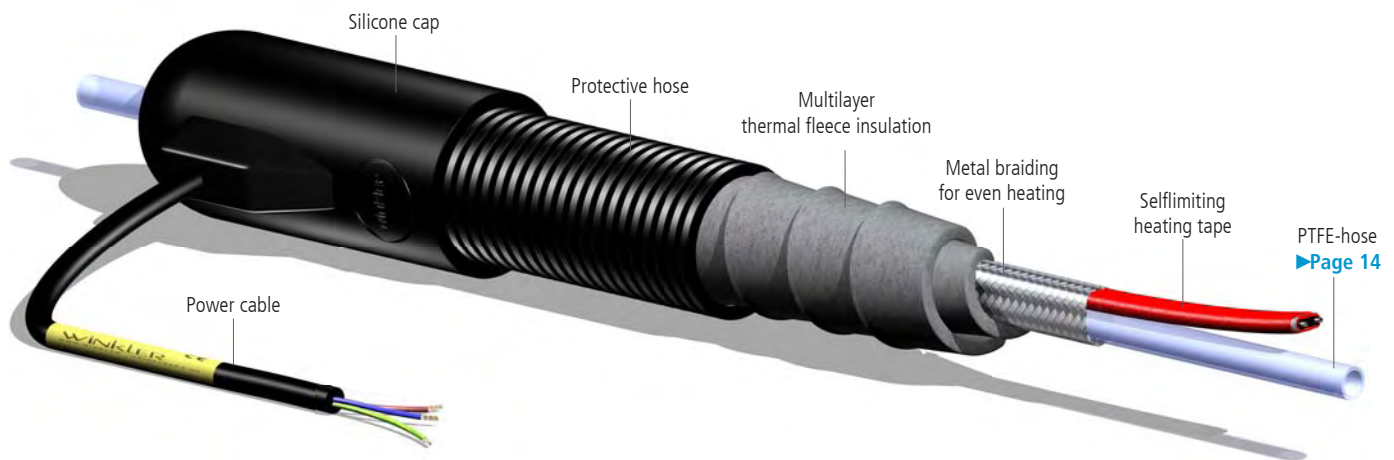
### Applications

Heated lines for the transport of gas samples in the temperature range up to  $120^{\circ}C$ .  
Ideal for fix installation - especially outdoors - with normal mechanical strain.  
Can be cut to any length on site and terminated with termination kit.



### Structure

- PTFE-hose, unheated overlapping 500 mm on both ends (see picture).  
Options for basic hoses and fittings as well as their available nominal diameters [▶Page 14](#).
- Heating with selflimiting heating tape with protective braiding and polyolefin/fluoropolymer-covering. **Available also with ATEX-connections.**
- Flexible insulation structure with multilayer thermal fleece.
- Outer cover with sturdy corrugated hose made of black polyamide (PA 12) and silicon caps.
- Without sensor, no controller necessary.
- Ready to connect with core cable ends.



## Heated lines type WAP

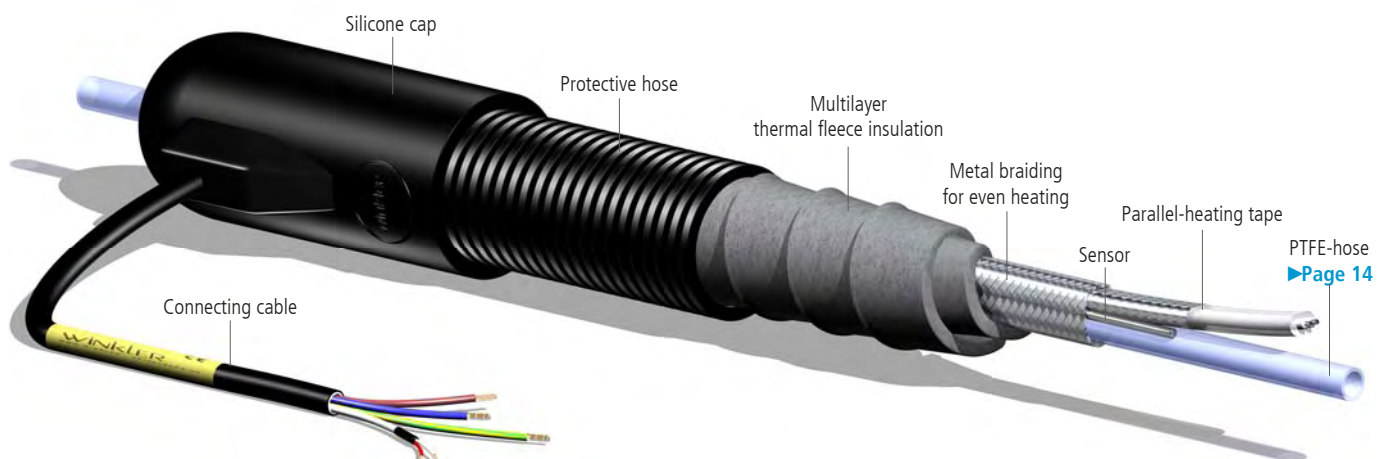
$T_{Max} = 120^{\circ}C$

### Applications

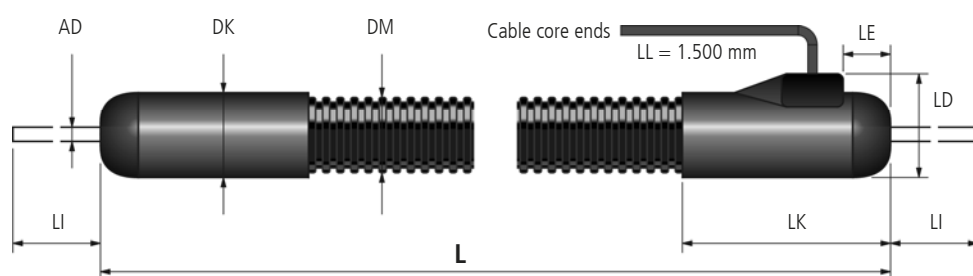
Heated lines for the transport of gas samples in the temperature range up to  $120^{\circ}C$ .  
Ideal for fix installation - especially outdoors - with normal mechanical strain.  
Can be cut to any length on site every 60 cm (to insure continuous heating) and terminated with termination kit.

### Structure

- PTFE-hose, unheated overlapping 500 mm on both ends (see picture).  
Options for basic hoses and fittings as well as their available nominal diameters [▶Page 14](#).
- Heating with parallel heating tape with protective braiding.
- Flexible insulation structure with multilayer thermal fleece.
- Outer cover with sturdy corrugated hose made of black polyamide (PA 12) and silicon caps.
- Built-in temperature sensor [▶Page 16](#) for the operation with a controller.
- Ready to connect with core cable ends.



## Technical data types WAL, WAH + WAP



L : Total length of the heated line

AD : Outer diameter of the inner line

DK : Outside diameter of cap

DM : Outside diameter of outer cover

LI : Overlap of inner line

LK : Length of cap

LD : Height of cap with cable outlet


LE : Recess of cable outlet

LL : Length of connecting cable

### Dimensions and bend radiuses (Tolerances of length $\pm 2\%$ , tolerances of diameter $\pm 5\%$ )

ND	2	4	6	8	10
AD	4 mm	6 mm	8 mm	10 mm	12 mm
DK	48 mm				
DM	42,5 mm				
LI	500 mm				
LK	105 mm				
LD	62 mm				
LE	35 mm				
Min. bend radius	200 mm				300 mm

### Technical data for 230 VAC (Tolerances of power $\pm 10\%$ , $T_U$ : ambient temperatures)

Type	WALW210..	WALW215..	WALW226..	WAHW225..	WAHW245..	WAHW260..	WAPW240..
Power at $T_U = +10^\circ\text{C}$	10 W/m	15 W/m	26 W/m	25 W/m	45 W/m	60 W/m	40 W/m
Temperature maintained at $T_U = +20^\circ\text{C}$	30 - 40°C	35 - 45°C	40 - 50°C	70 - 80°C	90 - 100°C	110 - 120°C	120°C
Temperature maintained at $T_U = -20^\circ\text{C}$	15 - 25°C	20 - 30°C	30 - 40°C	50 - 60°C	80 - 90°C	100 - 110°C	110 - 120°C
 Temperature class (for Ex-Versions)	T6			T3			—
Max. oper. temperature at Power ON	65°C			120°C			120°C
Max. oper. temperature at Power OFF	85°C			190°C			180°C
Admissible ambient temperatures	-20°C / +40°C						
Max. lengths manufactured	78 m			78 m			100 m
Max. length of circuit $T_U = -20^\circ\text{C}$ (16A fuse)	145 m	95 m	59 m	102 m	61 m	45 m	100 m
Max. length of circuit $T_U = -20^\circ\text{C}$ (20A fuse)	183 m	125 m	77 m	128 m	77 m	55 m	100 m

## Standard basic hoses and fittings

Example: type 3 → WAKG0203-230XP006-1500STND

Available basic hoses and fittings for heated lines of the types listed. Depending on design, basic hoses with PTFE hose can be employed for fluid temperatures up to 250°C. Heated lines with stainless steel pipes and corrugated stainless steel hoses are designed for fluid temperatures up to 400°C, depending on the type of insulation.

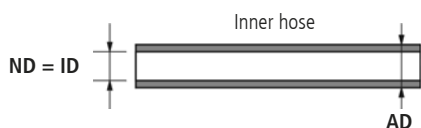
Higher temperatures and special solutions upon enquiry.

		Types of heated lines					
		WAL/H WAP	WEX	WAKG	WAKS	WAKW	WAF WAM
		▶ Page 4	▶ Page 6	▶ Page 8	▶ Page 8	▶ Page 10	Page 12,13
	<b>Type 0</b> PTFE hose (overlapping 500 mm on both ends)	ND 2 ND 4 ND 6 ND 8 ND 10		Auf Anfrage	Auf Anfrage	Auf Anfrage	
<b>T<sub>Max</sub> = 250°</b>							
	<b>Type 1</b> Exchangeable PTFE hose in hose (overlapping 500 mm on both ends)	ND 2 ND 4 ND 6		Auf Anfrage	Auf Anfrage	Auf Anfrage	
<b>T<sub>Max</sub> = 250°</b>							
	<b>Type 3</b> PTFE basic hose + stainless steel tube ends	ND 4 ND 6 ND 8 ND 10	ND 4 ND 6 ND 8 ND 10 ND 13	ND 4 ND 6 ND 8 ND 10 ND 13 ND 16,20 ND 25,32	ND 4 ND 6 ND 8 ND 10	ND 4 ND 6 ND 8 ND 10 ND 13 ND 16	<b>WAF</b> ND 4 ND 6
<b>T<sub>Max</sub> = 250°</b>							
	<b>Type 4</b> PTFE carrier hose with exchangeable PTFE hose (overlapping 500 mm on both ends) + stainless steel tube ends	ND 4 ND 6		ND 4 ND 6 ND 8	ND 4 ND 6 ND 8	ND 4 ND 6 ND 8	
<b>T<sub>Max</sub> = 250°</b>							
	<b>Type 5</b> Stainless steel tube (overlapping 50 mm on both ends)	ND 4 ND 6		ND 4 ND 6 Larger ND upon request	ND 4 ND 6 Larger ND upon request	ND 4 ND 6 Larger ND upon request	
<b>T<sub>Max</sub> = 800°</b>							
	<b>Type 6</b> PTFE carrier hose with exchangeable PTFE hose (overlapping 500 mm on both ends)	ND 2 ND 4 ND 6		ND 2 ND 4 ND 6 ND 8	ND 2 ND 4 ND 6 ND 8	ND 2 ND 4 ND 6 ND 8	
<b>T<sub>Max</sub> = 250°</b>							
	<b>Type 7</b> Corrugated stainless steel hose + stainless steel studs			ND 6 ND 8 ND 10 ND 12 ND 15	ND 6 ND 8 ND 10	ND 6 ND 8 ND 10 ND 12 ND 15	<b>WAM</b> ND 40 ND 50 ND 65 ND 80 ND 100 ND 125 ND 150
<b>T<sub>Max</sub> = 600°</b>							
	<b>Type 8</b> PTFE carrier hose with exchangeable PTFE hose + exchangeable stainless steel tube ends			ND 2 ND 4 ND 6 ND 8	ND 2 ND 4 ND 6 ND 8	ND 2 ND 4 ND 6 ND 8	
<b>T<sub>Max</sub> = 250°</b>							
	<b>Type 9</b> PTFE carrier hose with exchangeable PTFE hose + stainless steel ferrule fittings			ND 4 ND 6 ND 8	ND 4 ND 6 ND 8	ND 4 ND 6 ND 8	
<b>T<sub>Max</sub> = 250°</b>							

## Nominal diameters ND

Example : ND = 6 mm → WAKG0203-230XP006-1500STND

**Important !** The nominal diameter (ND) of a heated line always refers to the inner diameter (ID) in mm of the inner hose or the inner tube.



**Important !** The nominal diameter is not to be confused with the dimensions of the fitting.



Nominal diameter (mm)		Inner diameter ID	Outer diameter AD
ND	Code	Inner hose	Inner hose
4	004	4 mm	6 mm
6	006	6 mm	8 mm
8	008	8 mm	10 mm
10	010	10 mm	12 mm
13	013	13 mm	15 mm
16	016	16 mm	18 mm

## Innenschläuche + Innenrohre



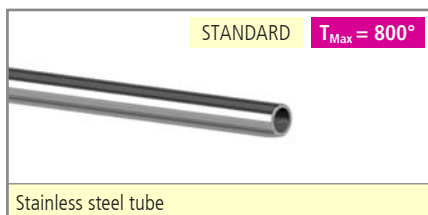
### PTFE-hose

Standard in all basic hoses of types 0, 1, 3, 4, 6, 8 and 9.

Resistant to all chemical agents, acids and bases of any concentration. Exception: alkaline metals and fluorine compounds.

For replacement :

ND 4 : Art.-Nr. WAZ02742-004TX006  
 ND 6 : Art.-Nr. WAZ02743-006TX008  
 ND 8 : Art.-Nr. WAZ02744-008TX010  
 ND 10 : Art.-Nr. WAZ02745-010TX012

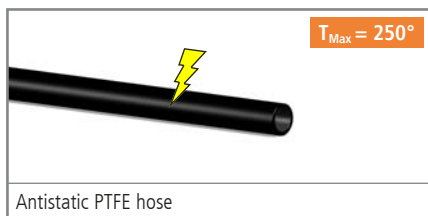


### Stainless steel tube 1.4404

Standard in heated lines of type 5  
 Available in ND 4 and 6 mm  
 Other nominal diameters upon request

For replacement :

ND 4 : Art.-Nr. WAZ02753-004VV006  
 ND 6 : Art.-Nr. WAZ02754-006VV008



### Option antistatic PTFE hose

For all basic hose with exchangeable hoses of types 0, 1, 4, 6, 8 and 9.  
 Available in ND 4 - ND 13



### Option PFA-hose

For all basic hose with exchangeable hoses of types 0, 1, 4, 6, 8 and 9.  
 Available in ND 4

## Lengths of heated lines L

Example : L = 15 m → WAKG0203-230XP006-1500STND

### Lengths of heated lines

We supply heated lines to the exact length required, ranging from 0,30 m to 78 m.  
 As from certain lengths, several heating circuits or three-phase arrangements will be necessary, depending on voltage, temperature and power.

**Tolerances** : ± 2 %

Pressure or thermal load variations during operation can result in changes in length of up to ± 2 %.

## Operating voltages

**Standard: 230 VAC-50 Hz**

Options: 12 VAC, 24 VAC, 48 VAC, 115 VAC, 200VAC, 400 VAC, 480 VAC  
12 VDC, 24 VDC, 48 VDC  
Others upon request

## Temperature sensors

### Standard types of sensors:

Temperature sensor Pt 100 (2 wire)	Code <b>XP</b>
Thermocouple type K (NiCr-Ni)	Code <b>XK</b>
Thermocouple type J (Fe-CuNi)	Code <b>XJ</b>

### Options for types of sensors:

Temperature sensor Pt 100 (3 wire)	Code <b>XT</b>
Temperature sensor Pt 100 (4 wire)	Code <b>XQ</b>
Bi-metal temperature controller	Code <b>XB</b>
Temperature fuse	Code <b>XS</b>

### Options for multiple sensors and sensor combinations:

Multiple sensors

2 x Pt 100 (2 wire)	Code <b>ZP</b>
3 x Pt 100 (2 wire)	Code <b>DP</b>
2 x thermocouple type K	Code <b>ZK</b>
... etc.	

Sensor combination e.g. Pt100 + thermocouple type K

...	Code <b>PK</b>
...	

**Example: 230 V → WAKG0203-230XP006-1500STND**

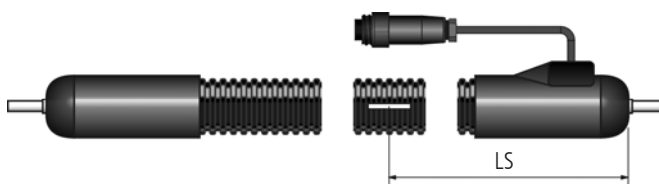
**Standard: One heating circuit = one heating zone**

Options: Several heating circuits → several heating zones.  
3-phase layout possible.

**Example: Pt 100 → WAKG0203-230XP006-1500STND**

### Standard sensor position:

The sensor position is always measured from the electrical connection side.  
**LS = 300 mm** for heated lines with heating cable.  
**LS = 1.000 mm** for heated lines with parallel heating tape.



### Optional sensor positions:

Please indicate your desired sensor position **LS** in your order.  
The correct position of the sensor is particularly important in cases of (partial) installation in switch cabinets, through walls or outdoors.  
Please ask our specialists for advice.



### Important!

Exposure to wind, as in the case of outdoor installations, can cool down the heated line quite considerably. Under these conditions, the heated line should be laid with appropriate protection, provided with stronger insulation (see options) and/or more power (W/m), while the temperature sensors have to be strategically placed. If the analytical measurement line runs through areas with different ambient temperatures, the internal hose temperature will vary accordingly. This can be prevented by incorporating different heating zones with separate control.

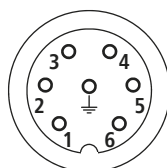
## Connecting cables and plugs

### Standard:

- Power- and sensor cable together.
- Cable exit sideways according to type 1.
- Length of connecting cable: 1,5 m
- 7-pin round plug (< 10 A), 5-pin round plug (< 20 A)
- Cable ends with ferrules (types WAL, WAH, WAP, WEX)

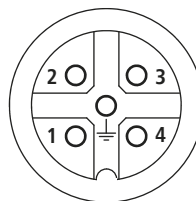
### Options:

- Power and sensor cable routed separately.
- Cable exits according to types 2, 3, 4 or 5
- Other lengths of connecting cable possible from 0,1 m.
- Without plug (cable ends with ferrules)
- Other plugs : You may specify other kinds of plugs required apart from the standard. If the correct type is not known, please send us a sample and the desired pin assignment.



### Pin assignment (7-pin round plug)

1 : Power (L)	5 : Sensor (+)
2 : Power (N)	6 : Sensor (-)
3 : free	PE : Earth
4 : free	



### Pin assignment (5-pin round plug)

1 : Power (L)	3 : Sensor (+)
2 : Power (N)	4 : Sensor (-)
	PE : Earth

