

Heated lines types WAKG + WAKS

$T_{Max} = 100^{\circ}C \mid 200^{\circ}C \mid 250^{\circ}C$

$T_{Max} = 300^{\circ}C \mid 400^{\circ}C^*$

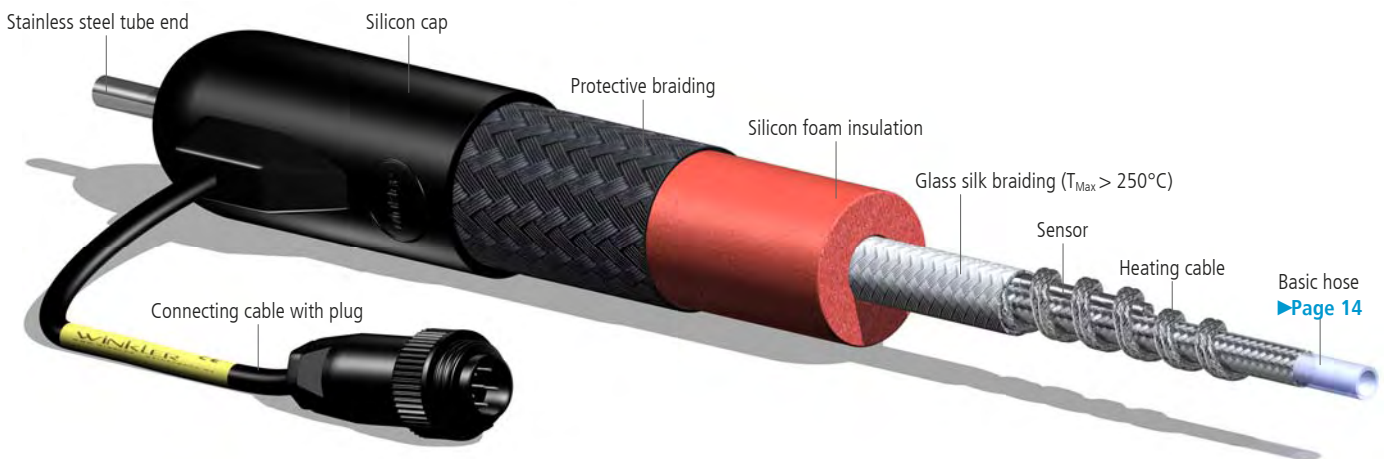
* with stainless steel tube or corrugated hose

Applications

Heated lines for the transport of gas samples in the temperature range up to **250°C**. Well suited for fix installation and mobile use indoors with normal mechanical strain. Versions for high temperatures up to **400°C**.

Structure

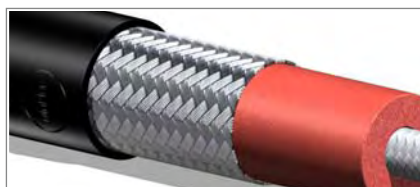
- PTFE basic hose with stainless steel braiding and tube ends made of stainless steel 1.4305. Options for basic hoses and fittings as well as their available nominal diameters [▶Page 14](#).
- Heating with PTFE ($T_{Max} < 250^{\circ}C$) or glass silk ($T_{Max} > 250^{\circ}C$) insulated heating cable with protective braiding.
- Soft and extremely flexible insulation structure with glass silk braiding ($T_{Max} > 250^{\circ}C$) and silicon foam. Standard-insulation structure approx. 40 mm (up to ND 16) and approx. 60 mm (from ND 20). Options underneath.
- Outer cover with protective braiding in different versions (WAKG) or silicon skin (WAKS) and silicon caps.
- Built-in temperature sensor [▶Page 16](#) for the operation with a controller.
- Ready to connect with plug.



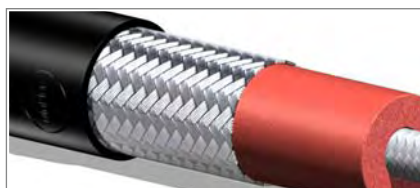
Options of protective braidings for the outer cover of type WAKG



Code G0	Black polyamide braiding. Use for standard applications. Available up to ND 32
G1	Red polyamide braiding (up to ND 16)
G2	Orange polyamide braiding (up to ND 16)
G3	Blue polyamide braiding (up to ND 16)
G4	Grey polyamide braiding (up to ND 16)

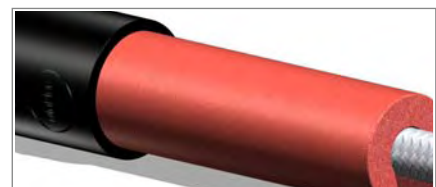


Code G8	Galvanised steel braiding. Very robust. Use for higher strain. Available up to ND 32
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Code G9	Stainless steel braiding. Best performance. Ideal for a long-lasting perfect look. Available up to ND 32
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Outer covers for type WAKS

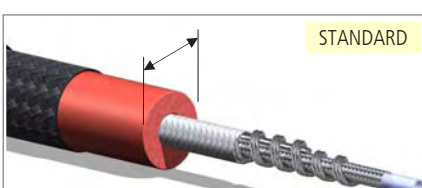


Code S0	Red silicon foam. Light and very flexible. Use inside cabinets. Available up to ND 32
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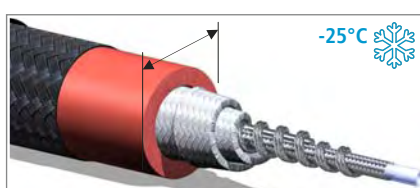


Code S1	Black silicon skin. Washable. Combines flexibility and durability. Available up to ND 10 and lengths up to 20 m
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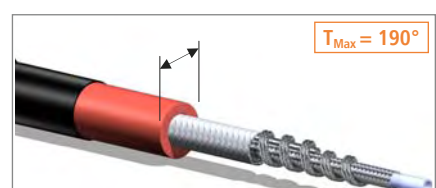
Options of insulation structures for types WAKG and WAKS



IG40 IS40	Insulation structure approx. 40 mm. IG40 standard up to ND 16 IS40 available up to ND 10
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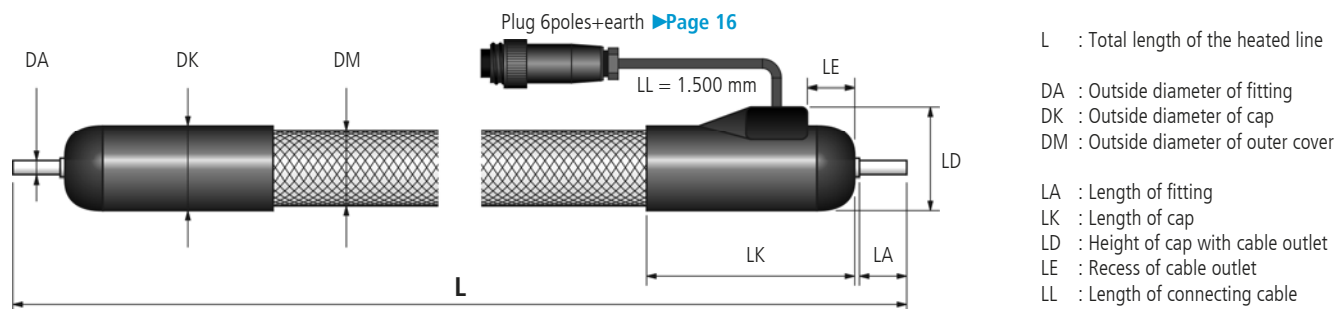


Option IG60	Insulation structure approx. 60 mm. Use for instance in climate chambers. Available up to ND 16 (G0, G8 and G9)
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Option IS30	Insulation structure approx. 30 mm. Ideal for cabinets + mobile use. Available for ND 4 and ND 6 (S1)
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Technical data types WAKG and WAKS



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

ND	2	4	6	8	10	13 (12*)	16 (15*)	20	25	32
DA	4 mm	6 mm	8 mm	10 mm	12 mm	15 mm	18 mm	22 mm	28 mm	35 mm
DK	48 mm			52 mm						
DM	42 mm			46 mm						
LA	25 mm				26 mm	28 mm	32 mm	32 mm	34 mm	41 mm
LK	110 mm			105 mm			100 mm			
LD	64 mm									
LE	35 mm									
Min. bend radius	160 mm				250 mm			450 mm	500 mm	600 mm

*For heated lines with corrugated stainless steel hose

Maximum operating temperatures and power (Tolerances of power $\pm 10\%$, ambient temperatures -20°C up to $+40^{\circ}\text{C}$)

T_{Max}	ND	2	4	6	8	10	13	16	20	25	32
100°C	fix	—	100 W/m			125 W/m		150 W/m	180 W/m	240 W/m	300 W/m
	exchang.	100 W/m		125 W/m		150 W/m	—				
200°C	fix	—	100 W/m			125 W/m		150 W/m	180 W/m	240 W/m	300 W/m
	exchang.	100 W/m		125 W/m		150 W/m	—				
250°C	fix	—	125 W/m			150 W/m		240 W/m		400 W/m	
	exchang.	125 W/m		150 W/m		180 W/m	—				
300°C	fix	—	150 W/m		180 W/m	220 W/m	260 W/m	300 W/m	—		
400°C	fix	—	200 W/m		225 W/m	250 W/m	300 W/m	400 W/m	—		

Maximum lengths for operating voltages of 230 VAC and 115 VAC with one heating circuit (Tolerance of lengths $\pm 2\%$)

T_{Max}	ND	2	4	6	8	10	13	16	20	25	32
100°C	230 V	52 m			41 m		34 m	28 m	21 m	17 m	
	115 V	25 m			20 m		17 m	14 m	10 m	8 m	
200°C	230 V	52 m			41 m		34 m	28 m	21 m	17 m	
	115 V	25 m			20 m		17 m	14 m	10 m	8 m	
250°C	230 V	41 m			34 m		21 m		17 m	12 m	
	115 V	20 m			17 m		10 m		8 m	6 m	
300°C	230 V	—	34 m		28 m	23 m	20 m	17 m	—		
	115 V	—	17 m		14 m	11 m	10 m	8 m	—		
400°C	230 V	—	26 m		23 m	20 m	17 m	13 m	—		
	115 V	—	13 m		11 m	10 m	8 m	6 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.

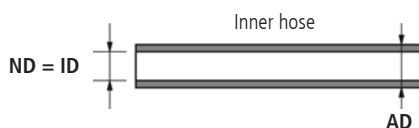
Higher temperatures and special solutions upon enquiry.

		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
	Type 0 PTFE hose (overlapping 500 mm on both ends)			Auf Anfrage	Auf Anfrage	Auf Anfrage	
		T_{Max} = 250°					
	Type 1 Exchangeable PTFE hose in hose (overlapping 500 mm on both ends)			Auf Anfrage	Auf Anfrage	Auf Anfrage	
		T_{Max} = 250°					
	Type 3 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	WAF ND 4 ND 6
	Type 4 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	
		T_{Max} = 250°					
	Type 5 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	
		T_{Max} = 800°					
	Type 6 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	
		T_{Max} = 250°					
	Type 7 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	WAM ND 40 ND 50 ND 65 ND 80 ND 100 ND 125 ND 150
		T_{Max} = 600°					
	Type 8 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	
		T_{Max} = 250°					
	Type 9 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	
		T_{Max} = 250°					

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



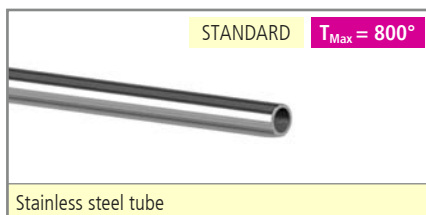
PTFE-hose

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

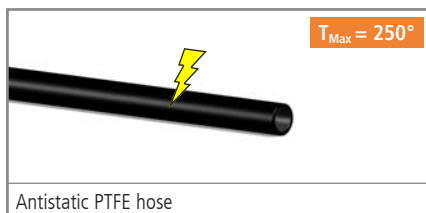


Stainless steel tube 1.4404

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 XP
Thermocouple type K (NiCr-Ni)	Code XK
Thermocouple type J (Fe-CuNi)	Code XJ

Options for types of sensors:

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

Options for multiple sensors and sensor combinations:

Multiple sensors

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

Sensor combination e.g. Pt100 + thermocouple type K

...	Code PK
...	

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

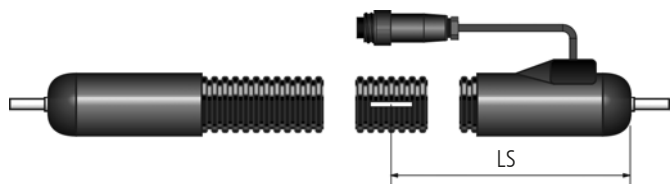
Standard: One heating circuit = one heating zone

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.

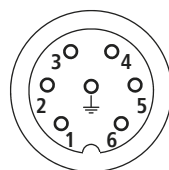
Connecting cables and plugs

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)

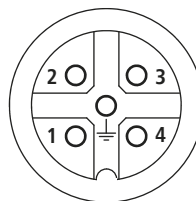
Options:

- 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

