

Temperature sensors, connection designs and thermowells for mechanical and mechatronic expansion thermometers

WIKA data sheet IN 00.20

Applications

- Determining the temperature sensor design
- Determining the required minimum length
- For all expansion thermometers

Versions

- Plain design
- Designs with screw connections
- Designs with thermowells

Description

Temperature sensors

The various temperature sensors can be combined with all expansion thermometers. They differ from each other with their various connection designs and wetted parts.

In addition to the standard designs, there are also special solutions for the widest variety of measuring point constructions.

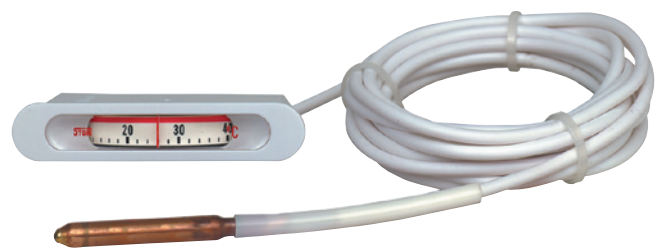
The respective minimum required stem length, ET, for the various designs and display ranges are presented in a table.

Thermowells

The fast-response designs, in order to optimise the response characteristics, have both a reduced wall thickness and a minimised air gap between the thermowell inner wall and the fitted temperature sensor.



SB15 safety temperature limiter with an SF91/SV20 temperature sensor



Expansion thermometer model TF59 with a plain SF94 temperature sensor

Connection design

Connection rotatable with sealing cone, SF91/SV20

Available for models IFC, SB-, SC-, SW15 and TF58/59 expansion thermometers

Model SF91 temperature sensor

Process connection

G = G ¼ B; G ⅝ B; G ½ B; M14 x 1.5

Stem diameter

D = 5; 6; 8; 8.5; 10 mm

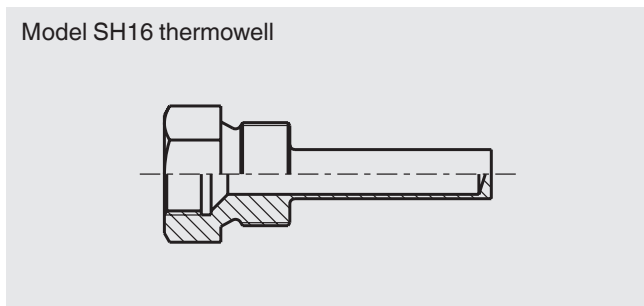
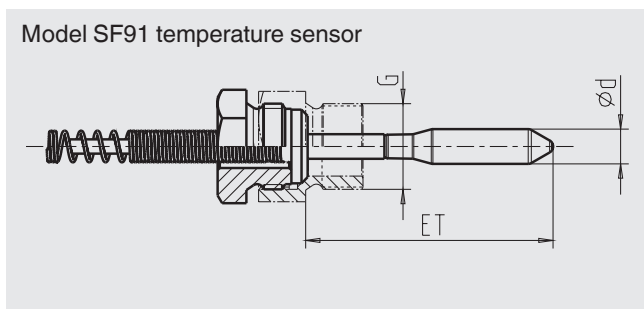
Stem material

Brass (2.0401); Copper (Cu)
1.4571 stainless steel

Fitting

Brass (2.0401)

Length is automatically determined from the required control volume for the respective measuring range
For minimum sensor length, ET, see tables on page 3



Model SH16 thermowell

Process connection

G = G ⅝ B; G ½ B (for others see page 9)

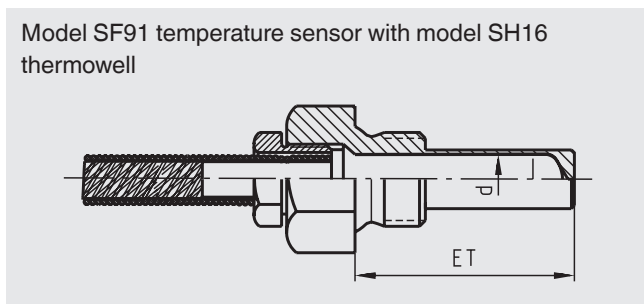
Material

Brass (2.0401)
1.4571 stainless steel

Standard lengths

40, 50, 75, 80, 100, 150 mm

Immersion depth, ET = variable up to ET 80 mm one-piece,
from 100 mm two-piece, soldered or welded
Immersion depth, ET = variable



Connection rotatable with sealing cone, SF91/SV19

Available for models IFC, SB-, SC-, SW15 and TF58/59 expansion thermometers

Model SF91 temperature sensor

Process connection

G = G ¼ B; G ⅜ B; G ½ B; G ¾ B; G 1 B;
M14 x 1.5; M16 x 1.5; M18 x 1.5;

SV19 fitting

Brass (2.0401)
Stainless steel

Stem diameter

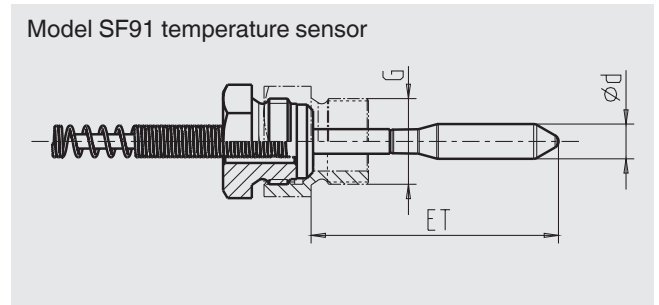
D = 5; 6; 8; 8.5; 10 mm

Stem material

Brass (2.0401)
Copper (Cu)
1.4571 stainless steel

Immersion depth, ET = variable

Length is automatically determined from the required control volume for the respective measuring range



Model	Material	Sensor diameter in mm	Appliable for model	Minimum sensor length = ET min. X mm									
				Scale range in °C	-40 ... +40	0 ... 40	0 ... 120	50 ... 150	0 ... 200	0 ... 250	0 ... 300	0 ... 350	50 ... 250
SF91 SV20	Copper (Cu) BR (2.0401)	5	IFC SB15 SC15 SW15	250	-	200	150	100	100	100	50	100	
		6		150	300	100	100	70	100	100	50	100	
		8		100	150	50	50	50	50	50	50	50	
		8.5		100	100	50	40	35	35	30	25	35	
		10		70	100	50	50	50	40	50	50	40	
	Stainless steel	6		250	-	200	150	100	100	100	50	100	
		8		150	300	100	100	70	50	50	50	50	
		8.5		100	100	50	40	35	35	30	25	35	
		10		70	100	50	50	50	40	50	50	40	
		10		50	150	50	50	50	50	50	50	50	

Plain stem (without thread), SF94

Available for models IFC, MFT, SB-, SC-, SW15 and TF58/59 expansion thermometers

Model SF94 temperature sensor

Stem diameter

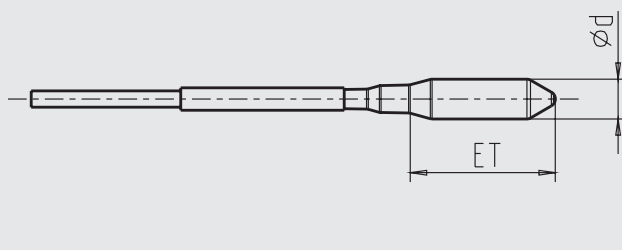
D = 6; 8; 8.5; 10 mm

Immersion depth, ET = variable

Length is automatically determined from the required control volume for the respective measuring range

For minimum sensor length, ET, see table

Model SF94 plain temperature sensor



Model SH22 thermowell

Process connection

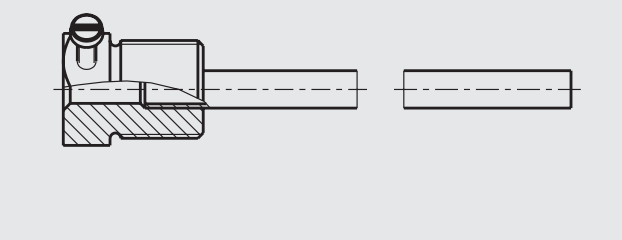
G = G ¼ B, G ⅜ B; G ½ B

Standard lengths

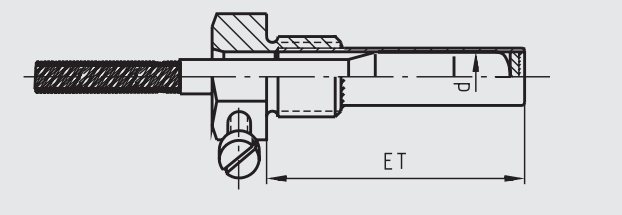
50, 70, 100, 150 mm (for others see page 9)

Immersion depth ET = variable up to ET 80 mm one-piece, from 100 mm two-piece, soldered or welded

Model SH22 thermowell



Model SF94 temperature sensor with model SH22 thermowell



Model	Material	Sensor diameter in mm	Applicable for model	Minimum sensor length = ET min. X mm									
				Scale range in °C	-40 ... +40	0 ... 40	0 ... 120	50 ... 150	0 ... 200	0 ... 250	0 ... 300	0 ... 350	50 ... 250
SF94	Copper (Cu) BR (2.0401)	6	TF 58 TF 59 MFT	150	250	100	100	50	100	50	50	100	
		8.5		80	-	65	60	60	60	60	55	70	
		6	IFC SB15 SC15 SW15	150	300	100	100	70	100	100	50	100	
		8		100	150	50	50	50	50	50	50	50	
		8.5		100	100	50	40	35	35	30	25	35	
	10	70	100	50	50	50	40	50	50	40			
	Stainless steel	6	250	-	200	150	100	100	100	50	100		
		8	150	300	100	100	70	50	50	50	50		
		10	50	150	50	50	50	50	50	50	50		

Connection rotatable with compression spring and fitting, SF95

Available for models IFC, SC15 and TF58/59 expansion thermometers

Model SF95 temperature sensor

Process connection

M10 x 1

Fitting

Brass (2.0401)

Stem diameter

D = 8.5 mm

Stem material

Brass (2.0401)

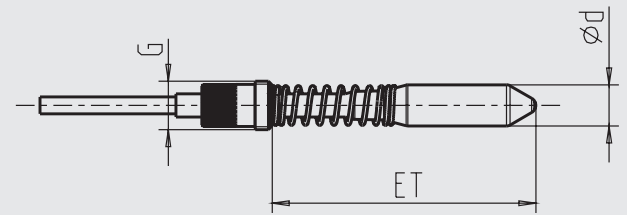
Copper (Cu)

1.4571 stainless steel >300 °C

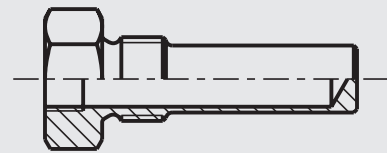
Immersion depth, ET = variable

Length is automatically determined from the required control volume for the respective measuring range

Model SF95 temperature sensor



Model SB18 thermowell



Model SB18 thermowell

Process connection

G = G ¼ B, G ⅜ B, G ½ B

Material

Brass (2.0401)

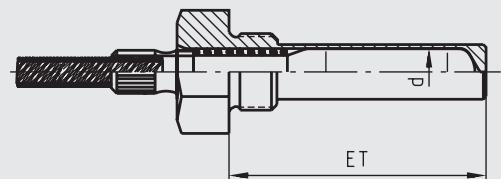
1.4571 stainless steel

Standard lengths

29, 32, 45, 75, 100, 150 mm (for others see page 9)

Immersion depth, ET = variable up to ET 80 mm one-piece, from 100 mm two-piece, soldered or welded

Model SF95 temperature sensor with model SB18 thermowell



Model	Material	Sensor diameter in mm	Applicable for model	Minimum sensor length = ET min. X mm																	
			Scale range in °C	-40 ... +40	0 ... 40	0 ... 120	50 ... 150	0 ... 200	0 ... 250	0 ... 300	0 ... 350	50 ... 250									
SF95	Brass	8.5		0 ... 80			50 ... 200						65	120	50	50	35	35	30	30	35

Connection rotatable with straight sealing ring, SF96/SV20

(identical to BF2)

Available for models IFC, SC15, SB15 and SW15 expansion thermometers

Model SF96 temperature sensor

Process connection

G = G 1/4 B; G 3/8 B; G 1/2 B; G 3/4 B; M14 x 1

SV20 fitting

Brass (2.0401)

Stainless steel

Stem diameter

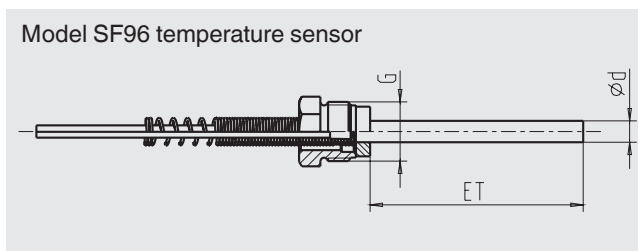
D = 5; 6; 8; 10 mm

Stem material

Brass (2.0401)

Copper (Cu)

1.4571 stainless steel



Standard lengths l1 (ET)

80, 140, 180, 230 mm, consistent with thermowells in accordance with DIN 16179 Form BD, BE, BS

Immersion depth, ET = variable

Length is automatically determined from the required control volume for the respective measuring range

Model	Material	Sensor diameter in mm	Applicable for model	Minimum sensor length = ET min. X mm									
				Scale range in °C	-40 ... +40	0 ... 40	0 ... 120	50 ... 150	0 ... 200	0 ... 250	0 ... 300	0 ... 350	50 ... 250
SF96	Brass Copper (Cu)	6	IFC SB15	150	300	100	100	70	100	100	50	100	
		8		100	150	50	50	50	50	50	50	50	
		10		70	100	50	50	50	40	50	50	40	
	Stainless steel	6	SC15 SW15	250	-	200	150	100	100	100	50	100	
		8		150	300	100	100	70	50	50	50	50	
		10		50	150	50	50	50	50	50	50	50	

Connection with union nut, SF97/SV21

(similar to Form 3, union nut)

Available for models IFC, SB-, SC-, SW15 expansion thermometers

Model SF97 temperature sensor

Process connection

G = G ¼ B; G ⅜ B; G ½ B; G ¾ B; G 1 B;
M12 x 1; M14 x 1.5; M18 x 1.5

SV21 fitting

Brass (2.0401)
Stainless steel

Stem diameter

D = 6, 8, 10 mm

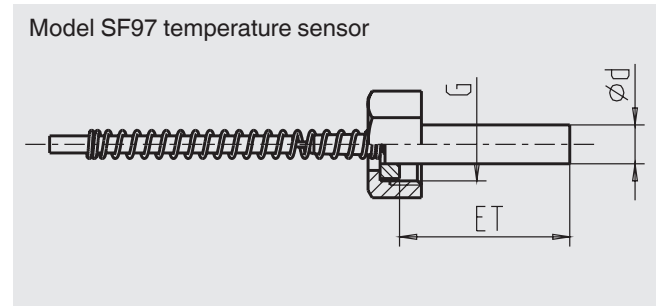
Stem material

Brass (2.0401)
Copper (Cu)
1.4571 stainless steel

Standard lengths l1 (ET)

89, 126, 186, 226, 276 mm consistent with thermowells in accordance with DIN 16179 Form CD, CE, CS

Immersion depth ET = variable from minimum length (active part to the end of the stem extension)



Model	Material	Sensor diameter in mm	Applicable for model	Minimum sensor length = ET min. X mm										
				Scale range in °C	-40 ... +40	0 ... 40	0 ... 120	50 ... 150	0 ... 200	0 ... 250	0 ... 300	0 ... 350	50 ... 250	
SF97	Brass Copper (Cu)	6		0 ... 80	150	300	100	100	70	100	100	50	100	
		8		0 ... 80	100	150	50	50	50	50	50	50	50	
		10		0 ... 80	70	100	50	50	50	40	50	50	40	
	Stainless steel	6		50 ... 200	250	-	200	150	100	100	100	100	50	100
		8		50 ... 200	150	300	100	100	70	50	50	50	50	50
		10		50 ... 200	50	150	50	50	50	50	50	50	50	50

Compression fitting sliding along the stem, SF98

(similar to BF4)

Available for models IFC, SB-, SC- and SW15 expansion thermometers

Model SF98 temperature sensor

Process connection

G = G ¼ B; G ⅜ B; G ½ B; G ¾ B; G 1 B;
M12 x 1; M14 x 1.5; M18 x 1.5

SV19 fitting

Brass (2.0401)
Stainless steel

Stem diameter

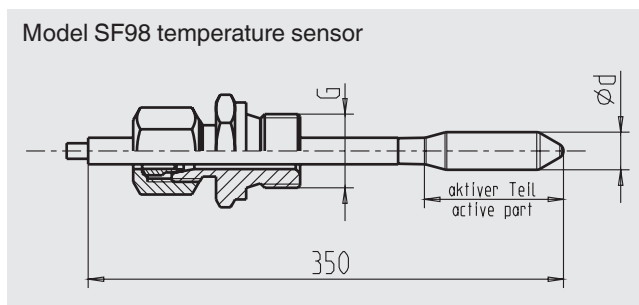
D = 8.5 mm (extension D = 6 mm)

Stem material

Copper (Cu)
1.4571 stainless steel

Stem extension tube

Brass (2.0401)
1.4571 stainless steel



Immersion depth ET = variable from minimum length (active part to the end of the stem extension)

Model	Material	Sensor diameter in mm	Appli-cable for model	Minimum sensor length = ET min. X mm									
				Scale range in °C	-40 ... +40	0 ... 40	0 ... 120	50 ... 150	0 ... 200	0 ... 250	0 ... 300	0 ... 350	50 ... 250
SF98	Brass Copper (Cu)	8.5		50	-	35	26	20	25	20	20	30	

Thermowells

In order to eliminate corruption of the display, the temperature sensors which are fitted into the thermowells, are matched. The play between the thermowell drilling and the temperature sensor diameter must not be more than 0.2 mm.

The SF94 and SF95 temperature sensors must touch the bottom of the thermowell. The SF91 temperature sensor must fill the entire thermowell. The spiral at the end of the sensors protects the capillary against buckling. To prevent buckling of the capillary on insertion of sensors with longer immersion depths, ET, the temperature sensor is supplied with an extension tube. In order to prevent corruption of the display, all temperature sensors must be immersed with their complete active part into the medium. The active part extends, for the minimum length, over the entire sensor length.

Lock nuts and washers can be delivered for thermowells mounted in through-holes. For applications for thermowells at pressures over 10 bar with immersion depths over 50 mm, please consult with us.

Ordering example

SH22 thermowell in BR for temperature sensor with 8.5 mm diameter and an immersion depth of 100 mm and G $\frac{3}{8}$ B mounting threads for temperatures under 120 °C.

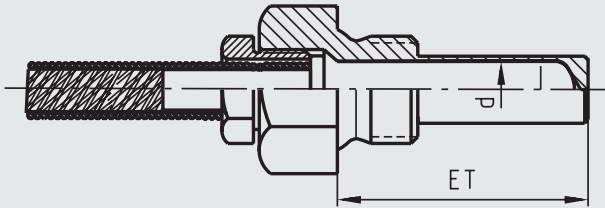
SH22-8.50-ET 100 G $\frac{3}{8}$ B-MS-under 120 °C

Thermowells for temperatures under 120 °C are soft soldered.

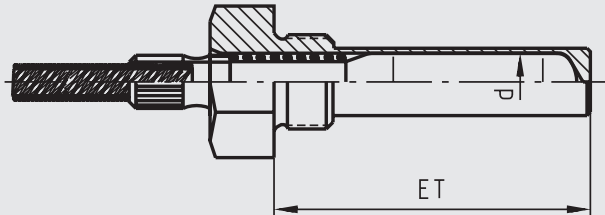
For special purposes V4A, chrome-plated BR and nickel-plated BR thermowells can be supplied.

Model	Mounting threads / process connection							Immersion depth in mm	Probe diameter			
	G $\frac{1}{4}$ B	G $\frac{3}{8}$ B	G $\frac{1}{2}$ B	G $\frac{3}{4}$ B	M14 x 1.5	M16 x 1.5	M18 x 1.5		6 mm	8 mm	8.5 mm	10 mm
SB18	X	X	X		X	X	X	29			X	
	X	X	X		X		X	32			X	
	X	X	X		X		X	45			X	
		X	X					60			X	
		X	X					75			X	
		X	X					90			X	
			X	X				100			X	
			X				150			X		
SH16	X	X						40		X	X	
	X	X	X					50	X	X	X	
	X	X						75	X		X	
	X	X	X					80			X	
	X	X	X	X	X	X		100	X	X	X	
	X	X						150	X	X	X	
	X	X						200	X	X	X	
SH22	X	X	X					45	X	X		
	X	X						50	X		X	
	X	X						60	X	X		
		X						75			X	X
	X	X						100	X	X	X	X
	X	X						150	X	X	X	
	X	X	X					200	X	X	X	
	X	X						250	X		X	
X	X	X					300	X	X	X		

Model SF91 temperature sensor with model SH16 thermowell



Model SF95 temperature sensor with model SB18 thermowell



Model SF94 temperature sensor with model SH22 thermowell

