

THERMOMETERS

INERT GAS FILLED

APPLICATIONS

- Liquid & gaseous mediums
- Corrosive environments
- Oil & Gas applications
- Chemical & Petrochemical







BASIC MODEL	TT701	TT702	TT703	TT707
SPECIAL FEATURES	Inert gas filled expansion Bi-metal compensation	Inert gas filled expansion Filled versions Bi-metal compensation	Inert gas filled expansion Electric contacts Bi-metal compensation High case version	Inert gas filled expansion Anti-vibration spring assembly
NOMINAL DIAL SIZES	DN100, DN125, DN150 & DN250	DN100, DN125, DN150 & DN250	DN100 & DN150	DN100 & DN150
RANGE	-100...650°C ³	-100...650°C ³	-100...650°C ³	-100... 650° ³
STEM LENGTH (BELOW THREAD)	110...600 mm ≥ 600...2000 mm ¹	110...600 mm ≥ 600...2000 mm ¹	110...600 mm ≥ 600...2000 mm ¹	100... 600 mm
SHEATH DIAMETER	8 mm 6 mm / 6,35 mm (1/4") 9.5 mm / 10 mm / 12 mm	8 mm 6 mm / 6,35 mm (1/4") 9.5 mm / 10 mm / 12 mm	8 mm 6 mm / 6,35 mm (1/4") 9.5 mm / 10 mm / 12 mm	12 mm
ACCURACY	CL 1.0	CL 1.0	CL 1.0	CL 1.0
MOUNTING STYLES	Bottom Lower back / Centre back Bottom with wall mounting Lower back with 3-hole panel Lower back with mounting bracket	Bottom Lower back / Centre back Bottom with wall mounting Lower back with 3-hole panel Lower back with mounting bracket Every angle entry clamp entry	Bottom Lower back / Centre back Bottom with wall mounting Lower back with 3-hole panel Lower back with mounting bracket Every angle entry clamp entry	Bottom
PROCESS CONNECTION ²	1/2" NPT (M) 1/2" BSP (M) (Fixed / Adjustable / Swivel)	1/2" NPT (M) 1/2" BSP (M) (Fixed / Adjustable / Swivel)	1/2" NPT (M) 1/2" BSP (M) (Fixed / Adjustable / Swivel)	1/2" NPT (M) 1/2" BSP (M) (Fixed / Adjustable / Swivel)
CASE / ENCLOSURE MATERIAL	AISI 304 SS AISI 316 SS ¹	AISI 304 SS AISI 316 SS ¹	AISI 304 SS AISI 316 SS ¹	AISI 304 SS AISI 316 SS ¹
CAPILLARY ARMOUR	AISI 304 SS / AISI 316 SS AISI 304 SS / AISI 316 SS / PVC (Max length 25 mtrs.)	AISI 304 SS / AISI 316 SS AISI 304 SS / AISI 316 SS / PVC (Max length 25 mtrs.)	AISI 304 SS / AISI 316 SS AISI 304 SS / AISI 316 SS / PVC (Max length 10 mtrs.)	
PROTECTION CLASS	IP 65 IP 66 / IP 67 ¹ EN 13190	IP 65 IP 66 / IP 67 ¹ EN 13190	IP 65 IP 66 / IP 67 ¹ EN 13190	IP 65 IP 66 / IP 67 ¹ EN 13190
REFERENCE STANDARD	Silicon / Glycerin filled	Silicon / Glycerin filled	Die-electric oil filled	Helium gas filled system
OPTIONAL EXTRAS	MRP pointer Dampened movement Helium gas filled system	MRP pointer Dampened movement Helium gas filled system	High-case version Helium gas filled system Magnetic / Inductive contacts CE / ATEX approved contacts	

- Notes**
1. Optional, charges extra, contact factory for details.
 2. Other connections, sizes & types (threaded / flanged / triclamp) are available, charges extra, contact factory for details.
 3. Refer "Thermometer guidance" for available ranges & knowing minimum stem/sensor lengths. Equivalent scales available in °F, °C/°F, °F/°C.
 4. Refer "Thermometer guidance" page for further details on the switch ratings.
 5. Gauge accuracy CL 1.0 & switching accuracy within CL 5.0

APPLICATIONS

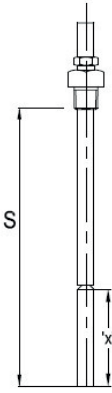
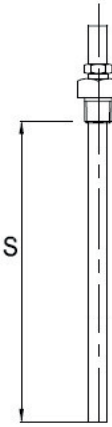
- Liquid & gaseous mediums
- Corrosive environments
- Oil & Gas applications
- Chemical & Petrochemical
- Food & Beverages
- Nuclear power plants



				
BASIC MODEL	TT501	TT502	TT503	TT706
SPECIAL FEATURES	Bimetal helix system Hermetically sealed Stem length max up to 1.5 Mtr	Bimetal helix system Hermetically sealed Every angle entry External zero adjustment	Bimetal helix system Hermetically sealed Elbow mounting External zero adjustment	Exhaust temperature application Anti-vibeation spring assembly Iner gas / Nitrogen filled system Silicon oil dampened
NOMINAL DIAL SIZES	DN50, DN63, DN80, DN100, DN125 & DN150	DN80, DN100, DN125 & DN150	DN100, DN125 & DN150	DN100
RANGE	-100...600°C ³	-100...600°C ³	-100...600°C ³	+50... +650C/°F
STEM LENGTH	50...1500 mm	50...1500 mm	50...1500 mm	200 mm, 250 mm & 300 mm
SHEATH DIAMETER	8 mm 6 mm / 6.35 mm (1/4") 9.5 mm / 10 mm / 12 mm	8 mm 6 mm / 6.35 mm (1/4") 9.5 mm / 10 mm / 12 mm	8 mm 6 mm / 6.35 mm (1/4") 9.5 mm / 10 mm / 12 mm	12 mm
ACCURACY	CL 1.0	CL 1.0	CL 1.0	CL 1.0
MOUNTING STYLES	Bottom Centre back	Every Angle mounting	Bottom with elbow mounting	Bottom
PROCESS CONNECTION ²	1/2" NPT (M) 1/2" BSP (M)	1/2" NPT (M) 1/2" BSP (M)	1/2" NPT (M) 1/2" BSP (M)	3/4" NPT (M) 3/4" BSP (M)
CASE MATERIAL	AISI 304 SS AISI 316 SS ¹	AISI 304 SS AISI 316 SS ¹	AISI 304 SS AISI 316 SS ¹	Die-cast aluminum
PROTECTION CLASS	IP 65	IP 65	IP 65	IP 65
REFERENCE STANDARD	EN 13190	EN 13190	EN 13190	-
OPTIONAL EXTRAS	Silicon / Glycerin filled External zero adjustment Hermetically sealed case Shatterproof glass	Silicon / Glycerin filled Hermetically sealed case Shatterproof glass	Silicon / Glycerin filled Hermetically sealed case Shatterproof glass	SS Tag plate

Notes 1. Optional, charges extra, contact factory for details.
2. Other connections & sizes are available, charges extra, contact factory for details.
3. Refer "Thermometer guidance" for available ranges & knowing minimum sensor lengths. Equivalent scales available in °F, °C/°F, °F/°C.

THERMOMETER GUIDANCE

Manufactured Temperature Ranges		Sensor Length Chart for Inert Gas Thermometer		
		Stem / Sensor Size (mm)	(x) Sensor Length (mm)	(S) Minimum Stem Length (mm)
-20...+40		Rigid Stem type Inert Gas Thermometer		
-20...+60		Capillary type Inert Gas Thermometer (≤10 Mtr.)		
-20...+80		6 / 6.35	200	240
-20...+100		8 / 9.5	120	160
-20...+120		10	90	130
-20...+180		12 / 14	70	110
-30...+50		Capillary type Inert Gas Thermometer (>10 Mtr. up to 25 Mtr.)		
-30...+70		8 / 9.5	170	210
-40...+40		10	140	180
-40...+60		12 / 14	90	130
-50...+100		Capillary compensation is preferred for all capillary inert gas thermometers, if capillary length is above 6 meter.		
-100...+60				
0...50	Sensor Length Chart for Bi-metal Thermometer			
0...60	Stem Diameter Range (°C)			
0...80	6 mm & 1/8"	8 mm	10 mm	12 mm
0...100	(mm)	(mm)	(mm)	(mm)
0...120	120	100	100	100
0...150	100	85	85	85
0...160	85	60	60	60
0...200	65	60	60	60
0...250	60	50	50	50
0...300	50	40	40	40
0...400	40	35	35	35
0...500	30	25	25	25
0...600	50	40	40	40
0...650	40	35	35	35
50...650	35	30	30	30
100...600	30	25	25	25
100...700	All length mentioned above are to be considered below thread only.			

ELECTRIC CONTACT DETAILS (FOR PRESSURE / TEMPERATURE GAUGE SWITCHES)			
Switch type	Contacts	Action	Rating
Normally closed (1NC)	Single	Break contact	230VAC/1A; 48VDC/0.5A
Normally open (1NO)	Single	Make contact	230VAC/1A; 48VDC/0.5A
Normally closed (2NC)	Double	Break contact	230VAC/1A; 48VDC/0.5A
Normally open (2NO)	Double	Make contact	230VAC/1A; 48VDC/0.5A
Normally closed + Normally open (1NC+1NO)	Double	Break contact + Make contact	230VAC/1A; 48VDC/0.5A
Normally open + Normally closed (1NO+1NC)	Double	Make contact + Brake contact	230VAC/1A; 48VDC/0.5A
SPDT	Single		230VAC/1A; 48VDC/0.5A
DPDT	Double		230VAC/1A; 48VDC/0.5A
Normally closed (1NC)	Single	Break contact	220VAC/0.4A
Normally open (1NO)	Single	Make contact	220VAC/0.4A
Normally closed (2NC)	Double	Break contact	220VAC/0.4A
Normally open (2NO)	Double	Make contact	220VAC/0.4A
Normally closed + Normally open (1NC+1NO)	Double	Break contact + Make contact	220VAC/0.4A
Normally open + Normally closed (1NO+1NC)	Double	Make contact + Brake contact	220VAC/0.4A

MICROSWITCH DETAILS (FOR PRESSURE / TEMPERATURE SWITCHES)		
Microswitch protection	Type	Switch rating
General; low deadband	1 SPDT	250VAC/15A; 24VDC/2A or 110VDC/0.4A or 220VDC/0.2A
General; high deadband	1 SPDT	250VAC/15A; 24VDC/6A or 110VDC/0.5A or 220VDC/0.25A
Adjustable differential	1 SPDT	250VAC/15A
Gold plated contact	1 SPDT	125VAC/1A; 28VDC/0.5A
Environmentally sealed silver contact	1 SPDT	250VAC/15A; 125VDC/0.4A
Environmentally sealed gold contact	1 SPDT	28VDC/1A
Hermetically sealed silver contact	1 SPDT	230VAC/4A; 28VDC/3A resistive; 24VDC/2A inductive
Hermetically sealed gold contact	1 SPDT	125VAC/1A
High DC rating	1 SPDT	125VAC/10A; 125VDC/10A resistive; 125VDC/6A inductive
DPDT	1 DPDT	125VAC/10A; 250VDC/0.2A resistive





THERMOWELLS

CONVENTIONAL

APPLICATIONS

- Air & flue gas
- Tanks & vessels
- Oil & Gas applications
- Corrosive environments
- Power & Steel industries
- HVAC, Air filters & utilities
- On-shore/Off-shore application



				
BASIC MODEL	TW101	TW102	TW103	TW104
SPECIAL FEATURES	Fabricated	Solid bar-stock drilled design	Fabricated	Solid bar-stock drilled design
CONNECTION TYPE	Threaded	Threaded	Flanged	Flanged
SHANK FORM	Straight	Straight Straight reduced tip Partial taper Full taper	Straight	Straight Straight reduced tip Partial taper Full taper
MATERIAL OF CONSTRUCTION ¹	SS 304 / 310 / 316 / 316L	SS 304 / 310 / 316 / 316L / 446 Inconel 600 / 800 / 625 / 825 Monel, Hastelloy C, Titanium Alloy 20, ASTM A105	SS 304 / 310 / 316 / 316L	SS 304 / 310 / 316 / 316L / 446 Inconel 600 / 800 / 625 / 825 Monel, Hastelloy C, Titanium Alloy 20, ASTM A105
INSTRUMENT CONNECTION	3/8" NPT (F)...2" NPT (F) 3/8" BSP (F)...2" BSP (F)	3/8" NPT (F)...2" NPT (F) 3/8" BSP (F)...2" BSP (F)	1/2" NPT (F)...1" NPT (F) 1/2" BSP (F)...1" BSP (F)	1/2" NPT (F)...1" NPT (F) 1/2" BSP (F)...1" BSP (F)
PROCESS CONNECTION ²	3/8" NPT (M)...2" NPT (M) 3/8" BSP (M)...2" BSP (M)	3/8" NPT (M)...2" NPT (M) 3/8" BSP (M)...2" BSP (M)	1 1/2"...5" flange to ANSI B16.5 Rating 150#...2500#	1 1/2"...5" flange to ANSI B16.5 Rating 150#...2500#
BORE SIZES ¹	7x10 mm, 7x12 mm, 9x14 mm 10x12 mm, 12x14 mm 12x16 mm Or pipe 1/8"...1/2", Sch 40...160	6.6 mm / 7 mm 9 mm, 9.6 mm, 11 mm & 13 mm	1/8"...1/2", Sch 40...160	6.6 mm / 7 mm 9 mm, 9.6 mm, 11 mm & 13 mm
HEAD TYPE	Hex Round with spanner slots	Hex Round with spanner slots	Round	Hex Round
EXTENSION LENGTH ³	45 mm	50 mm	50 mm	50 mm
INSERTION LENGTH ³ (Below thread/flange)	Up to 1000 mm	1000 mm (Max.) 300 mm (Max. for Hex type)	Up to 1000 mm	1000 mm (Max.)
OPTIONAL EXTRAS	-	Wake Frequency Calculation Plug & chain in AISI 304 SS	Plug & chain in AISI 304 SS Shank lining & coating Sleeve on shank & flange RF	Shank lining & coating Overlay of flange RF Sleeve on shank & flange RF Wake Frequency Calculation

Notes

1. Check guidance chart before selecting the element type.
2. Other connections & sizes are available, charges extra, contact factory for details.
3. Optional, charges extra, contact factory for details.





THERMOWELLS

CUSTOMIZED

APPLICATIONS

- Food & beverages
- Oil & Gas applications
- Corrosive environments
- Power & Steel industries
- Sterile process industries
- On-shore/Off-shore application
- Biochemical & pharmaceutical Industries



				
BASIC MODEL	TW201	TW202	TW203	TW204
SPECIAL FEATURES	Van-stone design Single piece forged drilled	Sanitary design Solid bar-stock drilled	Weld-in / Socket-weld design Solid bar-stock drilled	Partial bar-stock Flanged process connection
CONNECTION TYPE	Flange RF	Sanitary, Triclover	Weld-in / Socket-weld	Flanged
SHANK FORM	Straight Straight reduced tip Partial taper Full taper	Straight Straight reduced tip Partial taper Full taper	Straight Straight reduced tip Partial taper Full taper	Straight Straight reduced tip Partial taper
MATERIAL OF CONSTRUCTION ¹	AISI 316 SS / AISI 316L SS Inconel 600 / Inconel 625 Monel 400 / Hastelloy C	AISI 316 SS AISI 304 SS AISI 316L SS	AISI 316 SS / AISI 316L SS ASTM F11 / F22 / F91 Inconel 600 / Inconel 625	SS 304 / 310 / 316 / 316L / 446 Inconel 600 / 800 / 625 / 825 Monel, Hastelloy C, Titanium Alloy 20, ASTM A105
INSTRUMENT CONNECTION	1/2" NPT (F) 1/2" BSP (F)	3/8" NPT (F)...3/4" NPT (F) 3/8" BSP (F)...3/4" BSP (F)	1/2" NPT (F)...1" NPT (F) 1/2" BSP (F)...1" BSP (F)	1/2" NPT (F)...1" NPT (F) 1/2" BSP (F)...1" BSP (F)
PROCESS CONNECTION ²	1" ANSI flange RF 1 1/2" ANSI flange RF 2" ANSI flange RF	1 1/2" Sanitary seal 2" Sanitary seal 2 1/2" Sanitary seal	As per customer requirement	1 1/2"...5" flange to ANSI B16.5 Rating 150#...2500#
BORE SIZES ¹	6.6 mm / 7 mm 9 mm, 9.6 mm, 11 mm & 13 mm	6.6 mm / 7 mm 9 mm, 9.6 mm, 11 mm & 13 mm	6.6 mm / 7 mm 9 mm, 9.6 mm, 11 mm & 13 mm	6.6 mm / 7 mm 9 mm, 9.6 mm, 11 mm & 13 mm
HEAD TYPE	Round	Round with spanner slots	Round	Round
EXTENSION LENGTH ³	45 mm	50 mm	50 mm	50 mm
INSERTION LENGTH ³ (Below thread/flange)	1000 mm (Max.)	1000 mm (Max.)	1000 mm (Max.)	Up to 1000 mm
SPECIAL OPTIONS	Electro polishing Wake frequency calculation Cover flange (Lap joint type)	Electro polishing Tri-clamp with Gasket	Plug & chain in AISI 304 SS Wake frequency calculation	Shank lining & coating Overlay of flange RF Sleeve on shank & flange RF

Notes

1. Check guidance chart before selecting the element type.
2. Other connections & sizes are available, charges extra, contact factory for details.
3. Optional, charges extra, contact factory for details.