THERMATEL® TG1/TG2

Thermal dispersion switch

DESCRIPTION

Thermatel® TG1/TG2 switches consist of electronics in a DIN rail housing and a remote sensor with aluminium or stainless steel sensor housing (max 500 m (1640 ft) away from electronics).

TG1/TG2 switches can easily be adjusted to detect flow (gases and liquids), level or liquid-liquid interface. Both units are 2-wire 24 V DC powered and intrinsically safe approved.

The TG1 offers standard LED flow indication, the TG2 offers LED flow indication per NAMUR NE 44.

FEATURES

- Easy field calibration – pre-calibration from factory at request.
- Variable flow or Flow / No flow detection of gases and liquids.
- Excellent low flow sensitivity.
- Continuous diagnostics detect sensor fault.
- Continuous monitoring of flow rate versus setpoint via LED.
- mA output provides repeatable indication of flow rate and fault detection.
- Optional retractable fitting for dismantling under process conditions.
- Process conditions up to +450 °C (+850 °F) and 414 bar (6000 psi).
- Unique spherical tip design option ideal for liquids or high viscosity applications.
- Suited for SIL1 and SIL2 loops (full FMEDA report available).

For FLOW/LEVEL/INTERFACE applications

Twin tip type sensor

Spherical type sensor

DIN rail

APPLICATIONS

MEDIA: all types of gases and liquids.

VESSELS: pipe sizes down to 1/4". Max sensor length up to 3,3 m. Can be installed at any angle vertically/horizontally.

CONDITIONS: Can be used on conductive and non conductive media, very light density to heavy viscous media (up to 10.000 cP). Can be set to ignore foam, aeration, turbulence, and cavitation.

AGENCY APPROVALS

Agency	*Approval*
ATEX	II 1 G EEx ia IIB T5
Russian Authorisation Standards①	
Other approvals are available, consult factory for more details	

① Consult factory for proper model numbers and classifications.

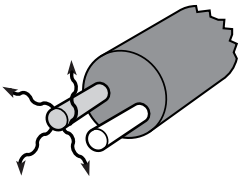
TECHNOLOGY

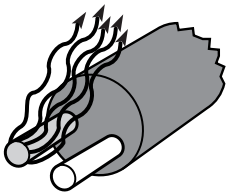
The unit utilises the proven thermal dispersion technology. The sensor consists of two RTD (Resistance Temperature Detector) elements. One is the reference and the second is heated to a temperature above the process temperature. The electronics detect the temperature difference between the two elements. The temperature difference is greatest in air, then decreases when cooling occurs due to a change in media. An increase in the flow rate further decreases the temperature difference.

The set point is adjusted for the switch to alarm at the desired temperature difference. Once the set point is reached, the relay will change state.

Flow

No Flow/Low Flow
In the absence of flow/low flow, the self-heated sensor creates a temperature differential between the two sensors.

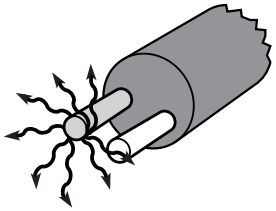


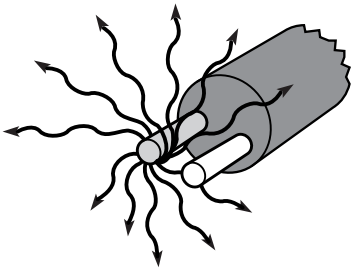


Flow
As media flows increases across the sensing assembly, heat is dissipated and temperature differential decreases .

Level

Low Level
In the absence of media, the self-heated sensor tip creates a temperature differential between the two sensors.



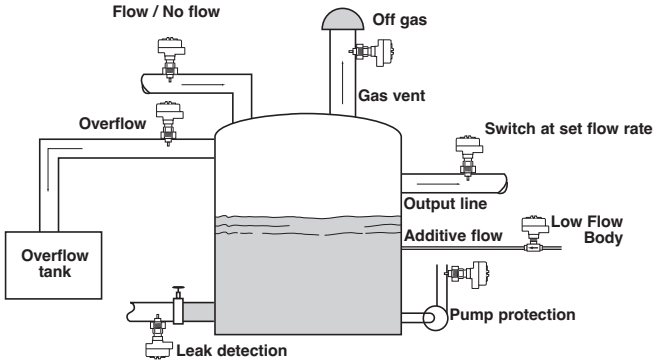


High Level
As media contacts the sensing assembly, heat is absorbed by the fluid, decreasing the temperature differential.

APPLICATIONS

FLOW

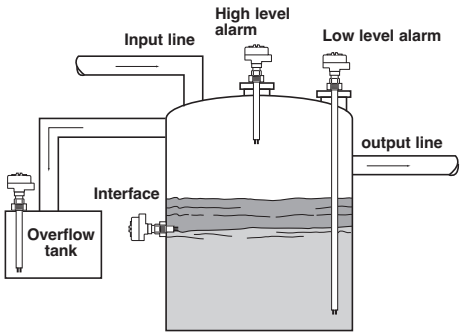
Thermatel® TG1/TG2 switches may be installed in a variety of flow applications as shown in the illustration below. Flow/No Flow can be detected in an input line to a primary tank, or in an output line. They may be installed for overflow detection in a pipe connected to an overflow tank or installed in a drain line for Wet/Dry indication. In addition, due to the capability to detect liquids or gases, the Thermatel® flow switch may be installed in a gas vent to detect off-gas from the primary tank.



- Liquid or Gas flow detection
- Maintain a minimum flow rate
  - Pump protection
  - Cooling air/water
  - Lubrication systems
  - Chemical feed pumps
- Detect presence of flow
  - Relief valves
  - Flare lines
- Water for injection (WFI)
- Filtration systems
- Separation systems
- CIP systems
- Air, CO_2, N_2 flow

LEVEL

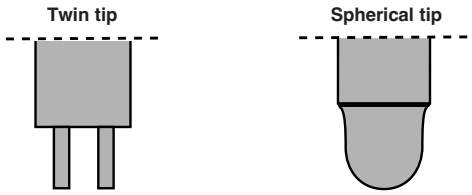
Thermatel® TG1/TG2 switches can be installed in a variety of level applications as shown in the illustration below. High or low level alarm applications can be installed in either vertical or horizontal mountings.



- High level
- Low level
- Interface between different media
  - Oil/water
  - Liquid/foam
- Suitable for any liquid level detection including:
  - High viscosity
  - High solids content
  - Aeration
  - Foam
- Insensitive to dielectric, specific gravity, viscosity

SENSOR DESIGNS

Thermatel offers two sensor tip designs: the twin tip and the unique spherical tip. Both designs have similar operating ranges. Both detect flow or level at approximately the same rate. However, the spherical tip responds faster to a loss of flow or a dry condition.



SPHERICAL TIP

The sensing elements are bonded directly to the wall of the tip, providing protection of the sensors.

The spherical tip is recommended for all types of applications: general purpose use, liquid flow applications, high viscosity, full vacuum and applications where buildup can occur. The spherical tip is suitable for process pressures up to 41,4 bar (600 psi) and can handle process temperatures up to +200 °C (+400 °F).

TWIN TIP

The sensing elements are mounted at the end of each tip.

The twin tip is preferred for air flow applications and is available in corrosion resistant materials including Hastelloy C and Monel. The twin tip is suitable for process pressures up to 207 bar (3000 psi) and can handle process temperatures up to +200 °C (+400 °F).

HIGH TEMPERATURE/HIGH PRESSURE (TMH)

This twin tip sensor is suitable for process pressures up to 414 bar (6000 psi) and can handle process temperatures up to +450 °C (+850 °F).

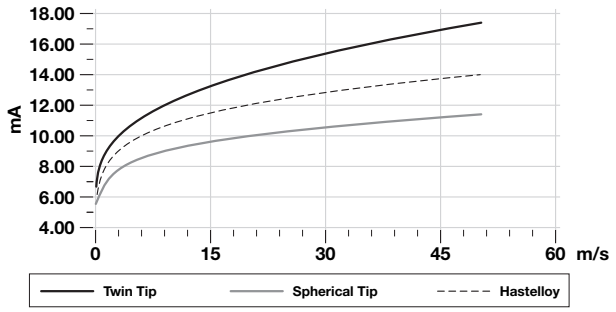
MINI SENSOR (TMM)

This twin tip sensor is suitable for installing in smaller pipe sizes. Available with 1/2", 3/4" and 1" NPT connections. The twin tip design provides minimal blockage of the pipe.

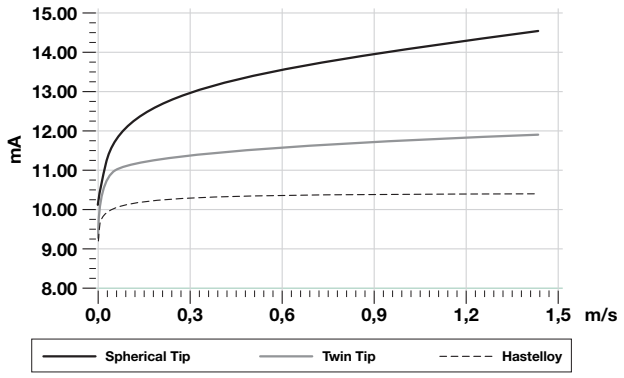
LOW FLOW BODY (TML)

This version is used for even lower flow rates with 1/4" and 1/2" connections.

Typical air flow

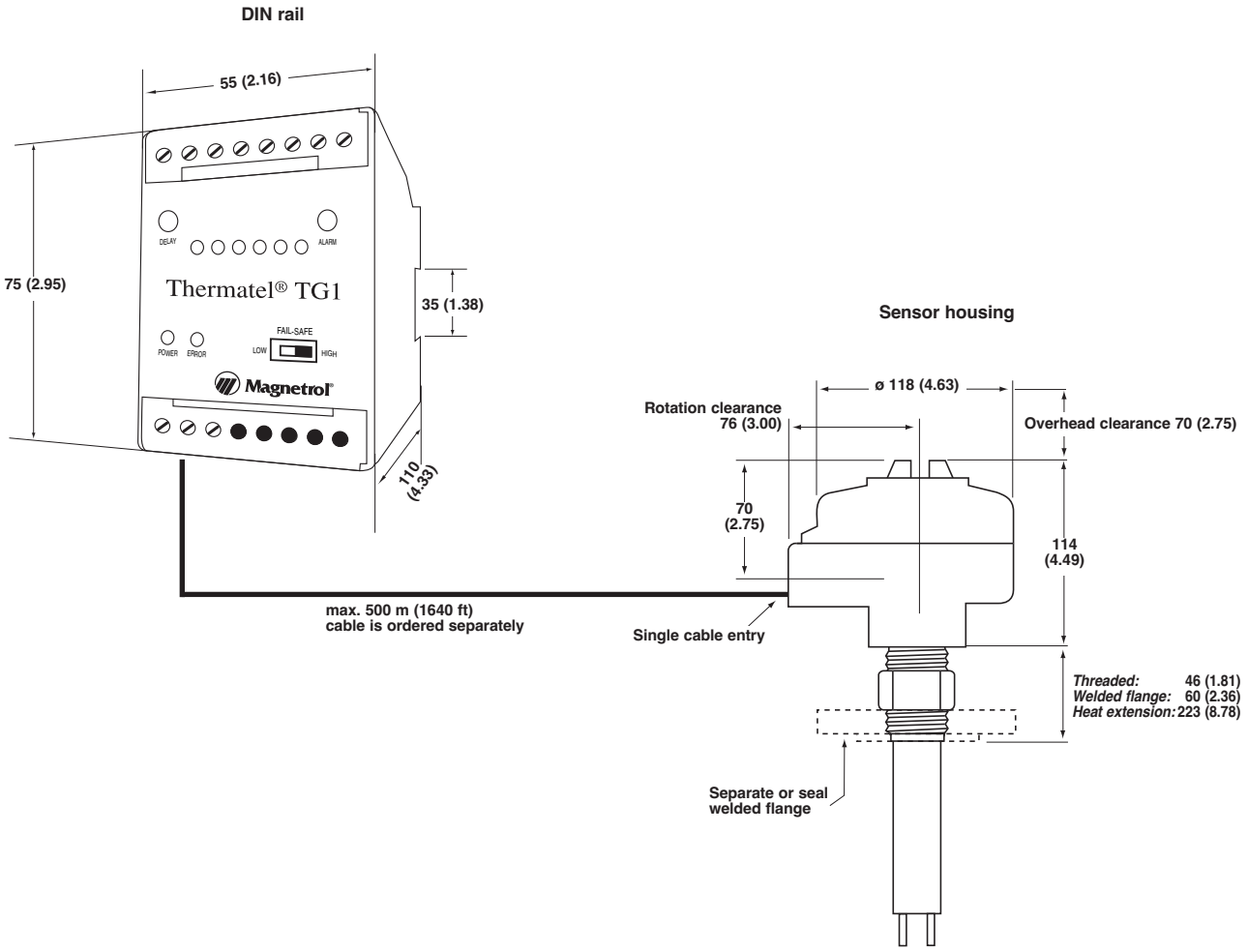


Typical water flow



Model	Sensor design	Recommended for
TMA	Spherical tip	Best sensitivity for liquid flows / suitable for gas flow – resists heavy coating
TMB	Spherical tip	Same as TMA but can be used with integral electronics up to +200 °C (+400 °F)
TMC	Twin tip	Best sensitivity for air/gas flows – resists light coating
TMD	Twin tip	Same as TMC but can be used with integral electronics up to +200 °C (+400 °F)
TMH	Twin tip	High temperature and/or high pressure conditions – resists light coating
TMM	Mini twin tip	Installation in small pipe sizes – resists light coating
TML	Low flow body	Detection/control of extreme low flows – resists light coating

DIMENSIONS IN mm (inches)



QUICK RESPONSE CELL (QRC)

Several models are available for extra quick shipment, within max. 15 days after factory receipt of purchase order, through the Quick Response Cell (QRC).
Models covered by QRC service are conveniently green coded in the selection data charts.
To take advantage of QRC, simply match the green model number codes (standard dimensions apply).
QRC delivery is limited to a maximum of 10 units per order. Contact your local representative for lead times on larger volume orders, as well as other products and options.

SELECTION DATA

A complete measuring system consists of:

1. THERMATEL® DIN RAIL electronics and sensor housing
2. Connecting cable
3. THERMATEL® sensor
4. Optional: Order code for thread-on mounting flanges
5. Optional: Retractable probe assembly, consult factory for details
6. Optional: Factory calibration, consult factory

1. Order code for Thermatel® DIN RAIL ELECTRONICS

T G 1	Electronics with standard LED flow indication
T G 2	Electronics with LED flow indication per NAMUR NE 44

OUTPUT

1	2 Amp SPDT alarm relay with mA output signal (non linear / non scaleable)

POWER SUPPLY

2	24 V DC

MOUNTING

0 D	Remote DIN rail mounted electronics

SENSOR HOUSING / CABLE ENTRY

T	IP 65, Cast aluminium, M20 x 1,5 cable entry
2	IP 65, Cast aluminium, 3/4" NPT cable entry
6	IP 65, Cast stainless steel, 3/4" NPT cable entry

APPROVAL

A 0	ATEX II 1 G EEx ia IIB T5, intrinsically safe

[ ] T G | 1 2 0 D | [ ] A 0 **complete order code for Thermatel® TG1/TG2 electronics**

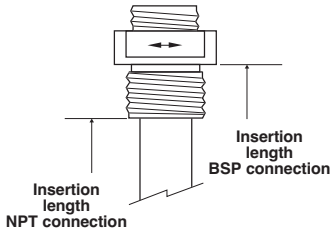
→ X = product with a specific customer requirement

2. Order code for connecting cable (standard 2-wire shielded instrument cable – 0,50 mm²)

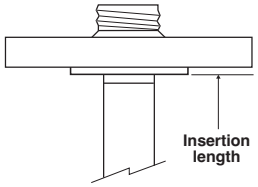
0 0 1 - 5 0 0	From 1 m (3.28 ft) min. to 500 m (1640 ft) max. Specify in increments of 1 m (3.28 ft)

1 3 7 | 3 2 2 2 | [ ] [ ] [ ] **complete order code for connecting cable**

CONNECTIONS

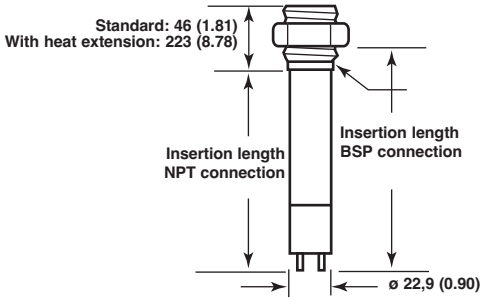


Threaded

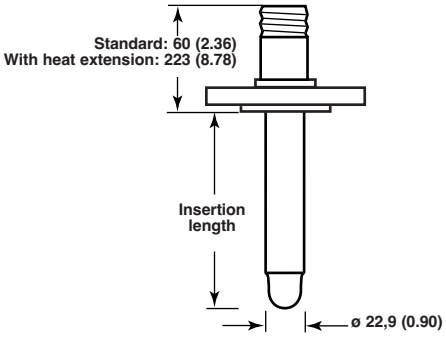


Welded flange ASME - EN

DIMENSIONS IN mm (inches) – TMA/TMB/TMC/TMD



Threaded Sensor

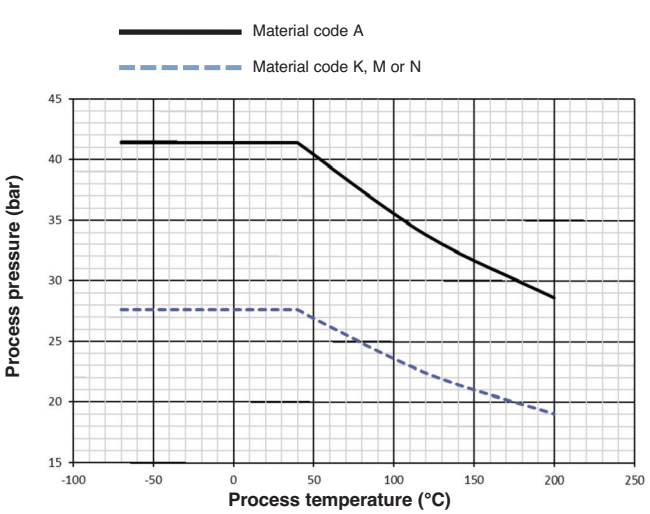


Flanged Sensor

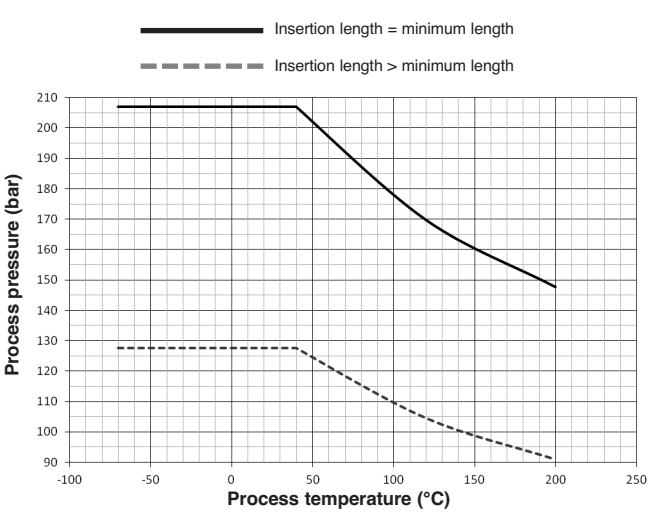
PRESSURE/TEMPERATURE RATING – TMA/TMB/TMC/TMD

Sensor	Material code	Insertion length	Maximum process pressure		
			@ +40 °C (+100 °F)	@ +120 °C (+250 °F)	@ +200 °C (+400 °F)
TMA, TMB	A	All	41,4 bar (600 psi)	33,8 bar (490 psi)	28,6 bar (415 psi)
	K, M, N	All	27,6 bar (400 psi)	22,4 bar (325 psi)	19,0 bar (275 psi)
TMC, TMD	A, D, K, M, N	= minimum length	207 bar (3000 psi)	170 bar (2460 psi)	148 bar (2140 psi)
		> minimum length	128 bar (1850 psi)	105 bar (1517 psi)	91,0 bar (1320 psi)
TMC, TMD	B, F	= minimum length	207 bar (3000 psi)	181 bar (2627 psi)	161 bar (2340 psi)
		> minimum length	103 bar (1500 psi)	90,6 bar (1313 psi)	80,7 bar (1170 psi)
TMC, TMD	C, G	= minimum length	172 bar (2500 psi)	147 bar (2125 psi)	137 bar (1980 psi)
		> minimum length	82,8 bar (1200 psi)	70,3 bar (1020 psi)	65,5 bar (950 psi)

TMA/TMB sensors



TMC/TMD sensors with material code A or D



3. Order code for Thermatel® TG1/TG2 – STANDARD SENSOR

T M A	Spherical tip	- standard	max +120 °C (+250 °F)
T M B	Spherical tip	- with heat extension	max +200 °C (+400 °F)
T M C	Twin tip	- standard	max +120 °C (+250 °F)
T M D	Twin tip	- with heat extension	max +200 °C (+400 °F)

MATERIAL OF CONSTRUCTION FOR SENSOR AND PROCESS CONNECTION

A	316/316L (1.4401/1.4404) stainless steel①	
B	Hastelloy® C (2.4819)	– TMC/TMD only
C	Monel® (2.4360)	– TMC/TMD only
D	316/316L (1.4401/1.4404) stainless steel	– TMC/TMD only
F	Hastelloy® C (2.4819), NACE	
G	Monel® (2.4360), NACE	
K	316/316L (1.4401/1.4404) stainless steel, ASME B31.3	
M	316/316L (1.4401/1.4404) stainless steel, ASME B31.3 and NACE	
N	316/316L (1.4401/1.4404) stainless steel, NACE	

① Not suitable for zone 0 applications in combination with hermetically sealed relay; use in this case material code D.

PROCESS CONNECTION – SIZE/TYPE

Threaded

1 1 0	3/4" NPT
2 1 0	1" NPT
2 2 0	1" BSP (G 1")

No threads – only for use with compression fitting

0 0 0	Compression fitting (customer-supplied)

ASME flanges

2 3 0	1"	150 lbs ASME RF
2 4 0	1"	300 lbs ASME RF
2 5 0	1"	600 lbs ASME RF
3 3 0	1 1/2"	150 lbs ASME RF
3 4 0	1 1/2"	300 lbs ASME RF

3 5 0	1 1/2"	600 lbs ASME RF
4 3 0	2"	150 lbs ASME RF
4 4 0	2"	300 lbs ASME RF
4 5 0	2"	600 lbs ASME RF

EN flanges

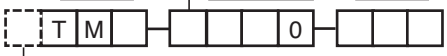
B B 0	DN 25	PN 16/25/40	EN 1092-1	Type A
B C 0	DN 25	PN 63/100	EN 1092-1	Type B2
C B 0	DN 40	PN 16/25/40	EN 1092-1	Type A
C C 0	DN 40	PN 63/100	EN 1092-1	Type B2
D A 0	DN 50	PN 16	EN 1092-1	Type A
D B 0	DN 50	PN 25/40	EN 1092-1	Type A
D D 0	DN 50	PN 63	EN 1092-1	Type B2
D E 0	DN 50	PN 100	EN 1092-1	Type B2

INSERTION LENGTH – **MINIMUM**

		Sensor	Process connection
0 0 5	5 cm (2")	TMA, TMB	NPT
0 0 6	5,5 cm (2.17")		flanged
0 0 7	7 cm (2.76")		BSP
0 0 6	5,5 cm (2.17")	TMC, TMD	NPT, flanged
0 0 8	7,5 cm (3")		BSP

INSERTION LENGTH – **SELECTABLE** – Specify per cm (0.39") increment

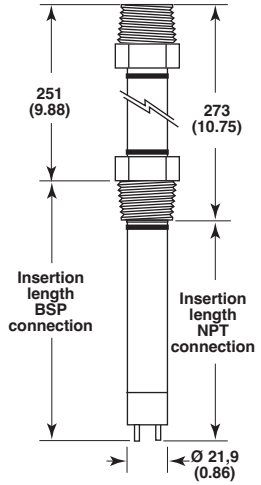
		Sensor	Process connection
0 0 6	Minimum 6 cm (2.36")	TMA, TMB	NPT
0 0 7	Minimum 7 cm (2.76")		flanged
0 0 8	Minimum 8 cm (3.15")		BSP
0 0 7	Minimum 7 cm (2.76")	TMC, TMD	NPT, flanged
0 0 9	Minimum 9 cm (3.54")		BSP
3 3 0	Maximum 330 cm (130")	all	all

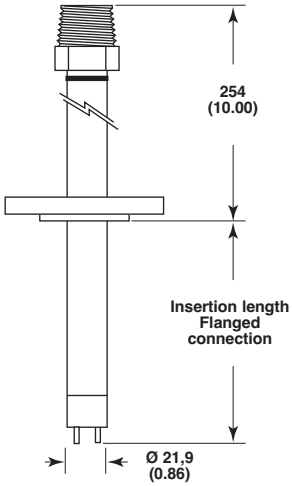


complete order code for Thermatel® TG1/TG2 STANDARD SENSOR

X = product with a specific customer requirement

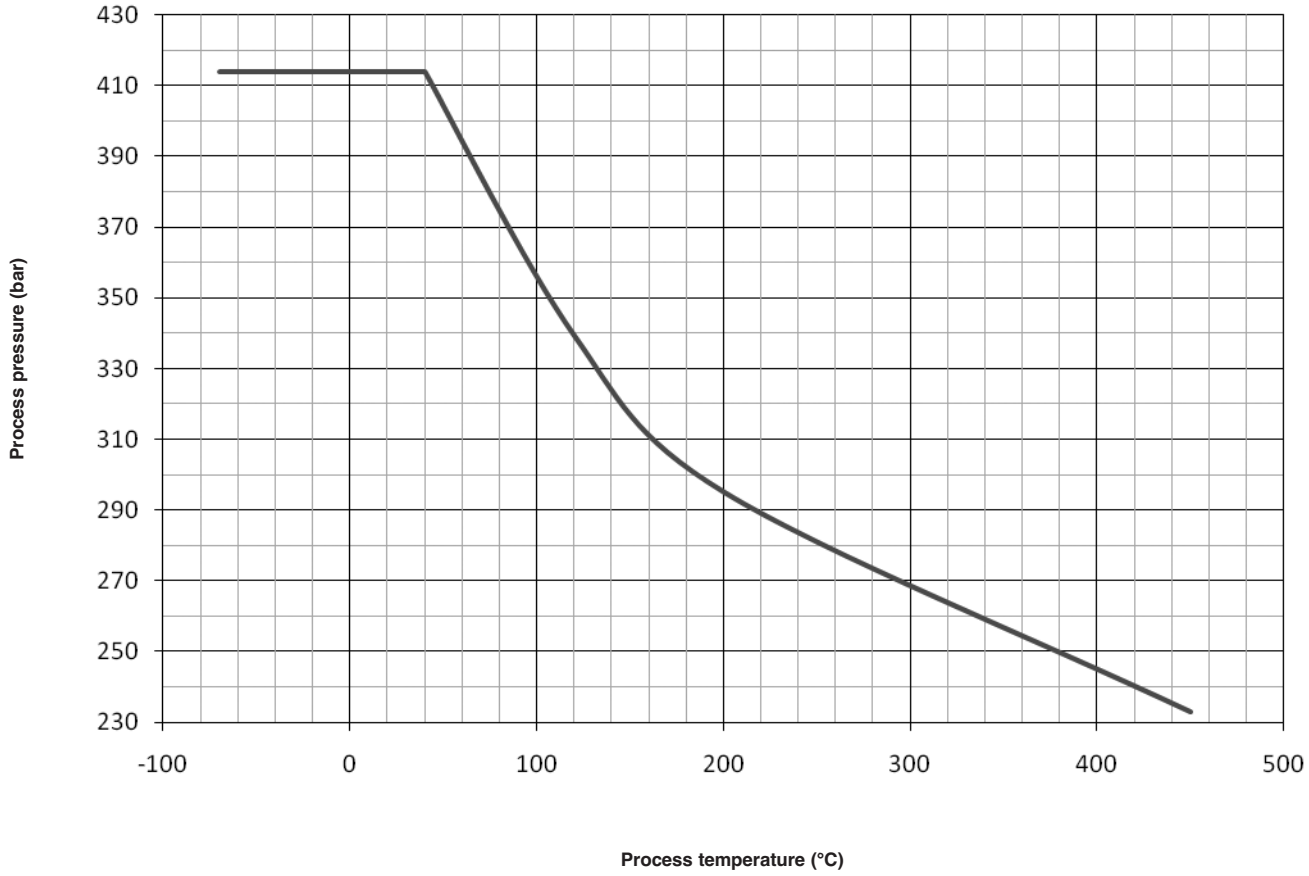
DIMENSIONS IN mm (inches) – TMH





PRESSURE/TEMPERATURE RATING – TMH

Maximum process pressure			
@ +40 °C (+100 °F)	**@ +120 °C (+250 °F)**	**@ +200 °C (+400 °F)**	**@ +450 °C (+850 °F)**
414 bar (6000 psi)	339 bar (4920 psi)	295 bar (4280 psi)	233 bar (3380 psi)



3. Order code for Thermatel® TG1/TG2 – HIGH TEMPERATURE / HIGH PRESSURE SENSOR

T M H	High temperature / high pressure twin tip – max +450 °C (+850 °F) / max 414 bar (6000 psi)①

① Not available with retractable probe assembly.

MATERIAL OF CONSTRUCTION FOR SENSOR AND PROCESS CONNECTION

A	316/316L (1.4401/1.4404) stainless steel①
B	Hastelloy® C (2.4819)
D	316/316L (1.4401/1.4404) stainless steel
F	Hastelloy® C (2.4819), NACE
K	316/316L (1.4401/1.4404) stainless steel, ASME B31.3
M	316/316L (1.4401/1.4404) stainless steel, ASME B31.3 and NACE
N	316/316L (1.4401/1.4404) stainless steel, NACE

① Not suitable for zone 0 applications in combination with hermetically sealed relay; use in this case material code D.

PROCESS CONNECTION – SIZE/TYPE

Threaded

1 1 0	3/4" NPT
2 1 0	1" NPT
2 2 0	1" BSP (G 1")

ASME flanges

2 3 0	1"	150 lbs	ASME RF
2 4 0	1"	300 lbs	ASME RF
2 5 0	1"	600 lbs	ASME RF
2 7 0	1"	900/1500 lbs	ASME RF
3 3 0	1 1/2"	150 lbs	ASME RF
3 4 0	1 1/2"	300 lbs	ASME RF
3 5 0	1 1/2"	600 lbs	ASME RF

3 7 0	1 1/2"	900/1500 lbs	ASME RF
3 8 0	1 1/2"	2500 lbs	ASME RF
4 3 0	2"	150 lbs	ASME RF
4 4 0	2"	300 lbs	ASME RF
4 5 0	2"	600 lbs	ASME RF
4 7 0	2"	900/1500 lbs	ASME RF
4 8 0	2"	2500 lbs	ASME RF

EN flanges

B B 0	DN 25	PN 16/25/40	EN 1092-1 Type A
B C 0	DN 25	PN 63/100	EN 1092-1 Type B2
B G 0	DN 25	PN 250	EN 1092-1 Type B2
C B 0	DN 40	PN 16/25/40	EN 1092-1 Type A
C C 0	DN 40	PN 63/100	EN 1092-1 Type B2
C G 0	DN 40	PN 250	EN 1092-1 Type B2
C J 0	DN 40	PN 400	EN 1092-1 Type B2
D A 0	DN 50	PN 16	EN 1092-1 Type A
D B 0	DN 50	PN 25/40	EN 1092-1 Type A
D D 0	DN 50	PN 63	EN 1092-1 Type B2
D E 0	DN 50	PN 100	EN 1092-1 Type B2
D G 0	DN 50	PN 250	EN 1092-1 Type B2
D J 0	DN 50	PN 400	EN 1092-1 Type B2

INSERTION LENGTH – **MINIMUM**

		Process connection
0 0 6	5,5 cm (2.17")	NPT
0 0 7	7 cm (2.76")	flanged
0 0 8	7,5 cm (3")	BSP

INSERTION LENGTH – **SELECTABLE** – Specify per cm (0.39") increment

		Process connection
0 0 7	Minimum 7 cm (2.76")	NPT
0 0 8	Minimum 8 cm (3.15")	flanged
0 0 9	Minimum 9 cm (3.54")	BSP
0 9 1	Maximum 91 cm (36")	all

complete order code for Thermatel® TG1/TG2 HIGH TEMPERATURE /HIGH PRESSURE SENSOR

→ X = product with a specific customer requirement

SELECTION DATA (CONT.)

3. Order code for Thermatel® TG1/TG2 – MINI SENSOR

T M M	Mini twin tip – max +120 °C (+250 °F)

MATERIAL OF CONSTRUCTION FOR SENSOR AND PROCESS CONNECTION

A	316/316L (1.4401/1.4404) stainless steel (CRN Available)①
N	316/316L (1.4401/1.4404) stainless steel, NACE (CRN Available)

① Not suitable for zone 0 applications in combination with hermetically sealed relay.

PROCESS CONNECTION – SIZE/TYPE
Threaded

0 1 0	1/2" NPT
1 1 0	3/4" NPT
2 1 0	1" NPT

INSERTION LENGTH – **MINIMUM**

0 0 3	2,5 cm (1")

INSERTION LENGTH – **SELECTABLE** – Specify per cm (0.39") increment

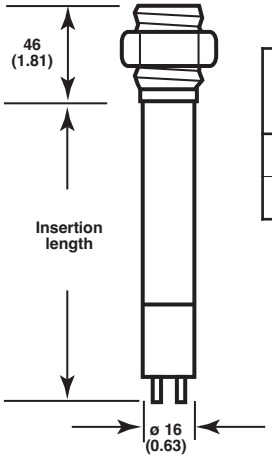
0 0 5	Minimum 5 cm (2")
3 3 0	Maximum 330 cm (130")

	T	M	M			1	0		

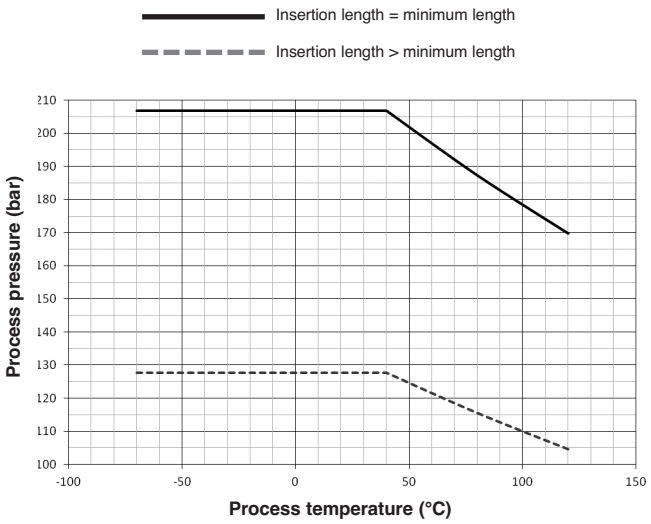
complete order code for Thermatel® TG1/TG2 MINI SENSOR

X = product with a specific customer requirement

DIMENSIONS IN mm (inches) & PRESSURE/TEMPERATURE RATING – TMM



Insertion length	Maximum process pressure	
	@ +40 °C (+100 °F)	@ +120 °C (+250 °F)
= 2,5 cm (1")	207 bar (3000 psi)	170 bar (2460 psi)
> 2,5 cm (1")	126 bar (1850 psi)	105 bar (1517 psi)



RECOMMENDED FLOW RANGES – TMM

Pipe size	Water	Air
1/2"	0,75 to 680 l/h (0.2 to 180 GPH)	0,85 to 120 Nm³/h (0.5 to 70 SCFM)
3/4"	2 to 900 l/h (0.5 to 240 GPH)	2,5 to 170 Nm³/h (1.5 to 100 SCFM)
1"	3,8 to 1600 l/h (1 to 420 GPH)	5 to 290 Nm³/h (3 to 170 SCFM)

SELECTION DATA (CONT.)

3. Order code for Thermatel® TG1/TG2 – LOW FLOW BODY SENSOR

T M L	Low flow body – max +120 °C (+250 °F) / max 400 bar (5800 psi)

MATERIAL OF CONSTRUCTION FOR SENSOR AND PROCESS CONNECTION

A	316/316L (1.4401/1.4404) stainless steel

PROCESS CONNECTION – SIZE/TYPE

Threaded

T 1	1/4" NPT-F (CRN Available)
V 1	1/2" NPT-F (CRN Available)
T 0	1/4" BSP (G 1/4")
V 0	1/2" BSP (G 1/2")

SENSITIVITY

0	Standard
1	High Sensitivity①

① Only available for gas applications and when digit 5 = T.

MOUNTING BRACKET

0 0 0	None
1 0 0	With carbon steel mounting bracket

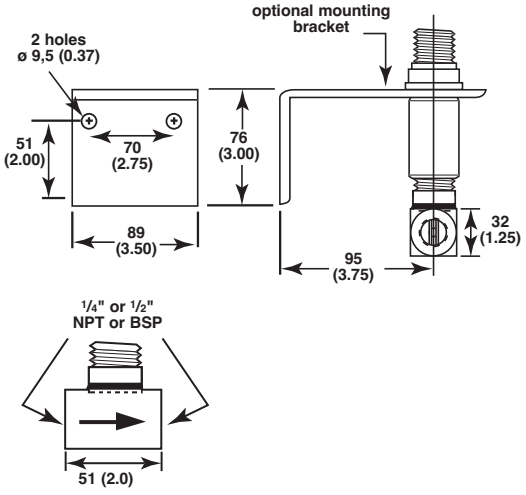
	T	M	L	A				0	0

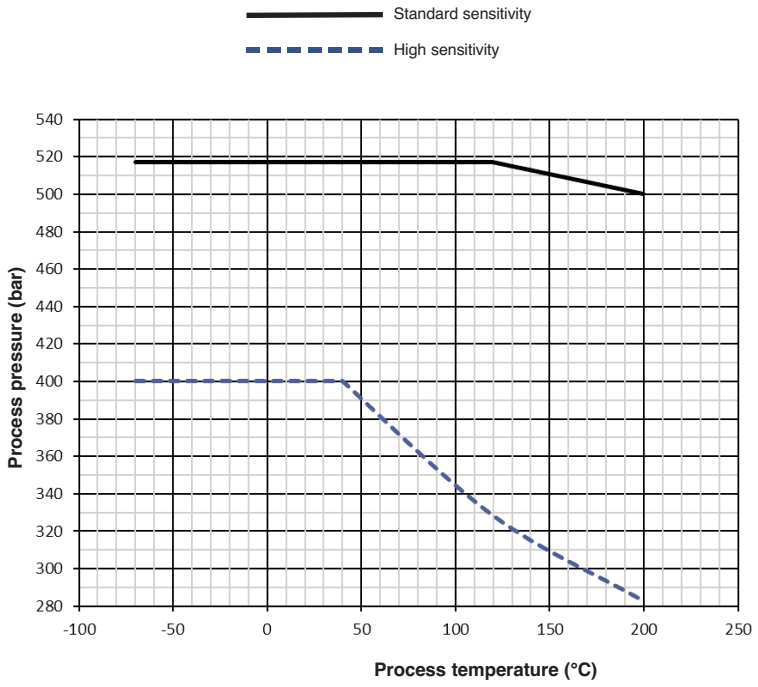
complete order code for Thermatel® TG1/TG2 LOW FLOW BODY SENSOR

→ X = product with a specific customer requirement

DIMENSIONS IN mm (inches) & PRESSURE/TEMPERATURE RATING – TML

Sensitivity (refer to digit 7)	Maximum process pressure		
	@ +40 °C (+100 °F)	@ +120 °C (+250 °F)	@ +200 °C (+400 °F)
Standard sensitivity	517 bar (7500 psi)	517 bar (7500 psi)	500 bar (7250 psi)
High sensitivity	400 bar (5800psi)	328 bar (4760 psi)	283 bar (4100 psi)





RECOMMENDED FLOW RANGES – TML

Size	Water	Air
1/4" flow body	0,02 to 5,7 l/h (0.0055 to 1.5 GPH)	0,071 to 5,75 Nm³/h (2.5 to 200 SCFH)①
1/2" flow body	0,04 to 11,5 l/h (0.01 to 3 GPH)	0,071 to 11,5 Nm³/h (2.5 to 400 SCFH)

①For 0,0078 to 0,0708 Nl³/h (0.064 to 2.5 SCFH) use high sensitivity low flow body sensor.

SELECTION DATA (CONT.)

4. Optional sensor mounting flanges

Thread-on mounting flanges can only be used in combination with 3/4" NPT process connection sensor.
Consult factory for other sizes or materials.

Thread-on flanges for use with 3/4" NPT-M connections

ANSI B16.5 flanges	Part No.		
	Carbon steel	316/316L SST	Hastelloy C
1" 150 lbs RF	004-5867-041	004-5867-043	004-5867-052
1 1/2" 150 lbs RF	004-5867-021	004-5867-001	004-5867-031
2" 150 lbs RF	004-5867-022	004-5867-002	004-5867-032
3" 150 lbs RF	004-5867-023	004-5867-003	004-5867-033
4" 150 lbs RF	004-5867-024	004-5867-004	004-5867-034
6" 150 lbs RF	004-5867-025	004-5867-005	004-5867-035
1" 300 lbs RF	004-5867-042	004-5867-044	004-5867-053
1 1/2" 300 lbs RF	004-5867-026	004-5867-006	004-5867-036
2" 300 lbs RF	004-5867-027	004-5867-007	004-5867-037
3" 300 lbs RF	004-5867-028	004-5867-008	004-5867-038
4" 300 lbs RF	004-5867-029	004-5867-009	004-5867-039
6" 300 lbs RF	004-5867-030	004-5867-010	004-5867-040
1" 600 lbs RF	004-5867-051	004-5867-050	004-5867-054
1 1/2" 600 lbs RF	004-5867-046	004-5867-045	004-5867-055
2" 600 lbs RF	004-5867-049	004-5867-048	004-5867-056

ELECTRONICS SPECIFICATIONS

Description		***Specifications***
Power supply		19,2 to 28,8 V DC
Power consumption		5 W max.
Flow range		TMA-A, TMB-A, TMC-A, TMD-A, TMM: 0,003 to 1,5 m/s (0.01 to 5.0 FPS) – water 0,03 to 150 m/s (0.1 to 500 FPS) – air
		TMM: see table on page 12
		TMC-B, TMC-C, TMD-B, TMD-C,TMH: 0,003 to 0,3 m/s (0.01 to 1.0 FPS) – water 0,03 to 150 m/s (0.1 to 500 FPS) – air
		TML: see table on page 13
Output	Alarm	2 A SPDT relay
	Continuous	mA output (non linear, non scaleable)
	Error	3,6 mA (Low Level Fail-Safe) – 22 mA (High Level Fail-safe)
User interface	Set point	Adjustable via potentiometer located on DIN Rail housing
	Range selection	Selectable in probe electronics
LED indication	Power	LED's for Power/Alarm status
	Error	Red LED blinks in case of error
	Alarm	4 x green LED's – for safe/ (normal) condition 1 x yellow LED – indicates when flow or level is approaching the alarm set point 1 x red LED – indicates an alarm condition (TG1) all LED's OFF – indicates an alarm condition (TG2)
Approvals		ATEX II 1 G EEx ia IIB T5 Other approvals are available, consult factory for more details
SIL (Safety Integrity Level)		Functional safety to SIL1 as 1oo1 / SIL2 as 1oo2 in accordance to IEC 61508 – SFF of 79,4 % – full FMEDA reports and declaration sheets available
Housing material		DIN Rail: IP 20, polycarbonate / Sensor housing: IP 65, Aluminium or Stainless Steel
Net weight		Aluminium: 1,6 kg (3.5 lbs) – electronics only Stainless steel: 4,0 kg (8.8 lbs) – electronics only

PERFORMANCE

Description	*Specification*
Response time	1-10 s typical (dependent on sensor type, application and set point)
Repeatability	< 1 % @ constant temperature
Ambient temperature	-40 °C to +70 °C (-40 °F to +160 °F) Storage: -50 °C to +75 °C (-58 °F to +170 °F)
Humidity	0-99 %, non-condensing
Electromagnetic compatibility	Meets CE requirements (EN 61326: 1997 + A1 + A2)

SENSOR SPECIFICATIONS

Description	*Spherical tip - Twin tip sensors INDUSTRIAL TMA/TMB - TMC/TMD*	*HTHP sensor TMH*
Materials	316/316L (1.4401/1.4404) Hastelloy® C (2.4819) – TMC/TMD only Monel® (2.4360) – TMC/TMD only	316/316L (1.4401/1.4404) Hastelloy® C (2.4819)
Sensor diameter	22,9 mm (0.90")	21,9 mm (0.86")
Process connection	Threaded: NPT or BSP Flanged: various ASME or EN flanges	
Sensor length	5 - 330 cm (2" - 130")	5,5 - 91 cm (2.17" - 36")
Process temperature	TMA/TMC: -70 °C to +120 °C (-100 °F to +250 °F) TMB/TMD: -70 °C to +200 °C (-100 °F to +400 °F)	-70 °C to +450 °C (-100 °F to +850 °F)
Max process pressure	See info on page 6	See info on page 8

Description	*Mini twin tip sensor TMM*	*Low flow body TML*
Materials	316/316L (1.4401/1.4404)	
Sensor diameter	16 mm (0.63")	1/4" or 1/2" pipe size
Process connection	Threaded: 1/2", 3/4" or 1" NPT	Threaded: 1/4" or 1/2" NPT-F or BSP
Sensor length	2,5 - 330 cm (1" - 130")	Not applicable
Process temperature	-70 °C to +120 °C (-100 °F to +250 °F)	
Max process pressure	See info on page 10	See info on page 11

Notes

Notes

QUALITY ASSURANCE - ISO 9001

THE QUALITY ASSURANCE SYSTEM IN PLACE AT MAGNETROL GUARANTEES THE HIGHEST LEVEL OF QUALITY DURING THE DESIGN, THE CONSTRUCTION AND THE SERVICE OF CONTROLS.
OUR QUALITY ASSURANCE SYSTEM IS APPROVED AND CERTIFIED TO **ISO 9001** AND OUR TOTAL COMPANY IS COMMITTED TO PROVIDING FULL CUSTOMER SATISFACTION BOTH IN QUALITY PRODUCTS AND QUALITY SERVICE.

PRODUCT WARRANTY

ALL MAGNETROL ELECTRONIC AND ULTRASONIC LEVEL CONTROLS ARE WARRANTED FREE OF DEFECTS IN MATERIALS AND WORKMANSHIP FOR 18 MONTHS FROM THE DATE OF ORIGINAL FACTORY SHIPMENT. IF RETURNED WITHIN THE WARRANTY PERIOD; AND, UPON FACTORY INSPECTION OF THE CONTROL, THE CAUSE OF THE CLAIM IS DETERMINED TO BE COVERED UNDER THE WARRANTY; THEN, MAGNETROL INTERNATIONAL WILL REPAIR OR REPLACE THE CONTROL AT NO COST TO THE PURCHASER (OR OWNER) OTHER THAN TRANSPORTATION.
MAGNETROL SHALL NOT BE LIABLE FOR MISAPPLICATION, LABOR CLAIMS, DIRECT OR CONSEQUENTIAL DAMAGE OR EXPENSE ARISING FROM THE INSTALLATION OR USE OF THE EQUIPMENT. THERE ARE NO OTHER WARRANTIES EXPRESSED OR IMPLIED, EXCEPT, SPECIAL WRITTEN WARRANTIES COVERING SOME MAGNETROL PRODUCTS.

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