



NICO TEMPERATURE GAUGE

TGN & TGS SERIES



Nikan Sanat Khavarmianeh



NICO Temperature Gauge Family

TGN & TGS Series

A complete temperature gauge family for local temperature indication and switch-contact applications, including bimetal thermometers to EN 13190 and TGS switch-contact thermometer models for process monitoring and alarm switching.



7

MODELS · TWO SERIES

EN 13190

BIMETAL STANDARD

-70...+600 °C

MEASURING RANGE

TGN + TGS

INDICATION +
SWITCHING

TGN BIMETAL THERMOMETERS

TGN20

TGN21

TGN22

TGN23

TGS SWITCH-CONTACT THERMOMETERS

TGS25

TGS26

TGS27

WHY NICO TEMPERATURE

Why NICO Temperature Measurement

The NICO TGN family delivers reliable local temperature indication across the toughest industrial environments — mechanically, with no power and no fragile fill system, built to EN 13190.

TEMPERATURE FAMILY · BIMETAL DIAL THERMOMETERS

-70...+600 °C · Class 1 (±1% FS) · EN 13190

Ø100 / 160 mm dials · Ø6–12 mm stems · full TR10–22 thermowell compatibility · SS316 wetted parts

Inherently Safe

No power and no fragile capillary or fill system — ideal for hazardous, remote and unmanned points where electronics cannot go.

Built for Process

All-stainless construction, thermowell-ready, with the heavy-duty process flagship TGN22 for severe oil & gas, power and petrochemical duty.

Readable Everywhere

Wide ≥270° dial and knife-edge pointer; every-angle adjustable heads keep the indication facing the operator regardless of connection orientation.

One Coherent System

Models sharing one platform, one ordering logic and one thermowell range (TR10–22) — simple to specify, stock and maintain.

BIMETAL VS ELECTRONIC SENSORS

Aspect	Bimetal (TGN)	RTD / Thermocouple
Power	None required	Required (transmitter / loop)
Output	Local dial only (mechanical)	Electrical signal for control
Response	Slower (mechanical)	Fast
Best use	Local indication, inherent safety	Remote monitoring & control

Working principle

A helical bimetal element — two bonded metals with different thermal expansion — coils and uncoils with temperature, rotating the pointer proportionally. Fully mechanical, no power. Response (τ_{63}) is set by stem diameter: Ø6 ≈8 s · Ø8 ≈12 s · Ø10 ≈18 s · Ø12 ≈25 s in water at 1 m/s.

FAMILY OVERVIEW

The TGN Bimetal Family

Four models share the EN 13190 helical-bimetal platform, Class 1 accuracy and the Ø6–12 mm stem / TR10–22 thermowell system. They differ by head/connection, filling and construction grade:



Model	Name	Type	Typical duty
TGN20	Every-Angle Adjustable Bimetal Thermometer	Bimetal · adjustable head	General process
TGN21	Industrial Fixed Bimetal Thermometer	Bimetal · fixed connection	Standard industrial lines
TGN22	Heavy-Duty Process Bimetal Thermometer	Bimetal · heavy-duty process	Oil & gas, power, severe process
TGN23	Sanitary Bimetal Thermometer	Bimetal · hygienic	Food & beverage

One family, one system

All four models use the same Ø100/160 dials, Ø6–12 mm stems, EN 13190 Class 1 accuracy and the TR10–22 thermowell range — so a plant can standardise on a single ordering logic across every temperature point.

SELECTION GUIDE

Which TGN Model Is Right for You?

Start from the service condition, not the model number. Find your situation below — it points straight to the right model:

Reading angle varies → TGN20

The connection orientation is set by the process but the dial must face the operator.

Cost-sensitive fixed point → TGN21

Standard industrial line where the reading direction is known in advance.

Severe / heavy-duty or vibration → TGN22

Oil & gas, petrochemical, power, offshore — or pumps, compressors and skids where a dry pointer would flutter.

Hygienic process → TGN23

Food, dairy, pharma or biotech needing a crevice-free, CIP/SIP-cleanable thermometer.

Pressurised / high-velocity line → + Thermowell

Any of the above on a pressurised line: add a TR10–22 thermowell.

SELECTION IN THREE STEPS

Step	Decide	Guidance
1 · Range	Measuring span	Operating point in the middle third ($\approx 40\text{--}75\%$ FS); e.g. $80\text{ }^{\circ}\text{C} \rightarrow 0\text{...}+160\text{ (C5)}$.
2 · Stem	Diameter & length (U)	Immersion $\approx 6\text{--}10\times$ stem $\varnothing$; add boss height + insulation thickness (4-digit U code).
3 · Connection	Process fitting	On request (OR) — matched to the line, thermowell or (TGN23) hygienic interface; pressurised/high-velocity → add a TR thermowell.

Then choose the model by duty

Adjustable reading → TGN20 · economic fixed → TGN21 · heavy-duty / severe / vibration → TGN22 (flagship) · hygienic → TGN23.
The full range, stem and connection guidance is in the Selection Engineering chapter.

MODEL COMPARISON

Model Comparison Matrix

All four models at a glance — head, filling, construction, protection and best-fit duty:



Feature	TGN20	TGN21	TGN22	TGN23
Industry	General	Industrial	Oil & Gas / Power / Rotating	Food / Pharma
Connection form	Every-angle	Fixed L/B	Fixed L/B	Hygienic (OR)
Liquid filled (FL)	Not available	Not available	Optional	Not available
Case material	SS316/304	SS316/304	Full SS316	SS316L
Ingress protection	IP65	IP65	IP65 / IP66 (FL)	IP65
Process temp. (°C)	-70...+600	-70...+600	-70...+600	Range-dependent
Vibration service	●	○	●	●
Hygienic / CIP-SIP	○	○	○	●
Heavy-duty process	●	○	●	○
Best for	Flexible reading	Economy	Heavy-duty / severe	Hygiene
Relative cost	\$\$	\$	\$\$\$	\$\$\$

● standard / best · ● optional / partial · ○ not applicable. Confirm against the official datasheet before order.

FL is an optional vibration-damping configuration available for TGN22 only.

Adjustable reading → TGN20 · economic fixed point → TGN21 · heavy-duty / severe / vibration → TGN22 (flagship) · food/dairy/ pharma → TGN23. Add a thermowell on any pressurised or high-velocity line.

INDUSTRY APPLICATIONS

Temperature Solutions by Industry

Where each TGN model fits across the industries NICO serves – from general utilities to severe oil & gas and hygienic process:

Oil & Gas / Petrochemical

→ TGN22 + TR11 / TR12 thermowell

- Heat-exchanger, pump & compressor discharge
- Reboilers, rundown and storage-transfer lines
- Compressor stations, dehydration, remote valve sites

Power Plants

→ TGN22 + TR11 (C5–C8 ranges)

- Feedwater heaters and condensate systems
- Turbine / generator lube-oil temperature
- Cooling-water and auxiliary steam lines

Food · Dairy · Pharma · Biotech

→ TGN23 (sanitary, SC finish)

- Pasteurisation, CIP/SIP and hot-fill lines
- WFI loops, jacketed reactors, fermenters
- Crevice-free 316L, Tri-Clamp / DIN 11851

Rotating Equipment & Skids

→ TGN22 (FL option)

- Pumps, compressors, engine / generator skids
- Hydraulic systems and mobile equipment
- Vibration / pulsation present

General Industry & Utilities

→ TGN20 (every-angle) / TGN21 (fixed)

- Water & wastewater, HVAC, boiler & steam
- Tanks, vessels and general plant lines
- Fixed or adjustable reading direction

Any Pressurised / High-Velocity Line

→ + TR10–22 thermowell

- Add a thermowell on any of the above
- Flanged TR10–12 or threaded TR20–22
- Service the thermometer without shutdown

Deep-dive application notes

Detailed hygienic (food/dairy/pharma/biotech) and severe-service (oil&gas/power) configurations are given on the TGN23 and TGN22 model pages and in the Selection Engineering chapter.

TGN20 BIMETAL · ADJUSTABLE HEAD

Every-Angle Adjustable Bimetal Thermometer

Bimetal thermometer with a rotatable head and adjustable stem angle for optimal reading from any direction.

ECONOMY VERSION



KEY FEATURES

- ✓ Every-angle readability regardless of connection orientation
- ✓ Wide $\geq 270^\circ$ dial, knife-edge pointer
- ✓ All-stainless construction
- ✓ Thermowell-ready for pressurised lines

APPLICATIONS

General process · Utilities & HVAC · Water & wastewater · Boiler & steam plant · OEM machinery

Standard	EN 13190	Process connection	On request – to be specified according to process connection type, size, rating, thermowell arrangement and application requirement.
Measuring range	-70...+600 °C (spans -30/+50 ... 0/+600)	Connection form	Every-angle adjustable (rotatable dial + adjustable stem angle)
Accuracy class	Class 1 ($\pm 1\%$ FS) per EN 13190; Class 2 ($\pm 2\%$) optional	Wetted / stem material	Stainless steel 316 (Hastelloy on request)
Dial size	$\varnothing 100 / 160$ mm	Case material	Stainless steel 316 / 304
Stem diameter	$\varnothing 6 / 8 / 10 / 12$ mm	Ingress protection	IP65
Stem length (U)	63 / 100 / 160 / 250 / 400 mm – 4-digit U-code (0063, 0100 ... XXXX on request)		

Selection

Choose: Reading angle must be adjustable · **Avoid:** Heavy vibration → TGN22; sanitary → TGN23

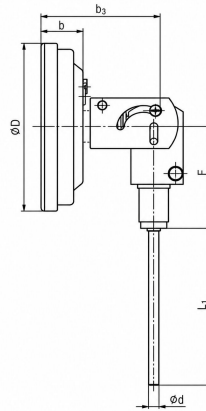
TGN20

DIMENSIONS & ORDERING

TGN20 — Dimensions & Mounting

DIMENSIONAL DRAWINGS

Back mount, adjustable stem and dial



AVAILABLE MOUNTING STYLES

EA

Every-angle adjustable

TYPICAL ENVELOPE DIMENSIONS — PRELIMINARY, NOT FOR FABRICATION

Dial	Case Ø (D)	Depth (a)	Stem Ø (d)	Stem length (U)	Connection
Ø100	≈ 103 mm	≈ 38 mm	8 / 10 mm	0100 / 0160 / 0250	On request
Ø160	≈ 163 mm	≈ 42 mm	10 / 12 mm	0160 / 0250 / 0400	On request

Preliminary — not for fabrication

Official NICO dimensional drawings for TGN20 are not yet released. Figures above are typical envelope dimensions for guidance only; confirm against the official NICO datasheet before fabrication, ordering or installation.

ORDERING EXAMPLE

TGN20-100-EA-10-0160-C6-OR-XX

TGN20 Every-angle adjustable bimetal · **100** Ø100 mm dial · **EA** Every-angle adjustable · **10** Ø10 mm stem · **0160** 160 mm stem length (U) · **C6** Range 0...+200 °C · **OR** Process connection on request · **XX** Standard

OPTIONS

MP	Max / drag pointer
SC	Sanitary finish (TGN23)
CN	ISO/IEC 17025 cal. cert — NICO
CT	ISO/IEC 17025 cal. cert — third-party

TGN21

BIMETAL · FIXED CONNECTION

Industrial Fixed Bimetal Thermometer

Economic fixed-connection bimetal thermometer (lower or back mount) for standard industrial points.

ECONOMY VERSION



KEY FEATURES

- ✓ Economic fixed-connection design
- ✓ Lower or back mount to suit the reading direction
- ✓ All-stainless construction
- ✓ EN 13190 Class 1 accuracy

APPLICATIONS

Standard industrial lines · Water & utilities · HVAC · Tanks & vessels · General plant

Standard	EN 13190	Process connection	On request — to be specified according to process connection type, size, rating, thermowell arrangement and application requirement.
Measuring range	-70...+600 °C (spans -30/+50 ... 0/+600)	Connection form	Fixed lower (bottom) or back mount
Accuracy class	Class 1 ($\pm 1\%$ FS) per EN 13190; Class 2 ($\pm 2\%$) optional	Wetted / stem material	Stainless steel 316 (Hastelloy on request)
Dial size	Ø100 / 160 mm	Case material	Stainless steel 316 / 304
Stem diameter	Ø6 / 8 / 10 / 12 mm	Ingress protection	IP65
Stem length (U)	63 / 100 / 160 / 250 / 400 mm — 4-digit U-code (0063, 0100 ... XXXX on request)		

Selection

Choose: Fixed point, economy · **Avoid:** Orientation unknown → TGN20

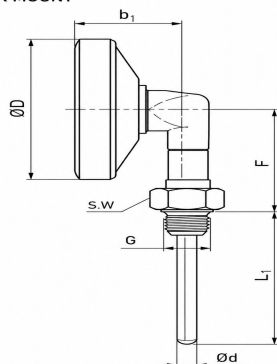
TGN21

DIMENSIONS & ORDERING

TGN21 – Dimensions & Mounting

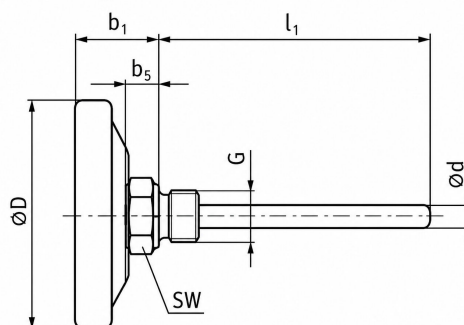
DIMENSIONAL DRAWINGS

LOWER MOUNT



Back mount

(up to 250 °C)



AVAILABLE MOUNTING STYLES

LM

Lower (bottom) mount

BM

Back mount

TYPICAL ENVELOPE DIMENSIONS – PRELIMINARY, NOT FOR FABRICATION

Dial	Case Ø (D)	Depth (a)	Stem Ø (d)	Stem length (U)	Connection
Ø100	≈ 103 mm	≈ 38 mm	8 / 10 mm	0100 / 0160 / 0250	On request
Ø160	≈ 163 mm	≈ 42 mm	10 / 12 mm	0160 / 0250 / 0400	On request

Preliminary – not for fabrication

Official NICO dimensional drawings for TGN21 are not yet released. Figures above are typical envelope dimensions for guidance only; confirm against the official NICO datasheet before fabrication, ordering or installation.

ORDERING EXAMPLE

TGN21-100-LM-08-0100-C3-OR-XX

TGN21 Industrial fixed bimetal · 100 Ø100 mm dial · LM Lower (bottom) mount · 08 Ø8 mm stem · 0100 100 mm stem length (U) · C3 Range 0...+100 °C · OR Process connection on request · XX Standard

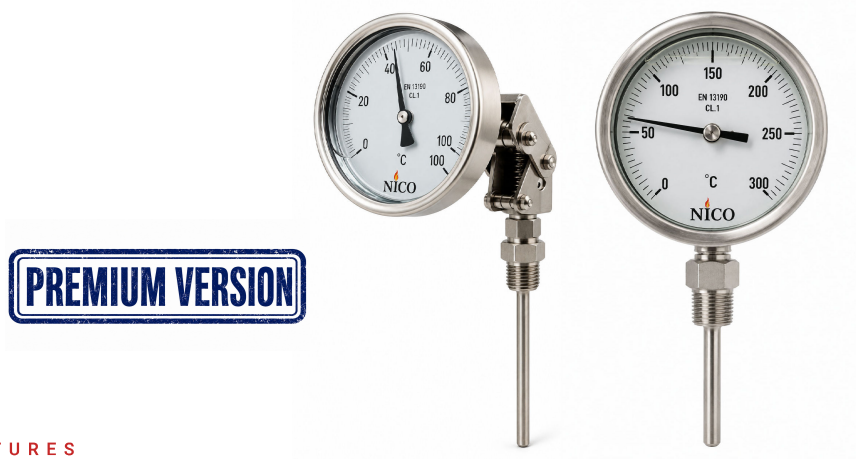
OPTIONS

MP	Max / drag pointer
SC	Sanitary finish (TGN23)
CN	ISO/IEC 17025 cal. cert – NICO
CT	ISO/IEC 17025 cal. cert – third-party

TGN22 BIMETAL · HEAVY-DUTY PROCESS

Heavy-Duty Process Bimetal Thermometer

Flagship heavy-duty bimetal thermometer with full stainless-steel construction and optional liquid filling for severe oil & gas, petrochemical, refining and power-plant duty.



KEY FEATURES

- ✓ Heavy-duty full stainless-steel construction
- ✓ Optional FL liquid filling (silicone / oil) for vibration damping
- ✓ Built for severe process duty — oil & gas, power, offshore
- ✓ Heavy-duty thermowell-ready (TR10–12 / TR20–22), Hastelloy option

APPLICATIONS

Oil & gas / petrochemical · Refining & power plants · Offshore & heavy industry · Pumps, compressors & engine skids · Severe / high-vibration process

Standard	EN 13190	Connection form	Fixed lower (bottom) or back mount
Measuring range	–70...+600 °C (spans –30/+50 ... 0/+600)	Wetted / stem material	Stainless steel 316 (Hastelloy on request)
Accuracy class	Class 1 (±1% FS) per EN 13190; Class 2 (±2%) optional	Case material	Full stainless steel 316
Dial size	Ø100 / 160 mm	Ingress protection	IP65 standard / IP66 with FL option
Stem diameter	Ø6 / 8 / 10 / 12 mm	Construction	Heavy-duty, full stainless steel
Stem length (U)	63 / 100 / 160 / 250 / 400 mm — 4-digit U-code	Case filling (FL)	Optional liquid filling — silicone / oil (vibration damping), available for TGN22 only
Process connection	On request — to be specified according to process connection type, size, rating, thermowell arrangement and application requirement.	Severe service	Oil & gas, petrochemical, refining, power, offshore

Selection

Choose: Heavy-duty / severe process; vibration or pulsation · **Avoid:** Light-duty / budget point → TGN20/21

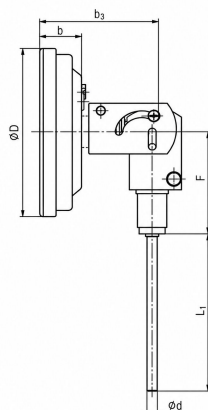
TGN22

DIMENSIONS & ORDERING

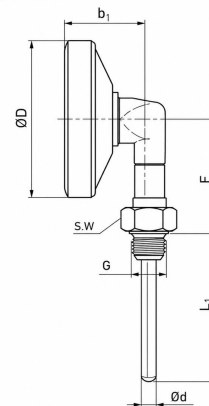
TGN22 — Dimensions & Mounting

DIMENSIONAL DRAWINGS

Back mount, adjustable stem and dial



LOWER MOUNT



AVAILABLE MOUNTING STYLES

LM

Lower mount (fixed)

BM

Back mount (fixed)

TYPICAL ENVELOPE DIMENSIONS — PRELIMINARY, NOT FOR FABRICATION

Dial	Case Ø (D)	Depth (a)	Stem Ø (d)	Stem length (U)	Connection
Ø100	≈ 103 mm	≈ 38 mm	8 / 10 mm	0100 / 0160 / 0250	On request
Ø160	≈ 163 mm	≈ 42 mm	10 / 12 mm	0160 / 0250 / 0400	On request

Preliminary — not for fabrication

Official NICO dimensional drawings for TGN22 are not yet released. Figures above are typical envelope dimensions for guidance only; confirm against the official NICO datasheet before fabrication, ordering or installation.

ORDERING EXAMPLE

TGN22-100-LM-10-0160-C6-OR-FL

TGN22 Heavy-duty process bimetal · 100 Ø100 mm dial · LM Lower mount · 10 Ø10 mm stem · 0160 160 mm stem length (U) · C6 Range 0...+200 °C · OR Process connection on request · FL Optional liquid filling (silicone / oil) — TGN22 only

OPTIONS

FL	Optional liquid filling — silicone / oil, available for TGN22 only
MP	Max / drag pointer
SC	Sanitary finish (TGN23)
CN	ISO/IEC 17025 cal. cert — NICO
CT	ISO/IEC 17025 cal. cert — third-party

TGN23 BIMETAL · HYGIENIC

Sanitary Bimetal Thermometer

Hygienic bimetal thermometer with Tri-Clamp connection and crevice-free finish for food, dairy and pharma.



KEY FEATURES

- ✓ Hygienic Tri-Clamp connection, crevice-free
- ✓ 316L polished wetted surface ($Ra \leq 0.8 \mu m$)
- ✓ CIP / SIP cleanable
- ✓ Every-angle reading option

APPLICATIONS

Food & beverage · Dairy · Brewing · Pharmaceutical · Hygienic process skids

Standard	EN 13190	Connection form	Lower (bottom), back, or every-angle adjustable
Measuring range	-70...+600 °C (spans -30/+50 ... 0/+600)	Wetted / stem material	Stainless steel 316L, $Ra \leq 0.8 \mu m$
Accuracy class	Class 1 ($\pm 1\%$ FS) per EN 13190; Class 2 ($\pm 2\%$) optional	Case material	Stainless steel 316 / 304
Dial size	$\varnothing 100 / 160$ mm	Ingress protection	IP65
Stem diameter	$\varnothing 6 / 8 / 10 / 12$ mm	Surface finish	Polished, crevice-free ($Ra \leq 0.8 \mu m$)
Stem length (U)	63 / 100 / 160 / 250 / 400 mm — 4-digit U-code	Hygienic cleaning	CIP / SIP capability depends on selected range, connection, gasket and process specification
Process connection	On request — hygienic connection type, size, standard and gasket arrangement to be specified according to the hygienic process requirement.		

Selection

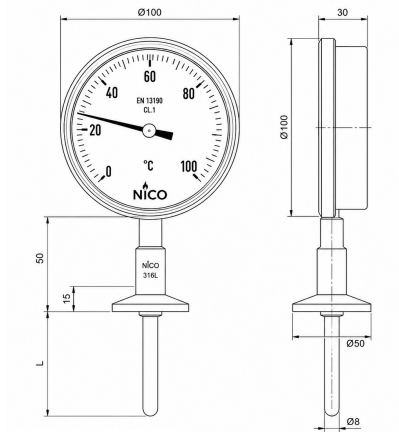
Choose: Hygienic food/pharma line · **Avoid:** Industrial high-pressure / severe → TGN22

TGN23

DIMENSIONS & ORDERING

TGN23 – Dimensions & Mounting

DIMENSIONAL DRAWINGS



AVAILABLE MOUNTING STYLES

LM

Lower mount

BM

Back mount

EA

Every-angle

TYPICAL ENVELOPE DIMENSIONS – PRELIMINARY, NOT FOR FABRICATION

Dial	Case Ø (D)	Depth (a)	Stem Ø (d)	Stem length (U)	Connection
Ø100	≈ 103 mm	≈ 38 mm	8 / 10 mm	0100 / 0160 / 0250	On request
Ø160	≈ 163 mm	≈ 42 mm	10 / 12 mm	0160 / 0250 / 0400	On request

Preliminary – not for fabrication

Official NICO dimensional drawings for TGN23 are not yet released. Figures above are typical envelope dimensions for guidance only; confirm against the official NICO datasheet before fabrication, ordering or installation.

ORDERING EXAMPLE

TGN23-100-BM-Ø8-Ø100-C3-OR-SC

TGN23 Sanitary bimetal · **100** Ø100 mm dial · **BM** Back mount · **Ø8** Ø8 mm stem · **Ø100** 100 mm stem length (U) · **C3** Range 0...+100 °C · **OR** Process connection on request (hygienic) · **SC** Sanitary finish

OPTIONS

MP	Max / drag pointer
SC	Sanitary finish (TGN23)
CN	ISO/IEC 17025 cal. cert – NICO
CT	ISO/IEC 17025 cal. cert – third-party

Severe-Service Applications

The flagship TGN22 is specified where a failed or unreadable thermometer is not acceptable: heavy-duty full stainless steel, optional liquid filling (silicone / oil), in fixed lower or back mount, always paired with a heavy-duty or tapered thermowell. Typical duty by sector:

Refining & Petrochemical

- Heat-exchanger inlet / outlet local indication
- Pump and compressor bearing & discharge temperature
- Product rundown and storage-transfer lines
- Utility headers around CDU/VDU, FCC and hydrotreater units

CONFIGURATION

- ✓ TR11 heavy-duty or TR12 tapered flanged well, bar-stock SS316
- ✓ Process connection on request (OR) — type, size and rating to be specified for the plant and well arrangement
- ✓ Calibration certificate to ISO/IEC 17025 (CN / CT) per project requirement

Typical: TGN22-100-LM-10-0160-C6-OR-FL + TR11

Gas Processing & Pipelines

- Compressor-station discharge temperature (pulsating duty)
- Glycol dehydration and amine-unit reboilers
- Metering / regulating stations and pig-trap areas
- Remote block-valve stations with no power available

CONFIGURATION

- ✓ Specify FL option for reciprocating-compressor or high-vibration service
- ✓ Sour-gas wetted options (NACE MR0175 / ISO 15156) on request
- ✓ No-power local indication suits unmanned remote sites

Typical: TGN22-100-LM-10-0160-C6-OR-FL + TR21

Offshore

- Topsides process and utility modules
- Engine / turbine skids with continuous vibration
- Seawater cooling and firewater systems

CONFIGURATION

- ✓ Heavy-duty full-stainless IP66 case (with FL option) resists salt-laden atmosphere
- ✓ Liquid fill keeps the pointer readable on vibrating skids
- ✓ SS316 case standard; special coatings on request

Typical: TGN22-100-BM-10-0100-C5-OR-FL + TR12

Power Plants

- Feedwater heaters and condensate systems
- Turbine and generator lube-oil temperature
- Cooling-water circuits and auxiliary steam lines
- Boiler-house local indication beside control-room RTDs

CONFIGURATION

- ✓ Ranges C5–C8 cover feedwater-to-steam duties with mid-scale margin
- ✓ Heavy-duty TR11/TR21 wells on high-velocity steam and water
- ✓ Wake-frequency check per ASME PTC 19.3 is mandatory on steam lines

Typical: TGN22-160-LM-12-0250-C8-OR-FL + TR11

EPC specification checklist

For oil & gas and power projects, fix these with the datasheet: piping class & connection rating (process connection on request) · thermowell material and wake-frequency calculation (ASME PTC 19.3) at maximum velocity · sour-service requirement (NACE option) · calibration certificate (CN / CT to ISO/IEC 17025) · tag-plate and range per the instrument index.

SELECTION ENGINEERING

Range, Stem & Connection Selection

Three decisions fix most of a TGN order code before the model is chosen — range, stem length and process connection. Select the range so the operating point sits in the middle third of the scale ($\approx 40\text{--}75\%$ FS).

EN 13190 RANGE CODE TABLE

Code	Range	Typical service
C0	-70...+30 °C	Cryogenic / cold storage
C1	-30...+50 °C	Refrigeration, HVAC
C2	0...+60 °C	Cooling water, utilities
C3	0...+100 °C	Hot water, CIP, light process
C4	0...+120 °C	Heating circuits, vessels
C5	0...+160 °C	LP steam, condensate
C6	0...+200 °C	Steam, hot oil, compressors
C7	0...+250 °C	MP steam, heat-transfer oil
C8	0...+300 °C	HP steam, reboilers
C9	0...+400 °C	Furnace auxiliaries, hot gas
CA	0...+500 °C	Flue gas, high-temp process
CB	0...+600 °C	Extreme (upper bimetal limit)
XX	On request	Other EN 13190 spans on request

Order the range so the normal operating point sits around mid-scale (middle third, $\approx 40\text{--}75\%$ FS). Range code [E] in the ordering system refers to this table.

STEM LENGTH (U) – 4-DIGIT MM CODE

$$U \geq \text{immersion (6-10} \times \text{Ød)} + \text{boss} + \text{insulation}$$

U	Length	Typical installation
0063	63 mm	Small pipes DN25–50, panels
0100	100 mm	Pipes DN50–150 (threaded boss)
0160	160 mm	Pipes DN150–300, small tanks
0250	250 mm	Large / insulated lines, vessels
0400	400 mm	Tanks, ducts, deep nozzles
XXXX	On request	Any 4-digit length, e.g. 1200 = 1200 mm

PROCESS CONNECTION

Code	Connection	Specified
OR	On request	On request — to be specified according to process connection type, size, rating, thermowell arrangement and application requirement.

Decision shortcuts

Range: if the operating point is 80 °C order C5 (0...+160), not C3 where 80 °C sits at 80% FS. · Stem: with a thermowell, match the 4-digit U code to the well insertion length. · Connection: always specified on request (OR) — pressurised/hazardous lines take a TR thermowell; hygienic lines (TGN23) take a Tri-Clamp / DIN 11851 / ISO 2852 interface, size and standard on request.

THERMOWELL COMPATIBILITY

Compatible Thermowells for TGN Series

A thermowell isolates the TGN stem so the thermometer can serve pressurised, high-velocity, corrosive or hazardous lines and be removed without shutting down the process. The full TR10–22 family is documented in the NICO Thermowell catalog; the essentials for pairing with TGN are below.

T R THERMOWELL RANGE

Code	Type	Connection	Shank	Best for
TR10	Flanged	Flange (DIN/ANSI)	Straight	General flanged lines
TR11	HD Flanged	Flange (DIN/ANSI)	Heavy wall	High pressure / velocity
TR12	Tapered Flanged	Flange (DIN/ANSI)	Tapered	High velocity / fast response
TR20	Threaded	½/¾ NPT or G	Straight	General threaded lines
TR21	HD Threaded	½/¾ NPT or G	Heavy wall	High pressure / velocity
TR22	Tapered Threaded	½/¾ NPT or G	Tapered	High velocity / fast response

Ordering structure

TR[xx]–[CONN]–[U]–[BORE]–[MAT] CONN: flange D16/D25/A15/A30 or thread N2/N3/G2/G3 · U: 0063/0100/0160/0250/0400 mm · BORE: B6/B8/B10/B12 (stem Ø6–12) · MAT: S6=SS316, S4=SS304, HC=Hastelloy C.

THERMOMETER × THERMOWELL COMPATIBILITY MATRIX

Thermometer	TR10	TR11	TR12	TR20	TR21	TR22
TGN20	✓	✓	✓	✓	✓	✓
TGN21	✓	○	○	✓	○	○
TGN22	✓	✓✓	✓✓	✓	✓✓	✓✓
TGN23	○	○	○	○	○	○

✓✓ specially recommended · ✓ compatible · ○ case-by-case (TGN23 normally uses a direct hygienic connection). Confirm bore/connection against the official datasheet before order.

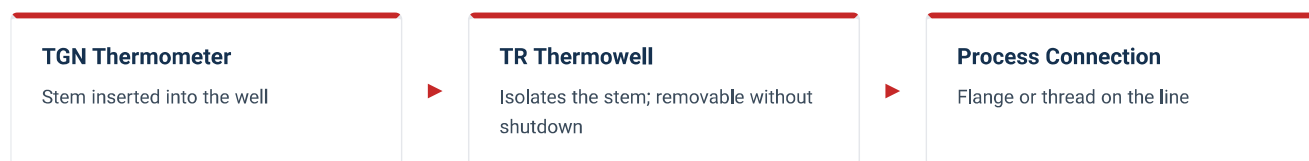
THERMOWELL SELECTION

Thermowell Selection Guide

A thermowell is mandatory on pressurised, high-velocity, corrosive or hazardous lines. Select it in this order:

Decision	Guidance
Connection	Match to the process: flanged (TR10/11/12) or threaded (TR20/21/22).
Shank form	Straight for general duty; tapered (TR12/22) for higher wake-frequency margin and faster response.
Construction	Bar-stock for high pressure/velocity and critical duty; fabricated for large, low-pressure or economic service.
Wake-frequency	Verify per ASME PTC 19.3 at maximum velocity; heavy-duty (TR11/21) or tapered (TR12/22) improve the margin.
Immersion (U)	Tip in the flowing stream; immersion $\approx 6\text{--}10\times$ stem $\varnothing$; match bore to stem and use heat-transfer paste.
Material	SS316 standard; Hastelloy / special alloys for corrosive media.

Assembly Concept



TYPICAL ENVELOPE DIMENSIONS – PRELIMINARY, NOT FOR FABRICATION

Thermowell	Insertion U	Bore	Root / Tip $\varnothing$	Connection	Weight $\approx$ (kg)
TR10 Flanged	100–400	B6–B12	22 / 13	Flange	1.5
TR11 HD Flanged	100–400	B6–B12	26 / 19	Flange	2.5
TR12 Tapered Flanged	100–400	B6–B12	22 $\rightarrow$ 13	Flange	1.4
TR20 Threaded	100–400	B6–B12	22 / 13	$\frac{1}{2}$ / $\frac{3}{4}$ NPT	0.5
TR21 HD Threaded	100–400	B6–B12	26 / 19	$\frac{1}{2}$ / $\frac{3}{4}$ NPT	0.8
TR22 Tapered Threaded	100–400	B6–B12	22 $\rightarrow$ 13	$\frac{1}{2}$ / $\frac{3}{4}$ NPT	0.5

Preliminary – not for fabrication

Official NICO thermowell drawings are not yet released. Figures above are typical envelope dimensions for guidance only; confirm final dimensions and the wake-frequency calculation against the official NICO drawing before fabrication, ordering or installation.

TGS · SWITCH-CONTACT THERMOMETERS

TGS Switch-Contact Thermometer Family

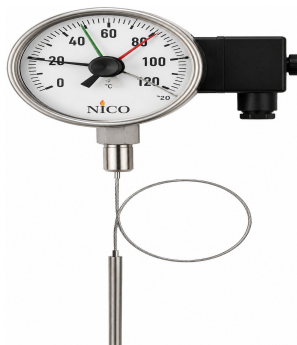
Where a process temperature must be indicated locally and, at the same time, an electrical circuit has to be switched, NICO offers the TGS family. These are a separate product line from the mechanical TGN bimetal thermometers and use their own ordering system — they are not part of TGN coding.



TGS25 — Gas-Actuated Thermometer with Switch Contact

Gas-filled (inert-gas) measuring system. The pressure of the enclosed gas changes with temperature and drives the pointer. A capillary and a contact bulb allow the temperature to be measured and switched without direct contact with the medium and at points that are difficult to access.

- ✓ Measurement without direct medium contact (contact-bulb version)
- ✓ Capillary version for remote / inaccessible points
- ✓ Magnetic snap-action, inductive (Ex) or electronic (PLC) contacts
- ✓ Stainless-steel case and stem; optional liquid damping



TGS26 — Expansion Thermometer with Microswitch

Liquid-expansion measuring system combining a local temperature indicator and a temperature limiter in one instrument. One or two adjustable microswitches make or break a circuit when the pointer passes the set point.

- ✓ Indicator and temperature limiter in a single instrument
- ✓ One or two adjustable microswitches
- ✓ Remote capillary version for inaccessible points
- ✓ Stainless-steel case and stem



TGS27 — Bimetal Thermometer with Switch Contacts

Helical bimetal measuring element for direct-stem local indication, fitted with adjustable switch contacts that make or break a circuit at the set point while the indicating pointer continues to move freely over the full scale.

- ✓ Direct-stem bimetal indication with switch contacts
- ✓ Contacts freely adjustable over $\approx 10\text{--}90\%$ of the scale
- ✓ Inductive (Ex) or electronic (PLC, PNP) contacts
- ✓ Stainless-steel case and stem

Local indication plus switching

Switch contacts (electrical alarm contacts) make or break a circuit according to the pointer position; the indicating pointer keeps moving freely over the whole scale, independent of the set point. Inductive contacts (with an isolating amplifier) suit hazardous areas; electronic contacts drive a PLC directly. For a continuous remote signal use RTD / thermocouple assemblies with a transmitter.

NICO TGS Series – Selection Positioning

Each NICO TGS model is positioned by its measuring principle and switching method so the right product class and selection logic are unambiguous. Select by measuring principle and switching method, not by model number alone.

NICO Model	Product Type	Measuring Principle	Switching Method	Typical Application	Selection Logic
TGS25	Gas-actuated thermometer with switch contact	Gas-actuated / inert-gas pressure system	Switch contact	Remote or difficult-to-access measuring points, capillary / contact-bulb arrangement	Choose when remote measurement, contact-bulb arrangement or difficult-to-access measuring point is required.
TGS26	Expansion thermometer with microswitch	Liquid expansion	Microswitch	Temperature limiting, HVAC, refrigeration, machinery, transformers and utility applications	Choose when microswitch temperature limiting or switching duty is required.
TGS27	Bimetal thermometer with switch contacts	Helical bimetal	Switch contacts	Direct local process indication with switching	Choose when direct-stem bimetal indication with adjustable alarm contacts is required.

Selection logic in one line

Need a remote or contact-bulb point without medium contact → **TGS25** (gas-actuated). Need a temperature limiter with a microswitch → **TGS26** (liquid expansion). Need direct-stem local indication with alarm contacts → **TGS27** (bimetal). The three principles are not interchangeable – match the measuring principle to the duty first, then the switching method.

TGS Model Selection Guide

TGS25 GAS-ACTUATED · SWITCH CONTACT

Gas-Actuated Thermometer with Switch Contact

MODEL POSITIONING

TGS25 is the NICO gas-actuated switch-contact thermometer for local temperature indication plus electrical switching, especially where a capillary, contact bulb or difficult-to-access measuring point is required.

USE THIS MODEL FOR

- ✓ gas-actuated measuring system
- ✓ remote capillary / contact-bulb applications
- ✓ difficult-to-access measuring points
- ✓ industrial process monitoring and switching
- ✓ stainless-steel construction
- ✓ switch-contact applications

Do not mix TGS25 with direct-stem bimetal TGS27.

TGS26 LIQUID-EXPANSION · MICROSWITCH

Expansion Thermometer with Microswitch

MODEL POSITIONING

TGS26 is the NICO liquid-expansion thermometer with microswitch for applications requiring local indication and temperature limiting / switching.

USE THIS MODEL FOR

- ✓ liquid-expansion measuring system
- ✓ microswitch function
- ✓ temperature limiter / switching duty
- ✓ one or two adjustable microswitches
- ✓ remote capillary version where required
- ✓ refrigeration, HVAC, machinery, transformers and utility applications

Do not describe TGS26 as gas-actuated.

Do not describe TGS26 as direct-stem bimetal.

TGS27 BIMETAL · SWITCH CONTACTS

Bimetal Thermometer with Switch Contacts

MODEL POSITIONING

TGS27 is the NICO bimetal switch-contact thermometer for direct local indication with adjustable electrical contacts.

USE THIS MODEL FOR

- ✓ helical bimetal measuring element
- ✓ direct-stem local indication
- ✓ switch contacts integrated with dial indication
- ✓ adjustable alarm contacts
- ✓ chemical, petrochemical, process and general industrial applications
- ✓ stainless-steel construction

Do not describe TGS27 as gas-actuated.

Do not describe TGS27 as expansion / microswitch type.

TGS · TECHNICAL DATA

TGS Family – Technical Data & Applications

Per-model technical data for the TGS switch-contact thermometers. All three indicate locally and switch one or two electrical contacts.

TGS25 GAS-ACTUATED · SWITCH CONTACT · STAINLESS STEEL

Gas-Actuated Thermometer with Switch Contact

Standard	EN 13190	Switch contacts	Up to 2; magnetic snap-action / inductive / electronic
Nominal size	Ø100 / 160 mm	Capillary	Stainless steel, up to ≈ 60 m (length on request)
Measuring principle	Gas-actuated (inert-gas pressure system)	Wetted material	Stainless steel 316
Accuracy class	Class 1	Case	Stainless steel
Scale ranges	-80...+60 °C up to 0...+600 °C (EN 13190 spans; see Range Code Table)	Damping	Optional liquid damping

APPLICATIONS

Control and regulation of industrial processes · Plant monitoring and circuit switching · Machine, plant, tank and equipment building · Panel / cabinet mounting via capillary

TGS26 LIQUID-EXPANSION · MICROSWITCH · STAINLESS STEEL

Expansion Thermometer with Microswitch

Standard	EN 13190	Switch contacts	1 or 2 adjustable microswitches (snap-action)
Nominal size	Ø100 mm	Capillary	Stainless steel, up to ≈ 10 m (length on request)
Measuring principle	Liquid expansion	Wetted material	Stainless steel
Accuracy class	Class 2	Case	Stainless steel
Scale ranges	-60...+40 °C up to 0...+250 °C (see Range Code Table)	Mounting	Surface / panel mounting bracket on request

APPLICATIONS

Local indication with simultaneous circuit switching · Refrigeration and air-conditioning · Machine building and transformers · Food industry and general utilities

TGS27 – Technical Data & Applications

TGS27 BIMETAL · SWITCH CONTACTS · STAINLESS STEEL

Bimetal Thermometer with Switch Contacts

Standard	EN 13190	Switch contacts	Up to 2; inductive (Ex) / electronic (PLC, PNP)
Nominal size	Ø100 mm	Stem diameter	Ø6 / 8 / 10 / 12 mm
Measuring principle	Helical bimetal element	Wetted material	Stainless steel 316
Accuracy class	Class 1 (Ø8–12 mm stem) / Class 2 (Ø6 mm)	Case	Stainless steel 304 / 316
Scale ranges	–70...+30 °C up to 0...+600 °C (see Range Code Table)	Damping	Optional liquid damping

APPLICATIONS

Control and regulation of industrial processes · Plant monitoring and circuit switching · Chemical, petrochemical and process industry · Food industry / aggressive media

Preliminary — confirm before order

Final ranges, contact ratings, capillary lengths and connections are confirmed against the official NICO datasheet. Inductive-contact electrical data depends on the associated isolating amplifier; electronic contacts are PNP type for PLC inputs.

TGS ORDERING SYSTEM

TGS Ordering Code System (switch-contact)

Separate from the TGN system. General format: TGS[xx]-[A Dial]-[B Mounting]-[C Measuring Arrangement]-[D Length]-[E Range]-[F ProcessConn]-[G Contacts]-[H Contact Type]-[I Options]

TGS27-100-LM-DS-0100-C3-OR-2C-EC-XX

[A] Dial size

100	Ø100 mm
160	Ø160 mm (TGS25)

[C] Measuring Arrangement

DS	Direct stem, for TGS27
CB	Contact bulb, for TGS25
CP	Capillary remote arrangement, for TGS25 / TGS26

[E] Range code

C0...CB	See EN 13190 Range Code Table
XX	Other span, on request

[G] Contacts

1C	Single contact
2C	Double contact

[I] Options

XX	Standard
FL	Liquid damping
CN	ISO/IEC 17025 cal. cert — NICO
CT	ISO/IEC 17025 cal. cert — third-party

[B] Mounting

LM	Lower mount
BM	Back mount
EA	Adjustable stem & dial

[D] Length

0063...0400	Direct stem: 4-digit U length in mm
XXXX	Capillary: capillary length on request

Length definition depends on measuring arrangement.

[F] Process connection

OR	On request — connection type, size, rating and mounting arrangement to be specified according to the selected model and application.
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[H] Contact type

IC	Inductive (Ex, via amplifier)
EC	Electronic (PLC, PNP)
MS	Magnetic snap-action / microswitch

Ordering examples

TGS25-100-BM-CB-XXXX-C6-OR-1C-IC-FL (gas-actuated, contact bulb, single inductive contact, liquid damping) · TGS26-100-LM-CP-XXXX-C3-OR-2C-MS-XX (expansion, remote capillary, double microswitch) · TGS27-100-LM-DS-0100-C3-OR-2C-EC-XX (bimetal, direct stem Ø8, double electronic contact)

TGS is independent of TGN

Keep TGS and TGN order codes separate. The TGN system has no switch-contact or transmitter options; switching capability is provided only by the TGS family above.

ORDERING SYSTEM

TGN Ordering Code System (mechanical bimetal)

General format: TGN[xx]-[A Dial]-[B Form]-[C StemØ]-[D StemL]-[E Range]-[F ProcessConn]-[G Options]

TGN22-100-LM-10-0160-C6-OR-FL

[A] Dial size

100	Ø100 mm
160	Ø160 mm

[C] Stem diameter

06	Ø6 mm
08	Ø8 mm
10	Ø10 mm
12	Ø12 mm

[E] Range code

C0...CB	See EN 13190 Range Code Table
XX	Other span, on request

[G] Options

XX	Standard
FL	Optional liquid filling — silicone / oil, available for TGN22 only
MP	Max / drag pointer (on confirmation)
SC	Sanitary finish (TGN23 only)
CN	ISO/IEC 17025 calibration cert — NICO
CT	ISO/IEC 17025 calibration cert — third-party lab

[B] Connection form

LM	Lower (bottom) mount
BM	Back mount
EA	Every-angle adjustable

Forms by model: TGN20 = EA · TGN21 = LM/BM · TGN22 = LM/BM (fixed) · TGN23 = LM/BM/EA.

[D] Stem length U — 4-digit mm

0063	63 mm
0100	100 mm
0160	160 mm
0250	250 mm
0400	400 mm
XXXX	mm, on request

[F] Process connection

OR	On request — to be specified according to process connection type, size, rating, thermowell arrangement and application requirement.
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Ordering examples

TGN20-100-EA-10-0160-C6-OR-XX · TGN21-100-LM-08-0100-C3-OR-XX · TGN22-100-LM-10-0160-C6-OR-FL · TGN23-100-BM-08-0100-C3-OR-SC

Mechanical-only family

The TGN ordering system covers mechanical bimetal thermometers only. FL liquid filling is a TGN22-only option. For local indication combined with electrical switching, see the separate TGS switch-contact thermometer family and its own ordering system. For a remote electrical signal use RTD / thermocouple assemblies with a transmitter.

INSTALLATION & CARE

Installation Guidelines

1. Insert the stem so the sensitive tip reaches the flowing medium; aim for an immersion depth of roughly 6–10× the stem diameter.
2. Use a thermowell (NICO TR10–12 flanged / TR20–22 threaded) on pressurised, high-velocity, corrosive or hazardous lines.
3. Orient the dial for reading — use the every-angle (EA) version where the connection direction is fixed by the process.
4. Where vibration is present, specify the FL liquid-filling option (TGN22) to damp the pointer.
5. Apply heat-transfer paste in the thermowell bore to reduce response time.
6. Allow the reading to stabilise after installation before recording.

Accessories

Accessory / option	Code	Function
Thermowell — threaded	TR20 / TR21 / TR22	Isolates the element on threaded connections
Thermowell — flanged	TR10 / TR11 / TR12	Isolates the element on flanged connections
Heat-transfer paste	—	Improves response time inside the thermowell
Liquid case filling (silicone / oil)	FL	Vibration damping for dynamic / heavy-duty service — TGN22 only
Max / drag pointer	MP	Records the maximum reading (on confirmation)
Sanitary finish (TGN23)	SC	Polished crevice-free finish for hygienic service
Calibration certificate — NICO	CN	Calibration to ISO/IEC 17025, issued by NICO
Calibration certificate — third-party	CT	Calibration to ISO/IEC 17025, third-party laboratory

Maintenance & Troubleshooting

Symptom	Likely cause	Action
Pointer does not return to zero / fixed offset	Overrange exposure or mechanism fatigue	Verify against a reference; re-zero via the adjustment screw or replace
Slow or sluggish response	Poor immersion or air gap in the thermowell	Increase immersion; add heat-transfer paste; use a reduced-tip well
Reading error vs reference	Insufficient immersion / stem conduction error	Increase insertion length; insulate the connection head
Fogging inside the window	Temperature cycling / condensation	Use the FL liquid-filling option (TGN22)
Stiff or stuck pointer	Vibration damage or contamination	Use the FL option (TGN22); replace if mechanism is damaged

CALIBRATION & STORAGE

Calibration & Storage Recommendations

Calibration Recommendations

- Verify periodically against a reference (dry-block or ice-point) across the working range.
- Re-zero using the internal adjustment screw where provided; replace if outside the accuracy class.
- Calibrate the complete assembly (thermometer + thermowell) where response is critical.
- ISO/IEC 17025 calibration certificates are available from NICO (CN) or a third-party laboratory (CT).

Storage Recommendations

- Store dry, in the original packaging, away from shock and vibration.
- Protect the stem from bending and the window from impact.
- Keep within the stated ambient limits before installation.

Before you publish or order

All specifications should be verified against the latest official NICO datasheet before final publication. Ranges, accuracy classes, contact ratings, capillary lengths and process connections are confirmed on the official datasheet for the selected model.

PRODUCT CATALOG

NICO Temperature Gauge Family

TGN & TGS Series

TGN BIMETAL THERMOMETERS

TGN20 Every-Angle Adjustable Bimetal Thermometer

TGN21 Industrial Fixed Bimetal Thermometer

TGN22 Heavy-Duty Process Bimetal Thermometer

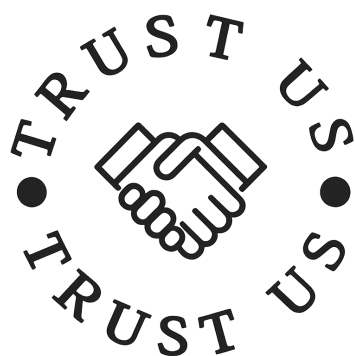
TGN23 Sanitary Bimetal Thermometer

TGS SWITCH-CONTACT THERMOMETERS

TGS25 Gas-Actuated Thermometer with Switch Contact

TGS26 Expansion Thermometer with Microswitch

TGS27 Bimetal Thermometer with Switch Contacts





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