



TEMPERATURE GAUGES

Introduction



Welcome to **Goa Instruments Industries Pvt. Ltd.**, established by Mr. M. T Kulkarni, it is a family owned company. He is a Mechanical Engineer with over 42 years of experience of manufacturing process control instruments for measurement of Temperature, Pressure, Flow, Level & Instrumentation Valves.

We are the leaders in manufacturing various types of Thermowells for all types of Temperature Sensors and Gauges for Industrial applications like Sugar, Power, Oil, Gas, Petrochemical, Fertilizer and other process Industries.

The company has many sets of excellent mechanical processing equipments and modern inspection and testing equipments for our products.

A-State-of-the-Art manufacturing facility, continuous Research & Development, innovative technology & stringent quality control at every stage have been some of the key factors in the manufacturing of our products.

We are not only the manufacturer but the solution providers.

We have built world class reputation of total understanding of customers requirements and needs, thus delivering excellent products and services at competitive prices.









For us, commitment and integrity are valued the most, which reflects in the philosophy of achieving total customer satisfaction. With our presence in major cities in India and a growing international network across all continents, we are in a position to reach clients all over the world.

Our Products have been supplied to the following Industries

- Bhabha Atomic And Research Center
- Oil & Gas Refineries & Petrochemical Industries
- Chemical, Process, Sugar Industries
- Thermal Power & Atomic Power Plants
- Fertilizers & Agro Chemicals
- Pharmaceuticals & Laboratories
- Steel & Metallurgical Plants
- Original Equipment Manufacturers
- EPC Contractors
- Water & Effluent Treatment Plants
- Pulp, Paper & Fibre Industries
- Defence
- And Many More



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Bimetal Dial Thermometer

The Bimetal thermometer employs a bimetal strip in the form of helix, it works on the principle of thermal expansion - two metals having different coefficient of expansions are joined together to form a bimetal. The resultant expansion of bimetal is proportional to temperature that is sensed. Bimetal dial thermometers are simple in construction, but rugged.

They are used for measurement of temperature in most of the industrial applications. They are offered in the range of (-) 50°C to 500°C. With rigid stem having bottom or back entry. It can also be offered in every angle rotatable construction at 180°A

Features

- Protection class IP-67
- Accuracy $\pm 1\%$ FSD
- Fast response
- Bottom/Back entry, every angle construction
- High repeatability, low hysteresis
- Hermetically sealed case

Technical Specifications

Reference standard : ASME B 40.3, EN 13190

Dial : 63mm, 100mm, 125mm, 150mm in aluminium white background, black markings

Case : Die cast aluminium with screwed bezel SS304/SS316 with bayonet bezel

Protection : Weatherproof to IP-67 (IS/IEC 60529:2001)

Window : Shatterproof / Toughened glass / Acrylic for Switches

Pointer : Aluminium, black

Stem : SS304 or SS316 in 6mm, 8 mm, 10mm, 12mm, 14mm, 1/4", 3/8", 1/2", 5/8" dia and length from 100mm to 1200mm as standard

Connection : 1/2" NPT (M) as standard in SS304 or SS316 adjustable three piece compression fitting (any other on request)

Range : (-) 50°C to 500°C with a minimum span of 80°C (0-600°C-optional)

Accuracy : $\pm 1\%$ FSD ($\pm 2\%$ FSD for 63mm dial size)
(In accordance with EN 13190)

Over range : 125% FSD (110% for 500°C)

Reset : External

Contact : Single SPST, normally open, closed on rise in temperature (specify action required) adjustable over the entire range, rating 30 VA @ 230 V AC (100mm dial back entry model in SS case only)

Optional : The following can be provided on request

- 1) Silicon filled for Dampening the Vibrations
(Maximum Range: 0 to 400°C on account of Limitation of Silicon due to Temperature)
- 2) Color Band Dials
- 3) Dual Scale Dials
- 4) 130% Over range
- 5) Pointer Stopper for Over range and Under range
- 6) Range of 0 to 600°C
- 7) Accuracy ($\pm 0.5\%$ FSD)
- 8) Spring loaded Glands and Nipple Union Nipple assemblies

Note : For minimum insertion length essential for proper sensing, contact our design department



Mercury in Steel Dial Thermometer

Mercury filled system based on mercury expansion principle is used for measuring temperature ranging from (-) 40°C to 650°C. It has faster response and the same is available in rigid stem as well as capillary type for remote sensing. Every angle type can be offered in all SS construction. Manufactured in accordance with BS:5235.

System is case compensated as standard (SAMA CI VB). Fully compensated (capillary compensation), Double Bourdon system is also offered wherever essential.

Features

- Rugged construction
- Rigid stem or capillary type
- Fast response
- Protection class IP-67
- Accuracy $\pm 1\%$ FSD
- High repeatability, low hysteresis
- Case compensated system
- Micrometer Pointer for Reset



Technical Specifications

Reference standard	: BS 5235, EN 13190
System	: Mercury filled, case compensated in accordance with SAMA CI. V B
Dial	: 63mm, 100mm, 150mm or 250mm in aluminium, white background, black markings
Case	: Die cast aluminum with screwed bezel in SS304 / SS316 with bayonet bezel as standard
Protection	: Weather proof to IP-67 (IS/IEC 60529:2001)
Window	: Shatterproof / Toughened glass / Acrylic for switches
Pointer	: Aluminium, black
Stem	: SS304 or SS316 in 6mm, 8mm, 10mm, 12mm, 14mm, 1/4", 3/8", 1/2", 5/8" dia and length from 100mm to 2000mm (longer lengths available on request)
Capillary	: SS Solid drawn
Capillary Covering	: SS covered / SS covered + PVC / SS armoured / SS covered + SS armoured + PVC / (upto 15 Mtrs)
Connection	: 1/2" NPT (M) as standard in SS304 or SS316 three piece adjustable compression fitting. (any other on Request)
Range	: (-) 40°C to 650°C with a minimum span of 50°C
Accuracy	: $\pm 1\%$ FSD
Overrange	: 125% FSD as standard
Zero reset	: Micrometer Pointer
Optional	: The following can be provided on request <ol style="list-style-type: none"> 1) Silicon filled for SS304 / SS316 case (Maximum Range: 0 to 400°C on account of Silicon Limitation of Temperature) 2) Fully compensated double bourdon system in accordance with SAMA CI. V A 3) Pointer Stopper for Over range and Under range 4) Color Band Dials 5) Dual Scale Dials 6) 130% Over range 7) Accuracy ($\pm 0.5\%$ FSD) for Rigid Stem or Capillary Models maximum Length upto 1 Meter 8) Spring loaded Glands and Nipple Union Nipple assemblies 9) Surface Temperature measurements (Skin Type) can be provided on request



Note : For minimum immersion length essential for proper sensing, contact our design department.

Liquid Filled Dial Thermometer

Liquid filled system based on liquid (other than mercury) expansion principle is used for measuring temperature ranging from (-) 30°C to 250°C. It has faster response and the same is available in rigid stem as well as capillary type for remote sensing. Every angle type can be offered in all SS construction. Generally used where mercury type thermometer is not used in industries such as Food, Pharmaceutical, etc. The main advantage is its minimum immersion length required for sensing (as low as 30mm suffices for proper sensing thereby making it ideal for installing in lower line sizes)



Features

- Rugged construction
- Rigid stem or capillary type
- Suitable for pharmaceutical, food, biotechnology industry
- Protection class IP-67
- Accuracy $\pm 1\%$ FSD
- Minimum immersion length (as low as 30mm suitable for lower line sizes) possible
- Case compensated system (SAMA Cl. IB)

Technical Specifications

System	: Liquid filled, case compensated in accordance with SAMA Cl. I B
Dial	: 100mm or 150mm in aluminium, white background, black markings
Case	: Die cast aluminium with screwed bezel, SS304 / SS316 with bayonet bezel
Protection	: Weather proof to IP - 67 (IS/IEC 60529:2001)
Window	: Shatterproof / Toughened glass / Acrylic
Pointer	: Aluminium, black
Stem	: SS304 or SS316 in 6mm, 8mm, 10mm, 12mm, 14mm, 1/4", 3/8", 1/2", 5/8" dia (immersion length as small as 30mm possible)
Capillary	: SS Solid drawn
Capillary Covering	: SS covered / SS covered + PVC / SS armoured / SS covered + SS armoured + PVC / (upto 5 Mtrs)
Connection	: 1/2" NPT (M) as standard in SS304 or SS316 three piece adjustable compression fitting. (any other on request)
Range	: (-) 30°C to 250°C with a minimum span of 500°C
Accuracy	: $\pm 1\%$ FSD
Over range	: 125% FSD as standard
Zero reset	: Micrometer Pointer
Optional	: The following can be provided on request <ol style="list-style-type: none"> 1) Silicon filled for SS304 / SS316 case (Maximum Range: 0 to 400°C on account of Silicon Limitation of Temperature) 2) Pointer Stopper for Over range and Under range 3) Color Band Dials 4) Dual Scale Dials 5) 130% Over range 6) Spring loaded Glands and Nipple Union Nipple assemblies



Note : For minimum immersion length essential for proper sensing, contact our design department.

Gas Filled Dial Thermometer

Gas filled temperature gauge overcomes most of the limitations of other members of family. It is offered in a very wide temperature range i.e. (-)200° to 800°C.

Practically any stem length can be offered and capillary length as long as 25 Mtrs without any loss of accuracy. Inert, non hazardous, non toxic nature of the gas filled system makes it virtually ideal choice of cross section of industries.



Features

- Use of inert gas – N₂
- Suitable for sanitary application
- All SS construction
- Rigid stem or capillary type
- Fast response
- Non-polluting, environment friendly
- Non-hazardous for the service
- High reliability
- IP-67 protection
- Accuracy ± 1% FSD

Technical Specifications

System	: Gas (N ₂) filled, case compensated in accordance with SAMA Cl. III B
Dial	: 63mm, 100mm, 125mm, 150mm, 250mm in aluminium, white background, Black marking
Case	: SS304 / SS316 with bayonet bezel
Protection	: Weatherproof to IP-67 (IS/IEC 60529:2001)
Window	: Shatterproof / Toughened glass / Acrylic for Switches
Pointer	: Aluminium, black with micrometer adjustment
Stem	: SS316 in 8mm, 10mm, 12mm, 1/4", 3/8", 1/2", 5/8" dia as standard, SS310 for ranges above 600°C
Capillary	: SS Solid drawn
Capillary Covering	: SS covered / SS covered + PVC / SS armoured + PVC / SS + SS armoured (up to 25 Mtrs).
Connection	: 1/2" NPT (M) adjustable three piece compression fitting in SS304 or S316. (any other on request)
Range	: (-) 200°C to 800°C with minimum span of 80°C
Accuracy	: ± 1% FSD in accordance with EN 13190
Over range	: 125% FSD upto 600°C, 110% for 800°C
Zero Reset	: Micrometer pointer
Optional	: The following can be provided on request <ol style="list-style-type: none"> 1) Silicon filled case (Maximum Range : 0 to 400°C on account of Silicon Limitation of Temperature) 2) Pointer Stopper for Over range and Under range 3) Color Band Dials 4) Dual Scale Dials 5) 130% Over range 6) Accuracy (±0.5% FSD) for Rigid Stem or Capillary Models maximum Length upto 3 Mtrs 7) Any Non Standard Bulb Design on request 8) Spring loaded Glands and Nipple Union Nipple assemblies 9) Surface Temperature measurements (Skin Type) can be provided on request.



Note : For minimum immersion length (excluding thread length) for proper sensing, contact our design department.

Indicating Temperature Switch

Indicating temperature switch combines indication with switching (in order to make or break the associated electrical circuit). Can be offered with contact assembly as well as microswitch assembly (as a combination of switch and movement)

Features

- Combination of indication and switching
- Fast response
- Choice of contact assembly or microswitch
- Switching accuracy $\pm 2\%$ FSD
- High repeatability and low hysteresis
- Case compensated system



Technical Specifications

System	: Mercury filled or Gas (N ₂) filled case compensated in accordance with SAMA C.I. V B/IIIB
Dial	: 100mm or 150mm, white anodised, black markings
Case	: SS304 / SS316 with bayonet bezel or Aluminium Case/Bezel (See note)
Protection	: Weatherproof to IP-67 (IS/IEC 60529:2001)
Window	: Acrylic
Stem	: SS304 or SS316, 6mm, 8mm, 10mm, 12mm
Connection	: 1/2" NPT (M) adjustable three piece compression fitting as standard
Capillary	: SS Solid drawn
Capillary Covering	: SS covered or SS armoured or SS covered with PVC up to 10 Mtrs for Mercury Filled and 25 Mtrs for Gas Filled.
Range	: (-) 40°C to 600°C with a minimum span 50°C for mercury filled temperature switch / (-) 20° to 600°C or upto 0-800°C for gas filled temperature switch (minimum span 80°C)
Accuracy	: $\pm 1\%$ FSD for indication, $\pm 2\%$ FSD for switching
Over range	: 125% FSD as standard (130% FSD on request upto 500°C)
Contacts	: 1) 1 SPST, single, normally open, closed on rise in temperature or vice versa, rated 30 VA @ 230V AC 2) 2 SPST, two contacts, independently adjustable, one normally open other normally closed or both normally open or both normally closed, rated 30VA @ 230 V AC 3) 1 SPDT, single microswitch, adjustable over entire range, rated 5 amp @ 230 V AC (3A @ 28 VDC) 4) 2 SPDT, double microswitch, adjustable over entire range, rated 5 amp @ 230 V AC (3A @ 28 VDC)
Accessory	: Relay for the contact assembly to suit 5 amp @ 230 V AC, separately mounted.
Note	: 1) 2 SPDT only in 150mm dial size. 2) SPDT contacts in SS case only 3) SPST contacts in Aluminium Case only 4) For minimum immersion length essential for proper sensing, contact our design department.



Advantages of Microswitch Type Models :

- 1) Microswitch is rated 5 amp @ 230 V AC (3A @ 28 VDC). No relay is required.
- 2) Microswitch assembly is imported, having combination of movement and switch.
- 3) Microswitch assembly gives better switching accuracy. Compact design.

Flameproof Indicating Temperature Switch

Flameproof Indicating temperature switch combines indication with switching (in order to make or break the associated electrical circuit). Can be offered with microswitch assembly (as a combination of switch and movement)

Features

- Combination of indication and switching
- Fast response
- Switching accuracy $\pm 2\%$ FSD
- High repeatability and low hysteresis
- Flameproof housing
- Case compensated system

Technical Specifications

System	: Mercury filled or Gas (N ₂) filled case compensated in accordance with SAMA C I . V B/IIIB
Dial	: 100mm (Internal), white anodised, black markings
Housing	: Flameproof to IIA IIB (Equivalent to NEC C I . I Div 2 Gr. C & D)
Housing Material	: Aluminium LM 6
Dimensions	: 230mm x 255mm
Window	: Toughened Glass
Stem	: SS304 or SS316, 6mm, 8mm, 10mm, 12mm
Connection	: 1/2" NPT (M) adjustable three piece compression fitting as standard
Capillary	: SS Solid drawn
Capillary Covering	: SS covered or SS armoured or SS covered with PVC up to 10 Mtrs. For Mercury filled and 25 Mtrs for Gas filled.
Range	: (-) 40°C to 600°C with a minimum span 50°C for mercury filled temperature switch / (-) 20° to 600°C for gas filled temperature switch (minimum span 80°C)
Accuracy	: $\pm 1\%$ FSD for indication, $\pm 2\%$ FSD for switching
Over range	: 125% FSD as standard (130% FSD on request upto 500°C)
Contacts	: 1) 1 SPDT, single microswitch, adjustable over entire range, rated 5 amp @ 230 V AC (3A @ 28 VDC) 2) 2 SPDT, double microswitch, adjustable over entire range, rated 5 amp @ 230 V AC (3A @ 28 VDC)
Note	: 1) Surface mounted flameproof housing is available with capillary. 2) Flameproof (conforming to IIC) version also available with microswitch. 3) For minimum immersion length essential for proper sensing, contact our design department



Advantages of Microswitch Type Models :

- 1) Microswitch is rated 5 amp @ 230 V AC (3A @ 28 VDC). No relay is required
- 2) Microswitch is imported from reputed international supplier as combination of movement and switch.
- 3) Microswitch assembly gives better switching accuracy. Compact design.

In-House Testing facilities

In-House Testing facilities for Temperature Gauges

For the manufacturing & testing of temperature gauges, we follow EN : 13190-2001 and DIN 16203, 16204, 16205, 16206 and ASME B.40.200 standard.

Following tests are carried out to ensure the quality of temperature gauges. We have facilities to carry out following tests in-house at our manufacturing plant.

- 1) Accuracy Test
- 2) Over range Test
- 3) Hysteresis Test
- 4) Response Time Test
- 5) Repeatability Test
- 6) Vibration Test (Rattling Test)
- 7) Load Test
- 8) Mounting Position Test
- 9) Ambient Temperature Compensation Test
(Case Compensation Test)
- 10) Capillary Compensation Test
- 11) Hermetical Sealing Test
(For Bimetal Temperature Gauges)
- 12) Thermal Stability Test
- 13) End Nipple Test
(For Bimetal Temperature Gauges)
- 14) Hose Down Test (Water Spray Test)
- 15) Switching Accuracy Test (For Contact Assembly & Microswitch Type Models)
- 16) High Voltage Test (For Contact Assembly & Microswitch Type Models)
- 17) Insulation Test
- 18) Contact Resistance Test
- 19) Altitude Test
- 20) Dial Printing Stability Test
- 21) Cyclic Test
- 22) Friction Test
- 23) Helium Leak Test
- 24) Life Test for SPDT movement



Some of our Valued Customers

- ❑ Bharat Petroleum Corporation Ltd
- ❑ Essar Oil Ltd
- ❑ Hindustan Petroleum Corporation Ltd
- ❑ India Oil Tanking Ltd
- ❑ Manali Petrochemicals Ltd
- ❑ Indian Oil Corporation Ltd
- ❑ The Andhra Petrochemicals Ltd
- ❑ Reliance Industries Ltd
- ❑ Chennai Petroleum Corporation Ltd
- ❑ Mangalore Refinery & Petrochemicals Ltd
- ❑ Ingersoll-Rand (India) Ltd
- ❑ Dresser Rand Ltd
- ❑ Torrent Pharmaceuticals Ltd
- ❑ DCW Ltd
- ❑ Godrej Industries Ltd
- ❑ Ciba Speciality Chemicals India Ltd
- ❑ Gujarat Fluorochemicals Ltd
- ❑ Gujarat Alkalies & Chemicals Ltd
- ❑ Hindustan Unilever Ltd
- ❑ India Glycols Ltd
- ❑ Shree Renuka Sugars Ltd
- ❑ Nirma Ltd
- ❑ Punjab Alkalies & Chemicals Ltd
- ❑ Finolex Industries Ltd
- ❑ Thirumalai Chemicals Ltd
- ❑ Bhabha Atomic Research Centre
- ❑ Bhushan Power & Steel Ltd
- ❑ Bilt Power Ltd
- ❑ JSW Energy Ltd
- ❑ Lanco Kondapalli Power Pvt Ltd
- ❑ BGR Energy Systems Ltd
- ❑ Nuclear Power Corporation of India Ltd
- ❑ National Thermal Power Corporation Ltd
- ❑ Coromandal Fertilizers Ltd
- ❑ National Organic Chemical Industries Ltd
- ❑ Chambal Fertilizers & Chemicals Ltd
- ❑ Gujarat Narmada Valley Fertilizers & Chemicals Ltd
- ❑ Indial Farmers & Fertilizers Co-operative Ltd
- ❑ Paradeep Phosphates Ltd
- ❑ Technimont ICB Pvt. Ltd
- ❑ Seshasayee Paper Boards Ltd
- ❑ National Peroxide
- ❑ United Phosphrous Ltd
- ❑ Syngenta India Ltd
- ❑ Zuari Industries Ltd
- ❑ Shalina Laboratories Pvt Ltd
- ❑ Hindalco Industries Ltd
- ❑ Jindal Steel & Power Ltd
- ❑ The Kerala Mineral & Metals Ltd
- ❑ BMM Ispat Ltd
- ❑ Air Liquid Engg. India Pvt. Ltd
- ❑ Charam Techno Chem & Equipments Pvt Ltd
- ❑ Driplex Water Engineering Ltd
- ❑ Elster Instromet India Pvt Ltd
- ❑ Forbes Marshall Pvt Ltd
- ❑ Inox India Ltd
- ❑ Cethar Vessels Ltd
- ❑ CICB-Chemicon Pvt Ltd
- ❑ Emerson Process Management Pvt Ltd
- ❑ Enpro Industries Ltd
- ❑ National Fertilizers Ltd
- ❑ GEA Process Engineering (India) Pvt Ltd
- ❑ Greenesol Power Systems Pvt Ltd
- ❑ Kirloskar Pneumatic Co Ltd
- ❑ Southern Lubrication Pvt Ltd
- ❑ Thermax Ltd
- ❑ Triveni Engineering & Industries Ltd
- ❑ Va Tech Wabag Ltd
- ❑ Lincoln Helious India Ltd
- ❑ Praj Industries Ltd
- ❑ TD Power Systems Pvt. Ltd
- ❑ Toyo Engineering India Ltd
- ❑ Technofab Engineering Limited
- ❑ ABB Ltd
- ❑ Bharat Heavy Electricals Ltd
- ❑ ISGEC John Thomson
- ❑ Larsen & Toubro Ltd
- ❑ Samsung Engineering Co Ltd
- ❑ Siemens Ltd
- ❑ Garden Silk Mills Ltd
- ❑ Teva Api India Ltd
- ❑ Nirmal Industrial Controls Pvt Ltd



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