SENSORS

User Manual

Temperature Sensor - 4 to 20 mA Output

Model: TEM100xxx

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Notices

Please read this manual in full and carefully observe the notes and instructions before and during installation, operation and maintenance. The manufacturer cannot be held liable for any damage which occurs as a result of noncompliance with this manual.

Do not tamper with device. Should the device be tampered with in any manner other than a procedure which is described and specified in this manual, the warranty is cancelled and the manufacturer is exempt from liability.

The product is designed exclusively for the described application. Use of this product in conditions not specified in this manual or, contrary to the instructions provided by the manufacturer, is considered improper handling of the product and will void your warranty. The manufacturer will not be held liable for any damages resulting from improper use of the product.

This manual should be read carefully by relevant personnel and the end user**.** This manual should be kept with the product and be made available as needed. **Once you install or use the product, you accept that you have read, understood and complied with this manual**.

CAA Sensors endeavours to make the content of this manual correct, but is not responsible for omissions or errors and the consequences caused. In case of any doubts or questions regarding this manual or the product, please contact CAA Sensors.

Warnings

Ignoring the warnings can lead to serious injury and/or cause damage!

When handling, operating or carrying out maintenance on this product, personnel must employ safe working practices and observe all local health & safety requirements and regulations.

Improper operation or maintenance of this product could be dangerous and result in an accident causing damage to machinery or injury or death.

The manufacturer cannot anticipate every possible circumstance which may represent a potential hazard. The warnings in this manual cover the most common potential hazards and are therefore not all-inclusive. If the user employs an operating procedure, an item of equipment or a method of working which is not specifically recommended by the manufacturer they must ensure that the product will not be damaged or made unsafe and that there is no risk to persons or property.

NEVER CHANGE ORIGINAL COMPONENTS WITH ALTERNATIVES.

Compressed Air Safety

Any contact with quickly escaping air or bursting parts of the compressed air system can lead to serious injuries or even death.

- Do not exceed the maximum permitted pressure.
- Only use pressure rated installation materials and parts.
- Avoid getting hit by escaping air or bursting parts.
- The system must be pressure-less during maintenance work.

Electrical Safety

Any contact with energised parts of the product, may lead to an electrical shock which can lead to serious injuries or even death. The user shall take all measures necessary to protect against electrical shock.

Consider all regulations for electrical installations.

The system must be disconnected from any power supply during maintenance work.

Any electrical work on the system is only allowed by authorised qualified personnel.

Storage and transportation

- Please make sure that the transport and storage temperature of the sensor is between -40°C to +90°C (-40°F to 194°F) and the humidity is <90%, no condensation.
- Avoid direct UV and solar radiation during storage.

Cleaning

If you need to clean the sensor it is recommended to use a clean, dry cloth. For stubborn marks, use distilled water or isopropyl alcohol only.

Disposal

Electronic devices are recyclable material and do not belong in the household waste. The product, accessories and its packing material must be disposed according to local statutory requirements.

About Temperature Sensors

Temperature sensors are used to measure the temperature of liquids, gases (including ambient air), compressed air, and other mediums.

Understanding the temperature your equipment operates at can help to prevent issues with equipment failures, diagnose problems, improve performance, and optimise efficiency.

Almost every piece of equipment comes with recommended operating conditions for optimal performance; this will certainly include a temperature range for any input or cooling mediums such as fluids, ambient conditions or environmental considerations.

Temperature sensors can be used in conjunction with other control equipment to trigger processes such as when a specific temperature is reached or switch on cooling equipment when systems are starting to overheat.

About the Sensor

CAA Sensors temperature sensor is easy to install. The sensor can be suspended in the ambient environment or the probe can be inserted directly into the medium being measured, such as gases or liquids flowing in pipes.

Calibration requirements

Temperature sensors should be calibrated every 2 years. CAA Sensors can arrange calibration for you.

Permanent and temporary solutions

Temperature sensors are available for temporary or permanent installations.

Key Features of Temperature Sensors

All CAA Sensors temperature sensors come with:

- G1/4” Mounting thread
- Robust 8mm probe
- Stainless Steel Casing
- 4 – 20mA loop powered output
- 24vDC powered
- IP65 rated
- Operating range between -50°C to +200°C (-58°F to 392°F)
- M12 Connector with 5m Cable option

Specifications

	Temperature Sensor	
Technology	PT100	
Accuracy	±0.25% FS	
Pressure Resistance	Up to 30 Mpa (300 bar)	Up to 4,351 psi
	Measurement Ranges	
Temperature Range	-50°C to +200°C	-58°F to +392°F
	Outputs	
Output	Analogue: 4 to 20mA (2 wire)	
Analogue Output Signal	Temperature	
	Power	
Power Supply	24V DC	
Electrical Connection	4 pin M12, female	
	Other Information	
Process Connection	ISO G1/4" thread	
Probe Length	150 mm *(other lengths available, 40mm – 2000 mm)*	5.9" *(other lengths available, 1.6" – 78.7")*
Probe Diameter	8 mm	0.3"
Casing	Stainless Steel	
IP Rating	IP65	
Installation Type	Permanent or temporary installation	
Calibration Frequency	Every 2 years	
Warranty Period	12 months	

Temperature Sensor Pack

Each Temperature Sensor Pack comes with:

- ✓ Temperature sensor
- Connector – either 5 meter cable with connector **or** connector only (no cable).

Temperature Sensor

PLUS

5-meter cable with
M12 connector

OR

M12 connector only
(no cable)

Installation – Mechanical

WARNING! Incorrect installation can damage the sensor or cause it to work incorrectly.

Notes

- **Before installing the sensor, make sure it is rated for your system** (refer to the "Specifications" section).
  - Use of the product outside specified ranges or operating parameters can lead to malfunctions and may damage the product or system.
- Do not use this product in explosive areas.
- Always use a spanner / wrench to install the product.
- Only use pressure rated materials and parts when installing and maintaining the product.
- Do not disassemble the product.
- Please observe local and national regulations before/during installation and operation.
- The product must be installed properly and calibrated regularly, otherwise it may lead to inaccurate measurement values.

Tools and Equipment needed for installation

(not included with Temperature Sensor Pack)

Wrench / Spanner

Compression fitting (optional)

Ball Valve (optional)

Thread Tape / Sealant

Step 1 – Find a suitable location for the sensor

The method of mounting or installing the temperature sensor will depend on the location and the desired measurement.

When installed in pipework, make sure the sensor location has enough room above the pipe to install the sensor.

Measuring Ambient Temperature

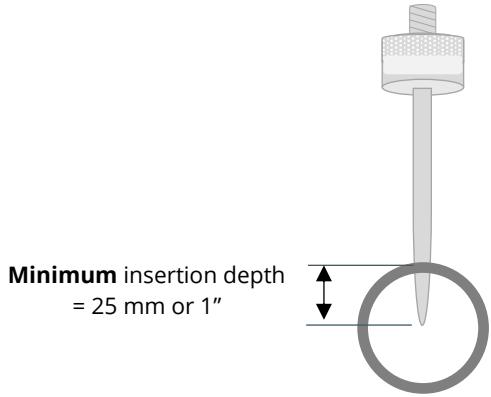
If measuring ambient temperature, the probe should be mounted in a suitable location with the tip exposed to the ambient conditions and not in direct contact with anything else.

Measuring Liquid or Gas Temperature

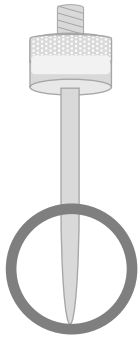
If installing the temperature sensor to measure a gas or liquid temperature careful attention must be paid to the insertion depth of the sensor.

- ✓ The probe should be inserted into the medium by a **minimum** of 25 mm or 1”
- ✗ Do **not** touch the probe tip with the inner wall of the pipe or conduit.

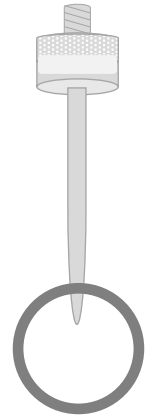
Correct Installation



Incorrect Installation



✗ Probe is touching the inner wall of the conduit



✗Probe is not deep enough

Connection Point and Compression Fitting

To install the sensor on a pipe or conduit, you need:

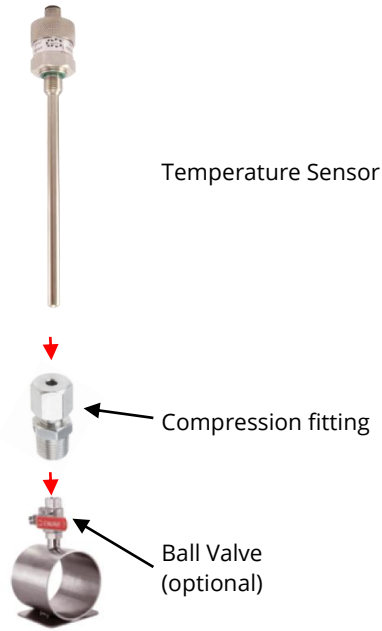
- connection point, e.g. a ball valve or a nozzle or nipple (thread must be G 1/4") and
- compression fitting.
  - The diameter of the hole must be ≥ 8 mm, otherwise the shaft cannot be inserted

Use of a ball valve is optional - You do not need to use a valve to install the sensor. However, using a valve will make removing the sensor easier (e.g. when you need to remove the sensor for calibration).

If installing a ball valve, you can use a hot tap drill and clamp to create a connection point on pressurized or unpressurised pipes. See the CAA Sensors website for information on hot tap drills and clamps.

Installation of the instrument

- Screw the compression fitting tightly to the ball valve or nozzle of the pipe.
- Loosen the nut of the compression fitting.
- Insert the temperature sensor through the compression fitting into the pipe.
    - At least 25 mm or 1" of the sensor's probe must be in the gas or liquid being measured
    - Do not let the sensor tip touch the inner wall of the pipe.
- Tighten the nut of the compression fitting.



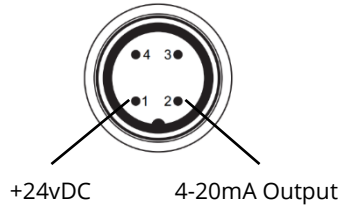
Installation – Electrical

WARNING! Incorrect wiring can damage the sensor or cause it to work incorrectly.

Notes:

- Do **not** screw the M12 connector using force, otherwise it may damage the connection pins.
- Always check the M12 connectors to make sure they are wired correctly.
- Consider all local and national safety requirements and regulations for electrical installations.
- **The system must be disconnected from any power supply during installation and maintenance work.**
- Any electrical work on the system is only allowed by authorised and qualified personnel.

Connector	
Pin 1	+24 vDC
Pin 2	4-20mA Output
Pin 3	Not used
Pin 4	Not used



4-20mA Scaling

The sensor has an analog output range of 4 to 20 mA, which is a 2-wire active analog output. The analog output scaling is:

- 4 mA = -50°C (-58°F)
- 20 mA = +200°C (392°F)

Warranty

CAA Sensors provides a 12-month warranty for all sensors. The warranty covers materials and workmanship under the stated operating conditions from the date of delivery. Please report any findings immediately and within the warranty time.

If faults occur during the warranty period CAA Sensors will repair or replace the defective unit, without charge for repair labour and material costs but there is a charge for other services such as labour to remove or reinstall the instrument, transport and packing. Warranty repairs do not extend the period of warranty.

The following damage is excluded from this warranty:

- Improper use and non-adherence to the user manual.
- Use of unsuitable accessories.
- External influences (e.g. damage caused by vibration, damage during transportation, excess heat or moisture).

The warranty is cancelled when one of the following situations occurs:

- The user opens the measurement instrument without a direct request written in this manual.
- Repairs or modifications are undertaken by third parties or unauthorised persons.
- The serial number has been changed, damaged or removed.

Other claims, especially damage occurring on the outside of the instrument (e.g. dents, marks), are not included unless responsibility is legally binding.

Calibration

The sensor is calibrated before delivery. The calibration date is printed on the certificate which is shipped with the sensor.

Temperature Sensors require calibration to remain accurate. The frequency of calibration depends greatly on the level of contamination within your system.

We recommend you calibrate the sensor every 2 years. Calibration is excluded from the product warranty. For more information, contact CAA Sensors.

Trouble Shooting

My sensor isn't reading correctly

If your sensor is not reading the correct values, follow these steps.

1. Make sure the sensor is suitable for your system. Refer to the "*Specifications*" section for details.
1. Make sure the sensor is calibrated. Sensors should be calibrated every 2 years. Contact your local distributor or CAA Sensors for calibration.

   Make sure the sensor is installed correctly. Refer to "*Installation - Mechanical*" section for more information.
2. Make sure the sensor is wired correctly. Refer to "*Installation – Electrical* " section for more information.
3. Check 4-20mA settings. Is the scaling correct> Refer to "*Installation – Electrical*" section for more information.
4. Is your associated equipment compatible with the temperature sensor output?

If you are still having problems, contact your local distributor or CAA Sensors

Need help?

For more information, contact CAA Sensors:

- Phone: +61 494095632
- WhatsApp: +61 494095632
- Email: sales@caasensors.com

Commissioning Report

About the Sensor

Part Number (e.g. TEM100001)			
Serial Number			
Installed by		**Installed Date**	

Installation

Step	Task	Yes	NA	No	Comments	Sign
1	Is the Temperature Sensor installed correctly? (refer to "*Installation - Mechanical*")					
2	Is the Temperature Sensor wired correctly? (refer to "*Installation – Electrical*")					
3	Is the 4-20mA scaling correct?					
4	Is the temperature reading correct?					

SENSORS

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