# Type 2350 Temperature Sensor

**Blind Transmitter or Digital (S³L) Sensor**



## Product description

The type 2350 Temperature Sensor has a one piece injection molded PVDF body that is ideal for use in high purity applications. It also outlasts metal sensors in aggressive liquids and eliminates the need for costly custom thermowells. These sensors are available with a proprietary digital (S³L) output or field-scaleable 4 to 20 mA output.

Dual threaded ends (¾ in. NPT) allow submersion in process vessels, or in-line installation with conduit connection. An integral adapter kit (sold separately) may be used to create a compact assembly with field mount versions of the type 9900 Transmitter.

### Features

- 4 to 20 mA or digital (S3L) output
- Standard ¾ in. NPT process connection
- One-piece injection molded PVDF body
- Pt1000 platinum RTD in extended tip for quick response
- Easy installation
- Threaded for in-line or submersible installation

### Applications

- Plating Bath Temperature Control
- Heat Exchange Monitor
- R.O. and D.I. System Monitor
- Hot/Cold Mixing System Monitor
- Data Acquisition
- Cooling Loops
- Effluent Monitoring
- HVAC
- Chemical Processing

## Technical Details

| General | |
|---|---|
| Output | Digital ($S^3L$) output or 4 to 20 mA |
| Accuracy | ±0.5 °C (±0.9 °F) |
| Response Time | 10 seconds |
| Repeatability | ±0.1 °C (±0.2 °F) |
| Resolution | 0.01 °C (0.02 °F) |
| Sensing-End Connection | ¾ in. NPT male thread |
| Cable-End Connection | ¾ in. NPT male thread |

| Wetted Materials | |
|---|---|
| Sensor Housing | PVDF |

| Electrical | | |
|---|---|---|
| Power Requirements | | |
| | Digital ($S^3L$) | 5 to 6.5 VDC ±10 %, <1.5 mA |
| | 4 to 20 mA | 12 to 24 VDC ±10 %, regulated |
| Cable Length | | 4.6 m (15 ft) cable length can also be extended up to 121 m (400 ft) |
| Digital ($S^3L$) Output | | Serial ASCII, TTL Level 9600 bps. |
| | | Reverse polarity and short circuit protected. |
| 4 to 20 mA Output | | |
| Accuracy | | ±32 µA |
| Resolution | | <5 µA |
| Span | | 4 to 20 mA factory calibrated 0 °C to 100 °C (32 °F to 212 °F) |
| Max. Loop Impedance | | 50 Ω @ 12 V |
| | | 325 Ω @ 18 V |
| | | 600 Ω @ 24 V |
| Update Rate | | <100 ms |

| Max. Temperature/Pressure Rating | | |
|---|---|---|
| Operating Temperature | | |
| In-line Mounting | -10 °C @ 16 bar to 100 °C @ 7.5 bar | 14 °F @ 232 psi to 212 °F @ 108 psi |
| Submersible Mounting | -10 °C @ 16 bar to 100 °C @ 7.5 bar | 14 °F @ 232 psi to 185 °F @ 108 psi |
| Storage Temperature | -55 °C to 100 °C | -67 °F to 212 °F |
| Relative Humidity | 0 to 95% non-condensing | |

| Shipping Weight | | |
|---|---|---|
| | 0.22 kg | 0.5 lb |

| Standards and Approvals |
|---|
| CE, UKCA, FCC |
| RoHS compliant, China RoHS |
| Manufactured under ISO 9001, ISO 14001, and ISO 45001 |

## Dimensions



34 mm
(1.34 in.)

3/4 in.
NPT
threads

105 mm
(4.15 in.)

40.1 mm
(1.59 in.)

2350-X

Temperature instrument
(sold separately)

197 mm
(7.75 in.)
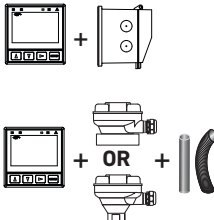
Mounting Kit
(sold separately)
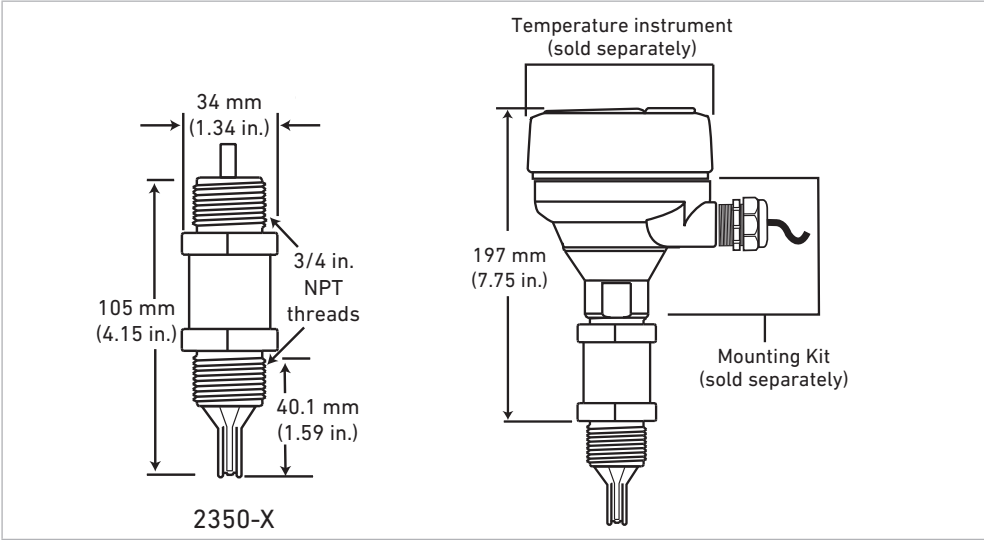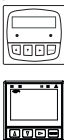
# System Overview

## In-Line Installation

| Panel Mount | Pipe, Tank, Wall Mount | Field Mount | 4 to 20 mA Output | Automation System |
|---|---|---|---|---|
| GF Instruments<br>- 9900<br>- 9950 | GF Instruments*<br>- 9900-1P with Rear Enclosure<br>- 9900-1 with 3-8050 Universal Mount Kit* | GF Instruments with 3-8052 Integral Mount Kit<br>- 9900 | - Customer Supplied Chart Recorder, Programmable Logic Controller or<br>- Programmable Automation Controller | - 0486 Profibus Concentrator and Customer Supplied Programmable Logic Controller or<br>- Programmable Automation Controller |

**Type 2350 Temperature Sensor**

In-Line Installation - Fittings Customer Supplied                                                                         All sold separately

## Submersible Installation

| Panel Mount | Pipe, Tank, Wall Mount | 4 to 20 mA Output | Automation System |
|---|---|---|---|
| GF Instruments<br>- 9900<br>- 9950 | GF Instruments*<br>- 9900-1P with Rear Enclosure<br>- 9900-1 with 3-8050 Universal Mount Kit or 3-8052 Integral Mount Kit and Pipe Extension or Conduit with 3/4 in. FNPT Threads** | - Customer Supplied Chart Recorder Programmable Logic Controller or<br>- Programmable Automation Controller | - 0486 Profibus Concentrator and Customer Supplied Programmable Logic Controller or<br>- Programmable Automation Controller |

**Type 2350 Temperature Sensor**

All sold separately

*For tank or wall mount installations, user must use the Universal Adapter Kit (3-8050)
**Refer to the GF Submersion Kit brochure (3-0000.707) located on our website for installation suggestions and options.

## Pressure-temperature diagram

**Note**

The pressure-temperature diagrams are specifically for the GF sensor. During system design the specifications of all components must be considered. In the case of a metal piping system, a plastic sensor will reduce the system specification. When using a PVDF sensor in a PVC piping system, the fitting will reduce the system specification.



2350
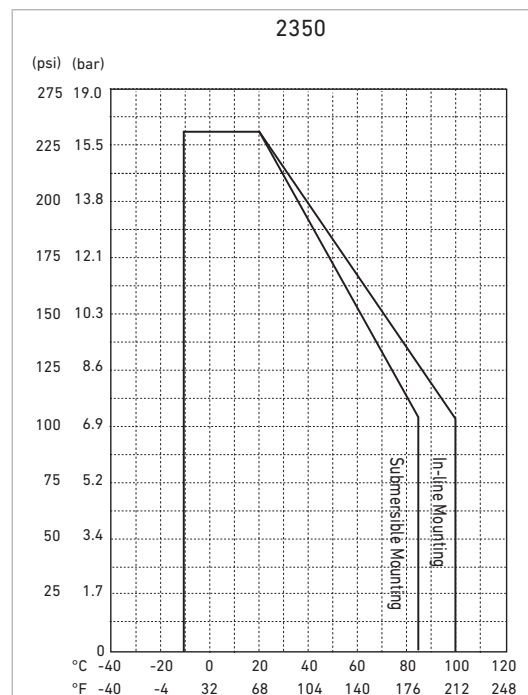
## Application Tips

- For submersible sensor mounting, always use a water tight conduit and a cable gland to prevent moisture intrusion.
- To extend the cable, use a 3-conductor shielded cable and junction box.
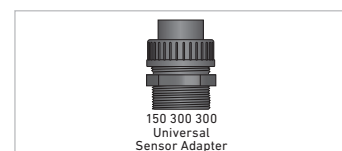- Sensors with extended cables available, contact Special Order products.

## Ordering Information

| Mfr. Part No. | Code | Output and Cable Length |
|---|---|---|
| **Temperature Sensor** | | |
| 3-2350-1 | 159 000 021 | Digital (S$^3$L) and 4.6 m (15 ft) cable |
| 3-2350-3 | 159 000 920 | Current (4 to 20 mA) and 4.6 m (15 ft) cable |
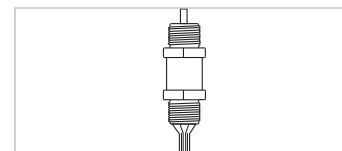


## Accessories

| Mfr. Part | Code | Description |
|---|---|---|
| 5523-0322 | 159 000 761 | Sensor cable (per ft), 3 cond. plus shield, 22 AWG |
| 3-8052 | 159 000 188 | ¾ in. Integral mounting kit |
| 3-8052-1 | 159 000 755 | ¾ in. NPT mount junction box with one liquid tight connector and cap with junction terminals |
| 3-9000.392-1 | 159 000 839 | Liquid tight connector kit, NPT (1 connector) |
| 3-9000.392-2 | 159 000 841 | Liquid tight connector kit, PG 13.5 (1 connector) |
| 3-0252 | 159 001 808 | Configuration Tool |
| Universal Sensor Adapter | 150 300 300 | For in-line applications requiring extra insertion depth for conductivity, temperature, and pressure process measurements. |
| | Contact Factory | Custom cable length available |



150 300 300
Universal
Sensor Adapter