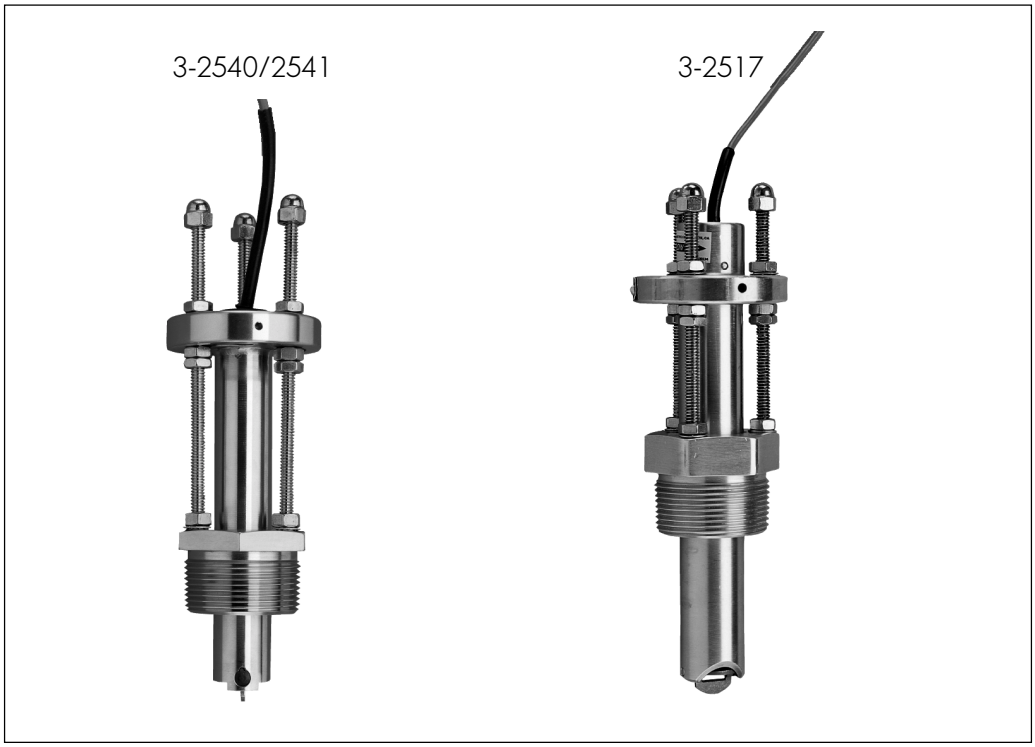
# +GF+ SIGNET 2540/2541/2517 High Performance Flow Sensors




## Features

- **316SS or Brass Construction**
- **Measures flow rates as low as 0.1m/s (0.3 ft/s) (2540/2541)**
- **Standard NPT or ISO process connections**
- **Hot-tap versions for installation/service without system shutdown**
- **Non-magnetic RF detection (2540/2541)**

## Application

- **HVAC**
- **Turf Irrigation**
- **Cooling Systems**
- **Filtration Systems**
- **Water Distribution**
- **Leak Detection**
- **Pump Protection**
- **Clarified Effluent Totalization**
- **Ground Water Remediation**

## Description

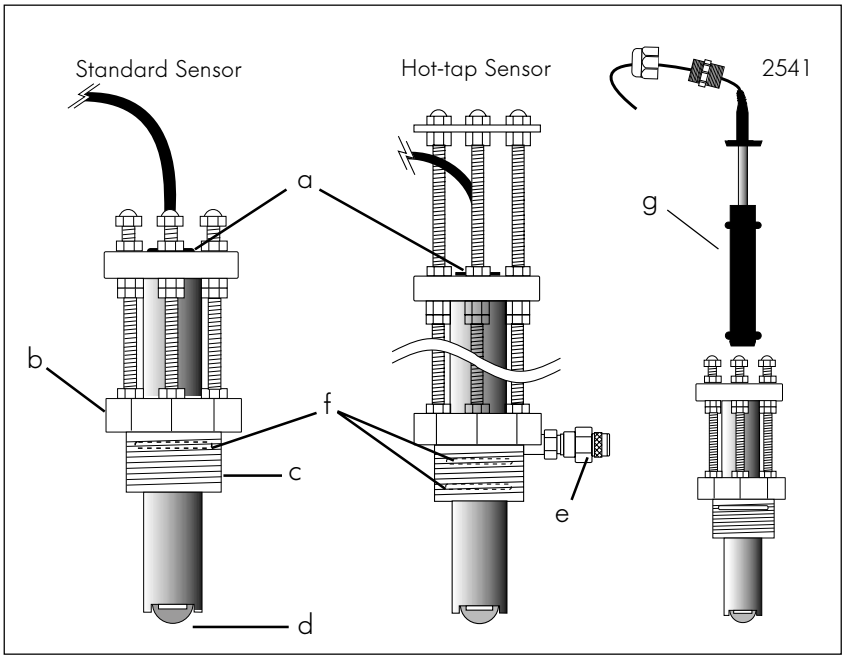
The +GF+ SIGNET 2540/2541 offers the added strength and corrosion resistance of stainless steel for applications with low velocity measurements. Unique internal circuitry eliminates the need for magnets in the process fluid, enabling lower flow measurement while maintaining the advantages of insertion sensor design. Fluoroloy B® bearings and Tungsten Carbide pin provide exceptional wear resistance. The model 2541 offers field replaceable electronics and transient voltage suppression (TVS) to provide greater immunity to large voltage disturbances (ie. lightening) sometimes encountered in field wiring. The 2517 Brass High Performance sensor signal allows for remote totalization when coupled with the 5100 Battery operated Flow Monitor.

## Options

| Flow Sensors | Instrument Options | | | | | |
|---|---|---|---|---|---|---|
| | 8550 | 5075 | 5100 | 5500 | 5600 | 9010 |
| 2517 | ● | ● | ● | ● | ● | ● |
| 2540/2541 | ● | ● | | ● | ● | ● |

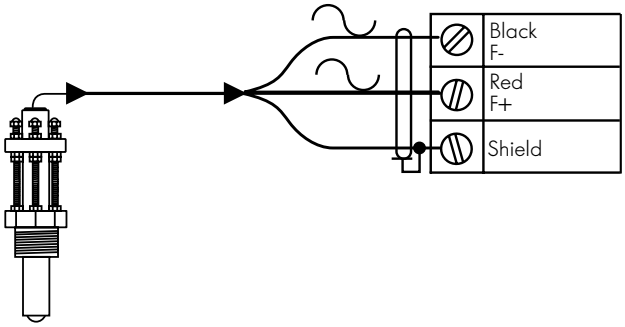
## Technical Features

a) 1/2 in. NPT Conduit Port
b) Solid 316SS or brass construction
c) Standard 1-1/2 in. NPT or ISO 7/R 1-1/2 in. connection
d) Low Mass open cell rotor and Tungsten Carbide pin for greater resistance to wear
e) Hot-tap version with bleed valve
f) Standard Viton O-rings (EPR optional)
g) Removeable electronics module

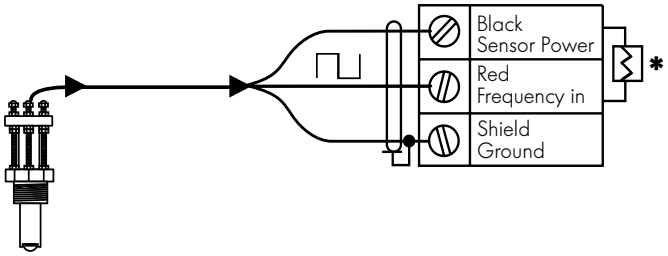


# Wiring

**2517 Sensor Connections to +GF+ SIGNET Instruments**




**2540/2541 Sensor Connections to +GF+ SIGNET Instruments**

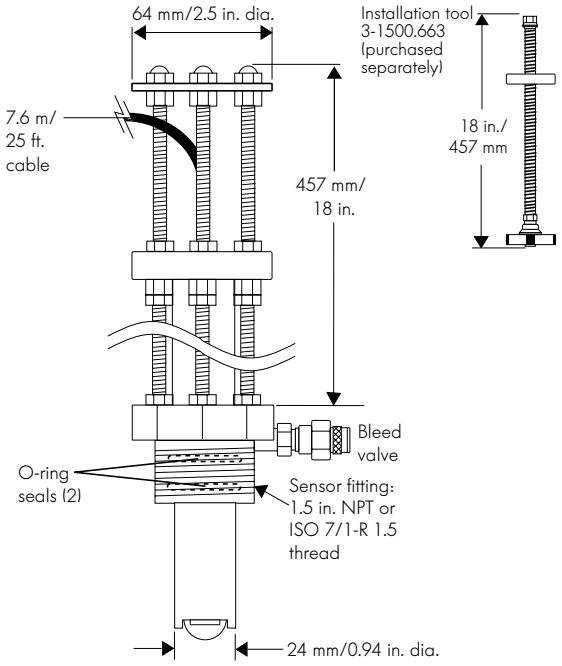



- DC sensor power supplied from +GF+ SIGNET instrument.

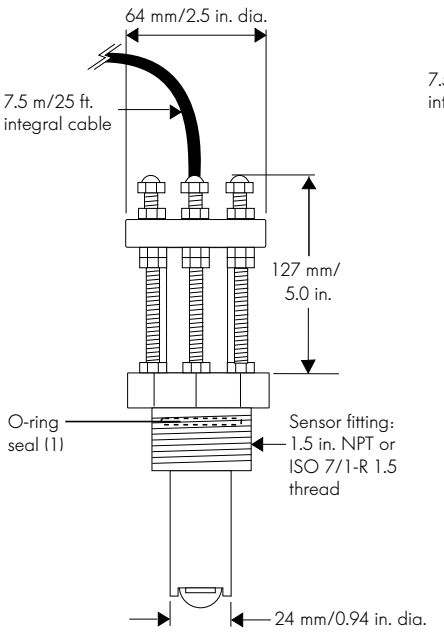
* 10KΩ Pull-up resistor may be required for non-SIGNET brand instrument

# Dimensions

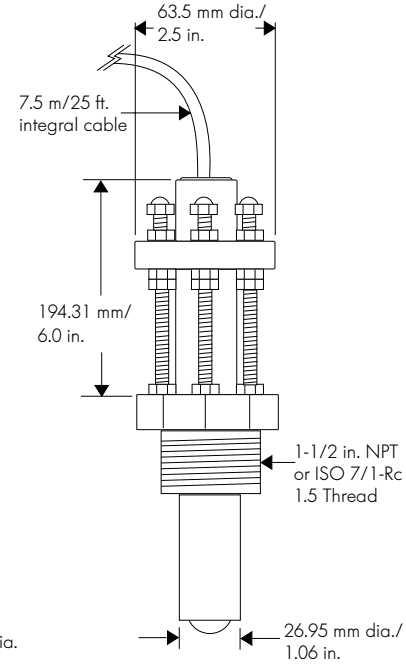
- 3 ft. recommended clearance for Hot-tap installation
- 16" recommended clearance for 2540, 2541, 2517




**2540/2541/2517 Hot-Tap for 1.5 to 36 in. pipes**



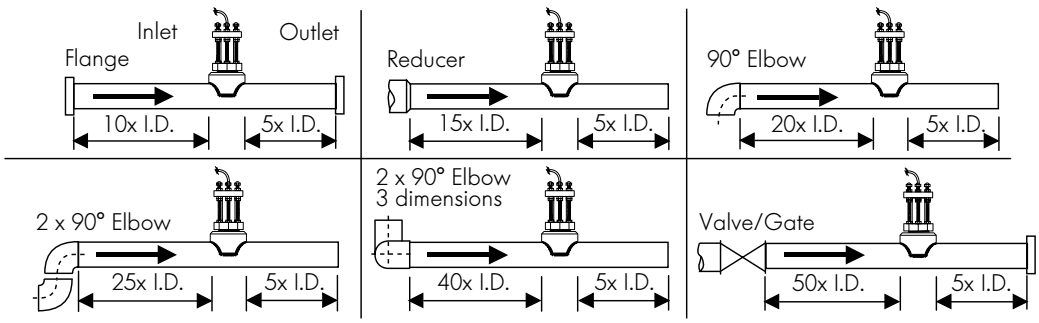

**2540/2541 High Performance Flow Sensor for 1.5 to 24 in. pipes**




**2517 Brass High Performance Flow Sensor for 1.5 to 24 in. pipes**

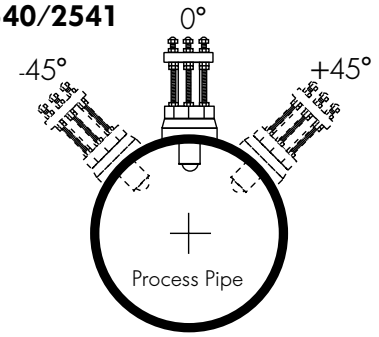
# Installation

Six common installation configurations are shown here as guidelines to help you select the best location in your system for a paddlewheel flow sensor. Always maximize distance between sensor and pump sources.

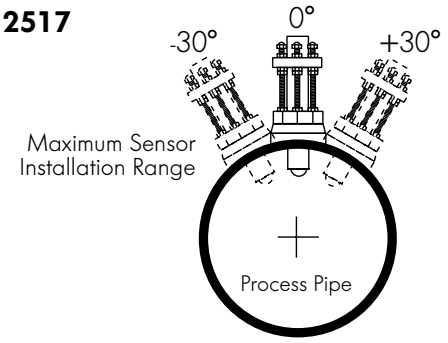


## Sensor Mounting Position

**2540/2541**




**2517**




## Technical Data

### General

Flow Rate Range:
- 2540/2541: 0.1 to 6 m/s (0.3 to 20 ft/s)
- 2517: 0.5 to 6 m/s (1 .6 to 20 ft/s)

Linearity: ±1% of full range
Repeatability: ±0.5% of full range
Minimum Reynolds Number Required: 4500
Maximum operating pressure/temperature:
- Sensor with standard Viton® sensor fitting O-rings: 17 bar (250 psi) @ 82°C (180°F)
- Sensor with optional EPR sensor fitting O-rings: 17 bar (250 psi) @ 100°C (212°F)

Pipe range:
- Standard version: 40 to 600 DIN (1 .5 to 24 in.)
- Hot-Tap version: 40 to 1000 DIN (1 .5 to 36 in.)

Sensor fitting options: 1 .5in NPT threads
ISO 7/1-R 1 .5 threads
Cable length: 7.6 m (25 ft.), can splice up to 300 m (1,000 ft.)
Cable type: 2-conductor twisted-pair with shield, 22AWG

### Wetted Materials (2540/2541)

| | |
|---|---|
| Sensor body: | 316 Stainless Steel |
| Sensor fitting: | 316 Stainless Steel |
| Sensor fitting O-rings: | Standard Viton®, optional EPR |
| Rotor: | CD4MCu stainless steel |
| Rotor pin: | Tungsten Carbide GRP 1 |
| Retainers (2): | 316 stainless steel |
| Rotor bearings (2): | Fluoroloy B® |

### Signal (2517)

| | |
|---|---|
| Frequency: | 20 Hz per ft/s nominal,<br>5 to 8 mV p-p per Hz |
| Source Impedance: | 11 .6 KΩ |

### Signal (2540/2541)

| | |
|---|---|
| Frequency: | 15 Hz per ft/s nominal |
| Supply voltage: | 5 to 24 VDC |
| Supply current: | 1 .5 mA max. |
| Output type: | Open collector, sinking |
| Output current: | 10.0 mA max. |

### Wetted Materials (2517)

| | |
|---|---|
| Sensor body: | C36000 Free cutting brass |
| Sensor fitting: | C36000 Free cutting brass |
| Sensor fitting O-rings: | Standard Viton®, opt. EPR |
| Rotor: | CD4MCu stainless steel |
| Rotor pin: | Tungsten Carbide GRP 1, 316 |
| Retainers (2): | 316 stainless steel |
| Rotor bearings (2): | Fluoroloy B® |

### Shipping Weight:

| | | |
|---|---|---|
| 3-2540-1, -2: | 1.79 Kg | 3.9 lbs. |
| 3-2540-3, -4: | 2.15 Kg | 4.7 lbs. |
| 3-2541-1, -2: | 1.82 Kg | 4.0 lbs. |
| 3-2541-3, -4: | 2.10 Kg | 4.6 lbs. |
| 3-2517.100, .101: | 2.04 Kg | 4.5 lbs. |
| 3-2517.102, .103: | 2.63 Kg | 5.8 lbs. |

### Standards and Approvals

- Manufactured under ISO 9001 and ISO 14001
- CE (2540 only)

## Ordering Information

| Mfr. Part No. | Code | Description |
|---|---|---|
| 3-2540-1 | 198 840 035 | High Performance Flow Sensor with 1 .5 in. NPT thread |
| 3-2540-2 | 198 840 036 | High Performance Flow Sensor with 1 .5 in. ISO thread |
| 3-2540-3 | 198 840 037 | Hot-Tap Flow Sensor with 1 .5 in. NPT thread |
| 3-2540-4 | 198 840 038 | Hot-Tap Flow Sensor with 1 .5 in. ISO thread |
| 3-2541-1 | 159 000 845 | High Performance Flow Sensor w/1 .5 in. NPT & removeable electronics |
| 3-2541-2 | 159 000 846 | High Performance Flow Sensor w/1 .5 in. ISO & removeable electronics |
| 3-2541-3 | 159 000 847 | Hot-Tap Flow Sensor w/1 .5 in. NPT & removeable electronics |
| 3-2541-4 | 159 000 848 | Hot-Tap Flow Sensor w/1 .5 in. ISO & removeable electronics |

## Ordering Information (continued)

| Mfr. Part No. | Code | Description |
|---|---|---|
| 3-2517.100 | 198 840 003 | Brass High Performance Flow Sensor with 1.5 in. NPT thread |
| 3-2517.101 | 198 840 007 | Brass High Performance Flow Sensor with 1.5 in ISO thread |
| 3-2517.102 | 159 000 267 | Brass Hot-Tap Flow Sensor with 1.5 in. NPT thread |
| 3-2517.103 | 159 000 268 | Brass Hot-Tap Flow Sensor with 1.5 in. ISO thread |

## Accessories

| | | |
|---|---|---|
| 3-1500.663 | 198 820 039 | Hot-Tap Installation Tool |
| 1220-0021 | 198 801 186 | O-ring, Viton® (2540/2541 only) |
| 1224-0021 | 198 820 006 | O-ring, EPR (2540/2541 only) |
| 1228-0021 | 198 820 007 | O-ring, Kalrez® (2540/2541 only) |
| 1220-0121 | 159 000 852 | O-ring, Viton® (2517 only) |
| 3-2540.320 | 198 820 040 | Rotor Kit, 2540/2541 Peek Bearing (old version) |
| 3-2540.321 | 159 000 623 | Rotor Kit, 2540/2541 Tungsten Carbide Pin (new version since 1.1.2000) |
| P52509-1 | 198 801 501 | Rotor Kit, 316 SS Pin (2517 Sensor) |
| P52509-2 | 198 820 023 | Rotor Kit, Tungsten Carbide Pin (2517 Sensor) |
| P52504-1 | 198 801 500 | Pin, 316 SS (2517 Sensor) |
| P52504-2 | 198 820 023 | Pin, Tungsten Carbide (2517 Sensor) |
| 3-2540.520 | 159 000 648 | Bearing, Flouroloy B® (2540/2541 Sensor) |
| P52503 | 198 820 013 | Bearing, Flouroloy B® (2517 Sensor) |
| P52527 | 159 000 481 | Retainers, SS (2540/2541 Sensor) |
| 3-2517.567 | 159 000 269 | Retainers, SS (2517 Sensor) |
| 3-2541.260-1 | 159 000 849 | Standard replacement electronics module (2541 Sensor) |
| 3-2541.260-2 | 159 000 850 | Hot-Tap replacement electronics module (2541 Sensor) |
| 5523-0222 | 159 000 392 | Cable, per ft. |
| P51589 | 159 000 476 | Conduit Adapter Kit |
| P31934 | 159 000 466 | Conduit Cap |

## Engineering Specifications for +GF+ SIGNET 2540/2541 Sensor

- The flow sensor shall use a four-blade, open-cell rotor design using insertion paddlewheel technology.
- Sensor shall use non-magnetic sensing principle. The sensor shall operate with a power input of 5 to 24 VDC.
- The sensor shall be available in models usable in pipe sizes from 1.5 to 24 in. and 1.5 to 36 in. when combined with hot-tap assembly.
- The sensor output shall be an open-collector pulse at a frequency of 15 Hz per ft/s nominal.
- Output shall be via a twisted pair, foil-shielded cable with drain wire. Supplied cable shall be at least 7.6 m (25 ft) long, with a maximum allowable length of 300 m (1000 ft).
- Linearity of the output signal with respect to flow rate shall be ±1% of full range.
- Measurement repeatability shall be ±0.5% of full range.
- The operating range of the sensor shall accommodate nominal flow rates from 0.1 to 6 m/s (0.3 to 20 ft/s).
- The sensor body shall be made of ACI type CFR-8M (316 SS) per ASTM A351 that shall accommodate up to 250 psi @ 82°C (180°F) with Viton® seals or up to 250 psi @ 100°C (212°F) with EPR seals.
- Rotor materials shall be CD4MCu alloy. Shafts shall be Tungsten Carbide.
- The sensor shall provide 1.5 in. NPT or ISO male pipe threads for attachment to a pipe. An installation fitting that includes an isolation valve and suitable hardware to allow complete installation in pipes containing fluid (Hot-Tap fittings) must be available.
- The sensor shall meet appropriate CE standards and shall be +GF+ SIGNET 2540/2541 High Performance.

## Engineering Specifications for +GF+ SIGNET 2517 Sensor

- The flow sensor shall use a four-blade, open-cell rotor design using insertion paddlewheel technology.
- The sensor shall be available in models usable in pipe sizes from 1.5 to 24 in. and 1.5 to 36 in. when combined with hot-tap assembly.
- Linearity of the output signal with respect to flow rate shall be ±1% of full range.
- Measurement repeatability shall be ±0.5% of full range.
- The operating range of the sensor shall accommodate nominal flow rates from 0.5 to 6 m/s (1.6 to 20 ft/s).
- The sensor body shall be made of C36000 free cutting brass that shall accommodate up to 17 bar @ 100°C (250 psi @ 212°F).
- Rotor materials shall be CD4MCu alloy. Shafts shall be Tungsten carbide.
- The sensor shall provide 1.5 in. NPT or ISO male pipe threads for attachment to a pipe. An installation fitting that includes an isolation valve and suitable hardware to allow complete installation in pipes containing fluid (Hot-Tap fittings) must be available.

# +GF+ SIGNET 8550 Flow Transmitters

3-8550-X (Field)


3-8550-XP (Panel)


## Features

- **Permanent & resettable totalizers**
- **Scaleable outputs**
- **Relay options**
- **Mounting versatility**
- **2 x 16 character dot matrix LCD**
- **NEMA 4X enclosure with self-healing window**
- **Large pushbuttons**
- **Numbered terminals**
- **Output simulation for complete system testing**

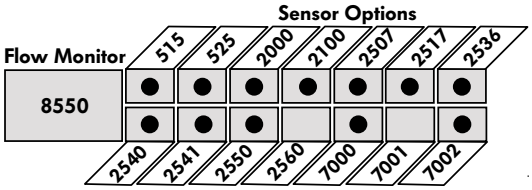
## Application

- **Flow control and monitoring**
- **Filtration or softener regeneration**
- **Effluent totalization**
- **Pump protection**
- **Feed pump pulsing**
- **Ratio control**
- **Water distribution**
- **Leak detection**

## Description

+GF+ SIGNET 8550 Flow Transmitters are advanced instruments that convert the signal from all +GF+ SIGNET flow sensors into a 4 to 20 mA signal for long distance transmission. Configuration flexibility is maximized with single or dual input/output, two optional relays for process control, two packaging options for integral/pipe mount or panel installation, and scalability for virtually any flow range or engineering unit. State-of-the-art electronic design ensures long-term reliability, signal stability, and simple user setup and operation.

## Options

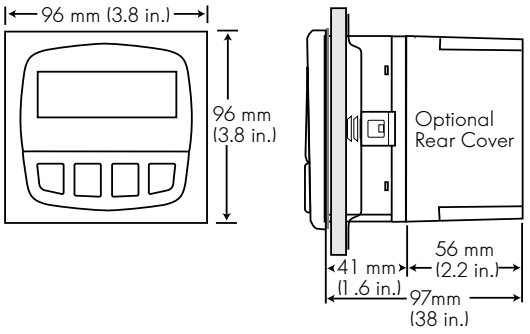



## Technical Features

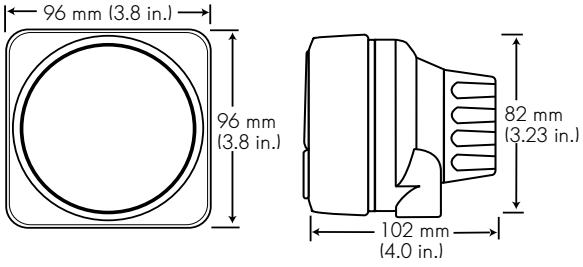
| Mounting Version | Part No. | Wire Power | Sensor Input | 4 to 20 mA Output | Open Collector/ Relay |
|---|---|---|---|---|---|
| **Field**  | 3-8550-1 | 2/4 non-powered and powered sensors | 1 | 1 | 1 O.C. Hi, Lo, Pulse Freq or Off |
| | 3-8550-2 | 4 non-powered and powered sensors | 1 | 1 | 2 Relays Hi, Lo, Pulse or Off |
| | 3-8550-3 | 2/4 non-powered and powered sensors | 2 | 2 Sensor 1, Sensor 2 or delta Flow | 2 O.C.'s Hi, Lo, Pulse Freq or Off |
| **Panel**  | 3-8550-1P | 2/4 non-powered and powered sensors | 1 | 1 | 1 O.C. Hi, Lo, Pulse Freq or Off |
| | 3-8550-2P | 4 non-powered and powered sensors | 1 | 1 | 2 Relays Hi, Lo, Pulse or Off |
| | 3-8550-3P | 2/4 non-powered and powered sensors | 2 | 2 Sensor 1, Sensor 2 or delta Flow | 2 O.C.'s Hi, Lo, Pulse Freq or Off |

# Dimensions

**Panel Mount**




**Integral/Universal Mount**

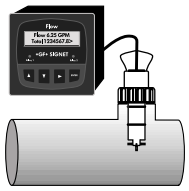



# Installation

The transmitter is available in a panel mount or a field version. The field version is mounted to the sensor using the integral mount kit (3-8051) or you may select the universal mount kit (3-8050) to mount the transmitter on a surface near the sensor.

### 1 . Panel Mount

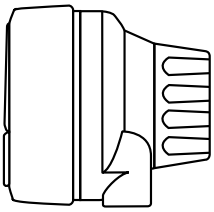
3-8550-XP



All panel mount transmitters (3-8550-XP) include a mounting bracket and gasket for a NEMA 4X watertight panel installation. Panel mount transmitters fit into a standard 1/4 DIN panel cutout.

### 2. Integral Mount

3-8051Kit

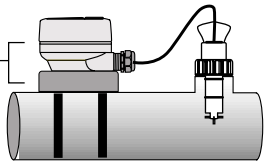


The Integral Mount Kit (3-8051) can be ordered separately and includes a conduit base, locking ring, and integral adapter for mounting the transmitter directly onto a sensor.

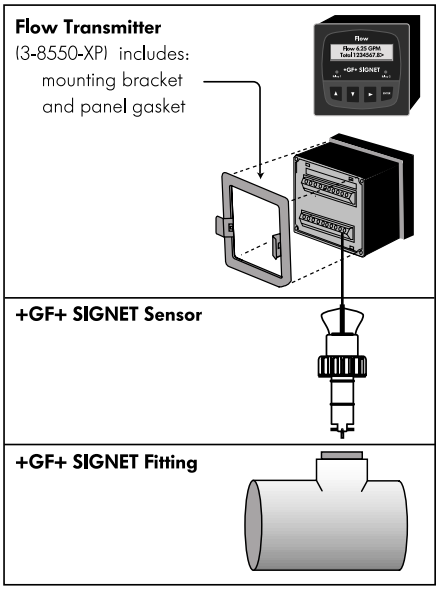
### 3. Universal Mount

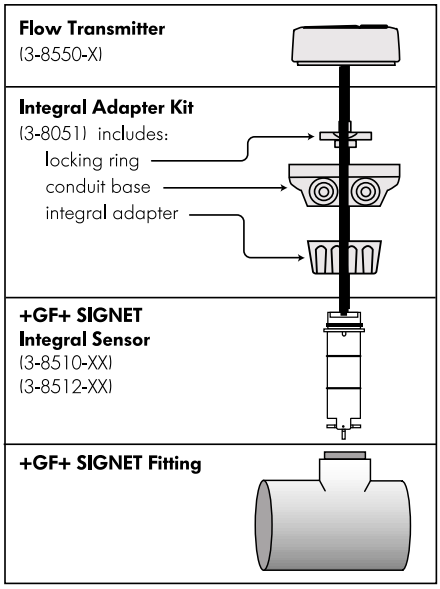
3-8550-X Transmitter

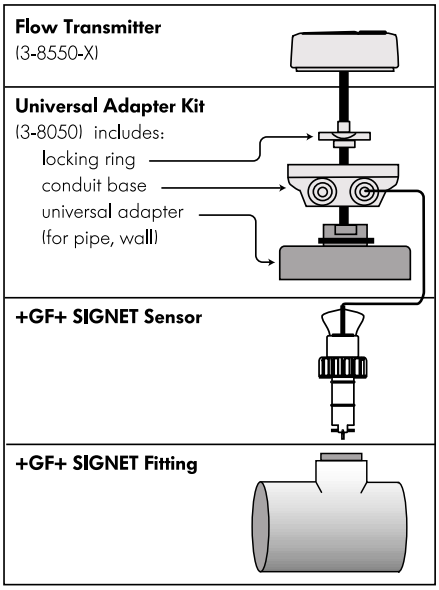
3-8050 Kit



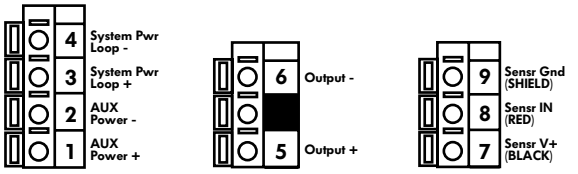
The Universal Mount Kit (3-8050) can be ordered separately and includes a conduit base, locking ring, and universal adapter for mounting the transmitter on a pipe, wall, or other stationary surface.



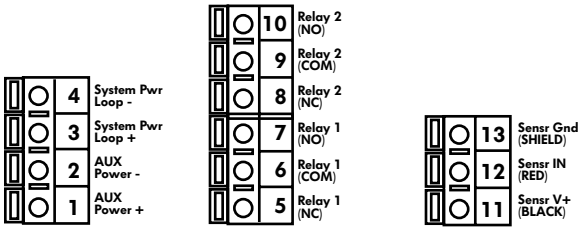



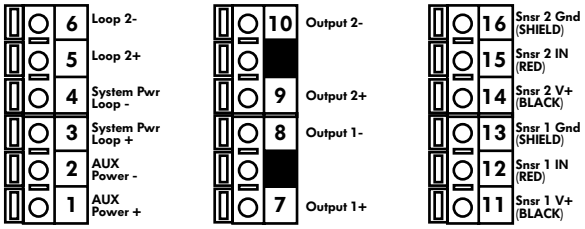
## Rear Terminal View




**Terminal 8550-1**




**Terminal 8550-2**




**Terminal 8550-3**

Note: The terminal blocks are not labeled on the back of the unit. An adhesive label is supplied with terminal descriptions to serve as a remote terminal display.

## Technical Data

### General

Compatibility:
+GF+ SIGNET Flow Sensors with frequency outputs (all except 2560 and 7001)
Accuracy: ± 0.5% of reading @ 25°C
Enclosure:
- Rating: NEMA 4X/IP65 front
- Case: PBT
- Panel Case Gasket: Neoprene
- Window: Polyurethane coated polycarbonate
- Keypad: Sealed 4-key silicone rubber
- Shipping Weight: 0.325kg (0.8 lbs.)

Display:
- Alphanumeric 2 x 16 LCD
- Update rate: 1 second
- Contrast: User selectable, 5 levels

### Environmental

Operating temperature:
-10 to 70°C (14 to 158°F)
Storage temperature:
-15 to 80°C (5 to 176°F)
Relative humidity:
0 to 95%, non-condensing

### Standards and Approvals

- CSA, CE, UL listed
- Manufactured under ISO 9001 and ISO 14001
- NEMA 4X and IP65

### Electrical

Power:
- 12 to 24 VDC ±10%, regulated
  (-1) 61 mA max.; (-2) 200 mA max.; (-3) 122 mA max.

Sensor Input:
- Range: 0.5 to 1500 Hz
- Sensor power:
  2-wire: 1.5 mA @ 5 VDC ± 1%
  3 or 4 wire: 20 mA @ 5 VDC ± 1%
- Optically isolated from current loop
- Short circuit protected

Current output:
- 4 to 20 mA, isolated, fully adjustable and reversible
- Max loop impedance:
  50Ω max. @ 12 V,
  325Ω max. @ 18 V,
  600Ω max. @ 24 V
- Update rate: 100 ms
- Accuracy: ±0.03 mA

Relay output:
- Mechanical SPDT contacts: Hi, Lo, Pulse, Off
- Maximum voltage rating: 5 A @ 30 VDC, 5 A @ 250 VAC resistive load
- Hysteresis: User selectable
- Max 300 pulses/min.

Open-collector output: Hi, Lo, Pulse, Off
- Open-collector, optically isolated, 50 mA max. sink, 30 VDC max. pull-up voltage.
- Max 300 pulses/min.
- Hysteresis: User selectable

## Ordering Information

| Mfr. Part No. | Code | Description |
|---|---|---|
| 3-8550-1 | 159 000 047 | Flow transmitter, Field mount |
| 3-8550-1P | 159 000 048 | Flow transmitter, Panel mount |
| 3-8550-2 | 159 000 049 | Flow transmitter, Field mount with relays |
| 3-8550-2P | 159 000 050 | Flow transmitter, Panel mount with relays |
| 3-8550-3 | 159 000 051 | Flow transmitter, Field mount with dual input/output |
| 3-8550-3P | 159 000 052 | Flow transmitter, Panel mount with dual input/output |

## Accessories

| Mfr. Part No. | Code | Description |
|---|---|---|
| 3-8050 | 159 000 184 | Universal mounting kit |
| 3-8050.395 | 159 000 186 | Transmitter NEMA 4X cover |
| 3-8051 | 159 000 187 | Flow Integral Mnt NPT |
| 3-8052 | 159 000 188 | 3/4 in. Integral Mounting Kit |
| 3-8050.396 | 159 000 617 | RC Filter kit (for relay use) |
| 3-8050.392 | 159 000 640 | Model 200 retro-fit adapter |
| 3-0000.596 | 159 000 641 | Heavy duty wall mount bracket |
| 3-5000.598 | 198 840 225 | Surface Mount Bracket |
| 3-9000.392 | 159 000 368 | Liquid tight connector kit for rear cover (includes 3 connectors) |
| 3-9000.392-1 | 159 000 839 | Liquid tight connector kit, NPT (1 piece) |
| 3-9000.392-2 | 159 000 841 | Liquid tight connector kit, PG13.5 (1 piece) |

## Engineering Specifications

- The transmitter shall meet appropriate CE, CSA & UL standards.
- The transmitter shall be manufactured under ISO 9001 and ISO 14001 certified processes.
- The transmitter shall be field or panel mountable.
- The transmitter shall have flow rate and dual totalization capability.
- The display units shall be fully scaleable.
- The device shall meet NEMA 4X and IP65 standards.
- The operating voltage shall be 12 to 24 VDC.
- The transmitter shall have a 4 to 20 mA output with an open collector output, 5 to 30 VDC or a 4 to 20 mA output with 2 relays, or dual 4 to 20 mA output with dual open collector with delta capability.
- The transmitter shall have simulate capability.
- The transmitter shall be +GF+ SIGNET 8550 Flow Transmitter.