

## Type 2537 Paddlewheel Flowmeter



### Product description

The type 2537 Flowmeter is the next generation in fluid measurement technology from the inventor of the original paddlewheel flowmeter. This sensor is an improvement on what's already an industry standard. It has the added functionality of various output options including flow switch, multi-functional pulse, digital (S<sup>3</sup>L) or 4 to 20 mA. Additionally, it offers low flow, low power and high resolution and can be configured onsite directly through the built-in user interface.

Installation is simple because the type 2537 utilizes the same fittings as the popular type 515 and 2536 Paddlewheel Sensors and fits into pipe sizes ranging from DN15 to DN200 (½ to 8 inches). Available in Polypropylene and PVDF, it is ideal for a variety of applications including chemical processing, water and wastewater monitoring and scrubber control.

### Features

- Digital (S<sup>3</sup>L) or 4 to 20 mA outputs or (Multi-function)
- Allows for up to six sensors to type 9950-XX
- Low flow capabilities down to 0.1 m/s (0.3 ft/s)
- Polypropylene or PVDF sensor bodies
- Polypropylene or PVDF retaining nuts standard, Valox optional
- Installs into pipe sizes DN15 to DN200 (½ to 8 in.)
- Test certificate included for -X0, -X1
- Low power and high resolution



### Applications

- Process Flow Monitoring
- Pump Protection
- Pure Water Production
- Filtration Systems
- Chemical Production
- Reverse Osmosis
- Demineralization/Regeneration
- Fume Scrubbers
- Cooling Towers
- Proportional Metering Pump

## Technical Details

### General

|                  |                                     |                |
|------------------|-------------------------------------|----------------|
| Operating Range  | 0.1 to 6 m/s                        | 0.3 to 20 ft/s |
| Pipe Size Range  | DN15 to DN200                       | ½ to 8 in.     |
| Linearity        | ±1% of max. range @ 25 °C (77 °F)   |                |
| Repeatability    | ±0.5% of max. range @ 25 °C (77 °F) |                |
| System Responses | 100 ms update rate nominal          |                |

### Wetted Materials

|             |                                                                                                            |
|-------------|------------------------------------------------------------------------------------------------------------|
| Sensor Body | Glass-filled PP (black) or PVDF (natural)                                                                  |
| O-rings     | FKM (std) optional EPR (EPDM) or FFKM                                                                      |
| Rotor Shaft | Titanium, Hastelloy-C or PVDF; optional Ceramic, Tantalum or Stainless Steel                               |
| Rotor       | Black PVDF or Natural PVDF; optional ETFE, with or w/o carbon fiber reinforced PTFE sleeve for rotor shaft |

### Electrical

|                                              |                                                          |                                                                 |               |
|----------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------|---------------|
| Multi                                        | With Dry-Contact Relay                                   | 24 VDC nominal, ±10%, regulated, 30 mA max current              |               |
|                                              | With Solid State Relay                                   | 6 V to 24 VDC, ±10%, regulated, 30 mA max current               |               |
|                                              | Digital (S³L)                                            | 5.0 VDC min to 6.5 VDC max., 30 mA max current (1.5 mA nominal) |               |
|                                              | 4 to 20 mA                                               | 400 mV max ripple voltage, 30 mA max current                    |               |
|                                              | Maximum Pulse Rate                                       | 300 Hz                                                          |               |
|                                              | Maximum Pulse Width                                      | 50 ms                                                           |               |
|                                              | Minimum Pulse Rate                                       | 0.5 Hz                                                          |               |
|                                              | Compatible with PLC, PC or similar equipment             |                                                                 |               |
|                                              | Compatible with customer supplied metering pump          |                                                                 |               |
| Digital (S³L) Version                        | 5 VDC nominal, regulated, 3 mA max current               |                                                                 |               |
|                                              | Type                                                     | Serial ASCII, TTL lever 9600 bps                                |               |
|                                              | Compatible with types 9900,9950-1/2, 9950-10/11          |                                                                 |               |
| 4 to 20 mA Version                           | 12 to 32 VDC nominal, ±10%, regulated, 21 mA max current |                                                                 |               |
|                                              | Loop Accuracy                                            | ±32 µA @ 25 °C @ 24 VDC)                                        |               |
|                                              | Loop Resolution                                          | 5 µA                                                            |               |
|                                              | Temp. Drift                                              | ±1µA per °C max.                                                |               |
|                                              | Power Supply Rejection                                   | ±1µA per V                                                      |               |
|                                              | Max. Cable                                               | 305 m                                                           | 1'000 ft      |
|                                              | Maximum Loop Resistance                                  | 600 Ω @ 24 VDC                                                  | 1 KΩ @ 32 VDC |
|                                              | Load Impedance                                           | 375 Ω                                                           |               |
|                                              |                                                          |                                                                 |               |
| Reverse Polarity and Short Circuit Protected |                                                          | Up to 40 V. 1 hour                                              |               |
| Over-voltage Protection                      |                                                          | > 40 VDC over 1 hour                                            |               |
| <b>Relay Specifications</b>                  |                                                          |                                                                 |               |
|                                              | Mechanical SPDT                                          | 5 A @ 30 VDC, 5 A @ 250 VAC                                     |               |
|                                              | Solid-State Relay                                        | 100 mA @ 40 VDC, 70 mA @ 33 VAC                                 |               |
|                                              | Relay Modes                                              | Low, High                                                       |               |
|                                              | Time Delay                                               | 0.0 to 6'400.0 seconds                                          |               |
|                                              | Hysteresis                                               | Adjustable for exiting alarm condition                          |               |

## Max. Temperature/Pressure Rating

|                               |      |                          |                 |
|-------------------------------|------|--------------------------|-----------------|
| Storage Temperature           |      | -10 °C to 75 °F          | 14 °C to 167 °F |
| Operating Temperature         |      | 0 °C to 65 °C            | 32 °F to 149 °F |
| Relative Humidity             |      | 0 to 90%, non-condensing |                 |
| Flow Sensor/<br>Retaining Nut | PP   | 12.5 bar @ 20 °C         | 181 psi @ 68 °F |
|                               |      | 1.7 bar @ 85 °C          | 25 psi @ 185 °F |
|                               | PVDF | 14 bar @ 20 °C           | 203 psi @ 68 °F |
|                               |      | 1.7 bar @ 85 °C          | 25 psi @ 185 °F |

## Operating Temperature

|  |      |                 |                |
|--|------|-----------------|----------------|
|  | PP   | -18 °C to 85 °C | 0 °F to 185 °F |
|  | PVDF | -18 °C to 85 °C | 0 °F to 185 °F |

## Environmental

|           |              |
|-----------|--------------|
| Enclosure | NEMA 4X/IP65 |
|-----------|--------------|

## Shipping Weight

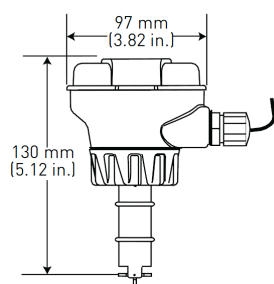
|          |         |
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| 0.640 kg | 1.41 lb |
|----------|---------|

## Standards and Approvals

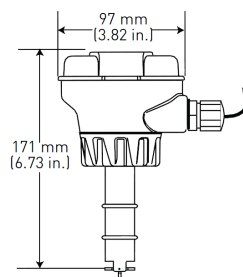
|                                                      |
|------------------------------------------------------|
| CE, UKCA, FCC, UL, NSF (3-2537-XC-PX version only)   |
| RoHS compliant, China RoHS                           |
| Manufactured under ISO 9001, ISO 14001 and ISO 45001 |

## Dimensions

### ½ in. to 4 in. pipe



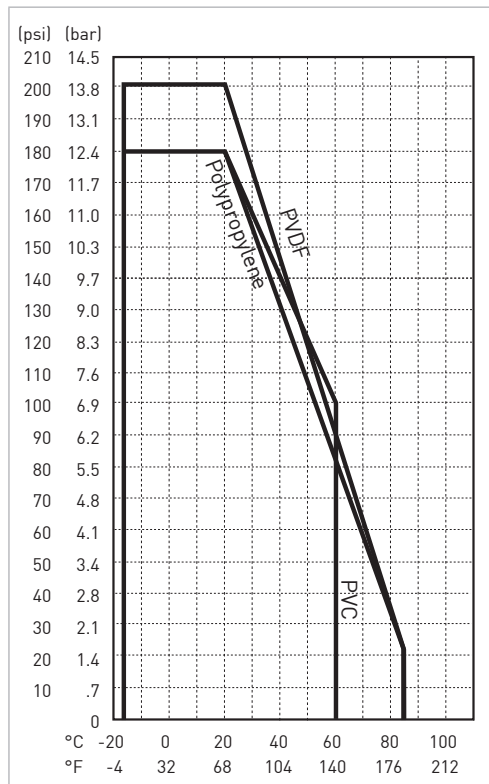
### 5 to 8 in. pipe



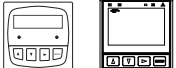
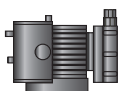
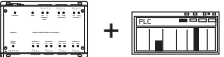
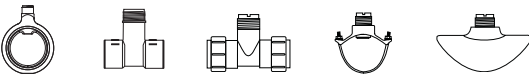
## Pressure-temperature diagrams

### 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.



## System Overview

| Panel Mount                                                                                                                   | 4 to 20 mA<br>Dry Contact, Solid State                                                                                   | 4 to 20 mA Output                                                                                                                                                                                  | Automation System                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GF Instruments<br>- 9900<br>- 9950<br>     | - Customer Supplied Metering Pump<br> | - Customer Supplied Chart Recorder<br>- Programmable Logic Controller or Programmable Automation Controller<br> | - 0486 Profibus Concentrator and Customer Supplied Programmable Logic Controller or Programmable Automation Controller<br> |
| <b>Type 2537 Paddlewheel Flowmeter</b><br> |                                                                                                                          |                                                                                                                                                                                                    |                                                                                                                                                                                                                |
| GF Fittings<br>                            |                                                                                                                          |                                                                                                                                                                                                    |                                                                                                                                                                                                                |

All Sold Separately

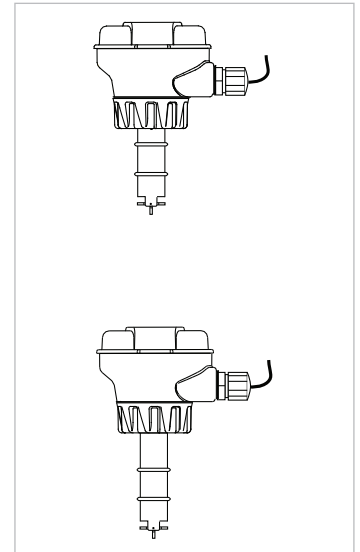
## Application Tips

- Select PVDF Rotor Shaft for use in Deionized Water.
- Use a sleeved rotor in abrasive liquids to reduce wear.
- Sensor plug is used to plug installation fitting after extraction of sensor from pipe.
- For liquids containing ferrous particles, use GF Magmeters.
- For systems with components of more than one material, the maximum temperature/pressure Specification must always be referenced to the component with the lowest rating.

## Ordering Information

| Mfr. Part                                                                                                   | Code        | Output                                    |
|-------------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------|
| Paddlewheel Flowmeter – Integral Mount (8512 sensors)                                                       |             |                                           |
| DN15 to DN100 – ½ to 4 in.                                                                                  |             |                                           |
| <b>Polypropylene body, black Polypropylene retaining nut, black PVDF rotor, Titanium shaft, FKM O-rings</b> |             |                                           |
| 3-2537-1C-P0                                                                                                | 159 001 291 | Pulse/Flow Switch Dry Contact Relay (DCR) |
| 3-2537-2C-P0                                                                                                | 159 001 292 | Pulse/Flow Switch Solid State Relay (SSR) |
| 3-2537-5C-P0                                                                                                | 159 001 295 | Digital (S <sup>3</sup> L)                |
| 3-2537-6C-P0                                                                                                | 159 001 296 | 4 to 20 mA                                |
| <b>Natural PVDF body, Natural PVDF retaining nut, rotor and shaft, FKM O-rings*</b>                         |             |                                           |
| 3-2537-1C-T0                                                                                                | 159 001 315 | Pulse/Flow Switch Dry Contact Relay (DCR) |
| 3-2537-2C-T0                                                                                                | 159 001 316 | Pulse/Flow Switch Solid State Relay (SSR) |
| 3-2537-5C-T0                                                                                                | 159 001 319 | Digital (S <sup>3</sup> L)                |
| 3-2537-6C-T0                                                                                                | 159 001 320 | 4 to 20 mA                                |
| DN125 to DN200 – 5 to 8 in.                                                                                 |             |                                           |
| <b>Polypropylene body, black Polypropylene retaining nut, black PVDF rotor, Titanium shaft, FKM O-rings</b> |             |                                           |
| 3-2537-1C-P1                                                                                                | 159 001 303 | Pulse/Flow Switch Dry Contact Relay (DCR) |
| 3-2537-2C-P1                                                                                                | 159 001 304 | Pulse/Flow Switch Solid State Relay (SSR) |
| 3-2537-5C-P1                                                                                                | 159 001 307 | Digital (S <sup>3</sup> L)                |
| 3-2537-6C-P1                                                                                                | 159 001 308 | 4 to 20 mA                                |

\* PVDF available ½ in. to 4 in. only.



## Accessories and Replacement Parts

| Mfr. Part            | Code        | Output                                                   |
|----------------------|-------------|----------------------------------------------------------|
| <b>Rotors</b>        |             |                                                          |
| 3-2536.320-1         | 198 820 052 | Rotor, PVDF Black                                        |
| 3-2536.320-2         | 159 000 272 | Rotor, PVDF Natural                                      |
| 3-2536.320-3         | 159 000 273 | Rotor ETFE                                               |
| 3-2536.322-3         | 198 820 056 | Sleeved rotor, PVDF Black                                |
| 3-2536.322-2         | 198 820 057 | Sleeved rotor, PVDF Natural                              |
| 3-2536.322-3         | 198 820 058 | Sleeved rotor, ETFE                                      |
| <b>Rotor Shafts</b>  |             |                                                          |
| M1546-1              | 198 801 182 | Shaft, Titanium                                          |
| M1546-2              | 198 801 183 | Shaft, Hastelloy-C                                       |
| M1546-3              | 198 820 014 | Shaft, Tantalum                                          |
| M1546-4              | 198 820 015 | Shaft, Stainless Steel                                   |
| P51545               | 198 820 016 | Shaft, Ceramic                                           |
| <b>O-Rings</b>       |             |                                                          |
| 1220-0021            | 198 801 000 | O-ring, FKM (2 required per sensor)                      |
| 1224-0021            | 198 820 006 | O-ring, EPR (EPDM) (2 required per sensor)               |
| 1228-0021            | 198 820 007 | O-ring, FFKM (2 required per sensor)                     |
| <b>Miscellaneous</b> |             |                                                          |
| P31536               | 198 840 201 | Sensor plug, Polypropylene                               |
| 3-2536.321           | 198 820 054 | PVDF Natural, Rotor kit                                  |
| 3-8050.390-1         | 159 001 702 | Retaining Nut Replacement Kit, NPT, Valox                |
| 3-8050.390-3         | 159 310 116 | Retaining Nut Replacement Kit, NPT, PP                   |
| 3-8050.390-4         | 159 310 117 | Retaining Nut replacement Kit, NPT PVDF                  |
| 3-8050-396           | 159 000 617 | RC Filter kit (for relay use, inductive loads) 2 per kit |
| 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)             |
| 7310-1024            | 159 873 004 | 24 VDC Power Supply, 10 W, 0.42 A                        |
| 7310-2024            | 159 873 005 | 24 VDC Power Supply, 24 W, 1.0 A                         |
| 7310-4024            | 159 873 006 | 24 VDC Power Supply, 40 W, 1.7 A                         |
| 7310-6024            | 159 873 007 | 24 VDC Power Supply, 60 W, 2.5 A                         |
| 7310-7024            | 159 873 008 | 24 VDC Power Supply, 96 W, 4.0 A                         |

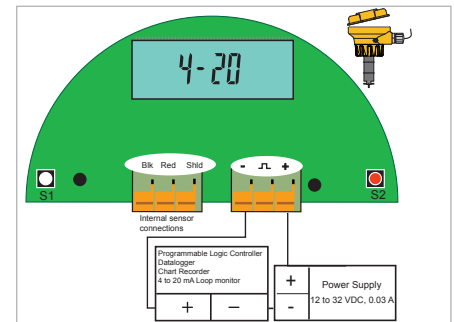
## Wiring Information

### Digital (S<sup>3</sup>L) Wiring

The digital (S<sup>3</sup>L) output is compatible with the type 9900 single-channel transmitters and 9950 multi-channel transmitters.

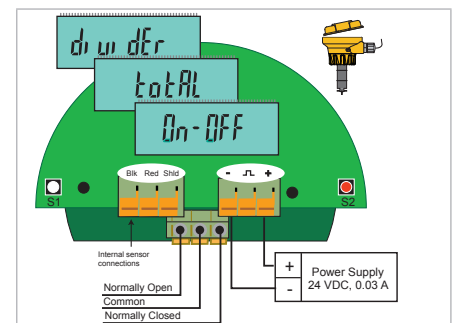
### Loop Wiring

The 4 to 20 mA output can be connected to Chart Recorders, PLCs or any device that requires a 4 to 20 mA signal.



### Dry Contact Relay Wiring

The wiring is identical for On-OFF and Pulse modes.



### Solid State Relay Wiring

The wiring is identical for On-OFF and Pulse modes.

