

**Signet 515/2536 Rotor-X Flow Sensors**

3-0515.090 Rev. U 04/15

**Operating Instructions****Description**515 Sensor  
(with red cap)8510 Integral  
Sensor2536 Sensor  
(with blue cap)8512 Integral  
Sensor

- [English](#)
- [Deutsch](#)
- [Français](#)
- [Español](#)
- [Italiano](#)
- [中文](#)

**Operating Instructions for all versions of 515/8510 and 2536/8512**

Simple to install with time-honoured reliable performance, Signet 515 and 2536 Rotor-X Paddlewheel Flow Sensors are highly repeatable, rugged sensors that offer exceptional value with little or no maintenance.

Signet 515 and 2536 sensors measure liquid flow rates in full pipes and can be used in low pressure systems.

- The many material choices including PP and PVDF make this model highly versatile and chemically compatible with many liquid process solutions.
- Sensors can be installed in DN15 to DN900 (½ to 36 in.) pipes using Signet's comprehensive line of custom fittings
- These custom fittings, which include tees, saddles, and weldolets, seat the sensor to the proper insertion depth into the process flow.
- The sensors are also offered in configurations for wet-tap installation requirements.

**515/8510 Advantages:**

- Flow rate range 0.3 to 6 m/s (1 to 20 ft/s)
- Installs into pipe sizes DN15 to DN900 (½ to 36 in.)
- Wide Turndown Ratio of 20:1
- Sinusoidal frequency output capable of driving a self-powered flowmeter (Model 5090)
- Self-powered
- Highly repeatable output
- Chemically resistant materials
- Easy to replace rotor

**2536/8512 Advantages:**

- Flow rate range 0.1 to 6 m/s (0.3 to 20 ft/s)
- Installs into pipe sizes DN15 to DN900 (½ to 36 in.)
- Wide Turndown Ratio of 66:1
- Open-collector output
- High resolution and noise immunity
- Chemically resistant materials
- Easy to replace rotor

## Warranty Information

Refer to your local Georg Fischer Sales office for the most current warranty statement.

All warranty and non-warranty repairs being returned must include a fully completed Service Form and goods must be returned to your local GF Sales office or distributor. Product returned without a Service Form may not be warranty replaced or repaired.

Signet products with limited shelf-life (e.g. pH, ORP, chlorine electrodes, calibration solutions; e.g. pH buffers, turbidity standards or other solutions) are warranted out of box but not warranted against any damage, due to process or application failures (e.g. high temperature, chemical poisoning, dry-out) or mishandling (e.g. broken glass, damaged membrane, freezing and/or extreme temperatures).

## Product Registration







Thank you for purchasing the Signet line of Georg Fischer measurement products.

If you would like to register your product(s), you can now register online in one of the following ways:

- Visit our website [www.gfsignet.com](http://www.gfsignet.com). Under **Service and Support** click on **Product Registration Form**
- If this is a pdf manual (digital copy), [click here](#)

## Safety Information

1. Depressurize and vent system prior to installation or removal.
2. Confirm chemical compatibility before use.
3. DO NOT exceed maximum temperature or pressure specs.
4. ALWAYS wear safety goggles or faceshield during installation and/or service.
5. DO NOT alter product construction.

	<b>Warning / Caution / Danger</b> Indicates a potential hazard. Failure to follow all warnings may lead to equipment damage, injury, or death
	<b>Personal Protective Equipment (PPE)</b> Always utilize the most appropriate PPE during installation and service of Signet products.
	<b>Pressurized System Warning</b> Sensor may be under pressure, take caution to vent system prior to installation or removal. Failure to do so may result in equipment damage and/or serious injury.
	<b>Hand Tighten Only</b> Overtightening may permanently damage product threads and lead to failure of the retaining nut.
	<b>Do Not Use Tools</b> Use of tool(s) may damage product beyond repair and potentially void product warranty.
	<b>Note / Technical Notes</b> Highlights additional information or detailed procedure.

## Chemical Compatibility

Georg Fischer Signet products are manufactured in a variety of wetted materials to suit various liquids and chemicals.

All plastic materials including typical piping types (PVC, PVDF, PP and PE) are more or less permeable to contained media, such as water or volatile substances, including some acids. This effect is not related to porosity, but purely a matter of gas diffusion through the plastic.

If the plastic material is compatible with the medium according to the application guidelines, the permeation will not damage the plastic itself. However, if the plastic encloses other sensitive components, as is the case with GF Signet plastic paddlewheel sensors, these may be affected or damaged by the media diffusing through the plastic body and rotor.

Failures of PVDF paddlewheel sensors when used in hot nitric acid applications have been reported. PVDF is known to allow for substantial permeation of nitric acid constituents without being damaged itself. No clear guideline can be given here, since the damaging effect to the sensor is highly dependent on temperature, pressure and concentration.

Utilizing sensors in applications with aggressive substances is possible. On special request GF Signet can provide sensors with a different internal resin encapsulation (potting) that will delay the damaging effect of acids to the sensors.

For all Special Product inquiries or to place an order, please email [signet-specialproduct@georgfischer.com](mailto:signet-specialproduct@georgfischer.com).



### WARNING!



### Paddlewheel Retaining Nuts: Red (515) and Blue (2536)

The retaining nuts of paddlewheel sensors are not designed for prolonged contact with aggressive substances. Strong acids, caustic substances and solvents or their vapor may lead to failure of the retaining nut, ejection of the sensor and loss of the process fluid with possibly serious consequences, such as damage to equipment and serious personal injury. Retaining nuts that may have been in contact with such substances, e.g. due to leakage or spilling, must be replaced.

### Paddlewheel Maintenance:

Paddlewheel flow sensors are subject to wear and may require maintenance and replacement of mechanical parts (rotors, pin, O-rings, bearings, retainers, etc.). The frequency of recommended maintenance will vary based upon application specifications, characteristics of the measured fluid, and installation details. These can include, but are not limited to: process flowrate, occurrence of water hammer, fluid corrosiveness and abrasiveness, sensor installation relevant to other equipment.

GF Signet offers individual replacement parts and rotor replacement kits, which include replacement instructions, allowing customers to perform field maintenance and reduce application down-time. Please refer to the Paddlewheel Replacement section (page 5) or contact your local GF Sales Representative with any questions.

### 515, 2536, 8510, 8512, 2537 Only:

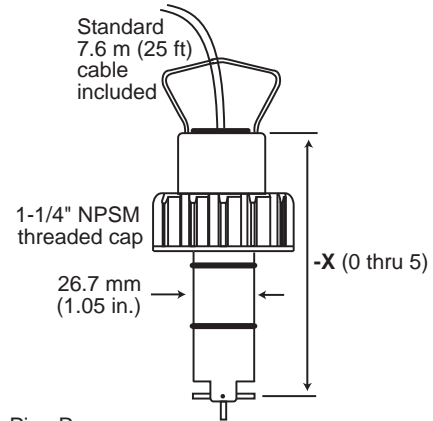
To support our customers, the GF Signet Repair Department offers services to recertify the plastic paddlewheel products to factory specification. Contact your distributor or visit [www.gfsignet.com](http://www.gfsignet.com) for more information.

## Table of Contents

Description.....	1
Warranty Statement.....	2
Product Registration.....	2
Safety Information.....	2
Chemical Compatibility.....	2
Table of Contents.....	3
Dimensions.....	3
Specifications.....	4
Location of Fitting.....	5
Sensor Mounting Position.....	5
Standard Sensor Installation.....	5
Sensor Wiring.....	5
Rotor Replacement Procedure.....	5
K-Factors.....	6
H-Dimensions.....	6
Signet Fittings.....	7
Ordering Information (515/8510).....	7
Ordering Information (2536/8512).....	8

## Dimensions

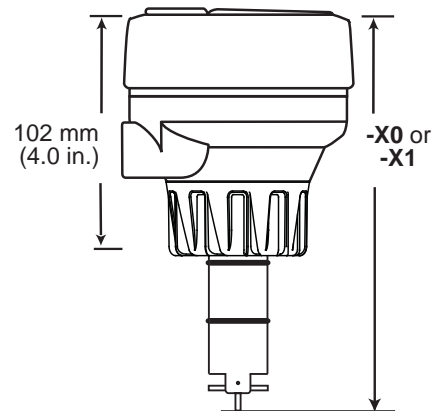
### 515/2536 Sensor



Pipe Range:	
1/2 in. to 4 in.	-X0 = 104 mm (4.1 in.)
5 in. to 8 in.	-X1 = 137 mm (5.4 in.)
10 in. and up	-X2 = 213 mm (8.4 in.)
1/2 in. to 4 in.	-X3 = 297 mm (11.7 in.)
5 in. to 8 in.	-X4 = 332 mm (13.1 in.)
10 in. and up	-X5 = 408 mm (16.1 in.)

Wet-tap  
Lengths

### 8510-XX/8512-XX Integral Sensor shown with Transmitter and Integral Adapter Kit (sold separately)



-X0 = 152 mm (6.0 in.)
-X1 = 185 mm (7.3 in.)

## Specifications

### General

Flow Rate Range:	
515	0.3 to 6 m/s (1 to 20 ft/s)
2536	0.1 to 6 m/s (0.3 to 20 ft/s)
Pipe Size Range	DN15 to DN900 (½ in. to 36 in.)
Cable Length	7.6 m (25 ft) standard
515	60 m (200 ft) maximum
2536	305 m (1000 ft) maximum
Cable type	2-conductor twisted pair w/ shield (22 AWG)
Minimum Reynolds Number	4500

### Materials:

Cap Material	Glass Filled Polypropylene
515:	Red
2536:	Blue

### Wetted Materials:

Sensor Body	Glass Filled Polypropylene (black) or PVDF
O-Rings	FPM (Std), EPR (EPDM) or FFPM optional
Pin	Titanium, Hastelloy-C or PVDF; optional Ceramic, Tantalum, or Stainless Steel
Rotor	Black PVDF or Natural PVDF; optional ETFE with or without carbon fiber reinforced PTFE sleeve for rotor pin

### Shipping Weight:

-X0	0.454 kg (1 lb)
-X1	0.476 kg (1.04 lbs)
-X2	0.680 kg (1.50 lbs)
-X3	0.794 kg (1.75 lbs)
-X4	0.850 kg (1.87 lbs)
-X5	1.0 kg (2.20 lbs)
3519	1.3 kg (2.86 lbs)

### Performance

Linearity	±1% of maximum range @ 25 °C (77 °F)
Repeatability	±0.5% maximum range @ 25 °C (77 °F)

### Electrical

#### 515 Sensor

Frequency	19.7 Hz per m/s nominal (6 Hz per ft/s)
Amplitude	3.3 V p/p per m/s nominal (1V p/p per ft/s)
Source Impedance	8 kΩ

#### 2536 Sensor

Frequency	49 Hz per m/s nominal (15 Hz per ft/s nominal)
Supply Voltage	5 to 24 VDC ±10% regulated
Supply Current	<1.5 mA @ 3.3 to 6 VDC <20 mA @ 6 to 24 VDC
Output Type	Open collector, sinking
Output Current	10 mA maximum

## Environmental Requirements

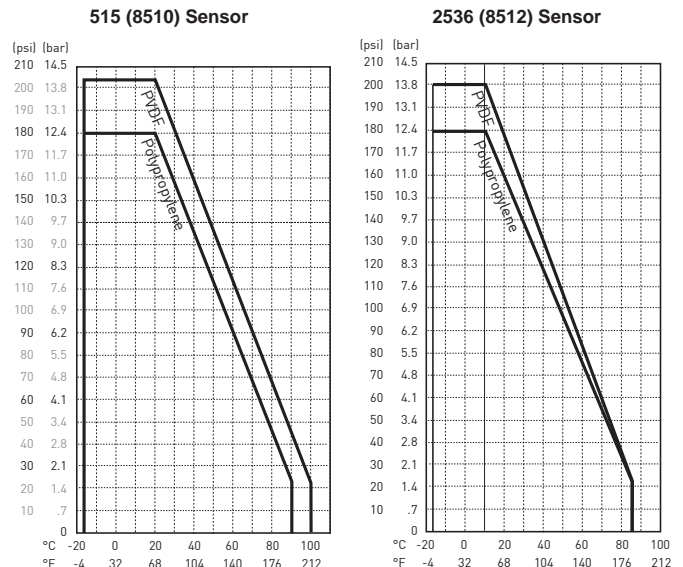
### Pressure/Temperature Ratings

#### Standard and Integral Sensors:

<b>Polypropylene Body</b>	12.5 bar (180 psi) max. @ 20 °C (68 °F)
515	1.7 bar (25 psi) max. @ 90 °C (194 °F)
2536	1.7 bar (25 psi) max. @ 85 °C (185 °F)
Operating Temperature	-18 °C to 66 °C (0 °F to 150 °F)
<b>PVDF Body</b>	14 bar (200 psi) max. @ 20 °C (68 °F)
515	1.7 bar (25 psi) max. @ 100 °C (212 °F)
2536	1.7 bar (25 psi) max. @ 85 °C (185 °F)
Operating Temperature	-18 °C to 100 °C (0 °F to 212 °F)

#### Wet-Tap Sensor:

<b>Polypropylene Body</b>	7 bar @ 20 °C, 1.4 bar @ 66 °C (100 psi @ 68 °F, 20 psi @ 150 °F)
Max Removal Rating	1.7 bar @ 22 °C (25 psi @ 72 °F)
Operating Temperature	-18 °C to 66 °C (0 °F to 150 °F)



## Standards and Approvals

- RoHS Compliant
- China RoHS (Go to [www.gfsgnet.com](http://www.gfsgnet.com) for details)
- Manufactured under ISO 9001 for Quality, ISO 14001 for Environmental Management and OHSAS 18001 for Occupational Health and Safety.

#### P51530

- NSF (P51530-Px versions only)
- Lloyd's Register Type Approval

#### 2536

- NSF (3-2536-Px versions only)
- CE

## FC Declaration of Conformity according to FCC Part 15

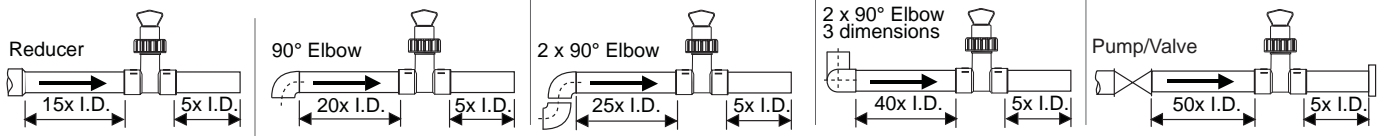
This device complies with Part 15 of the FCC rules.

Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

## Location of Fitting

Recommended sensor upstream/downstream mounting requirements.



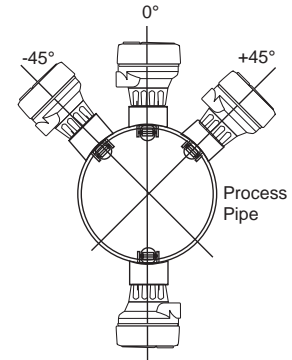
## Sensor Mounting Position

### Horizontal pipe runs:

- Mount sensor in the upright (0°) position for best performance (pipe must be full).
- Mount at a maximum of 45° when air bubbles are present.
- Do not mount on the bottom of the pipe when sediments are present.

### Vertical pipe runs:

- Mount sensor in any orientation.
- Upward flow is preferred to ensure full pipe.



## Standard Sensor Installation

- Lubricate O-rings with a non-petroleum based, viscous lubricant (grease) compatible with the system.
- Using an alternating/twisting motion, lower the sensor into the fitting, making sure the installation arrows on the black cap are pointing in the direction of flow, see Figure A.
- Engage one thread of the sensor cap then turn the sensor until the alignment tab is seated in the fitting notch.



**Hand tighten the sensor cap.**  
**DO NOT use any tools on the sensor cap or the cap threads and/or fitting flange threads will be damaged, see Figure B.**

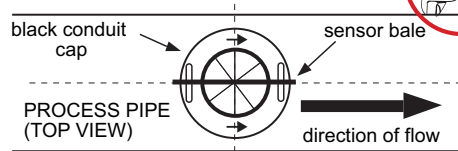


Figure A

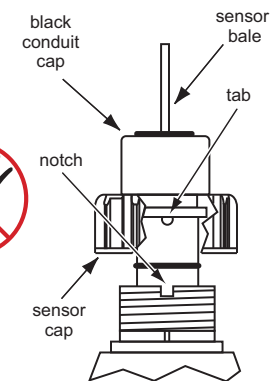


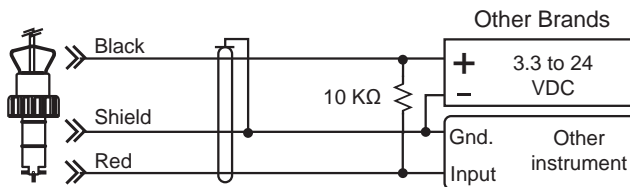
Figure B

## Sensor Wiring

### Technical Notes

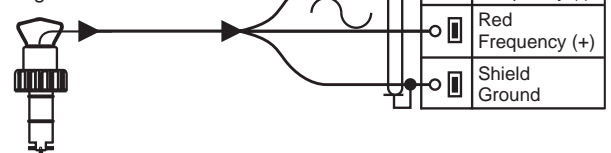
- Use 2-conductor shielded cable for cable extensions.
- Cable shield must be maintained through cable splice.
- Refer to your instrument manual for specific wiring details.

### 2536 Sensor Connections to Other Brand Instruments

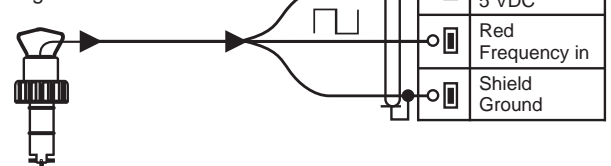


- DC sensor power supplied from Signet instrument.
- 10 K $\Omega$  Pull-up resistor may be required for non-Signet brand instrument.

### 515 Sensor Connections to Signet Instruments

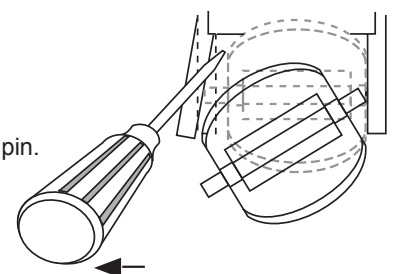


### 2536 Sensor Connections to Signet Instruments



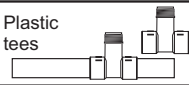







## Rotor Replacement Procedure

- To remove the rotor, insert a small screwdriver between the rotor and the ear of the sensor.
- Twist the screwdriver blade to flex the ear outward enough to remove one end of the rotor and pin.
- **DO NOT** flex the ear any more than necessary! If it breaks, the sensor cannot be repaired.
- Install the new rotor by inserting one tip of the pin into the hole, then flex the opposite ear back enough to slip rotor into place.





## Signet Fittings

Type	Description	Type	Description
 <p>Plastic tees</p>	<ul style="list-style-type: none"> <li>• 0.5 to 2 inch versions</li> <li>• MPVC or CPVC</li> </ul>	 <p>Iron, Carbon Steel, 316 SS Threaded tees</p>	<ul style="list-style-type: none"> <li>• 0.5 to 2 in. versions</li> <li>• Mounts on threaded pipe ends</li> </ul>
 <p>PVC Glue-on Saddles</p>	<ul style="list-style-type: none"> <li>• Available in 10 and 12 inch sizes only</li> <li>• Cut 2-1/2 inch hole in pipe</li> <li>• Weld in place using solvent cement</li> </ul>	 <p>Carbon steel &amp; stainless steel Weld-on Weldolets</p>	<ul style="list-style-type: none"> <li>• 2 to 4 inch, cut 1-7/16 inch hole</li> <li>• Over 4 inch, cut 2-1/8 inch hole in pipe</li> </ul>
 <p>PVC Clamp-on Saddles</p>	<ul style="list-style-type: none"> <li>• 2 to 4 inch, cut 1-7/16 inch hole in pipe</li> <li>• 6 to 8 inch, cut 2-1/8 inch hole in pipe</li> </ul>	 <p>Fiberglass tees</p> <p>FPT</p>	<ul style="list-style-type: none"> <li>• 1.5 in. to 2 in. PVDF insert</li> </ul>
 <p>Iron Strap-on saddles</p>	<ul style="list-style-type: none"> <li>• 2 to 4 inch, cut 1-7/16 inch hole in pipe</li> <li>• Over 4 inch, cut 2-1/8 inch hole in pipe</li> <li>• Special order 14 in. to 36 in.</li> </ul>	 <p>Metric Union Fitting</p>	<ul style="list-style-type: none"> <li>• For pipes from DN 15 to 50 mm</li> <li>• PP or PVDF</li> </ul>

## Ordering Information

### 515/8510-XX

Mfr. Part No.	Code	Description
P51530-H0	198 801 659	Sensor, Polypropylene, Hastelloy-C, Black PVDF; 0.5 to 4 inch
P51530-P0	198 801 620	Sensor, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black), 0.5 to 4 inch
P51530-P1	198 801 621	Sensor, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 5 to 8 inch
P51530-P2	198 801 622	Sensor, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 10 to 36 inch
P51530-P3	198 840 310	Sensor, Wet-Tap, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black), 0.5 to 4 inch
P51530-P4	198 840 311	Sensor, Wet-Tap, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 5 to 8 inch
P51530-P5	198 840 312	Sensor, Wet-Tap, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 10 to 36 inch
P51530-S0	198 801 661	Sensor, polypropylene, PVDF (natural), Black PVDF; 0.5 to 4 inch
P51530-T0	198 801 663	Sensor, PVDF (natural), PVDF (nat.) Rotor Pin, PVDF Rotor (nat.), 0.5 to 4 inch
P51530-T1	198 801 664	Sensor, PVDF (natural), PVDF (nat.) Rotor Pin, PVDF Rotor (nat.), 5 to 8 inch
P51530-V0	198 801 623	Sensor, PVDF (natural), Hastelloy-C Rotor Pin, PVDF Rotor (natural), 0.5 to 4 inch
P51530-V1	198 801 624	Sensor, PVDF (natural), Hastelloy-C Rotor Pin, PVDF Rotor (natural), 5 to 8 inch
P51530-V2	198 801 625	Sensor, PVDF (natural), Hastelloy-C Rotor Pin, PVDF Rotor (natural), 10 to 36 inch
3-8510-P0	198 864 504	Sensor, Integral, PP, Titanium Rotor Pin, PVDF Rotor (black), 0.5 to 4 inch
3-8510-P1	198 864 505	Sensor, Integral, PP, Titanium Rotor Pin, PVDF Rotor (black) 5 to 8 inch
3-8510-T0	159 000 622	Sensor, Integral, PVDF (nat.), PVDF (nat.) Rotor Pin, PVDF Rotor (nat.), 0.5 to 4 inch
3-8510-V0	198 864 506	Sensor, Integral, PVDF (nat.), Hastelloy-C Rotor Pin, PVDF Rotor (nat.), 0.5 to 4 inch
3-3519/515-P3	159 000 819	Sensor & Wet-Tap Assy., PP, Titanium Rotor Pin, PVDF Rotor (black), 0.5 to 4 inch
3-3519/515-P4	159 000 820	Sensor & Wet-Tap Assy., PP, Titanium Rotor Pin, PVDF Rotor (black), 5 to 8 inch
3-3519/515-P5	159 000 821	Sensor & Wet-Tap Assy., PP, Titanium Rotor Pin, PVDF Rotor (black), 10 to 36 inch

### Replacement Parts 515/8510

M1538-2	198 801 181	Rotor, PVDF Black
P51547-3	159 000 474	Rotor, PVDF Natural
M1538-4	198 820 018	Rotor, ETFE
P51550-3	198 820 043	Rotor and Pin, PVDF Natural
3-0515.322-1	198 820 059	Sleeved Rotor, PVDF Black
3-0515.322-2	198 820 060	Sleeved Rotor, PVDF Natural
3-0515.322-3	198 820 017	Sleeved Rotor, ETFE
P31542	198 801 630	Sensor Cap, Red (for use with 515)

## Ordering Information

### 2536/8512-XX

Mfr. Part No.	Code	Description
3-2536-P0	198 840 143	Sensor, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black), ½ to 4 inch
3-2536-P1	198 840 144	Sensor, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 5 to 8 inch
3-2536-P2	198 840 145	Sensor, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 10 to 36 inch
3-2536-P3	159 000 758	Sensor, Wet-Tap, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black), ½ to 4 inch
3-2536-P4	159 000 759	Sensor, Wet-Tap, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 5 to 8 inch
3-2536-P5	159 000 760	Sensor, Wet-Tap, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 10 to 36 inch
3-2536-V0	198 840 146	Sensor, PVDF (natural), Hastelloy-C Rotor Pin, PVDF Rotor (natural), ½ to 4 inch
3-2536-V1	198 840 147	Sensor, PVDF (natural), Hastelloy-C Rotor Pin, PVDF Rotor (natural), 5 to 8 inch
3-2536-T0	198 840 149	Sensor, PVDF (natural), PVDF (nat.) Rotor Pin, PVDF Rotor (natural), ½ to 4 inch
3-8512-P0	198 864 513	Sensor, Integral, PP, Titanium Rotor Pin, PVDF Rotor (black), ½ to 4 inch
3-8512-P1	198 864 514	Sensor, Integral, PP, Titanium Rotor Pin, PVDF Rotor (black) 5 to 8 inch
3-8512-T0	198 864 518	Sensor, Integral, PVDF (nat.), PVDF (nat.) Rotor Pin, PVDF Rotor (nat.), ½ to 4 inch
3-8512-V0	198 864 516	Sensor, Integral, PVDF (nat.), Hastelloy-C Rotor Pin, PVDF Rotor (nat.), ½ to 4 inch
3-3519/2536-P3	159 000 822	Sensor & Wet-Tap Assy., PP, Titanium Rotor Pin, PVDF Rotor (black), ½ to 4 inch
3-3519/2536-P4	159 000 823	Sensor & Wet-Tap Assy., PP, Titanium Rotor Pin, PVDF Rotor (black), 5 to 8 inch
3-3519/2536-P5	159 000 824	Sensor & Wet-Tap Assy., PP, Titanium Rotor Pin, PVDF Rotor (black), 10 to 36 inch

### Replacement Parts 2536/8512

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
3-2536.321	198 820 054	Rotor and Pin, PVDF Natural
3-2536.322-1	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
P31542-3	159 000 464	Sensor Cap, Blue (for use with 2536)

### Accessories 515/8510 & 2536/8512

M1546-1	198 801 182	Rotor Pin, Titanium
M1546-2	198 801 183	Rotor Pin, Hastelloy-C
M1546-3	198 820 014	Rotor Pin, Tantalum
M1546-4	198 820 015	Rotor Pin, Stainless Steel
P51545	198 820 016	Rotor Pin, Ceramic
1220-0021	198 801 186	O-Ring, FPM
1224-0021	198 820 006	O-Ring, EPDM
1228-0021	198 820 007	O-Ring, FFKM
P31536	198 840 201	Sensor Plug, Polypropylene
P31934	159 000 466	Conduit Cap
P51589	159 000 476	Conduit Adapter Kit
5523-0222	159 000 392	Cable (per foot), 2 conductor with shield, 22 AWG
3-8050	159 000 184	Universal mount kit
3-8050-1	159 000 753	Universal junction box
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
3-8051	159 000 187	Transmitter integral adapter (for 8510 and 8512)



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