Type 2551 Magmeter Flow Sensor

Available in a variety of wetted materials and ideal for pipe sizes up to DN900 (36. in.)

Product description

The type 2551 Magmeter is an insertion style magnetic flow sensor that features no moving parts. The patented* sensor design is available in corrosionresistant materials to provide long-term reliability with minimal maintenance costs. Material options include PP with stainless steel, PVDF with Hastelloy-C, or PVDF with Titanium. Utilizing the comprehensive line of GF installation fittings, sensor alignment and insertion depth is automatic. These versatile, simple-to-install sensors deliver accurate flow measurement over a wide dynamic range in pipe sizes ranging from DN15 to DN900 (½ to 36 in.), satisfying the requirements of many diverse applications.

Type 2551 Magmeters offer many output options of frequency/digital (S^3L) or 4 to 20 mA which are available on both the blind and display versions. The frequency or digital (S^3L) sensor output can be used with GF 's extensive line of flow instruments while the 4 to 20 mA output can be used for a direct input to PLCs, chart recorders, etc. Both the 4 to 20 mA output and digital (S^3L) sensor interface is available for long distance signal transmission. An additional benefit is the empty pipe detection which features a zero flow output when the sensors are not completely wetted. Also, the frequency output is bi-directional while the 4 to 20 mA output can be set for uni- or bi-directional flow using the display or the 3-0252 Configuration Tool which connects to PCs for programming capabilities.

In addition the display version of the 2551 Magmeter is available with relays and features permanent and resettable totalizer values which can be stored and seen on the display. Also, the display contains multilanguages with English, Spanish, German, French, Italian and Portuguese menu options.

Features

- Test certificate included for -X0, -X1
- Patented Magmeter technology*
- No moving parts
- Bi-directional flow
- Empty pipe detection
- Installs into pipe sizes DN15 to DN900 (½ to 36 in.)
- Operating range 0.05 to 10 m/s (0.15 to 33 ft/s)
- Accurate measurement even in dirty liquids
- Polypropylene and PVDF retaining nuts standard, Valox optional
- 4 to 20 mA, digital (S^3L), frequency, relay output (display only)
- No pressure drop
- Corrosion resistant materials; PP or PVDF with SS, Hastelloy-C, or Titanium
- Multi-language display menu available

(3-2551-PX-XX version only)

Applications

- Chemical Processing
- Water and Wastewater Monitoring
- Metal Recovery and Landfill Leachate
- Commercial Pools, Spas, and Aquariums
- HVAC
- Irrigation
- Scrubber Control
- Neutralization Systems
- Industrial Water Distribution

Technical Details

General		
Operating Range	0.05 to 10 m/s	0.15 to 33 ft/s
Pipe Size Range	DN15 to DN900	½ in. to 36 in.
Linearity	± 1% reading plus 0.1% of full scale	
Repeatability	±0.5% of reading @ 25 °C (77 °F)	
Minimum Conductivity	20 µS/cm	

Wetted Materials	
Sensor Body/Electrodes and Grounding Ring	-P0, -P1, -P2: PP/316L SS
	-T0, -T1, -T2: PVDF/Titanium
	-V0, -V1, -V2: PVDF/Hastelloy-C
O-rings	FKM (standard) EPR (EPDM), FFKM (optional)
Case	PBT
Display Window	Polyamide (transparent nylon)
Protection Rating	NEMA 4X/IP65

Electrical		
Power Requirements	4 to 20 mA	24 VDC ±10%, regulated, 22.1 mA max.
	Frequency	5 to 24 VDC ±10%, regulated, 15 mA max.
	Digital (S^3L)	5 to 6.5 VDC, 15 mA max.
Auxiliary (only required for units with relays)		9 to 24 VDC, 0.4 A max.
Reverse Polarity and Short Circuit Protected		
Current Output 4 to 20 mA	Loop Accuracy	32 µA max. error (25 °C @ 24 VDC)
	Isolation	Low Voltage < 48 VAC/DC from electrodes and auxiliary power
	Maximum Cable	300 m (1000 ft)
	Error Condition	22.1 mA
	Max. Loop Resistance	300 Ω
	Compatible with PLC, PC or similar equipment	
	4 to 20 mA load needed	
Frequency Output	Output Modes	Freq., or Mirror Relay (display version only)
	Max. Pull-up Voltage	30 VDC
	Max. Current Sink	50 mA, current limited
	Maximum Cable	300 m (1'000 ft)
	Compatible with type type 9900, 9900-1BC, 9950	
Digital S^3L Output	Serial ASCII, TTL level 9600 bps	
	Compatible with type type 9900, 9950, 0486 Profibus Concentrator	

Relay Specifications	
#1, #2 type	Mechanical SPDT
Rating	5 A @ 30 VDC max., 5 A @ 250 VDC max.

Relay Specifications	
#3 type	Solid State
Rating	50 mA @ 30 VDC, 50 mA @ 42 VAC
Hysteresis	User adjustable for exiting alarm condition
Alarm On Trigger Delay	Adjustable (0 to 9999.9 sec)
Relay Modes	Off, Low, High, Window and Proportional Pulse
Relay Source	Flow Rate, Resettable Totalizer
Error Condition	Selectable; Fail Open or Closed

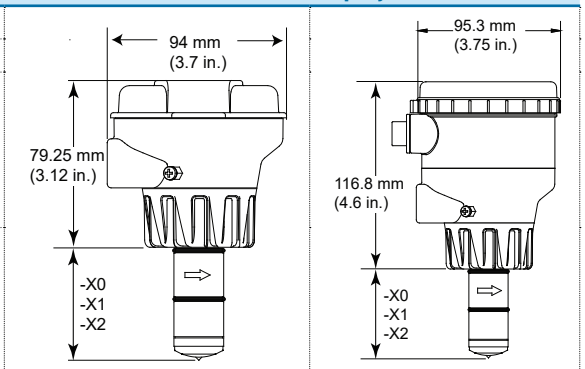
Display	
Characters	2 x 16
Contrast	User-set in four levels
Backlighting (only on relay versions)	Requires external 9-24 VDC, 0.4 mA max.

Max. Temperature/Pressure Rating			
Storage Temperature		-20 °C to 70 °C	-4 °F to 158 °F
Relative Humidity		0 to 95% (non-condensing)	
Operating Temperature	Ambient	-10 °C to 70 °C	14 °F to 158 °F
	Media	0 °C to 85 °C	32 °F to 185 °F
Maximum Operating Pressure		10.3 bar @ 25 °C	150 psi @ 77 °F
		1.4 bar @ 85 °C	20 psi @ 185 °F

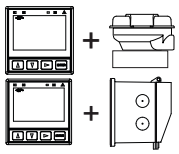
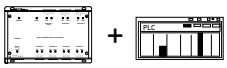
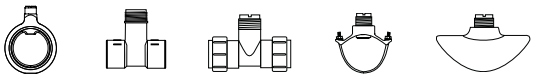
Shipping Weight		
	0.680 kg	1.50 lb

Standards and Approvals
CE, FCC, UL, CUL, NSF (3-2551-PX-XX version only)
RoHS compliant, China RoHS
NEMA 4X / IP65 Enclosure (with cap installed)
Manufactured under ISO 9001, ISO 14001 and ISO 45001

Dimensions

Pipe Range		Blind version	Display version
½ to 4 in.	-X0 = 58 mm (2.3 in.)		
5 to 8 in.	-X1 = 91 mm (3.6 in.)		
10 to 36 in.	-X2 = 167 mm (6.6 in.)		
X = Sensor Body P, T, or V			

System Overview

Stand-Alone	Panel Mount	Pipe, Tank, Wall	4 to 20 mA Output	Automation System
Type 2551 Magmeter	GF Instruments - 9900-1P - 9900-1BC - 9950	GF Instruments - 9900-1 with 3-8050-1 Universal Mount Kit - 9900-1BC with Rear Enclosure 	- Customer Supplied Chart Recorder, Programmable Logic Controller or - Programmable Automation Controller	- 0486 Profibus Concentrator and Customer Supplied - Programmable Logic Controller or Programmable Automation Controller 
	Type 2551 Magmeter			
GF Fittings 				

All Sold Separately

Application Tips

- Note minimum process liquid conductivity requirement is 20 µs/cm.
- Install sensor using standard GF installation fittings for best results.
- Sensor is capable of retrofitting into existing 515 and 2536 fittings

Pressure-temperature diagram

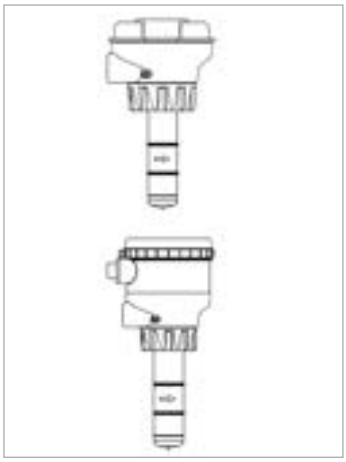
Note

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.

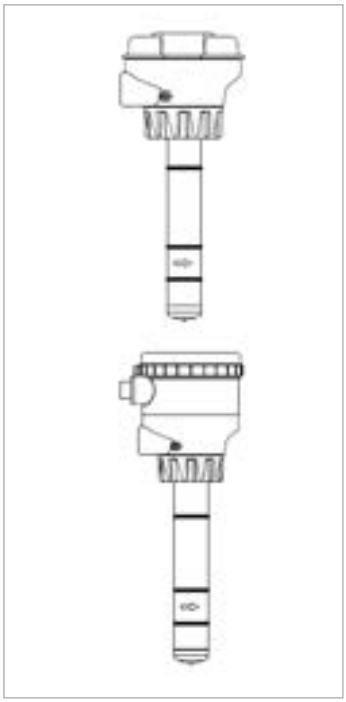
Ordering Information

Pipe Size	Mfr. Part No.	Code	Sensor Body
Frequency or Digital (S^3L) output			
Programmable open collector for use with any GF Flow Instrument or the 9900 or 9950 Instruments. This option is a programmable open collector output that is available with display versions only.			
DN15 to DN100 (½ to 4 in.)			
No Display			
	3-2551-P0-11	159 001 105	Polypropylene and 316L SS
	3-2551-T0-11	159 001 108	PVDF and Titanium
	3-2551-V0-11	159 001 257	PVDF and Hastelloy-C
With Display, two SPDT relays, one solid state relay			
	3-2551-P0-21	159 001 267	Polypropylene and 316L SS
	3-2551-T0-21	159 001 436	PVDF and Titanium
	3-2551-V0-21	159 001 269	PVDF and Hastelloy-C
With Display			
	3-2551-P0-41	159 001 261	Polypropylene and 316 L SS
	3-2551-T0-41	159 001 433	PVDF and Titanium
	3-2551-V0-41	159 001 263	PVDF and Hastelloy-C

DN125 to DN200 (5 to 8 in.)			
No Display			
	3-2551-P1-11	159 001 106	Polypropylene and 316L SS
	3-2551-T1-11	159 001 109	PVDF and Titanium
	3-2551-V1-11	159 001 258	PVDF and Hastelloy-C
With Display, two SPDT relays, one solid state relay			
	3-2251-P1-21	159 001 268	Polypropylene and 316L SS
	3-2551-T1-21	159 001 437	PVDF and Titanium
	3-2551-V1-21	159 001 270	PVDF and Hastelloy-C
With Display			
	3-2551-P1-41	159 001 262	Polypropylene and 316L SS
	3-2551-T1-41	159 001 434	PVDF and Titanium
	3-2551-V1-41	159 001 264	PVDF and Hastelloy-C

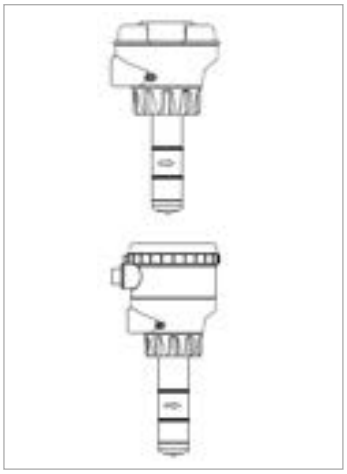


DN250 to DN900 (10 to 36 in.)			
No Display			
	3-2551-P2-11	159 001 107	Polypropylene and 316L SS
	3-2551-T2-11	159 001 448	PVDF and Titanium
	3-2551-V2-11	159 001 450	PVDF and Hastelloy-C
With Display, two SPDT relays, one solid state relay			
	3-2551-P2-21	159 001 435	Polypropylene and 316L SS
	3-2551-T2-21	159 001 454	PVDF and Titanium
	3-2551-V2-21	159 001 456	PVDF and Hastelloy-C
With Display			
	3-2551-P2-41	159 001 432	Polypropylene and 316L SS
	3-2551-T2-41	159 001 460	PVDF and Titanium
	3-2551-V2-41	159 001 462	PVDF and Hastelloy-C

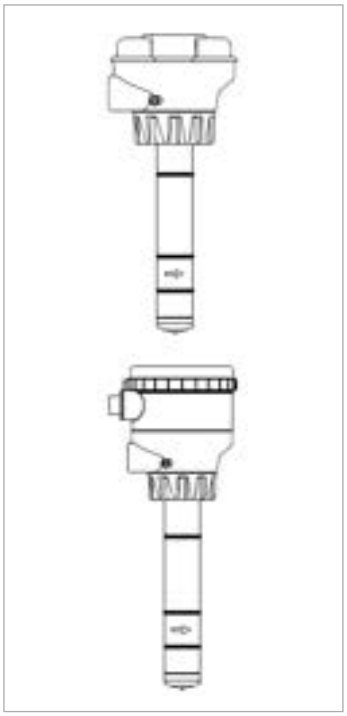


Pipe Size	Mfr. Part No.	Code	Sensor Body
4 to 20 mA output for use with PLC, PC or similar equipment			
DN15 to DN100 (1/2 to 4 in.)			
No Display			
	3-2551-P0-12	159 001 110	Polypropylene and 316L SS
	3-2551-T0-12	159 001 113	PVDF and Titanium
	3-2551-V0-12	159 001 259	PVDF and Hastelloy-C
With Display, two SPDT relays, one solid state relay			
	3-2551-P0-22	159 001 273	Polypropylene and 316L SS
	3-2551-T0-22	159 001 439	PVDF and Titanium
	3-2551-V0-22	159 001 275	PVDF and Hastelloy-C
With Display			
	3-2551-P0-42	159 001 279	Polypropylene and 316 L SS
	3-2551-T0-42	159 001 442	PVDF and Titanium
	3-2551-V0-42	159 001 281	PVDF and Hastelloy-C

DN125 to DN200 (5 to 8 in.)			
No Display			
	3-2551-P1-12	159 001 111	Polypropylene and 316L SS
	3-2551-T1-12	159 001 114	PVDF and Titanium
	3-2551-V1-12	159 001 260	PVDF and Hastelloy-C
With Display, two SPDT relays, one solid state relay			
	3-2251-P1-22	159 001 274	Polypropylene and 316L SS
	3-2551-T1-22	159 001 440	PVDF and Titanium
	3-2551-V1-22	159 001 276	PVDF and Hastelloy-C
With Display			
	3-2551-P1-42	159 001 280	Polypropylene and 316L SS
	3-2551-T1-42	159 001 443	PVDF and Titanium
	3-2551-V1-42	159 001 282	PVDF and Hastelloy-C



DN250 to DN900 (10 to 36 in.)			
No Display			
	3-2551-P2-12	159 001 112	Polypropylene and 316L SS
	3-2551-T2-12	159 001 449	PVDF and Titanium
	3-2551-V2-12	159 001 451	PVDF and Hastelloy-C
With Display, two SPDT relays, one solid state relay			
	3-2551-P2-22	159 001 438	Polypropylene and 316L SS
	3-2551-T2-22	159 001 455	PVDF and Titanium
	3-2551-V2-22	159 001 457	PVDF and Hastelloy-C
With Display			
	3-2551-P2-42	159 001 441	Polypropylene and 316L SS
	3-2551-T2-42	159 001 461	PVDF and Titanium
	3-2551-V2-42	159 001 463	PVDF and Hastelloy-C



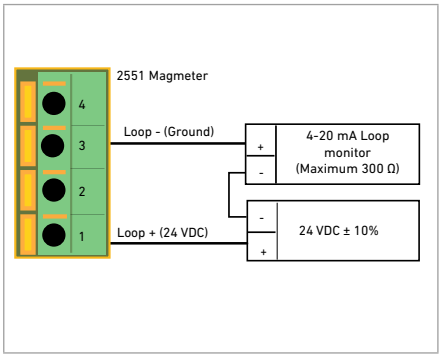
Accessories and Replacement Parts

Mfr. Part	Code	Description
O-Rings		
1220-0021	198 801 000	O-ring, FKM (2 required per sensor)
1224-0221	198 820 006	O-ring, EPR (EPDM) (2 required per sensor)
1228-0221	198 820 007	O-ring, FFKM (2 required per sensor)
Replacement Transducers		
3-2551-P0	159 001 211	PP/316L SS, DN15 to DN100 (1/2 to 4 in.) pipe
3-2551-P1	159 001 212	PP/316L SS, DN125 to DN200 (5 to 8 in.) pipe
3-2551-P2	159 001 444	PP/316L SS, DN250 to DN900 (10 to 36 in.) pipe
3-2551-T0	159 001 213	PVDF/Titanium, DN15 to DN100 (1/2 to 4 in.) pipe
3-2551-T1	159 001 214	PVDF/Titanium, DN125 to DN200 (5 to 8 in.)
3-2551-T2	159 001 445	PVDF/Titanium, DN250 to DN900 (10 to 36 in.) pipe
3-2551-V0	159 001 376	PVDF/ Hastelloy-C, DN15 to DN100 (1/2 to 4 in.) pipe
3-2551-V1	159 001 377	PVDF/Hastelloy-C, DN125 to DN 200 (5 to 8 in.) pipe
3-2551-V2	159 001 446	PVDF/Hastelloy-C, DN250 to DN900 (10 to 36 in.)
Replacement Electronics Module		
3-2551-11	159 001 215	Magmeter electronics, frequency or digital (S^3L) output
3-2551-12	159 001 216	Magmeter electronics, 4 to 20 mA output
3-2551-21	159 001 372	Magmeter display electronics, frequency or digital (S^3L) output, with relays
3-2551-22	159 001 373	Magmeter display electronics, 4 to 20 mA output w/relays
3-2551-41	159 001 374	Magmeter display electronics, frequency or digital (S^3L) output
3-2551-42	159 001 375	Magmeter display electronics, 4 to 20 mA output
3-2551.395	159 310 096	Display Cap Magmeter w/relays
3-2551.395-1	159 310 097	Display Cap Magmeter no relays
Other		
P31536	198 840 201	Sensor plug, Polypropylene
7310-1024	159 873 004	24 VDC Power Supply, 0.42 A, 10W
7310-2024	159 873 005	24 VDC Power Supply, 1.0 A, 24W
7310-4024	159 873 006	24 VDC Power Supply, 1.7 A, 40W
7310-6024	159 873 007	24 VDC Power Supply, 2.5 A , 60W
7310-7024	159 873 008	24 VDC Power Supply, 4.0 A, 96W
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
3-8551.521	159 001 378	Clear plastic cap for display
1222-0042	159 001 379	O-ring for clear plastic cap, EPR (EPDM)
3-0252	159 001 808	Configuration Tool (blind version only)
3-9900.392-1	159 000 839	Liquid Tight Connector Kit, NPT (1 pc.)
3-8050.396	159 000 617	RC Filter kit (for relay use, inductive loads), 2 per kit

Wiring Information

Loop Wiring

The 2551-XX-12 Magmeter is a traditional 2-wire passive 4 to 20 mA loop transmitter. External loop power (24 VDC ±10% regulated) is required.



⚠ The maximum loop resistance the Magmeter can accommodate is 300 Ω.

All 2551-XX-12 Magmeters are shipped from the factory with the 4 to 20 mA output scaled for 0 to 5 m/s (0 to 16.4 ft/s). If this operating range is suitable, no adjustments are necessary.

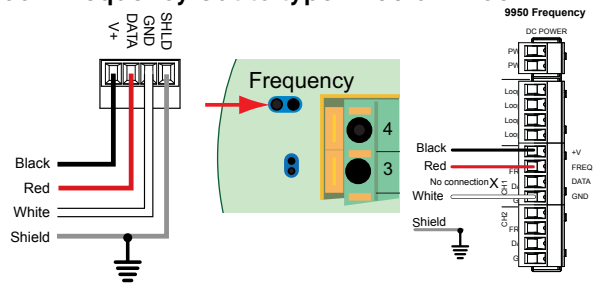
The 3-0252 Configuration Tool is required to change the operating range.

Frequency Wiring

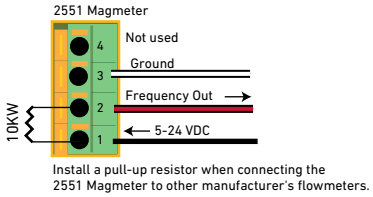
- When the blue jumper illustrated here is placed over both pins, the 2551-XX-11 outputs an open collector frequency signal that can be connected to any powered GF flow meter. (Types 9900, 9900-1BC, 9950).
- 5 VDC power is provided to the 2551 Magmeter by all GF flow instruments. No additional power is required.
- If connecting the 2551 Magmeter to a flow instrument from another manufacturer, 5 to 24 VDC ±10% regulated power must be provided to the 2551.
- A 10 KΩ pull up resistor must also be connected between terminals 1 and 2.
- The frequency output will be displayed as positive flow regardless of the flow direction.

2551 Frequency Out

2551 Frequency Out to type 9900 or 9950



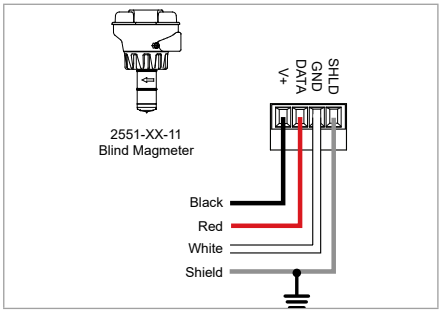
2551 Frequency Out to other Manufacturer's Equipment



Install a pull-up resistor when connecting the 2551 Magmeter to other manufacturer's flowmeters.

Digital (S³L) Wiring:

- When the blue jumper illustrated here is removed (or placed over one pin for storage) the 2551-XX-11 outputs a digital (S³L) signal compatible with the type 9900 or 9950.
- The 2551 receives 5 VDC power from the 9900 or 9950. No additional power is required.
- The 9900 or 9950 will display negative flow rate during periods of reverse flow.
- The maximum cable length from the 2551 to the 9900 or 9950 is 1000 ft.



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