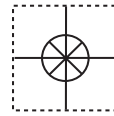


CE



User's Guide



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It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

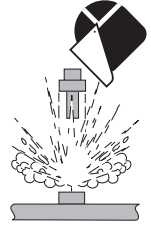
WARNING: These products are not designed for use in, and should not be used for, patient-connected applications.

FMG-550 Series OMEGAMAG



SAFETY INSTRUCTIONS

1. Depressurize and vent systems without Hot-tap valve prior to installation or removal.
2. Confirm chemical compatibility before use.
3. Do not exceed maximum temperature/pressure specifications.
4. Wear safety goggles or face shield during installation/service.
5. Do not disassemble or alter product construction.
6. Disconnect power before attempting any service or wiring.



Specifications

Wetted Materials:

- 316L Stainless Steel body and electrodes
- PVDF Insulator
- O-rings: FPM standard, EPDM, Kalrez® optional
- Cable: 4-cond + shield, PVC jacket (Fixed cable models)
- Watertight rubber cable assembly w/NEMA 6P connector (Submersible cable models)

Power Requirements

- 4 to 20 mA: 24 VDC nominal, 22.1 mA maximum (21.6 VDC min. to 26.4 max.)
400 mV p-p maximum ripple voltage
- Frequency: 5 to 24 VDC nominal, 15 mA maximum (5 VDC min. to 26.4 VDC max.)
- Reverse polarity and short circuit protected

Performance

- Pipe size range: 2 in. to 48 in.
- Minimum Flow Range 0.05 m/s (0.15 ft/s)
Maximum Flow range: 10 m/s (33 ft/s)
- Linearity: $\pm 1\%$ reading + 0.1% of max. range
- Repeatability $\pm 0.5\%$ of reading @ 25°C
- Accuracy: $\pm 2\%$ of measured value (in reference conditions where the fluid is water at ambient temperature, the appropriate upstream and downstream distances are observed, the sensor is inserted at the correct depth and there is a fully developed flow profile which is in compliance with ISO 7145-1982 (BS 1042 section 2.2))
- Minimum Conductivity: 20 $\mu\text{S/cm}$

Output Specifications

Current output (4 to 20 mA)

- Programmable and reversible
- Loop Accuracy: 32 μA max. error (@ 25°C @ 24 VDC)
- Temp. drift: $\pm 1 \mu\text{A}$ per °C max.
- Power supply rejection: $\pm 1 \mu\text{A}$ per V
- Isolation: Low voltage <48 VAC/DC from electrodes and auxiliary power
- Maximum cable: 300 m (1000 ft.)
- Max. Loop Resistance: 300 Ω
- Error condition: 22.1 mA

Frequency output:

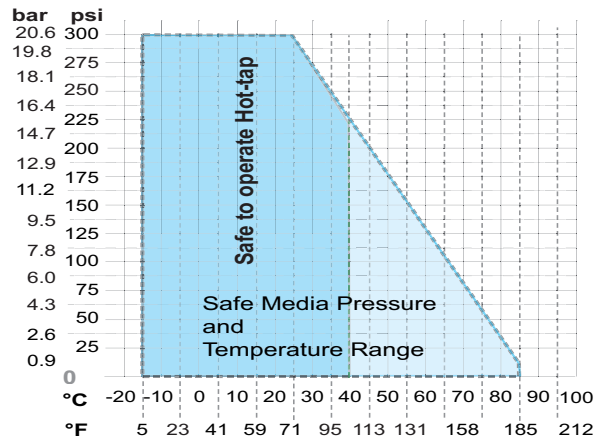
- Max. Pull-up Voltage: 30 VDC
- Short Circuit Protected: $\leq 30 \text{ V}$ @ 0 Ω pull-up for one hour
- Reverse Polarity Protected to -40 V for 1 hour
- Overvoltage Protected to +40 V for 1 hour
- Minimum Current Sink: 50 mA
- Maximum cable: 300 m (1000 ft.)

Tests, Approvals & Standards

- CE
- EN 61326 Emissions and Immunity for Control Equipment
Immunity: EN 61000-6-1
Emissions: EN 55011 class B

Environmental

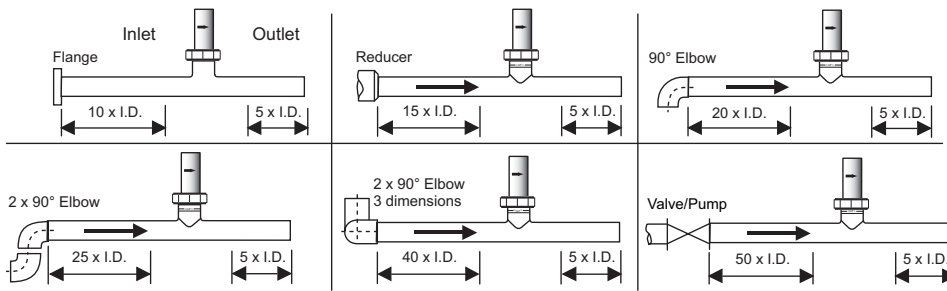
- NEMA 4 / IP65 (Fixed cable models only)
- NEMA 6P / IP68 (Submersible cable models only)
- Storage Temperature: -15°C to 70°C (5°F to 158°F) (non-icing conditions)
- Operating Temperature (non-icing conditions)
Ambient: -15°C to 70°C (5°F to 158°F)
Media: -15°C to 85°C (5°F to 185°F)
- Max. operating pressure: 20.6 bar @ 25°C (300 psi @ 77°F)



Selecting a Location

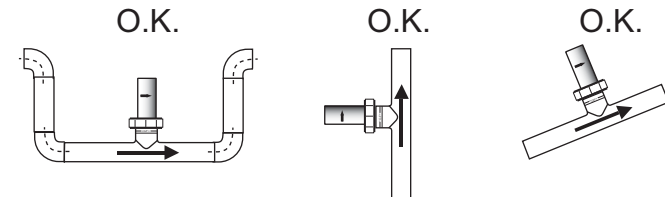
- The FMG-55x requires a fully developed turbulent flow profile for accurate measurement.
- If the piping system harbors air pockets or bubbles, locate the sensor so the air pockets will not contact the electrodes.
- New magmeters should be allowed to soak in a full pipe for 24 hours before operation. This is especially important if the conductivity of the process liquid is less than 100 μS .
- FMG-55x Magmeters equipped with the submersible cable are rated NEMA 6P (IP68). These units can withstand submersion to depths no greater than 2 m (6 ft.) for prolonged periods.
- FMG-55x Magmeters with fixed cables are rated NEMA 4 / IP65. They are NOT suitable for submersion.

Select a location with sufficient distance of straight pipe immediately upstream of the sensor.

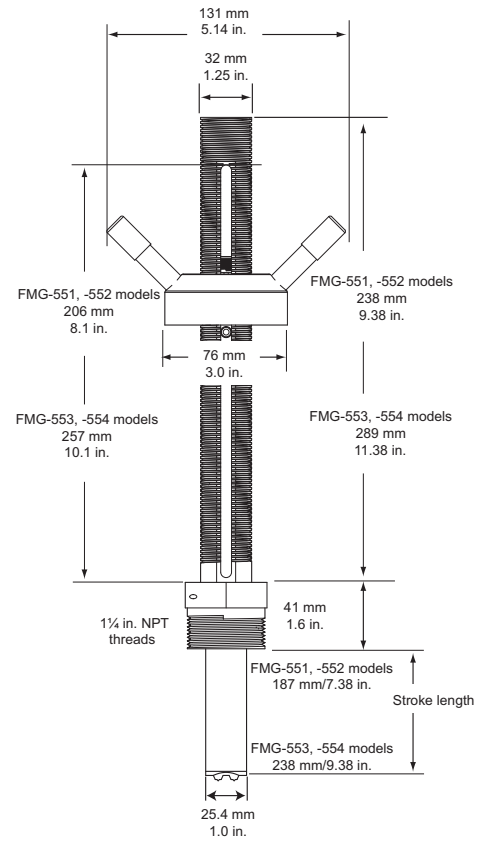


Locating the sensor in a trap or where the flow is upward helps to protect the sensor from exposure to air bubbles when the system is in operation.

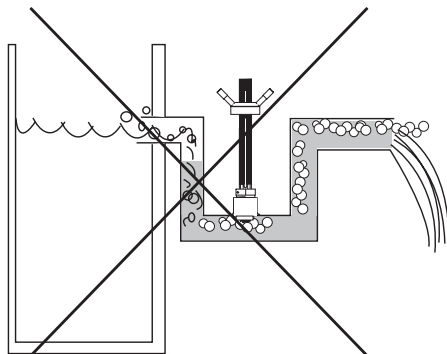
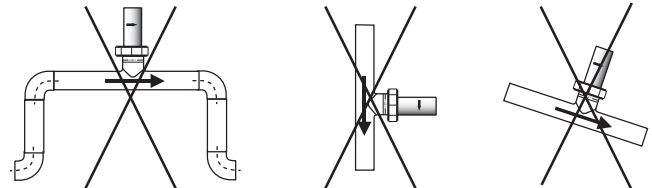
NOTE: The system should be designed to keep the sensor wet at all times.



Dimensions

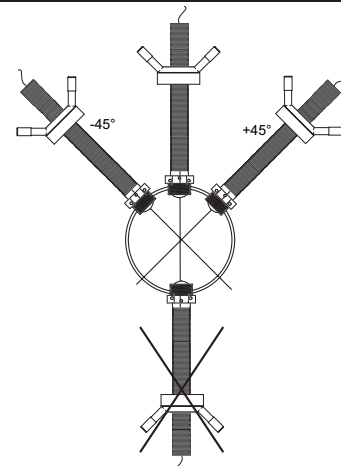


These configurations are not recommended because it is difficult to keep the pipe full.



In a gravity-flow system, the tank must be designed so the level does not drop below the outlet.

This causes the pipe to draw air in from the tank. If air bubbles pass across the Magmeter electrodes, the output will become erratic.



Mounting the sensor upright is OK only where the pipe is full and no air pockets are present at the top of the pipe.

Mount at a maximum of 45° when air bubbles are present.

Do not mount on the bottom of the pipe if sediments are present.

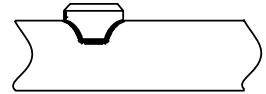
Standard Magmeter Installation

The following items are required to properly install the Magmeter:

- **Supplied with FMG-551 and FMG-552 Magmeters:**
 - 12-inch Ruler
 - Brass alignment rod
 - H-dimension value for your pipe (See pages 9-10)
 - Hex wrench
 - 2 clamp rings
- **Not supplied:**
 - Female pipe fitting (weld-on or saddle) with 1½ in. NPT or ISO 7/1-Rc 1¼ threads
 - 32 mm (1¼ in.) diameter drill
 - Pipe thread sealant suitable for application
 - Pipe wrench

1. Prepare the pipe:

- Cut a 32 mm (1¼ in.) opening in the pipe.
 - Install a 1½ inch outlet onto the pipe.
- ⚠ This fitting must withstand pressures up to 20 bar (300 psi).

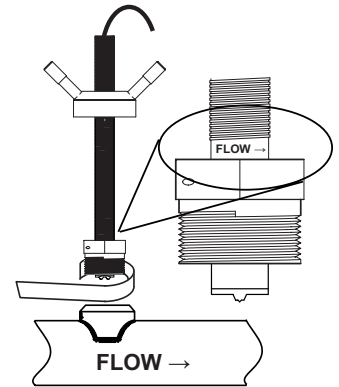


2. Install the Magmeter into the pipe

- Apply sealing tape or paste to the male threads of the sensor nut and thread it securely into the pipe fitting.

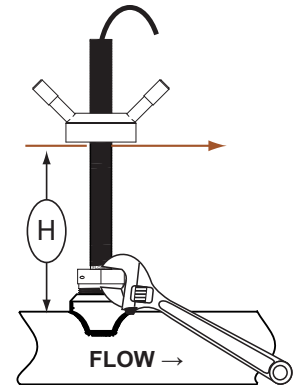
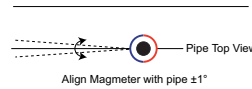
⚠ The sensor is marked to identify the downstream alignment. The arrow MUST point DOWNSTREAM.

⚠ Wear gloves to grip the sensor. Hold the sensor securely while threading the sensor nut into the fitting. Do not allow the magmeter cable to become twisted while turning the nut.



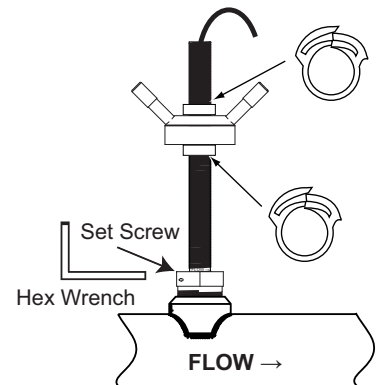
3. Adjust the magmeter position and insertion depth

- Find the H-dimension for your specific pipe size on pages 9-10.
- Insert the brass rod through the alignment opening at the top of the sensor.
- Adjust the height of the magmeter so the distance (H) from the OUTSIDE of the pipe to the bottom of the alignment rod is equal to the H-dimension.
- Adjust the alignment rod so it is parallel to the pipe $\pm 1^\circ$.
- ⚠ Misalignment will cause inaccurate measurement.
- A dry lubricant is applied to the threaded column at the factory. If necessary, re-apply a suitable lubricant to the threaded column to facilitate smooth operation.



4. Secure the Magmeter in position

- Secure the fitting by tightening the set screw on the side of the sensor assembly. A set screw wrench is provided in the magmeter package.
- Secure the height adjustment by installing the two pipe clamps.
 - Spread the clamp apart to wrap it around the threaded stem.
 - Place one clamp immediately above and one clamp immediately below the magmeter adjustment hub.
 - Squeeze the clamp together until it is firmly locked around the threads.



Hot-tap Magmeter Installation

The following items are required to properly install the Magmeter through a Hot-tap valve:

- | | |
|---|---|
| <ul style="list-style-type: none">• Supplied with FMG-553 and FMG-554 Magmeters:<ul style="list-style-type: none">• 12-inch Ruler• Brass alignment rod• Allen wrench• 2 clamps• H-dimension value for your pipe (See pages 9-10) | <ul style="list-style-type: none">• Not supplied:<ul style="list-style-type: none">• Female pipe fitting (weld-on or saddle) with 1¼ in. NPT or ISO 7/1-Rc 1¼ threads• 32 mm (1¼ in.) pipe nipple• 32 mm (1¼ in.) ball valve• 32 mm (1¼ in.) drill bit• Pipe thread sealant suitable for application• Pipe wrench |
|---|---|

1. Prepare the pipe:

- Install a 1¼ inch outlet onto the pipe.

⚠ This fitting must withstand pressures up to 20 bar (300 psi).

- Thread the 1¼ in. pipe nipple into the outlet. Use a suitable paste or sealing tape to provide a leakproof connection.

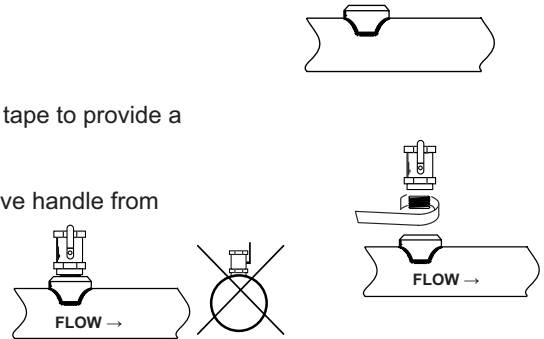
- Thread the 1¼ in. ball valve onto the pipe nipple.

Position the valve handle so it is parallel to the pipe. This will prevent the valve handle from interfering with the adjustment and alignment of the magmeter.

- **Cut a 32 mm (1¼ in.) opening in the pipe.**

⚠ Hot-tap drilling requires special tools and skills.

This task should only be performed by qualified personnel.

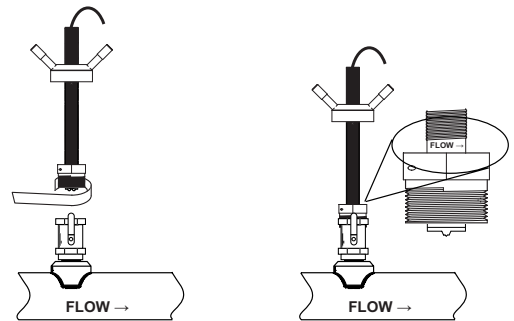


2. Install the Magmeter into the pipe

- Apply sealing tape or paste to the male threads of the sensor nut and thread it securely into the pipe fitting.

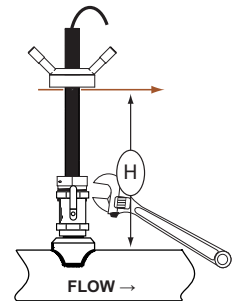
⚠ The sensor is marked to identify the downstream alignment. The arrow **MUST** point **DOWNSTREAM**.

⚠ Wear gloves to grip the sensor. Hold the sensor securely while threading the sensor nut into the fitting. Do not allow the magmeter cable to become twisted while turning the nut.



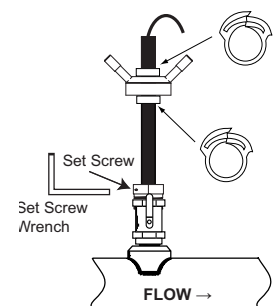
3. Adjust the magmeter position and insertion depth

- Find the H-dimension for your specific pipe size on pages 9-10.
- Insert the brass rod through the alignment opening at the top of the sensor.
- Adjust the height of the magmeter until the distance (H) from the **OUTSIDE** of the pipe to the bottom of the alignment rod is equal to the H-dimension.
- Adjust the alignment rod so it is parallel to the pipe $\pm 1^\circ$.
- ⚠ Misalignment will cause inaccurate measurement.
- A dry lubricant is applied to the threaded column at the factory. If necessary, re-apply a suitable lubricant to the threaded column to facilitate smooth operation.



4. Secure the Magmeter in position

- Secure the fitting by tightening the set screw on the side of the sensor assembly. A set screw wrench is provided in the magmeter package.
- Secure the height adjustment by installing the two pipe clamps:
 - Spread the clamp apart to wrap it around the threaded stem.
 - Place one clamp immediately above and one clamp immediately below the magmeter adjustment hub.
 - Squeeze the clamp together until it is firmly locked around the threads.



General Installation and Grounding Tips

Sensor conditioning

The Magmeter output signal may be unstable immediately after installation. Allowing the sensor to soak in a full pipe (or in any container of water) for 24 hours will stabilize the performance.

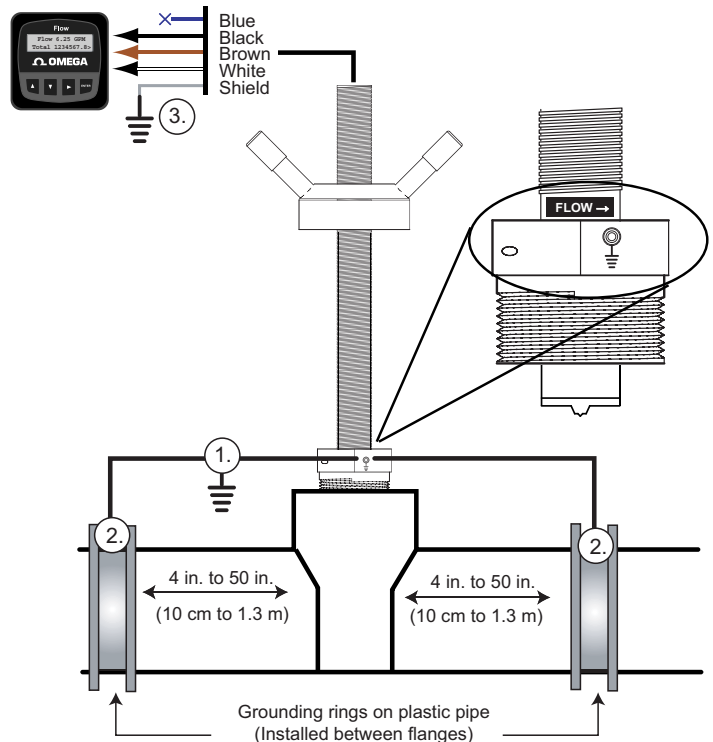
- Very low conductivity fluids may require a longer conditioning period. (The Magmeter may not operate properly in fluids where the conductivity is less than 20 $\mu\text{S}/\text{cm}$.)

Grounding

The FMG-55x Magmeter is unaffected by moderate levels of electrical noise, especially if installed in a properly grounded metal piping system. However, in some applications it may be necessary to ground portions of the system to eliminate electrical interference. The grounding requirements will vary with each installation.

One or more of the following steps may be applied if the Magmeter is affected by electrical noise:

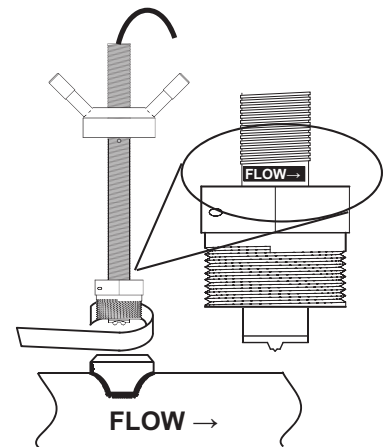
- ① Connect a wire (14 AWG/2.08 mm² recommended) from the ground terminal screw on the outside of the sensor nut directly to a local Earth ground.
- ② Install fluid grounding devices immediately upstream and downstream of the Magmeter. Connect the fluid grounds to the Earth ground terminal on the FMG-55x. Use flanged grounding rings or metal electrodes on plastic pipes, or metal clamps on metal pipes. Fluid grounds must be in direct contact with the fluid, and as near to the Magmeter as possible.
- ③ Connect the SHIELD conductor to Earth ground at the instrument.



Bi-Directional Flow

The FMG-55x magmeter is designed to measure bi-directional flow.

- **4-20 mA output models:** May be scaled to span any flow range: For example: "4 to 20 mA = -100 GPM to +100 GPM"
- **Frequency output models:** Reverse flow is processed same as forward flow.
- The forward flow direction is indicated at the base of the sensor. The arrow must point DOWNSTREAM.



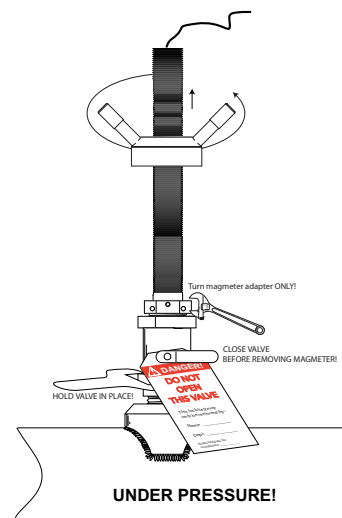
Removal Instructions

⚠ REDUCE THE PROCESS TEMPERATURE TO LESS THAN 40°C (104°F)

- Remove the plastic clamp from the top of the assembly.
- Turn the sensor nut to the top of the threads to retract the sensor. A light lubricant can be applied to the threads if required.
- Close the valve.

⚠ Install a LOCKOUT TAG on the closed valve to prevent accidents!

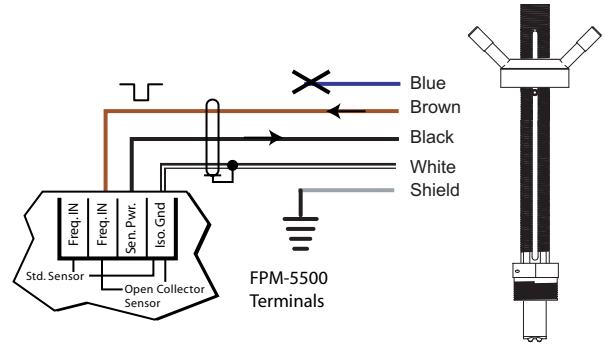
- Remove the magmeter from the top of the valve.
- Loosen the set screw from the sensor adapter fitting.
- Use one pipe wrench to hold the valve in place while turning the sensor adapter with a second wrench.



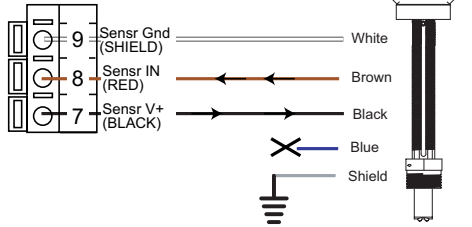
Wiring the FMG-551 and FMG 553 with Frequency output

Wiring: Frequency output

- The FMG-551 and FMG-553 output an open collector frequency signal that can be connected to most powered flow meters. (Recommended for use with the Omega FP series flow transmitters and the FPM series of flow monitors).
- DC power is provided to the Magmeter by these flow instruments. No additional power is required.
- If connecting the Magmeter to a flow instrument from another manufacturer, 5 to 24 VDC power must be provided to the FMG-55x, and a 10 K Ω pull up resistor must also be connected between the +V (Black) and the Freq. Out (Red) wires.

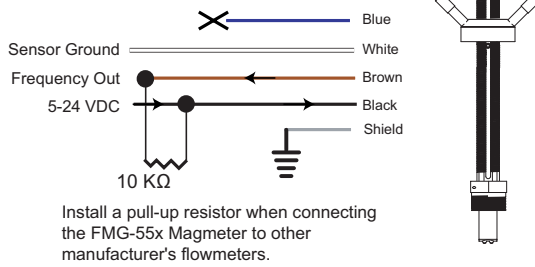


FP-90 Series Flow Transmitter



Connect AUX power on the FP-90 to provide power for the FMG-55x output signal.

Third party Instrument

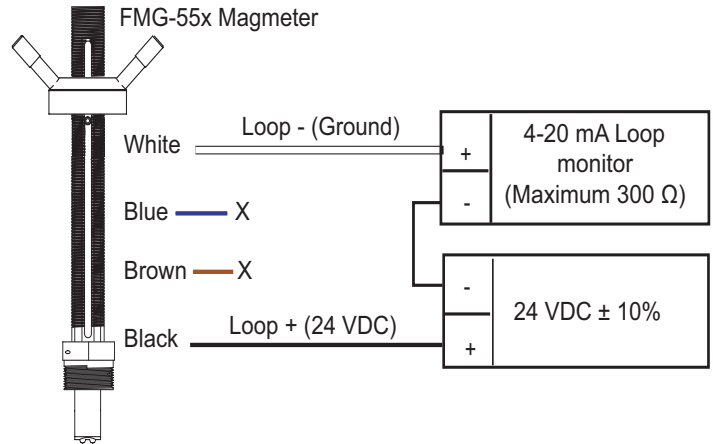


Wiring the FMG-552 and FMG-554 with 4-20 mA Loop Output

The FMG-552 and FMG-554 Magmeters are traditional 2-wire passive 4-20 mA loop transmitters.

- External loop power (24 VDC $\pm$ 10%) is required.

- ⚠ The maximum loop resistance the Magmeter can accomodate is 300 Ω .**
- ⚠ The cable length from the Magmeter to the loop monitor cannot exceed 300 m (1000 ft.)**
- All FMG-55x Magmeters are shipped from the factory with the 4-20 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 calibration charts in this manual list the 20 mA setpoint for each pipe size. Use this information to program the 4-20 mA range of the loop device (PLC, Datalogger, recorder, etc.)



Calibration Data: K-factors and Full Scale Current Values

The data in this table is based on dimensions of metal pipe per ANSI 36.10 and ANSI 36.19.
Stainless steel and carbon steel pipe schedules are the same according to ANSI standards.

Pipe Size (Inch)	Schedule	OD (Inches)	WALL (Inches)	ID (Inches)	H Dim mm FMG-551 FMG-552		H Dim mm FMG-553 FMG-554		K-Factor Pulse/liter	K-Factor Pulse/Gal	Factory set 20 mA (liter/min)	Factory set 20 mA (GPM)
					/32 inch	mm	/32 inch	mm				
2	40	2.375	0.15	2.07	8 16/32	216.4	10 16/32	267.0	46.19	174.83	649.5	171.6
	80	2.375	0.22	1.94	8 15/32	215.1	10 15/32	265.9	52.49	198.68	571.5	151.0
2 ½	40	2.875	0.20	2.47	8 14/32	214.1	10 14/32	264.9	32.37	122.54	926.7	244.8
	80	2.875	0.28	2.32	8 12/32	212.6	10 12/32	263.4	36.57	138.42	820.3	216.7
3	40	3.500	0.22	3.07	8 12/32	212.3	10 12/32	263.1	20.97	79.36	1431	378.0
	80	3.500	0.30	2.90	8 10/32	210.6	10 9/32	261.4	23.47	88.82	1278	337.8
3 ½	40	4.000	0.23	3.55	8 10/32	210.8	10 10/32	261.6	15.68	59.34	1914	505.6
	80	4.000	0.32	3.36	8 8/32	208.9	10 8/32	259.7	17.44	66.01	1720	454.5
4	40	4.500	0.24	4.03	8 8/32	209.3	10 8/32	260.1	12.18	46.09	2464	651.0
	80	4.500	0.34	3.83	8 6/32	207.3	10 5/32	258.1	13.48	51.03	2225	587.9
5	40	5.563	0.26	5.05	8 4/32	206.2	10 4/32	257.0	7.748	29.33	3872	1023
	80	5.563	0.38	4.81	8	203.8	10	254.6	8.519	32.25	3521	930.4
6	40	6.625	0.28	6.07	8	203.0	10	253.8	5.365	20.31	5591	1477
	80	6.625	0.43	5.76	7 28/32	200.0	9 28/32	250.8	5.946	22.51	5045	1333
8	40	8.625	0.32	7.98	7 24/32	197.1	9 24/32	247.9	3.098	11.73	9683	2558
	80	8.625	0.50	7.63	7 20/32	193.5	9 20/32	244.3	3.394	12.85	8838	2335
10	40	10.75	0.37	10.0	7 16/32	190.8	9 16/32	241.6	1.966	7.440	15262	4032
	80	10.75	0.59	9.56	7 11/32	186.2	9 11/32	237.00	2.158	8.170	13899	3672
12	STD	12.75	0.38	12.0	7 10/32	185.6	9 10/32	236.4	1.371	5.187	21890	5783
	XHY	12.75	0.50	11.8	7 7/32	183.0	9 6/32	233.8	1.429	5.410	20987	5545
14	30	14.00	0.38	13.3	7 6/32	182.4	9 6/32	233.2	1.124	4.255	26688	7051
	XHY	14.00	0.50	13.0	7 3/32	179.8	9 3/32	230.6	1.168	4.420	25690	6787
16	30	16.00	0.38	15.3	7	177.3	9	228.1	0.849	3.212	35352	9340
	40/ XHY	16.00	0.50	15.0	6 28/32	174.8	8 28/32	225.6	0.877	3.320	34202	9036
18	STD	18.00	0.38	17.3	6 25/32	172.2	8 25/32	223.0	0.663	2.510	45233	11950
	XHY	18.00	0.50	17.0	6 22/32	169.7	8 22/32	220.5	0.683	2.585	43931	11610
20	20/ STD	20.00	0.38	19.3	6 18/32	167.1	8 19/32	217.9	0.533	2.016	56330	14880
	30/ XHY	20.00	0.50	19.0	6 16/32	164.6	8 16/32	215.39	0.547	2.069	54876	14500
22	20/ STD	22.00	0.38	21.3	6 12/32	162.1	8 12/32	212.85	0.437	1.654	68643	18136
	30/ XHY	22.00	0.50	21.0	6 9/32	159.5	8 9/32	210.31	0.448	1.694	67037	17711
24	20/ STD	24.00	0.38	23.3	6 6/32	157.0	8 6/32	207.77	0.365	1.382	82172	21710
	XHY	24.00	0.50	23.0	6 3/32	154.4	8 3/32	205.23	0.373	1.412	80414	21246

Pipe Size (Inch)	Schedule	OD (Inches)	WALL (Inches)	ID (Inches)	H Dim mm FMG-551 FMG-552		H Dim mm FMG-553 FMG-554		K-Factor Pulse/liter	K-Factor Pulse/Gal	Factory set 20 mA (liter/min)	Factory set 20 mA (GPM)
					/32 inch	mm	/32 inch	mm				
26	STD	26	0.38	25.25	6	151.89	8	202.69	0.310	1.172	96917	25606
	20/XHY	26	0.50	25.00	5 28/32	149.35	7 28/32	200.15	0.316	1.195	95008	25101
28	STD	28	0.38	27.25	5 25/32	146.81	7 25/32	197.61	0.266	1.006	112879	29823
	20/XHY	28	0.50	27.00	5 22/32	144.27	7 22/32	195.07	0.271	1.025	110817	29278
30	STD	30	0.38	29.25	5 19/32	141.73	7 19/32	192.53	0.231	0.873	130056	34361
	20/XHY	30	0.50	29.00	5 16/32	139.19	7 16/32	189.99	0.235	0.888	127842	33776
32	STD	32	0.38	31.25	5 12/32	136.65	7 12/32	187.45	0.202	0.765	148449	39220
	20/XHY	32	0.50	31.00	5 9/32	134.11	7 9/32	184.91	0.205	0.777	146084	38595
34	STD	34	0.38	33.25	5 6/32	131.57	7 6/32	182.37	0.179	0.676	168059	44401
	20/XHY	34	0.50	33.00	5 3/32	129.03	7 3/32	179.83	0.181	0.686	165541	43736
36	STD	36	0.38	35.25	5	126.49	7	177.29	0.159	0.601	188885	49903
	20/XHY	36	0.50	35.00	4 28/32	123.95	6 28/32	174.75	0.161	0.610	186215	49198
38	STD	38	0.38	37.25	4 25/32	121.41	6 25/32	172.21	0.142	0.538	210926	55727
	XHY	38	0.50	37.00	4 22/32	118.87	6 22/32	169.67	0.144	0.546	208105	54981
40	STD	40	0.38	39.25	4 19/32	116.33	6 19/32	167.13	0.128	0.485	234184	61872
	XHY	40	0.50	39.00	4 16/32	113.79	6 16/32	164.59	0.130	0.491	231210	61086
42	STD	42	0.38	41.25	4 12/32	111.25	6 12/32	162.05	0.116	0.439	258658	68338
	XHY	42	0.50	41.00	4 9/32	108.71	6 9/32	159.51	0.117	0.444	255532	67512
48	STD	48	0.38	47.25	3 25/32	96.01	5 25/32	146.81	0.088	0.335	339377	89664
	XHY	48	0.50	47.00	3 22/32	93.47	5 22/32	144.27	0.089	0.338	335795	88717

Installation instructions for other pipes

If your pipe is not listed in the tables, you can calculate the proper H-dimension as illustrated here.

Contact the factory for a custom K-factor.

Height from the sensor tip to the alignment rod is:

FMG-551, -552: 225.5 mm (8.88 in.)
FMG-553, -554: 276.3 mm (10.88 in.)

Subtract:

- Wall Thickness: _____ mm (_____ in.)

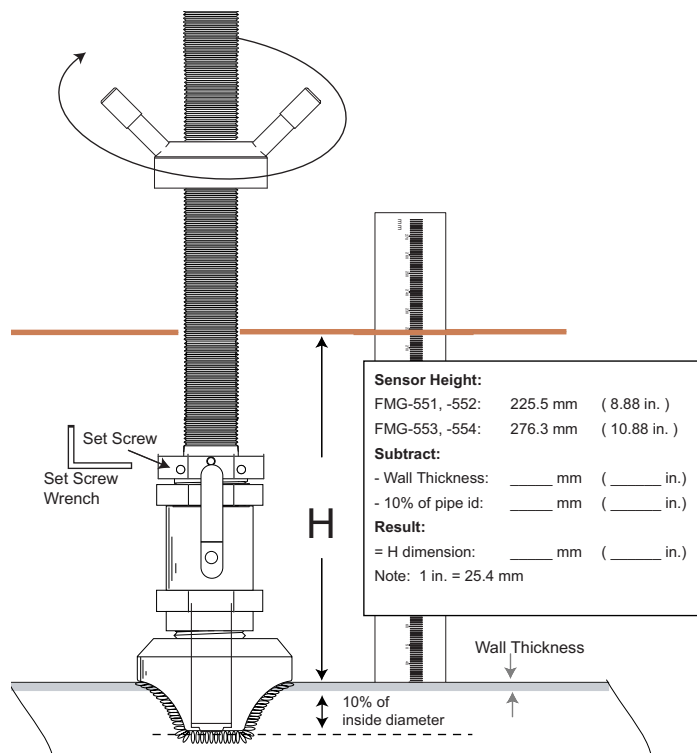
Subtract:

- 10% of pipe id: _____ mm (_____ in.)

Result:

= H dimension: _____ mm (_____ in.)

Note: 1 in. = 25.4 mm



Maintenance

There are no user-serviceable components in the FMG series Magmeter.

- If the fluid contains deposits and solids that may coat the electrodes, a regular cleaning schedule is recommended.
- Do not use abrasive materials on the metal electrodes. Clean with soft cloth and mild detergent only.
- Use a cotton swab and mild detergent to remove deposits on the metal electrodes at the tip of the sensor.
- If the sensor nut will not turn smoothly, a light lubricant can be applied to the threads.

Environmental Recommendations:

- When used properly, this product presents no inherent danger to the environment.
- Please follow local ordinance when disposing of this or any product with electronic components.

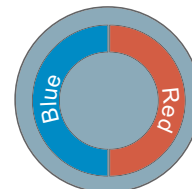
Troubleshooting

Symptom	Possible Cause	Possible Solution
• Frequency output or Current output is erratic.	• Magmeter installed too close to upstream obstruction. • Magmeter electrodes are coated with solids. • Magmeter electrodes exposed to air bubbles/pockets. • Electrical noise is interfering with the measurement. • New sensor, metal surface not properly conditioned.	• Move the Magmeter upstream at least 10 pipe diameters from obstruction. • Clean the electrodes with soft cloth. Do not use abrasives. • Eliminate air bubbles in the pipe. • Remove the Magmeter and reinstall with the flow direction arrow on the sensor body pointed DOWNSTREAM. • Modify grounding as required to protect the Magmeter from interference. • Soak sensor overnight in fluid.
• Output is not 0 when flow is stopped.	• Electrodes not adequately conditioned. • Pipe is empty, Magmeter is not in fluid. • Electrical noise is interfering with the measurement. • Defective Magmeter	• Soak sensor overnight in fluid. • Configure pipe so electrodes are always in fluid. • Modify grounding as required to protect the Magmeter from interference. • Return to factory for service.
• 4-20 mA output is incorrect.	• Magmeter 4-20 mA is not scaled same as Loop device. • Loop device is not scaled same as Magmeter. • Defective Magmeter	• Respan the Magmeter to match the Loop device. • Respan Loop device to match Magmeter. • Return to factory for service.
• Frequency output is inoperative • Loop output is inoperative.	• Magmeter is wrong model. • Wiring is not correct. • Frequency input to other manufacturer's flow instrument does not have pull-up resistor.	• Frequency model is FMG-551 or -553. • 4-20 mA model is FMG-552 or -554. • Blue wire must be grounded for freq out, open for S³L out. • Check wiring, make corrections. • Install 10kΩ resistor.
• Output is 22.1 mA.	• Conductivity is less than 20 μS/cm. • Electrical noise • Electronic component failure.	• Unsuitable application for Magmeter. • Check grounding, eliminate noise source • Return to factory for service.

Troubleshooting with the RED and BLUE lights

The FMG-55x uses two colored LEDs to indicate the status of the measurement. They are located at the top of the magmeter, recessed inside the threaded steel housing. Look down the tube to see them.

No Lights:	The power is off or the sensor is not connected
Solid Blue:	The power is on but there is no flow in the pipe.
Blinking Blue:	Normal operation, blink rate is proportional to the flow rate.
Alternating Red-Blue:	Empty pipe indication (electrodes are not wet.)
Blinking Red:	System errors (electrical noise interference)
Solid Red:	Instrument error (defective electronics component)



Ordering Information

Part No.	Description
FMG-551	7.3 in. Sensor protrusion depth, 1¼ in. NPT, Fixed Cable, Frequency Output
FMG-552	7.3 in. Sensor protrusion depth, 1¼ in. NPT, Fixed Cable, 4 to 20 mA Output
FMG-551-SUB	7.3 in. Sensor protrusion depth, 1¼ in. NPT, Connector, Frequency Output
FMG-552-SUB	7.3 in. Sensor protrusion depth, 1¼ in. NPT, Connector, 4 to 20 mA Output
FMG-553	9.3 in. Sensor protrusion depth, Hot-tap, 1¼ in. NPT, Fixed Cable, Frequency Output
FMG-554	9.3 in. Sensor protrusion depth, Hot-tap, 1¼ in. NPT, Fixed Cable, 4 to 20 mA Output
FMG-553-SUB	9.3 in. Sensor protrusion depth, Hot-tap, 1¼ in. NPT, Connector, frequency Output
FMG-554-SUB	9.3 in. Sensor protrusion depth, Hot-tap, 1¼ in. NPT, Connector, 4 to 20 mA Output
FMG-550-S-CABLE-19FT	4-conductor, 22 AWG, water-tight connector, 6m (19.5 ft.) for -SUB models



WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of 13 months from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal one (1) year product warranty to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY / DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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