RMG's GT400 Gas USM Regulator Noise Immunity Example

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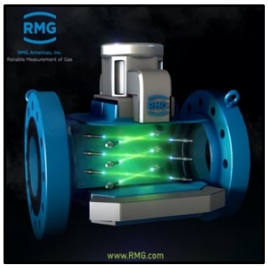
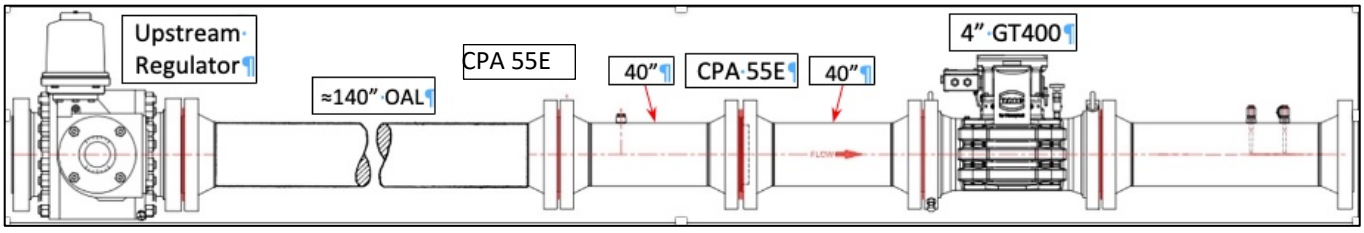


Introduction

Today's gas USM metering facilities often require using regulators in close proximity for pressure and/or flow control. It is well known that pressure regulators create significant ultrasonic noise inside the pipeline which can interfere with the meter's operation. When the regulator noise exceeds the meter's ability to differentiate the receiving signal from the extraneous noise, meter performance will decrease, and it can stop working. Traditionally many clients install tees between the meter and regulator to help isolate the noise from the meter. This solution significantly increases metering facility cost and size. A previous Tech Note 5 [1] discusses these issues and includes application details for a European Installation. **But what if a gas USM could cope with significant control valve noise, without the need for tees, even if the regulator is installed upstream of the meter?** This Tech Note discusses a North American client's application where the regulator was installed **upstream of the meter** with **no acoustic isolating tees** between the regulator and the meter.

Installation Details

For this application gas delivery required the client to significantly reduce the pressure to not exceed the downstream client's MAOP. A regulator was installed upstream of the meter due to space limitations. The regulator inlet pressure is typically 1,045 PSIG and the metering delivery pressure is 515 PSIG (about 530 PSIG pressure drop). There is approximately 20 feet of straight piping between the 4" RMG GT400 6-path meter and the upstream regulator. A CPA 55E flow conditioner is the only device installed between the regulator and the meter. The following generic drawing shows the basic meter / regulator design.



The generic drawing above, which is not to scale, shows no acoustic isolation devices were used between the regulator and the metering package. The CPA 55E piping is 10D (both spools), and the spool upstream of the meter's piping is approximately 18 feet long.

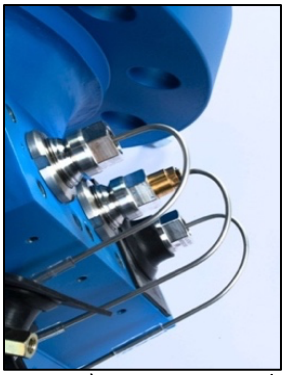
Path & Transducer Statistics

Path		AGC	SNR	SoS	Perf.
1	1.1	5.8	41.94	1130.315	100
	1.2	6.1	39.10		
2	2.1	6.3	40.78	1130.509	100
	2.2	6.9	42.53		
3	3.1	8.8	42.31	1130.045	100
	3.2	8.8	40.87		
4	4.1	7.5	40.90	1130.439	100
	4.2	8.0	41.21		
5	5.1	6.7	34.98	1129.740	100
	5.2	6.8	36.10		
6	6.1	7.4	35.52	1129.178	100
	6.2	7.7	35.49		

Performance Results

This 4" GT400 USM was installed in 2022 and has continued to operate with no problems. The RMGView image to the right shows all transducer path's (6) diagnostic information, including performance (all operating at 100%), SNR (well above the minimum of 15 dB), SOS and Gains, and are all in the normal range.

So, you ask, how is this possible? The answer lies in the meter's transducer and wiring design. Instead of using lower-cost intrinsically safe wiring to provide power to the transducers, RMG utilizes state-of-the-art explosion-proof "micro-tubing" (see picture to the right). This allows for much higher voltage to be delivered to the fully sealed titanium transducers. This higher voltage significantly increases the transducer's sound pressure level (SPL) and permits accurately identifying the receiving waveform in even this very demanding control valve noise application.



Summary

There are times when it isn't practical to install a regulator downstream of the meter. For this application the benefit of the RMG GT400's control valve noise immunity allowed this client to install the regulator upstream of the meter without concern that it would affect the meter's performance. **With capital expenditures being of major concern in today's market, RMG provides the most cost-effective ultrasonic metering solution.**

RMG Tech Notes

This is the 13th Tech Note in our series. Previous Tech Notes are posted on the RMG website (www.rmg.com), or we can send them to you directly via email. Please contact us at salesUSA@rmg.com to obtain a copy of any of our previous Tech Notes.

References

Tech Note 5: RMG's GT400 Gas USM Regulator Performance Significantly Reduces Cost