

C. Sathish Kumar, Ultrasonic flow measurement, M. Tech. Thesis, Department of Electrical Engineering, Indian Institute of Technology Bombay, 1996.

Supervisor(s): Prof. T. Anjaneyulu and Prof. P. C. Pandey

Abstract – In applications where the flowmeter should not obstruct the flow, ultrasonic flowmeter are best suited. An ultrasonic flowmeter for a single phase liquid flow, based on dual path sing-around technique has been developed by B. P. Parmar as an M. Tech project at IIT Bombay, in 1995. A detailed testing of this system has been done in the laboratory. It was observed that at high flows, the sing-around loop of the system becomes unstable and gives erratic readings. Recording and analysis of the received ultrasonic signal, at various flow rates, has been done and it revealed that the instability is due to the change in the relative amplitude levels of the peaks of the signal. As a particular level of the received signal was used for detection, this causes false triggering. A system, with an improved technique for detection of the received signal, has been developed. In this system, the received signal, amplified to saturation level by two staged of amplification, with a diode clipping circuit in between to filter out any noise and echo signals, is used for detection. Thus small changes in amplitude levels do not cause errors in the detection of the signal. Further modifications have been incorporated in the new system in order to iprove the performance. The flowmeter developed, has an accuracy of 5% and is suitable for measurement of liquid flow in the range 0 – 600 lpm.