

Winters Instruments: Corporate Engineering White Paper:

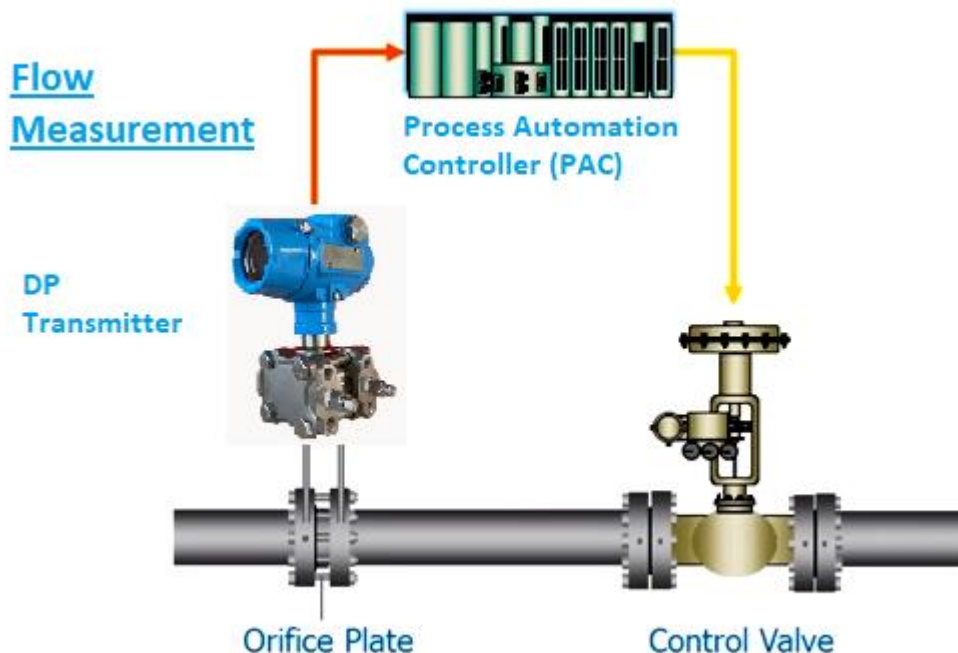
Use of WinSMART™ LY36 Series as a Flowmeter

Introduction

Winters Instruments WinSMART™ LY36 series is an explosion proof differential pressure transmitter suitable for use in Hazardous locations. The standard application for this product is to measure differences in pressure across two tap-off points on a pipe or across a filter. The output can be either 4-20mA 2-wire with or without HART protocol, 1-5 VDC 3-wire or Modbus RS485 4-wire .

Measuring Flow instead of difference in Pressure

Sometimes an application requires measurement of flow, rather than pressure to allow adjustment of a control valve. A typical arrangement is shown below.



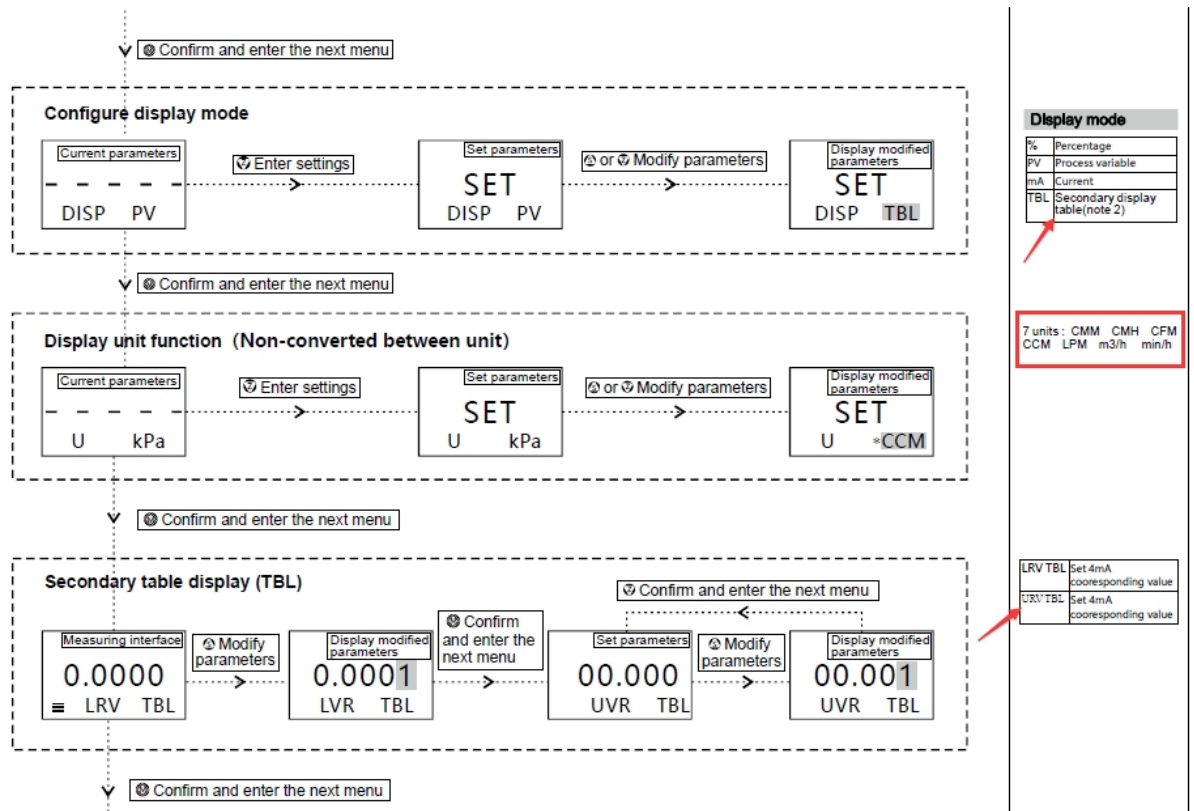
In order to measure flow down a pipe the following considerations are required:

1. Provide details of the requested process flow rate.
Flow rate is defined as volume per unit time.

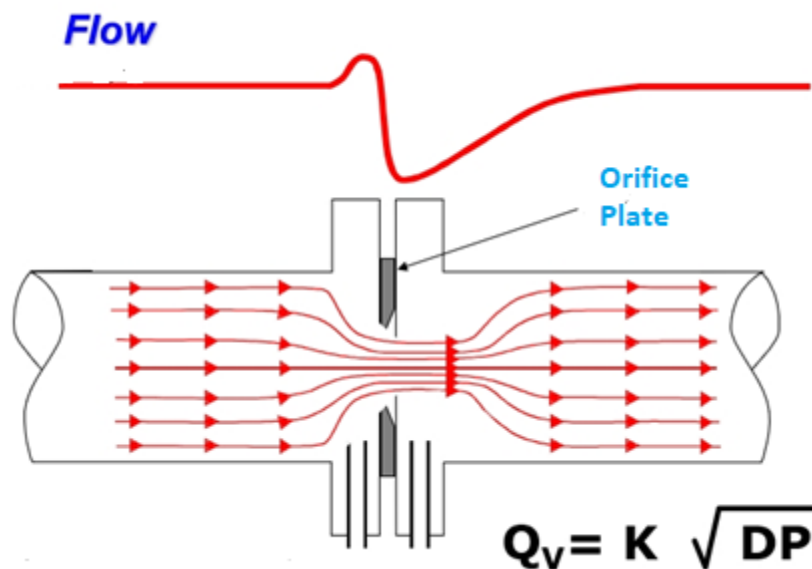
The following units of flow rate are available in the LY36 display program

- CMM (cubic meters per minute)
- CMH (Cubic meters per hour)
- CFM (cubic feet per minute)
- CCM (cubic centimeters per minute)
- LPM (litres per minute)
- m3/h (cubic meters per hour)
- min/h

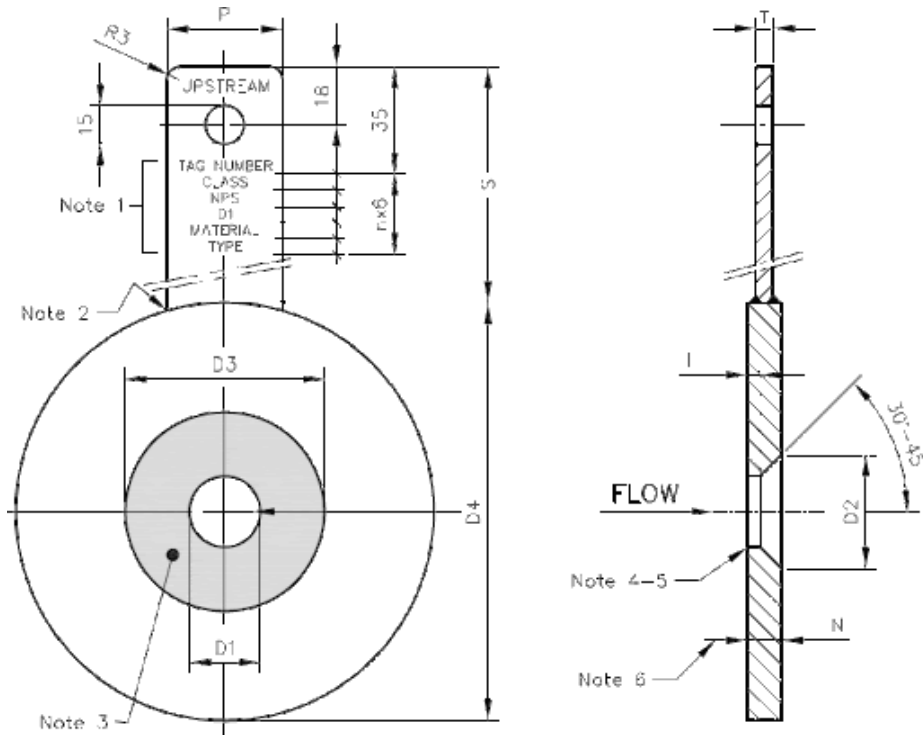
The LY36 can be programmed using the following menu routine to show unit flow. What also needs to be completed is to set-up the LRV and URV corresponding to 4-20mA. A full description of the programming options are available on the WinSMART™ LCD display Instruction manual.



- In order to measure flow, an orifice plate needs to be separately provided. Orifice plates are used to create a known pressure drop for flow through a specified hole size. The pressure drop is able to be measured by having two pressure tap points, one upstream and one downstream of the orifice plate. These two measurements of pressure can then be fed back to the LY36 differential pressure transmitter and converted back to a unit of flow measurement, using the calculation $Q_v = K \sqrt{DP}$, where Q_v = Flow, DP = differential pressure, K = k factor dependent upon the orifice diameter



The primary dimensions of the orifice plate are based on the diameter of the pipe, the thickness of the plate and the required inner hole diameter to achieve specified pressure drop. An example of an orifice plate is shown below:



- In addition, capillaries are required to make the connection between the LY36's two process connections and either side of the orifice plate. These capillaries can either be flexible stainless steel armored or fixed / rigid piping.

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Winters Instruments is a global manufacturer of pressure and temperature instrumentation, with distribution in over 80 countries. Go to www.winters.com to view our extensive list of products and distributors, or call 1-800-WINTERS for more information.

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