ABB Flow Measurement WaterMaster
Digital Outputs

Introduction
Many applications require the meter to output a signal that will pulse at preset intervals of volume or switch to indicate an alarm condition. This note will explain and demonstrate how the WaterMaster digital outputs can be configured and programmed to accomplish.

Passive Outputs
All WaterMaster digital outputs are passive Open Collector designs.
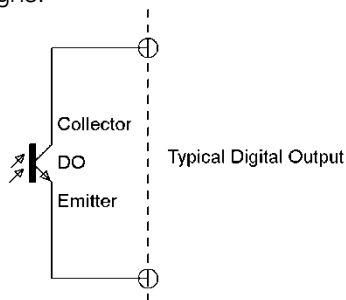

Fig. 1 Open Collector

This requires a voltage be applied to the Open Collector and the output signal driven to ground from the Emitter through the input of the device receiving the signal. It's important to understand that there will be no voltage measurable from this output if none is applied. The Outputs employ Galvanic Isolation, which simply mean that there is no current passed from the controlling circuit to the output circuit. This is possible because the Output transistors are photo transistors, that is to say the base drive of the transistor is driven by light, not a direct connection. This offers a certain level of safety with respect to the outputs.

Digital Output Specifications
The outputs are limited to the voltage that can be applied as well as the current they can pass. Exceeding either of these parameters will permanently damage the output. When specifying your output care must be taken to stay well within the design limitations given below. The frequency limitation of these outputs must be observed as well since attempting to drive at frequencies greater than the maximum allowed will result in the output not being able to switch fast enough.

- Rating 30 V @ 220 mA   - This is an absolute maximum rating for any DC voltage applied to the output.
- Open Collector
- Galvanically isolated
- Maximum output frequency 5250 Hz
- 1 dedicated to Alarm / Logic, programmable function
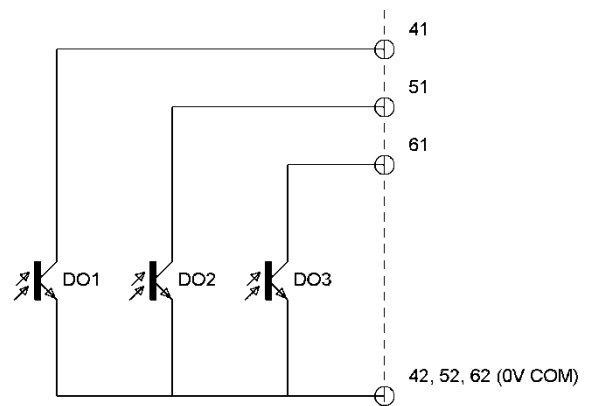- 2 configurable to Pulse / Frequency or Alarm/Logic function

Fig. 2 DO1, DO2 and DO3

From a hardware point of view the outputs are the same and share a common return terminal which is labeled 42, 52, 62. This has to be taken into consideration when using multiple outputs. This is a Sinking Configuration. Pins 41, 51, and 61 are the pin to connect to the individual outputs.

Setting up a Digital output
What you need to know:
- Can you input provide power to the output?
- What signal are you sending to the output?
- What is the requirement for your input?
- What's the frequency of this output?

Suppose you want to send a pulse for every 1000 gallons to your system for external totalization and you want a logic signal to indicate forward or reverse flow and you want a separate signal sent for an Empty Pipe alarm condition.

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Setting up a Digital output (continued)
Establish DO1 for the Pulse Output and DO2 for the Direction, DO3 will be the empty Pipe signal. In this example your input would have to provide the power to our outputs with a current limit of 220 mA and applied voltage of 30 VDC. Your inputs would be connected to our outputs at terminals 41, 51, and 61 using the terminal marked 42, 52, and 62 as a return.
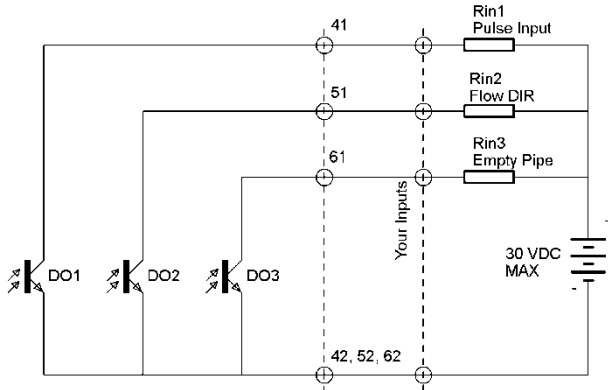

Fig. 3 Example of output

Programming to individual outputs would be a simple task.

Programming DO1
This output is going to provide a pulse per unit. Start with entering the "ADVANCE ACCESS". Once you navigate to the Input/Output Menu (5) take the following steps:

- Select Output Set Up
- Select DO1/DO2 Function
- Select DO1/DO2 for Pulse FR – Logic
- Select Logic SetUp
- Select DO2 F/R Signal
- Select DO2 Action
- Select DO3 logic
- Digital Out Alarm
- Select DO3 configuration
- Empty Pipe
- Select DO3 Action

The most efficient method of completing a task like this is plan ahead and know the steps you need to take to get the output you want from the meter to the system handling the signals. There are hundreds of permutations and combinations of signals and set up that can be accomplished with the digital outputs and programming features.

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