

Application Note: Math Modules: Flow: DP Totalizing - Effluent Plant Flow

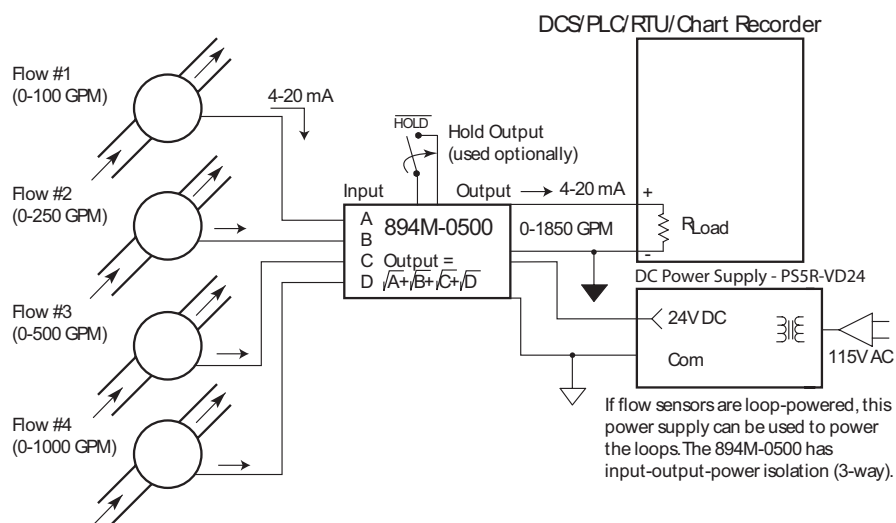
Defining the Problem:

Taking the square root and summing up to four 4-20mA signals from flow sensors.

Solution:

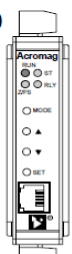
Model 894M-0500 quad-input math module
Model 800C-SIP software interface package
Optional: Model PS5R-VD24 power supply

System Diagram:

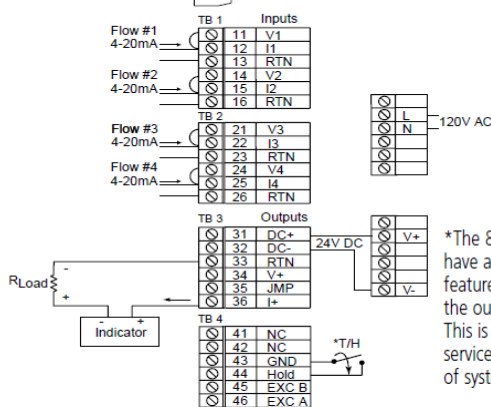
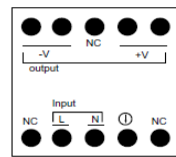


Wiring Diagram:

Model No: 894M-0500
Input(s): 4-20mA
Output: 4-20mA



Model No: PS5R-VD24
Input: 120V AC
Output: 24V DC (50W)



Scaling & Equation:

I/O	Equation Symbol	Zero Signal Value	Zero Engr. Units Value	Full Scale Signal Value	Full Scale Engr. Units Value	Engr. Units
Input 1	A	4.0 mADC	0	20.0 mADC	10000	gpm ²
Input 2	B	4.0 mADC	0	20.0 mADC	62500	gpm ²
Input 3	C	4.0 mADC	0	20.0 mADC	2.5e+005	gpm ²
Input 4	D	4.0 mADC	0	20.0 mADC	1e+006	gpm ²
Output 1		4.0 mADC	0	20.0 mADC	1850	gpm

Equation:
Output 1 = $\sqrt{\text{MAX}(A,0)} + \sqrt{\text{MAX}(B,0)} + \sqrt{\text{MAX}(C,0)} + \sqrt{\text{MAX}(D,0)}$

Output Equation: $\sqrt{\text{MAX}(A,0)} + \sqrt{\text{MAX}(B,0)} + \sqrt{\text{MAX}(C,0)} + \sqrt{\text{MAX}(D,0)}$

When taking individual flow inputs offline (0 mA input), the "maximum" function will clamp that channel to a flow rate of zero (ie; 0 GPM), for calculation purposes.