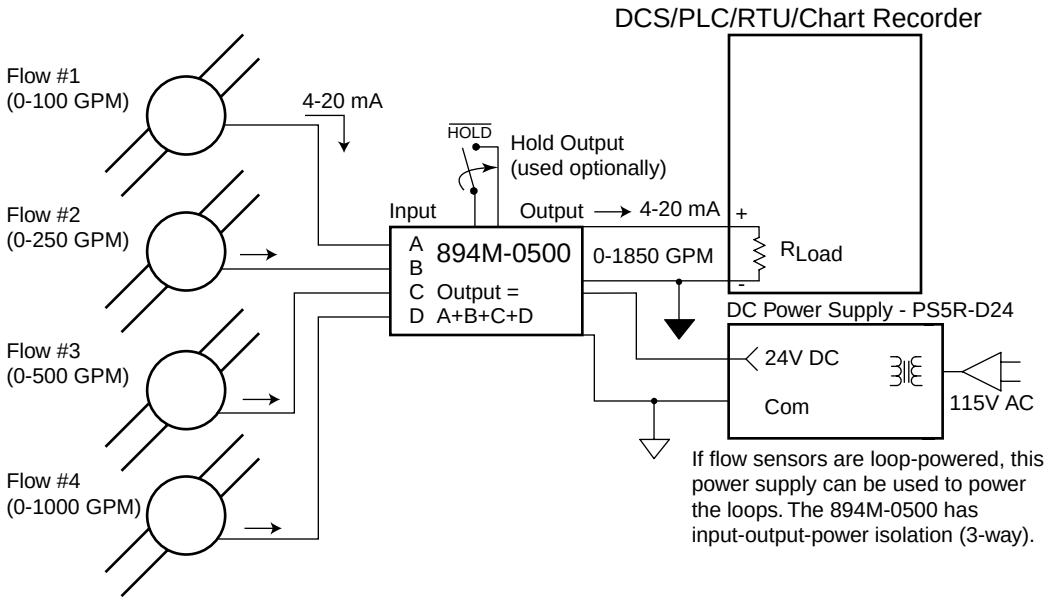
Application #1: Flow

Problem: Scaling & summing up to four 4-20mA signals from flow sensors.

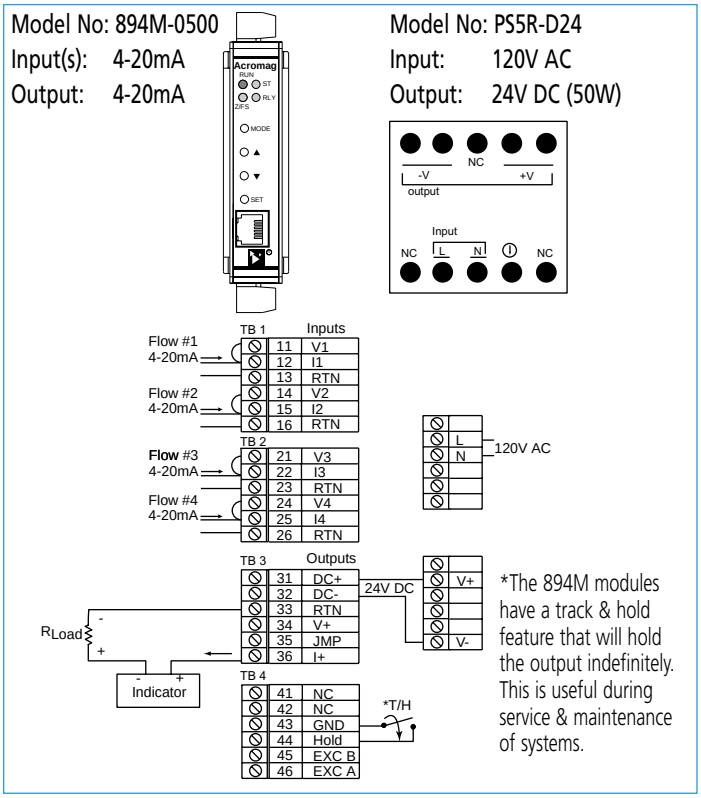
Solution

Model 894M-0500 quad-input math module
Model 800C-SIP software interface package
Optional: Model PS5R-D24 power supply

System Diagram

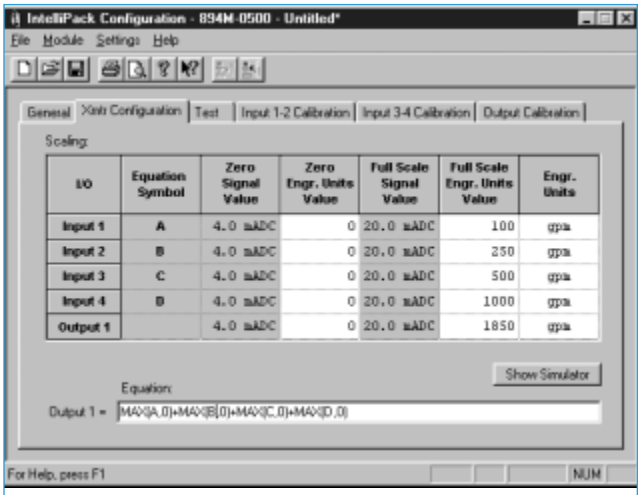


Wiring Diagram



*The 894M modules have a track & hold feature that will hold the output indefinitely. This is useful during service & maintenance of systems.

Scaling & Equation



Output Equation: MAX(A,0)+MAX(B,0)+MAX(C,0)+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.

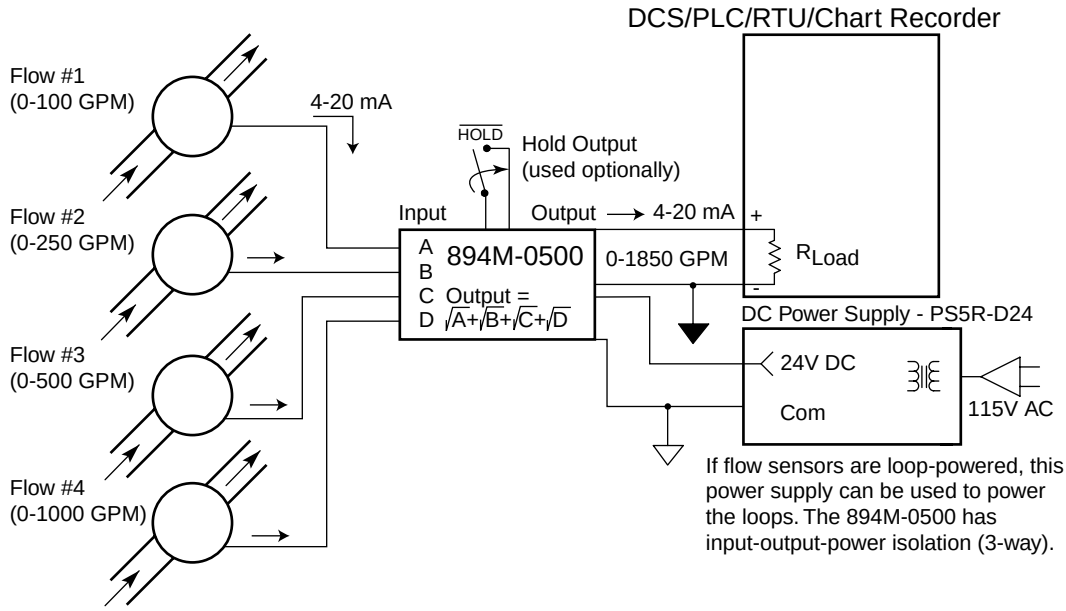
Application #2: Flow

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

Solution

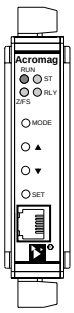
Model 894M-0500 quad-input math module
Model 800C-SIP software interface package
Optional: Model PS5R-D24 power supply

System Diagram

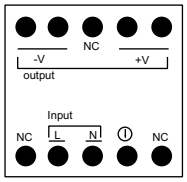


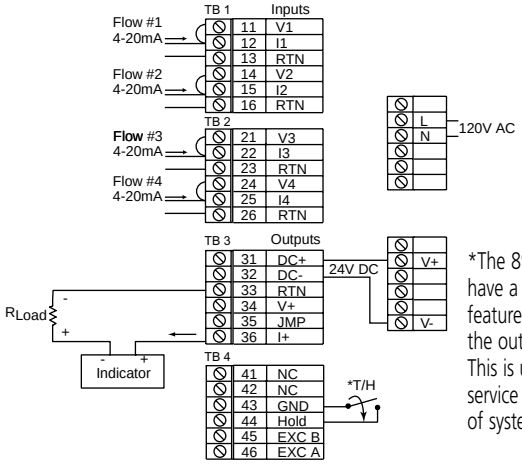
Wiring Diagram

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



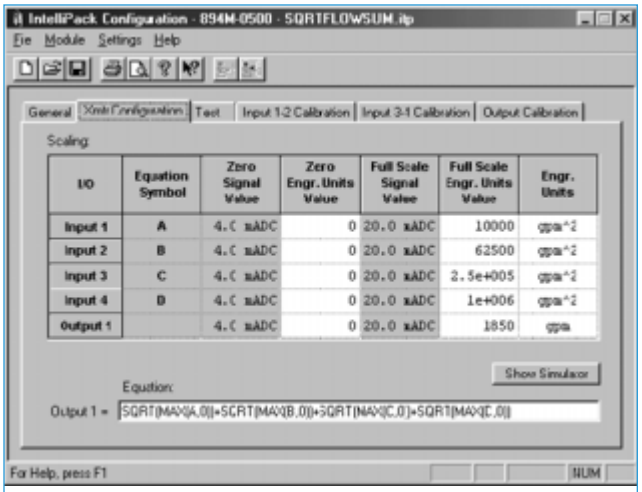
Model No: PS5R-D24
Input: 120V AC
Output: 24V DC (50W)





*The 894M modules have a track & hold feature that will hold the output indefinitely. This is useful during service & maintenance of systems.

Scaling & Equation



Output Equation: MAX(A,0)+MAX(B,0)+MAX(C,0)+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.

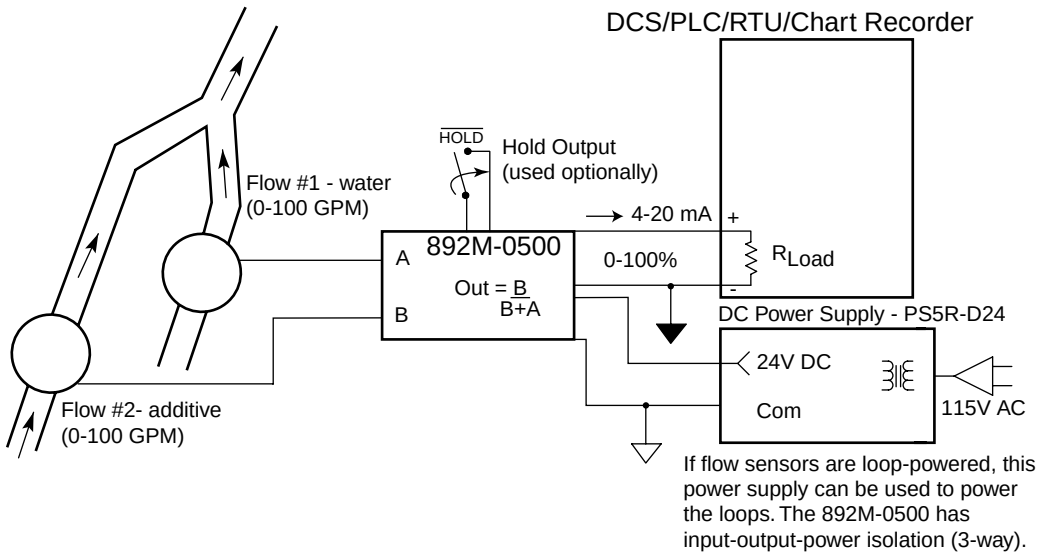
Application #3: Flow

Problem: Transmitting the calculated percentage (ratio) of an additive from two flow lines.

Solution

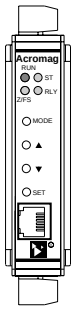
Model 892M-0500 dual-input math module
Model 800C-SIP software interface package
Optional: Model PS5R-D24 power supply

System Diagram

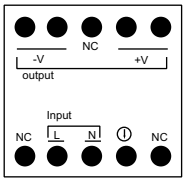


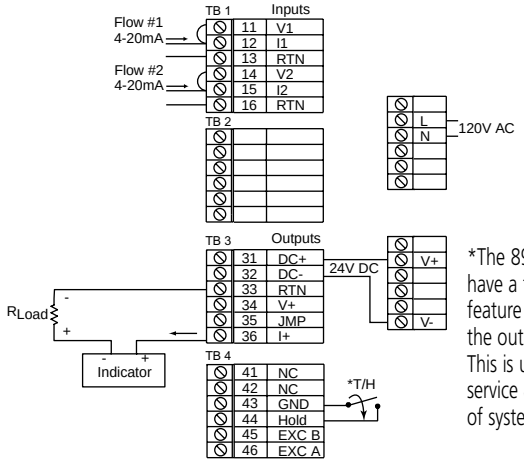
Wiring Diagram

Model No: 892M-0500
Input(s): 4-20mA
Output: 4-20mA



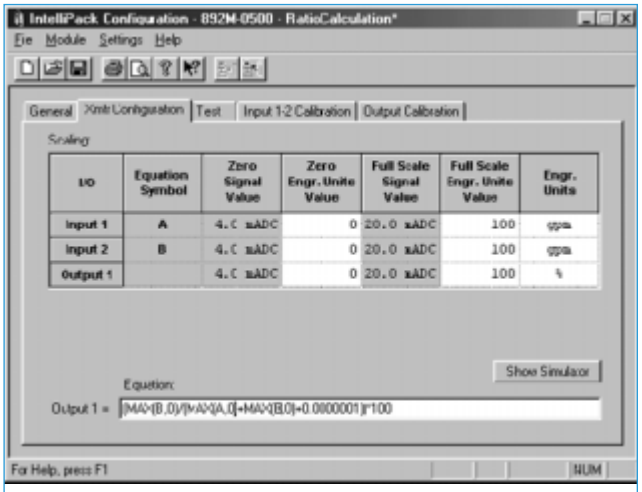
Model No: PS5R-D24
Input: 120V AC
Output: 24V DC (50W)





*The 892M modules have a track & hold feature that will hold the output indefinitely. This is useful during service & maintenance of systems.

Scaling & Equation



Output Equation:
(MAX(B,0)/(MAX(A,0)+MAX(B,0)+0.0000001))*100

Using the "MAX" function guarantees that 0 GPM will be used for calculation purposes in the event of an open/shorted input fault (0 mA). The use of .0000001 in the denominator protects against a "divide by zero" condition.

App. #4: Level/Volume

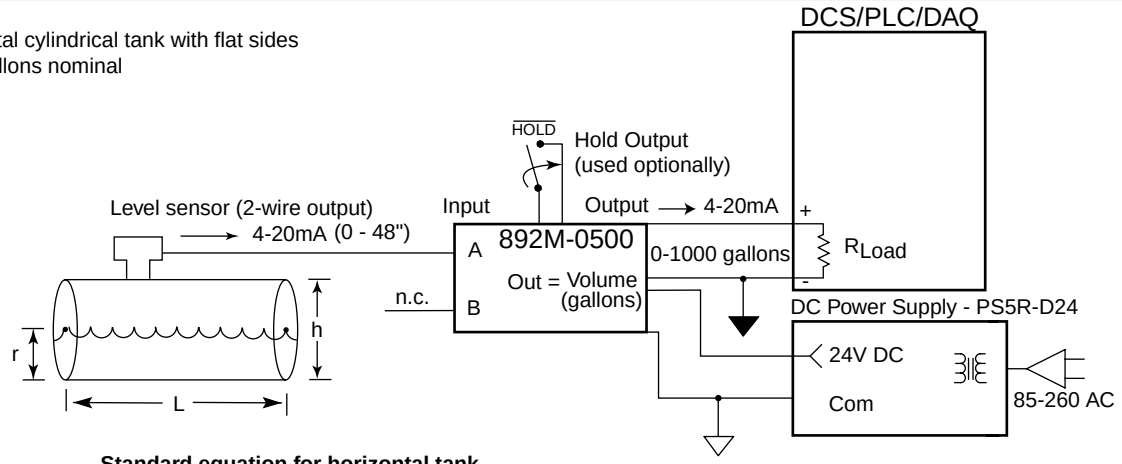
Problem: Convert a 4-20mA level signal (proportional to height) to a 4-20mA signal proportional to volume.

Solution

Model 892M-0500 dual-input math module
Model 800C-SIP software interface package
Optional: Model PS5R-D24 power supply

System Diagram

Tank Style: Horizontal cylindrical tank with flat sides
Tank Volume: 1000 gallons nominal
Tank height (h) = 4'
Tank radius (r) = 2'
Tank length (L)= 10'9"



Standard equation for horizontal tank

Volume (gallons) $= (((x-r)\sqrt{2rh-h^2} + r\sin^{-1}(\frac{h-r}{r}) + \frac{r^2\pi}{2})* L)/231$

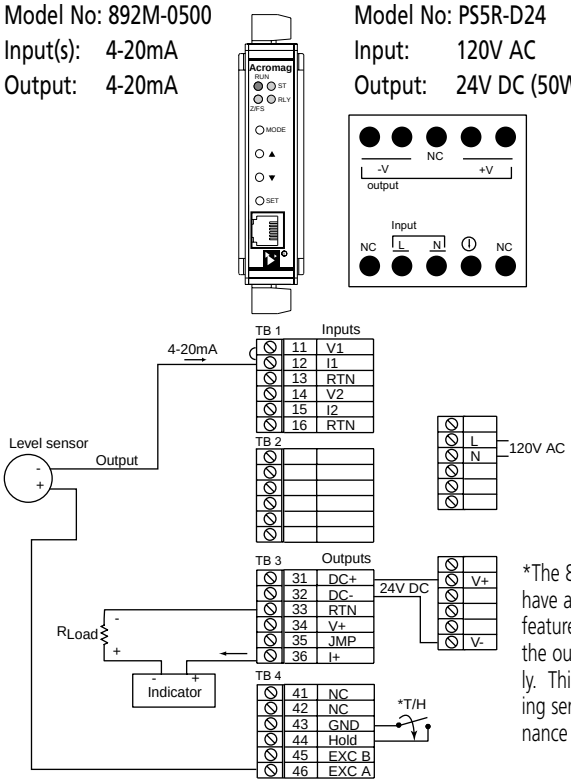
Where: r = radius (inches)
L = length (inches)
h = variable height (inches)
Conversion: 231 inches^3 = 1 gallon

$\pi = 3.141593$

Wiring Diagram

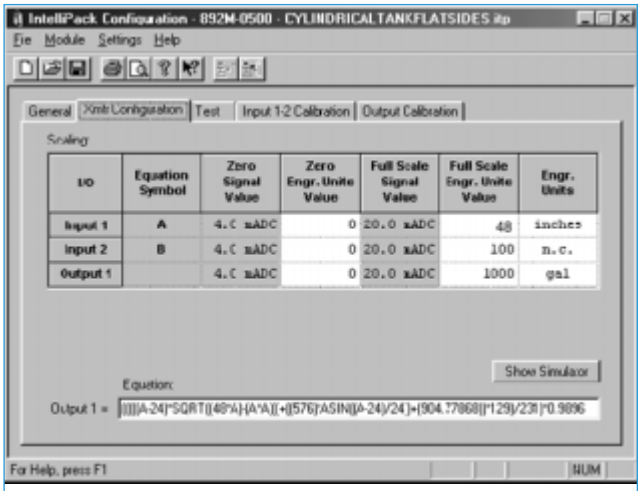
Model No: 892M-0500
Input(s): 4-20mA
Output: 4-20mA

Model No: PS5R-D24
Input: 120V AC
Output: 24V DC (50W)



*The 892M modules have a track & hold feature that will hold the output indefinitely. This is useful during service & maintenance of systems.

Scaling & Equation



Output Equation:(((((A-24)*SQRT((48*A)-(A*A)))+ ((576)*ASIN((A-24)/24)+(904.77868))*129)/231)* 0.9896

The volume equation above uses a final "multiplier" of 0.9896. This is used for full-scale "trimming" purposes. Without the multiplier, the calculated/theoretical output at full-scale is 1010 gallons. Also, a level tank is assumed for this example.

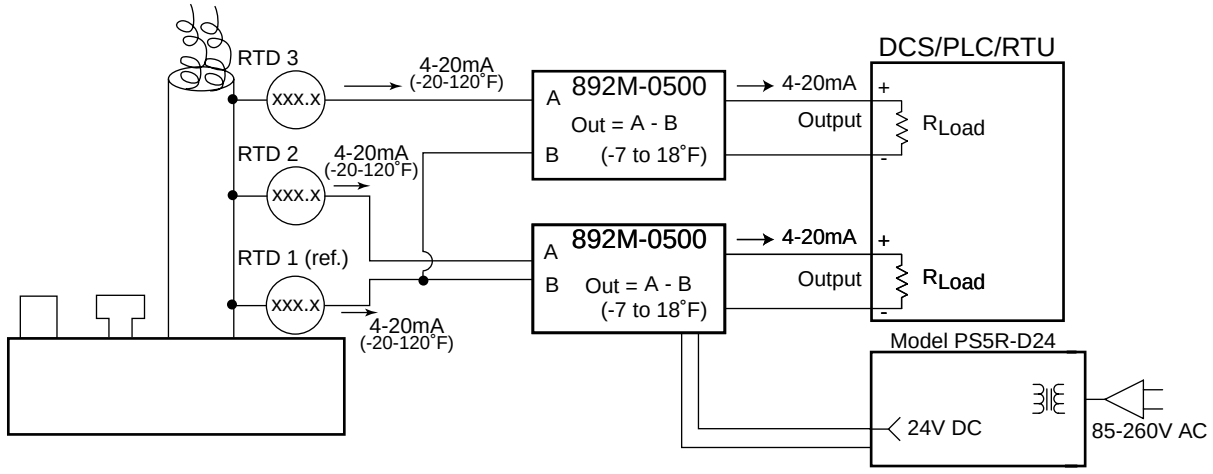
App. #5: Temperature

Problem: Monitor three RTD's on a stack and transmit two differential 4-20mA signals representing -7 to 18°F. Each RTD transmitter is calibrated -20 to 120°F.

Solution

Model 151T-0600-C RTD transmitters (qty. 3)
Model ATW-TLD plug-in LCD displays (qty. 3)
Model ATW-XPW housing w/ATW-PM2 (qty. 3)
Model 892M-0500 math module (qty. 3)
Model 800C-SIP software interface pkg. (qty. 1)
Model PS5R-D24 power supply (qty. 1)

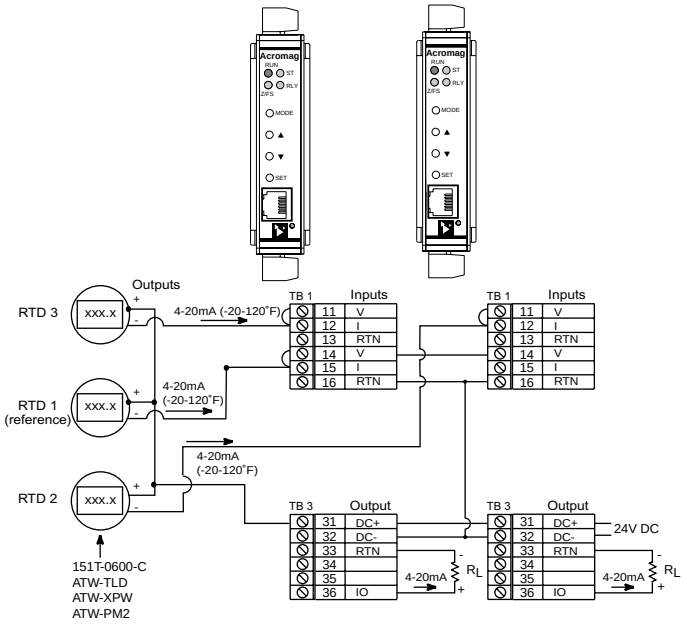
System Diagram



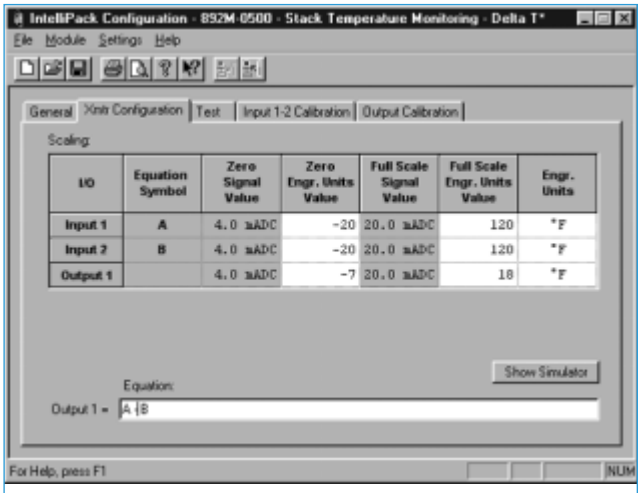
Wiring Diagram

Model No: 892M-0500
Tag No: RTD3-RTD1
Input: 4-20mA
Output: 4-20mA (-7 to 18°F)

Model No: 892M-0500
Tag No: RTD2-RTD1
Input: 4-20mA
Output: 4-20mA (-7 to 18°F)



Scaling & Equation



Output Equation: A-B

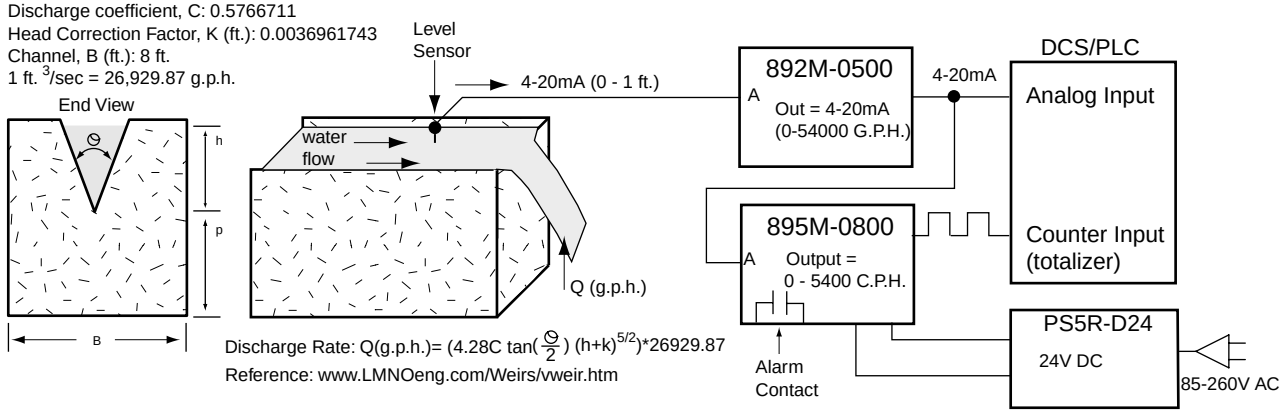
Application #6: Flow

Problem: Calculate the discharge rate Q (g.p.h.) output of a V-notch weir. Provide a 4-20mA output for flowrate and frequency output for totalization and alarm output for high-level alarm.

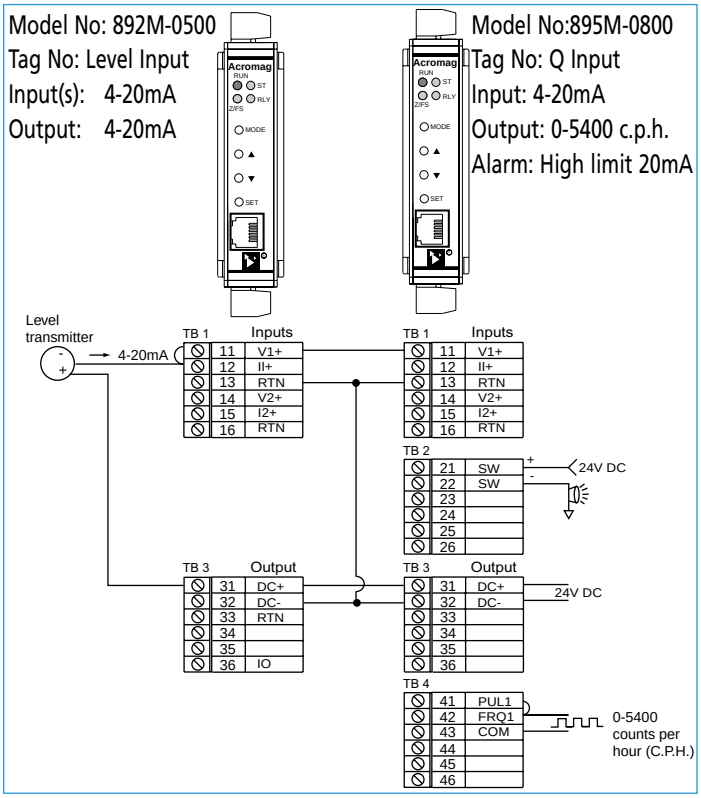
Solution

Model 892M-0500 DC output math module
Model 895M-0800 freq. output math module
Model: 800C-SIP software interface package
Optional: Model PS5R-D24 power supply

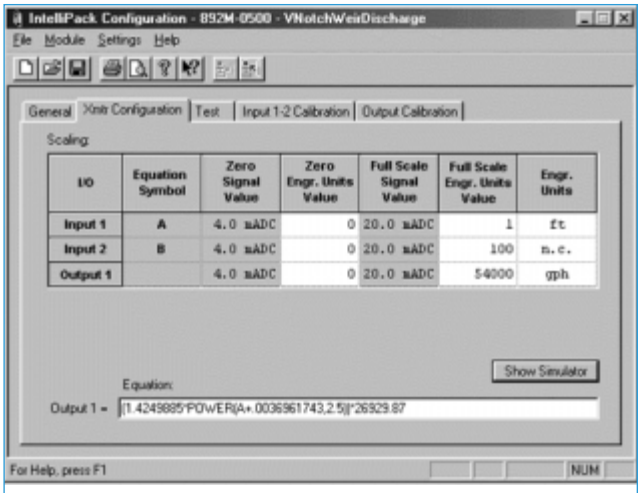
System Diagram



Wiring Diagram



Scaling & Equation



Output Equation:
(1.4249885*POWER(A+.0036961743,2.5))*26929.87

The equation above calculates discharge rate Q (g.p.h.) based on the level (height) measurement on input A. The "power" function shown raises "A+.0036961743" to the "2.5" power.`