

FACE:

Flowworks Advanced Calculation Engine

Quick Reference Guide

Channel Setup	New channels can be created from existing channels using any combination of mathematical operators.
Variables	Any channel from any station can be used in any calculation via an assigned single letter variable name. (A, B...Z)
Basic Math (FORMULA)	Add (A+B) Subtract (A-B) Multiply (A*B) Divide (A/B) Exponents (A^B)
Conditional Statements and Comparisons (FORMULA)	Conditional Statements (IF A>B THEN 0 ELSE 1) are written as: IF(A>B,0,1) where 0 and 1 may be a variable, constant, or equation. You may substitute the word NULL as in IF(A>B,0,null). Valid comparisons include: Equal IF(A==B,0,1) Not equal IF(A!=B,0,1) Greater than (A>B,0,1) Greater than or equal to (A>=B,0,1) Less than (A<B,0,1) Less than or equal to (A<=B,0,1) AND IF(A>B&C>D,0,1) OR IF(A>B C>D,0,1) NOT IF(A>B!C>D,0,1)
Trigonometric/Special (FORMULA)	A variety of functions are available, please contact FlowWorks technical support for exact syntax depending on your needs.
Cumulative	The Cumulative function builds a running cumulative total that resets to 0 at set intervals. How to Use: Choose the source site and channel, and choose how often you want the total to reset (Interval Length).
Delta	The Delta function creates a time series by calculating the difference between the current and previous values in a source channel. One of its uses is for detecting flat-lined data or sudden noise spikes for quality control alarming. How to Use: Choose the source site and channel.
Discrete	The Discrete function builds a discrete interval dataset using cumulative total input data. Uses include producing discrete interval rainfall data (such as 5-minute or hourly) from a daily rainfall totalizer signal. How to Use: Choose the source site and channel, set the interval of the data you want to create (Interval Minutes) and set the maximum value used in the source data before resetting to 0 (Rollover Value).
Interpolate	The Interpolate function creates a fixed interval time series by linearly interpolating between sparser values of the source channel. Its primary use is for creating a channel with a smaller time interval than the source channel (i.e. creating 5-minute interval data from hourly data). How to Use: Choose the source site and channel, and set the interval of the data points that you want to add (Interval Minutes).

Rolling Average	<p>The Rolling Average function produces a boxcar average of the values in a channel over a set duration, but with the same time-resolution as the source data. Typical uses include calculation of duration-based flow statistics for alarming (for example, calculating the average flow over the previous 24-hours).</p> <p>How to Use: Choose the source site and channel, set the size of the boxcar window (Interval Minutes), set the interval of the source data (Step Size), and set a value to write in the event FlowWorks detects the source data does not match the step size.</p>
Rolling Sum	<p>The Rolling Sum function produces a boxcar summation of the values in a channel over a set duration, but with the same time-resolution as the source data. Typical uses include calculation of duration-based rainfall statistics for alarming (for example, calculating the amount of rainfall over the previous 24-hours).</p> <p>How to Use: Choose the source site and channel, set the size of the boxcar window (Interval Minutes), set the interval of the source data (Step Size), and set a value to write in the event FlowWorks detects the source data does not match the step size.</p>
Shift	<p>The Shift function takes a segment of data and moves it forwards or backwards in time. Can be used for direct comparisons or calculations between different periods (such as difference in flow year to year).</p> <p>How to Use: Choose the source site and channel, set the interval that you want to shift the source data by (Interval Minutes), and choose the Shift Direction (forward or backward in time).</p>
Step	<p>The Step function takes event data (such as pump start or stop status) and approximates it into a fixed interval dataset. Useful when doing calculations that combine event data (such as pump status) with fixed interval data (such as wet well level).</p> <p>How to Use: Choose the source site and channel, and set the interval that you want the data approximated to (Interval Length).</p>
Sum	<p>The Sum function creates a fixed interval time series by summing the values within the given interval period. Common uses include creating hourly or daily summarized channels for rainfall and flow volume. Can also be used for turning event data into a fixed interval time series (for example, number of pump starts per hour).</p> <p>How to Use: Choose the source site and channel, and set the interval that you want the data summed into.</p>
Time-Weighted Average	<p>Time-Weighted Average takes an input channel and converts it into fixed-duration data using a time-weighted average. Useful for converting irregularly spaced data from SCADA polling systems or variable-interval flow meters into fixed-duration data.</p> <p>How to Use: Choose the source site and channel, and set the interval that you want the data averaged into.</p>



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For more information, including a FlowWorks brochure, please call 1.206.859.6999, x 1.

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