ConsoliDator+

MasterClass

Week 10 – Schedules and Timers

Today's Key Topics

- How to schedule events based on day and time
- Control/Alarm based on elapsed time
- Tank Filling Applications (time to fill)
- Keep track of pump run times!

Schedule Events Based on Day and Time

For this type of application, create a new "Channel" and we want the "Function" to be "Schedule" which can be found in the "Control" category.

NOTE: There ARE other ways to schedule events, but this is the best way!

Schedule Events Based on Day and Time

Units: Unless you WANT to display this channel on a screen, units are <u>NOT needed</u>.

Start/Stop: Select which day(s) of the week and TIME you want this event to start/end

Function: What you want the "event" to be.

FUNCTION CAN BE:

Anything you can program a "soft key" for, is what the function of this channel can be.

For example:

- Force on/off relays
- Manipulate an output
- Change screens
- Acknowledge alarms
- Start/Stop timers

And MORE!!

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Schedule Events Based on Day and Time

With this configuration, the ConsoliDator+ will turn on our "Pump 1" relay on SUNDAY at NOON.

Then, on SUNDAY at 12:30 pm, the ConsoliDator+ will turn OFF our "Pump 1" relay.

How to Control / Alarm Based on Elapsed Time

THE PROBLEM:

Your customer has a tank which cannot overfill or else it's big trouble! They have an alarm for when the tank gets to 80% capacity. They are monitoring their tank level with the ConsoliDator+ and using the device for the alarm.

However, the external horn for the alarm has a silence button on it. It doesn't clear the alarm, but it makes it quiet. Now, the idea is that the operator will eventually go back and take care of the tank…. But what if they don't?!?

THE SOLUTION:

Using the "Timer" on the ConsoliDator+ can allow us to time how long the high level alarm has been active. If the alarm is active for 20 minutes and nobody has addressed the issue, the ConsoliDator+ can sound a secondary alarm which basically says, *"hey, this high tank alarm has been active for 20 minutes!! Get over here!!"*

How to Control / Alarm Based on Elapsed Time

Input: For this case, the "input" to this timer is going to be the high level alarm!

Power Up: what does the timer do when power to the unit is cycled?

Error: what does the timer do if there is an error on the alarm?

Options Are:
Stop, Reset, Stop & Reset, Start, Stay As Is

New Timer ✕

Timer: 1. ▾

Display Tag: Tmr1. | Alarm Timer

Name for the Timer, 15 characters max.

Color Scheme: ▮ Default

Input: A2. Tank High Alarm

☐ **Bargraph** 0% | 00:00:00
100% | 00:01:00

Power Up: Stop & Reset ▾

Error: Stay As Is ▾

Reset: Falling ▾

Start: Rising ▾

Stop: Falling ▾

Decimals: 0 ➕ ➖

☑ **Count Down:** 00:20:00

Save | Cancel

How to Control / Alarm Based on Elapsed Time

Reset/Start/Stop: How to "tell" the timer when it should start, stop, and reset.

Options Are:
None – No action

Falling

Rising

Falling and Rising

WHAT DO THESE MEAN?

New Timer   ✕

Timer: [1. ▼] _____

Display Tag: Tmr1. [Alarm Timer]   Color Scheme: [■ Default]
Name for the Timer, 15 characters max.

Input: [A2. Tank High Alarm]   ☐ Bargraph   0%   [00:00:00]
                                                                  100%   [00:01:00]

Power Up: [Stop & Reset ▼]

Error: [Stay As Is ▼]

Reset: [Falling ▼]

Start: [Rising ▼]

Stop: [Falling ▼]

Decimals: [0 + −]

☑ Count Down: [00:20:00]

[Save]   [Cancel]

Count Down: Because we want to know when a certain amount of time has passed with our high level alarm on, we want this timer to start at 20 minutes, and count down to 0

When this timer "resets" it will actually reset to "00:20:00"

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How to Control / Alarm Based on Elapsed Time

Input: the input to this alarm is going to be the "Alarm Timer" we just created

Set Point: we want this alarm to trigger when our TIMER turns off (reaches 00:00:00) So, our set point is "ZERO"

Reset: We want this alarm to go away when our timer turns back on (is reset to 00:20:00) so our reset point is "ONE"

Alarm 3

Display Tag: A3.	Alarm Timer!

Name for the Alarm, 15 characters max.

Type: Single Source ▼

Input: Tmr1. High Timer

Color Scheme: ■ Default

☑ Sound Horn
☑ Alert!
☑ Automatic
☑ Ack Anytime

Break: Alarm Off ▼

Set Pt:	0.0	**On Delay:**	0.0
Reset:	1.0	**Off Delay:**	0.0

[New] [Copy] [Delete]

Think in terms of binary...

1 = ON, 0 = OFF

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How to Configure "Time to Fill" Applications

THE PROBLEM:

Your customer has a really large tank that can take HOURS to fill. However, the operator doesn't want to stand around and wait until the tank is full before working on something else. They want to be able to walk away from the tank, and then come back and monitor the tank when there is only 15 minutes left until the tank is completely full. Otherwise, the tank may over fill!

THE SOLUTION:

The ConsoliDator+ can monitor the "rate of change" in the tank over time, and then calculate (AND display) how many minutes until the tank is completely full. The ConsoliDator+ is smart enough to be able to compensate for a varying fill rate so that the amount of time until the tank is full is always accurate, regardless of changing process conditions.

When the tank is 15 minutes away from being full... the ConsoliDator+ can sound an alarm to tell an operator to get back to the tank!

How to Configure "Time to Fill" Applications

The first thing we want to do is create a "Constant Channel". This channel is going to be a constant value, and it will represent the full capacity of our tank!

In the "Math" category, you will find "Constant"

That is the channel function we want.

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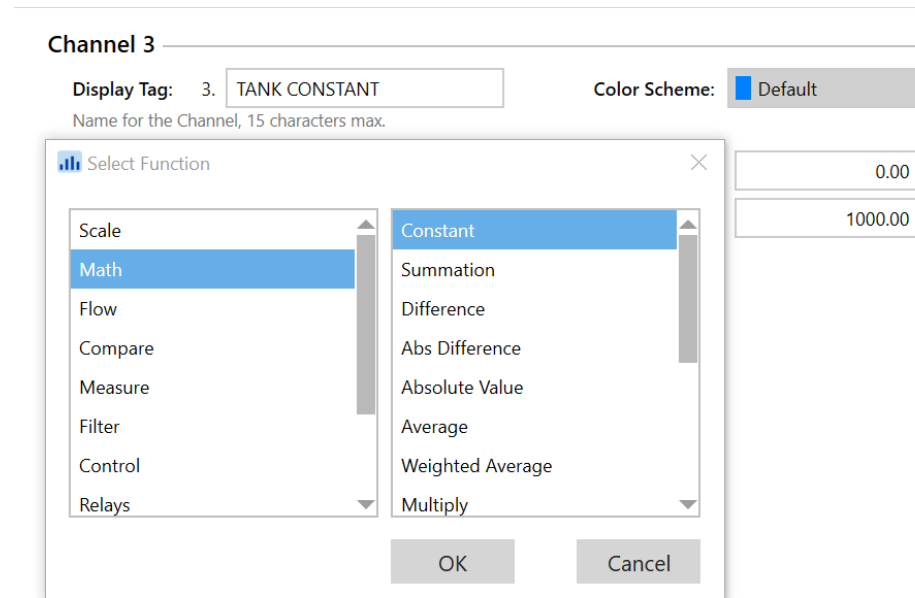
How to Configure "Time to Fill" Applications

Let's assume that the full capacity of our tank is 1,000 gallons…

Be sure to select the correct units for however the user measures their tank

Be sure to enter in the full capacity of the tank in the "Value" box

Channel 3

Display Tag: 3. | TANK CONSTANT |
Name for the Channel, 15 characters max.

Color Scheme: ■ Default

Function: | Constant |

☑ Bargraph   0% | 0.00 |
100% | 1000.00 |

→ Units: | Gallons |

Decimals: 2 + −

Value: | 1000.00 |

| New | Copy | Delete |

NOTE: *If you had a million-gallon tank, then you would enter "1000000.00" for the "Value".*

How to Configure "Time to Fill" Applications

Next, we want to create a NEW channel.

This time, we want use subtraction.

Under the "Math" category, you will find "Difference" and you want to select that.

Channel 4

Display Tag: 4. MATHS
Name for the Channel, 15 characters max.

Color Scheme: Default

0.00

100.00

Select Function

Scale	Constant
Math	Summation
Flow	Difference
Compare	Abs Difference
Measure	Absolute Value
Filter	Average
Control	Weighted Average
Relays	Multiply

OK   Cancel

New   Copy   Delete

NOTE: *"Abs Difference" is what is known as absolute difference, and we do NOT want to use that function!*

How to Configure "Time to Fill" Applications

For this channel, we want to take our tank constant channel (1,000 gallons) and subtract the actual level reading from our constant.

This is how the ConsoliDator+ will know how far away the tank is from being full. The smaller the value of this channel, the closer to the top the tank is!
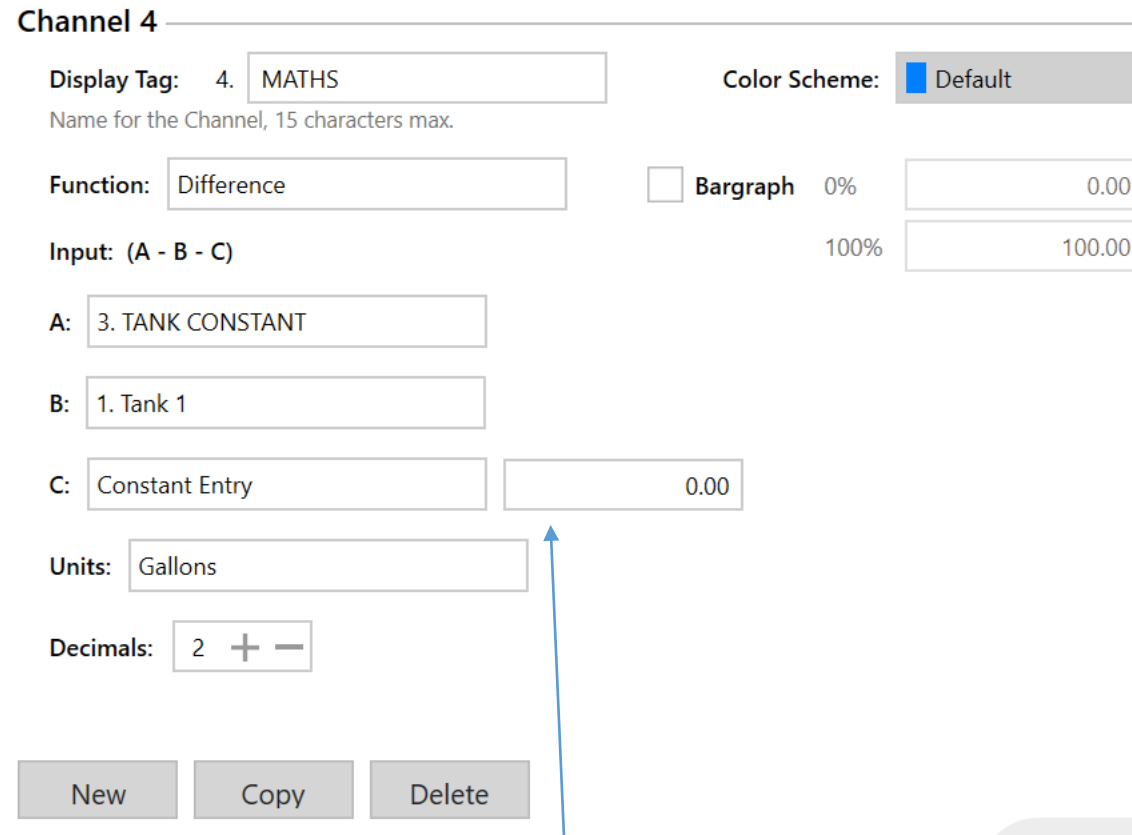

NOTE: *If you only need to subtract two values, then leave the third value as "0" so the math won't be affected*

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How to Configure "Time to Fill" Applications

Now we want to create my FAVORITE type of channel…

"Rate of Change"

We looked at this last week with the "leak detection" configuration.

This channel will simply look at the rate of change in our level, and report that back in UNITS/TIME.

Channel 2

Display Tag: 2. Tank Fill Rate
Name for the Channel, 15 characters max.

Color Scheme: Default

Function: Rate of Change

☐ Bargraph   0%   0.0
              100% 100.0

Input: 1. Tank 1

Units: Gallons/min

Decimals: 1 + −

New   Copy   Delete

Be sure your units match (if you scaled your tank to read in gallons, use gallons) and make sure the units for this channel is in:

UNITS/MINUTE

NOTE: *If your customer uses a flow meter to fill their tank, they could just make a regular flow rate channel based on the output from a flowmeter instead of using the "Rate of Change". The Rate of Change is simply replacing the need for a flow meter.*

How to Configure "Time to Fill" Applications

The last channel we want to create is another Math channel with the "Divide" function.

We want to take our "Maths" channel (Constant minus Level Reading) and divide that by our tank fill rate (rate of change channel)

Be sure that the "Units" of this particular channel is in MINUTES!

Remember, we are trying to have the ConsoliDator+ display how many MINUTES are left until the tank is full!

NOTE: *The value of this channel is going to be in "minutes" since we are taking a channel of "Gallons" and dividing it by "Gallons/Min" – the result leaves us with how many minutes until the tank is full!*

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How to Configure "Time to Fill" Applications

The next step is to simply create a new alarm with the input being the "Time Until Full" channel we created, and have the alarm trigger when the "Time Until Full" channel reads "15 minutes".

Now, if you wanted to get really fancy with this type of setup, you could also data log the alarm timers.

This would allow a plant manager to take a look through how long their alarms stay active before an operator takes care of the issue.