

Application Note 16:

Calculating Values at a Given Interval

P122682 Issue 1

The following example demonstrates how a recorder can be configured to calculate values at 1 minute intervals. The particular application has two inputs, one measures the weight in kg/min of a substance entering a process, and the other measuring the waste from the process (in kg), i.e. the input represents the weight of the container collecting the waste.

The requirement is for a calculation to be performed every minute to determine the percentage of the source material discarded as waste during that minute. The source input will remain fairly constant, but using an averaged value would provide a better result. Averaging is covered in Application note 13.

NB: This example requires the unit to be fitted with Markers and Maths options.

Recorder setup details

Analogue Input 1: Signal representing weight/min entering process.

Analogue Input 2: Signal representing weight of waste from process

Pen 1: The weight/min of the substance entering the process.

Maths expression : $P1=A1$

Pen 2: Calculation of the additional weight gained (increase in pen 3) in a minute. (Must be done before pen 3 calculations in the maths-block, hence pen 2)

Maths expression : $P2=(P2+(A2-P3))*(1-O2)$

Pen 3: The weight of the waste from the process

Maths expression : $P3=A2$

Pen 4: Calculated percentage waste during previous minute

Maths expression : $P4=(P2*100/P1)*O1+(1-O1)*P4$

Relay Outputs

Note: The relay output registers may be used without the need for a relay card to be fitted.

O1 Used to enable Pen 4's percentage calculation at the end of each minute (when CLOSED) and to hold it there for the following minute (when OPEN)

O2 Used to reset Pen 2's calculation, once per minute. This happens 1 second after the percentage calculation is performed so that Pen 2 is valid during the calculation.

Markers

Enable and configure the following markers:

Marker 1 :

- Cause Periodic, every 1 minute, no limit, synchronise on new session
- Effect mark on chart (if required)
- Trigger Marker 2 after 1 second
- Set Relay Output 1 CLOSED

Marker 2 :

Cause (leave defaults)
Effect No mark on chart
Trigger Marker 3 after 1 second
Set Relay Output 1 OPEN.
Set Relay Output 2 CLOSED.

Marker 3 :

Cause (leave defaults)
Effect No mark on chart
Set Relay Output 2 OPEN.

Physical Connections

None.