

ControlMaster CM10, CM30 and CM50

Universal process controllers



Increasing or decreasing
a setpoint using digital signals

Measurement made easy

ControlMaster CM10,
CM30 and CM50

Introduction

In some plants, where operators have little direct access to the recorder, there may be a requirement to enable remote adjustment of the setpoint.

This Technical Description explains how to enable remote adjustment of a setpoint using ControlMaster templates.

Adjusting the setpoint

ControlMaster controllers have the ability to switch between up to 4 local setpoints but, in some applications, this might not be acceptable and the ability to adjust a setpoint in smaller increments may be required. Depending on the process, this adjustment may also need to be made remotely from the controller. This can be achieved by utilizing the ControlMaster’s **Templates and Math** functionality.

In the **Device Setup** level of the configuration, select the **Single loop with remote setpoint** template. This template enables selection of a source to supply a setpoint in the form of a remote setpoint. A standard or local setpoint is a value programmed directly into the controller and so can be modified directly only from the front panel of the controller.

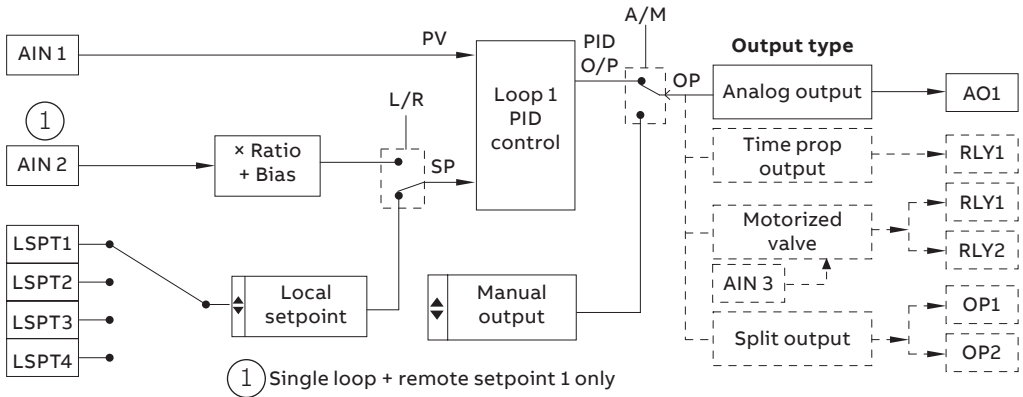


Figure 1 Standard template

The standard template shown in Figure 1 assigns the remote setpoint source as Analog Input 2 but, by using the custom configuration level, this can be programmed to be any analog source available on the recorder. This enables a completely customizable remote setpoint.

But how is the setpoint changed on demand?

This functionality is achieved by using a certain type of math block; a multiplexer.

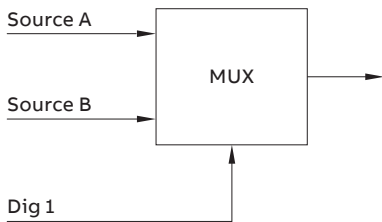


Figure 2 Multiplexer math block type (1st math block type)

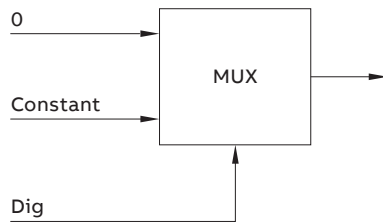


Figure 3 Multiplexer math block type (2nd math block type)

The multiplexer math block works by selecting 1 of 2 variables as its output, based on the condition of a digital signal. In Figure 2, source A is the chosen output of the multiplexer when Dig 1 is inactive and when Dig 1 is active, source B becomes the output of the multiplexer.

To enable the setpoint to be incremented or decremented, 2 of this type of math block are required – the setup of each is almost identical:

Source A becomes a math constant with a value of 0 and source B becomes a math block constant with a value of the amount required to increase the setpoint by. The digital source is the digital signal the setpoint is adjusted by.

A 2nd math block, almost identical to the 1st one is required but with 2 differences – the constant of 0 remains the same and the 2nd constant becomes a negative version of the constant used in the 1st equation. For example, if the constant for incrementing the setpoint in equation 1 is +1, then the constant in equation 2 becomes –1 and the digital source becomes the digital signal used to decrement the setpoint.

Once these 2 math blocks have been configured they are fed into a 3rd math block to add the values to the current setpoint:

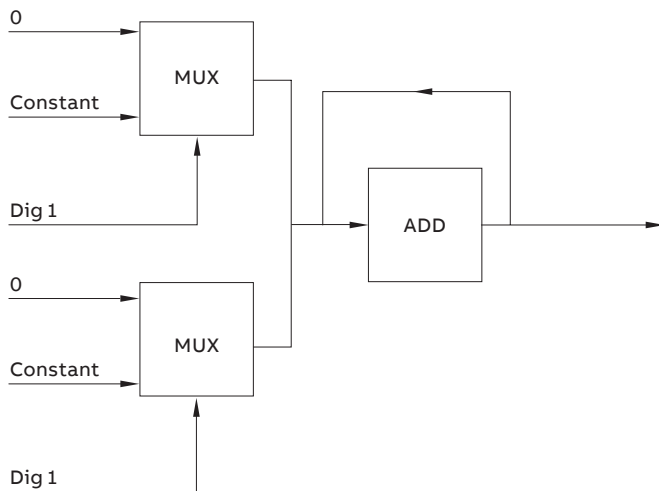


Figure 4 3rd math block

The 3rd math block adds the resulting output of the first 2 blocks together, as well as feeding its own result back into itself (thus adding the results of the multiplexer to the current setpoint – its own result).

This enables (upon the closure of a digital contact) either addition to or subtraction of a preconfigured value. To enable display of this as the setpoint, the **Custom Configuration** is used to configure the 3rd Math Block as the remote setpoint source.

This means that when the recorder is set as a single-loop controller with a remote setpoint, when in remote setpoint mode, the setpoint can be added to (or subtracted from), as required.

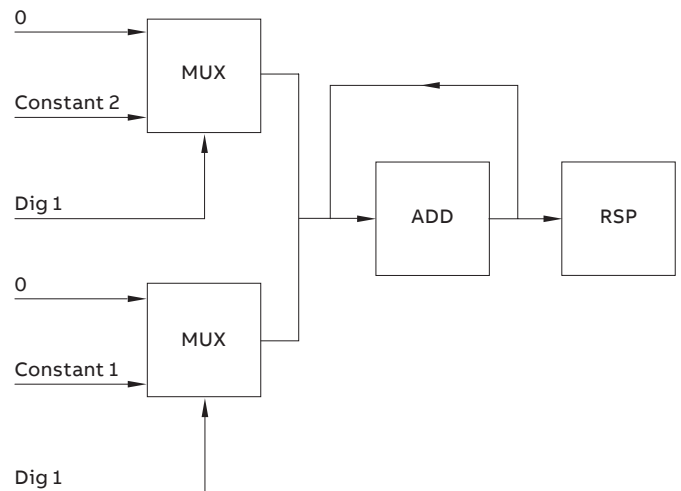


Figure 5 Remote setpoint

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