Technical Note 160

CRIUS® and CRONOS® Devices

Introduction

Not all controllers are the same. Some are simple devices with a sensor input and a 4 -20mA output, and maybe a couple of relays.

CRONOS® and CRIUS® 4.0 from Pi are a very long way from that! With an extremely powerful processor, a considerable array of I/O and over 500,000 lines of code, Pi's controllers can be used as simple analysers or as complex controllers that are often used to replace PLCs.

Devices

Every time a customer asks us to introduce a bit of additional functionality to the CRONOS® OR CRIUS® 4.0 we add a 'device code'. A device code allows us to add the functionality to a controller without it being there for those that don't use it. This way, if all you need is a sensor input, a 4-20mA output and a couple of relays then that's perfectly possible. If, however, you need more functionality then below is a list of some of the possible device codes (if what you need isn't there, please ask!).

Fig.1. A CRIUS® Controller.

Process Control Device Codes

When we measure something we often want to control it as well.

PID Trim - Calculates how much of a chemical to add based on flow rate, pump size and chemical concentration. Uses a sensor measurement to trim the dosing up or down as required.

PID - Maintains a setpoint and can be used to define how much chemical to add, how much to turn a pump on or how much to open a valve based on a sensor measurement.

PID Flow - Maintains a setpoint and can be used to define how much chemical to add, how much to turn a pump on or how much to open a valve whilst taking into consideration both flow and a sensor value.

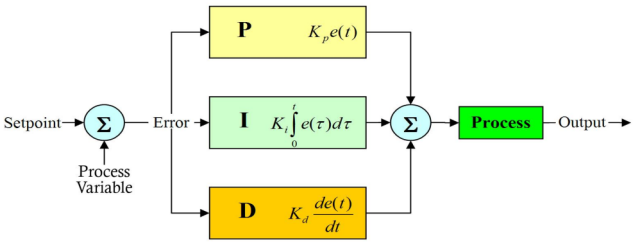

Fig.2. PID Diagram.

Feed Forward - Employs a user defined correlation to give the correct output based on a variable input value. Up to 5 points are defined within the correlation. Also uses a flow proportional element to vary the output as flow changes.

Polymer Dosing - Calculates how much of a chemical to add based on flow rate, pump size and chemical concentration. Has inbuilt functions to allow lines to be flushed before and after dosing starts/stops to prevent blockages.

Time based

Timer - Can trigger up to 5 actions at the end of a fixed time period.

Scheduler - Can trigger up to 5 actions at certain times of day, certain days per week or certain days in a month.

Input/Sensor based

Arithmetic Virtual Sensor - Allows a calculation to be performed between 2 parameter values. The options can be x, +, - or ÷

Manual Virtual Sensor - Acts as a sensor input and whose values can be changed through the user interface or remotely via a comms connection like Modbus.

Alarm - A value within a parameter that once reached triggers an alarm; can be either high or low. 2 per parameter.

Signals, Logic and switches

Virtual Setpoint - Takes a control value output and applies a user defined mx+c equation to give another value

Logic Gate - Allows the combination of up to 5 on/off signals to give a single combined on/off signal output in an AND/OR/NAND/NOR configuration.

Status Signal - Allows any status, parameter or system flag to be converted into an on/off signal that can be used elsewhere in the system.

Threshold - A value within a parameter that, once reached, triggers a flag which then can be used to trigger downstream actions. Can be set as either high or low, 2 per parameter.

Relay - An on/off switch to send a signal to an external device.

Signal Events - Triggers up to 5 actions to take place on either the rising edge or the falling edge of an on/off signal input

Digital Input - An on/off signal from an external switch.

This additional functionality in the CRIUS® and the CRONOS® controller allows the control of chemical dosing far beyond the capability of most instrumental controllers and can result in significant cost savings by replacing other control devices such as a PLC.

Challenge us!

If you have a control application, challenge us to design the right system using a CRIUS® or CRONOS®, and let us show you how you can achieve excellent process control whilst saving money.