I/O Interface with LVProSim
763509 (9065-B0)

LabVolt Series

Datasheet

* The product images shown in this document are for illustration purposes; actual products may vary. Please refer to the Specifications section of each product/item for all details. Festo Didactic reserves the right to change product images and specifications at any time without notice.

Festo Didactic
en
11/2024

Table of Contents

General Description ____ 3
PID Controller ____ 3
Trend Recorder ____ 4
Function Generator ____ 4
Data Acquisition ____ 4
Generic Process Simulator ____ 4
Specifications ____ 4

General Description

The I/O Interface is a module used to interface with a computer for data acquisition and PID control of a real process. The I/O Interface provides interconnection between the process devices and the computer. It performs analog signal and digital signal conversions and sends the information to LVProSim, a process control software included with the interface.

The I/O Interface has four 4-20 mA analog inputs, two 4-20 mA analog outputs, four 24 V digital inputs, and two relays (1A 30V DC). It connects to a computer through a USB cable and must be powered using a 24 V dc power supply.

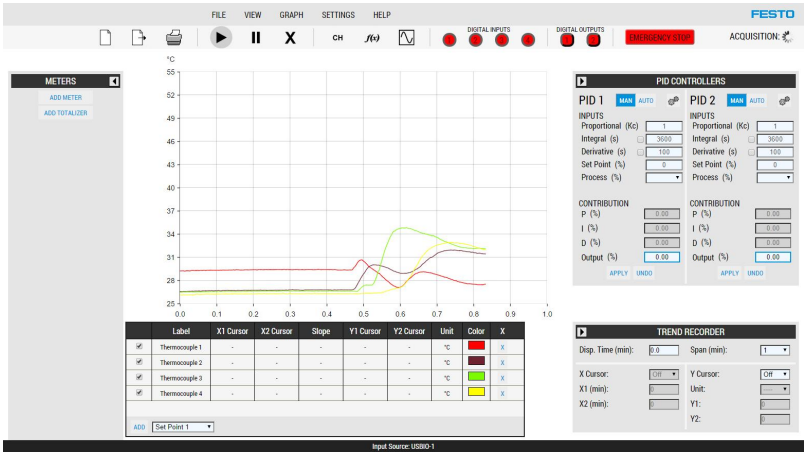
The I/O Interface requires LVProSim, a process control software specially designed to connect to the interface and collect data at a fast sampling rate (100 ms). LVProSim has two main features: it can operate as a process controller and a generic process simulator. LVProSim's modern web interface makes it easy to use, helping students focus on learning process control.

When used as a controller, LVProSim monitors data from the I/O Interface and applies a standard PID algorithm to determine the appropriate response. LVProSim can either control two processes simultaneously or use its two controllers in cascade mode. LVProSim also offers a set of mathematical functions to treat inputs and outputs signals.

The simulation mode allows students to model first-order or second-order processes. This mode encourages students to explore the various characteristics of a process such as its time constants, gain, and dead time. Once a generic process simulation is running, students can connect the simulated process to a controller and test different control schemes. Contrary to the data acquisition mode, the simulation mode does not require the I/O Interface. Therefore, students can experiment with the software on their own computer.

Note that, although the I/O interface is designed to be used with LVProSim, its data acquisition interface is compatible with Linux®, MATLAB®, and NI LabVIEW™. Raw data can be acquired using these software/ platform, given the appropriate drivers are installed.

PID Controller



LVProSim uses a non-interacting ideal algorithm to control processes. Two controllers are available. They can be used to control two independent processes or they can be coupled via a dynamic set point for cascade control. The sampling interval and the controller action (director or reverse) are user selectable. A square-root extracting function permits linearization of measured signals and other mathematical functions are available as well.

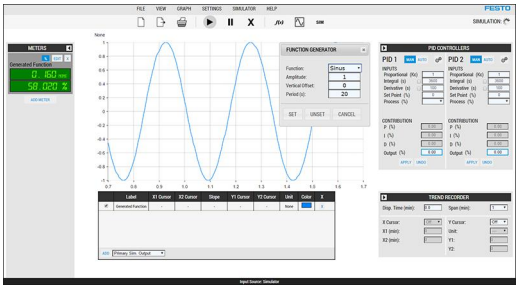
The proportional (P), integral (I), and derivative (D) contributions on the final controller output can be displayed independently on the trend recorder. Meters can be added to the interface to display monitored variables in real time.

© Festo Didactic

Trend Recorder

The LVProSim trend recorder can be used to plot different variables such as the set points, output signals, signals from the proportional, integral, and derivative contributions, measured and controlled variables, the function generator output signal, etc. A pause button can be used to stop the recorder at any time. The trend recorder can be scrolled backward and forward in time, with automatic time tracking during scrolling. Data can be exported to CSV format to be later imported into a spreadsheet software for detailed analysis and accurate measurement of the process characteristics.

Function Generator



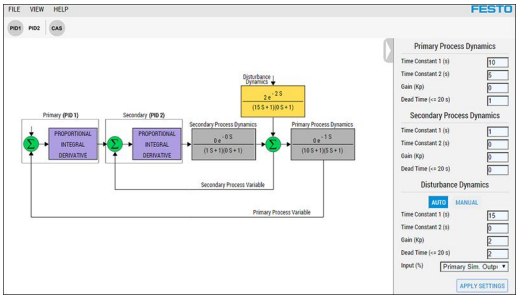
The function generator can produce a sine, square, triangle, or step signal. The signal from the function generator can be used as the controller set point or to perform manual control of a process device. When using LVProSim in the simulation mode, the generator signal can be used as the controller set point, the disturbance signal, or the controller output signal.

Data Acquisition

Through continuous acquisition of process data via the I/O Interface, LVProSim can:

- achieve digital PID control of the process
- be used as the primary and secondary controller of a cascade control loop
- be used as a process simulator
- be used as a general purpose data acquisition system

Generic Process Simulator



The generic process simulator provides simplified simulation to introduce basic concepts of process control. The simulator can be configured as first or second order process, with or without dead time. The disturbance can be configured as first order. The process and disturbance have variable gains.

Specifications

Parameter	Value
Supply Voltage	24 V
Inputs	
Analog	4 x 4-20 mA
Digital	4 x 24 V

Parameter	Value
Outputs	
Analog	2 x 4-20 mA
Digital	2 x 24 V
Analog/Digital Converter	
Resolution	12 bits
Digital/Analog Converter	
Resolution	8 bits
Relay	
Quantity	2
Current	1 A
Voltage	30 V DC
Computer Requirements	A currently available personal computer with USB 2.0 or 3.0 port, running under one of the following operating systems: Windows® 7, Windows® 8 or Windows® 10 .
Physical Characteristics	
Dimensions (H x W x D)	55 x 120 x 172 mm (2.2 x 4.7 x 6.8 in)
Net Weight	1 kg (2.2 lb)

© Festo Didactic

Reflecting the commitment of Festo Didactic to high quality standards in product, design, development, production, installation, and service, our manufacturing and distribution facility has received the ISO 9001 certification.

Festo Didactic reserves the right to make product improvements at any time and without notice and is not responsible for typographical errors. Festo Didactic recognizes all product names used herein as trademarks or registered trademarks of their respective holders. © Festo Didactic Inc. 2024. All rights reserved.

Festo Didactic SE

Rechbergstrasse 3
73770 Denkendorf
Germany

P. +49(0)711/3467-0
F. +49(0)711/347-54-88500

Festo Didactic Inc.

607 Industrial Way West
Eatontown, NJ 07724
United States

P. +1-732-938-2000
F. +1-732-774-8573

Festo Didactic Ltée/Ltd

675 rue du Carbone
Québec QC G2N 2K7
Canada

P. +1-418-849-1000
F. +1-418-849-1666

www.labvolt.com

www.festo-didactic.com