# Feedback

## Industrial Process Trainer 34-250

The Industrial Process Trainer provides a practical approach to understanding the way process systems work; chiefly their operation, control, maintenance and the function of system components.

There are three main areas of industrially relevant training provided by the trainer:

**Fault Finding** - Built-in switchable faults with fault diagnosis methodology. Built-in relay logic control.

**Process control** - Study of Level and flow processes using an external industrial process controller.

**PLC control** - Control of Level and flow processes using analogue input/outputs and logic control.

**Description -** The Trainer is a bench-standing, level and flow process control system that has been specifically designed to train students in the methodology of fault-finding and fault diagnosis in a typical industrial process control environment.

**Process -** The Trainer has two tanks, one mounted above the other. Water is transferred from the lower tank to the upper tank by means of a pump. The flow of liquid can be controlled via solenoid operated valves or via a proportional control valve. Sensors are fitted to all sections of the system to give indications of liquid flow.

The level in the upper tank can be controlled using adjustable limit switches that allow the upper and lower liquid levels to be set independently. There is also a proportional level sensor that allows the level to be monitored between full and empty, producing a 4-20mA signal across that range.

The Industrial Process Trainer comprises two interconnected panels:

the **Control Panel** and the **Process Panel** (see back page)

### Features

- **Self contained processes**
- **Wide range of easy-to-apply faults**
- **Mechanical, electrical, electronic and process component faults**
- **Teaches fault diagnosis and fault-finding methodology**
- **May be used as part of an Industrial Maintenance programme**
- **May be driven from external PLC or Process Controller**
- **Compatible with the Feedback range of Procon controllers and software**
- **Fully protected for safety**

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## Control Panel

The Control Panel and cabinet contain the main power input switching, power supplies and protection devices. The cabinet door in area one houses the main ac power control that includes separate power on and off push-buttons, emergency power off button and supply earth leakage breaker.
A second area contains the process system controls and indicators for starting/stopping the process and giving a visual indication of the process status by illuminated indicators.
The third area provides digital displays and transmitters for the level and flow transducers in the system and also a 4-20mA source to control the system motorised servo valve.
The Cabinet contains the internal relay based process controller, lockable fault switch enclosure and low voltage dc power supplies to run the process.

## Process Panel

The Process Panel presents the process system components in a way that conveys the sequence in which the process is timed, from the water delivery from the sump tank through controlled flow restriction solenoids and/or motorised control valve and into the working system header tank via flow sensors. The process water is then returned into the sump tank via controlled flow restricted solenoid valves, draining the tank and enabling output from the level sensor to provide a measure of the actual controlled water level. The visable components are: Water tanks, Manual valves, Flow switches, Flow sensor, Solenoid valves, Glass flow meter, Motorised servo valve and Valve drive electronics (under removable cover).

*Lockable fault switch enclosure*

*Fault switches*

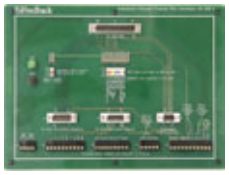
The **Fault Finding application** can be used to demonstrate a range of faults, which may be open circuit, short circuit, or faults to ground. It is also possible to introduce component faults in the sensors, solenoids on the main system. Faults may be introduced into this system, by switches and by the simple insertion of pre-faulted relay units, which are supplied. The use of plug-in relay modules greatly increases the insertion speed of faults. Security of the introduced switched faults is ensured by a lockable section within the control panel. The pump may also have a range of electrical and mechanical faults applied to it. The proportional servo valve, pulsed flow meter and proportional level sensor are self-contained sub-systems.
Each of these systems can have electronic faults introduced onto them. The trainees then have to identify where the faults are, either on the circuit boards or the sensors and transducers.

## Optional equipment

*Controller*

*Interface*

The **Process Control pack 34-010** can be run to convey the theory and operation of level and flow control processes. In this application an industrial programmable three-term controller is used to implement the control, replacing the built-in relay control system. To operate the unit in this way an Industrial Process Controller pack 34-010 is required. It contains the industrial controller and 4-20mA interface unit, 4-20mA modules, source and display and level and flow transmitters. Control and monitoring software is provided, along with instructions on the use and operation of the system.



*PLC Interface*

PLC control of the rig is possible via the **PLC Interface 34-252-1**. It allows the internal relay logic flow switches, level switches and 4-20mA inputs and outputs of the trainer to be accessed through a multi-way connector on the side of the control cabinet. The interface board presents these connections on terminal blocks that can be easily wired to the PLC.The PLC is required to have both analogue I/O and switched I/O. For further information on PLC requirements contact Feedback Instruments Limited.

## Power requirements

220-250V ac @ 250VA or 110-125V ac @ 250VA, 50/60Hz. Please specify.

## Dimensions

Height: 700mm ($27^1/_2$in), Length: 1450mm ($57^1/_8$in), Depth: 450mm ($17^3/_4$in),

## Ordering Information

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|---|---|
| Industrial Process Fault Finding Trainer | 34-250 |
| Industrial Process Controller pack | 34-010 |
| Industrial Process Trainer PLC Interface | 34-252-1 |

Feedback
Feedback Instruments Limited
Park Rd, Crowborough, East Sussex,
TN6 2QR, England.
Tel: +44 (0) 1892 653322
Fax: +44 (0) 1892 663719
E-mail: feedback@fdbk.co.uk
Website: www.fbk.com

For further information on Feedback equipment please contact: . . . . . .