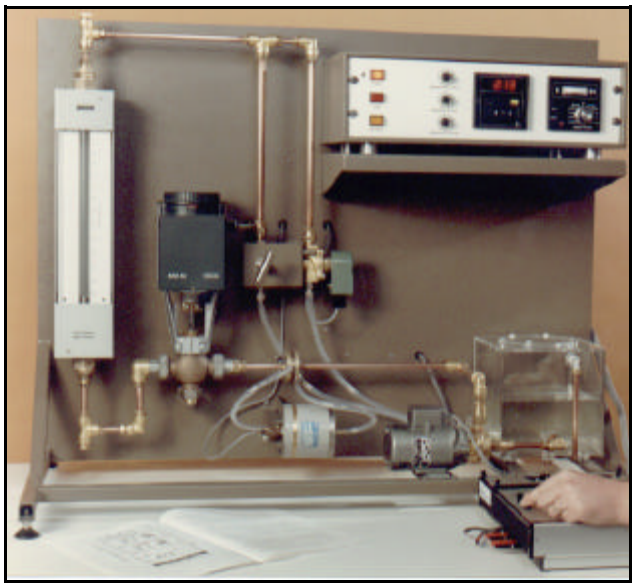
cussons
TECHNOLOGY



P3010

FLOW CONTROL APPARATUS

3 TERM ELECTRONIC

INTRODUCTION

Effective operation of industrial processes usually requires a capability to maintain a process variable such as flow, level, temperature, etc., at a required value.

Cussons P3010 Flow Control Apparatus is designed to demonstrate various aspects of control engineering using a flow controlled system to control the flow of water delivered by a centrifugal pump. The unit provides students with the opportunity of investigating the effects of a change of controller parameters (proportional band, integral and derivative times) on the control capability of the system.

Of particular benefit to the student is the fact that the unit is made up of typical items of control equipment currently used in industrial applications, thereby providing an excellent opportunity for familiarisation, including optional computer control and data logging using an IBM PC/XT or other compatible computer and also control from an optional programmable logic control module.

EXPERIMENTAL CAPABILITY

The range of investigations which may be carried out are:

- Manual (or open loop) two step control.
- Manual proportional control.
- Demonstration and calibration of controller proportional action and integral action.
- Demonstration of integral saturation.
- Response of first order flow system to closed loop control.

  Single Term – (proportional).
  Two Term – (proportional plus integral and proportional plus derivative).
  Three Term – (proportional plus integral plus derivative).

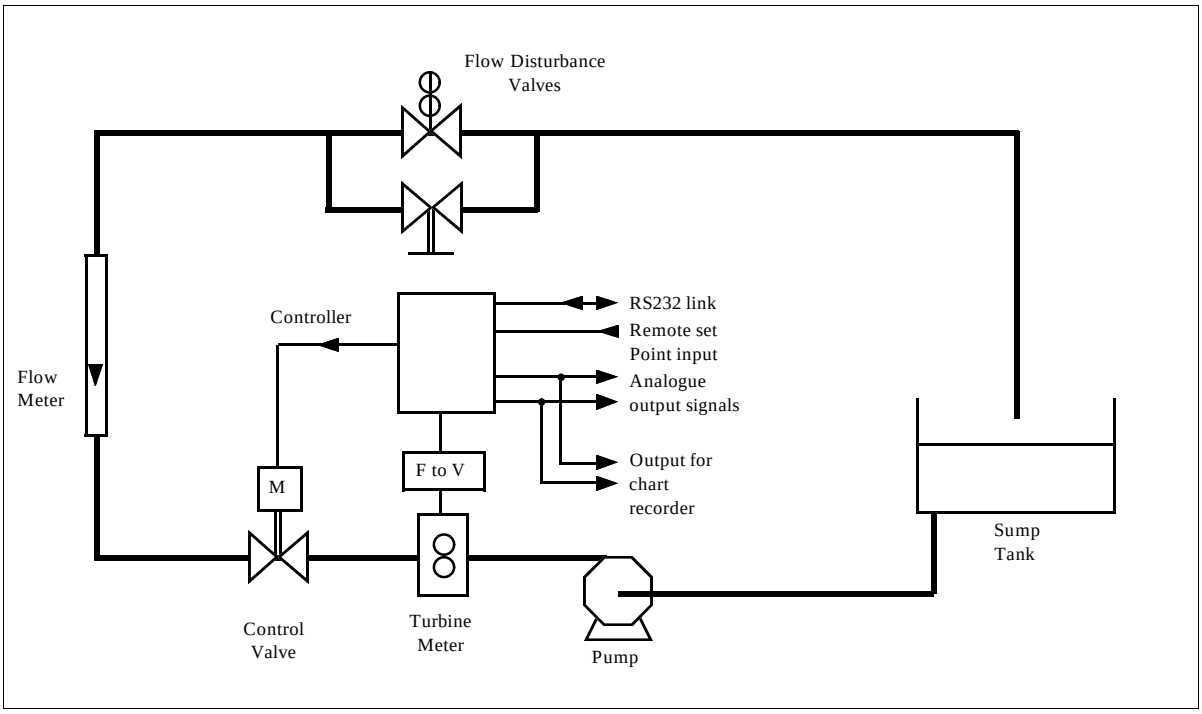
- Remote logic control from Cussons P3030 Programmable Logic Control Module.
- Remote control and data logging using Cussons P3025 Software and Interface with an IBM PC/XT.

DESCRIPTION

The apparatus consists of a water circulation system with a centrifugal pump coupled to a sump tank generating the process variable, namely water flow. The flow rate is measured by a turbine meter with frequency to voltage converter. A three term controller, which is an advanced programmable microprocessor based electronic control unit, incorporates an RS232C serial communications and retransmission of measured variable and controller output for analogue data logging. The controller drives the electrically operated modulating valve to regulate the flow automatically to the required set point value. The water flow may also be adjusted by manual control from the controller front panel.

A variable area flow meter is incorporated in the water circuit to provide an immediate visual indication of the flow rate. Manual and solenoid operated valves are included in the system to enable external disruptions to the flow to be introduced. The optional Cussons Programmable Logic Control Module (P3030) can be used to initiate the controller set point program as well as command the pump and disturbance solenoid valve.

Optional equipment available for use with this product includes a P3018 Multi Speed Flat Bed Chart Recorder, a P3030 Programmable Logic Control Module and P3025 software and interface for an IBM PC/XT.



TENDER SPECIFICATION

P3010 Flow Control Apparatus comprising a welded steel frame and backplate housing the following components.

Water flow circuit consisting of a sump tank constructed from clear acrylic material; centrifugal pump; turbine meter and frequency to voltage converter; electrically operated modulating flow control valve; variable area flow meter and a disturbance section comprising manual and solenoid valves.

A control unit comprising a steel instrumentation enclosure housing a 3 term digital microprocessor controller. Pushbutton switches for the mains power supply, the centrifugal pump and the flow disturbance solenoid valve.

The microprocessor based instrument has the facility for providing closed loop automatic control or manual control. During automatic control the level is controlled to the set point which can be changed using the increase/decrease buttons, the proportional band, integral time and derivative time can also be altered in the same manner. In manual operation the flow can be controlled using increase/decrease button to change the valve position.

The microprocessor control also incorporates an RS232 serial data link which allows external control via a suitable computer (IBM or equivalent). Analogue outputs are provided for 0-10V for measured variable and 0-10V for valve position which can both be fed into the optional P3018 Chart Recorder. The control unit incorporates both computer and programmable logic control communications sockets.

P3018 Chart Recorder – Bench mounting multi speed flat bed two channel chart recorder.

P3018/CK Consumables Kit – Consumables kit for chart recorder comprising:

10 rolls x 16m chart paper.
2 red pens and 2 green pens.

P3025 Cussons Computer Control Software and Datalogging Interface for use with an IBM PC/XT/AT or compatible.

P3030 Cussons Programmable Logic Module.

OVERALL DIMENSIONS

P3010	1075 mm wide, 600 mm deep, 870 mm high
P3018	250 mm wide, 325 mm deep, 76 mm high

Cussons Technology Ltd.
102 Great Clowes Street, Manchester M7 1RH, England
Tel. +(44)161 833 0036 Fax. +(44)161 834 4688
E-mail: sales@cussons.co.uk Web: www.cussons.co.uk