

Unit R116 – Process control systems

System layouts

Instructions and answers for teachers

These instructions should accompany the OCR resource ‘System layouts’ activity which supports OCR Cambridge Nationals in Engineering.



The Activity:

This resource comprises of 2 tasks.



This activity offers an opportunity for English skills development.

Associated materials:

'System layouts' activity sheet

Suggested timings:

Tasks 1 and 2: 1 hour

Task 1

For this activity learners are tasked to draw and label a block diagram showing the layout of a typical microprocessor-based control system in a washing machine. The diagram should also identify input devices (sensors) and output devices (actuators). Learners have been directed to a diagram on the Texas Instruments website (http://www.ti.com/solution/washing_machine_low_end) although teachers could select an alternative source.

The block diagram that learners produce could include the following input sensors and output actuators:

Inputs	Outputs
Display panel	Drum motor control
Water level sensor	Water supply valve
Temperature sensor	Drain valve
Volume sensor	Softener supply valve
Cover switch	Relay driver – for LEDs
	Buzzer

Task 2

For Activity 2 learners are required to research how a microcontroller might be configured in an Electronic Stability Control (ESC) system used in a car. Learners might find a block diagram on the Texas Instruments website, or at other sources (eg Bosch Automotive website). Learners might reproduce and simplify any block diagrams they find.

The block diagram that learners produce could include the following input sensors and output actuators:

Inputs	Outputs
ECU sensor including: Gyroscope Accelerator sensor	Solenoids (controlling brake fluid flow)
	ESC pressure pump
	Warning lamp
Wheel speed sensor	

Teachers could extend both activities to include investigating sensors used in both systems in more detail, and also how each system operates (ie sequence of operation).

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OCR Resources: the small print

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