

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).

To give us feedback on, or ideas about the OCR resources you have used, email resourcesfeedback@ocr.org.uk

OCR Resources: the small print

OCR's resources are provided to support the teaching of OCR specifications, but in no way constitute an endorsed teaching method that is required by the Board, and the decision to use them lies with the individual teacher. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources.

© OCR 2014 - This resource may be freely copied and distributed, as long as the OCR logo and this message remain intact and OCR is acknowledged as the originator of this work.

OCR acknowledges the use of the following content: English icon: Air0ne/Shutterstock.com, washing machine: tale/Shutterstock.com, car: Rawpixel/Shutterstock.com