Marking Schedule
Form 1 Ob.

Competitor No		**Competitor Name**		**Date**	**20 May 2015**
Competition	**UK Heats Mechatronics Higher – Pneumatic Sequence**	**Venue**	**FESTO Northampton**		

Aspect ID	Aspect of Criterion – Description	Max Mark	Requirement or Nominal Size	Result or Actual Value	Mark Awarded
A1	Switch air supply on and observe both cylinders in extended position.	1.0 (0.5 per cylinder)	Cylinders extended.		
A2	Supply pressure correctly set to 5.0 bar.	0.5	5.0 bar		
A3	Used a N/C 3/2 way valves with a selector switch for starting the cycle.	1.0	Y/N		
A4	Monitor Cylinder A pressure - gauge fitted to the back of cylinder	0.5	Pressure gauge fitted		
A5	Starve Cylinder A in forward direction.	1.0	Flow valve used on Cylinder A		
A6	Fit flow restrictor to starve Cylinder A.	1.0	Flow restrictor fitted correctly		
A7	A sensor from each cylinder is used to ensure both cylinders are extended before the cycle can be started.	2.0	Sensors are part of the starting sequence.		
A8	Fit proximity sensors to both cylinders for sensing extended and retracted positions.	2.0	Fitted 4 proximity sensors to 2 cylinders and wire into the circuit.		
A9	Observe specified sequence shown below: $\left[A-, B-, \begin{pmatrix} A+ \\ 4.0bar \end{pmatrix}, 2s, B+\right]$	12.0	Remove 2 marks for each incorrect step up to a max of 12.0 marks.		
A10	Cycle will self-repeat until interrupted by the selector switch.	1.0	Y/N		
A11	If the sequence is interrupted mid-cycle, it will continue with the rest of the sequence but cycle will not self-repeat.	1.0	Compete cycle on interruption.		
A12	Speed control element for Cylinder B fitted correctly.	0.5	Max force behind piston.		
A13	Cylinder B full forward stroke time.	0.5	3.0 ± 0.5s		
A14	Use quick exhaust valve on Cylinder B	0.5	Cylinder B returns fast.		

A15	Pressure sequence valve set correctly.	0.5	4.0bar		
A16	Time evaluation: If task completed within given time AND sequence in **A9** is correct then calculate bonus points for speed of completion the task. Points for time = (max. time – actual time) x max. points /(max. time – min. time) = (60.0 - .....) x 2 Points / (60.0 - .....)	2.0			
		27.0			

Judge 1	Initials	Judge 2	Initials	Judge 3	Initials

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Date

Awarded Mark is the Max Mark minus any specified deductions for difference between 'requirement and result'

2015 UK Heats
Mechatronics HIGHER
Competition

Marking Schedule
Form 1 Sub.

Judge number (please circle)

1	2	3	4	5

Competitor No		**Competitor Name**		**Date**	**20 May 2015**
Competition	**UK Heats Mechatronics Higher – Pneumatic Sequence**	**Heat/venue**	**FESTO Northampton**		

Aspect ID	Aspect of Criterion – Description	Max Mark	Judges' Score	Mark Awarded
A17	Professional practice: Circuit tidiness of the tubing and layout of the order of elements and the hierarchy of the circuit devised.	3.0		
		3.0		

Judge	Initials

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Marking Schedule
Form 1 Ob.

Competitor No		**Competitor Name**		**Date**	**20 May 2015**
Competition	**UK Heats Mechatronics Higher – Electro-pneumatics**	**Venue**	**FESTO Northampton**		

Aspect ID	Aspect of Criterion – Description	Max Mark	Requirement or Nominal Size	Result or Actual Value	Mark Awarded
B1	Supply pressure set to 5.5 bars.	0.5	5.5 bar		
B2	Both cylinders are double acting.	0.5	Double acting cylinders used.		
B3	Use proximity sensors for ensuring both cylinders are retracted before the sequence starts.	2.0	Both retracted position sensors are wired in.		
B4	Cylinder B is controlled by a solenoid actuated spring return solenoid 5/2 way DCV.	1.0	Used a 5/2 way spring return solenoid valve.		
B5	Cylinder A is controlled by a double solenoid 5/2 way DCV.	1.0	Used a 5/2 way double solenoid valve.		
B6	Cylinder A solenoids are wired in indirectly through relay contacts.	2.0	Indirect wiring,		
B7	Cylinder A is fitted with roller lever limit switches.	1.0	Roller limit switches fitted.		
B8	Cylinder B is fitted with magnetic pickup proximity sensors are mounted onto the cylinder body.	2.0	Reed switches fitted		
B9	Magnetic pickup sensors are passed through relay contacts.	2.0	Sensors are passed through relays.		
B10	Quick exhaust valve fitted to Cylinder B return direction.	1.0	Cylinder B returns fast		
B11	Observe specified sequence $[A+, B+, B-, A-]$	8.0	Remove 2 marks for each incorrect step (max of 8).		
B12	Cycle starts with a N/O momentary switch.	1.0	Used momentary switch.		
B13	Cycle stops with a N/O momentary switch.	1.0	Used momentary switch.		
B14	A latching relay is used for start and stop circuit.	1.0	Used a relay.		

B15	The sequence repeats itself until interrupted by the stop button.	1.0	Self-repeating circuit.		
B16	Cylinder B has a forward speed control element fitted.	1.0	Flow restriction valve is fitted correctly.		
B17	Forward stroke of Cylinder B is limited to 2-2.5 seconds.	1.0	Limited forward speed, 2.0-2.5 mm.		
B18	Time evaluation: If task completed within given time AND sequence in **B11** is correct then calculate bonus points for speed of completion the task. Points for time = (max. time – actual time) x max. points /(max. time – min. time) = (60.0 - .....) x 3 Points / (60.0 - .....)	3.0			
		30.0			

Judge 1	Initials	Judge 2	Initials	Judge 3	Initials

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Marking Schedule
Form 1 Ob.

Competitor No		**Competitor Name**		**Date**	**20 May 2015**
Competition	**UK Heats Mechatronics Higher – PLC programming**	**Venue**	**FESTO Northampton**		

Aspect ID	Aspect of Criterion – Description	Max Mark	Requirement or Nominal Size	Result or Actual Value	Mark Awarded
C1	Set pressure to 6.0 bars.	1.0	6.0 bars.		
C2	Both cylinders have two proximity sensors fitted to detect end of travel.	1.5	4 proximity sensors fitted.		
C3	Cylinder A is controlled by a 5/2 way solenoid actuated and spring return valve.	1.5	Y/N		
C4	Cylinder B is controlled by a 5/2 way solenoid actuated and solenoid return valve.	1.5	Y/N		
C5	Cylinder B solenoids are indirectly driven.	2.0	Solenoids are connected to relay contacts.		
C6	Programme the following sequence using a PLC: $\left[\left[\begin{pmatrix}A+\\B+\end{pmatrix},\begin{pmatrix}A-\\B-\end{pmatrix}\right]^2, 2s, A+, 2s, \left[\left[\begin{pmatrix}A-\\B+\end{pmatrix},\begin{pmatrix}A+\\B-\end{pmatrix}\right]^2, 2s, A-\right]\right.$	22.5	Deduct 2.5 points per step (steps are separated by commas) (max of 22.5)		
C7	Cycle starts by pressing a N/O momentary switch.	2.0	Y/N		
C8	The sequence repeats only once, whenever the start button is pressed, without resetting or reloading the PLC programme.	3.0	No self-repeat.		

C9	Time evaluation: If task completed within given time AND sequence in C6 is correct then calculate bonus points for speed of completion the task. Points for time = (max. time – actual time) x max. points /(max. time – min. time) = (60.0 - .....) x 5 Points / (60.0 - .....)	5.0			
		40.0			

Judge 1	Initials	Judge 2	Initials	Judge 3	Initials

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2015 UK Heats
Mechatronics HIGHER
Competition

Competitor Feedback Form 2

Judge number (please circle)

1	2	3	4	5

Competitor No		**Competitor Name**		**Date**	**20 May 2015**
Competition	**UK Heats Mechatronics HIGHER**	**Heat/venue**	**FESTO Northampton**		

Average score for competition %

Criterion ID	Criterion Description	Max Marks	Total averaged mark awarded
A	**TASK 1: Pneumatic sequence**	30	
B	**TASK 2: Electro-pneumatic (Hard-wired system)**	30	
C	**TASK 3: PLC programming**	40	
	Total Marks	**100**	

Comments

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