

# Overhead door operation

## Module 1

The circuit is to be designed to open and close an overhead door.

- 1) To open the overhead door you must push either green pushbutton B2 or B4. It will stop when limit switch LS1 is activated. ( M1 clockwise )
- 2) To close the door you must push either red pushbutton B3 or B5. It will stop when limit switch LS2 is activated. There must be a 10 second delay started when the door is opened before the door can be closed. ( M1 counter clockwise )
- 3) When pushbutton B1 is pushed the operation of the door is stopped. No operation can be achieved until B1 is manually pulled into operation mode.
- 4) In case of a motor overload the operation of the door will stop.
- 5) H2 and H5 indicate the door is opening.
- 6) H4 and H7 indicate the door is closing.
- 7) H1 will indicate panel is energized.
- 8) H3 will indicate a motor overload.
- 9) When the door is moving in either direction H6 will flash at 2 Hz until door travel has stopped.

**Function 1:**

**PB 1:** On/OFF P1 – Led shows the feedback ( On = LED ON Off = LED Off)

**Function 2:**

**PB 2:** On/OFF L2&L3 - Led shows the feedback ( On = LED ON Off = LED Off)

**Function 3:**

**PB 3:** On/OFF P2 – Led shows the feedback ( On = LED ON Off = LED Off)

**Function 4:**

**PB 4:** On/OFF L1 - Led shows the feedback ( On = LED ON Off = LED Off)

**Function 5:**

**PB 5:** On/OFF P3 – Led shows the feedback ( On = LED ON Off = LED Off)

**Function 6:**

**PB 6:** Moves the shutter to 50 % height, and the slats to 100% (closed).

**Function 7:**

**PB 7:** Central ON

- P1: ON
- P2: ON
- P3: On
- L1: ON
- L2: On
- L3: On
- Shutter: UP (0%)

**Function 8:**

- PB 8: Central Off
- P1: OFF
- P2: OFF
- P3: OFF
- L1: OFF
- L2: OFF
- L3: OFF
- Shutter: Down (100%)

**SW 1 Schneider**



Tegn:	KNX FUNCTION 1 WS 2015	
Dato:	08.08.2015	
Rev:	0	08.08.2015
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Team 2		
FILENAME		
KNX FUNCTION 1.VSD		

SW 2 Jung 4093

**Function 9:**

**PB 5:**

When you press PB5

Immediate: L5 ON

After 5 sec: L5 Off

L6 ON

After 10 sec: L6 OFF

**Function 10:**

**PB 1:**

Short push: L1:ON

Long press (longer than 2 sec): L2&L3: ON

LED:

During presence from PIR ON

During NO presence from PIR OFF

**Function 11:**

**PB 2:**

Short push: L1:ON

Long press (longer than 2 sec): L2&L3: ON

LED:

During presence from PIR ON

During NO presence from PIR OFF

**Function 12:**

**PB 3 :**

Short push: L4 ON

Long push: L4 Dim Up

Led shows the feedback of L4 ( On = LED ON Off = LED Off)

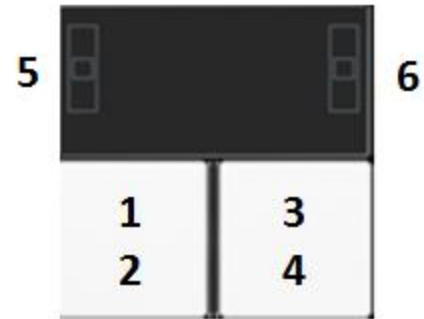
**Function 13:**

**PB 4 :**

Short push: L4 OFF

Long push: L4 Dim Down

Led shows the feedback of L4 ( On = LED ON Off = LED Off)



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**Function 14:**

**SW3 P1:**

ON: Activates Wind alarm:  
Shutter moves UP, and can't be controlled by other switches.  
OFF: Deactivates Wind alarm:  
Can then be controlled by other switches again.

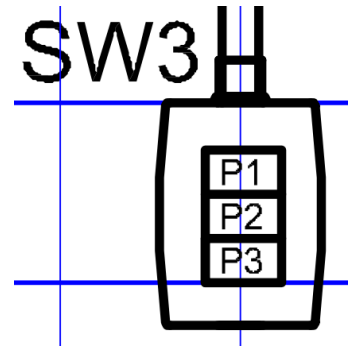
**Function 15:**

**SW3 P2:**

ON: Activates fire alarm:  
L2 & L3 blinks ON/OFF, and can't be controlled by other switches.  
OFF: Deactivates fire alarm:  
Stops blinking, and can be controlled by other switches again.

**SW3 P3:**

No function



**Function 16:**

**SW4 P1:**

Short press: Step/stop UP  
Long press: Move shutter UP

**Function 17:**

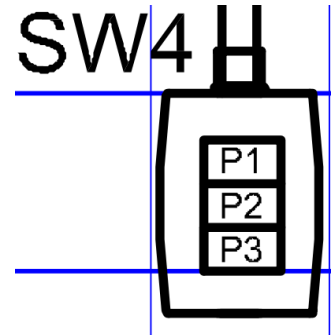
**SW4 P2:**

Short press: Step/stop DOWN  
Long press: Move shutter DOWN

**Function 18:**

**SW4 P3**

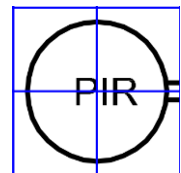
Short push: Toggle L4 ON/Off  
Long push: Toggle L4 Dim Up/Down



**Function 19:**

**PIR:**

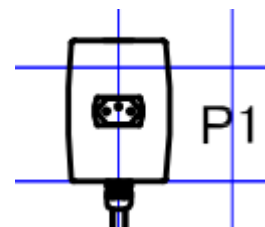
When motion the PIR starts constant light control:  
The setpoint is 600 lux.  
When there is no motion the light is turned off after 10 seconds.



**Function 20:**

**P1:**

If the power exceeds 100 W, P1 shall turn off after 5 seconds.



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**Function 1:**

**PB 1:** On/OFF P2 – Led shows the feedback ( On = LED ON Off = LED Off)

**Function 2:**

**PB 2:** On/OFF L2&L3 - Led shows the feedback ( On = LED ON Off = LED Off)

**Function 3:**

**PB 3:** On/OFF P3 – Led shows the feedback ( On = LED ON Off = LED Off)

**Function 4:**

**PB 4:** On/OFF L1 - Led shows the feedback ( On = LED ON Off = LED Off)

**Function 5:**

**PB 5:** On/OFF P1 – Led shows the feedback ( On = LED ON Off = LED Off)

**Function 6:**

**PB 6:** Moves the shutter to 80 % height, and the slats to 100% (closed).

**Function 7:**

**PB 7:** Central ON

- P1: ON
- P2: ON
- P3: On
- L1: ON
- L2: On
- L3: On
- Shutter: UP (0%)

**Function 8:**

- PB 8: Central Off
- P1: OFF
- P2: OFF
- P3: OFF
- L1: OFF
- L2: OFF
- L3: OFF
- Shutter: Down (100%)

**SW 1 Schneider**



Tegn:	KNX FUNCTION 2 WS 2015	
Dato:	08.08.2015	
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KNX FUNCTION 2.VSD		

SW 2 Jung 4093

**Function 9:**

**PB 5:**

When you press PB5

Immediate: L5 ON

After 2 sec: L5 Off

L6 ON

After 4 sec: L6 OFF

**Function 10:**

PB 1:

Short push: L1:ON

Long press (longer than 4 sec): L2&L3: ON

LED:

During presence from PIR ON

During NO presence from PIR OFF

**Function 11:**

PB 2:

Short push: L1:ON

Long press (longer than 4 sec): L2&L3: ON

LED:

During presence from PIR ON

During NO presence from PIR OFF

**Function 12:**

PB 3 :

Short push: L4 ON

Long push: L4 Dim Up

Led shows the feedback of L4 ( On = LED ON Off = LED Off)

**Function 13:**

PB 4 :

Short push: L4 OFF

Long push: L4 Dim Down

Led shows the feedback of L4 ( On = LED ON Off = LED Off)



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**SW3 P1:**  
No function.

**Function 14:**

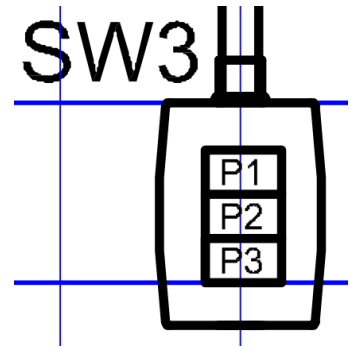
**SW3 P2:**

ON: Activates fire alarm:  
L2 & L3 blinks ON/OFF, and can't be controlled by other switches.  
OFF: Deactivates fire alarm:  
Stops blinking, and can be controlled by other switches again.

**Function 15:**

**SW3 P3:**

ON: Activates Wind alarm:  
Shutter moves UP, and can't be controlled by other switches.  
OFF: Deactivates Wind alarm:  
Can then be controlled by other switches again.



**Function 16:**

**SW4 P1:**

Short press: Step/stop UP  
Long press: Move shutter UP

**Function 17:**

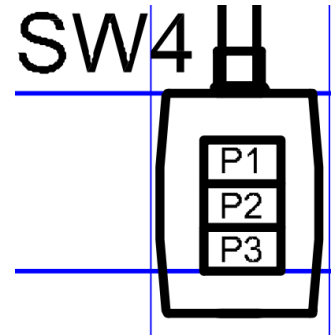
**SW4 P2:**

Short press: Step/stop DOWN  
Long press: Move shutter DOWN

**Function 18:**

**SW4 P3**

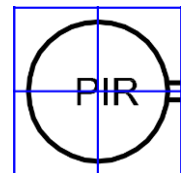
Short push: Toggle L4 ON/Off  
Long push: Toggle L4 Dim Up/Down



**Function 19:**

**PIR:**

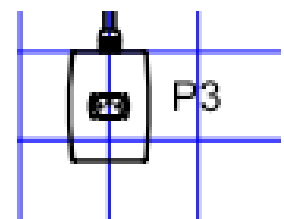
When motion the PIR starts constant light control:  
The setpoint is 600 lux.  
When there is no motion the light is turned off after 10 seconds.



**Function 20:**

**P3:**

If the power exceeds 100 W, P1 shall turn off after 5 seconds.



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**Function 1:**

**PB 1:** On/OFF P3 – Led shows the feedback ( On = LED ON Off = LED Off)

**Function 2:**

**PB 2:** On/OFF L2&L3 - Led shows the feedback ( On = LED ON Off = LED Off)

**Function 3:**

**PB 3:** On/OFF P1 – Led shows the feedback ( On = LED ON Off = LED Off)

**Function 4:**

**PB 4:** On/OFF L1 - Led shows the feedback ( On = LED ON Off = LED Off)

**Function 5:**

**PB 5:** On/OFF P2 – Led shows the feedback ( On = LED ON Off = LED Off)

**Function 6:**

**PB 6:** Moves the shutter to 30 % height, and the slats to 100% (closed).

**Function 7:**

**PB 7:** Central ON

- P1: ON
- P2: ON
- P3: On
- L1: ON
- L2: On
- L3: On
- L5: ON
- L6: ON
- Shutter: UP (0%)

**Function 8:**

- PB 8: Central Off
- P1: OFF
- P2: OFF
- P3: OFF
- L1: OFF
- L2: OFF
- L3: OFF
- L5: OFF
- L6: OFF
- Shutter: Down (100%)

**SW 1 Schneider**



Tegn:	KNX FUNCTION 3 WS 2015	
Dato:	08.08.2015	
Rev:	0	08.08.2015
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KNX FUNCTION 3.VSD		



SW 2 Jung 4093

**Function 9:**

**PB 5:**

When you press PB5

Immediate: L6 ON

After 3 sec: L6 Off

L5 ON

After 6 sec: L5 OFF

**Function 10:**

PB 1:

Short push: L1:ON

Long press (longer than 4 sec): L2&L3: ON

LED:

During presence from PIR ON

During NO presence from PIR OFF

**Function 11:**

PB 2:

Short push: L1:ON

Long press (longer than 4 sec): L2&L3: ON

LED:

During presence from PIR ON

During NO presence from PIR OFF

**Function 12:**

PB 3 :

Short push: L4 ON

Long push: L4 Dim Up

Led shows the feedback of L4 ( On = LED ON Off = LED Off)

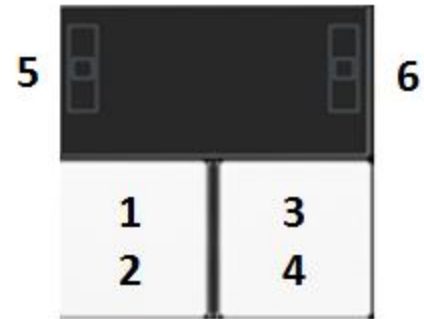
**Function 13:**

PB 4 :

Short push: L4 OFF

Long push: L4 Dim Down

Led shows the feedback of L4 ( On = LED ON Off = LED Off)



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**Function 14:**

**SW3 P1:**

ON: Activates Wind alarm:  
Shutter moves UP, and can't be controlled by other switches.  
OFF: Deactivates Wind alarm:  
Can then be controlled by other switches again.

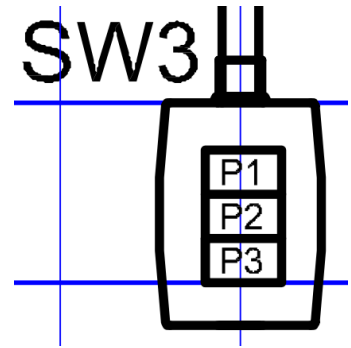
**SW3 P2:**

No function

**Function 15:**

**SW3 P3:**

ON: Activates fire alarm:  
L2 & L3 blinks ON/OFF, and can't be controlled by other switches.  
OFF: Deactivates fire alarm:  
Stops blinking, and can be controlled by other switches again.



**Function 16:**

**SW4 P1:**

Short press: Step/stop UP  
Long press: Move shutter UP

**Function 17:**

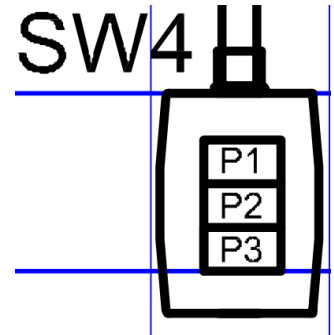
**SW4 P2:**

Short press: Step/stop DOWN  
Long press: Move shutter DOWN

**Function 18:**

**SW4 P3**

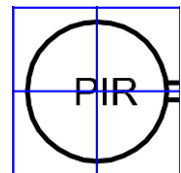
Short push: Toggle L4 ON/Off  
Long push: Toggle L4 Dim Up/Down



**Function 19:**

**PIR:**

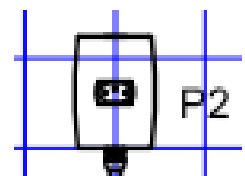
When motion the PIR starts constant light control:  
The setpoint is 600 lux.  
When there is no motion the light is turned off after 10 seconds.



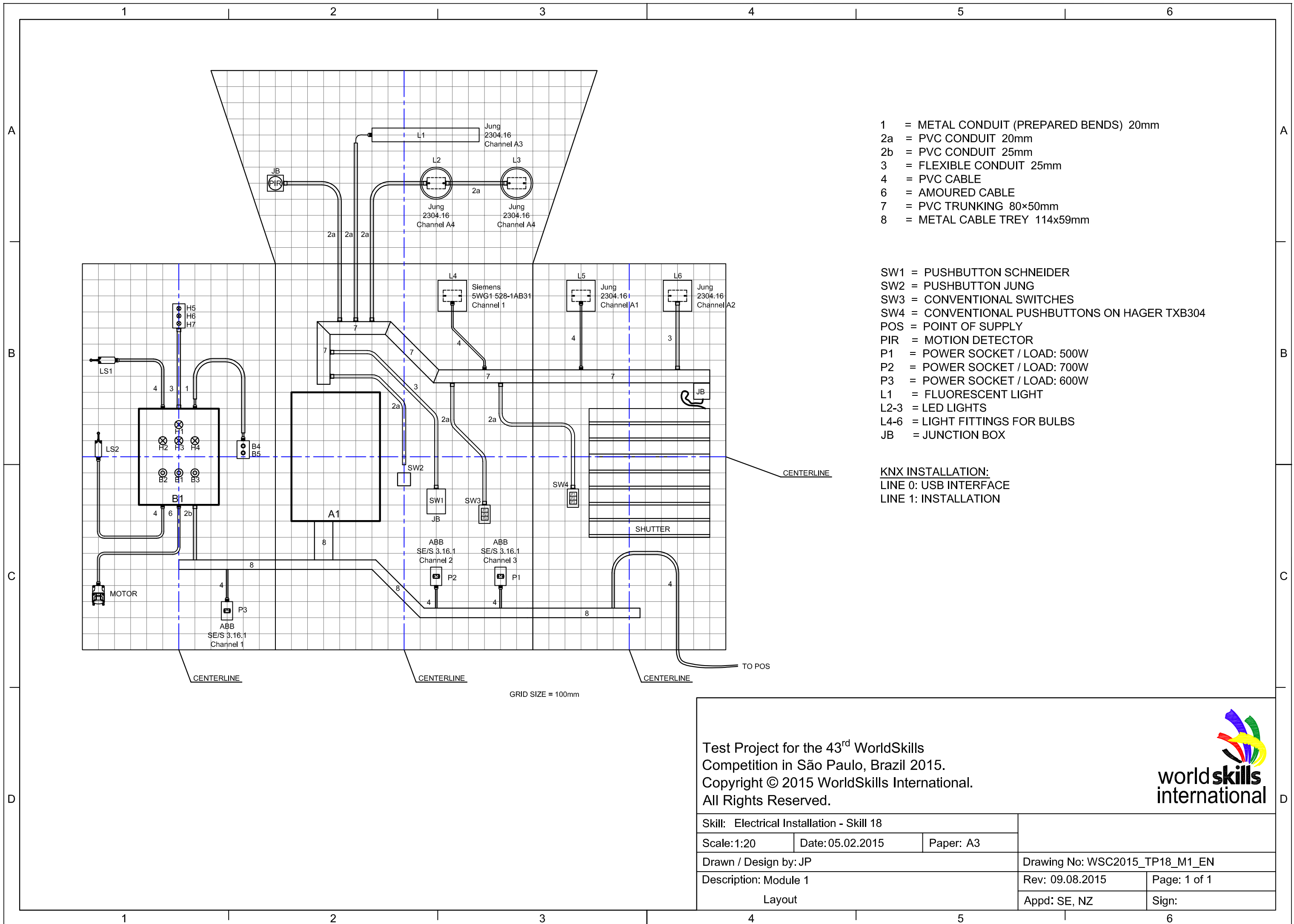
**Function 20:**

**P2:**

If the power exceeds 100 W, P1 shall turn off after 5 seconds.



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- 1 = METAL CONDUIT (PREPARED BENDS) 20mm
- 2a = PVC CONDUIT 20mm
- 2b = PVC CONDUIT 25mm
- 3 = FLEXIBLE CONDUIT 25mm
- 4 = PVC CABLE
- 6 = AMOURED CABLE
- 7 = PVC TRUNKING 80x50mm
- 8 = METAL CABLE TREY 114x59mm

- SW1 = PUSHBUTTON SCHNEIDER
- SW2 = PUSHBUTTON JUNG
- SW3 = CONVENTIONAL SWITCHES
- SW4 = CONVENTIONAL PUSHBUTTONS ON HAGER TXB304
- POS = POINT OF SUPPLY
- PIR = MOTION DETECTOR
- P1 = POWER SOCKET / LOAD: 500W
- P2 = POWER SOCKET / LOAD: 700W
- P3 = POWER SOCKET / LOAD: 600W
- L1 = FLUORESCENT LIGHT
- L2-3 = LED LIGHTS
- L4-6 = LIGHT FITTINGS FOR BULBS
- JB = JUNCTION BOX

**KNX INSTALLATION:**  
 LINE 0: USB INTERFACE  
 LINE 1: INSTALLATION

GRID SIZE = 100mm

Test Project for the 43<sup>rd</sup> WorldSkills  
 Competition in São Paulo, Brazil 2015.  
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Skill: Electrical Installation - Skill 18				
Scale: 1:20	Date: 05.02.2015	Paper: A3		
Drawn / Design by: JP			Drawing No: WSC2015_TP18_M1_EN	
Description: Module 1			Rev: 09.08.2015	Page: 1 of 1
Layout			Appd: SE, NZ	Sign:

## Skill name

## Electrical Installation

## Criteria

## Mark

A	Safety (electrical and personal)	10.00
B	Commissioning and function	25.00
C	Circuit design	10.00
D	Measurements	5.00
E	Installation of equipment and wire-ways	15.00
F	Wiring and termination	15.00
G	Installation testing	10.00
H	Programming	10.00

Sub Criteria ID	Sub Criteria Name or Description	Aspect Type O = Obj S = Sub J = Judg	Aspect - Description	Judg Score
A1	Health and Safety			
		O	Day 1 Health and Safety. No breach of the Health and Safety req	
		O	Day 2 Health and Safety. No breach of the Health and Safety req	
		O	Day 3 Health and Safety. No Breach of the Health and Safety req	
		O	Day 4 Health and Safety. No Breach of the Health and Safety req	
A2	Module 1:			
		O	Correct testing of earth continuity resistance	
		O	Correct testing of insulation resistance	
		O	All covers closed and not damaged before supply connected	

Sub Criteria ID	Sub Criteria Name or Description	Aspect Type O = Obj S = Sub J = Judg	Aspect - Description	Judg Score
B1	Module 1: Commissioning		<input type="radio"/> Test report OK, Safe to power up, Power On <input type="radio"/> Second attempt <input type="radio"/> Third attempt	
B2	Module 1: Function (Manual Function)		<input type="radio"/> Switch Actuator, ABB Channel 1 On = P3 On <input type="radio"/> Switch Actuator, ABB Channel 2 On = P2 On <input type="radio"/> Switch Actuator, ABB Channel 3 On = P1 On <input type="radio"/> Switch Actuator, Jung Channel A1 On = L5 On <input type="radio"/> Switch Actuator, Jung Channel A2 On = L6 On <input type="radio"/> Switch Actuator, Jung Channel A3 On = L1 On <input type="radio"/> Switch Actuator, Jung Channel A4 On = L2 & L3 On <input type="radio"/> SW3 on Binary In <input type="radio"/> Shutter Actuator, Channel A - Shutter up <input type="radio"/> Shutter Actuator, Channel B - Shutter down <input type="radio"/> Dimming Actuator = L4 <input type="radio"/> B2 (Green PB) - Open Door Command <input type="radio"/> B4 (Green PB) - Open Door Command <input type="radio"/> LS1 (Top Limit Switch) - Stop Open Command <input type="radio"/> B3 (Red PB) - Close Door Command <input type="radio"/> B5 (Red PB) - Close Door Command <input type="radio"/> LS2 (Bottom Limit Switch) - Stop Close Command <input type="radio"/> 10 Second Close Delay after opening <input type="radio"/> B1 (Emergency PB) - Door is stopped with No operation available <input type="radio"/> Motor Overload - Door is stopped with No operation available until <input type="radio"/> H2 & H5 - Indicate the door is opening <input type="radio"/> H4 & H7 - Indicate the door is closing <input type="radio"/> H1 - Indicates the panel is energised <input type="radio"/> H3 - Indicates a motor overload <input type="radio"/> H6 - Flashes at 2Hz while the door is moving <input type="radio"/> Motor Overload Set Correctly	

Sub Criteria ID	Sub Criteria Name or Description	Aspect Type O = Obj S = Sub J = Judg	Aspect - Description	Judg Score
C1	Module 1: Circuit Design	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	Correct layout on B1 front door Correct colours used for the Neutral and Earth cables Correctly wired 24v control circuit in B1 Correct use of cable colour for the power supply cable. Correct Polarity at the power socket P1 Correct cable type to the motor (Armoured Cable) Correct cable size to B1 (5 x 2.5mm <sup>2</sup> ) Correct cable size for the Power Supply (5 x 4mm <sup>2</sup> ) Correct cable size to the Lamps (3 x 1.5mm <sup>2</sup> ) Correct cable size to the sockets (3 x 2.5mm <sup>2</sup> )	
Sub Criteria ID	Sub Criteria Name or Description	Aspect Type O = Obj S = Sub J = Judg	Aspect - Description	Judg Score
D1	Module 1: Measurements	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	Measurement 1 correct Measurement 2 correct Measurement 3 correct Measurement 4 correct Measurement 5 correct Measurement 6 correct Measurement 7 correct Measurement 8 correct Measurement 9 correct Measurement 10 correct	

Sub Criteria ID	Sub Criteria Name or Description	Aspect Type O = Obj S = Sub J = Judg	Aspect - Description	Judg Score
E1	Module 1: Installation of equipment and wire-ways	O Item 1: Level / Plumb Correct O Item 2: Level / Plumb Correct O Item 3: Level / Plumb Correct O Item 4: Level / Plumb Correct O Item 5: Level / Plumb Correct O Item 6: Level / Plumb Correct O Item 7: Level / Plumb Correct O Item 8: Level / Plumb Correct O Item 9: All cable glands are correct and secure O Item 10: All saddles for the same length of pipe are level O Item 11: All saddles for the same length of pipe are level J PVC conduit. Conduits have even bend radius and no distortion	Clipping of flexible, PVC and armoured cable.  PVC trunking. Bends and angles are neat, no gaps	0 1 2 3  0 1 2 3  0 1 2 3
Sub Criteria ID	Sub Criteria Name or Description	Aspect Type O = Obj S = Sub J = Judg	Aspect - Description	Judg Score

F1	Module 1: Wiring and termination	<input type="radio"/> All conductors securely terminated with no bare copper showing. <input type="radio"/> Item 2: P1 <input type="radio"/> Item 3: P2 <input type="radio"/> Item 5: L1 <input type="radio"/> Item 6: L2 <input type="radio"/> Item 10: L6 <input type="radio"/> Item 11: B1 <input type="radio"/> Item 15: SW3 <input type="radio"/> Item 16: SW4 <input type="radio"/> Item 17: LS1 <input type="radio"/> Item 18: LS2	<input type="radio"/> Neatness of cables on metal cable tray	0 1 2 3
		<input type="radio"/> General neatness of wiring in A1		0 1 2 3
		<input type="radio"/> General neatness of wiring in B1		0 1 2 3
Sub Criteria ID	Sub Criteria Name or Description	Aspect Type O = Obj S = Sub J = Judg	Aspect - Description	Judg Score
G1	Module 3: Installation testing	<input type="radio"/> Fault 1: Found Correctly <input type="radio"/> Fault 2: Found Correctly <input type="radio"/> Fault 3: Found Correctly <input type="radio"/> Fault 4: Found Correctly		



Sub Criteria ID	Sub Criteria Name or Description	Aspect Type O = Obj S = Sub J = Judg	Aspect - Description	Judg Score
		<input type="radio"/> Fault 5: Found Correctly <input type="radio"/> Fault 6: Found Correctly <input type="radio"/> Fault 7: Found Correctly <input type="radio"/> Fault 8: Found Correctly <input type="radio"/> Fault 9: Found Correctly <input type="radio"/> Fault 10: Found Correctly		
H1	Module 2: Programming	<input type="radio"/> Correct operation of Function 1 <input type="radio"/> Correct operation of Function 2 <input type="radio"/> Correct operation of Function 3 <input type="radio"/> Correct operation of Function 4 <input type="radio"/> Correct operation of Function 5 <input type="radio"/> Correct operation of Function 6 <input type="radio"/> Correct operation of Function 7 <input type="radio"/> Correct operation of Function 8 <input type="radio"/> Correct operation of Function 9 <input type="radio"/> Correct operation of Function 10 <input type="radio"/> Correct operation of Function 11 <input type="radio"/> Correct operation of Function 12 <input type="radio"/> Correct operation of Function 13 <input type="radio"/> Correct operation of Function 14 <input type="radio"/> Correct operation of Function 15 <input type="radio"/> Correct operation of Function 16 <input type="radio"/> Correct operation of Function 17 <input type="radio"/> Correct operation of Function 18 <input type="radio"/> Correct operation of Function 19 <input type="radio"/> Correct operation of Function 20		



Extra Aspect Description (Obj or Subj) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Obj Only)	WSSS Section	Max Mark
		1	1.75
Mark lossed on the second occasion per day		1	1.75
Mark lossed on the second occasion per day		1	1.75
Mark lossed on the second occasion per day		1	1.75
Mark lossed on the second occasion per day		1	1.75
		6	1.00
		6	1.00
Any covers missing will lose points		6	1.00

Criterion  
A

Total  
Mark 10.00

Extra Aspect Description (Obj or Subj) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Obj Only)	WSSS Section	Max Mark
First attempt ok No second attempt needed No second or third attempt needed		6 6 6	2.00 2.00 2.00
KNX		5 5 5 5 5 5 5 5	0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50
All buttons correct 1.0, 2 x buttons correct 0.5, 1 x button c		5 5 5 5	1.00 0.50 0.50 0.50
LOGO: Motor 1 Turns Right (Clockwise when viewed from Motor 1 Turns Right (Clockwise when viewed from the sha Motor 1 Turns Left (Counter Clockwise when viewed from Motor 1 Turns Left (Counter Clockwise when viewed from		3 3 3 3 3 3 3 3 3 3	0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50
2 x Lamps correct 1.0, 1 x Lamp correct 0.5 2 x Lamps correct 1.0, 1 x Lamp correct 0.5		3 3 3 3 3	1.50 1.00 1.00 0.50 0.50
2Hz Flash 1.5, other frequency 0.5		3 3	1.50 1.00

Criterion B      Total Mark      25.00

Extra Aspect Description (Obj or Subj) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Obj Only)	WSSS Section	Max Mark
As per layout diagram Neutral = Black/Light Blue, Earth = green/yellow B1 control circuit 24v		2 2 2 2 4 4 4 4 4 4	1.00 1.50 1.00 1.50 0.50 0.50 1.00 1.00 1.00 1.00
Extra Aspect Description (Obj or Subj) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Obj Only)	WSSS Section	Max Mark
10 of a possible 25 measurements selected by lottery.		5 5 5 5 5 5 5 5 5 5	0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50

Criterion C Total Mark 10.00

Criterion D Total Mark 5.00

Extra Aspect Description (Obj or Subj) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Obj Only)	WSSS Section	Max Mark
<p>8 of a possible 22 Level / Plumb measurements selected</p> <p>(Check 3 Pipes above B1) (Check 3 Pipes above trunking)</p> <p>Below industry standard or No attempt: bends have uneven spacing Meets industry standard: Majority of conduit bends have even spacing Exceeds industry standard: All conduit bends have an even spacing Demonstrates Excellence: All conduit bends have identical spacing</p> <p>Below industry standard or No attempt: Cable clips unevenly spaced Meets industry standard: Cable clips not evenly spaced. Conduit clips are spaced Exceeds industry standard: Majority of cable clips evenly spaced Demonstrates Excellence: All cable clips evenly spaced, spaced evenly</p> <p>Below industry standard or No attempt: Angles are untidy Meets industry standard: Angles are neat and even but gaps between conduit Exceeds industry standard: Angles are neat with no gaps between conduit Demonstrates excellence: Angles are neat with no gaps between conduit</p>		<p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p>	<p>1.00</p> <p>1.00</p> <p>1.00</p> <p>1.00</p> <p>1.00</p> <p>1.00</p> <p>1.00</p> <p>1.00</p> <p>1.00</p> <p>0.50</p> <p>0.50</p> <p>0.50</p> <p>1.00</p> <p></p> <p>1.50</p> <p></p> <p>3.00</p>
Extra Aspect Description (Obj or Subj) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Obj Only)	WSSS Section	Max Mark

**Criterion E** **Total Mark 15.00**

**Criterion F** **Total Mark 15.00**

No copper visible when viewed at 90 degrees and No cuts		5	1.75
		5	0.75
		5	0.75
		5	0.75
		5	0.75
Deduct 1 mark for the first error and 0.5 for the second error		5	1.50
		5	0.75
		5	0.75
		5	0.75
		5	0.75
Below industry standard or No attempt: Cables untidy, cables not tied Meets industry standard: Cables tidy, not all cable ties and not all cables tied Exceeds industry standard: Cables tidy, neatly stacked or neatly bundled Demonstrates Excellence: Cables very neat, stacked perfectly		5	2.00
Below industry standard or No attempt: All cables not loomed Meets industry standard: Neutral and earth looms are tidy Exceeds industry standard: Neutrals and earths loomed neatly Demonstrates excellence: Neutrals and earths neatly loomed		5	2.00
Below industry standard or No attempt: Cables to B1 front panel not loomed Meets industry standard: Cables to B1 front panel are loomed Exceeds industry standard: Cables to B1 front panel neatly loomed Demonstrates excellence: Cables to B1 front panel neatly loomed			
Extra Aspect Description (Obj or Subj) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Obj Only)	WSSS Section	Max Mark
		7	1.00
		7	1.00
		7	1.00
		7	1.00

Criterion G Total Mark 10.00





Competition	Total Mark	100.00
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