



worldskills

INTERNATIONAL VOCATIONAL TRAINING ORGANISATION

45th WorldSkills Competition 2018

Guangdong/China

TRADE 19 INDUSTRIAL CONTROL

MAIN PROJECT

Name: _____ Nr: ____

TP 19_45DG_AT_01 |

TRADE 19

INDUSTRIAL - CONTROL

Main Project

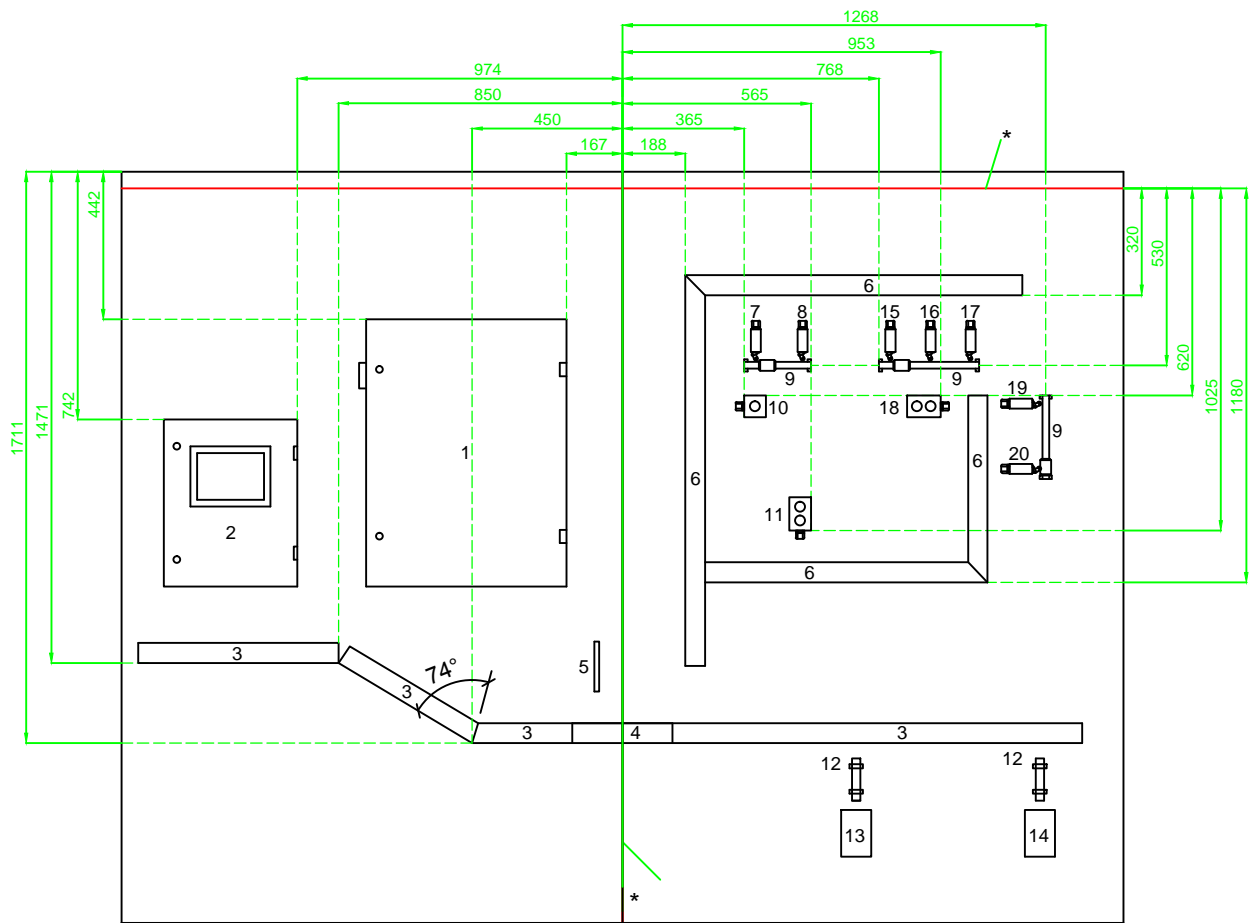
Version 2.0

Safety and Health

1. Each competitor is responsible for his own safety and health
2. Each competitor must keep his working area clear of obstacles and the floor space clean of material and equipment
3. Use safety glasses, when ever you use any hand or power tools which create chips, dirt, dust or fragments that may injure the eyes
4. Ear protection must always be used in work whose noise is over 85dba
5. Carry always working clothes and safety-shoes
6. Use only tools, which are conform with the international standards
7. Before the first starting, you have to ask an expert for the safety-check
8. You have to use safety glasses by live testing the installation
9. No live electrical work is allowed
10. All modifications must be made on a "dead" installation
11. Before any installation or repair work, the circuit must be confirmed "dead"
12. Smoking is prohibited at the competition venue
13. Competitors must ensure the cleanliness of their tools and hands

Competitor:

Date:



1. 控制箱1 (800x600mm)
2. 控制箱2 (400x500mm)
3. 金属电缆线槽 (100x60)
4. 90° 金属线槽弯角
5. 保护接地终端 (X8)
6. 墙壁塑料线槽 100x60
7. 限位开关S12
8. 限位开关S13
9. 塑料管 VR20
10. 按钮盒 (P10)
11. 按钮盒 (P13, P14)
12. 塑料管 VR25
13. 防水插座 (X6)
14. 防水插座 (X7)
15. 限位开关 (S14)
16. 限位开关 (S15)
17. 限位开关 (S16)
18. 按钮盒 (P12, P11)
19. 限位开关 (S10)
20. 限位开关 (S11)

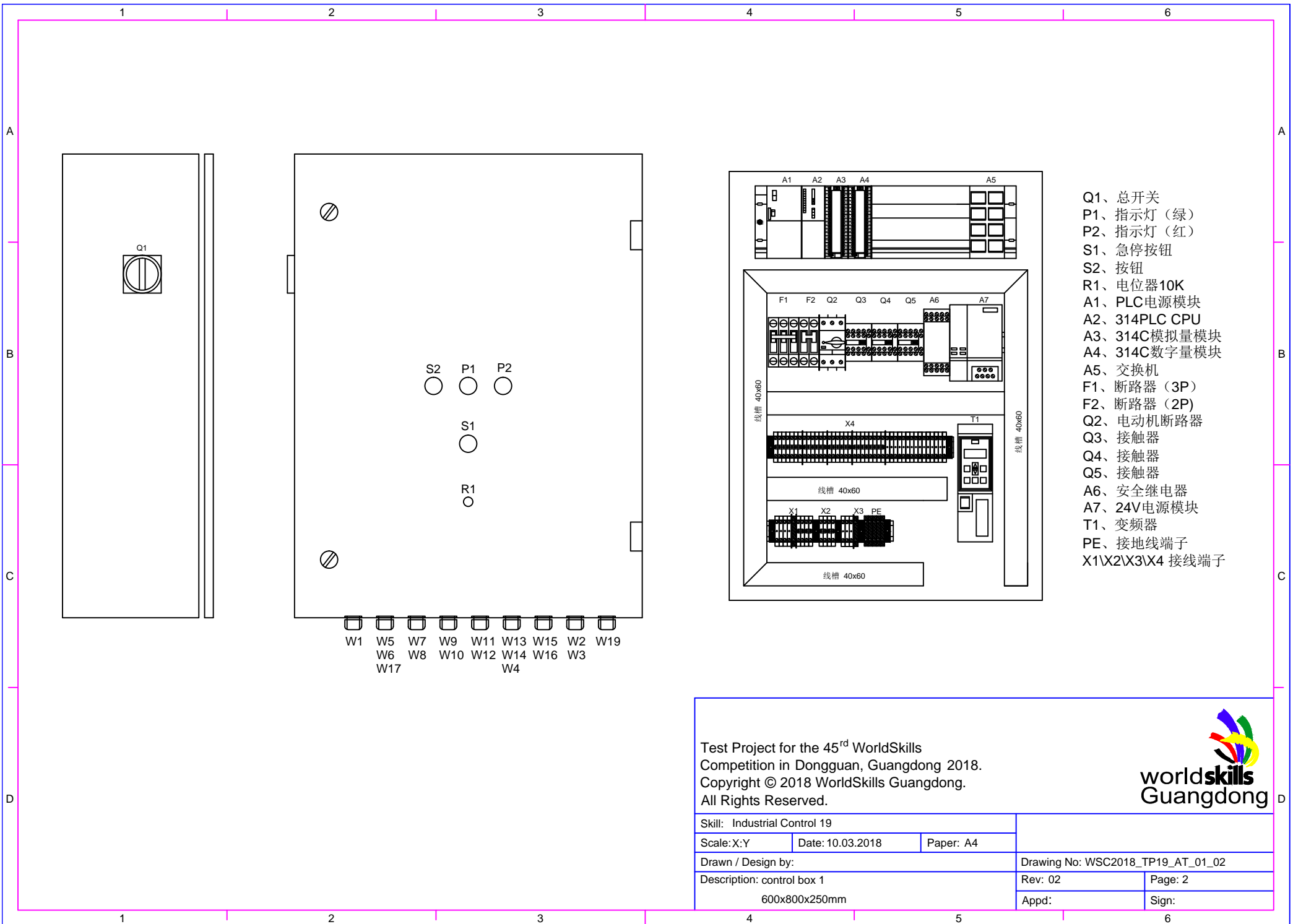
WALL INSTALLATION NOT IN SCALE
 * All measurements from a horizontal and vertical line
 ap 10 - 30mm from the end of the booth.

All devices, which are not in the mesuarements,
 the mounting is up to the competitor

Test Project for the 45rd WorldSkills
 Competition in Dongguan, Guangdong 2018.
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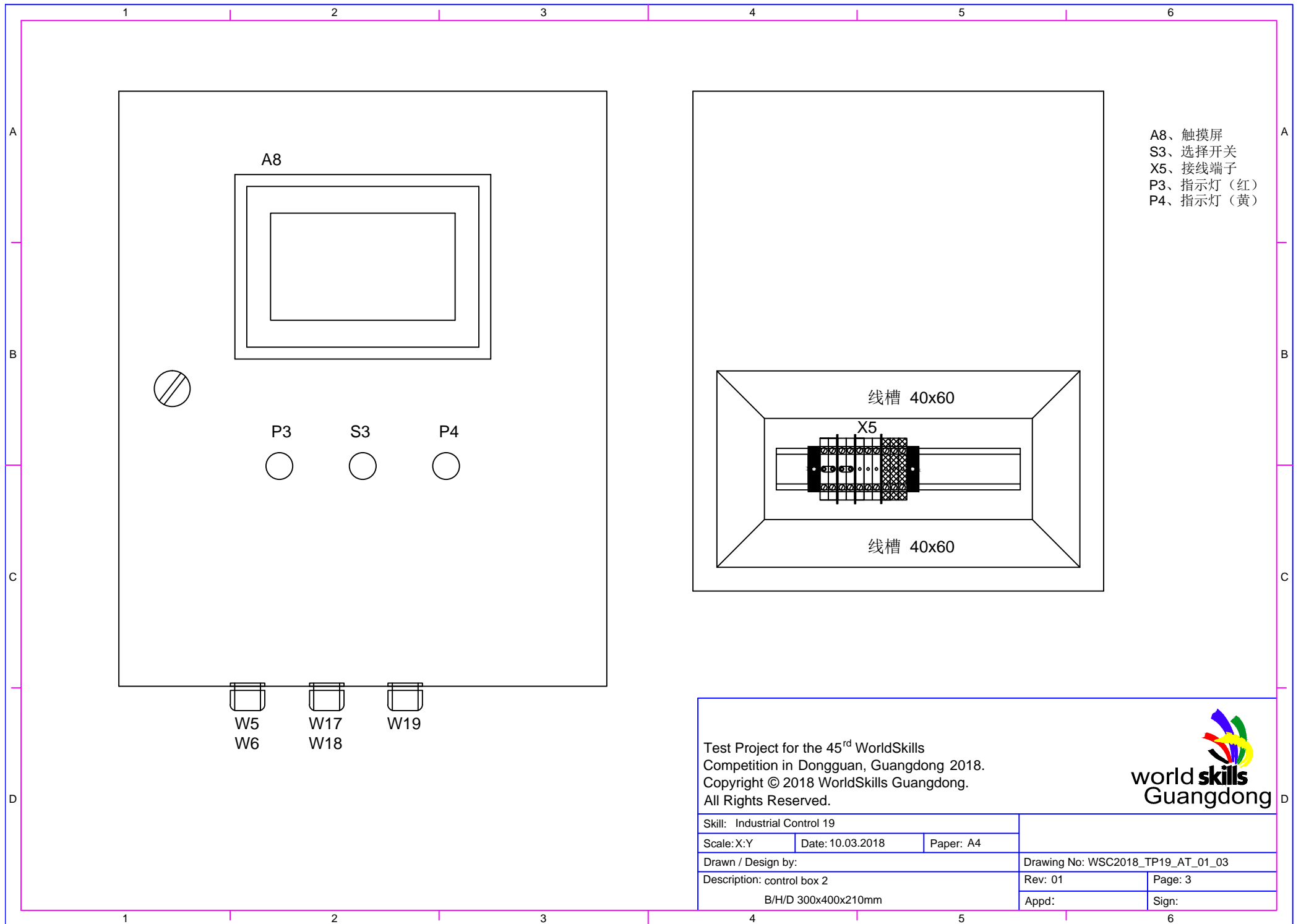
Skill: Industrial Control 19		
Scale: X:Y	Date: 10.03.2018	Paper: A4
Drawn / Design by:		Drawing No: WSC2018_TP19_AT_01_01
Description: Wall mounting		Rev: Page: 1
wall installation not in scale		Appd: Sign:



- Q1、总开关
- P1、指示灯（绿）
- P2、指示灯（红）
- S1、急停按钮
- S2、按钮
- R1、电位器10K
- A1、PLC电源模块
- A2、314PLC CPU
- A3、314C模拟量模块
- A4、314C数字量模块
- A5、交换机
- F1、断路器（3P）
- F2、断路器（2P）
- Q2、电动机断路器
- Q3、接触器
- Q4、接触器
- Q5、接触器
- A6、安全继电器
- A7、24V电源模块
- T1、变频器
- PE、接地线端子
- X1\X2\X3\X4 接线端子

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Skill: Industrial Control 19			
Scale: X:Y	Date: 10.03.2018	Paper: A4	
Drawn / Design by:			Drawing No: WSC2018_TP19_AT_01_02
Description: control box 1			Rev: 02
600x800x250mm			Page: 2
			Appd:
			Sign:



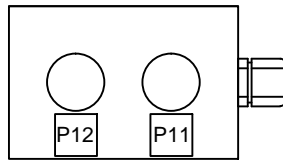
- A8、触摸屏
- S3、选择开关
- X5、接线端子
- P3、指示灯（红）
- P4、指示灯（黄）

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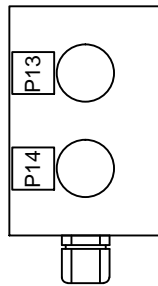


Skill: Industrial Control 19				
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Drawn / Design by:			Drawing No: WSC2018_TP19_AT_01_03	
Description: control box 2			Rev: 01	Page: 3
B/H/D 300x400x210mm			Appd:	Sign:

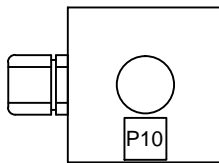
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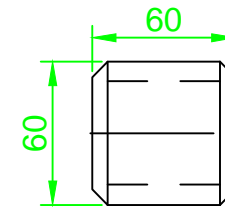
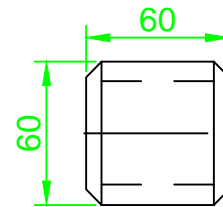
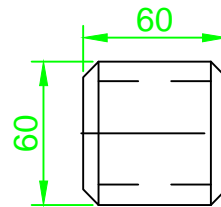
11



10



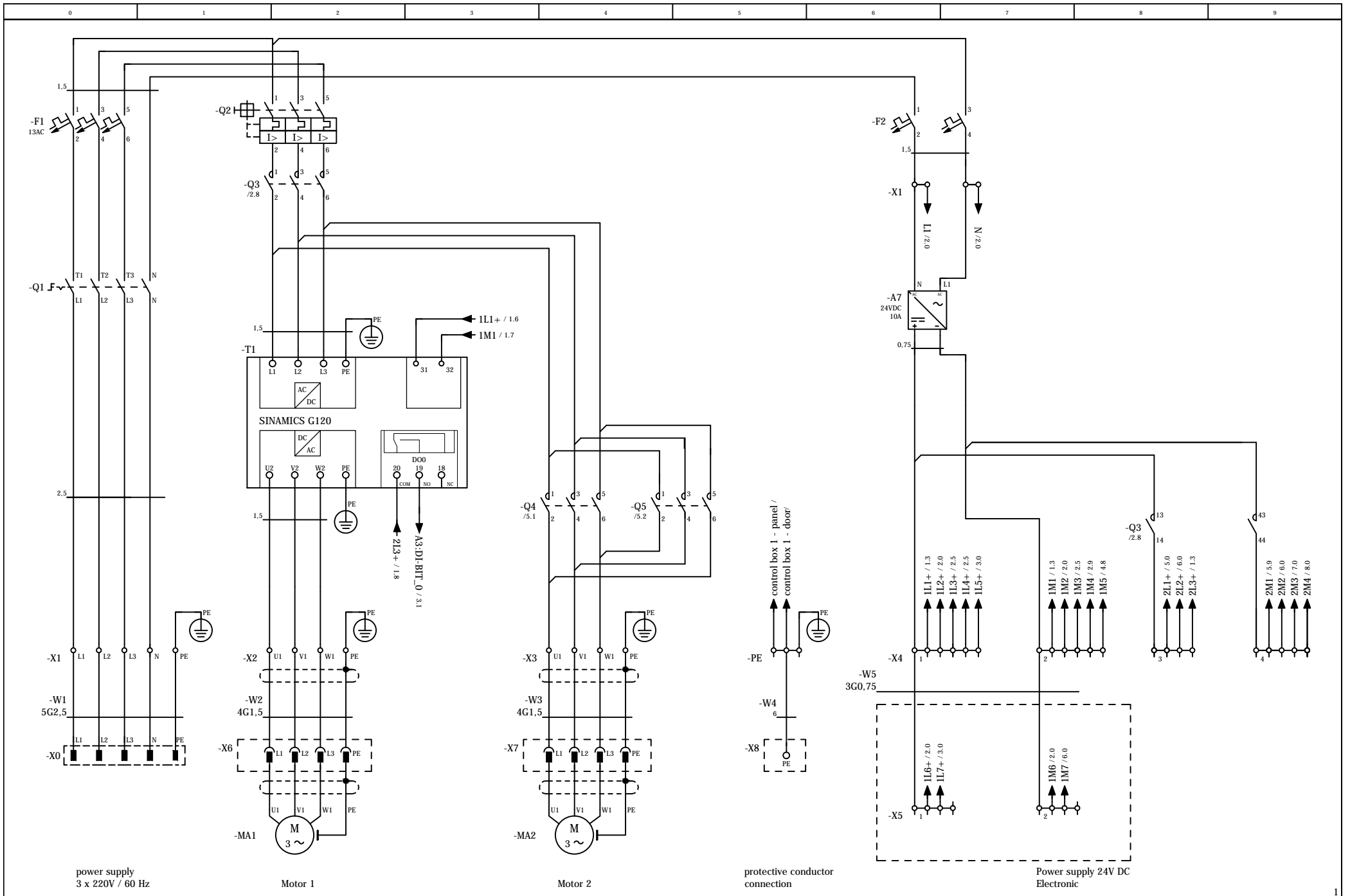
switch-ring



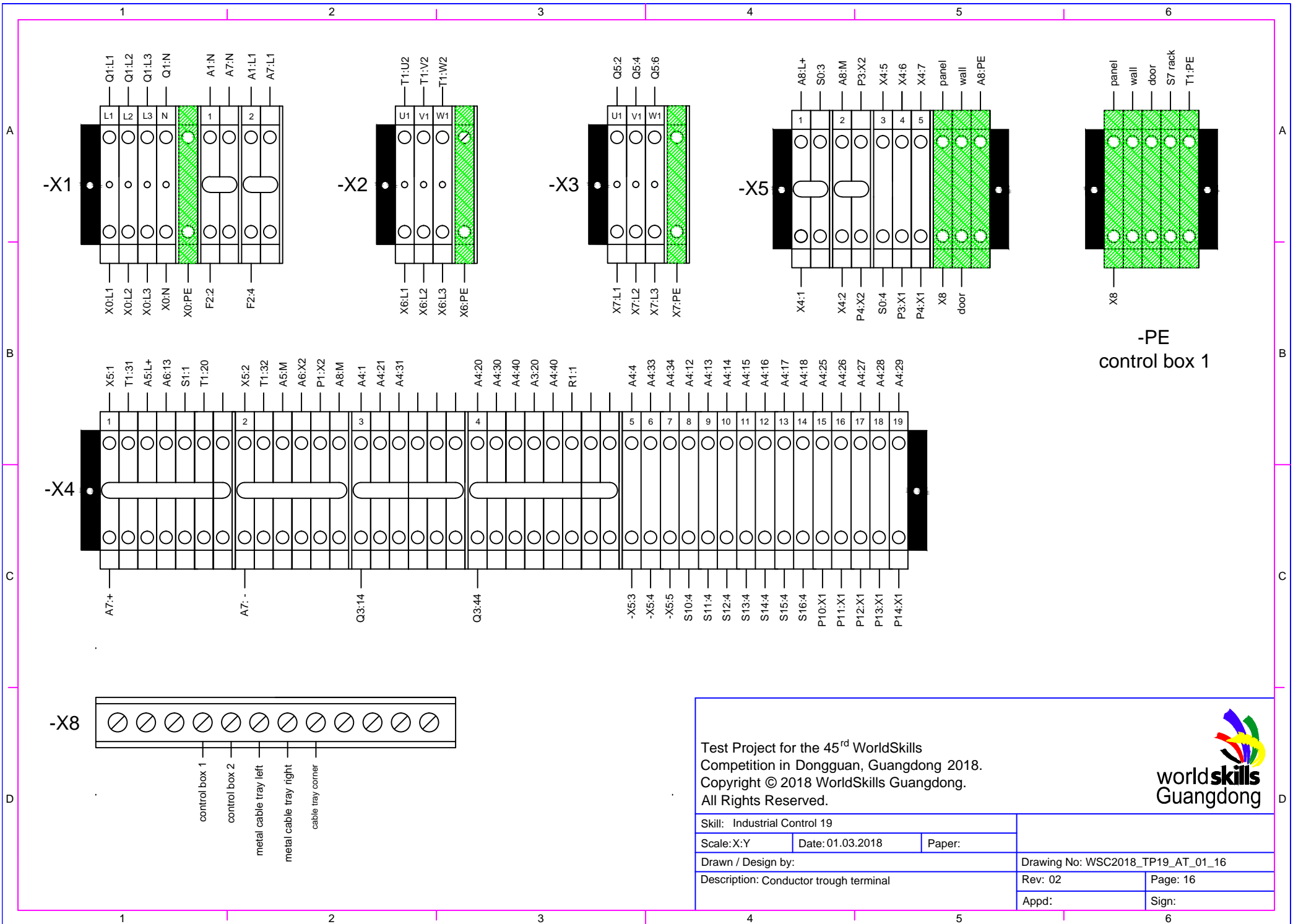
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 Competition in Dongguan, Guangdong 2018.
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Skill: Industrial Control 19				
Scale: X:Y	Date: 10.03.2018	Paper: A4		
Drawn / Design by: Andreas Puchner			Drawing No: WSC2018_TP19_AT_01_04	
Description: detail			Rev: 01	Page: 4
			Appd:	Sign:




			Datum	01.03.2018					
			Bearb.						
			Gepr			WS2018 Gongguan/Guangdong Skill 19: Industrial-Control			
Änderung	Datum	Name	Urspr	Ersatz von	Ersetzt durch				
								Main Circuit	
								WS2018_TP19_AT_V2.0	
								Blatt 1	
								Blatt 11	

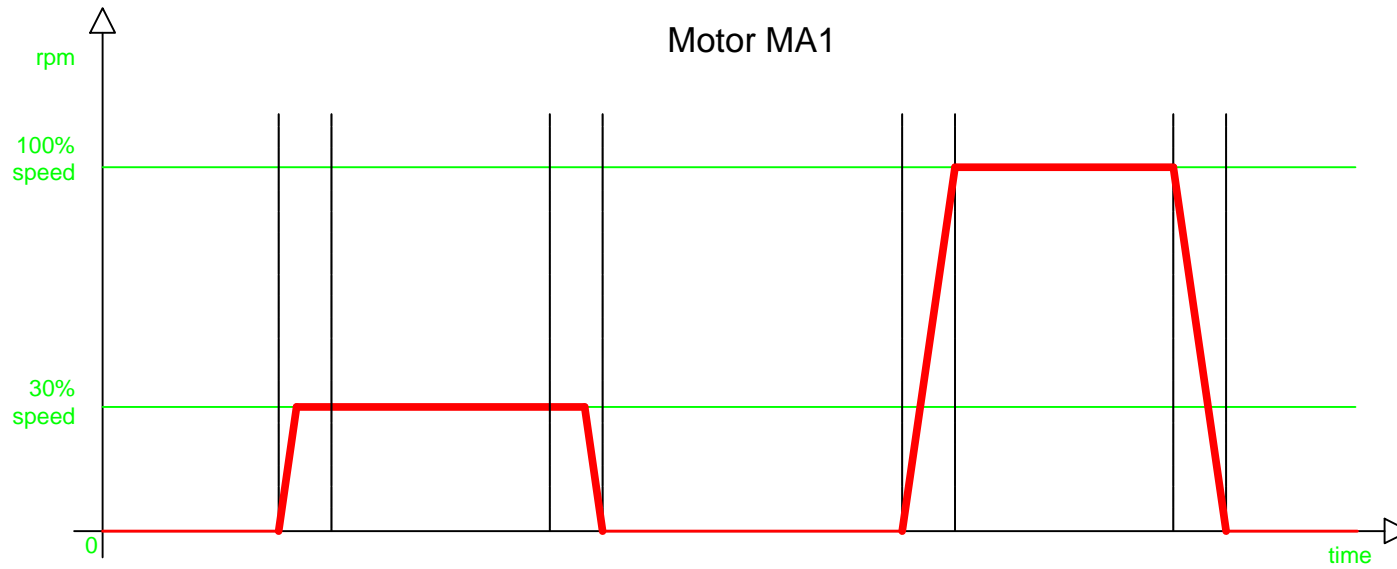


-PE control box 1

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Skill: Industrial Control 19		
Scale: X:Y	Date: 01.03.2018	Paper:
Drawn / Design by:		Drawing No: WSC2018_TP19_AT_01_16
Description: Conductor trough terminal		Rev: 02
		Page: 16
		Appd:
		Sign:



The changes in speed and the 0-speed will be reached in 2 seconds. The ramps must be programmed in the frequency converter.

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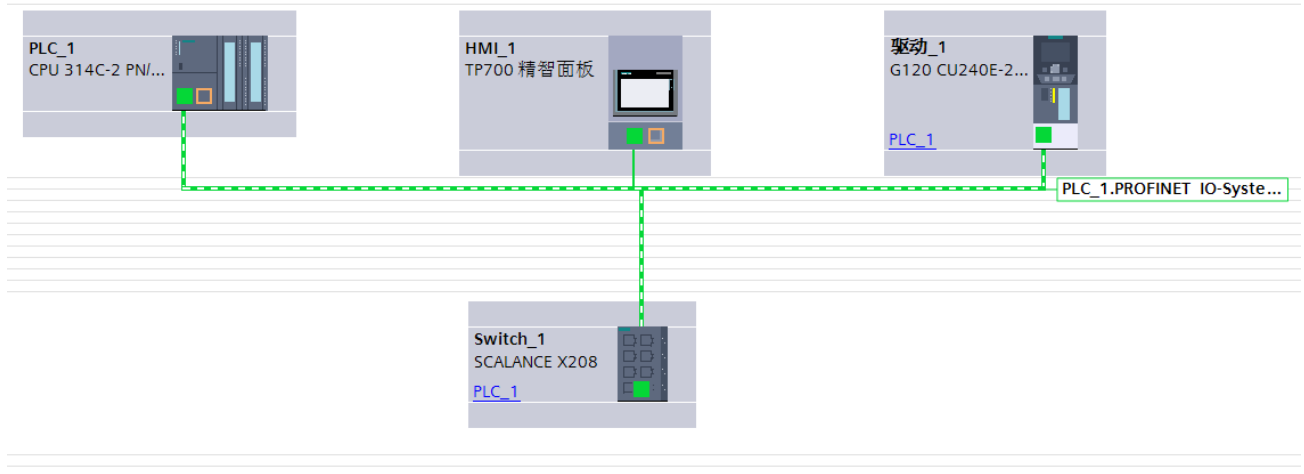


Skill: Industrial Control 19				
Scale: X:Y	Date: 10.03.2018	Paper: A4		
Drawn / Design by:			Drawing No: WSC2018_TP19_AT_01_19	
Description: VSD			Rev: 01	Page: 19
speed			Appd:	Sign:

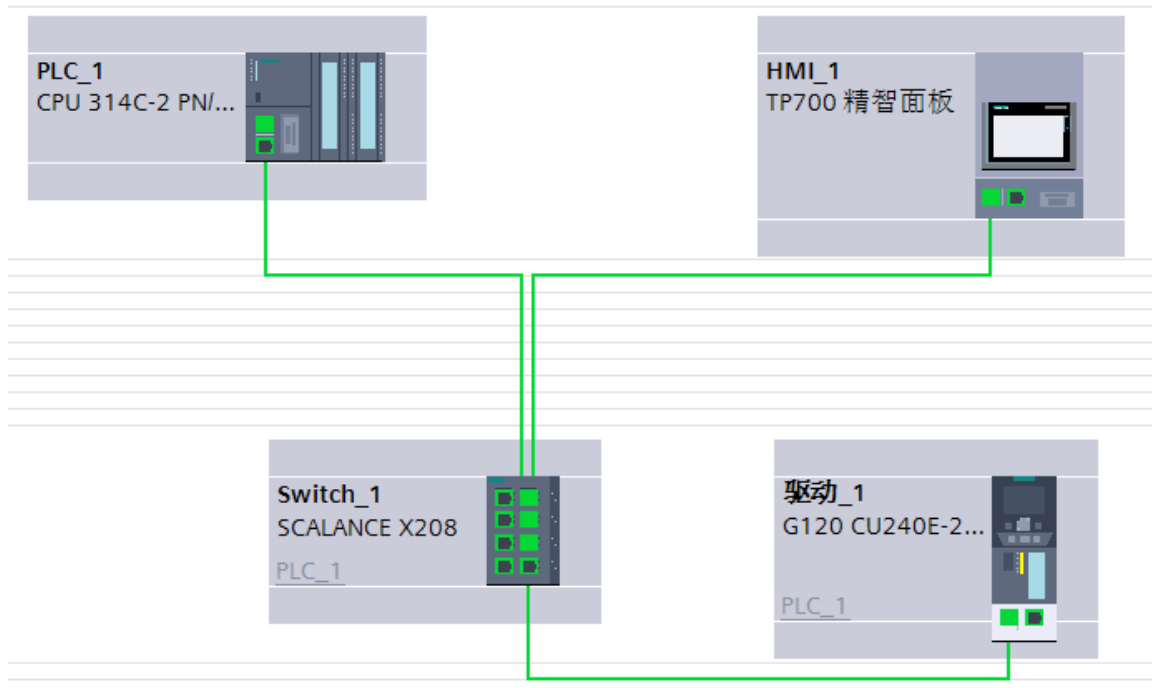


PROFINET CONNECTIONS

OVERVIEW TECHNOLOGY



OVERVIEW TOPOLOGY





CABLE LIST

Nr.	Cable type	intern		extern	Description
W1	RVV 5G2,5	X1	----->	X0	Power Supply 3x400V+N+PE
W2	RVV 4G1,5	X2	----->	X6	CEE socket 400V (MA1)
W3	RVV 4G1,5	X3	----->	X7	CEE socket 400V (MA2)
W4	BRV 1.5mm ²	PE	----->	X8	protective earth terminal
W5	RVV 3G0,75	X4	----->	X5	Power Supply 24V/DC control box 2
W6	RVV 2G0,75	X4	----->	X5	Manual/auto
W7	RVV 2G0,75	X4	----->	S10	Limit switch
W8	RVV 2G0,75	X4	----->	S11	Limit switch
W9	RVV 2G0,75	X4	----->	S12,	Limit switch
W10	RVV 2G0,75	X4	----->	S13	Limit switch
W11	RVV 2G0,75	X4	----->	S14	Limit switch
W12	RVV 2G0,75	X4	----->	S15	Limit switch
W13	RVV 2G0,75	X4	----->	S16	Limit switch
W14	RVV 2G0,75	X4	----->	P10	Light P10
W15	RVV 4G0,75	X4	----->	P11 ,P12	Light P11,P12
W16	RVV 4G0,75	X4	----->	P13 ,P14	Light P13,P14
W17	RVV 3G0,75	X4		X5	Light P3,P4
W18	BRV 1.5mm ²	X5	----->	X8	protective earth terminal
W19	IE-cable	A5	----->	A10	Profinet cable to HMI



SAFETY REPORT – COMMISSIONING

Competitor

Name:.....

Booth No.:

1. VISUAL INSPECTION:

The visual inspection includes:

- Control box 1
- Control box 2
- Protective earth terminal
- Plant installation

2. MEASUREMENT:

2.1 LOW IMPEDANCE TESTING:

Control box 1:

CEE- plug	---	X1/PE	..... Ω
X1/PE	---	PE	..... Ω
PE	---	panel	..... Ω
PE	---	door	..... Ω
PE	---	S7-rack	..... Ω
PE	---	T1/PE (VSD)	..... Ω
PE	---	X8	..... Ω

Control box 2:

PE	---	X8	..... Ω
PE	---	panel	..... Ω
PE	---	door	..... Ω
PE	---	A8/PE (HMI)	..... Ω

Wall Installation:

X8	---	cable tray right side	..... Ω
X8	---	cable tray corner	..... Ω
X8	---	cable tray left side	..... Ω
X8	---	X6/PE(CEE socket)	..... Ω
X8	---	X7/PE (CEE socket)	..... Ω



2.2. ISOLATION MEASUREMENT:

Main circuit X1 – Power supply:

X1/PE	---	L1, L2, L3	..... MΩ
X1/L1, L2, L3,	---	L1, L2, L3	..... MΩ

Main circuit X2 –CEE socket X6:

X2/PE	---	X2/ L1, L2, L3	..... MΩ
X2/L1, L2, L3	---	X2/ L1, L2, L3	..... MΩ

Main circuit X3– CEE socket X7:

X3/PE	---	X3/ L1, L2, L3	..... MΩ
X3/L1, L2, L3	---	X3/ L1, L2, L3	..... MΩ



SAFETY REPORT – COMMISSIONING

Allowed only in the presence of an expert !!!

2.3. TESTING: RESIDUAL CURRENT DEVICE (RCD):

function OK function not OK

2.4. VOLTAGE MEASUREMENT:

L1-X1	---	PE-X1	..... V
L2-X1	---	PE-X1	..... V
L3-X1	---	PE-X1	..... V
L1-X1	---	L2-X1	..... V
L1-X1	---	L3-X1	..... V
L2-X1	---	L3-X1	..... V

2.5. ROTATIONAL FIELD MEASUREMENT – X1:

Rotating field is left-handed (CCW) Rotating field is right-handed (CW)

2.6. EMERGENCY STOP FUNCTION:

OK not OK

For the accuracy

Signature by Competitor

Signature by Expert C.C.

Signature by Expert C.C.

Date: _____

Signature by Expert C.C.



MATERIAL LIST FOR THE TEST PROJECT

Nr.	Description	Qty	Producer	Specification	Comments
1	DIN 导轨	1p	Siemens	482mm/6ES7390-1AE80-0AA0	
2	电源模块	1p	Siemens	PS307 电源 120/230 V 24V DC/5A	
3	S7-300 PLC	1p	Siemens	CPU 314C-2PN/DP 含 40 针前连接器	
4	微型存储卡	1p	Siemens	MMC 存储卡 512K	
5	触摸屏	1p	Siemens	TP700 Comfort 精智面板 7 英寸/彩色	
6	工业交换机	1p	Siemens	SCALANCE X208	
7	24V 稳压电源 10A	1p	Siemens	6EP1334-3BA00	
8	PM240-2 功率模块	1p	Siemens	电压 3AC380-480V, 0.75KW, 2.2A	
9	变频器 G120	1p	Siemens	PROFINET CU240E-2 PN-fF	
10	G120 智能操作面板	1p	Siemens	智能操作面板 IOP	
11	G120 PC 连接组件	1p	Siemens	6SL3255-0AA00-2CA0	
12	TP 标准电缆	1m	Siemens	IE FC TP 标准电缆 GP2x2	
13	接头	8p	Siemens	6GK1901-1BB10-2AA0	
14	转换开关	1p	Siemens	3LD2003-1TL53	
15	电动机断路器	1p	Siemens	3RV1021-1EA10	
16	安全继电器	1p	Siemens	3TK2825-1BB40	
17	直流接触器	3p	Siemens	3RT2015-1FB44-3MA0	
18	断路器	1p	施耐德	C65N 3P 16A	
19	断路器	1p	施耐德	C65N 2P 6A	
20	蘑菇头式按钮开关	2p	施耐德	ZB2-BS54C	
21	按钮头	4p	施耐德	ZB2-BA2C(黑绿)	
22	选择开关头	4p	施耐德	ZB2-BD2C	
23	按钮触点	1p	施耐德	ZB2BZ105C 常开/常闭	
24	指示灯	1p	施耐德	XB7-EVB1LC 白 24V	
25	指示灯	1p	施耐德	XB7-EVB3LC 绿 24V	
26	指示灯	2p	施耐德	XB7-EVB4LC 红 24V	
27	指示灯	1p	施耐德	XB7-EVB5LC 黄 24V	
28	按钮盒	1p	施耐德	XAL-B01C 1 孔	
29	按钮盒	2p	施耐德	XAL-B02C 2 孔	
30	标签标牌 (急停)	1p	施耐德	ZB2-BY9330C	
31	标签	10	施耐德	ZB2-BZ32	
32	限位开关	5p	施耐德	XCE-102	
33	限位开关	3P	施耐德	XCE-118	



Nr.	Description	Qty	Producer	Specification	Comments
34	电机	2p		Y2-80M2-4 750W/380	
35	多圈电位器	1p		WXD3-13/10K16MM	
36	旋钮	3p		KYP16-16-4 (Φ4/灰小)	
37	工业防水插头	1p		CEE 插头 4极 400V/16A	
38	工业防水插座	1p		CEE 壁式插座 4孔 400V/16A	
39	工业防水插头	1p		16A 5芯 (公)	
40	扎带 (束线带)	200p		3*100mm	
41	扎带 (束线带)	100p		4*200mm	
42	标牌式扎带	20p		XG-200MKT 白	
43	针形线鼻	200p		E2508	
44	针形线鼻	200p		E1508	
45	针形线鼻 (双线)	20p		TE1010	
46	针形线鼻	100p		E0508 蓝	
47	针形线鼻 (双线)	100p		TE0508	
48	线比 (线鼻)	100p		Φ1.5-6 闭口	
49	多股软线	20m		RV 2.5mm ² 黑色	
50	多股软线	20m		RV 2.5mm ² 红色	
51	多股软线	20m		RV 1.5m ² 黑色	
52	多股软线	20m		RV 1.5m ² 红色	
53	多股软线	20m		RV 1.5m ² 黄绿	
54	多股软线	20m		RV 0.5mm ² 兰	
55	护套电缆线	20m		5*2.5RVV 黑色	
56	护套电缆屏蔽线	20m		4*1.5RVV 黑色	
57	护套电缆线	20m		4*0.75RVV 黑色	
58	护套电缆线	20m		3*0.75RVV 黑色	
59	线槽座和线槽盖	4p		60*40 PVC 2米/条	
60	铝导轨	1p		1米/条	
61	热缩管	1p		Φ3	
62	端子	30p		UK-2.5PE 接地端子	
63	端子	30p		UK 2.5B 灰色	
64	端子固定器	10p		E/UK	
65	端子隔板	8p		UK 2.5 灰	
66	UK 联接片	30p		2.5m ²	
67	识别条	1p		UK2.5 1-10	
68	识别条	1p		UK2.5 11-20	
69	缠绕管	1m		Φ6 透明 15米/卷	



Nr.	Description	Qty	Producer	Specification	Comments
70	塑料固定电缆防水接头 PG 型	2p		PG13.5	
71	塑料固定电缆防水接头 PG 型	2p		PG16	
72	塑料固定电缆防水接头 PG 型	2p		PG21	
73	壁式线槽	1p		联塑 PVC 60*100*3800mm	
74	金属线槽	1p		镀锌铁皮 60*100*2000mm	
75	九十度弯曲横向线槽	1p		镀锌铁皮 90 度直角 端口 60*100mm	
76	壁式托架	6p		120#白 金属线槽安装固定件	
77	塑料管	1m		plastic tube VR20	
78	U 型夹	6p		VR20 塑料管安装固定件	
79	十字半圆头自攻丝	50p		4*14 不锈钢	
80	十字半圆头自攻丝	50p		4*30 不锈钢	
81	大圆头自攻丝	50p		4*14 不锈钢	
82	大圆头自攻丝	50p		4*25 不锈钢	
83	大圆头自攻丝	50p		ST5.5×20 不锈钢	
84	十字半圆头带介螺丝	50p		4*10 不锈钢	
85	十字半圆头带介螺丝	50p		4*20 不锈钢	
86	十字半圆头带介螺丝	50p		5*12 不锈钢	
87	垫片	50p		5.3*8*1 不锈钢	
88	垫片	50p		4*10*0.8 不锈钢	
89	垫片	50p		5*16*1 不锈钢	
90	螺母	10p		M4 不锈钢	
91	螺母	10p		M5 不锈钢	
92	密封条	2m		U 型 包边密封条	
93	塑料管	2m		VR 25 2 米	
94	塑料 U 型夹	6p		VR 25	