

TEST PROJECT INDUSTRIAL CONTROL

WSC2015_TP19_EN_pre

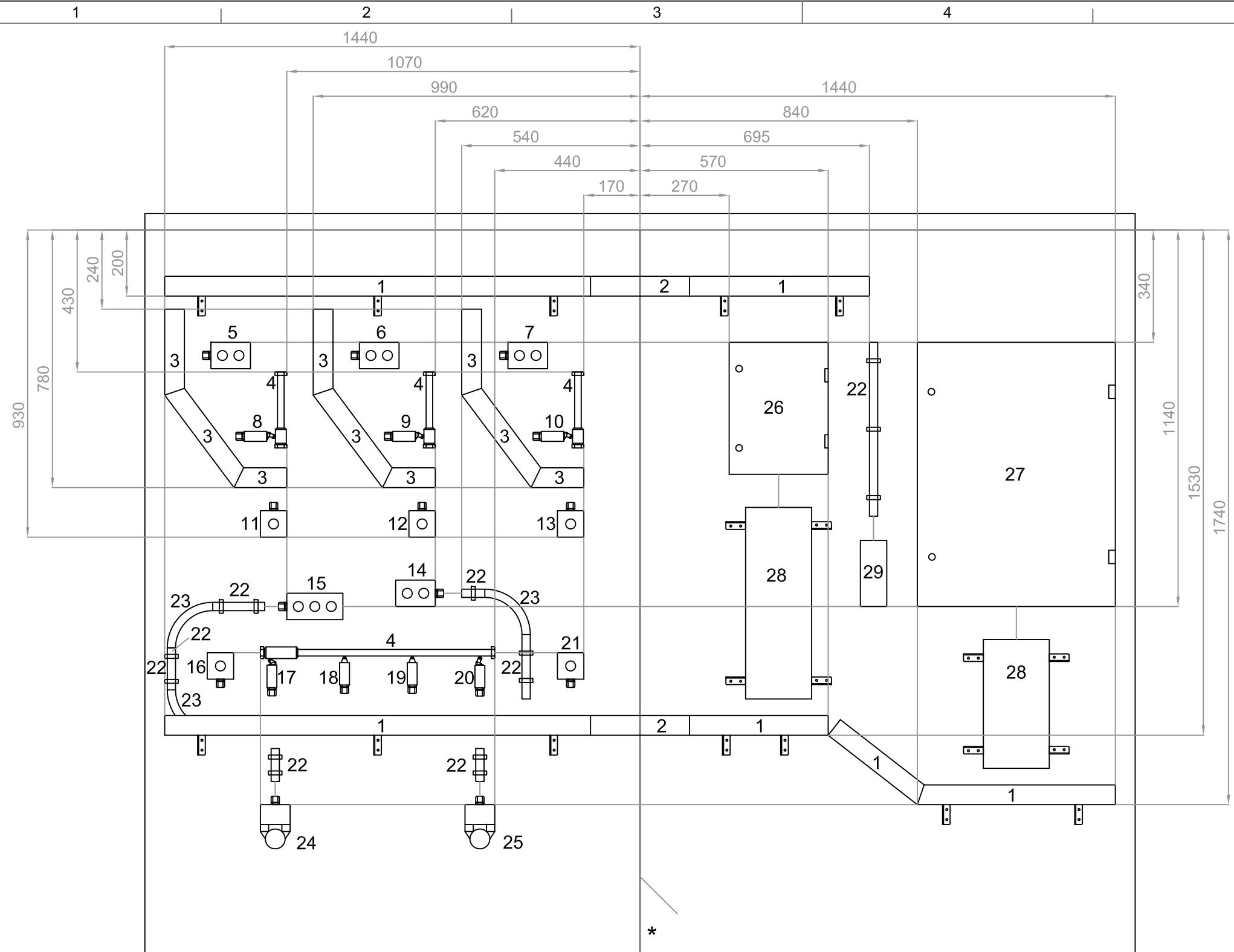
Submitted by: Andreas Puchner

Member country/region: Austria

Name of the Competitor: _____

Country Code: _____





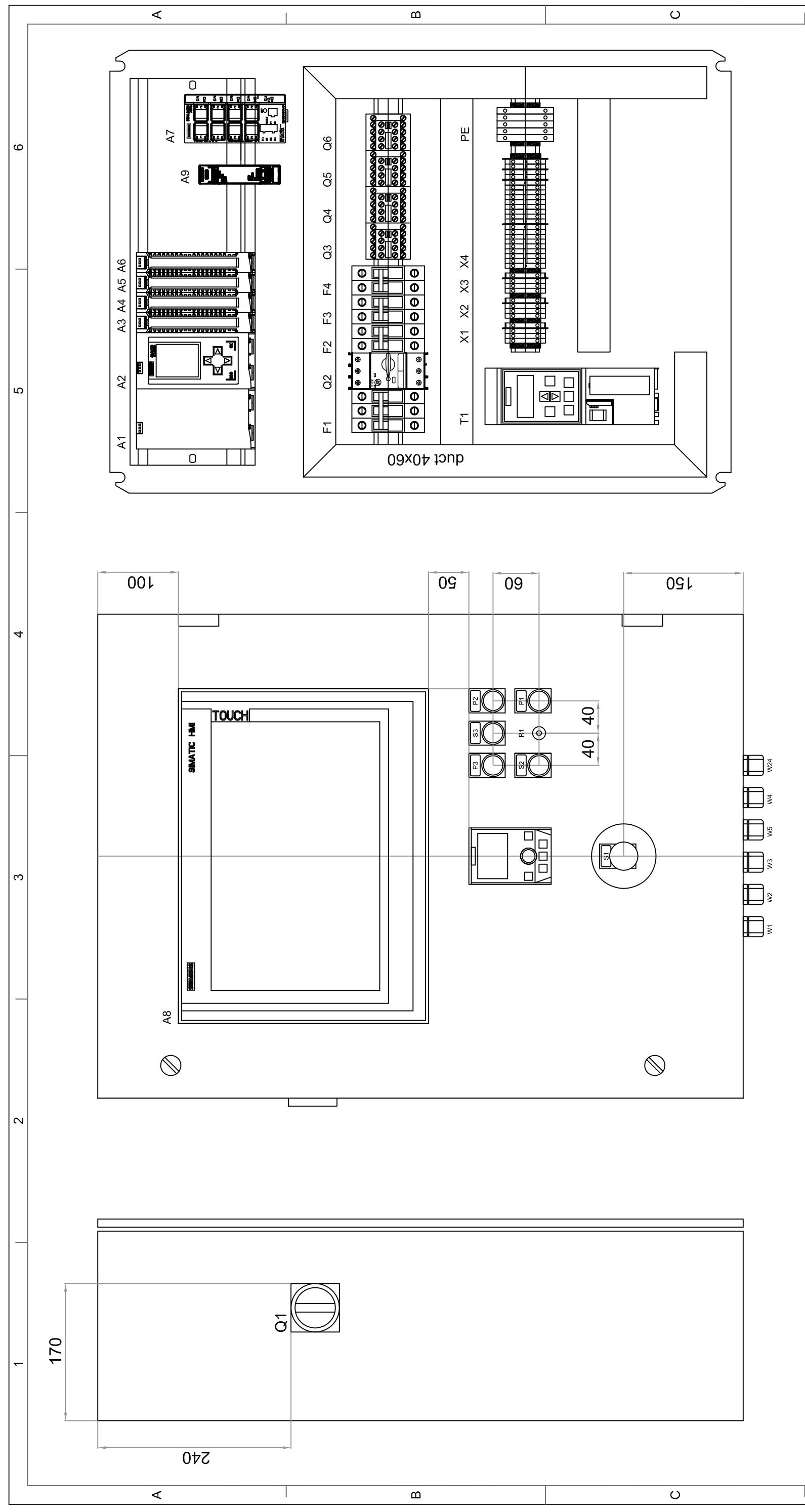
1. metal cable tray (100x60)
2. 90° bend for metal cable tray
3. wall duct 60x60
4. metal pipe ISO20
5. housing (S11, P11)
6. housing (S13, P13)
7. housing (S15, P15)
8. limit switch S12
9. limit switch S14
10. limit switch S16
11. housing (P12)
12. housing (P14)
13. housing (P16)
14. housing (S17, S18, P17)
15. housing (S19, S20, P18, P19)
16. housing (P20)
17. limit switch (S21)
18. limit switch (S22)
19. limit switch (S23)
20. limit switch (S24)
21. housing (R2)
22. plastic tube VR25
23. 90° bow for plastic tube VR25
24. CEE socket (-X6)
25. CEE socket (-X7)
26. control box 2 (400x300mm)
27. control box 1 (800x600mm)
28. metal vertical ladder
29. protective earth terminal (-X8)

Test Project for the 43rd WorldSkills
Competition in São Paulo, Brazil 2015.
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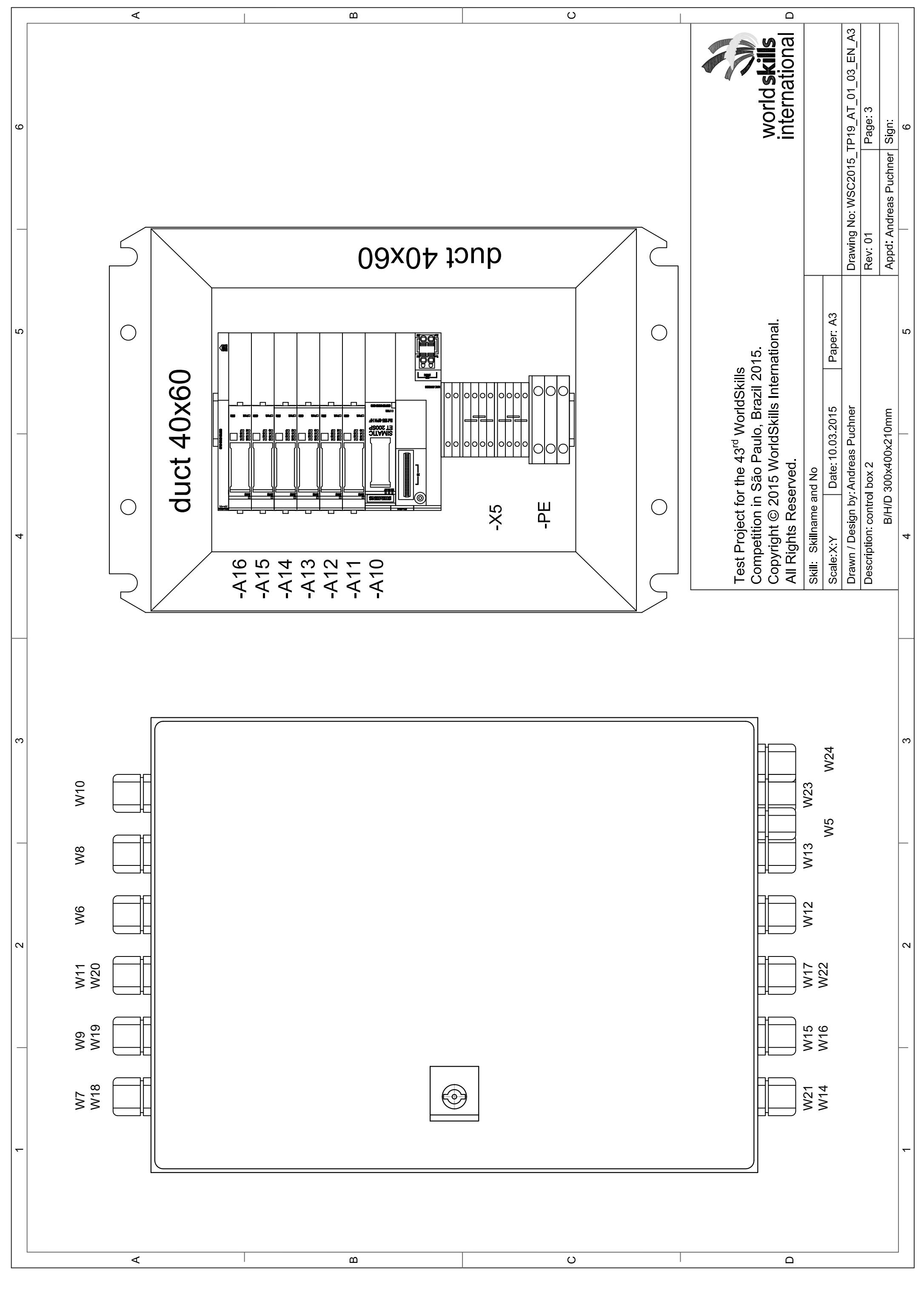
Skill: Skillname and No		
Scale:X:Y	Date: 10.03.2015	Paper: A3
Drawn / Design by: Andreas Puchner		Drawing No: WSC2015_TP19_AT_01_01_EN_A3
Description: Wall mounting wall installation not in scale		Rev: 01 Page: 1
Appd: Andreas Puchner	Sign:	



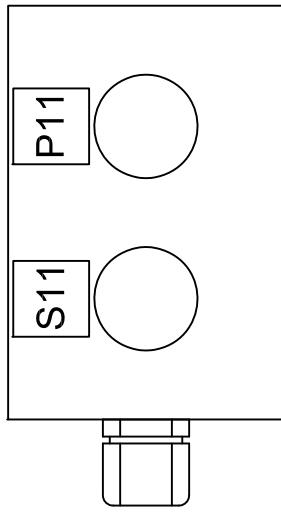
worldskills
international



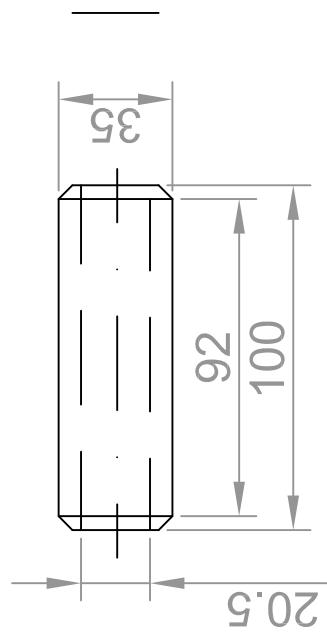
 worldskills international	
<p>Test Project for the 43rd WorldSkills Competition in São Paulo, Brazil 2015. Copyright © 2015 WorldSkills International. All Rights Reserved.</p>	
Skill: Industrial Control 19	Scale:X:Y
Date: 10.03.2015	Paper: A3
Drawn / Design by: Andreas Puchner	Drawing No: WSC2015_TP19_AT_01_02_EN_A3
Description: control box 1	Rev: 01
600x800x250mm	Page: 2
1	Appd: Andreas Puchner
2	Sign: _____
3	6
4	5
5	4
6	3
7	2
8	1



5



switch-ring (long)

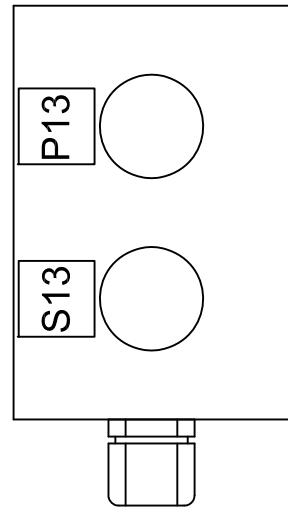


A

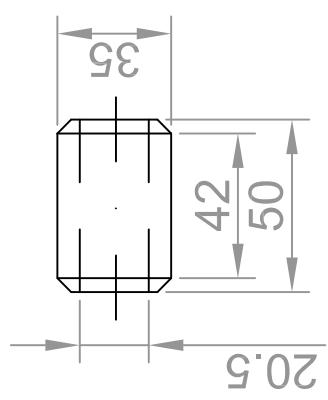
B

C

6



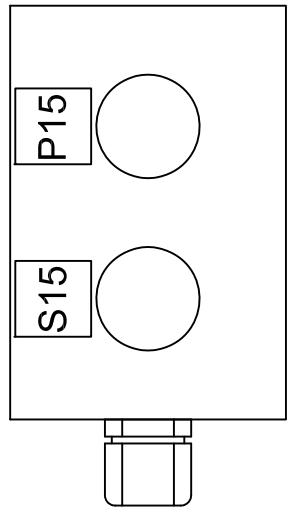
switch-ring (short)



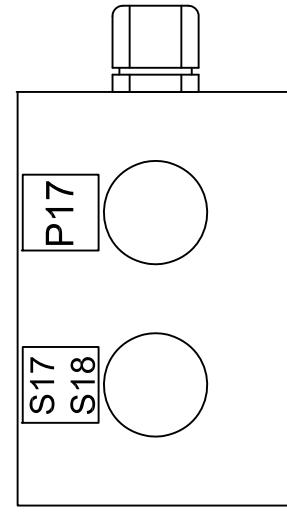
B

C

7

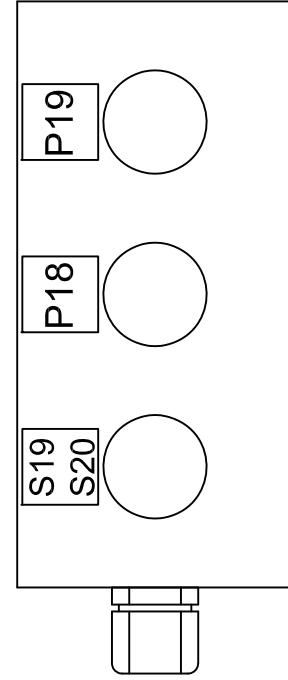


14



C

15



D


worldskills
international

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Skill: Skillname and No	Date: 10.03.2015	Paper: A3
Scale:X,Y		
Drawn / Design by: Andreas Puchner		
Description: detail		

Drawing No: WSC2015_TP19_AT_01_04_EN_A3
Rev: 01 Page: 4

Appd: Andreas Puchner Sign:

6

3

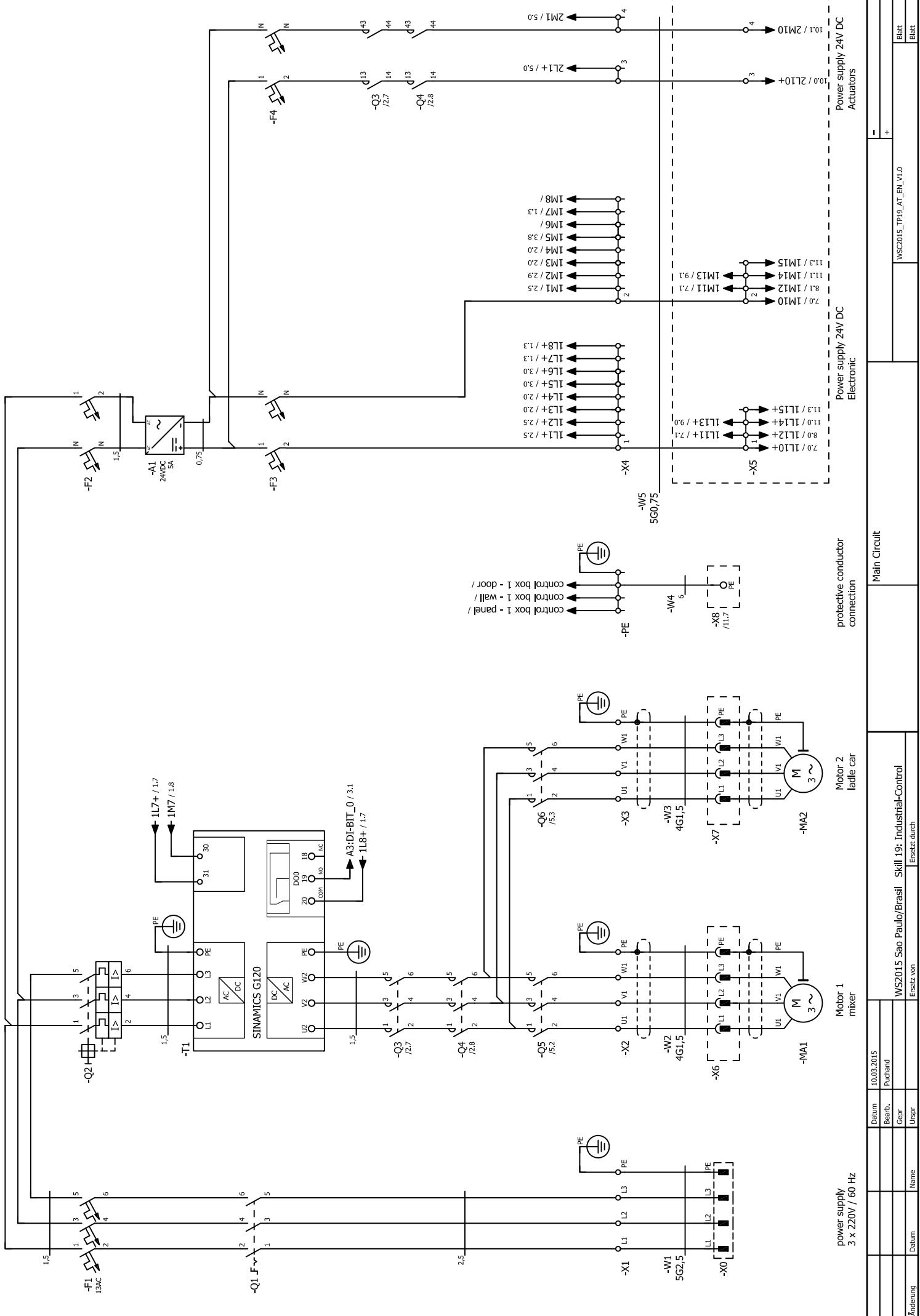
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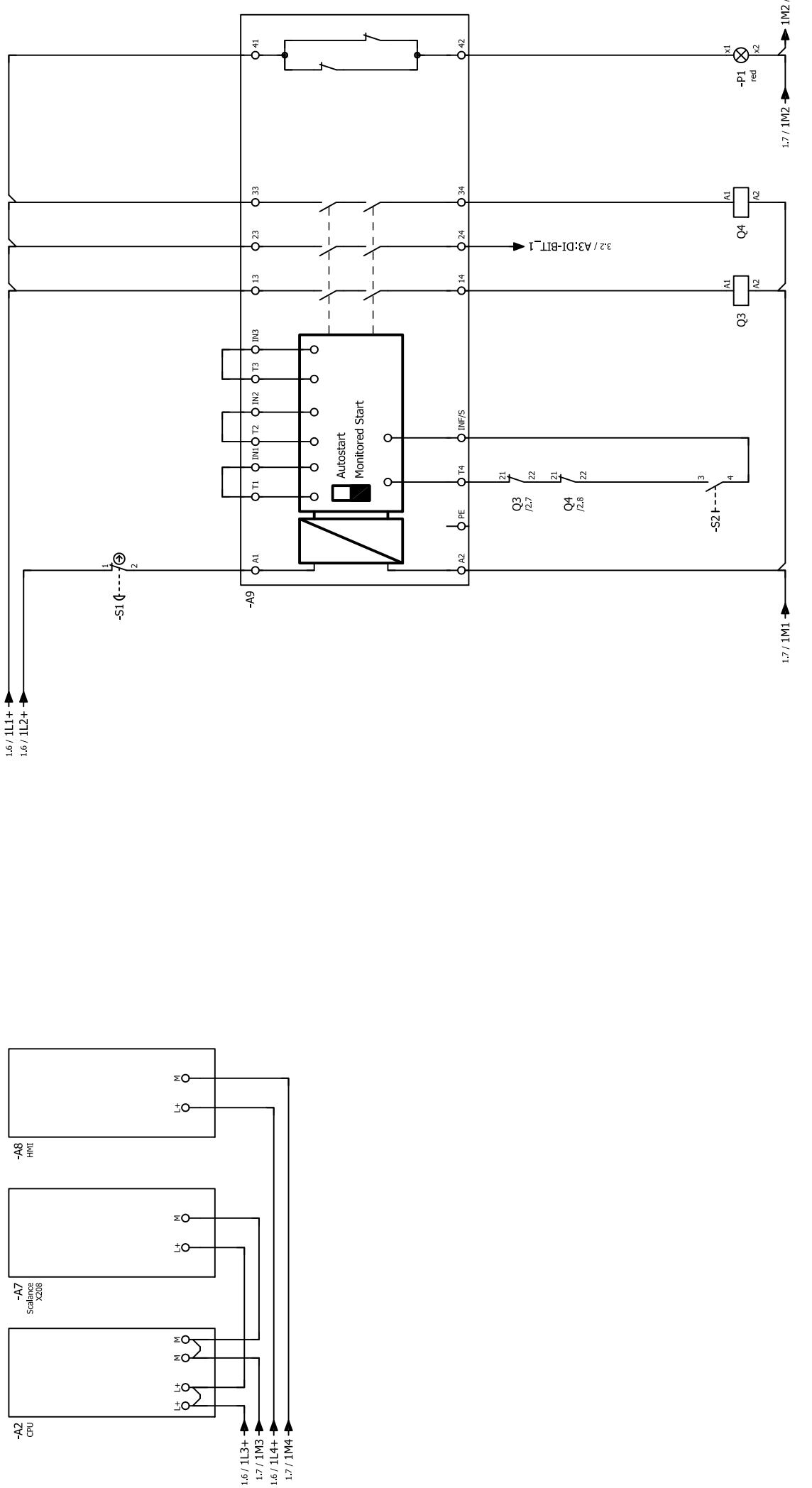
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6

5

4

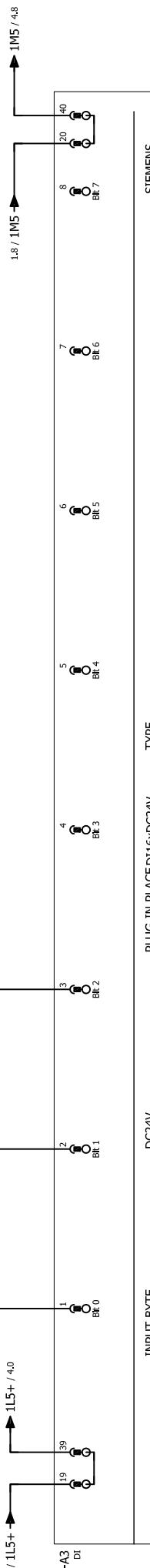
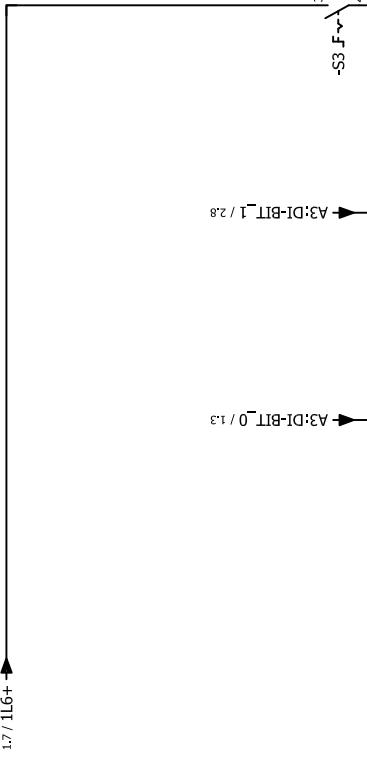




Power supply 24V DC

Emergency stop relay

signal lamp

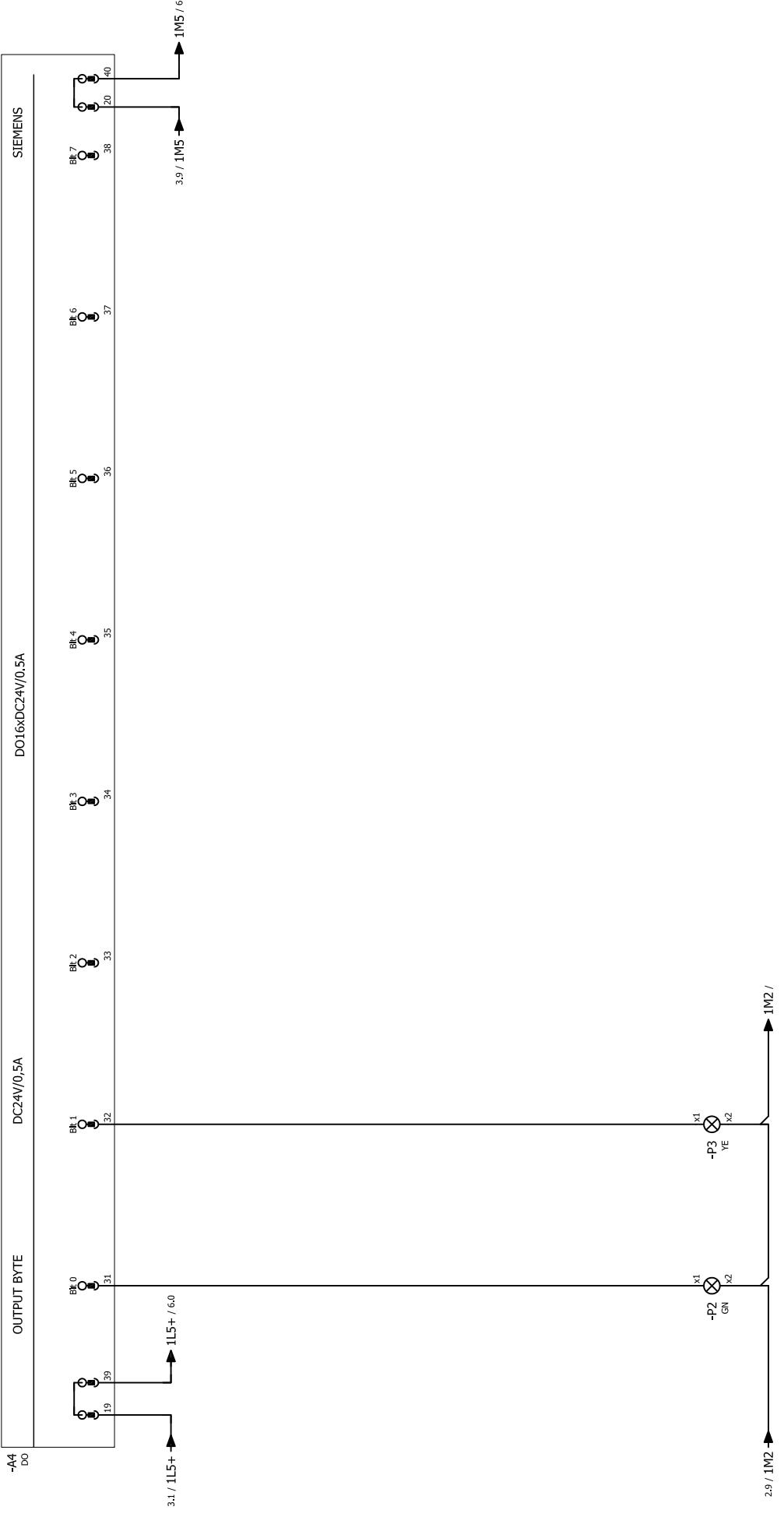


INPUT BYTE		PLUG-IN PLACE DI16xDC24V		TYPE		SIEMENS	
------------	--	--------------------------	--	------	--	---------	--

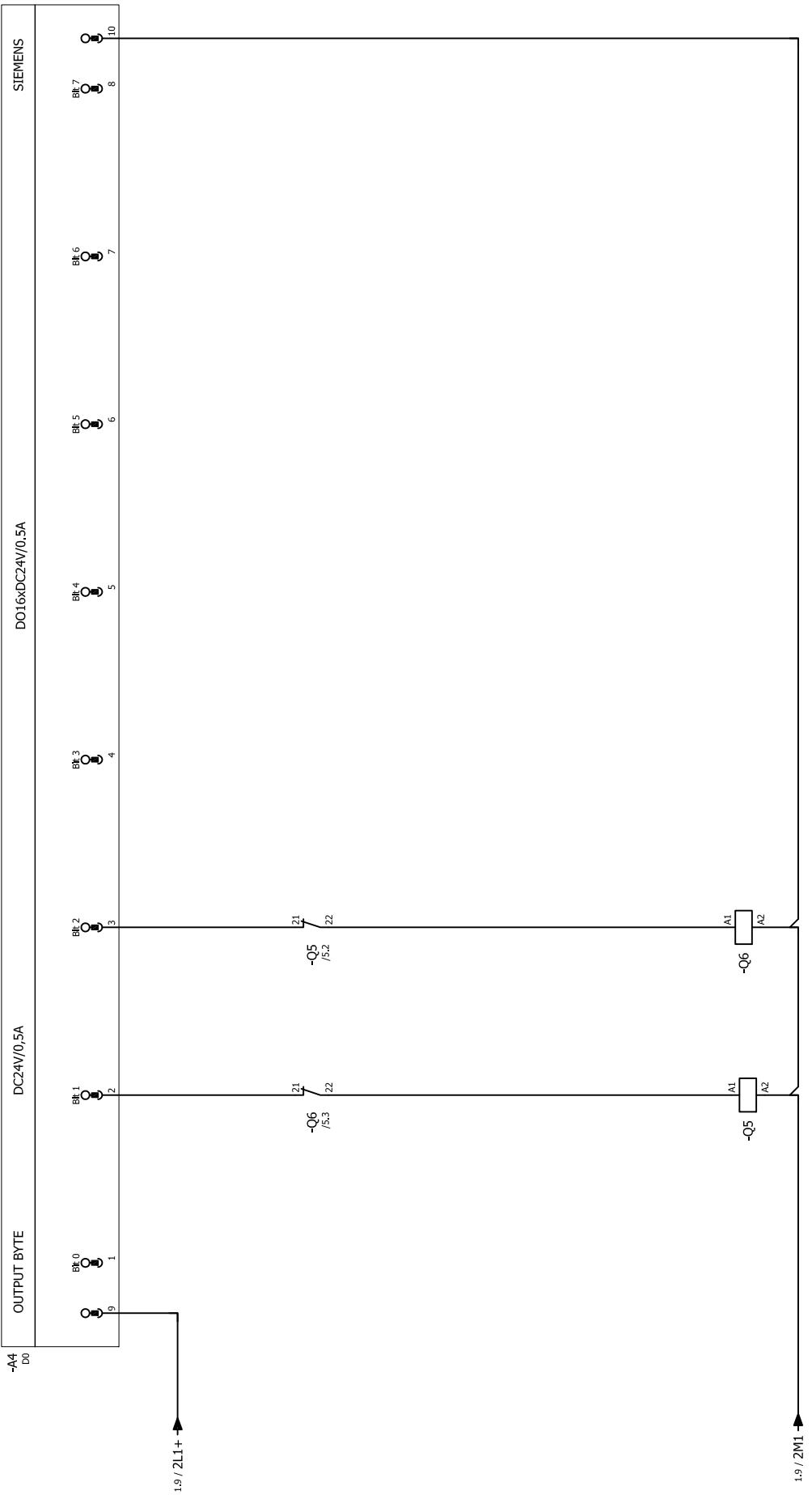
Änderung	Datum	Name	Urspr.	VSD ready	Emergency stop	not active	switch	M/AN / AUTO mode
							+	=
							WS2015 Sao Paulo/Brasil	Skill 19; Industrial-Control

Änderung	Datum	Name	Urspr.	Ersatz von	WS2015_TPI9_AT_EN_V1.0	Blatt 3
						Blatt 11

0		1		2		3		4		5		6		7		8		9
---	--	---	--	---	--	---	--	---	--	---	--	---	--	---	--	---	--	---



Änderung	Datum	Name	signal lamp		Control Circuit		=
			Automatic mode	Manual mode	WS2015 Sao Paulo/Brasil	Skill 19: Industrial-Control	
			Datum	Bearb., gepr.	Ersatz von		
						WS2015_TPI9_AT_EN_V1.0	
							Blatt 4
							Blatt 11
3							

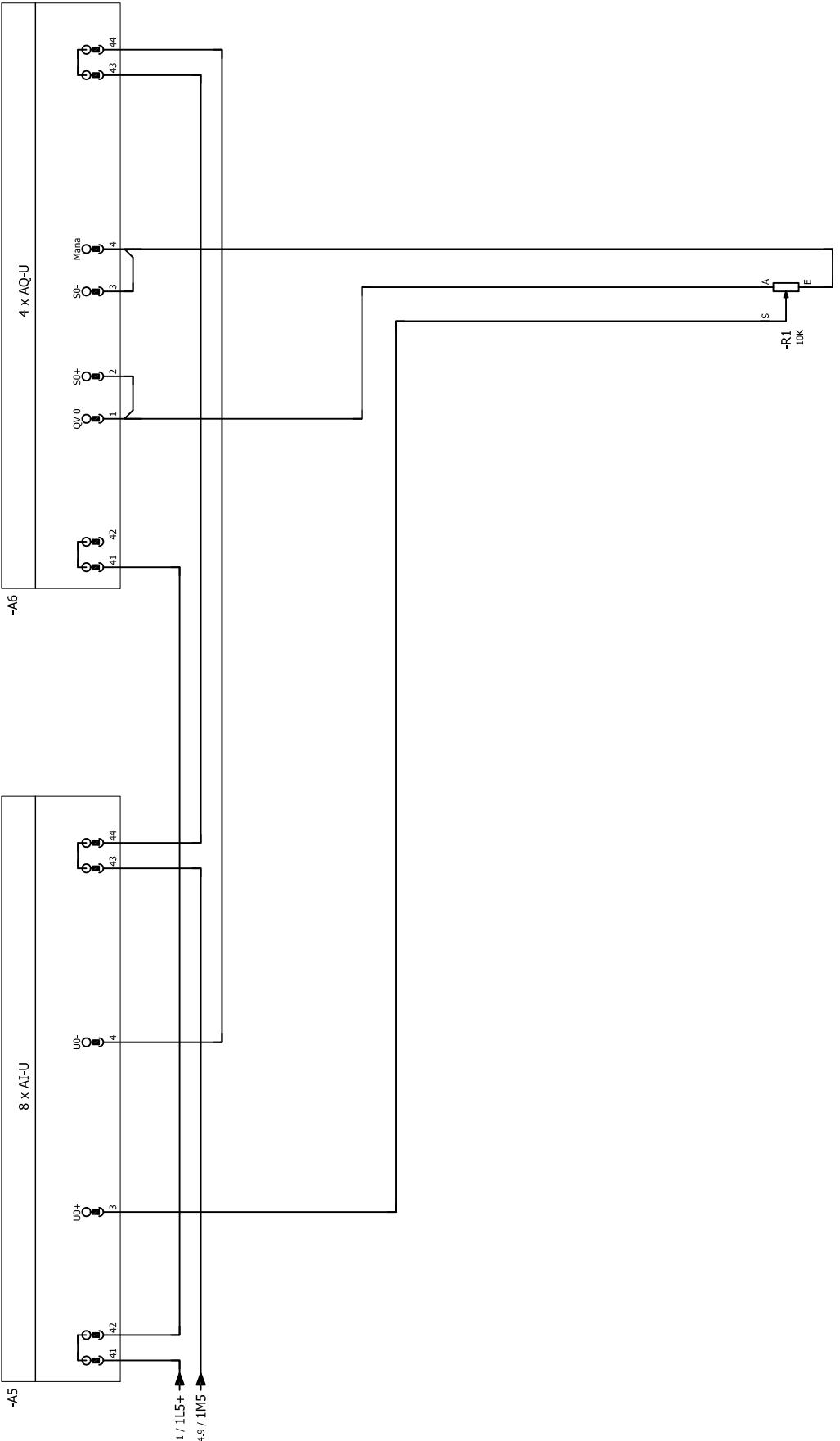


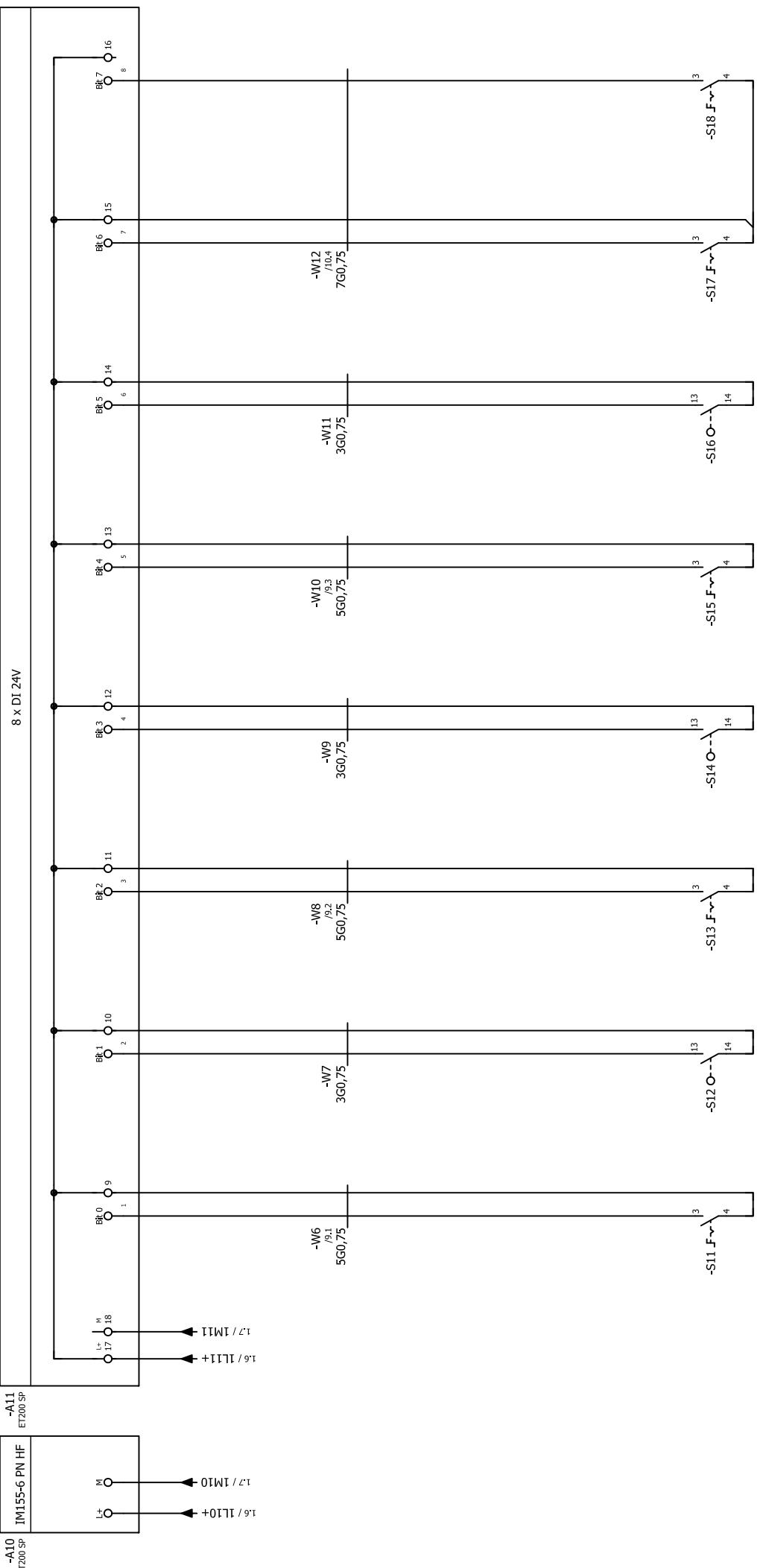
1 2 / 1.2
3 4 / 1.2
5 6 / 1.2
21 22 / 5.3

1 2 / 1.3
3 4 / 1.4
5 6 / 1.4
21 22 / 5.2

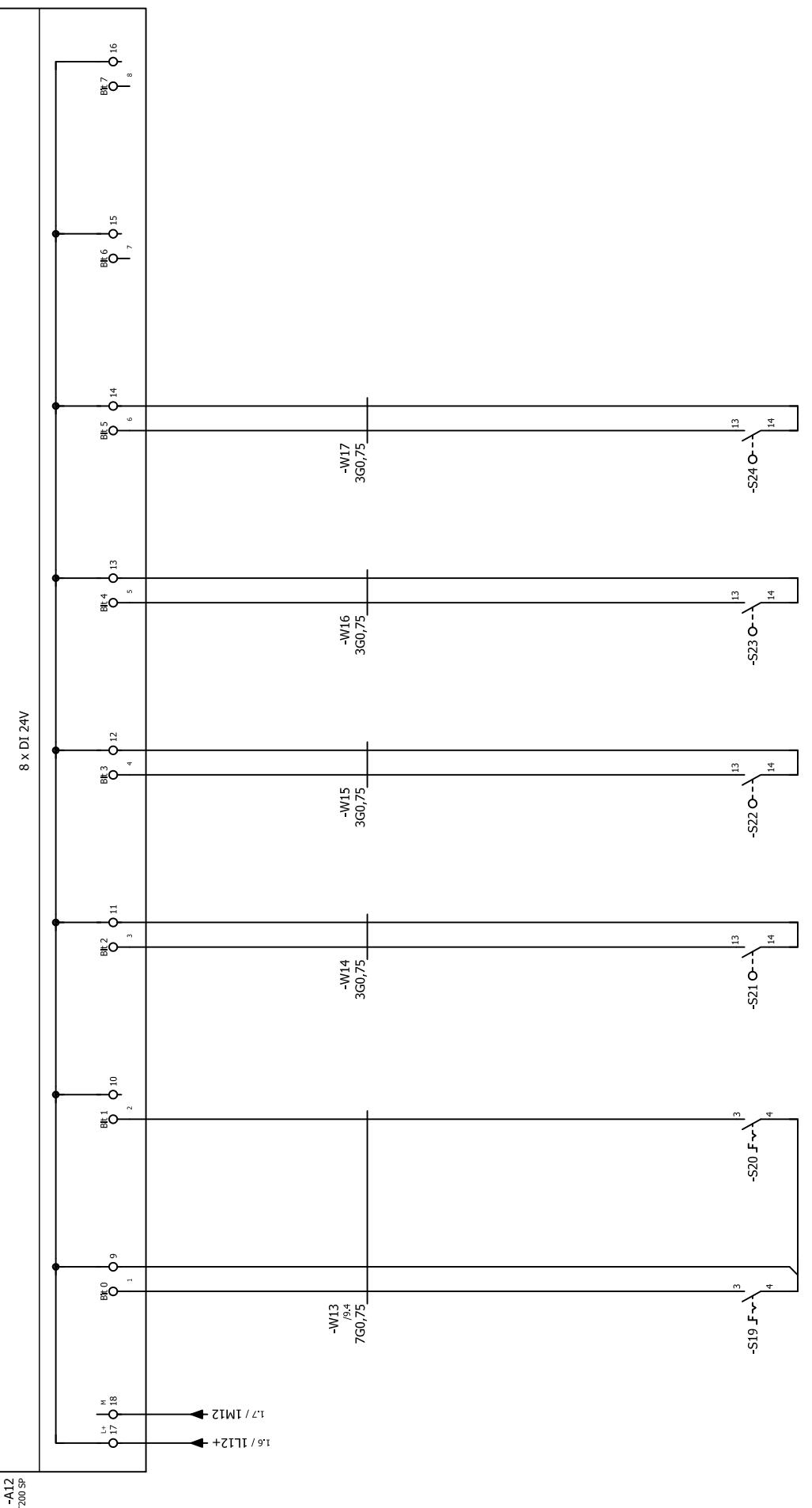
Motor MA1 selected
Motor MA2 selected

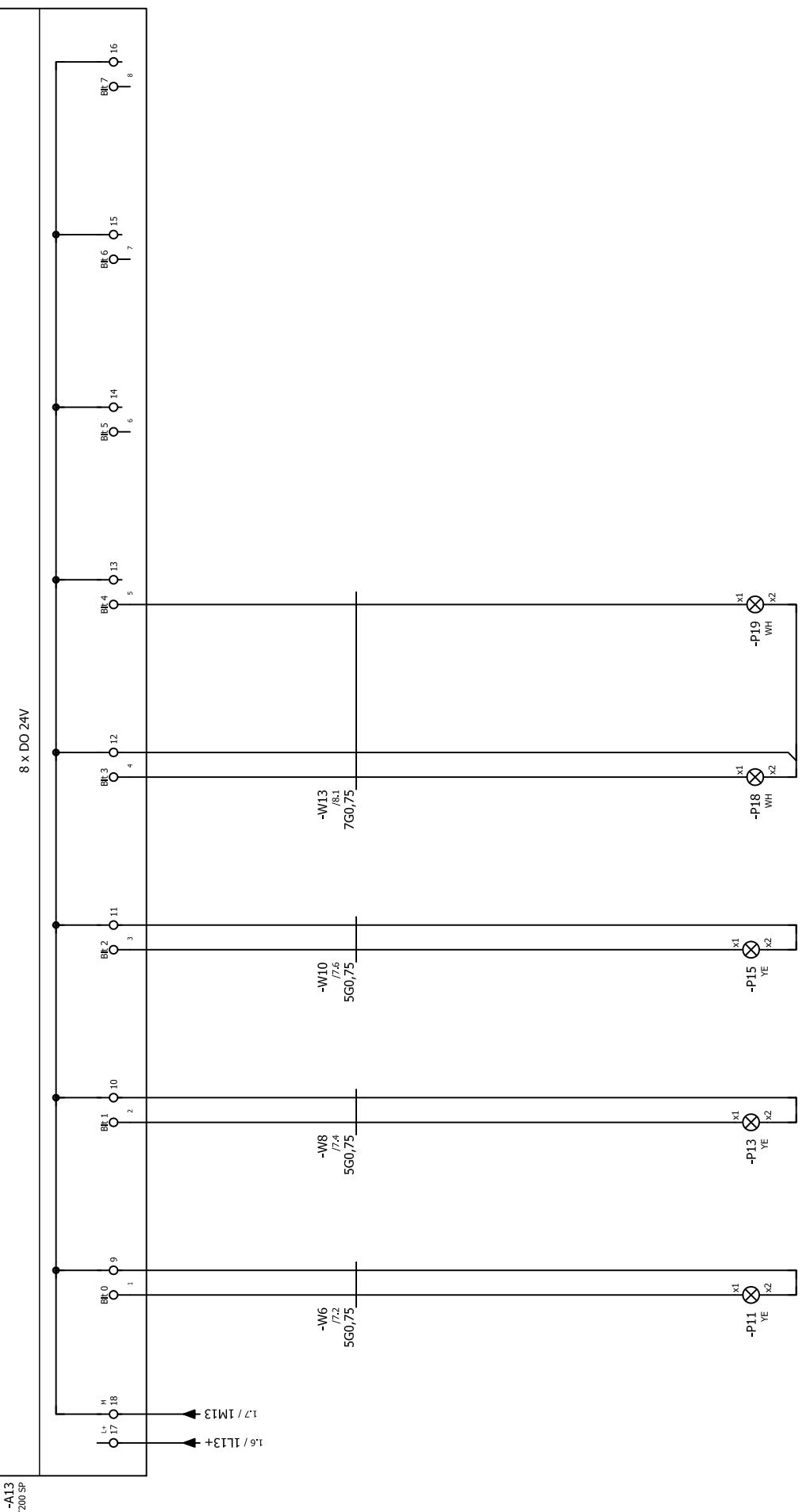
Änderung	Datum	Name	Control Circuit		=
			WS2015 Sao Paulo/Brasil	Skill 19; Industrial-Control	
4			Datum purchand Gepr. Uspr.	Ersatz von WS2015_TPI9_AT_EN_V1.0	Blatt Blatt Blatt Blatt

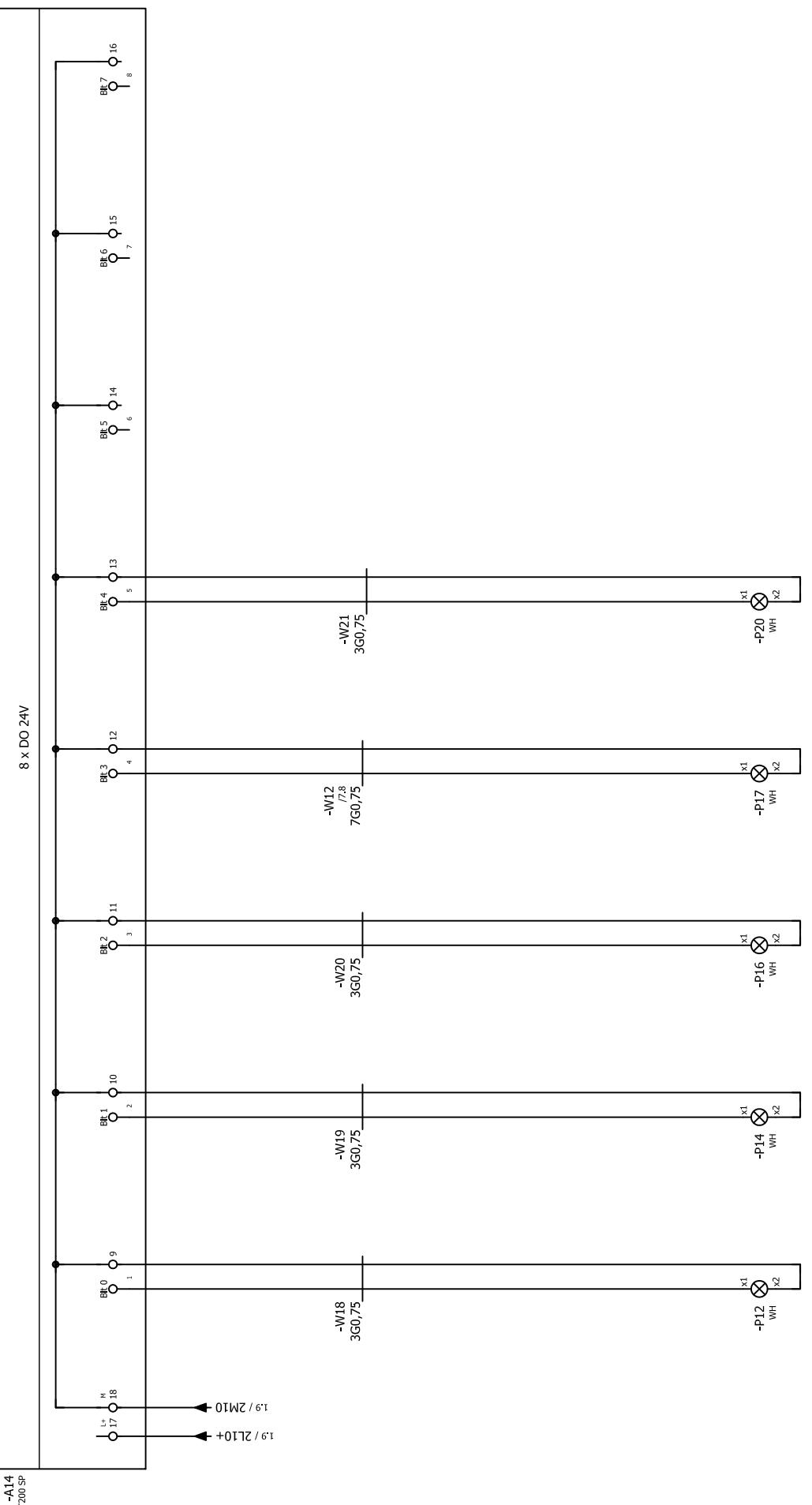




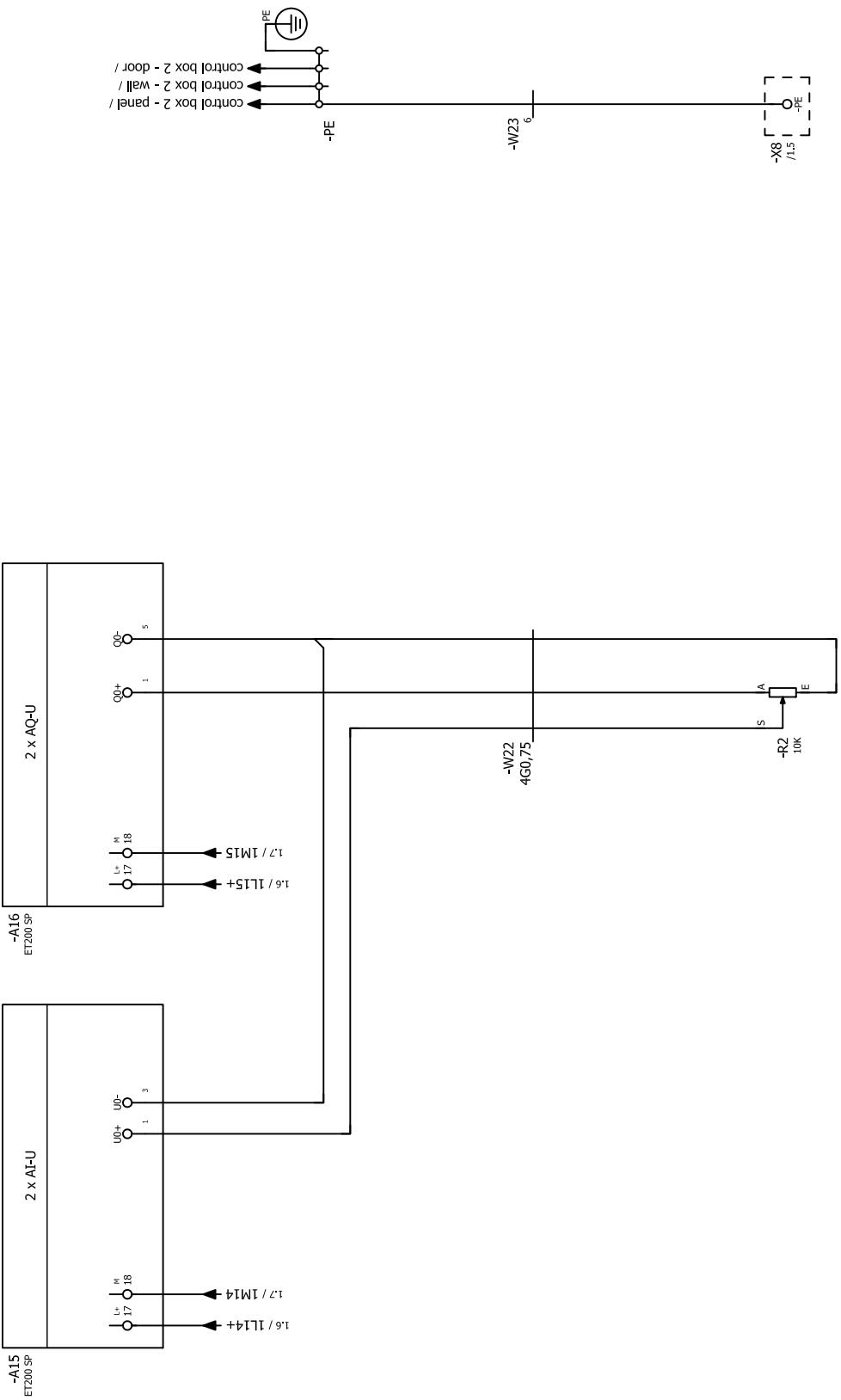
6	Power supply 24V DC -A10	Power supply 24V DC -A11	switch on tank 1	limit switch Tank 1 is empty	switch on tank 2	limit switch tank 2 is empty	switch on tank 3	limit switch tank 3 is empty	position switch outlet tank 4 closed	position switch outlet tank 4 open	8
			Datum 10.03.2015	Gepr. Pichard	Ersatz von	WS2015 Sao Paulo/Brasil	Skill 19: Industrial-Control	ET200SP	=	Blatt	
Anteileung	Datum	Name	Uspr.								W5C2015 TP19 AT EN V1.0





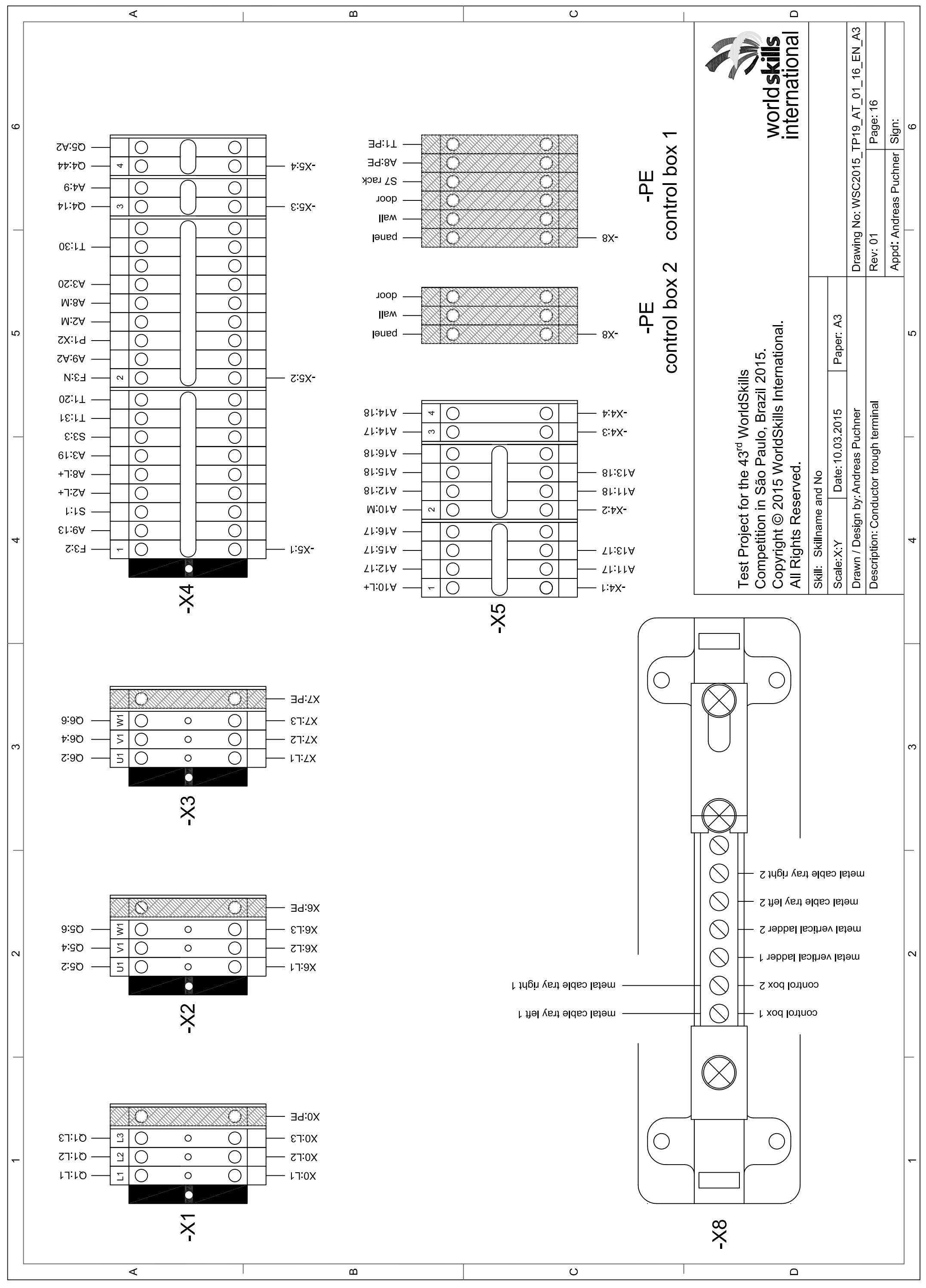


Anredeung	Datum	Name	Bearb.	WS2015 Sao Paulo/Brasil	WS2015_TP19_AT_EN_V1.0
			Gepr.	Skill 19; Industrial-Contro	+ Ersetzt von
			Urspr.	Ersatz durch	
					Blatt Blatt
					10 11



protective conductor connection

10	Power supply 24V DC -A15		Datum	10.03.2015	Power supply 24V DC -A16	actual position ladle car
Änderung	Datum	Name	Bearb., Gepr.	Puchard	WS2015 Sao Paulo/Brasil	Skill 19; Industrial-Control
		Urspr.			Ersatz von	Ersetzt durch
						ET200SP





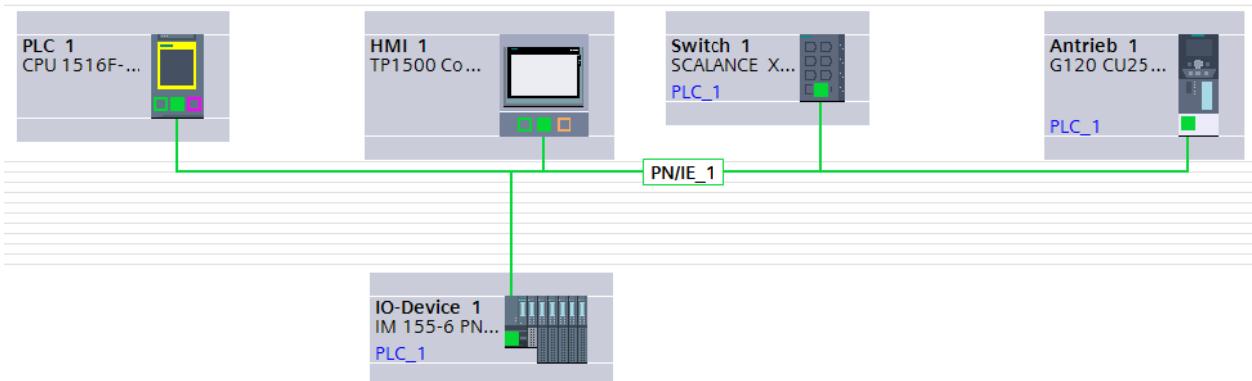
CABLE LIST

Nr.	Cable type	intern		extern	Description
W1	H07VV-F 5G2,5	X1	----->	X0	Power Supply 3x400V+N+PE
W2	LIYCY 4G1,5	X2	----->	X6	CEE socket 400V (MA1)
W3	LIYCY 4G1,5	X3	----->	X7	CEE socket 400V (MA2)
W4	H07V-K 6	PE	----->	X8	protective earth terminal
W5	H05VV-F 5G0,75	X4	----->	X5	Power Supply 24V/DC control box 2
W6	H05VV-F 5G0,75	ET200SP	----->	S11, P11	Tank 1
W7	H05VV-F 3G0,75	ET200SP	----->	S12	Limit switch tank 1
W8	H05VV-F 5G0,75	ET200SP	----->	S13,P13	Tank 2
W9	H05VV-F 3G0,75	ET200SP	----->	S14	Limit switch tank 2
W10	H05VV-F 5G0,75	ET200SP	----->	S15, P15	Tank 3
W11	H05VV-F 3G0,75	ET200SP	----->	S16	Limit switch tank 3
W12	H05VV-F 7G0,75	ET200SP	----->	S17,S18,P17	Outlet tank 4
W13	H05VV-F 7G0,75	ET200SP	----->	S19,S20,P18,P19	Ladle car
W14	H05VV-F 3G0,75	ET200SP	----->	S21	Position switch left max
W15	H05VV-F 3G0,75	ET200SP	----->	S22	Position switch left
W16	H05VV-F 3G0,75	ET200SP	----->	S23	Position switch right
W17	H05VV-F 3G0,75	ET200SP	----->	S24	Position right max
W18	H05VV-F 3G0,75	ET200SP	----->	P12	Outlet tank 1
W19	H05VV-F 3G0,75	ET200SP	----->	P14	Outlet tank 2
W20	H05VV-F 3G0,75	ET200SP	----->	P16	Outlet tank 3
W21	H05VV-F 3G0,75	ET200SP	----->	P20	limit switch
W22	H07VV-F 4G0,75	ET200SP	----->	R2	potentiometer
W23	H07V-K 6	X5	----->	X8	protective earth terminal
W24	IE-cable	A7	----->	A10	Profinet cable to ET200 SP

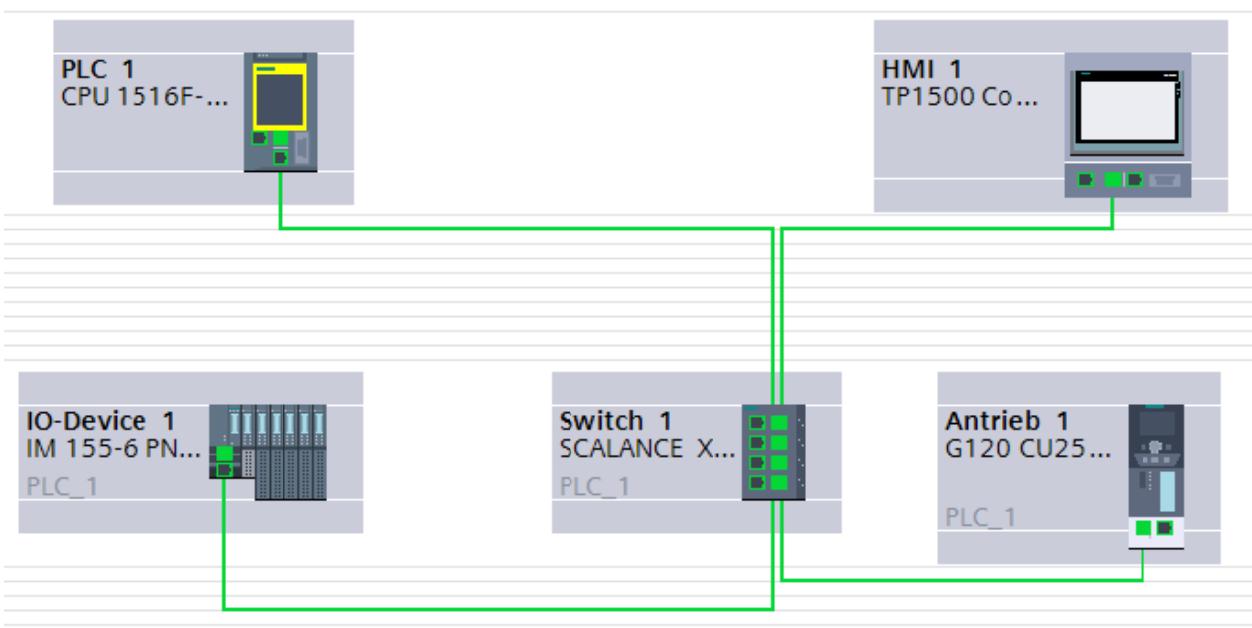


PROFINET CONNECTIONS

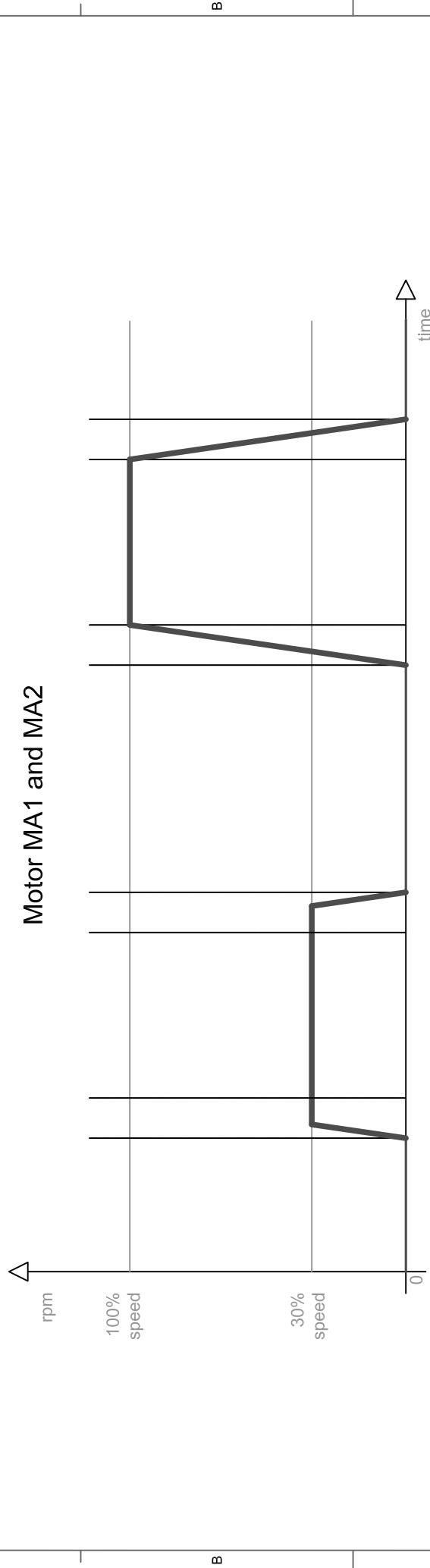
OVERVIEW TECHNOLOGY



OVERVIEW TOPOLOGY



Motor MA1 and MA2



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



Test Project for the 43rd WorldSkills
Competition in São Paulo, Brazil 2015.
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Skill: Skillname and No	Date: 10.03.2015	Paper: A4	Drawing No: WSC2015_TPI9_AT_01_19_EN_A4
Scale: X:Y	Drawn / Design by: Andreas Puchner	Paper: A4	Rev: 01
Description: VSD	Appd: Andreas Puchner	Sign:	Page: 19



SAFETY REPORT – COMMISSIONING

Competitor

Name, Country code /

Booth No.:

1. VISUAL INSPECTION:

The visual inspection includes:

- | | | | |
|--|--|--|---|
| <input type="checkbox"/> Control box 1 | <input type="checkbox"/> Control box 2 | <input type="checkbox"/> Protective earth terminal | <input type="checkbox"/> 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	---	side wall Ω
PE	---	door Ω
PE	---	S7-rack Ω
PE	---	T1/PE (VSD) Ω
PE	---	A8/PE (HMI) Ω
PE	---	X8 Ω
Control box 2:			
PE	---	X8 Ω
PE	---	panel Ω
PE	---	side wall Ω
PE	---	door Ω
Wall Installation:			
X8	---	vertical ladder 1 Ω
X8	---	vertical ladder 2 Ω
X8	---	cable tray right side 1 Ω
X8	---	cable tray right side 2 Ω
X8	---	cable tray corner 1 Ω
X8	---	cable tray corner 2 Ω



X8	---	cable tray left side 1	Ω
X8	---	cable tray left side 2	Ω
X8	---	X6/PE (CEE socket)	Ω
X8	---	X7/PE (CEE socket)	Ω

2.2. ISOLATION MEASUREMENT:

Main circuit X1 – Power supply:

X1/PE	---	L ₁ , L ₂ , L ₃	MΩ
X1/L ₁ , L ₂ , L ₃	---	L ₁ , L ₂ , L ₃	MΩ

Main circuit X2 – CEE socket X6:

X2/PE	---	X ₂ / L ₁ , L ₂ , L ₃	MΩ
X ₂ /L ₁ , L ₂ , L ₃	---	X ₂ / L ₁ , L ₂ , L ₃	MΩ

Main circuit X3 – CEE socket X7:

X ₃ /PE	---	X ₃ / L ₁ , L ₂ , L ₃	MΩ
X ₃ /L ₁ , L ₂ , L ₃	---	X ₃ / L ₁ , L ₂ , L ₃	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:

L ₁ -X ₁	---	PE-X ₁	V
L ₂ -X ₁	---	PE-X ₁	V
L ₃ -X ₁	---	PE-X ₁	V
L ₁ -X ₁	---	L ₂ -X ₁	V
L ₁ -X ₁	---	L ₃ -X ₁	V
L ₂ -X ₁	---	L ₃ -X ₁	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	CEE-Plug 220V/16A; 4 pole	3p			-X0, Pos. 24, 25
2	CEE-Socket 220V/16A; 4pole,	2p			Pos. 24, 25
3	Plastic tube VR25	2m			Pos. 22
4	Plastic 90° bow for VR25	3p			Pos. 23
5	clips for plastic tube VR20	8p			Pos. 4
6	clips for plastic tube VR25	15p			Pos. 22
7	wall duct 60 x 60 with cover	3m	Obo Bettermann	6021948	Pos. 3
8	metal cable tray 60x100	6m	Obo Bettermann	6047611	Pos. 1
9	90° bend for metal cable tray	2p	Obo Bettermann	6043216	Pos. 2
10	Edge protection for panel	1m	Obo Bettermann	6072909	Pos. 1
11	Wall brackets	20p	Obo Bettermann	6424716	Pos. 1, 28
12	Truss-head bolts M6x16mm with nut	48p	Obo Bettermann	6406157	Pos. 1, 2, 28
13	Vertical ladder 200x 60mm metal	1,5m	Obo Bettermann	6208538	Pos. 28
14	Protective conductor terminal;16mm ²	1p	Obo Bettermann	5015073	Pos. 29
15	Metal Pipe without thread M20	2m	Obo Bettermann	2046566	Pos. 4
16	Empty HOUSING 1 88 x 85 x 40mm	1p	Obo Bettermann	2000342	Pos. 21
17	Terminal strips, polyamide	1p	Obo Bettermann	2055929	Pos. 21
18	U-clamps 16-22mm	10p	Obo Bettermann	1160222	Pos. 28
19	U-clamps 12-16mm	10p	Obo Bettermann	1160168	Pos. 28
20	Sirius position switch	5p	Siemens	3SE5232-0BE10	Pos. 8, 9, 10, 17, 20
21	Sirius position switch	2p	Siemens	3SE5232-0FD03	Pos. 18, 19
22	Emty housing - 1 command point	4p	Siemens	3SB3801-0AA3	Pos. 11, 12, 13, 16
23	Emty housing - 2 command point	4p	Siemens	3SB3802-0AA3	Pos. 5, 6, 7, 14
24	Emty housing - 3 command point	1p	Siemens	3SB3803-0AA3	Pos. 15
25	Inscription Label 22x 22mm	15p	Siemens	3SB1901-3AA	Pos. 5, 6, 7, 11, 12, 13, 14, 15, 16
26	Indicator light (YELLOW) 24VDC Led	3p	Siemens	3SB3420-1PA	P11, P13, P15
27	Indicator light (WHITE) 24VDC Led	7p	Siemens	3SB3420-1PE	P12, P14, P16, P17, P18, P19, P20
28	auxiliary contact block 1NO	7p	Siemens	3SB3420-0B	S11, S13, S15, S17, S18, S19, S20
29	LAMP HOLDER LED (YELLOW)	3p	Siemens	3SB3001-6AA30	P11,13,15
30	LAMP HOLDER LED (WHITE)	7p	Siemens	3SB3001-6AA60	P12,14,16,17,18,19,20
31	Toogle switch 0-I 90° holder	3p	Siemens	3SB3000-2HA11	S11, 13, 15
32	Toogle switch I- 0-II 2x50° holder	2p	Siemens	3SB3000-2DA11	S17-18, S19-20
33	SIMOTICS GP LOW-VOLTAGE MOTOR	2p	Siemens	1LE1003-0DB22-2AC4	MA1, MA2



Nr.	Description	Qty	Producer	Specification	Comments
34	10 weel poti 10K, 2W	2p	RS Components	460-7526	R1, R2
35	turning knob for potentiometer	2p	RS Components	508-885	R1, R2
36	Switch ring short	3p	host country	WS2015_TP19_AT_01_04_EN	Pos. 8, 9, 10
37	Switch ring long	1p	host country	WS2015_TP19_AT_01_04_EN	Pos. 17
38	Compact enclosure B600/H800/T250	1p	Rittal	AE 1058.500	Pos. 27
39	Compact enclosure B300/H400/T210	1p	Rittal	AE 1034.500	Pos. 26
40	Cable Gland M16x1,5	2p	Obo Bettermann	2022864	Pos. 26, 27
41	Cable Gland M20x1,5	36p	Obo Bettermann	2022866	Pos. 5 - 21, 24, 25, 26, 27
42	Cable Gland M25x1,5	1p	Obo Bettermann	2022868	Pos. 27
43	Multiple sealing inserts, metric	6p	Obo Bettermann	2029677	Pos. 26, 27
44	Locknut M16x1,5	2p	Obo Bettermann	2049511	Pos. 26, 27
45	Locknut M20x1,5	29p	Obo Bettermann	2049538	Pos. 5 - 7, 11 - 16, 21, 24 - 27
46	Locknut M25x1,5	1p	Obo Bettermann	2049546	Pos. 27
47	Wiring duct Base and cover B40/H60	6m	Obo Bettermann	6178031	
48	Top-hat rail TS35x7,5	2m	Weidmüller	514500000	
49	STEP 7/Safety/StartDrive V13 SP1	1p	Siemens	6ES7822-1AA03-4YA5	TRAINING BUNDLE
50	DVD Manuel Collection SINAMICS	1p	Siemens	6SL3097-4CA00-0YG3	TRAINING BUNDLE
51	DVD Manuel Collection SIMATIC	1p	Siemens	6ES7998-8XC01-8YE0	TRAINING BUNDLE
52	SIMATIC PM 1507 24 V/8 A	1p	Siemens	6EP1333-4BA00	-A1
53	CPU 1516F-3 PN/DP	1p	Siemens	6ES7516-3FN00-0AB0	-A2
54	S7-1500 DIGITAL INPUT MODULE	1p	Siemens	6ES7521-1BL00-0AB0	-A3
55	S7-1500 DIGITAL OUTPUT MODULE	1p	Siemens	6ES7522-1BL00-0AB0	-A4
56	S7-1500, ANALOG INPUT MODULE	1p	Siemens	6ES7531-7KF00-0AB0	-A5
57	S7-1500, ANALOG OUTPUT MODULE	1p	Siemens	6ES7532-5HD00-0AB0	-A6
58	S7-1500, MOUNTING RAIL 482 MM	1p	Siemens	6ES7590-1AE80-0AA0	
59	S7-1500, FRONTCONNECTOR PUSH-IN	4p	Siemens	6ES7592-1BM00-0XB0	-A3, -A4, -A5, -A6
60	MEMORY CARD 24 MBYTE	1p	Siemens	6ES7954-8LF02-0AA0	-A2
61	IE TP XP CORD RJ45/RJ45, 6M	1p	Siemens	6XV1870-3RH60	
62	HMI TP1500 COMFORT	1p	Siemens	6AV2124-0QC02-0AX0	-A8
63	WINCC ADVANCED V13	1p	Siemens	S79220-B5178-F888	
64	IE TP XP CORD RJ45/RJ45, 6M	1p	Siemens	6XV1870-3RH60	
65	C-PLUG	1p	Siemens	6GK1900-0AB00	-A7
66	SCALANCE X208	1p	Siemens	6GK5208-0BA10-2AA3	-A7
67	RAIL WIDTH 35MM, LENGTH 483MM	1p	Siemens	6ES5710-8MA11	
68	ET 200SP, LABELING , LIGHT GREY	1p	Siemens	6ES7193-6LA10-0AA0	
69	IM155-6PN HIGH FEATURE	1p	Siemens	6ES7155-6AU00-0CN0	-A10



Nr.	Description	Qty	Producer	Specification	Comments
70	ET 200SP, DIGITAL INPUT MODULE	2p	Siemens	6ES7131-6BF00-0CA0	-A11, -A12
71	ET 200SP, DIGITAL OUTPUT MODULE	2p	Siemens	6ES7132-6BF00-0CA0	-A13, A14
72	BUSADAPTER BA 2X RJ45 FOR PN	1p	Siemens	6ES7193-6AR00-0AA0	-A10
73	ET 200SP, IDENTIFIER PLATES	1p	Siemens	6ES7193-6LF30-0AW0	
74	Baseunit BU15-P16+A0+2D, BU-TYPE AO	5p	Siemens	6ES7193-6BP00-0DA0	-A11, -A12, -A13, -A14
75	ET 200SP, IDENTIFICATION LABELS CC01	1p	Siemens	6ES7193-6CP01-2MA0	
76	ET 200SP, IDENTIFICATION LABELS CC02	1p	Siemens	6ES7193-6CP02-2MA0	
77	ET 200SP, IDENTIFICATION LABELS CC71	1p	Siemens	6ES7193-6CP71-2AA0	
78	ET 200SP, IDENTIFICATION LABELS CC72	1p	Siemens	6ES7193-6CP72-2AA0	
79	ET 200SP, IDENTIFICATION LABELS CC73	1p	Siemens	6ES7193-6CP73-2AA0	
80	ET 200SP, ANALOG INPUT MODULE	1p	Siemens	6ES7134-6HB00-0DA1	-A15
81	ET 200SP, ANALOG OUTPUT MODULE	1p	Siemens	6ES7135-6HB00-0DA1	-A16
82	Baseunit BU15-P16+A0+2D, BU-TYPE AO	2p	Siemens	6ES7193-6BP00-0DA0	-A15, -A16
83	ET 200SP, IDENTIFICATION LABELS CC03	1p	Siemens	6ES7193-6CP03-2MA0	
84	ET 200SP, 5 SHIELDING TERMINALS	1p	Siemens	6ES7193-6SC00-1AM0	
85	SINAMICS CONTROL UNIT CU250S-2	1p	Siemens	6SL3246-0BA22-1FA0	-T1
86	INTELLIGENT OPERATOR PANEL	1p	Siemens	6SL3255-0AA00-4JA1	-A17
87	SINAMICS POWER MODULE PM240	1p	Siemens	6SL3210-1PB13-8UL0	-T1
88	PC-CONVERTER-CONNECTION-KIT	1p	Siemens	6SL3255-0AA00-2CA0	
89	SINAMICS SD-CARD 512 MB	1p	Siemens	6SL3054-4AG00-2AA0	-T1
90	SINAMICS G120 door mounting kit	1p	Siemens	6SL3256-0AP00-0JA0	
91	CIRCUIT-BREAKER SZ S00 1.8...2,5A	1p	Siemens	3RV2011-1CA15	-Q2
92	Contactor	2p	Siemens	3RT2015-1BB42-0CC0	-Q5, -Q6
93	STRIPPING TOOL	1p	Siemens	6GK1901-1GA00	
94	PROFINET IE Cable	30m	Siemens	6XV1870-2B	
95	RJ45 PLUG CONNECTOR 180 DGR	1p	Siemens	6GK1901-1BB10-2AB0	(10pce)
96	RJ45 PLUG CONNECTOR 90 DGR	2p	Siemens	6GK1901-1BB20-2AA0	(1pce)
97	Contactor 3 NO + 2NO+2NC - 24VDC	2p	Siemens	3RT2015-1FB44-3MA0	-Q3, -Q4
98	SIRIUS SAFETY RELAY	1p	Siemens	3SK1111-2AB30	-A9
99	EM. STOP SWITCH 7.5KW 3 pole	1p	Siemens	3LD2003-0TK53	-Q1
100	CIRCUIT BREAKER 6KA 3POL C13	1p	Siemens	5SL6313-7	-F1
101	CIRCUIT BREAKER 6KA 1+N-P B6	3p	Siemens	5SL6506-6	-F2, -F3, -F4
102	Conductor trough terminal block 4 grey	9p	Siemens	8WH6000-0AG00	-X1, -X2, -X3
103	Conductor earth terminal block 4 gn/ye	8p	Siemens	8WH6000-0CG07	-X1, -X2, -X3, PE
104	End and intermediate plate 4	5p	Siemens	8WH9003-1GA00	-X1, -X2, -X3, PE
105	Marking system (L1,L2,...) for 4 SQMM	1p	Siemens	8WH8120-3AA15	-X1



Nr.	Description	Qty	Producer	Specification	Comments
106	Marking system (U,V,...) for 4 SQMM	1p	Siemens	8WH8120-3AA25	-X2, X3
107	Conductor earth terminal block 6 gn/ye	8p	Siemens	8WH6000-0CH07	-PE
108	End and intermediate plate 6	2p	Siemens	8WH9004-3SA00	-PE
109	Conductor terminal block 2,5 grey	50p	Siemens	8WH6000-0AF00	-X4, -X5
110	PE-TERMINAL 2.5SQMM, GREEN-YELLOW	6p	Siemens	8WH6000-0CF07	-PE
111	END RETAINER THERMOPLAST	12p	Siemens	8WH9150-0CA00	
112	End and intermediate plate 2,5	14p	Siemens	8WH9000-1GA00	-X4, -X5
113	Adjacent jumper (2 x), 2,5sqmm	50p	Siemens	8WH9020-6BC10	-X4, -X5
114	Marking system (1-10) for 2,5 SQMM	2p	Siemens	8WH8120-2AB05	-X4, -X5
115	Marking system (11-20) for 2,5 SQMM	2p	Siemens	8WH8120-2AB15	-X4
116	label plate	6p	Siemens	8WH9150-1CA00	-X1, -X2, -X3, -X4, -X5
117	Emergency stop button compl. 1NO+1NC	1p	Siemens	3SB3201-1HR20	-S1
118	push-button black compl. 1NO/1NC	1p	Siemens	3SB3201-0AA11	-S2
119	Toogle switch compl. 0-I 90° 1NC+1NO	1p	Siemens	3SB3201-2HA11	-S3
120	Indicator light compl. (RED) 24V DC	1p	Siemens	3SB3244-6AA20	-P1
121	Indicator light compl. (GREEN) 24V DC	1p	Siemens	3SB3244-6AA40	-P2
122	Indicator light compl. (YELLOW) 24V DC	1p	Siemens	3SB3244-6AA30	-P3
123	name plate holder for 12,5 x 27mm	6p	Siemens	3SB3922-0AV	-S1, S2, -S3, -P1, -P2, -P3
124	name plate 12,5 x 27mm	6p	Siemens	3SB1901-2AA	-S1, S2, -S3, -P1, -P2, -P3
125	cable tie 100x2,5	50p	Schneider Electric	NSYLZ25100	
126	block for cable tie; self adhesive	10p	Schneider Electric	NSYMB3A	
127	spiral band	4m	Schneider Electric	NSYTC12100	
128	End sleeve (ferrule) 6mm ² isolated	20p			
129	End sleeve (ferrule) 2,5 mm ² isolated	50p			
130	End sleeve (ferrule) 1,5 mm ² isolated	100p			
131	End sleeve (ferrule) 0,75mm ² isolated	100p			
132	End sleeve (ferrule) 0,75mm ² TWIN	10p			
133	cable lug ring form 6mm ² ;M5	10p			
134	cable lug ring form 6mm ² ;M6	30p			
135	cable lug ring form 6mm ² ;M8	10p			
136	cable lug ring form 2,5mm ² ;M4	5p			
137	cable lug ring form 1,5mm ² ;M4	10p			
138	cable lug ring form 1,5mm ² ;M5	20p			
139	cable lug ring form 1,5mm ² ;M6	20p			
140	Wire H07V-K 6 gn/ye	13m			
141	Wire H07V-K 2,5 black	20m			

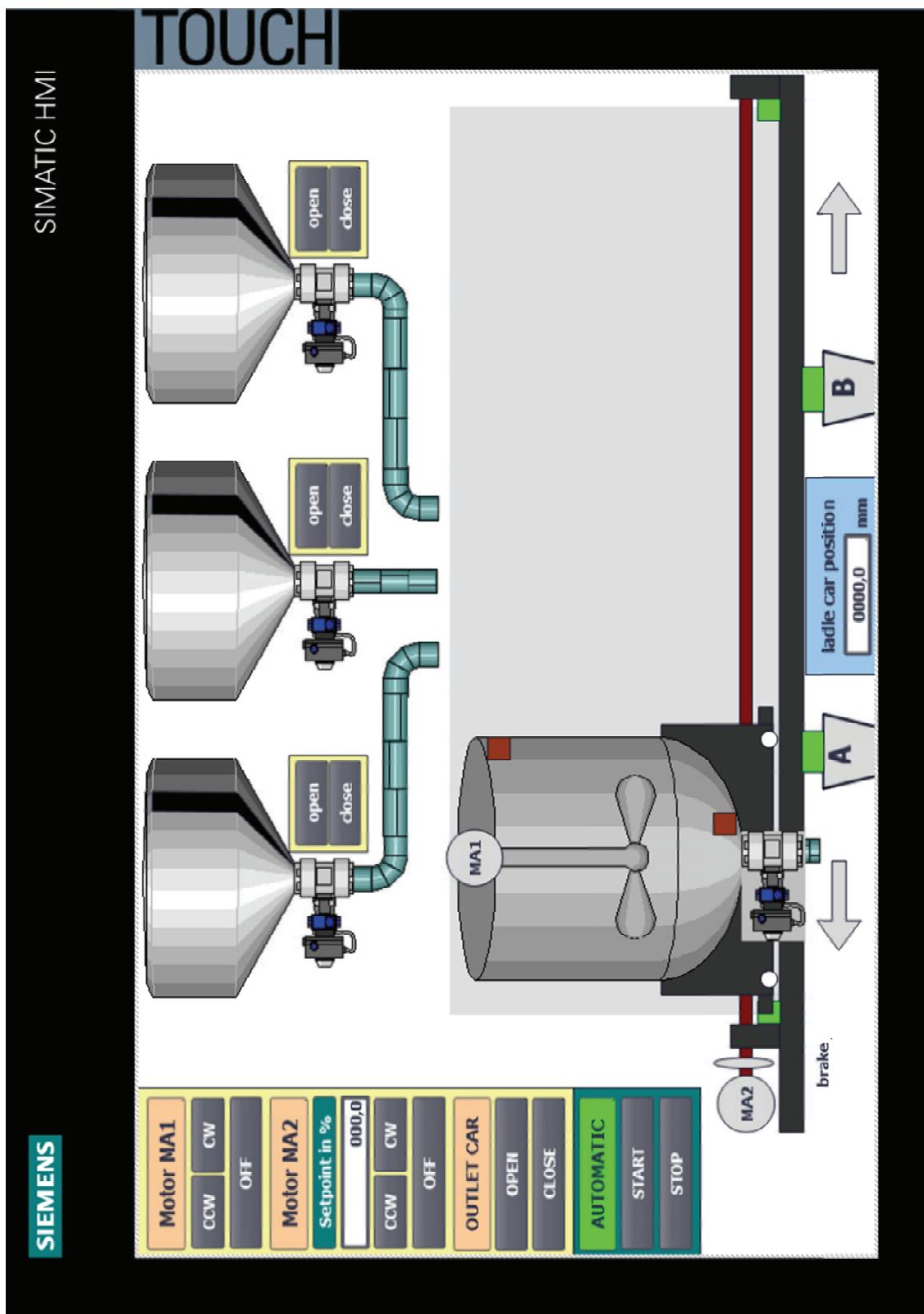


Nr.	Description	Qty	Producer	Specification	Comments
142	Cable H05VV-F 3G0,75	50m			
143	Wire H07V-K 1, 5 black	30m			
144	Cable H05VV-F 7G0,75	15m			
145	Wire H07V-K 1, 5 gn/ye	6m			
146	Wire H05V-K 0,75 blue	100m			
147	Cable H07VV-F 5G2,5	5m			
148	Cable H07VV-F 4G1,5	5m			
149	Cable LIYCY 4G1,5	10m			
150	Cable H05VV-F 4G0,75	4m			
151	Cable H05VV-F 5G0,75	12m			
152	Chipboard screws 3,5 x 20mm	120p			
153	Chipboard screws 3,5 x 45mm	80p			
154	sheet metal screws 3,9 x 13mm	10p			
155	sheet metal screws 4,8 x 19mm	50p			
156	Countersunk-head screws M4 x 10mm	4p			
157	Cylinder-head screws M4 x 25mm	4p			
158	Chipboard screws 5 x 40mm	60p			
159	Washer 4,3mm	4p			
160	Washer 4,3 x 15mm	80p			
161	Washer 5,3 x 20mm	50p			
162	Nut M4	4p			
163	Snap ring 4,3mm	4p			



HMI - CONFIGURATION

SCREEN OVERVIEW





HMI VARIABLES

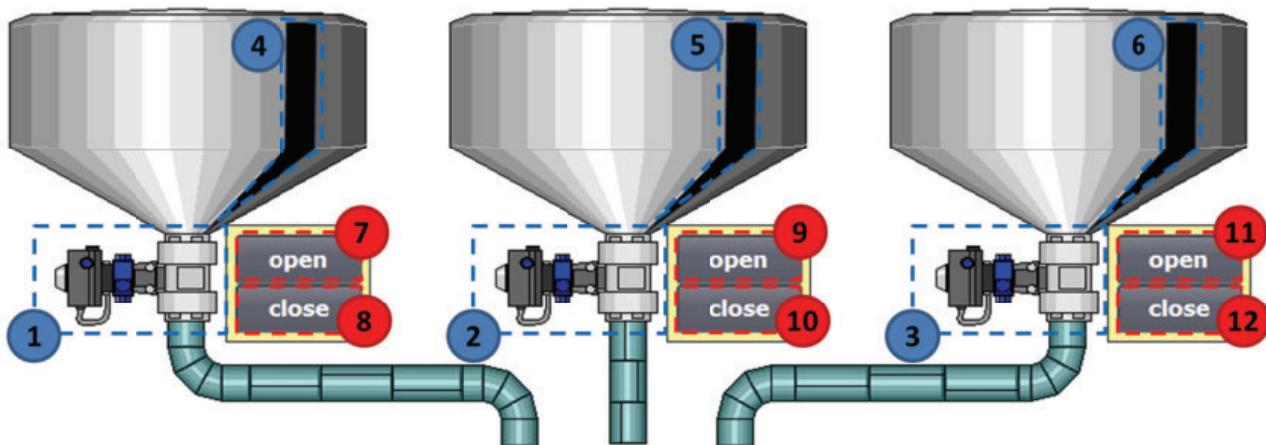
SYMBOL	TYPE	COMMENT	IN USE
S ₁₂	BOOL	PLC-Input	read
S ₁₄	BOOL	PLC-Input	read
S ₁₆	BOOL	PLC-Input	read
S ₁₉	BOOL	PLC-Input	read
S ₂₀	BOOL	PLC-Input	read
S ₂₁	BOOL	PLC-Input	read
S ₂₂	BOOL	PLC-Input	read
S ₂₃	BOOL	PLC-Input	read
S ₂₄	BOOL	PLC-Input	read
P ₁₂	BOOL	PLC-Output	read
P ₁₄	BOOL	PLC-Output	read
P ₁₆	BOOL	PLC-Output	read
P ₁₇	BOOL	PLC-Output	read
P ₂₀	BOOL	PLC-Output	read
Open_outlet_Tank1	BOOL	PLC-Variable	Write
Close_outlet_Tank1	BOOL	PLC-Variable	Write
Open_outlet_Tank2	BOOL	PLC-Variable	Write
Close_outlet_Tank2	BOOL	PLC-Variable	Write
Open_outlet_Tank3	BOOL	PLC-Variable	Write
Close_outlet_Tank3	BOOL	PLC-Variable	Write
MA ₁ _is_on	BOOL	PLC-Variable	Read
Car_position_DINT	DINT	PLC-Variable	Read
Car_position_REAL	REAL	PLC-Variable	Read
MA ₁ _CCW_direction	BOOL	PLC-Variable	Write



MA1_CW_direction	BOOL	PLC-Variable	Write
MA1_OFF	BOOL	PLC-Variable	Write
Setpoint_MA2	REAL	PLC-Variable	Read/Write
MA2_CCW_direction	BOOL	PLC-Variable	Write
MA2_CW_direction	BOOL	PLC-Variable	Write
MA2_OFF	BOOL	PLC-Variable	Write
Open_outlet_ladle_car	BOOL	PLC-Variable	Write
Close_outlet_ladle_car	BOOL	PLC-Variable	Write
Automatic_start	BOOL	PLC-Variable	Write
Automatic_stop	BOOL	PLC-Variable	Write
MA2_is_ON	BOOL	PLC-Variable	Read
Ladle_car_move_CCW	BOOL	PLC-Variable	Read
Ladle_car_move_CW	BOOL	PLC-Variable	Read



DETAILS TANK 1 – TANK 3



DESCRIPTION	SYMBOL LIBRARY	SYMBOL LIBRARY ITEM
Tank 1 to 3	Tanks	Tank 4
Outlet valve 1 to 3	Valve	Plastic control valve
Pipes and Bend	Segmented Pipes	Segmented pipe / segmented bend

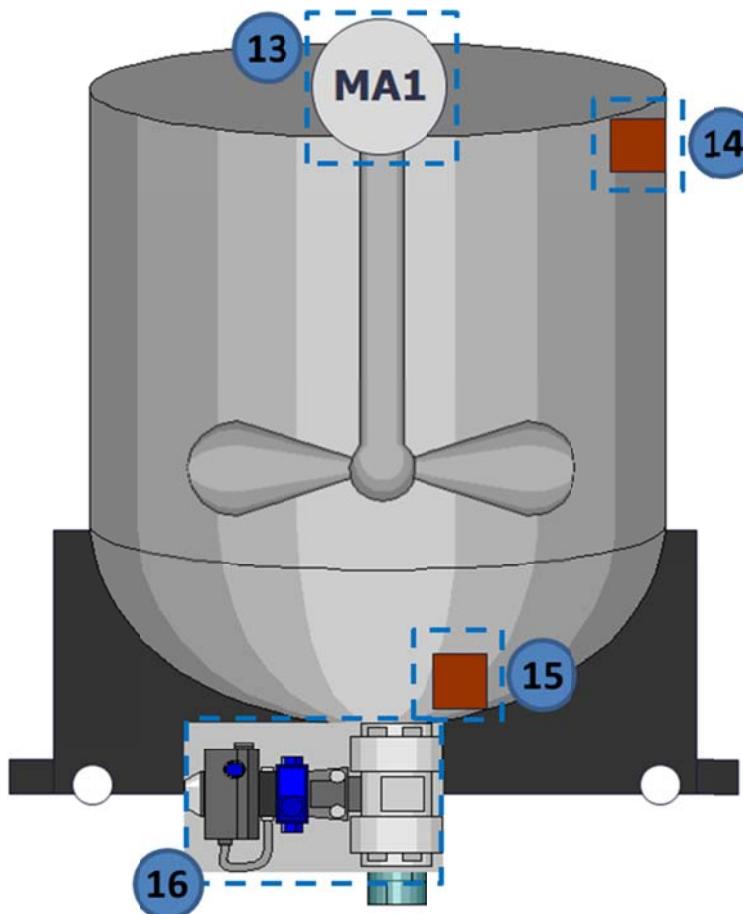
POSITION	VARIABLE	ACTION	COMMENT	
1	P12	Background Control Colour	not actuated	colour = WHITE colour = GREEN
2	P14	Background Control Colour	actuated	colour = WHITE colour = GREEN
3	P16	Background Control Colour	not actuated	colour = WHITE colour = GREEN
4	S12	Background Control Colour	actuated	colour = GREEN colour = BLACK
5	S14	Background Control Colour	not actuated	colour = RED colour = BLACK
6	S16	Background Control Colour	actuated	colour = BLUE colour = BLACK
7	Open_outlet_Tank1	Button control	"State 1" while button is pressed	
8	Close_outlet_Tank1	Button control	"State 1" while button is pressed	
9	Open_outlet_Tank2	Button control	"State 1" while button is pressed	



10	Close_outlet_Tank2	Button control	"State 1" while button is pressed
11	Open_outlet_Tank3	Button control	"State 1" while button is pressed
12	Close_outlet_Tank3	Button control	"State 1" while button is pressed



DETAILS LADLE CAR



DESCRIPTION		SYMBOL LIBRARY		SYMBOL LIBRARY ITEM	
Tank 4		Tanks		Tank 23	
Outlet valve		Valve		Plastic control valve	

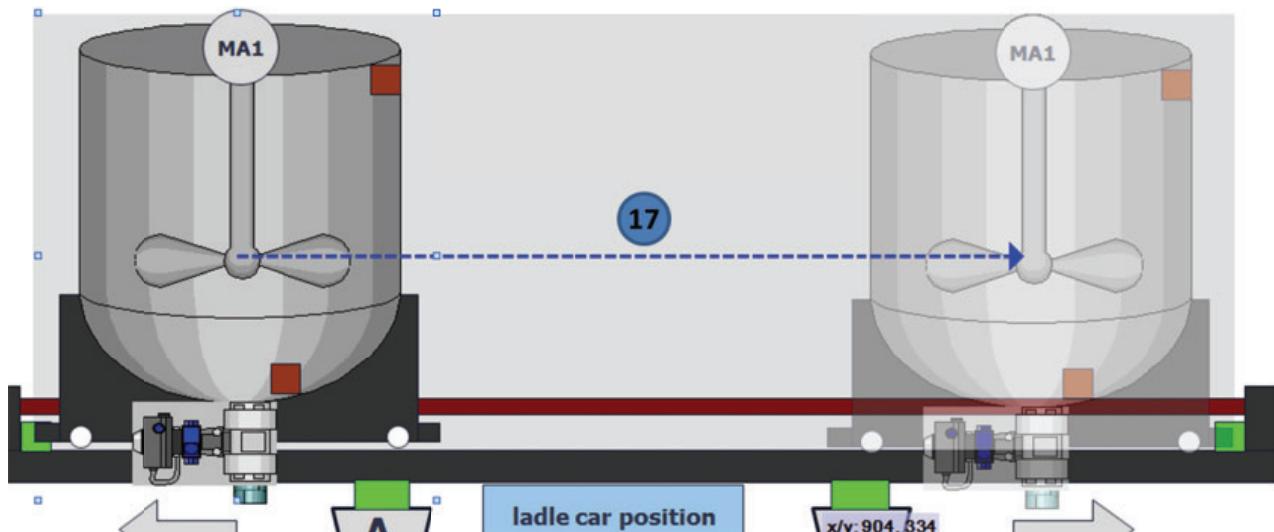
POSITION		VARIABLE		ACTION		COMMENT	
13		MA1_is_ON		Background Control Colour	not actuated actuated	colour = GRAY colour = GREEN	
14		S19		Background Control Colour	not actuated actuated	colour = BROWN colour = RED	
15		S20		Background Control Colour	not actuated actuated	colour = BROWN colour = RED	
16		P17		Background Control Colour	not actuated actuated	colour = GRAY colour = GREEN	



SPECIAL INFORMATION FOR LADLE CAR

Group all objects from the ladle car.

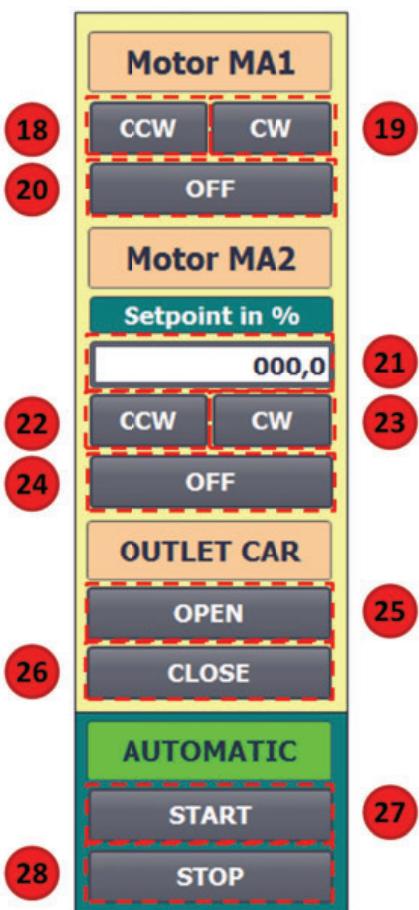
Animate the group with horizontal movement animation.



POSITION	VARIABLE	ACTION	COMMENT
17	Car_position_DINT	Horizontal movement	Start value = 0 End value = 720



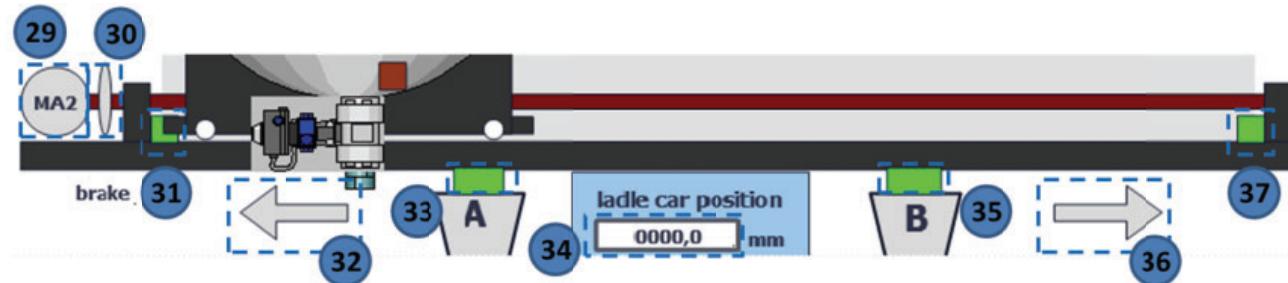
DETAILS CONTROL BOARD



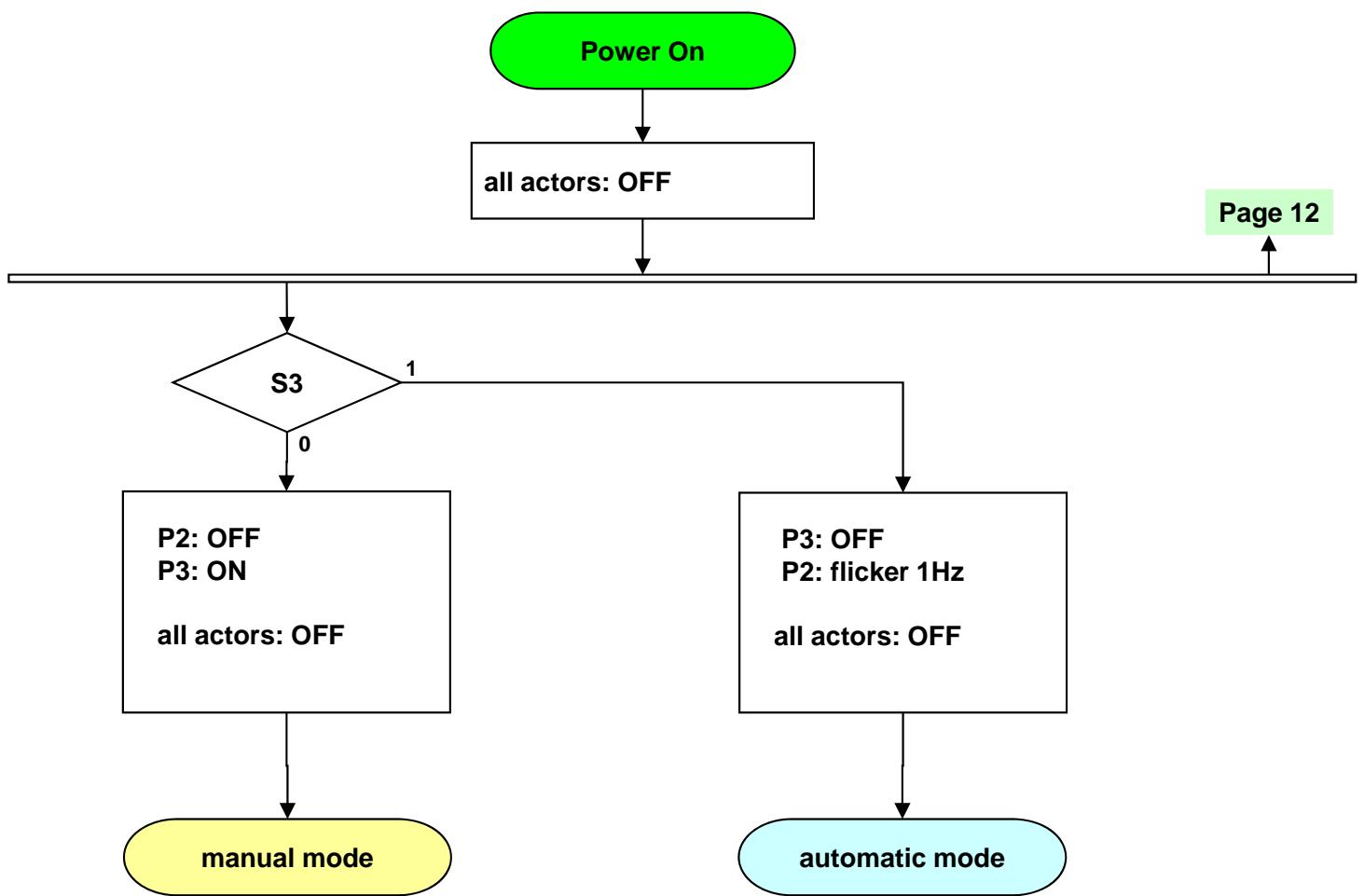
POSITION	VARIABLE	ACTION	COMMENT
18	MA1_CCW_direction	Button control	"State 1" while button is pressed
19	MA1_CW_direction	Button control	"State 1" while button is pressed
20	MA1_OFF	Button control	"State 1" while button is pressed
21	Setpoint_MA2	Input/output field	Value: 0,0 to 100,0
22	MA2_CCW_direction	Button control	"State 1" while button is pressed
23	MA2_CW_direction	Button control	"State 1" while button is pressed
24	MA2_OFF	Button control	"State 1" while button is pressed
25	Open_outlet_ladle_car	Button control	"State 1" while button is pressed
26	Close_outlet_ladle_car	Button control	"State 1" while button is pressed
27	Automatic_start	Button control	"State 1" while button is pressed
28	Automatic_stop	Button control	"State 1" while button is pressed



DETAILS ROADWAY LADLE CAR

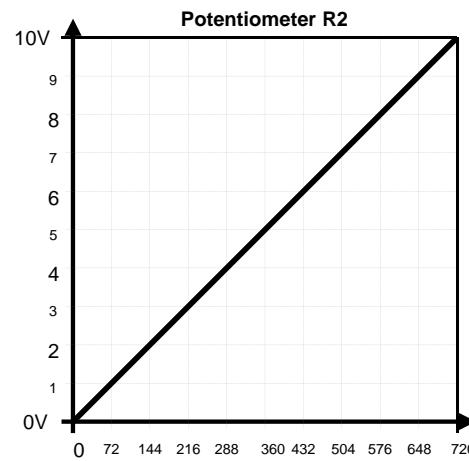
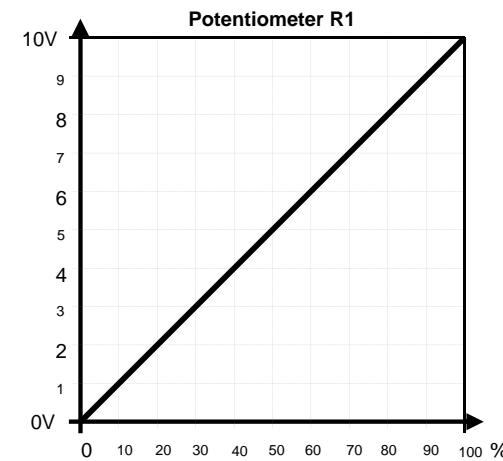
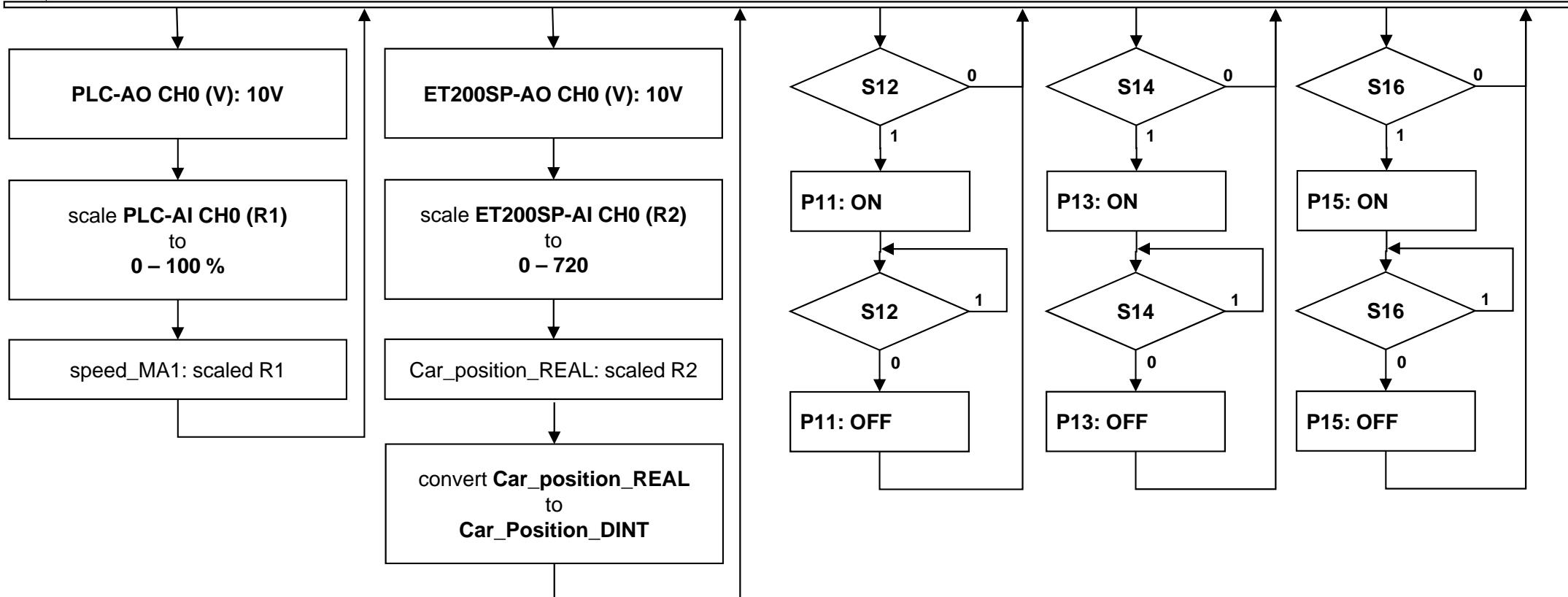


POSITION	VARIABLE	ACTION	COMMENT	
29	MA2_is_on	Background Control Colour	not actuated	colour = GRAY
			actuated	colour = GREEN
30	P20	Background Control Colour	not actuated	colour = GRAY
			actuated	colour = GREEN
31	S21	Background Control Colour	not actuated	colour = GRAY
			actuated	colour = GREEN
32	Ladle_car_move_CCW	Background Control Colour	not actuated	colour = GRAY
			actuated	colour = GREEN
33	S22	Background Control Colour	not actuated	colour = GRAY
			actuated	colour = GREEN
34	Car_position_REAL	Output field	Value: 0,0 to 720,0	
35	S23	Background Control Colour	not actuated	colour = GRAY
			actuated	colour = GREEN
36	Ladle_car_move_CW	Background Control Colour	not actuated	colour = GRAY
			actuated	colour = GREEN
37	S24	Background Control Colour	not actuated	colour = GRAY
			actuated	colour = GREEN



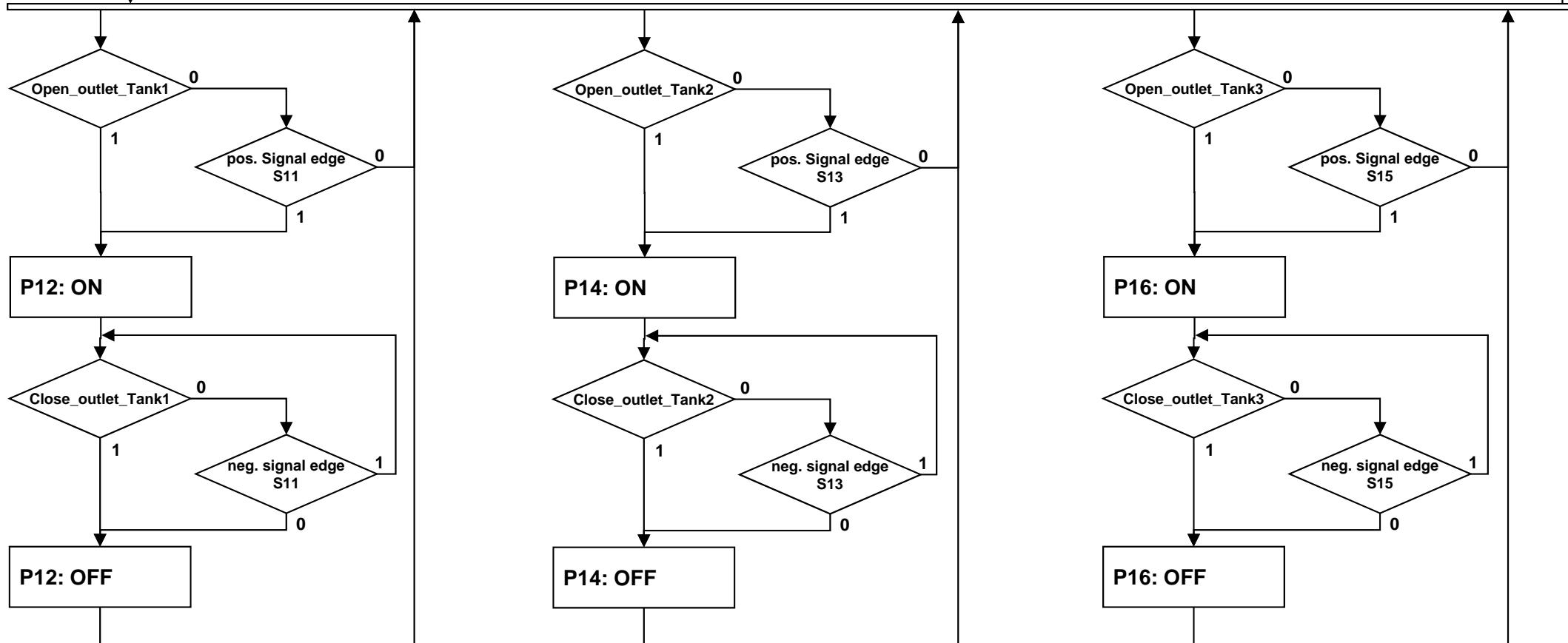
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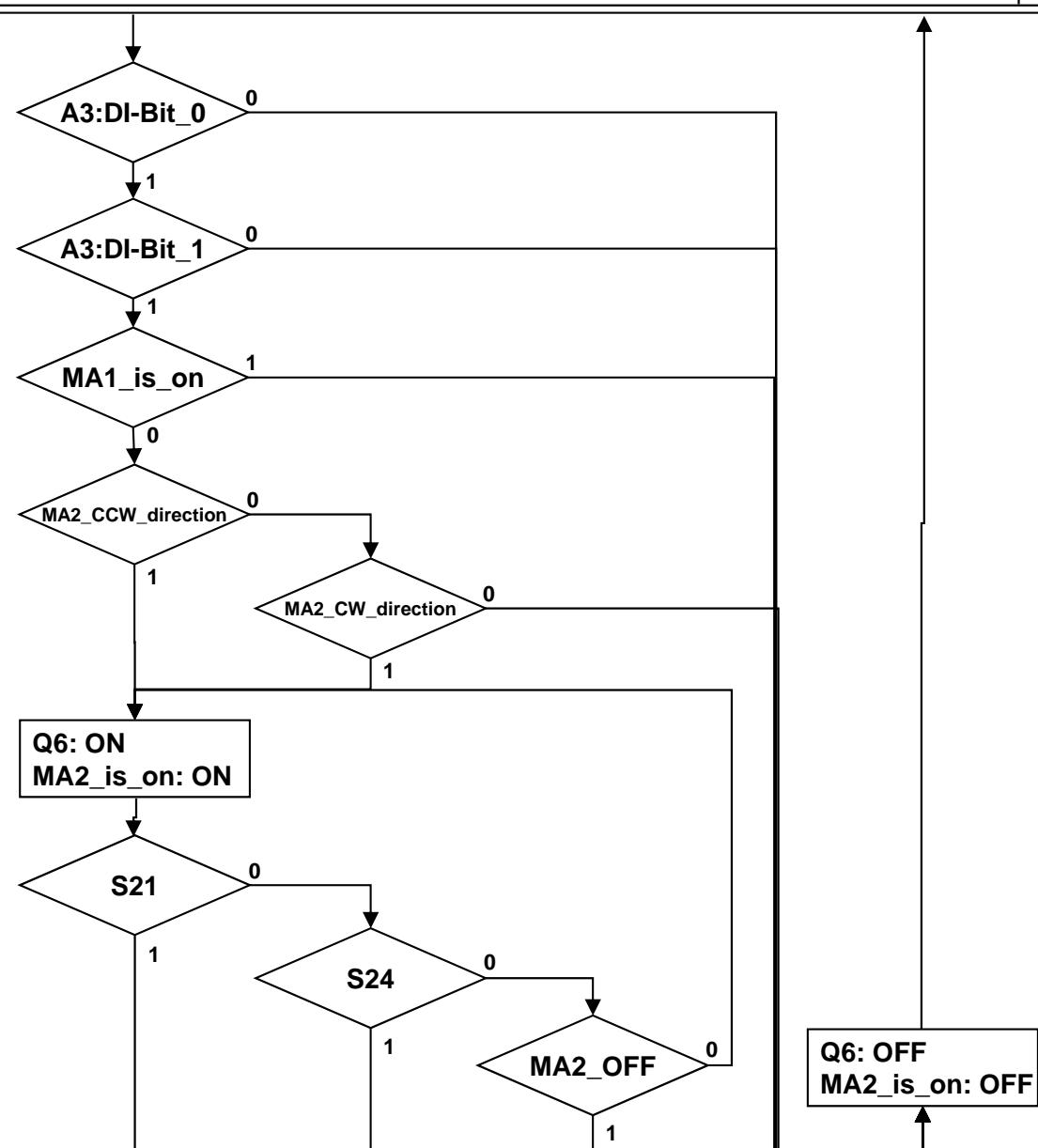
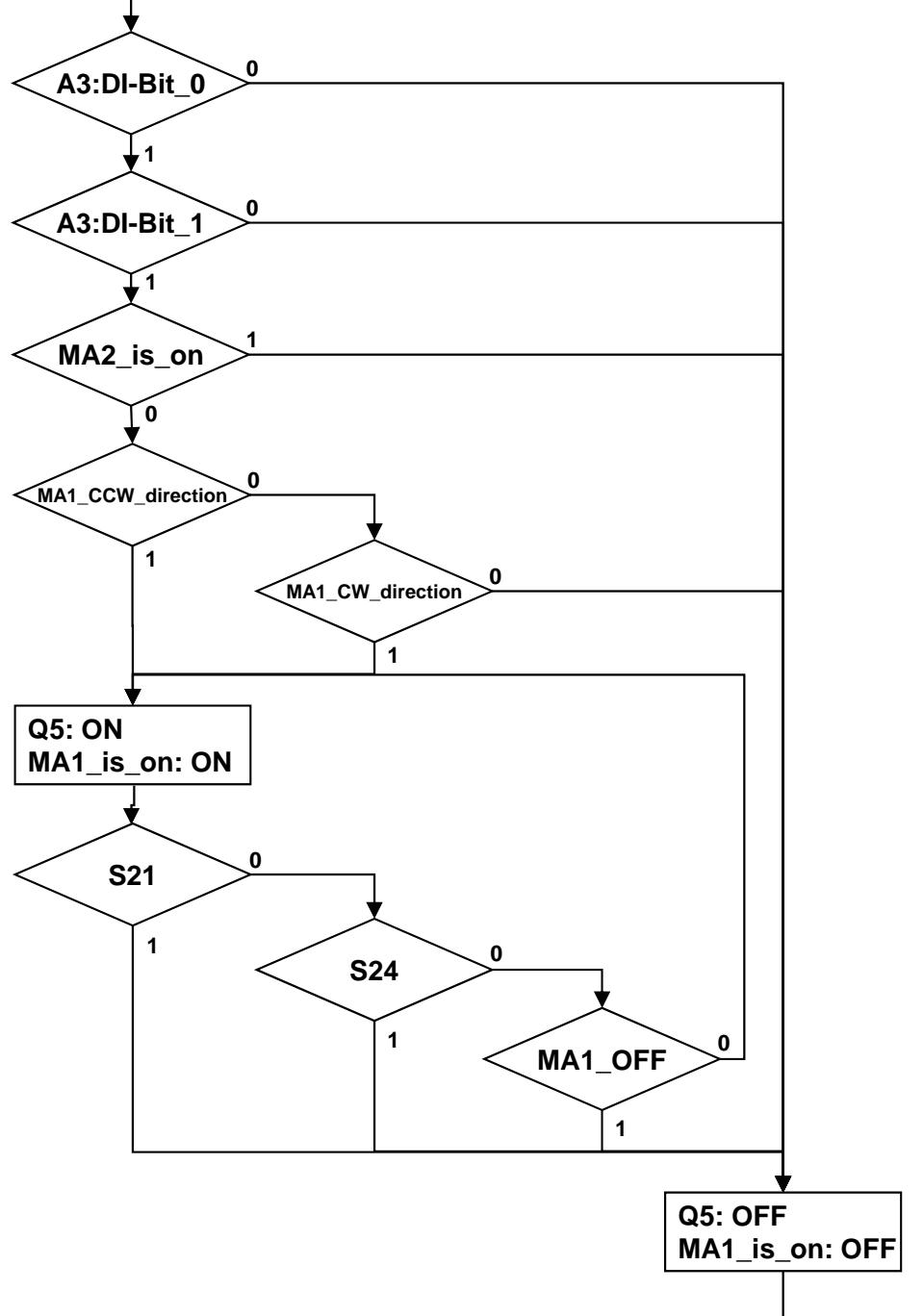
switches, push buttons or other devices **actuated = state “1”** on the function diagram
 switches, push buttons or other devices **not actuated = state “0”** on the function diagram

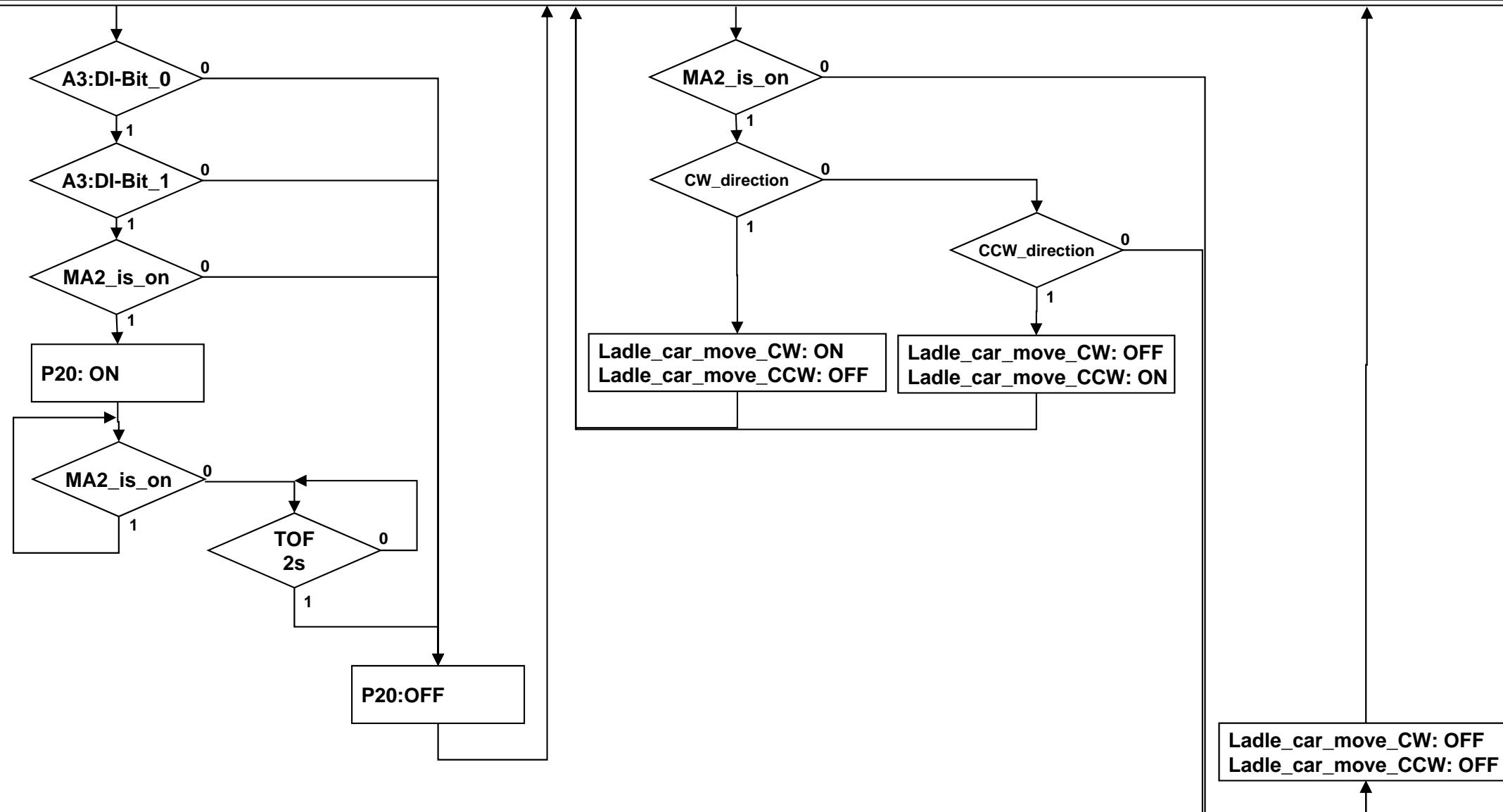


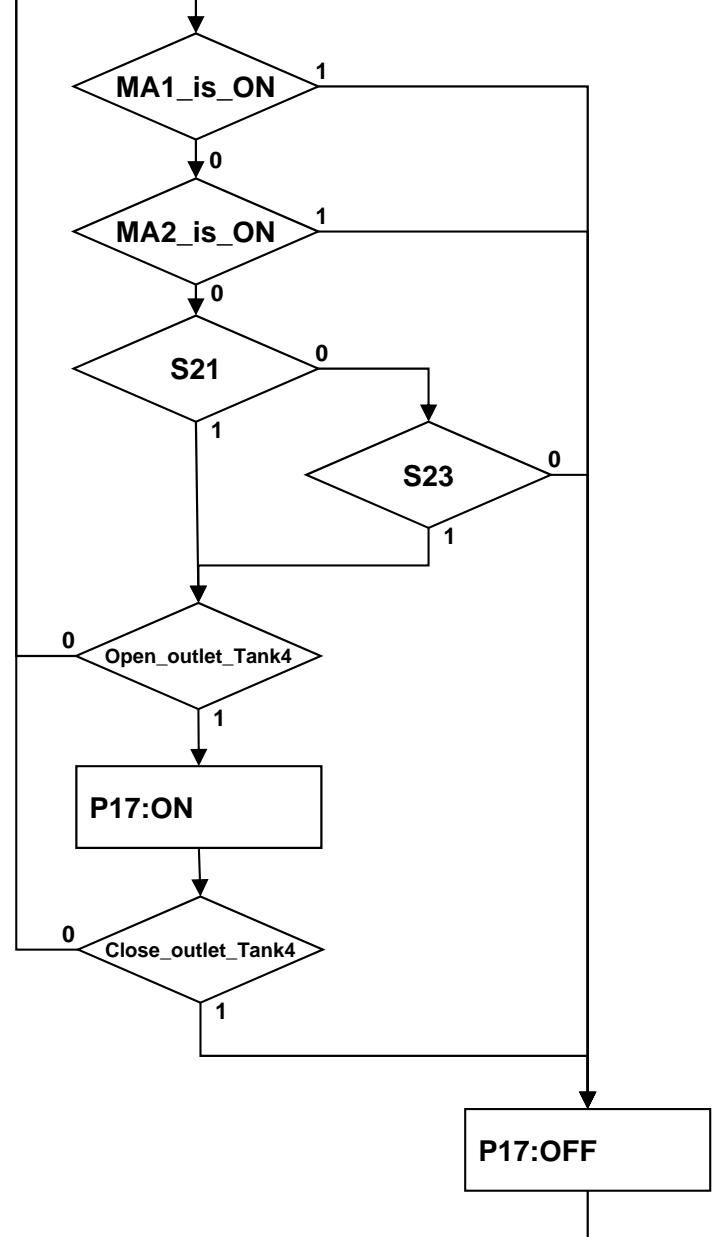
manual mode

Page 14

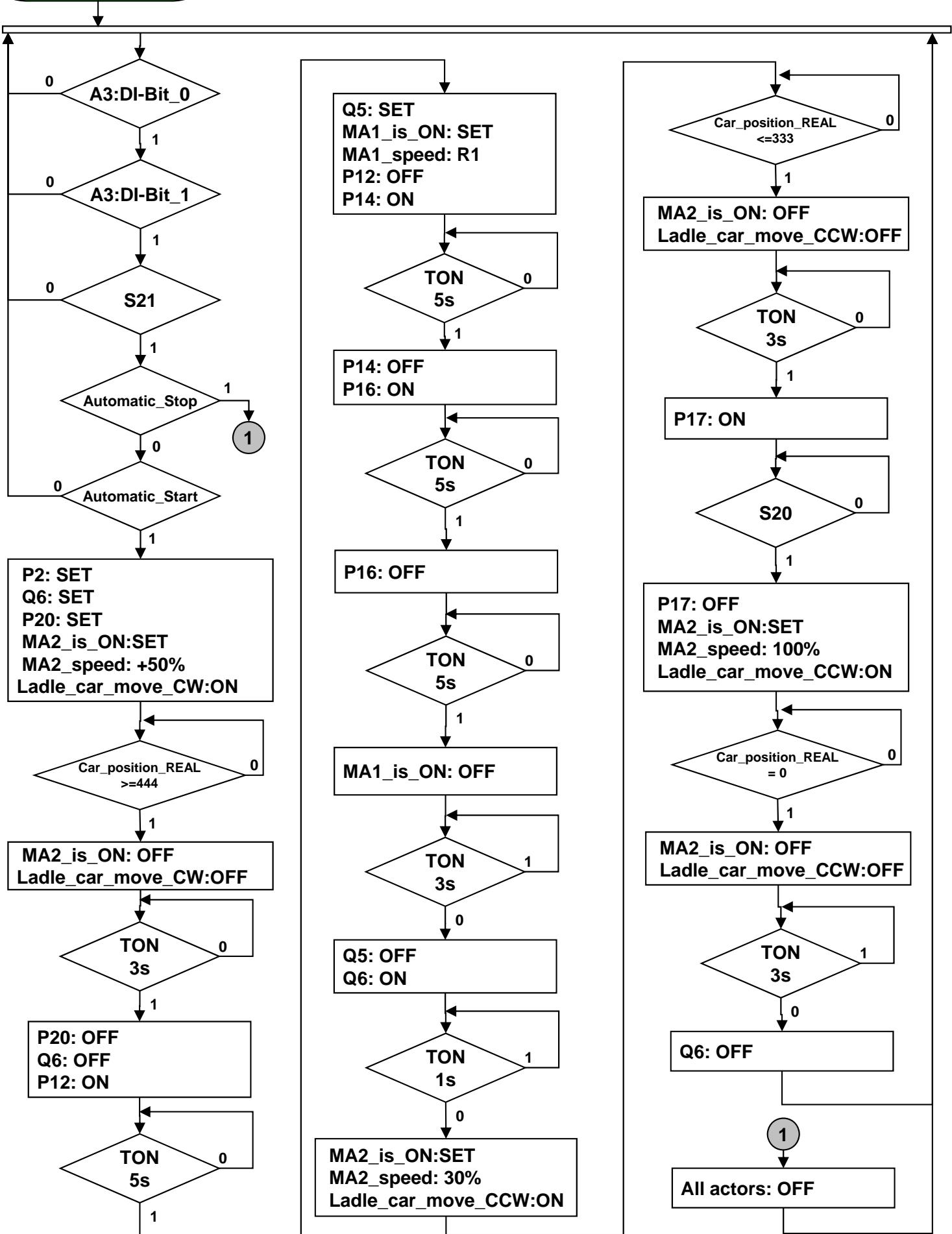








automatic mode





MODULE “FAULT FINDING HARDWARE”

SKILL 19 – INDUSTRIAL CONTROL

Competitor: _____

Country Code: _____

Country Code Experts: _____

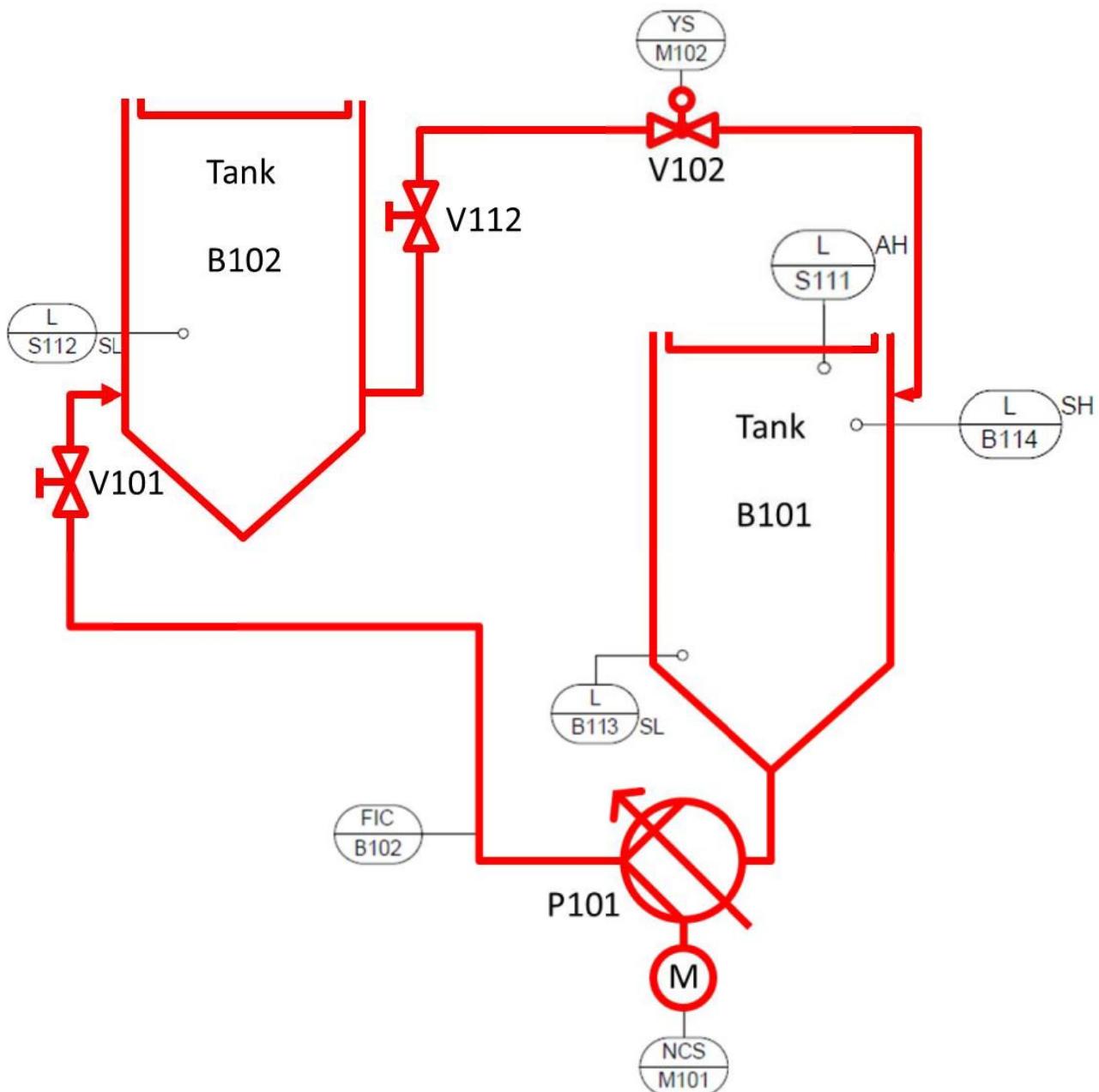


MPS® PA COMPACT WORKSTATION WITH LEVEL, FLOW RATE, PRESSURE AND TEMPERATURE CONTROLLED SYSTEMS.



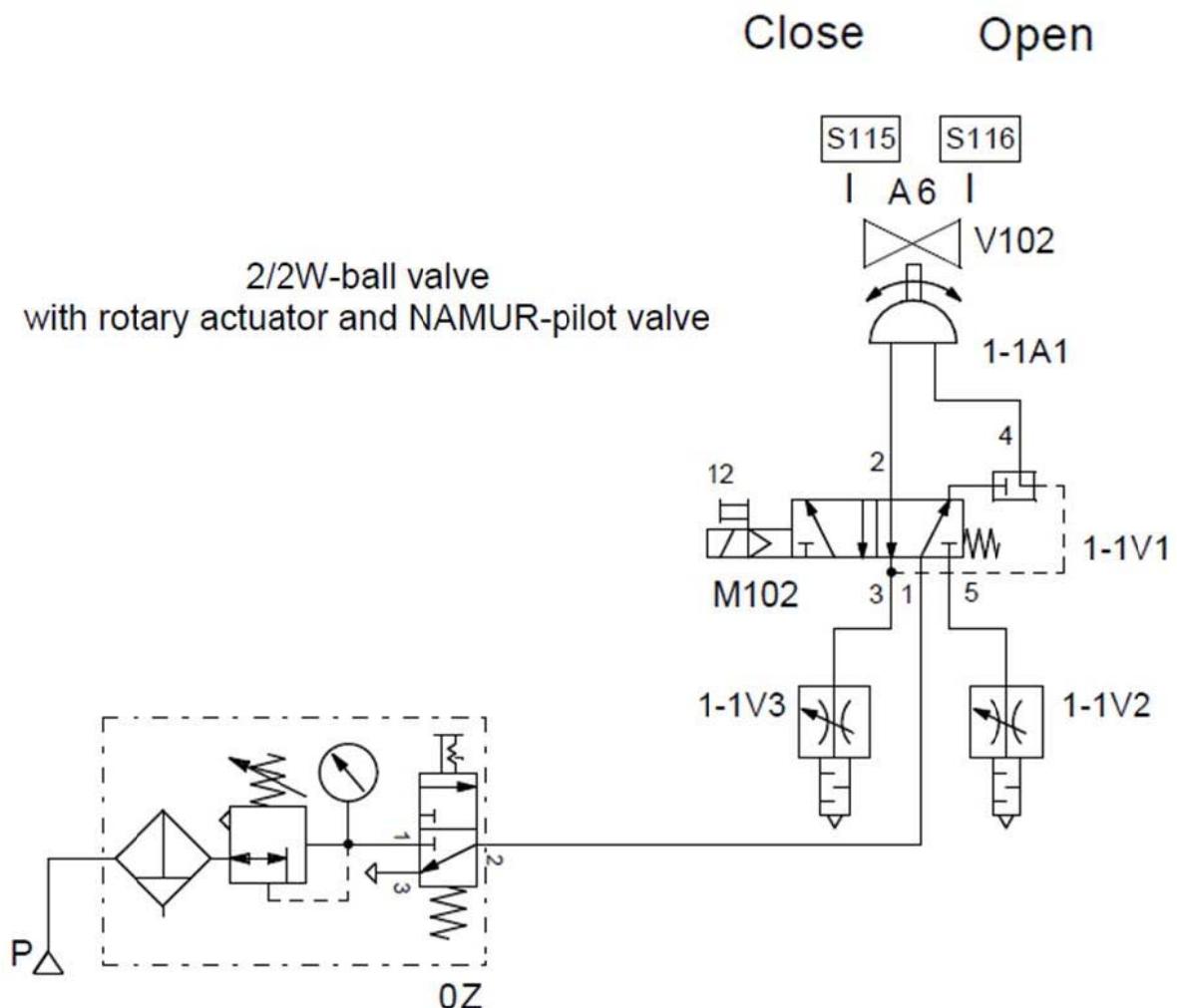


REPRESENTATION OF SYSTEM





PNEUMATIC DIAGRAM

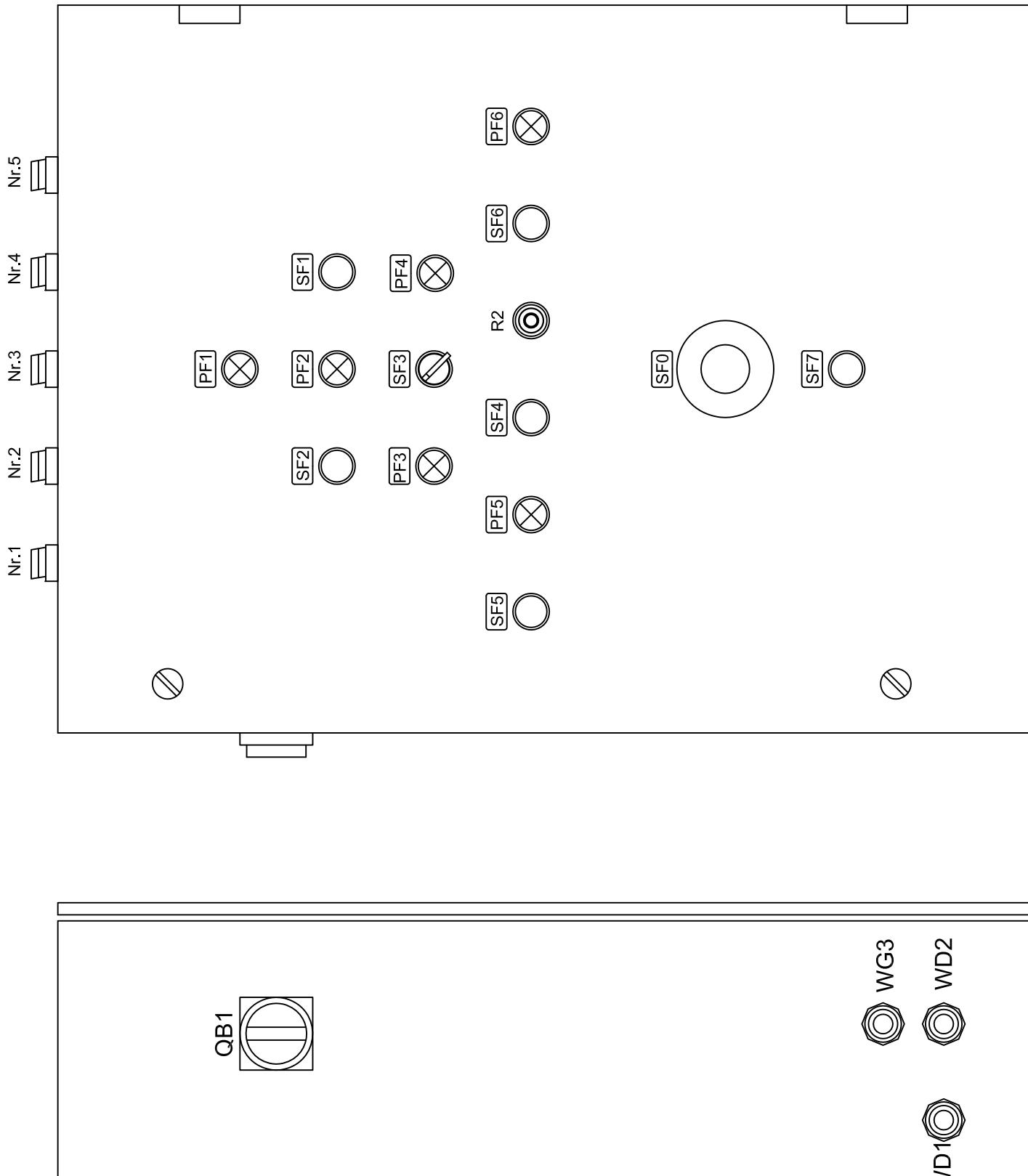


A

B

C

D



WD1 - cable for power supply	SF0 (red)	- Emergency Stop
WD2 - cable control box - MPS-PA workstation	SF1 (red)	- System OFF
WG3 - cable control box - MPS-PA workstation	SF2 (green)	- System ON
	SF3 (black)	- Switch MAN/AUTO
	SF4 (red)	- Pump OFF
	SF5 (black)	- Pump ON
	SF6 (black)	- Valve OPEN
	SF7 (black)	- Reset
	PF1 (red)	- Error
	PF2 (green)	- System ON
	PF3 (Yellow)	- Manual Mode
	PF4 (green)	- Automatic Mode
	PF5 (green)	- Pump ON
	PF6 (green)	- Valve OPEN
R2 (Poti)		- Speed Pump

1	2	3	4	5
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Switch Nr.1 to Nr.5 - Switch with NO and NC contact for the faults

Test Project for the 43rd WorldSkills
Competition in São Paulo, Brazil 2015.
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Skill: Industrial Control TR19

Scale:X:Y Date:19.02.2015 Paper: A4

Drawn / Design by: Andreas Puchner

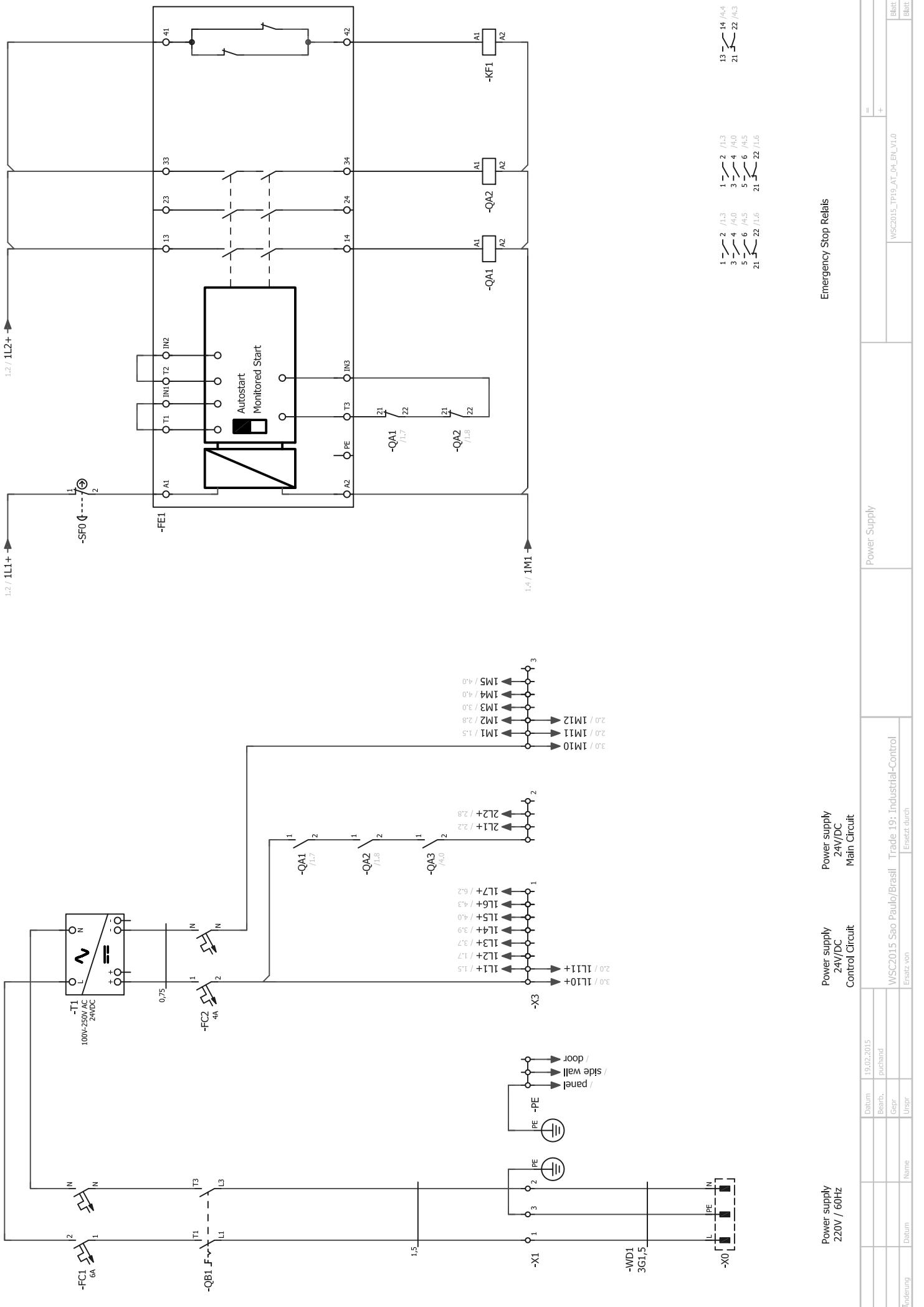
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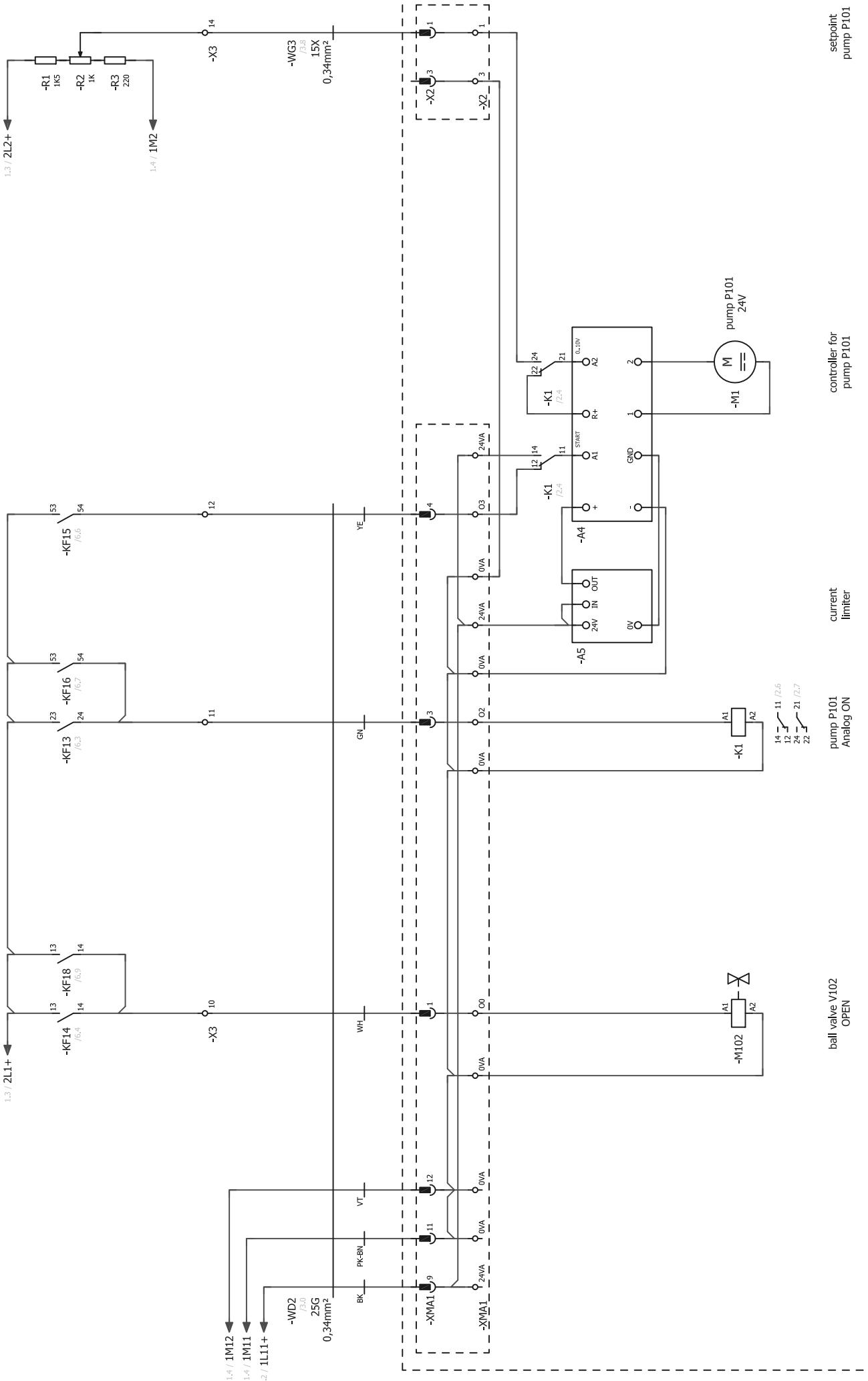
control box

Drawing No: WSC2015_TP19_AT_04_05_EN

Rev: 1.0 Page: 5 of 10

Appd: Andreas Puchner Sign:





PCS COMPACT WORKSTATION

