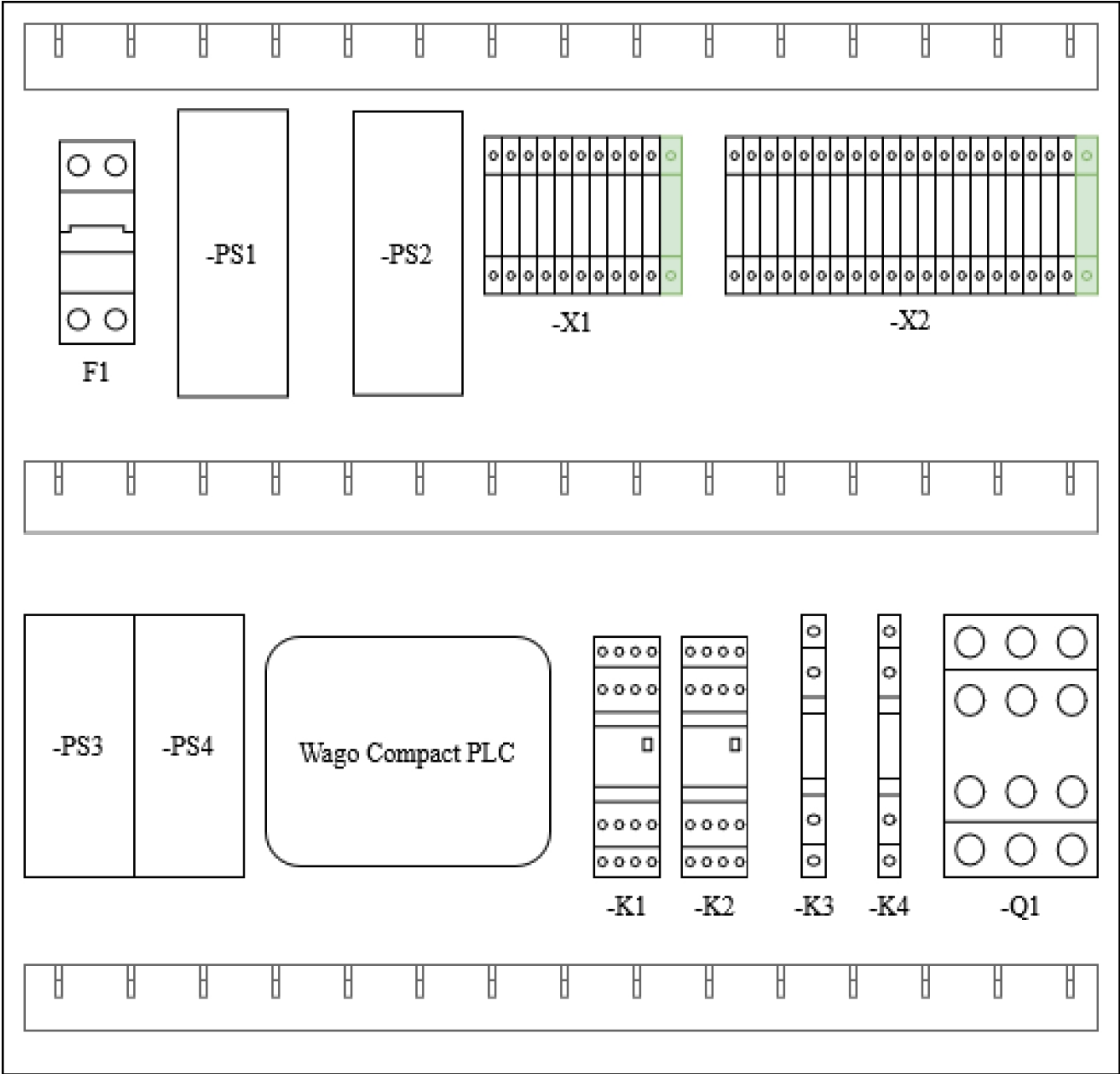


Bil simulator

Layout	1	11
Diagrams	2	12
	3	13
	4	14
	5	15
	6	16
	7	17
	8	18
	9	19
	10	20



- Power Supply

DC terminals

AC terminals

Circuit breaker

Contactor

Relay

Power out

Power plug

10 pins cable

Braking Resistor

Power supply

Programablr logic controller

Human user interface
- PS1...-PS4

-X1

-X2

-F1

-Q1

-K1...-K4

-PO1...-PO3

-PP1...-PP3

-ELCO

-R1...-R3

-PS1...-PS3

-PLC1

-HMI

[illegible]

Component	Article no.	Type	Function	Description	Manufacturer	Position
-PLC1	PCS8920102	PCS-PLC-Com1-2	POWER	Compact plc 8 inputs, 8 outputs, type 2	PCSCHEMATIC	/PLC1.1
-W1	PCS330005	PCS-CBLS01		3 conductors with screen	--	/servo motor.1
-W2	--	--		3 conductors with screen	--	/servo motor.4
-W4	PCS330006	PCS-CBLS02		4 conductors with screen	--	/servo motor.2
-W5	PCS330005	PCS-CBLS01		3 conductors with screen	--	/servo motor.3
-W6	--	--		3 conductors with screen	--	/servo motor.5
-W7	PCS330008	PCS-CBLS04		6 conductors with screen	--	/Control Station Enclosure.3
-W16	PCS330005	PCS-CBLS01		3 conductors with screen	--	/ETHERCAT topology diagram.2
-W20	--	--		3 conductors with screen	--	/HMI.8
-X2	PCS212001	PCS-XX1GY		1 layer Through terminal - 1 x 1 in 1 out GY	--	/Terminals.7
-DC_M						/DC-motor.4
-ELCO						/Elco cable.3
-F1						/Motor Control Center (MCC).2
-HMI						/HMI.8
-JB						/Elco cable.5
-K1						/DC-motor.5
-K2						/DC-motor.4
-K3						/Motor Control Center (MCC).7
-K4						/Motor Control Center (MCC).8
-LS1						/EMG stop motors.1
-LS2						/EMG stop motors.4
-LS3						/EMG stop motors.7
-LS4						/DC-motor.8
-M1						/ETHERCAT topology diagram.3
-M2						/ETHERCAT topology diagram.5
-M3						/ETHERCAT topology diagram.6
-P1						/Elco cable.2

Project title:	Bil simulator	Project no.:	1.0.3	Project rev.:	Page	Components List
Customer:	NTNU	DCC:			Scale:	1:1
Page title:	Components list	Dwg. no.:		Page rev.:	Previous page:	PLC_list
File name:	bil_simulator	Eng. (proj/page):	Gruppe 1	Last print:	6/1/2025	Next pageComponents List1
Page ref.:		Appr. (date/init):		Last edit:	5/31/2025	Total no. of pages: 27

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Component	Article no.	Type	Function	Description	Manufacturer	Position
-PC						/Motor Control Center (MCC).8
-PO1						/230 V AC Power Supply.4
-PO2						/230 V AC Power Supply.4
-PO3						/230 V AC Power Supply.4
-PP1						/EMG stop motors.2
-PP2						/EMG stop motors.4
-PP3						/EMG stop motors.7
-PS1						/Motor Control Center (MCC).2
-PS2						/Motor Control Center (MCC).2
-PS3						/Motor Control Center (MCC).3
-PS4						/Motor Control Center (MCC).4
-Q1						/Motor Control Center (MCC).4
-R1						/servo motor.1
-R2						/servo motor.3
-R3						/servo motor.4
-S0						/Elco cable.3
-S1						/Elco cable.2
-S2						/Elco cable.2
-S5						/Control Station Enclosure.4
-S6						/Control Station Enclosure.4
-S01						/EMG stop motors.5
-S02						/EMG stop motors.2
-S03						/EMG stop motors.8
-S04						/EMG stop motors.2
-SW1						/Elco cable.8
-W2						/servo motor.2
-W9						/Elco cable.1
-W10						/Elco cable.4

Project title:	Bil simulator	Project no.:	1.0.3	Project rev.:		Page	Components List1
Customer:	NTNU	DCC:				Scale:	1:1
Page title:	Components list	Dwg. no.:		Page rev.:		Previous page	Components List
File name:	bil_simulator	Eng. (proj/page):	Gruppe 1	Last print:	6/1/2025	Next page	Components List2
Page ref.:		Appr. (date/init):		Last edit:	5/31/2025	Total no. of pages:	27

[illegible]

FROM	TO	Wire no	Signal	Cable	Jumper	Line name	Line type	Routing class
-X1:1	-X1:1		-X1:1					
-X1:1	-X1:1		-X1:1					
-R1:1	-M1:PD							
-X2:5	-JB:1		L1					
-M1:L1	-M2:L1		L1	-W1:L1				
-M2:L1	-M3:L1		L1	-W2:L1				
-JB:1	-X2:6		L1					
-JB:1	-M1:L1		L1	-W1:L1				
-JB:1	-JB:1		L1					
-X2:4	-X2:5		L1					
-X1:1	-PP1:+24			-W13:2				
-LS1:3	-X1:1							
-LS1:4	-PP1:DO:07							
-X2:5	-F1:4							
-F1:4	-Q1:3							
-Q1:3	-X2:5							
-X2:4	-F1:2							
-F1:2	-Q1:1							
-Q1:1	-X2:4							
-M1:N	-M2:N		N	-W1:N				
-M2:N	-M3:N		N	-W2:N				
-JB:2	-X2:7		N	-W10:9				
-JB:2	-M1:N		N	-W12:2				
-JB:2	-JB:2		N	-W11:2				
-M1:PE	-M2:PE		PE	-W1:PE				
-M2:PE	-M3:PE		PE	-W2:PE				
-X2	-X2		PE	-W7:7				
-X2:PE	-PLC1:PE		PE					

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FROM	TO	Wire no	Signal	Cable	Jumper	Line name	Line type	Routing class
-M3:PE	-X2		PE	-W2:PE				
-JB:3	-ELCO:10		PE	-W10:10				
-JB:3	-M1:PE		PE	-W12:3				
-JB:3	-JB:3		PE	-W11:3				
-PLC1:PE	-JB:3		PE	-W11:3				
-HMI:PE	-X2:PE		PE	-W20:GNYE				
-X1:1	-PS1:+		+24V					
-X1:5	-PS3:+		+24V					
-X1:5	-M3:WH		+24V	-W6:WHITE				
-X1:7	-X1:5		+24V					
-M1:BR+BL	-X1:5		+24V	-W4:TWO WIRE				
-M1:BR+BL	-M2:BR+BL		+24V	-W4:TWO WIRE				
-M1:WH	-X1:7		+24V	-W4:WHITE				
-M1:WH	-M2:WH		+24V	-W4:WHITE				
-PS1:+	-PS1:+		+24V					
-PS1:+	-PS4:+		+24V					
-PS2:+	-PS3:+		+24V					
-PS2:+	-PS4:+		+24V					
-M2:BR+BL	-M3:BR+BL		+24V	-W5:TO WIRE				
-M2:WH	-M3:WH		+24V	-W5:WHITE				
-PS3:+	-Q1:5		+24V					
-K2:12	-K1:12		+24V					
-Q1:5	-HMI:+24V		+24V	-W20:BK				
-M3:WH	-M3:BR+BL		+24V	-W6:WHITE				
-K1:12	-LS4:1		+24V					
-SW1:1	-SW1:3		+24V					
-LS4:1	-SW1:3		+24V					
-HMI:+24V	-K2:12		+24V	-W20:BK				

Project title:	Bil simulator	Project no.:	1.0.3	Project rev.:		Page	Conection L1st1
Customer:	NTNU	DCC:				Scale:	1:1
Page title:	Connection list	Dwg. no.:		Page rev.:		Previous page	Conection L1st
File name:	bil_simulator	Eng. (proj/page):	Gruppe 1	Last print:	6/1/2025	Next page:	Conection L1st2
Page ref.:		Appr. (date/init):		Last edit:	5/31/2025	Total no. of pages:	27

FROM	TO	Wire no	Signal	Cable	Jumper	Line name	Line type	Routing class
-SW1:2	-X1:7		+24V					
-SW1:3	-SW1:2		+24V					
-X1:4	-PS1:-		0V					
-X1:6	-PS3:-		0V					
-X1:6	-M3:BU		0V	-W6:BLUE				
-M1:BU	-X1:6		0V	-W4:BLUE				
-M1:BU	-M2:BU		0V	-W4:BLUE				
-PS1:-	-PS1:-		0V					
-PS1:-	-PS4:-		0V					
-PS2:-	-PS3:-		0V					
-PS2:-	-PS4:-		0V					
-PS2:-	-PS3:-		0V					
-M2:BU	-M3:BU		0V	-W5:BLUE				
-PS3:-	-PS3:-		0V					
-PS3:-	-HMI:-0V		0V	-W20:BN				
-K2:14	-K1:14		0V					
-K1:14	-SW1:2		0V					
-SW1:3	-SW1:2		0V					
-SW1:3	-SW1:1		0V					
-SW1:3	-X1:6		0V					
-HMI:-0V	-K2:14		0V	-W20:BN				
-X1:7	-PS2:+							
-PS2:+	-PS3:+							
-R1:2	-M1:BO							
-X1:4	-X1:4		-X1:4					
-PLC1:out	-M1:in							
-X1:5	-X1:5		-X1:5					
-ELCO:1	-P1:2							

FROM	TO	Wire no	Signal	Cable	Jumper	Line name	Line type	Routing class
-P1:2	-S2:13							
-S2:13	-S1:13							
-X1:6	-X1:6		-X1:6					
-X1:7	-X1:7		-X1:7					
-F1:1	-PS2:L							
-PS1:L	-PS2:L							
-PS2:L	-PS3:L							
-PS3:L	-PS4:L							
-F1:3	-PS2:N							
-PS1:N	-PS2:N							
-PS2:N	-PS3:N							
-PS3:N	-PS4:N							
-P1:1	-ELCO:2			-W9:2				
-PS1:PE	-PS2:PE							
-PS2:PE	-PS3:PE							
-PS3:PE	-PS4:PE							
-X1:10	-X1:10		-X1:10					
-PP1:L1	-X2:11			-W13:4				
-X2:10	-PP1:N			-W13:3				
-X2:10	-S04:2							
-S2:14	-ELCO:3			-W9:3				
-S02:1	-X2:11							
-S04:1	-S02:2							
-S1:14	-ELCO:4			-W9:4				
-K2:24	-K1:A1							
-R2:1	-M2:PD							
-X2:10	-ELCO:5							
-X2:2	-X2:2		-X2:2					

FROM	TO	Wire no	Signal	Cable	Jumper	Line name	Line type	Routing class
-X2:2	-X2:2		-X2:2					
-X2:2	-X2:2		-X2:2					
-X2:2	-X2:2		-X2:2					
-X2:3	-X2:3		-X2:3					
-X2:3	-X2:3		-X2:3					
-X2:3	-X2:3		-X2:3					
-X2:3	-X2:3		-X2:3					
-S0:1	-X2:10			-W9:5				
-S0:2	-X2:11			-W9:6				
-R2:2	-M2:BO							
-X2:2	-PO1:1							
-X2:3	-PO1:2							
-X2:2	-PO2:1							
-X2:3	-PO2:2							
-X2:2	-PO3:1							
-X2:3	-PO3:2							
-X2:12	-S5:1							
-X2:13	-S6:3			-W7:2				
-X2:13	-S5:2			-W7:2				
-X2:14	-S6:4			-W7:3				
-X2:14	-P1:1			-W7:4				
-X2:7	-P1:2			-W7:5				
-K1:24	-K2:A1							
-M1:out	-M2:in							
-X2:11	-ELCO:6							
-X1:2	-PP2:+24			-W14:2				
-LS2:3	-X1:2							
-LS2:4	-PP2:DO:03							

FROM	TO	Wire no	Signal	Cable	Jumper	Line name	Line type	Routing class
-X2:6	-ELCO:8							
-Q1:2	-X2:2							
-K2:11	-DC_M:1							
-Q1:4	-X2:3							
-R3:1	-M3:PD							
-X2:7	-ELCO:9							
-R3:2	-M3:BO							
-PP2:L1	-X2:9			-W14:4				
-X2:8	-PP2:N			-W14:3				
-X2:8	-S01:2							
-Q1:13	-X2:6							
-Q1:14	-X2:7							
-DC_M:2	-K1:11			-W21				
-PLC1:+	-X1:10							
-M2:out	-M3:in							
-PLC1:-	-X1:1							
-S01:1	-X2:9							
-X2:7	-X2:7		-X2:7					
-X2:7	-X2:7		-X2:7					
-Q1:A1	-X2:14							
-Q1:A2	-X2:7							
-X2:5	-X2:4		L2					
-X2:6	-X2:6		-X2:6					
-X1:2	-PP3:+24			-W15:2				
-LS3:3	-X1:2							
-LS3:4	-PP3:DO:05							
-X2:13	-X2:13		-X2:13					
-X2:14	-X2:14		-X2:14					

[illegible]

Terminal	Cable	Conn. component (ext.)
-JB:1		
-JB:2		
-JB:3		
-X1:1		-LS1:3
-X1:2		-LS2:3
-X1:2		-LS3:3
-X1:5		
-X1:6		
-X1:7		
-X1:10		-PLC1:+
-X1:1		-PLC1:-
-X1:1		-X1:1
-X1:1		-X1:1
-X1:4		-X1:4
-X1:7		-X1:7
-X1:5		-X1:5
-X1:6		-X1:6
-X1:1		-X1:1
-X1:2		
-X1:3		
-X1:4		-X1:4
-X1:5		-X1:5
-X1:6		-X1:6
-X1:7		-X1:7
-X1:8		
-X1:9		
-X1:10		-X1:10

Terminal	Cable	Conn. component (ext.)
-X1:11		
-X1:12		
-X1:PE		
-X2:10		-S04:2
-X2:11		
-X2:11		-S02:1
-X2:12		
-X2:9		-S01:1
-X2:13		-X2:13
-X2:8		-S01:2
-X2:14		-X2:14
-X2:9		-S03:1
-X2:15		
-X2:10		-S03:2
-X2:16		
-X2:5		L1
-X2:17		
-X2:4		-X2:5
-X2:5		-Q1:3
-X2:4		-Q1:1
-X2:14		
-X2:7		
-X2:12		
-X2:1		
-X2:13		
-X2:2		-X2:2
-X2:14		



Project title:	Bil simulator	Project no.:	1.0.3	Project rev.:		Page	terminal list
Customer:	NTNU	DCC:				Scale:	1:1
Page title:	Terminal list - External connections	Dwg. no.:		Page rev.:		Previous page:	Connection List6
File name:	bil_simulator	Eng. (proj/page):	Gruppe 1	Last print:	6/1/2025	Next page:	terminal list1
Page ref.:		Appr. (date/init):		Last edit:	5/31/2025	Total no. of pages:	27

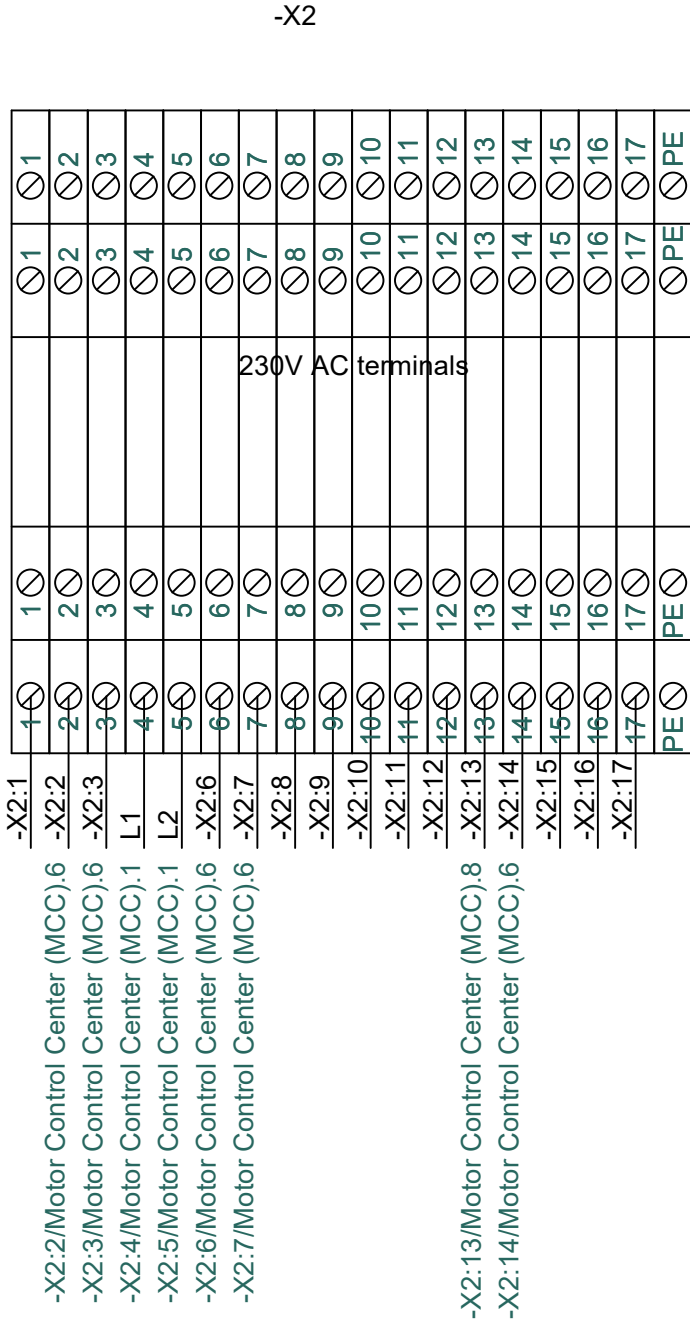
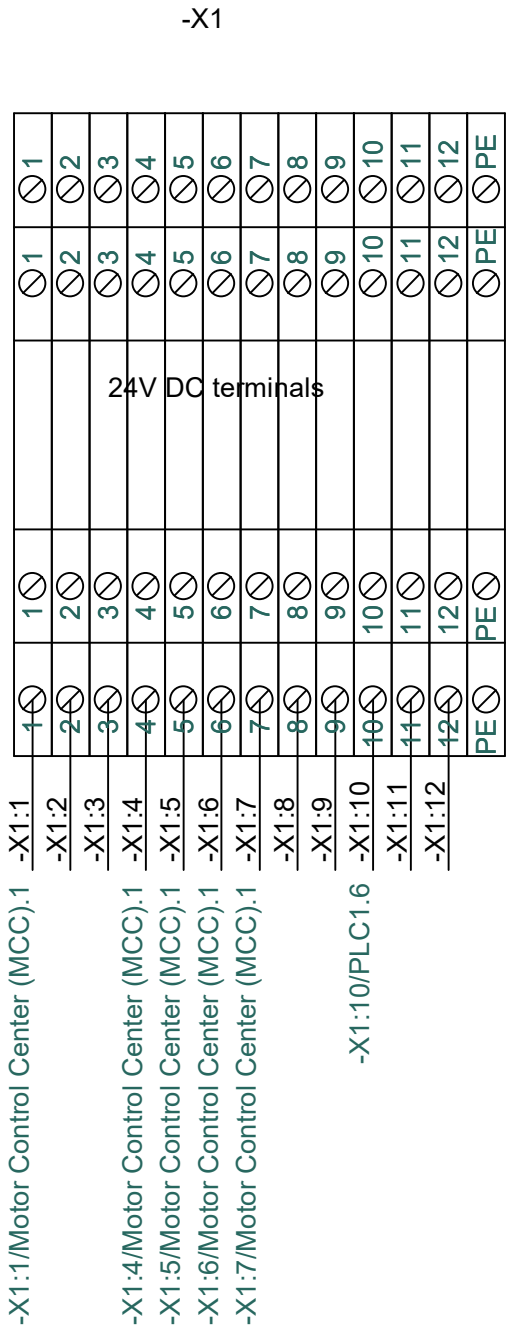
Terminal	Cable	Conn. component (ext.)
-X2		
-X2:3		-X2:3
-X2:2		-X2:2
-X2:4		L1
-X2:3		-X2:3
-X2:5		-X2:4
-X2:2		-X2:2
-X2:2		-X2:2
-X2:6		-X2:6
-X2:3		-X2:3
-X2:3		-X2:3
-X2:7		-X2:7
-X2:2		-X2:2
-X2:2		-X2:2
-X2:8		
-X2:3		-X2:3
-X2:3		-X2:3
-X2:9		
-X2:10		
-X2:PE		PE
-X2:PE		
-X2:6		-Q1:13
-X2:7		-Q1:14
-X2:3		-Q1:4
-X2:2		-Q1:2
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-X2:7		-Q1:A2
-X2:13		-K4:11

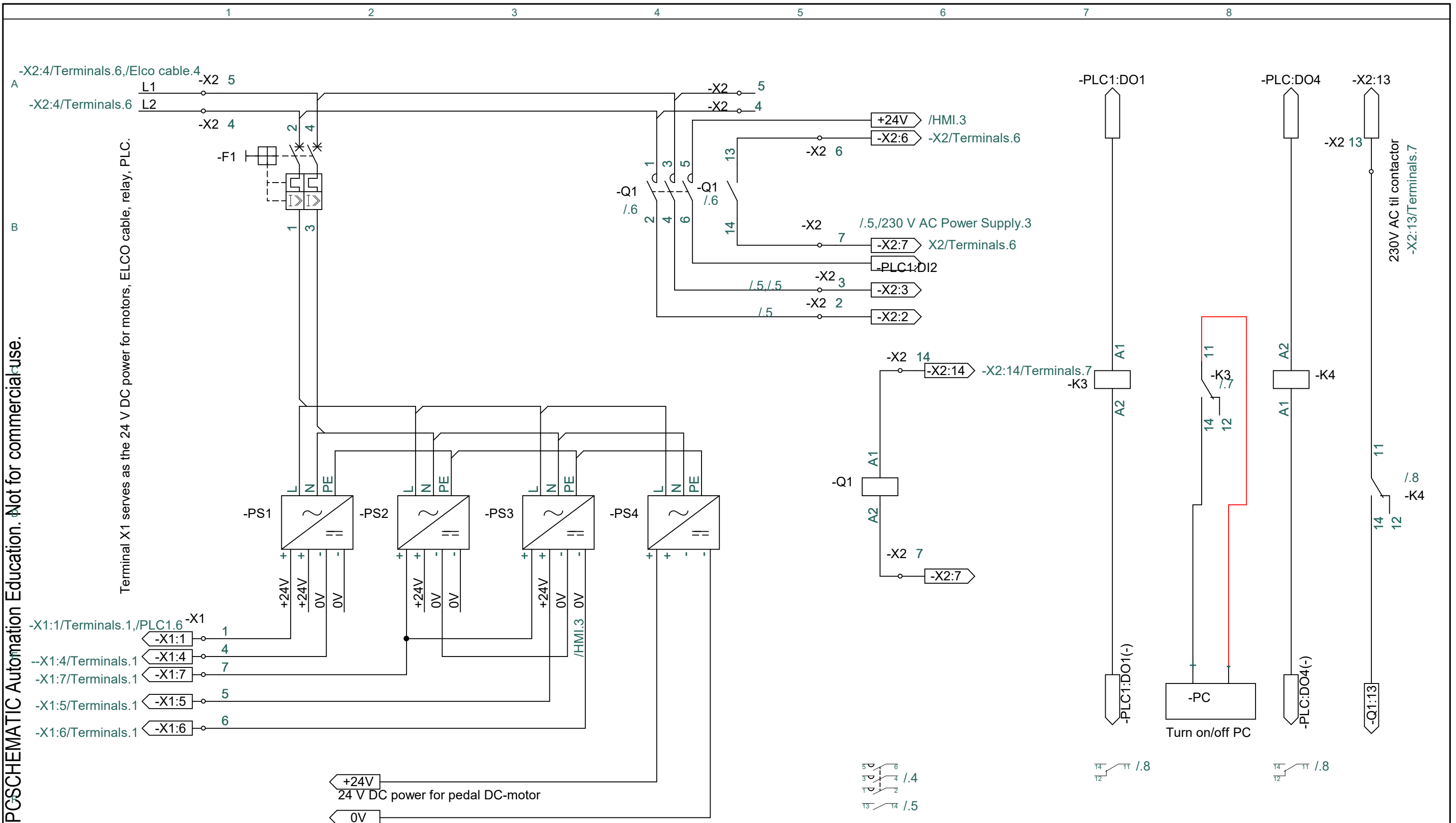
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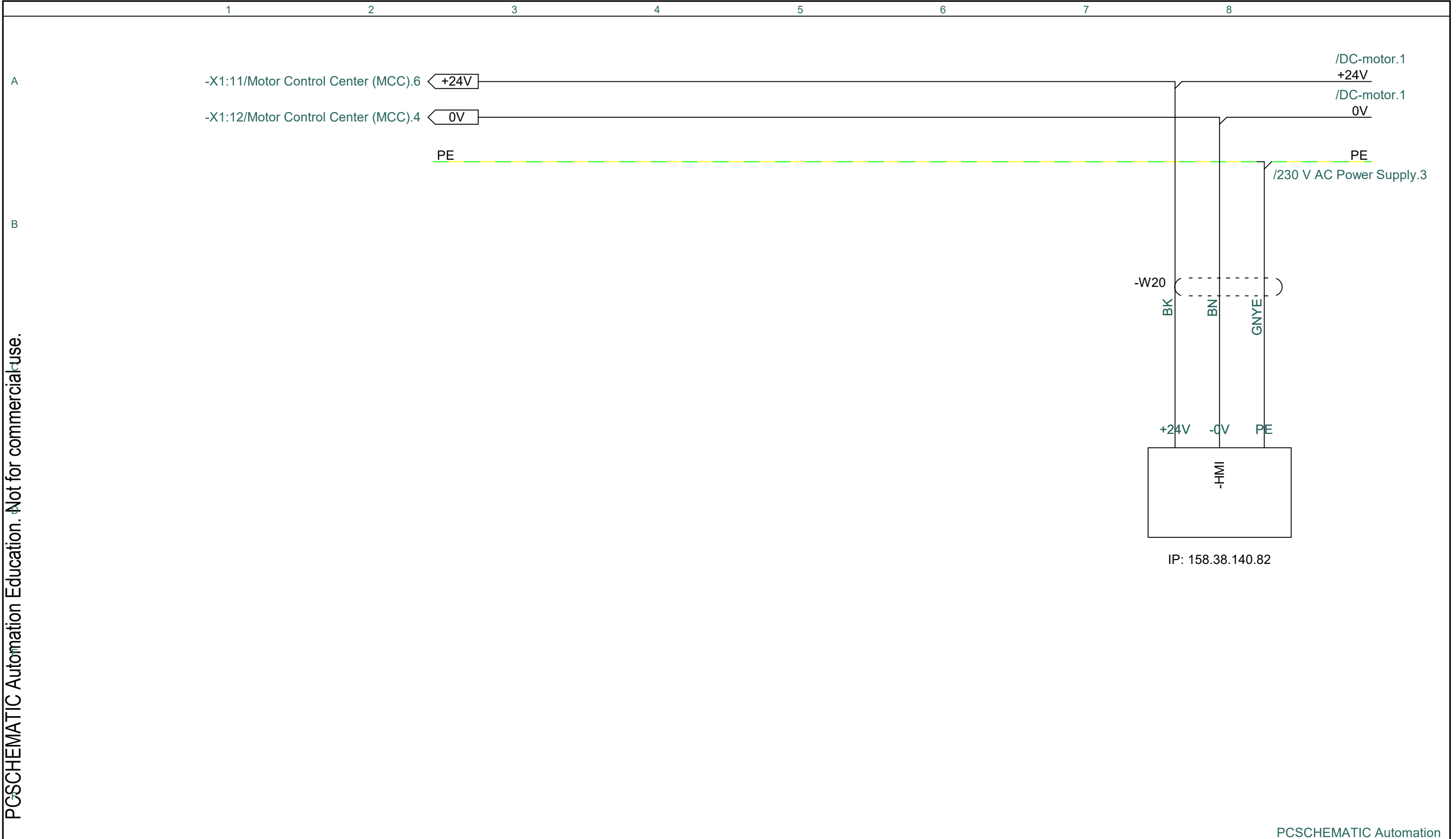
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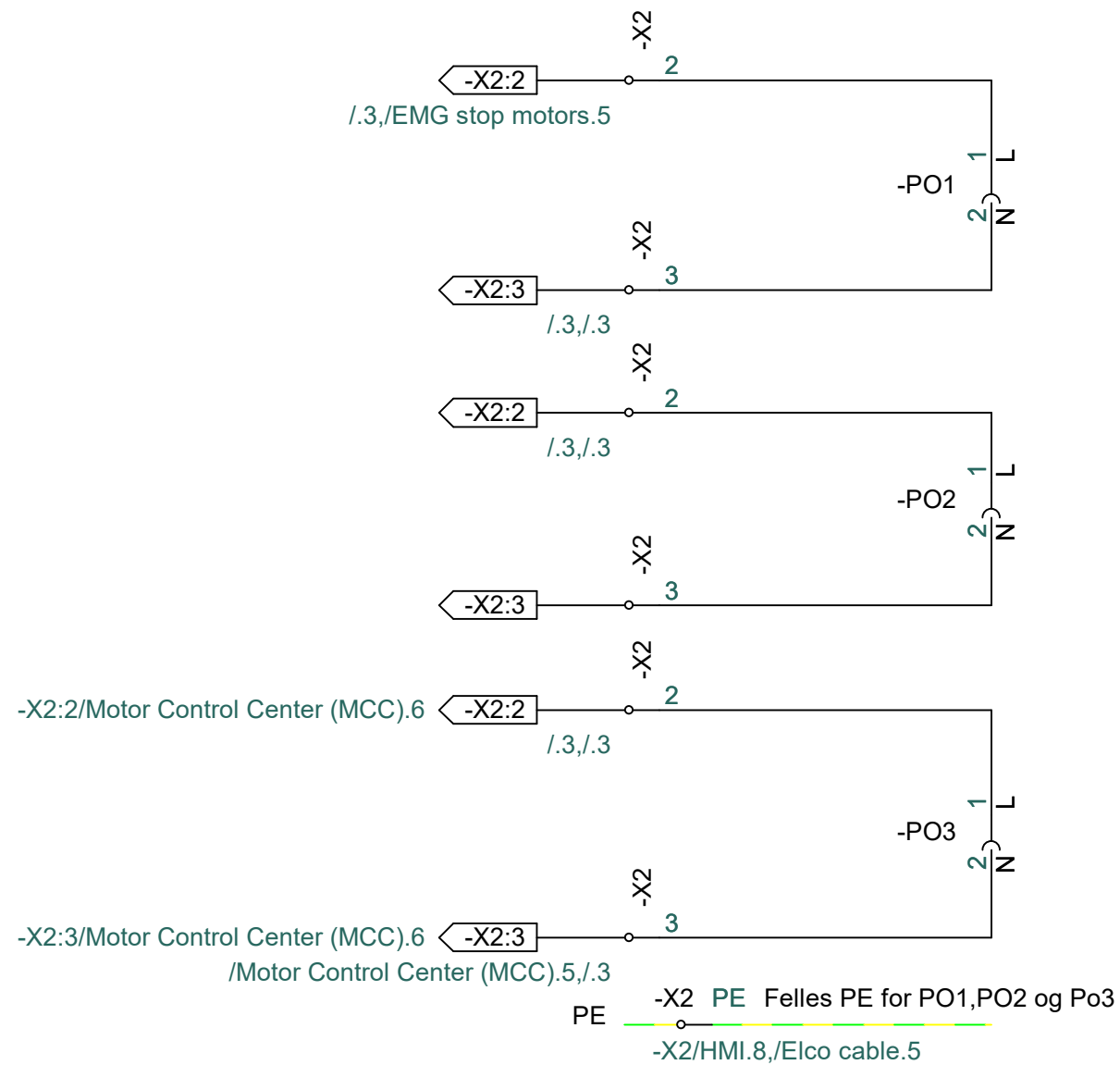
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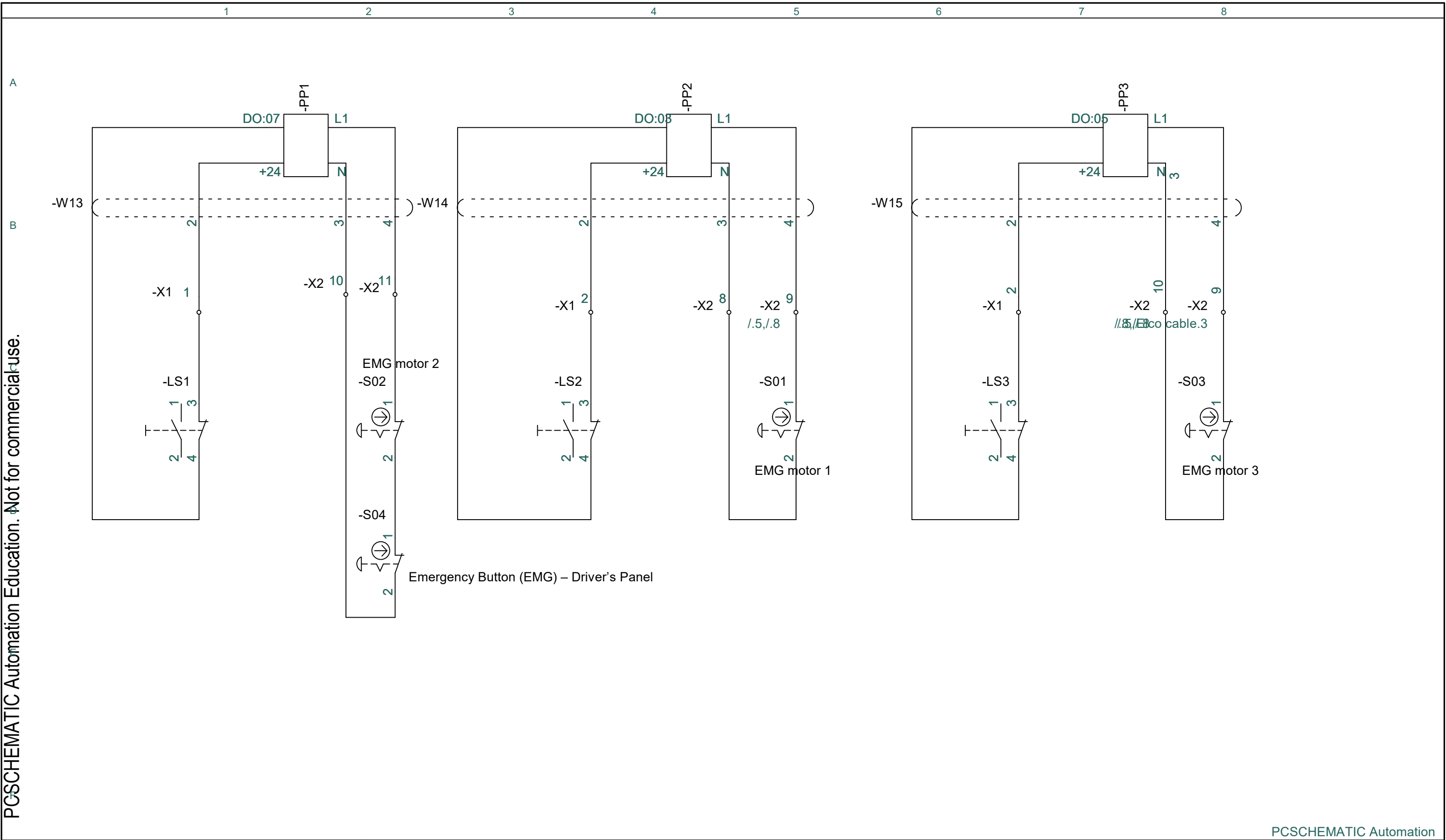
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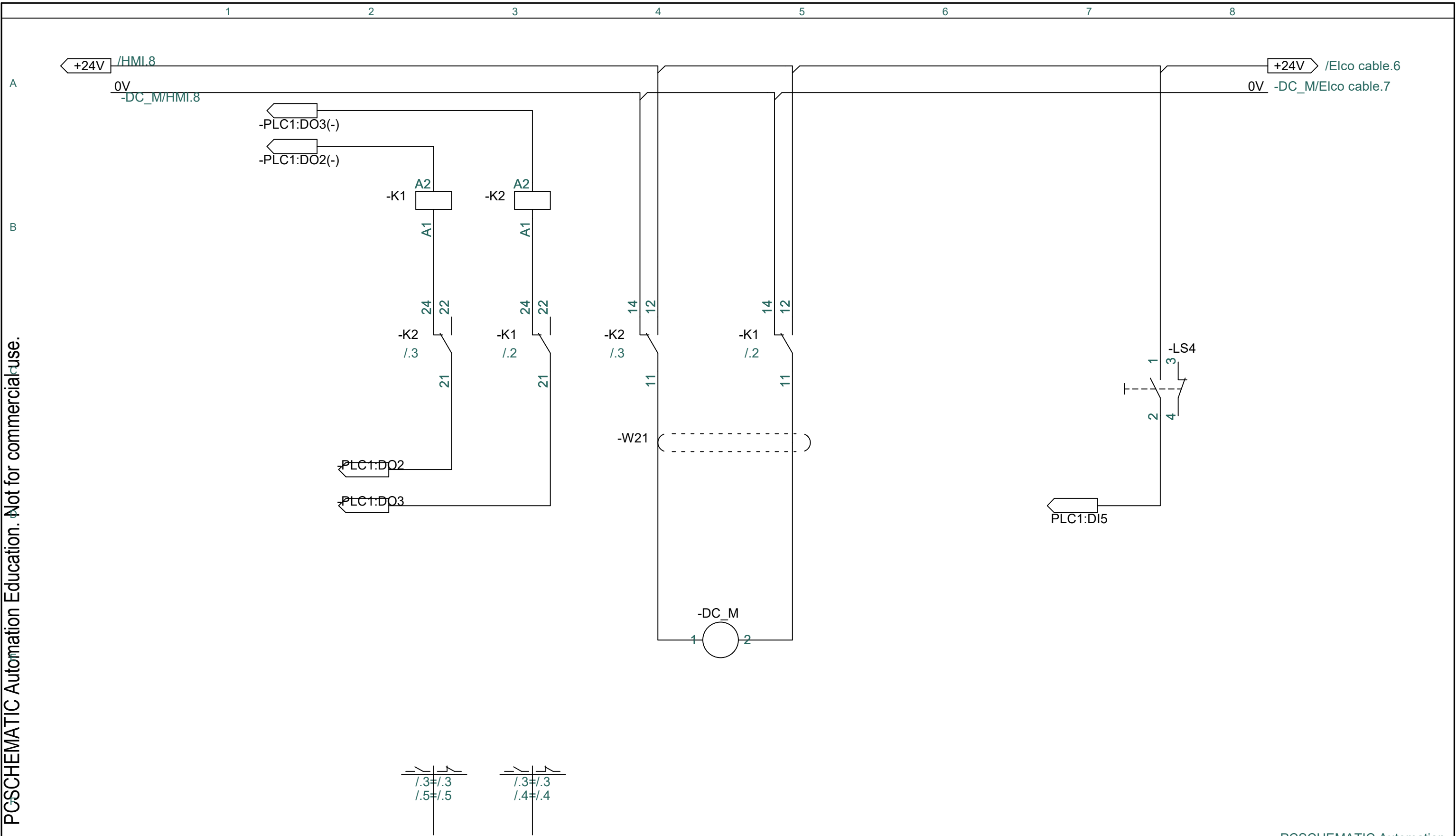




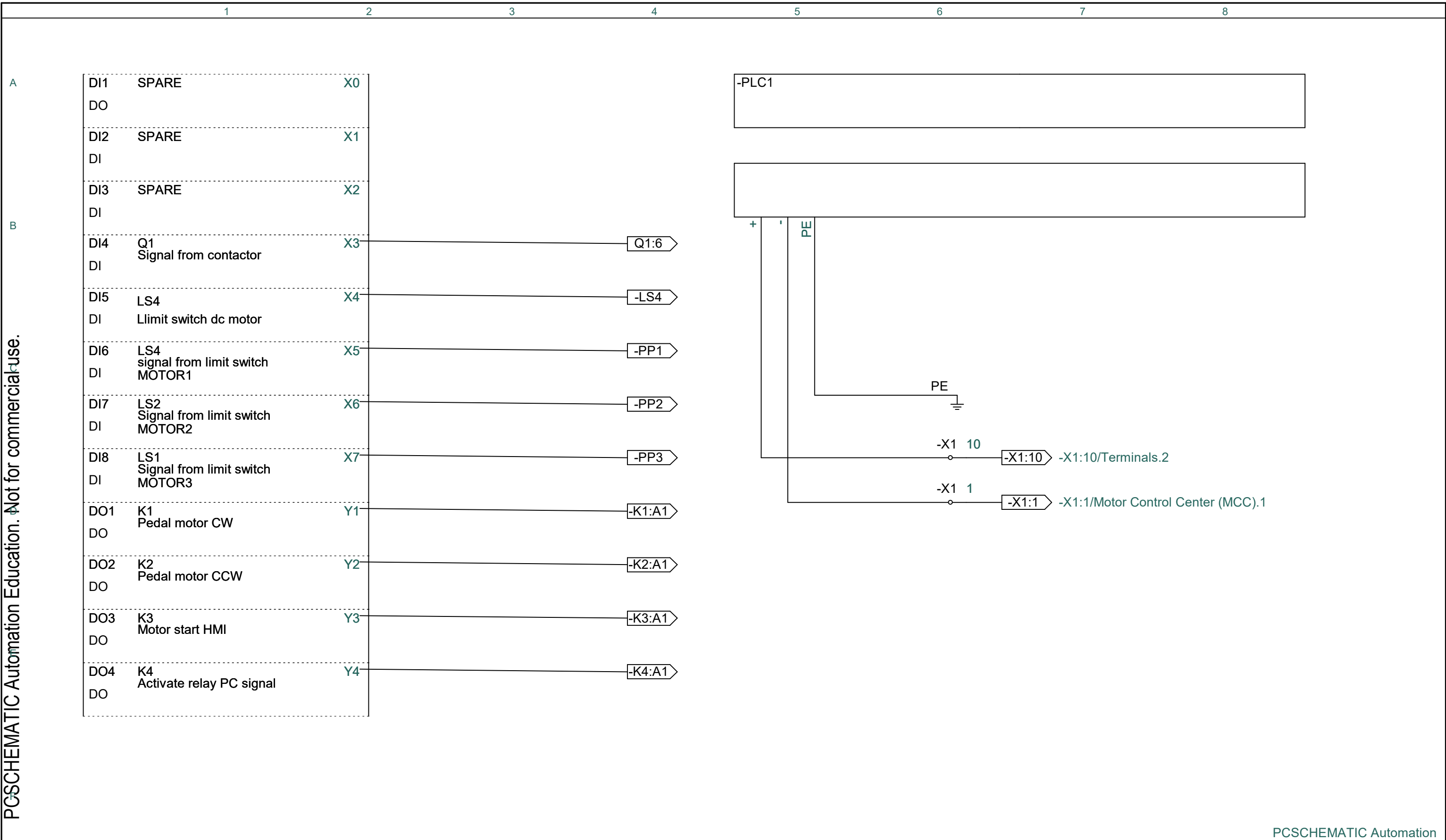


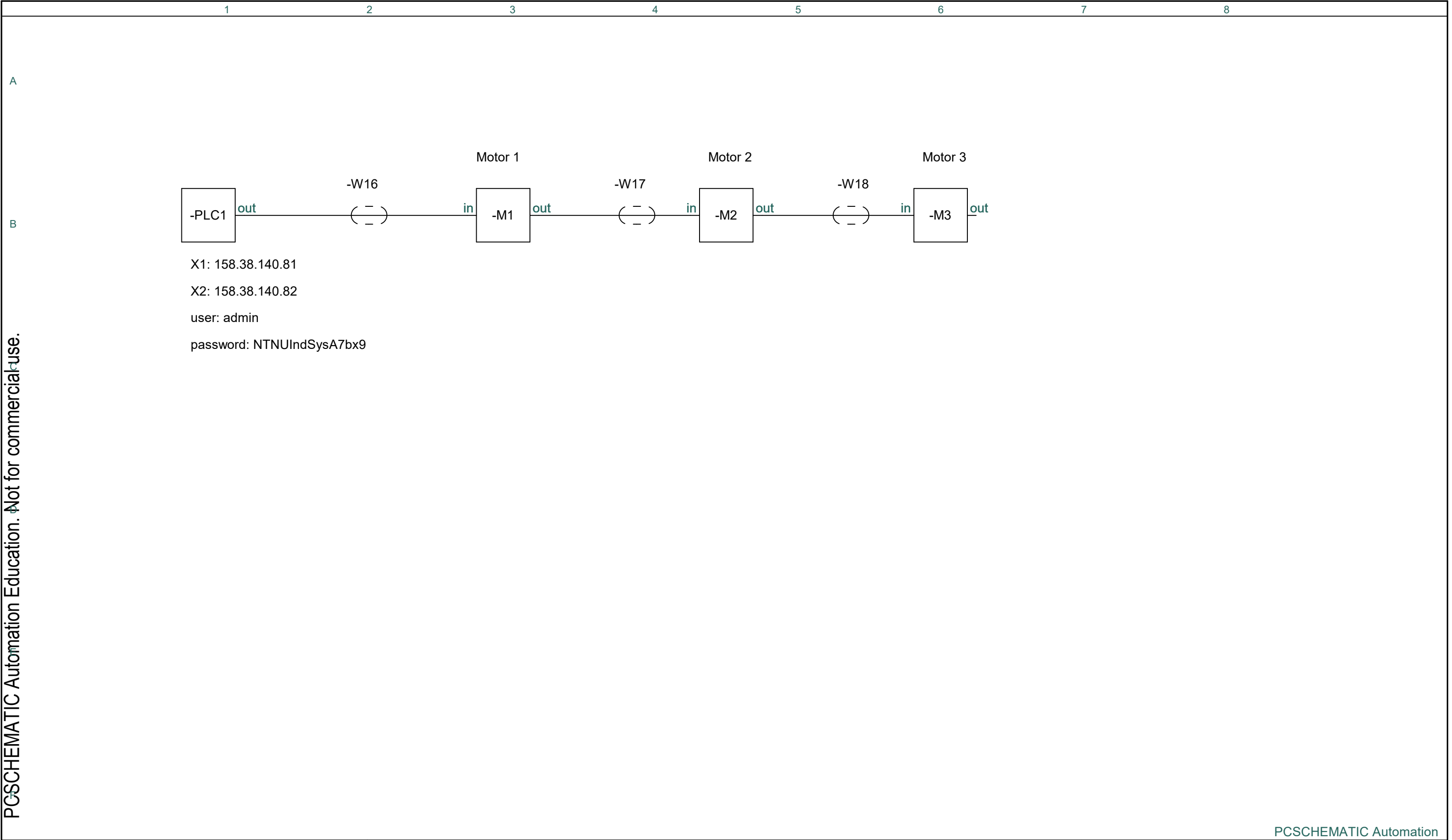


Project title:	Bil simulator	Project no.:	1.0.3	Project rev.:	Page	EMG stop motors	
Customer:	NTNU	DCC:			Scale:	1:1	
Page title:	Diagram	Dwg. no.:		Page rev.:	Prev. page:	230 V AC Power Supply	
File name:	bil_simulator	Eng. (proj/page):	Gruppe 1	Last print:	6/1/2025	Next page:	DC-motor
Page ref.:		Appr. (date/init):		Last edit:	5/31/2025	Total no. of pages:	27



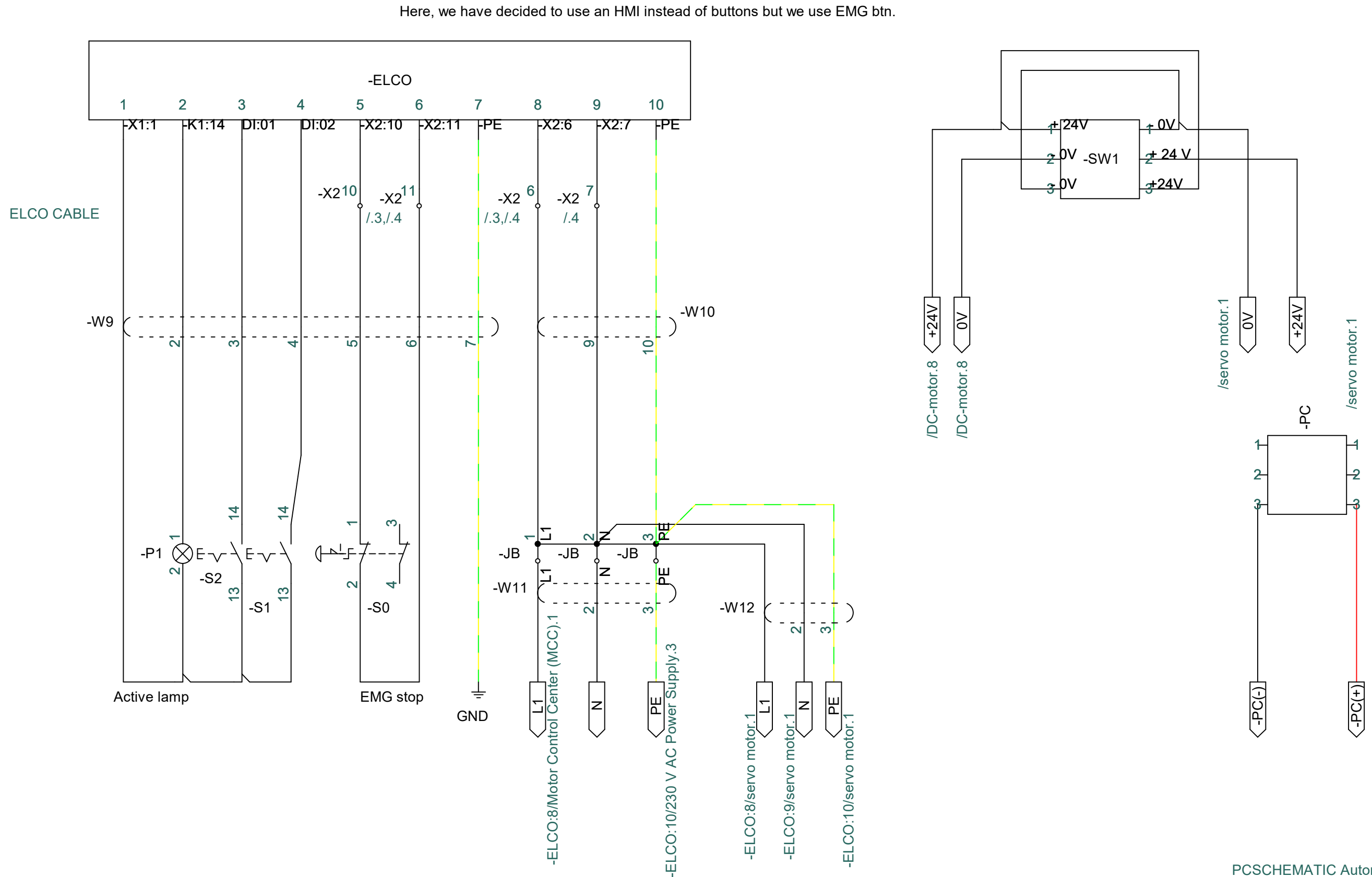
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Customer:	NTNU	DCC:			Scale:	1:1	
Page title:	Diagram	Dwg. no.:		Page rev.:	Previous page:	EMC stop motors	
File name:	bil_simulator	Eng. (proj/page):	Gruppe 1	Last print:	6/1/2025	Next page:	PLC1
Page ref.:		Appr. (date/init):		Last edit:	6/1/2025	Total no. of pages:	27





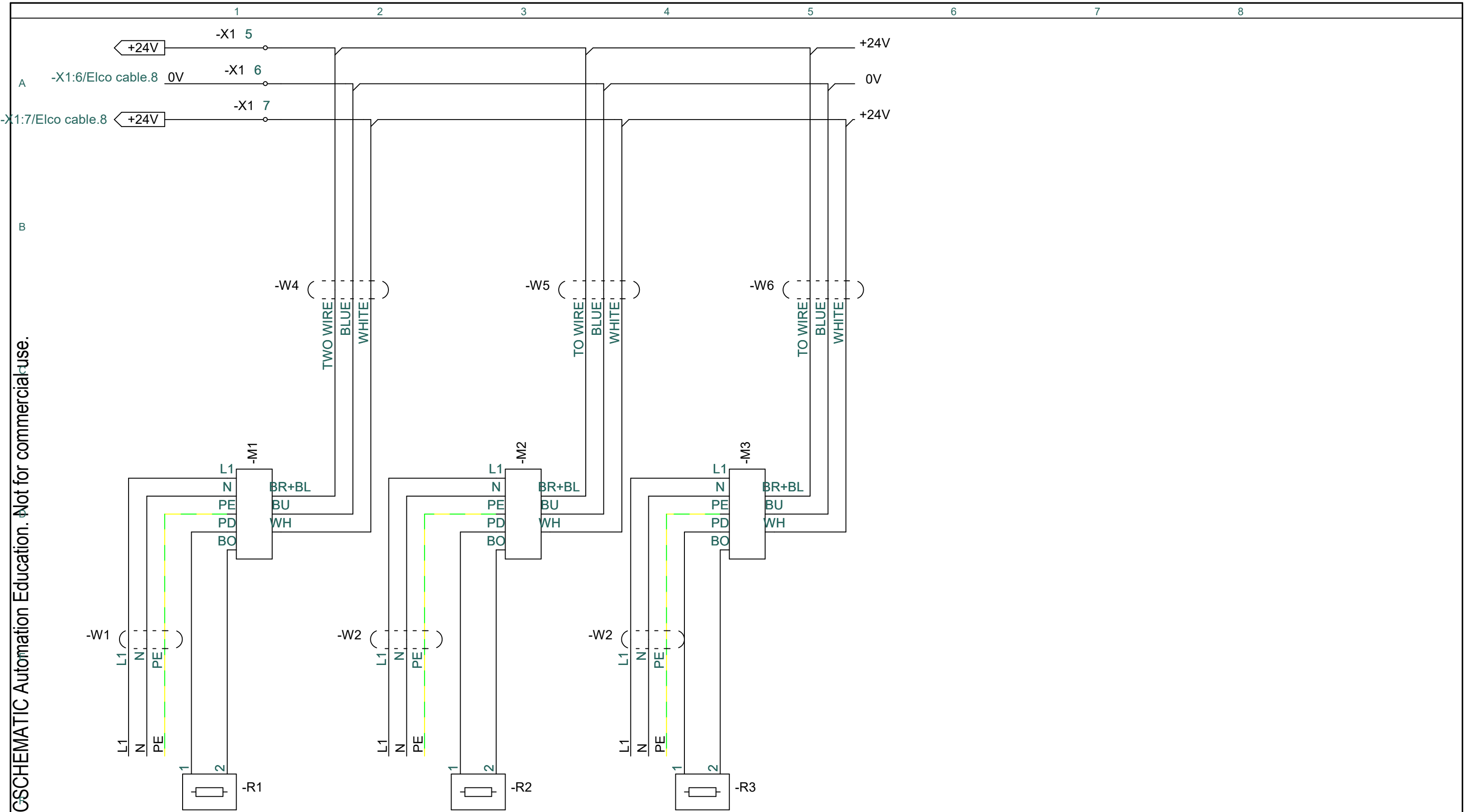
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B



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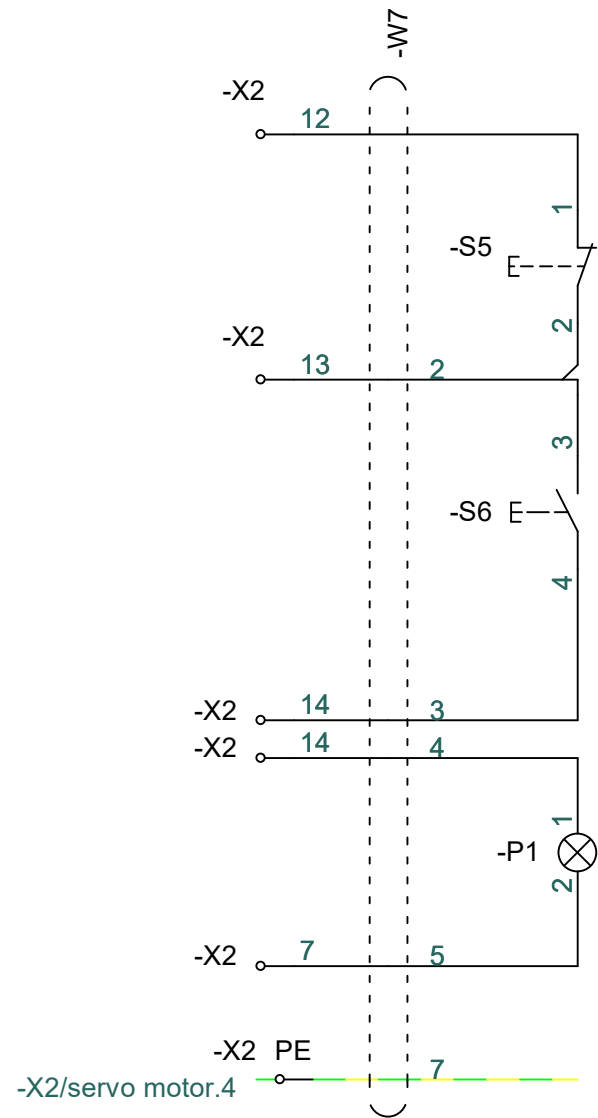
Project title:	Bil simulator	Project no.:	1.0.3	Project rev.:		Page	Elco cable
Customer:	NTNU	DCC:				Scale:	1:1
Page title:	Diagram	Dwg. no.:		Page rev.:		ETHERCAT topology diagram	
File name:	bil_simulator	Eng. (proj/page):	Gruppe 1	Last print:	6/1/2025	Next page:	servo motor
Page ref.:		Appr. (date/init):		Last edit:	6/1/2025	Total no. of pages:	27



Project title:	Bil simulator	Project no.:	1.0.3	Project rev.:		Page	servo motor
Customer:	NTNU	DCC:				Scale:	1:1
Page title:	Diagram	Dwg. no.:		Page rev.:		Previous page:	Elco cable
File name:	bil_simulator	Eng. (proj/page):	Gruppe 1	Last print:	6/1/2025	Next page:	Control Station Enclosure
Page ref.:		Appr. (date/init):		Last edit:	5/31/2025	Total no. of pages:	27

B

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Project title:	Bil simulator	Project no.:	1.0.3	Project rev.:	Control Station Enclosure
Customer:	NTNU	DCC:		Scale:	1:1
Page title:	Diagram	Dwg. no.:		Page rev.:	Previous page: servo motor
File name:	bil_simulator	Eng. (proj/page):	Gruppe 1	Last print:	6/1/2025
Page ref.:		Appr. (date/init):		Last edit:	5/20/2025
					Total no. of pages: 27