

Electrical Harness System

Official Electrical System Specification

Gear It Forward FRC 2338

A Brief History

In the 2014 season, FRC2338 experimented with the idea of using computer-aided wiring design. Through the use of Autodesk Inventor's wiring harness environment, the team successfully created an efficient electrical layout for their 2014 competition robot. With its precise, calculated design, the 2014 robot's electrical system was reliable, powerful, and expandable. For the 2015 season, team 2338 extended their implementation of wiring CAD to almost every wire on the robot.

Design Description

The 2015 electrical layout is a two-panel design, with an aluminum bellypan in the bottom of the robot frame and a backplane board made of polycarbonate. Height constraints on these boards changed throughout the design process, and range from 1.5 inches to roughly 6 inches on various points in the system. In order to control all mechanisms on the robot, the electrical system includes:

1 RoboRIO	1 Power Distribution Panel
2 Pneumatic Control Modules	1 Voltage Regulator Module
1 120A Breaker	8 Talon SRX with Anderson Powerpoles
6 Pneumatic Solenoids	2 Pneumatic Control Modules
2 Battery Brackets	1 D-Link Router
1 Viair Air Compressor	

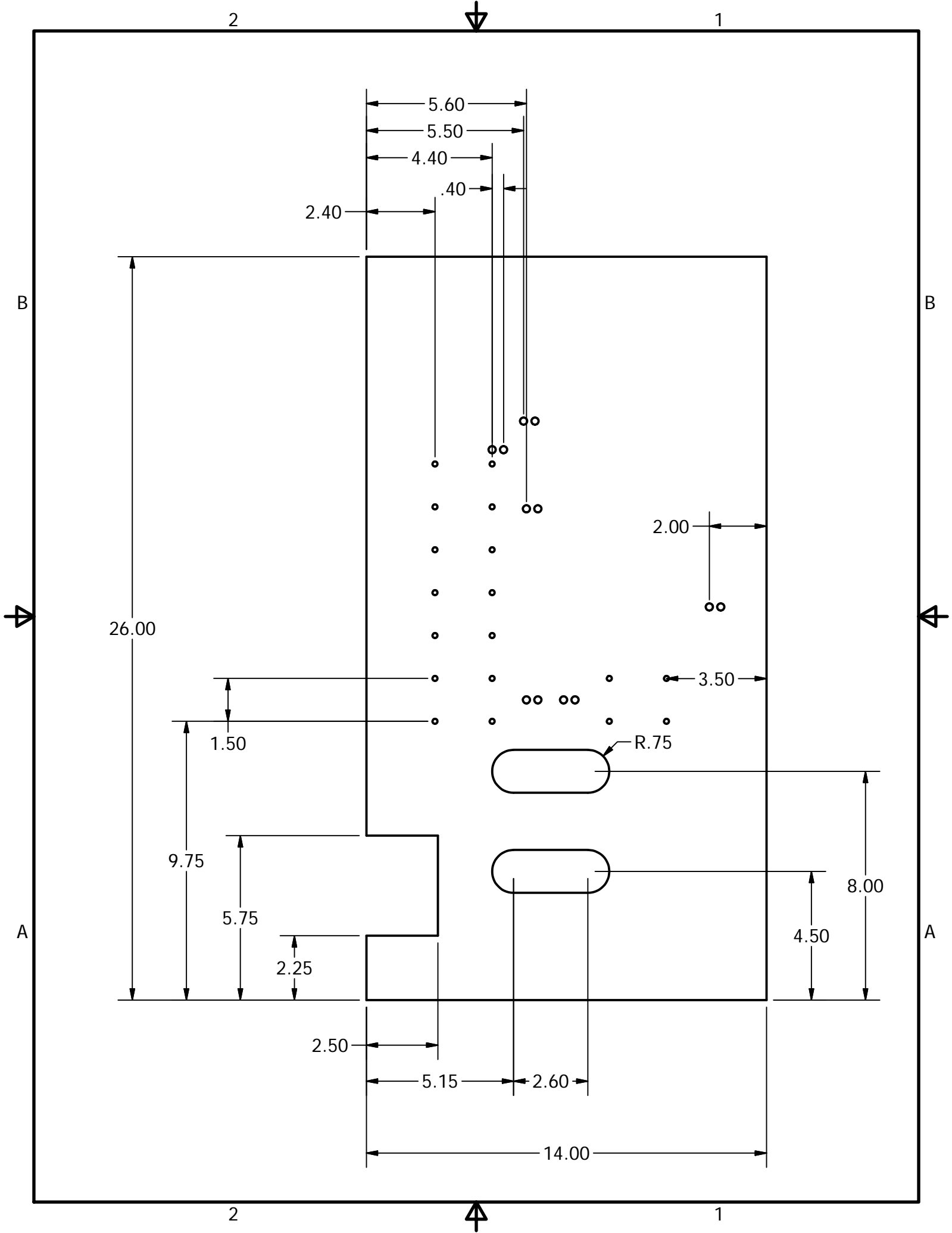
This datasheet, although it includes explicit specifications on wire lengths and positioning of electrical components, does not contain any specifications for the construction of the robot itself.

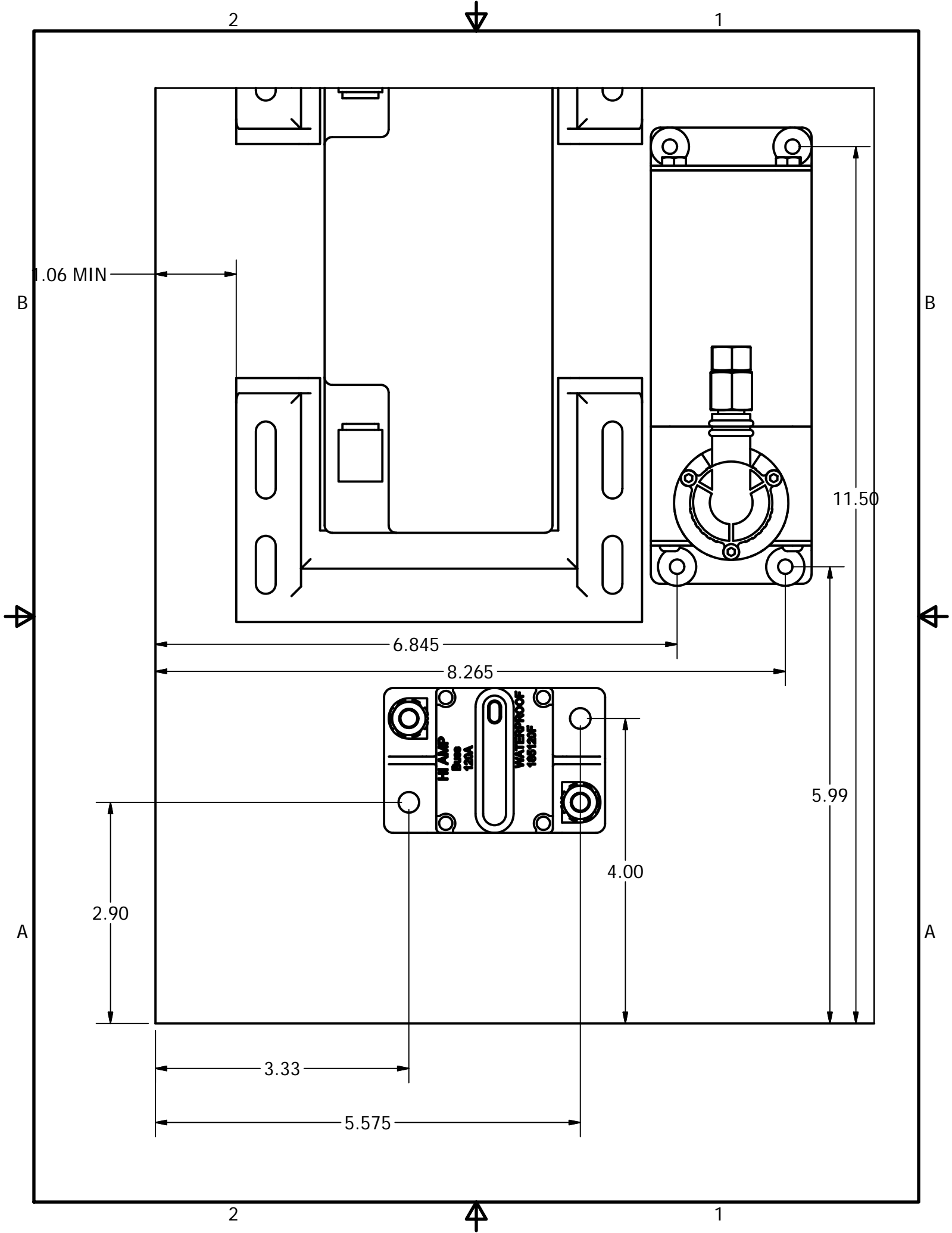
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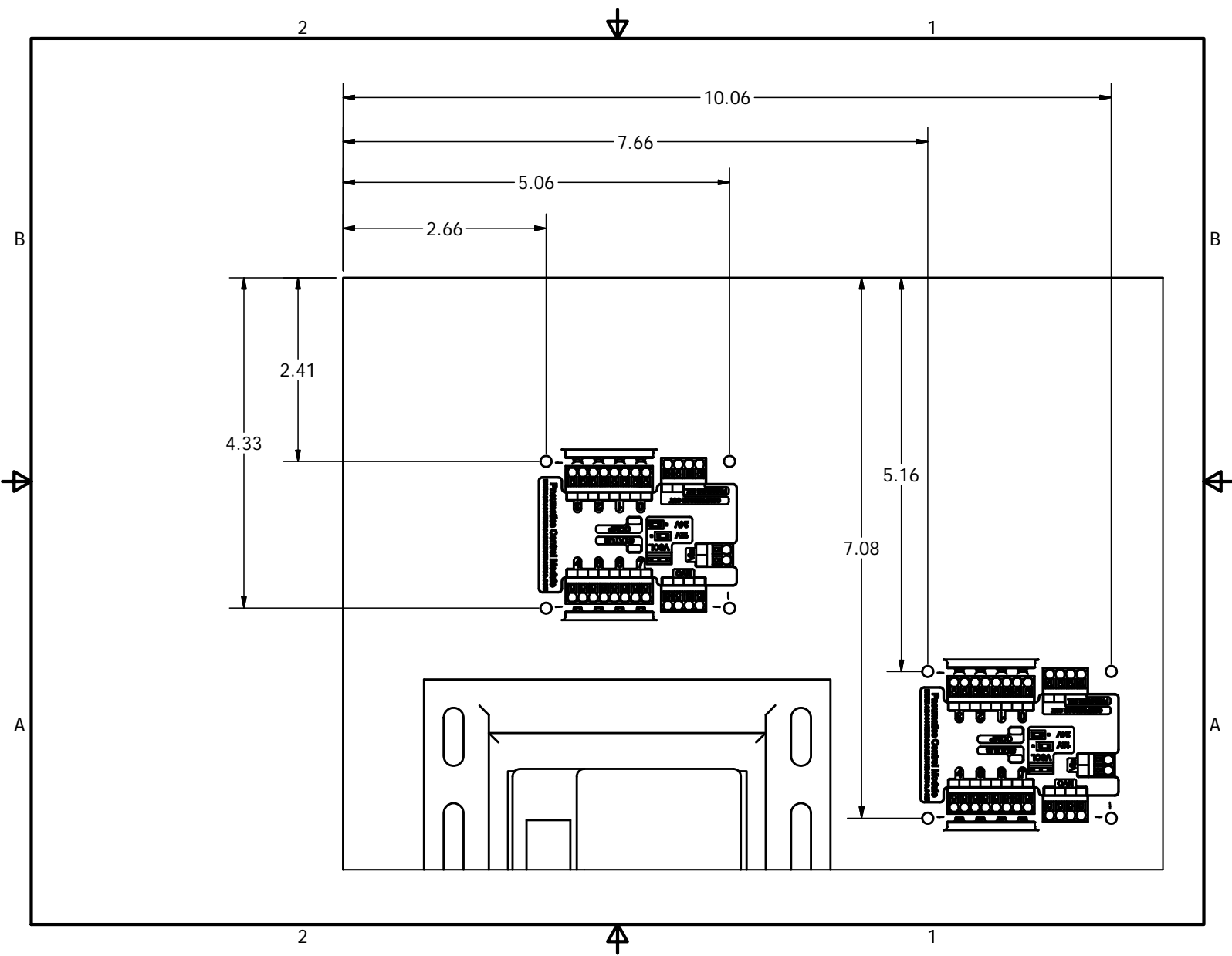
Drawing sheets included in the following pages show dimensions for the placement of each component. The final two drawing sheets show pin names for the VRM, PCM, and PDP. These pinouts are used in the wiring specification tables to show how various wires are attached to the board. Some connections are not shown in the harness specifications, including:

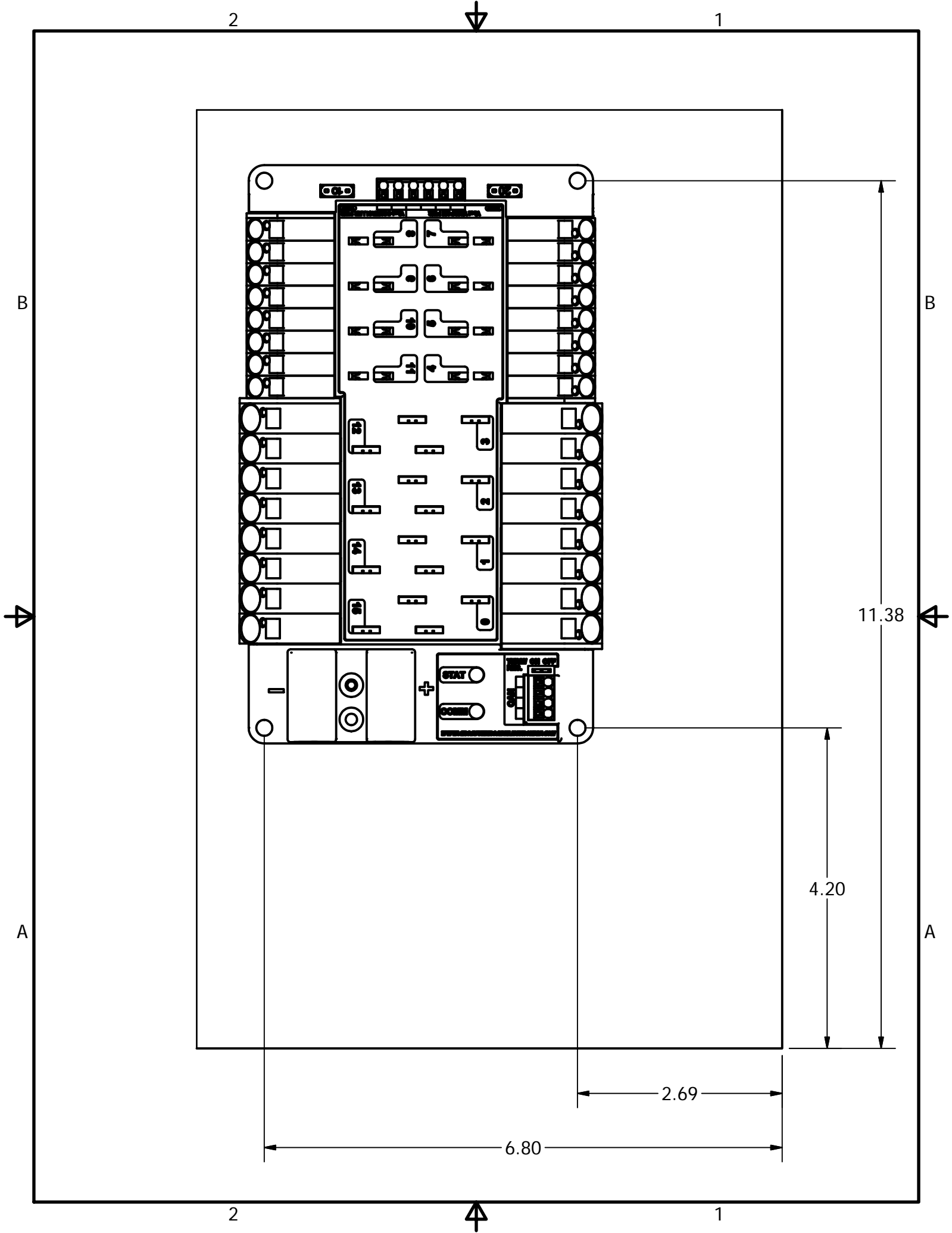
- CAN connections between Talons
- 6AWG connections for the battery
- Sensor, motor, and pneumatic tubing connections

Wire lengths in the wire specification table are based on the complete distance from two pins, through the harnesses. The length of pigtails on motor controllers and solenoids should be compensated for in the final design.









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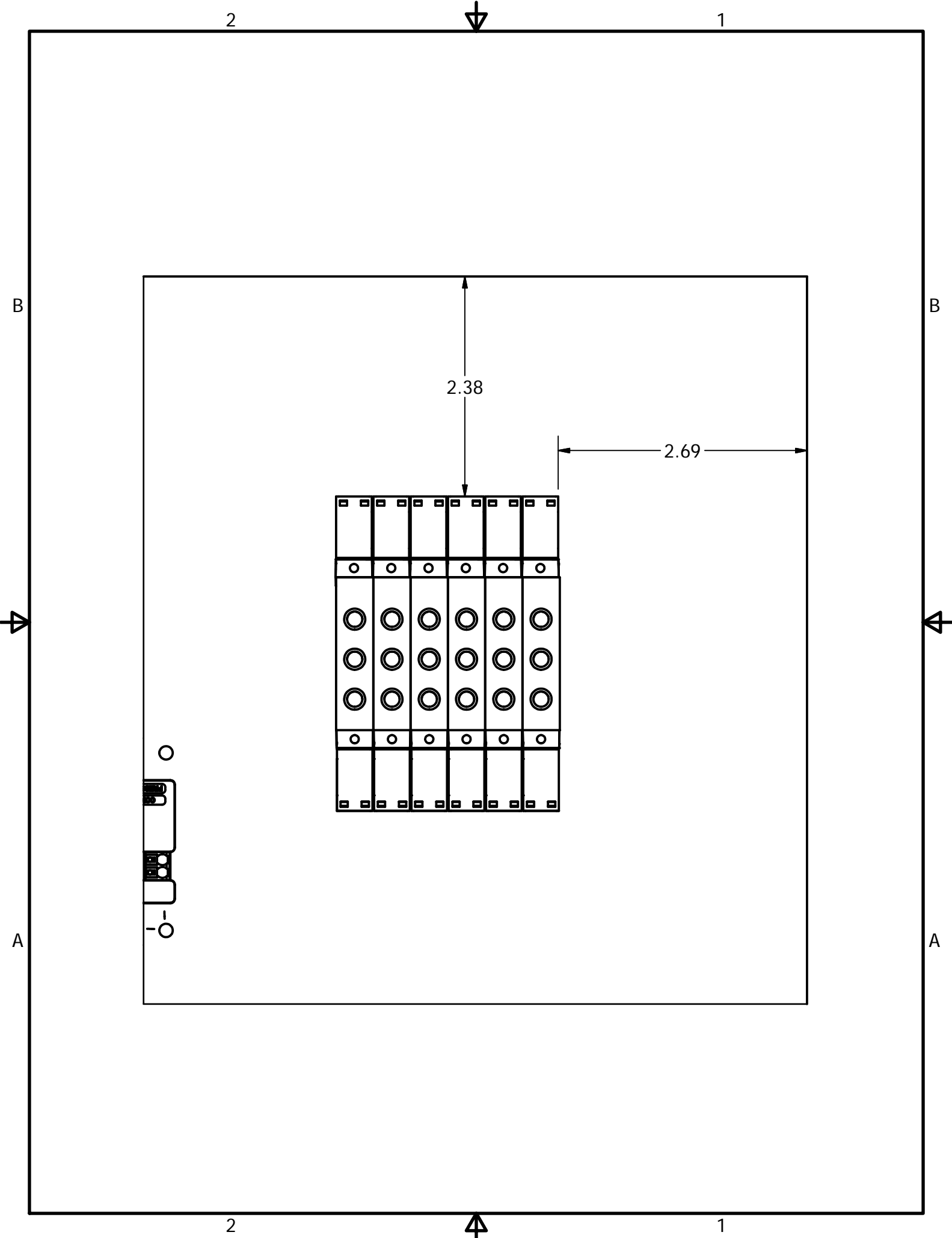
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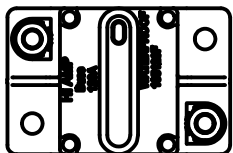
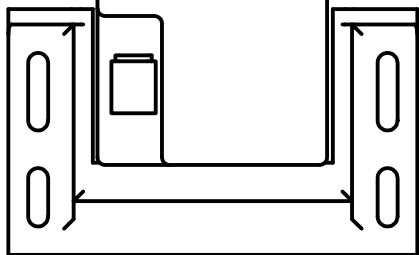
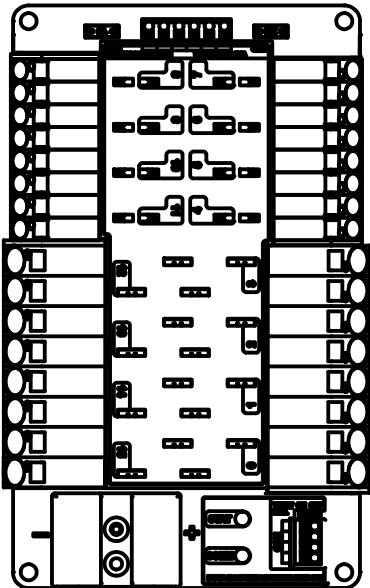
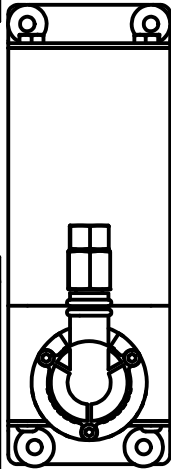
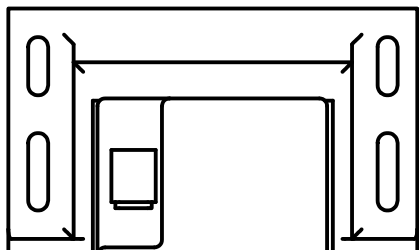
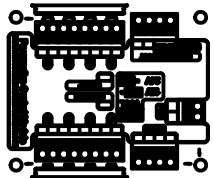
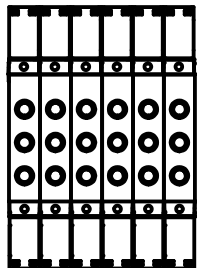
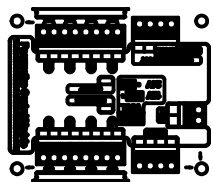
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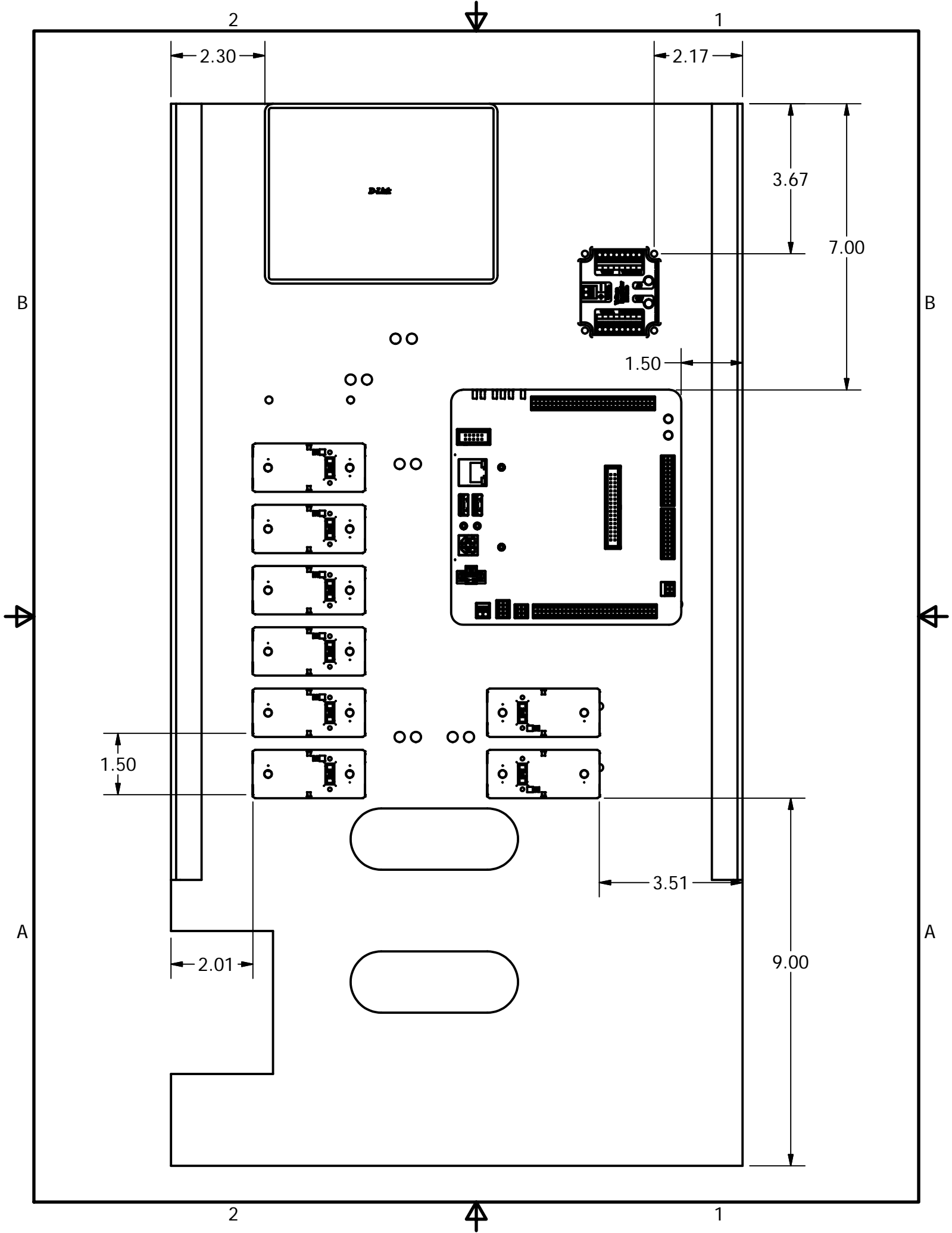
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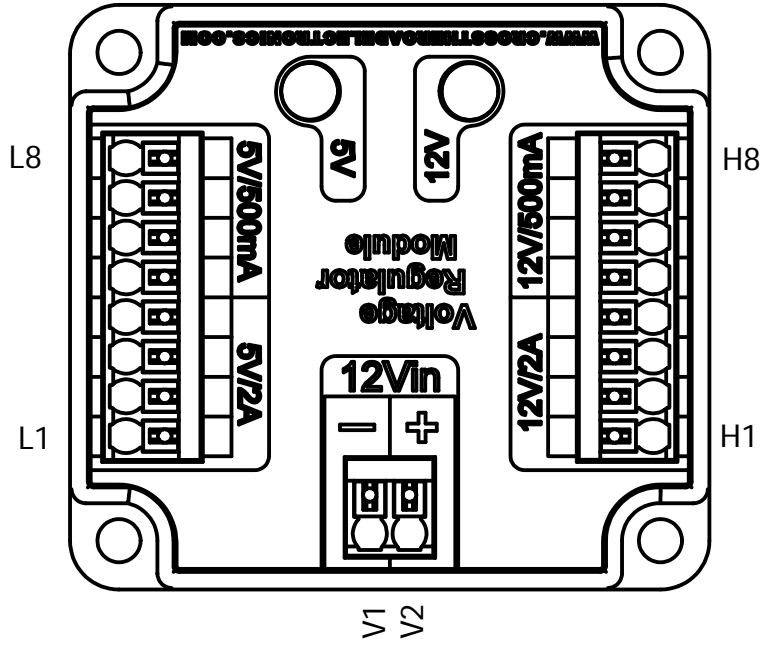
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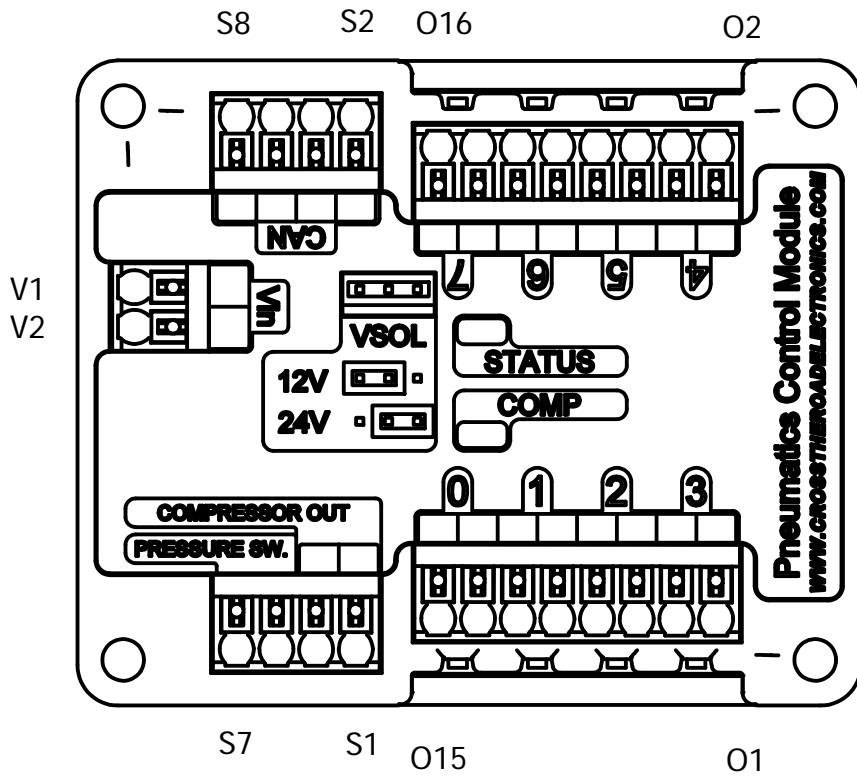
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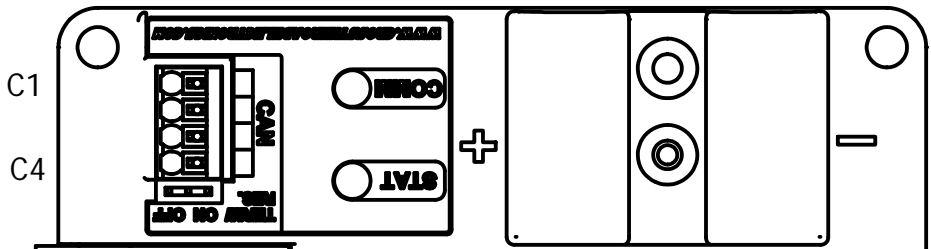
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C1

C4

L8

L16

L1

L9

S9

S1

S16

S1

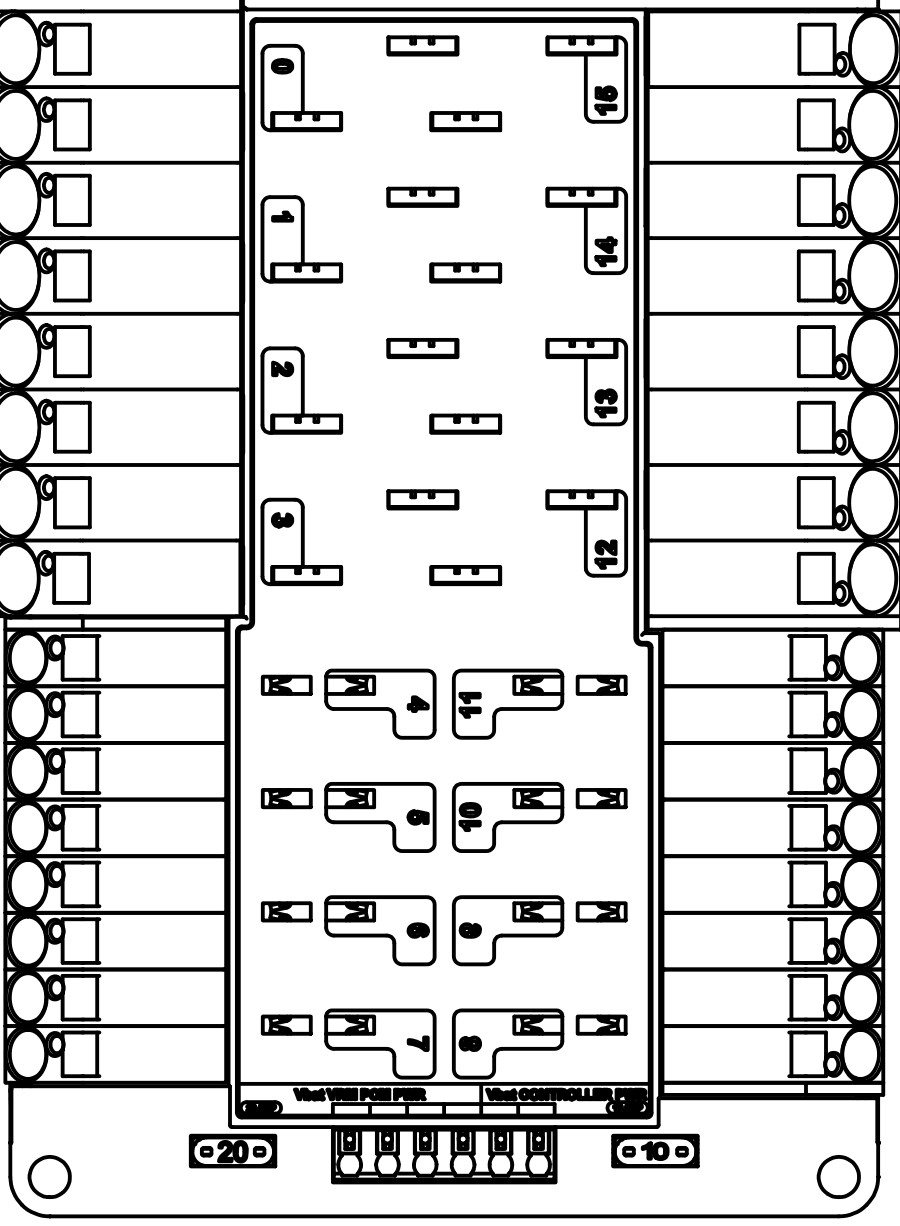


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P1

P6

Wire Definitions

ID	Wire	Adjusted Length	Min. Bend Radius	Start		End	
				Pin	Start Object	Pin	End Object
B-PDP-TAL1	12AWG-BLK	42.03929474	0.318147019	1	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:6	L2	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1
B-PDP-TAL2	12AWG-BLK	39.93909772	0.318147019	1	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:5	L4	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1
B-PDP-TAL3	12AWG-BLK	38.44998114	0.257755834	1	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:4	L6	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1
B-PDP-TAL4	12AWG-BLK	35.67216924	0.318147019	1	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:3	L8	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1
B-PDP-TAL5	12AWG-BLK	28.80122757	0.20893236	L13	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1	1	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:2
B-PDP-TAL6	12AWG-BLK	26.61875744	0.236145436	L15	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1	1	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:1
B-PDP-TAL7	12AWG-BLK	28.44052035	0.225179885	1	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:9	L11	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1
B-PDP-TAL8	12AWG-BLK	30.19980245	0.318147019	2	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:10	L9	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1
R-PDP-TAL1	12AWG-RED	41.34908628	0.318147019	L1	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1	2	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:6
R-PDP-TAL2	12AWG-RED	40.2698487	0.244516775	2	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:5	L3	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1
R-PDP-TAL3	12AWG-RED	37.74216924	0.25447211	L5	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1	2	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:4
R-PDP-TAL4	12AWG-RED	35.5378041	0.250476418	2	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:3	L7	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1
R-PDP-TAL5	12AWG-RED	26.89940822	0.318147019	2	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:2	L14	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1
R-PDP-TAL6	12AWG-RED	24.73775994	0.318147019	L16	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1	2	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:1

R-PDP-TAL8	12AWG-RED	29.83946056	0.318147019	1	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:10	L10	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1
R-PDP-TAL7	12AWG-RED	28.2707813	0.304268486	L12	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1	2	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:9
R-PDP-RIO	18AWG-RED	39.27725636	0.122307404	P5	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1	1	E_A_M_001_BackPlaneAssembly:1 cd_roborio:1
B-PDP-RIO	18AWG-BLK	39.43766423	0.096891386	P6	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1	2	E_A_M_001_BackPlaneAssembly:1 cd_roborio:1
B-PDP-VRM	18AWG-BLK	45.98526857	0.161814723	P4	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1	V1	E_A_M_001_BackPlaneAssembly:1 VRM:1
R-PDP-VRM	18AWG-RED	45.90903259	0.220792323	V2	E_A_M_001_BackPlaneAssembly:1 VRM:1	P3	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1
Y-TAL8-PCM1	22AWG-YEL	30.1299976	0.122538106	S4	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2	CAN1	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:10
G-TAL8-PCM1	22AWG-GRN	30.09372795	0.135747677	CAN2	E_A_M_001_BackPlaneAssembly:1 mc_talon-srx-HARNESS:10	S2	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2
R-PCM1-0	22AWG-RED	11.27847822	0.244478509	O15	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2	B	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUVG-L-10-B52-T-M5:6
R-PCM1-1	22AWG-RED	11.24819231	0.377881215	O11	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2	A	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUVG-L-10-B52-T-M5:5
R-PCM1-2	22AWG-RED	11.44013153	0.580989881	O7	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2	A	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUVG-L-10-B52-T-M5:3
R-PCM1-3	22AWG-RED	11.77166185	0.862106976	A	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUVG-L-10-B52-T-M5:1	O3	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2
B-PCM1-0	22AWG-BLK	11.24877084	0.303215798	O13	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2	A	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUVG-L-10-B52-T-M5:6
B-PCM1-1	22AWG-BLK	11.28907171	0.470075051	O9	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2	B	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUVG-L-10-B52-T-M5:5
B-PCM1-2	22AWG-BLK	11.48152843	0.709697793	B	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUVG-L-10-B52-T-M5:3	O5	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2
B-PCM1-3	22AWG-BLK	11.80999046	0.992336322	O1	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2	B	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUVG-L-10-B52-T-M5:1

B-PCM2-0	22AWG-BLK	8.297944608	0.255919916 O13	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1	B	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUUG-L-10-B52-T-M5:6
B-PCM2-1	22AWG-BLK	8.267320222	0.390311717 O9	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1	B	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUUG-L-10-B52-T-M5:5
B-PCM2-2	22AWG-BLK	8.440283905	0.616879164 B	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUUG-L-10-B52-T-M5:3	O5	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1
B-PCM2-3	22AWG-BLK	8.76371933	0.916811712 O1	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1	B	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUUG-L-10-B52-T-M5:1
R-PCM2-0	22AWG-RED	8.376610471	0.21257661 O15	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1	A	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUUG-L-10-B52-T-M5:6
R-PCM2-1	22AWG-RED	8.255104945	0.313390577 O11	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1	A	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUUG-L-10-B52-T-M5:5
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R-PCM2-4	22AWG-RED	8.749465983	1.074092611 O2	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1	A	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUUG-L-10-B52-T-M5:2
R-PCM2-5	22AWG-RED	8.896808621	0.792120012 O6	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1	A	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUUG-L-10-B52-T-M5:4
B-PCM2-4	22AWG-BLK	8.75764524	0.923591646 O4	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1	B	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUUG-L-10-B52-T-M5:2
B-PCM2-5	22AWG-BLK	8.938019703	0.678387925 O8	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1	B	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUUG-L-10-B52-T-M5:4
B-PCM1-4	22AWG-BLK	17.41992888	0.06739527 O4	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2	B	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUUG-L-10-B52-T-M5:2
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R-PCM1-4	22AWG-RED	17.319983	0.073868763 O2	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2	A	E_A_M_002_BellyPanAssembly:1 Pneumatics_Festo__VUUG-L-10-B52-T-M5:2
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G-PCM1-PCM2	22AWG-GRN	9.01812783	0.229972482	S6	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2	S6	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1
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R-PCM1-PCM2	18AWG-RED	12.33858007	0.18634896	V2	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1	V2	E_A_M_002_BellyPanAssembly:1 PCM_assmb:2
R-PCM1-PDB	18AWG-RED	5.450895655	0.334409696	V2	E_A_M_002_BellyPanAssembly:1 PCM_assmb:1	P1	E_A_M_002_BellyPanAssembly:1 PDP_asmb:1
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