

Installation Guide and Support Manual

# PHOENIX

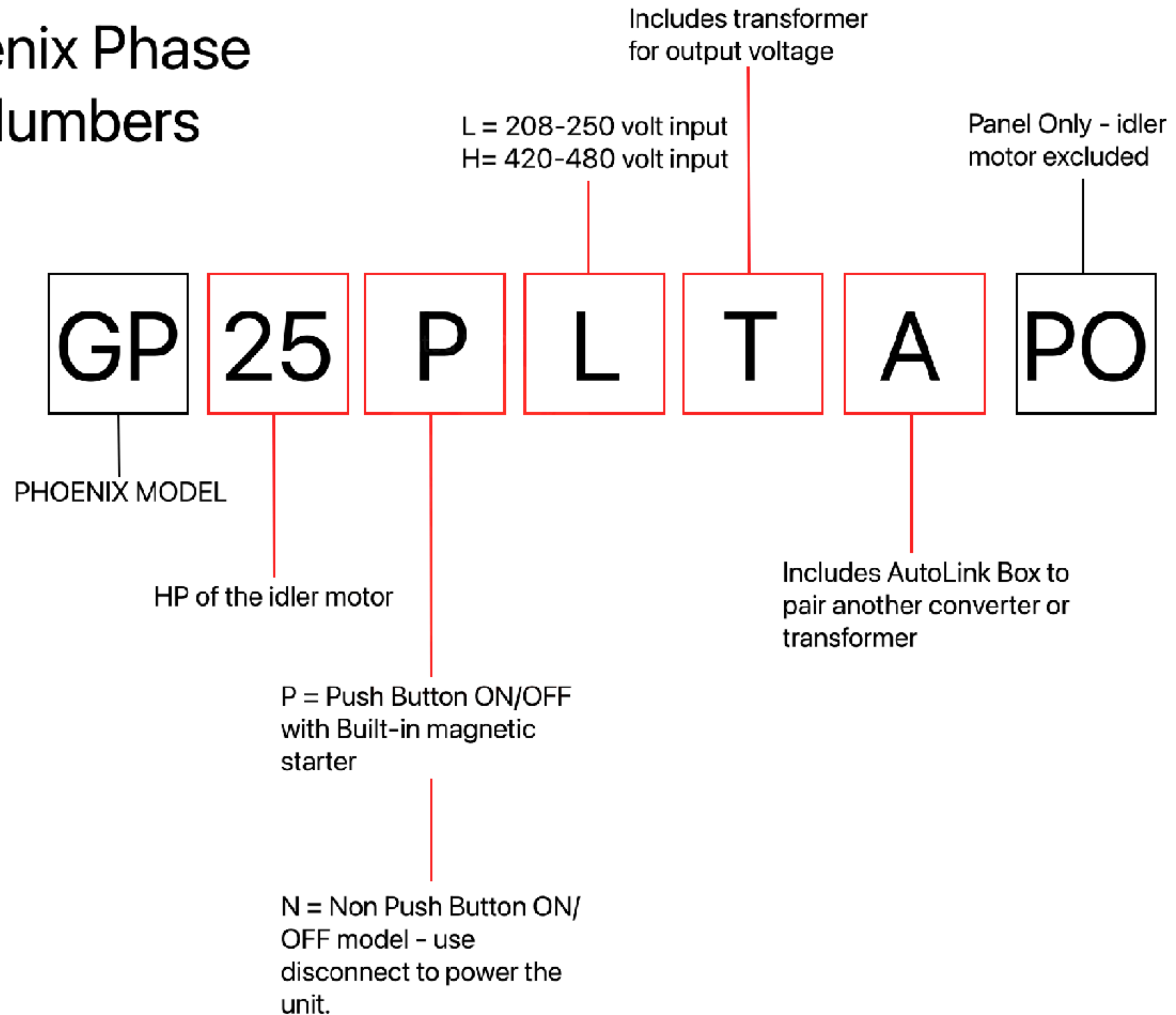
## Phase Converters



**NOTE: THIS INSTRUCTION MANUAL IS IN PROGRESS OF UPDATING ALL INFORMATION PROVIDED IS SUBJECT FOR REVIEW AND SOME INFORMATION IS UNAVAILABLE AT THIS TIME. WE WOULD APPRECIATE ANY FEEDBACK.**

Email: [www.phoenixphaseconverters@gmail.com](mailto:www.phoenixphaseconverters@gmail.com)

# How to read Phoenix Phase Converters Part Numbers



# Power Requirements

**RULE OF THUMB:** Make sure your power feeding your circuit breaker panel is enough. The KVA number should be at least the same or larger number of the HP of converter you have.

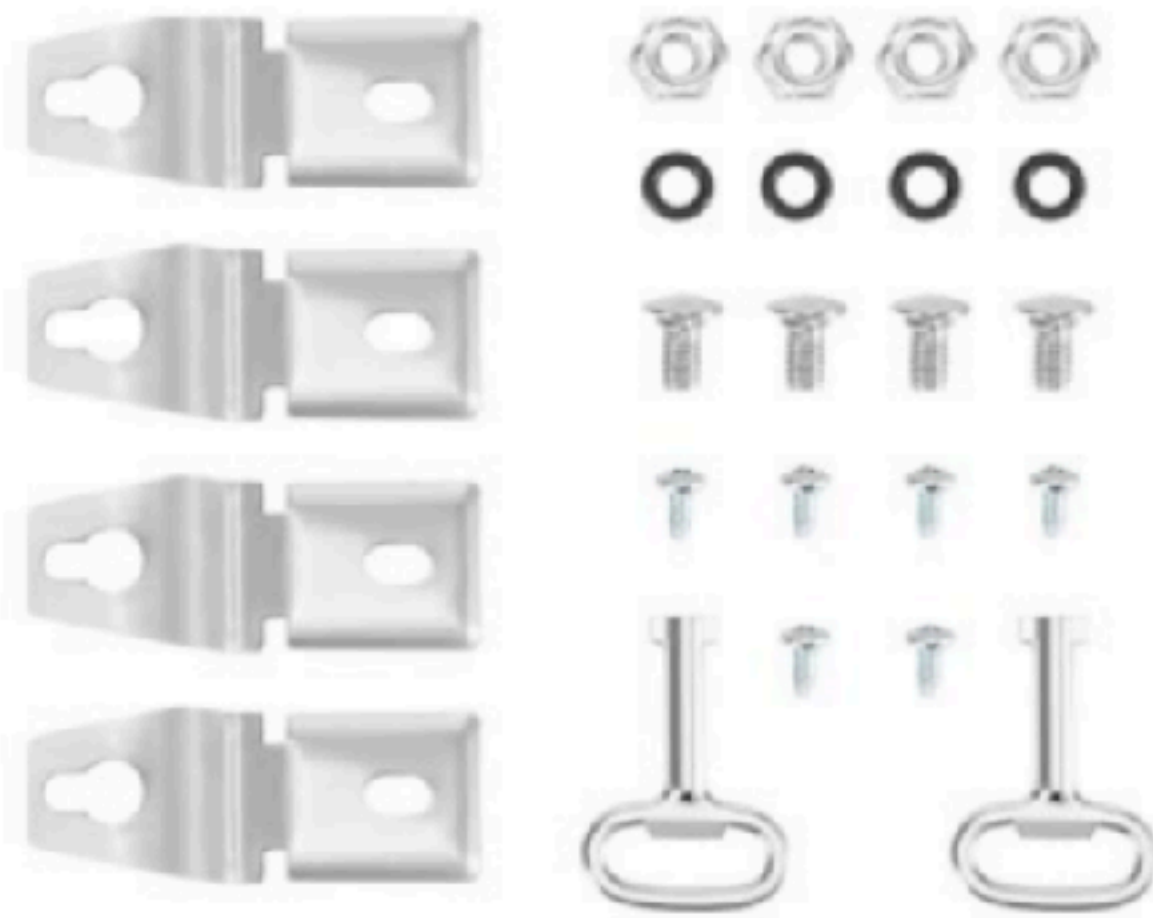
For an example 50 KVA 230 Volts, is enough power to start a 40 HP Phase Converter. 50 KVA 230 Volt is NOT large enough to start a 75 HP Rotary Phase Converter. But will be enough to start two 40 HP Rotary Phase Converters one at a time, and then pair together to Have a 80 HP Converter.

Make sure the Phase Converter you are installing is large enough for your equipment, and you have the right voltage phase converter, our team at Phoenix Phase Converters can help you with this. at 800-417-6568



# Mounting the Phase Converter Panel

Mount the enclosure first, to a non-vibrating surface, there are two options provided for mounting, next install the back plate with the four nuts provided. Mounting the phase converter panel near the breaker panel is recommended the larger wire is you single phase line, that is best to keep as short as possible. Every 50 feet you will need to increase the size of the single phase wire.



Additional mounting brackets and hardware are inside the enclosure.



Indoor or outdoor enclosure



# CAUTION

## READ INSTRUCTIONS BEFORE OPERATING

## READ FIRST - BEFORE INSTALLATION

- **Most important step to know.**
- NEVER Start the phase converter with a load, this includes transformers.
- Make sure you have the incoming service to start the phase converter, call your electric company verify the KVA size of the transformer, that KVA number should be larger then the HP of the idler motor.
- **DO NOT use WIRE NUTS for any connection, use the bolt down lugs. Check all make sure all connections even factory connections to the power block are secure, also recheck connections after a few week of using the converter.**
- **When powering up the unit, if the idler does NOT come up to FULL SPEED, then shut the phase converter down right away. If you don't understand then call us or a qualified electrician. if you do not turn the unit off you have a chance to damage the idler motor that will not be covered under warranty.**
- Must be installed by a license industrial electrician, our guidelines are not to supersede local and state laws.

# BREAKER SIZE REQUIREMENTS



- Make sure you have a big enough breaker for your main to handle the starting of the phase converter.
- Increase Copper Wire Size For Every 50 Feet And Round Up - For Breakers Use 2 Times the Full Load of the Equipment
- You must use an Industrial Licensed Electrician
- Magnetic controls, single phase loads, or resistive loads must be energized by L1 and L2
- Follow your state codes, most state require a disconnect between the circuit breaker panel and the converter if over 50 feet.

# WIRE AND BREAKER SIZES

- You will need to use a **motor load** type breaker. NOT a quick blow or trip breaker.
- Sizing a breaker for a single machine with an inductive load (motors) double the amps size of the machine. Example if the equipment pulls 20 amps use a 40 amp breaker.
- Sizing the equipment for multiple machine double the amp of the largest machine and add the the other machine that will run at the same time. Example; 20 AMP Lathe. 9 amp saw, 6 amp milling machine.  $20 \times 2 = 40 + 9 + 6 = 45$  amps, use the next standard size breaker which would be 50 Amps two pole breaker.
- Use the chart to make sure you don't go over or under the Minimum and maximum size allowed. For rural areas increase the minimum size breaker by 20% Click on the next picture to see this chart.

## Wire And Breaker Size Guide

230 VOLT MODELS ONLY

Idler Horsepower	3	5	7.5	10	15	20	25	30	40	50	60	75	100
Minimum Breaker Size	10	15	20	20	30	40	40	50	60	80	100	125	150
Maximum Breaker Size	25	30	40	40	80	100	125	150	200	250	300	350	400
Single Phase Wire Size	10	8	8	6	4	4	2	2	1/0	2/0	3/0	4/0	300
Idler Motor Wire Size	10	10	10	8	8	6	4	3	3	2	1	1/0	2/0

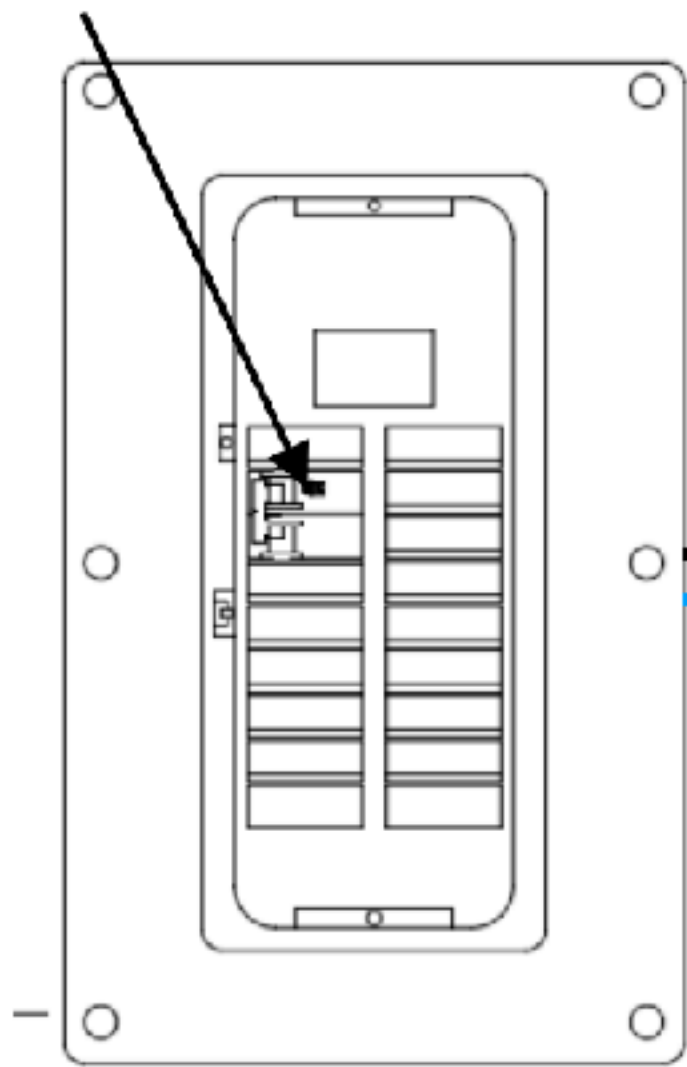




# NL AND NH MODELS

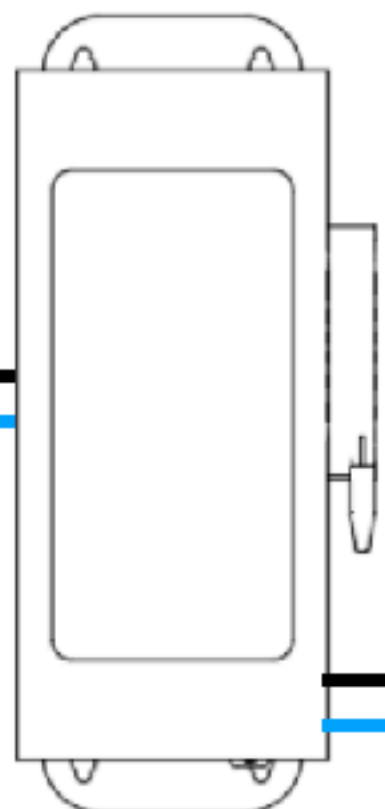
MUST BE INSTALLED BY A INDUSTRIAL LICENSED ELECTRICIAN

Motor Load Breaker should be size  
Twice the full load amps of your  
equipment

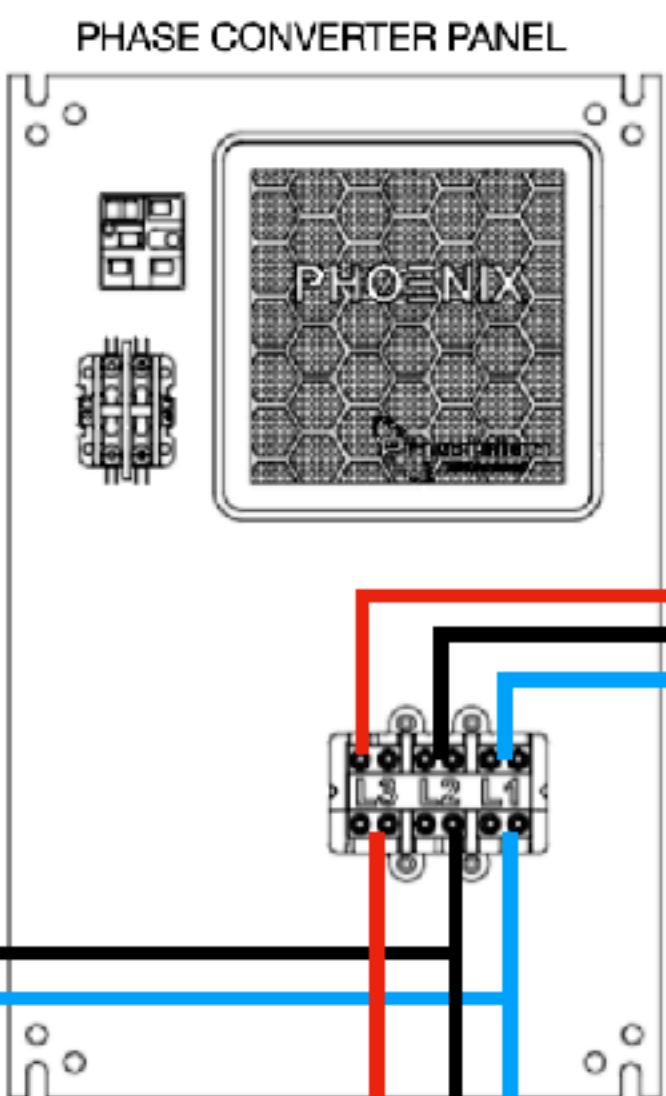


SINGLE PHASE CIRCUIT  
BREAKER PANEL

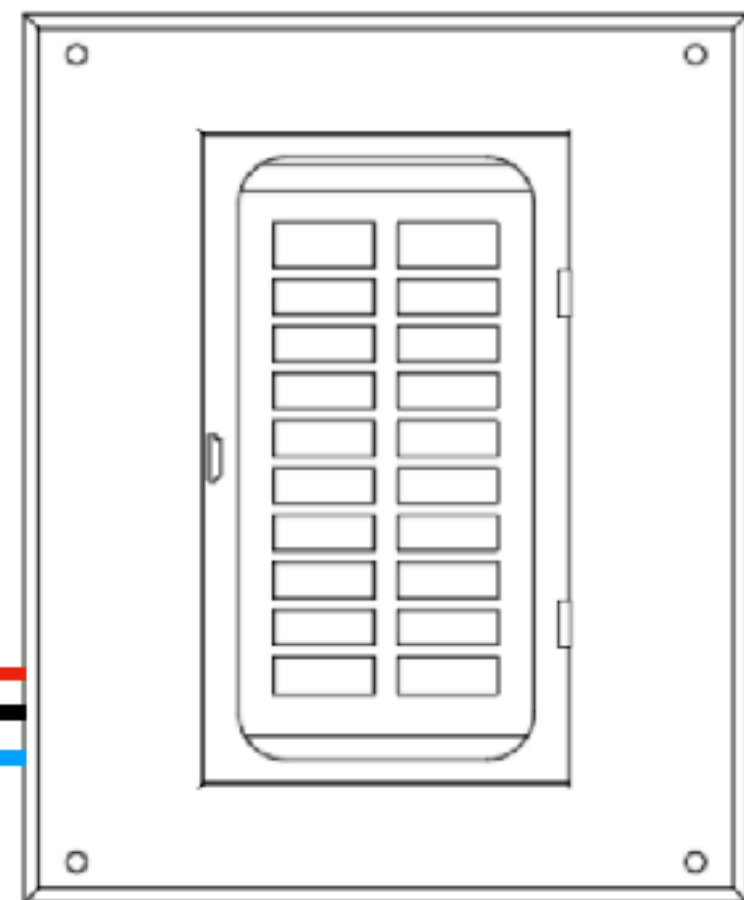
⊞



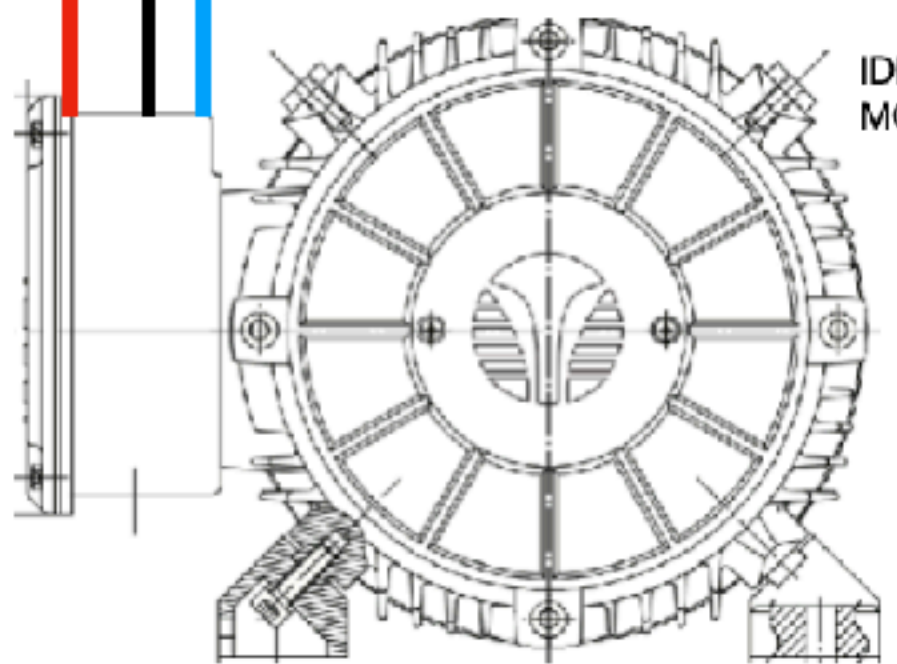
DISCONNECT  
SHOULD BE USED  
IF YOUR RUN IS  
OVER 50 FEET



PHASE CONVERTER PANEL



LOAD CENTER,  
3PH BREAKER  
PANEL, OR  
EQUIPMENT



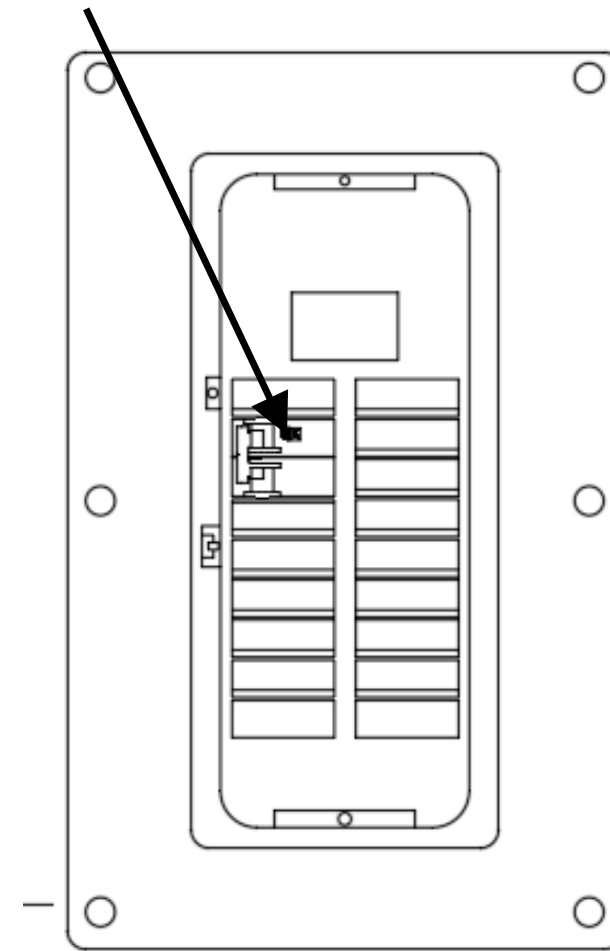
IDLER/GENERATOR  
MOTOR

230V Connection for NL and PL Models (low voltage)  
460V Connection for NH and PH Models (high voltage)

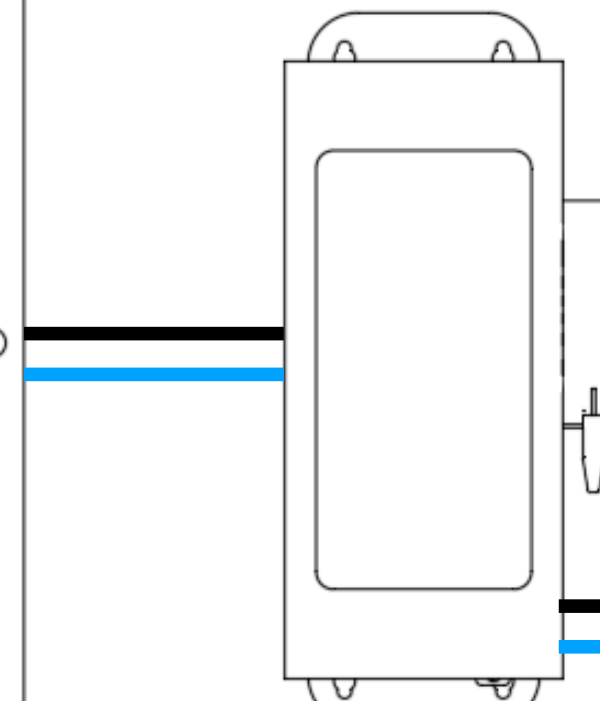
# PL AND PH MODELS

MUST BE INSTALLED BY A INDUSTRIAL LICENSED ELECTRICIAN

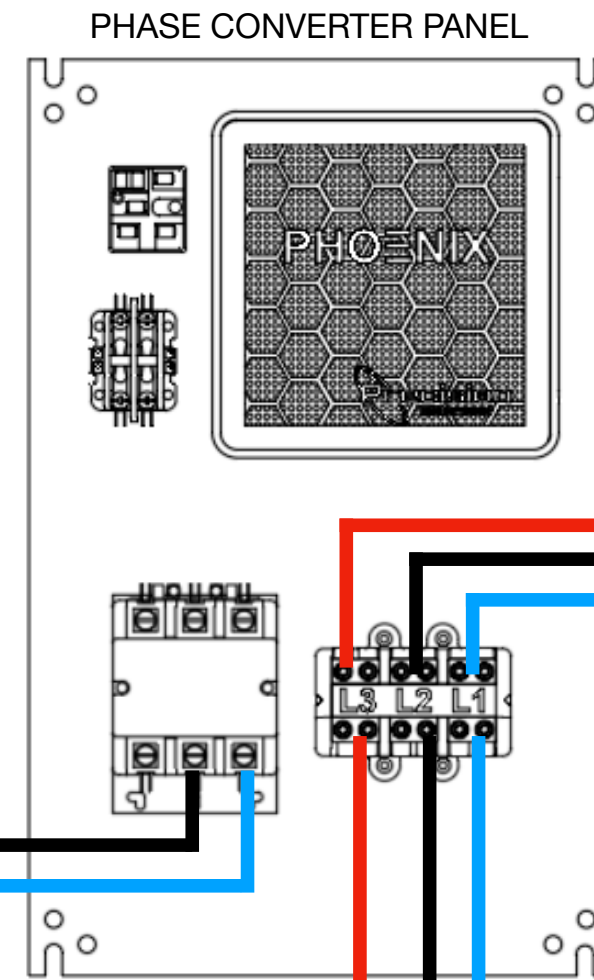
Motor Load Breaker should be size  
Twice the full load amps of your  
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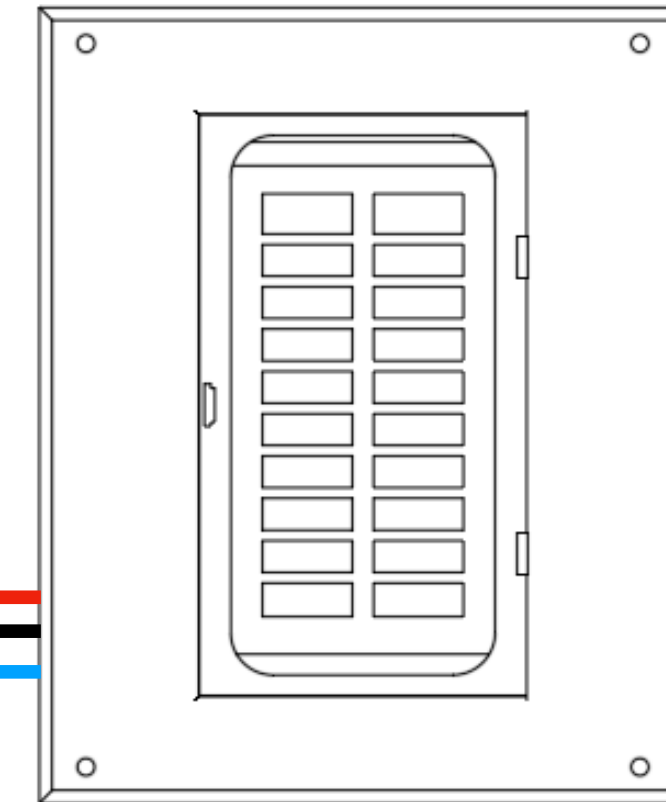
SINGLE PHASE CIRCUIT  
BREAKER PANEL



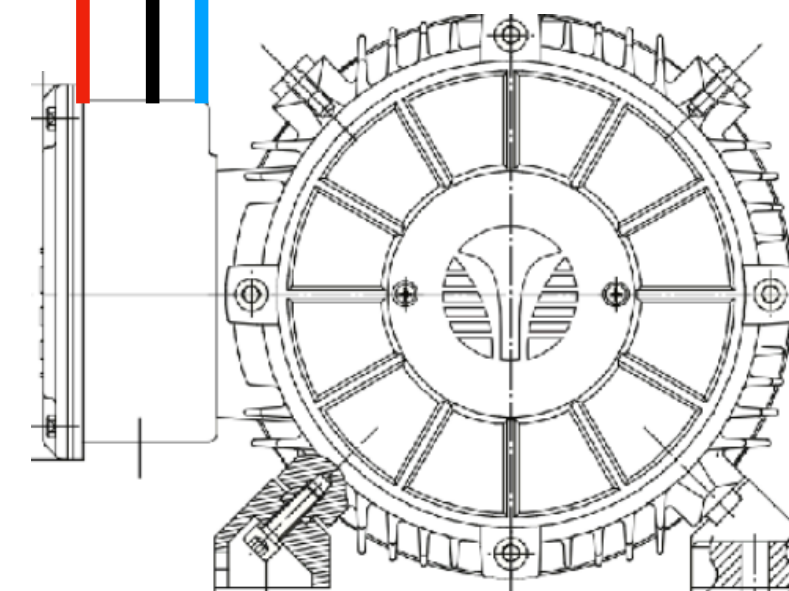
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PHASE CONVERTER PANEL



LOAD CENTER,  
3PH BREAKER  
PANEL, OR  
EQUIPMENT



IDLER/GENERATOR  
MOTOR

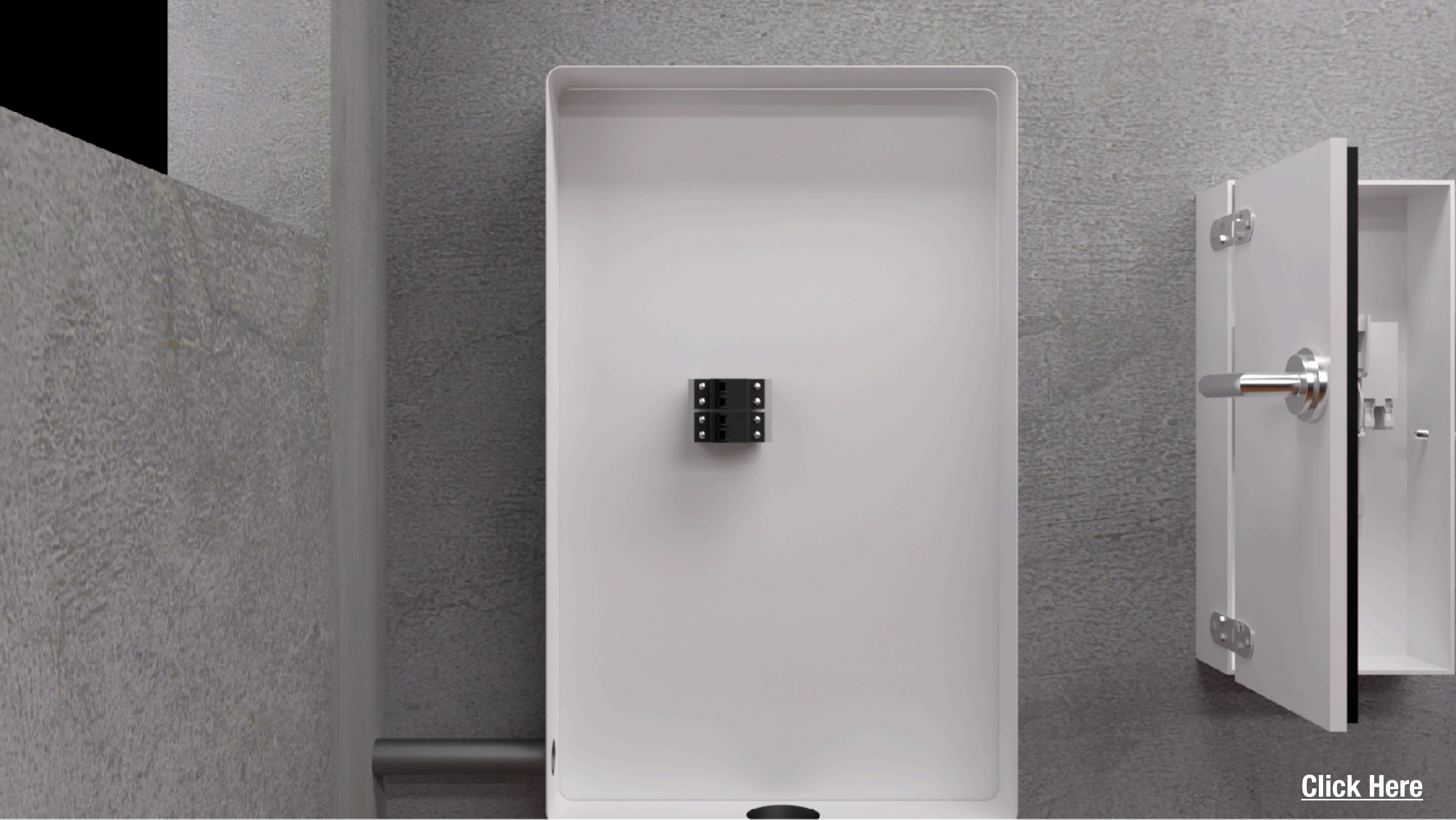
230V Connection for NL and PL Models (low voltage)

460V Connection for NH and PH Models (high voltage)

### 3d Animation of 12 Wire Idler Motor, Lead 1,7,6,12 to L1. Lead 2,4,10,12 to L2. Lead 3,5,9,11 to L3.



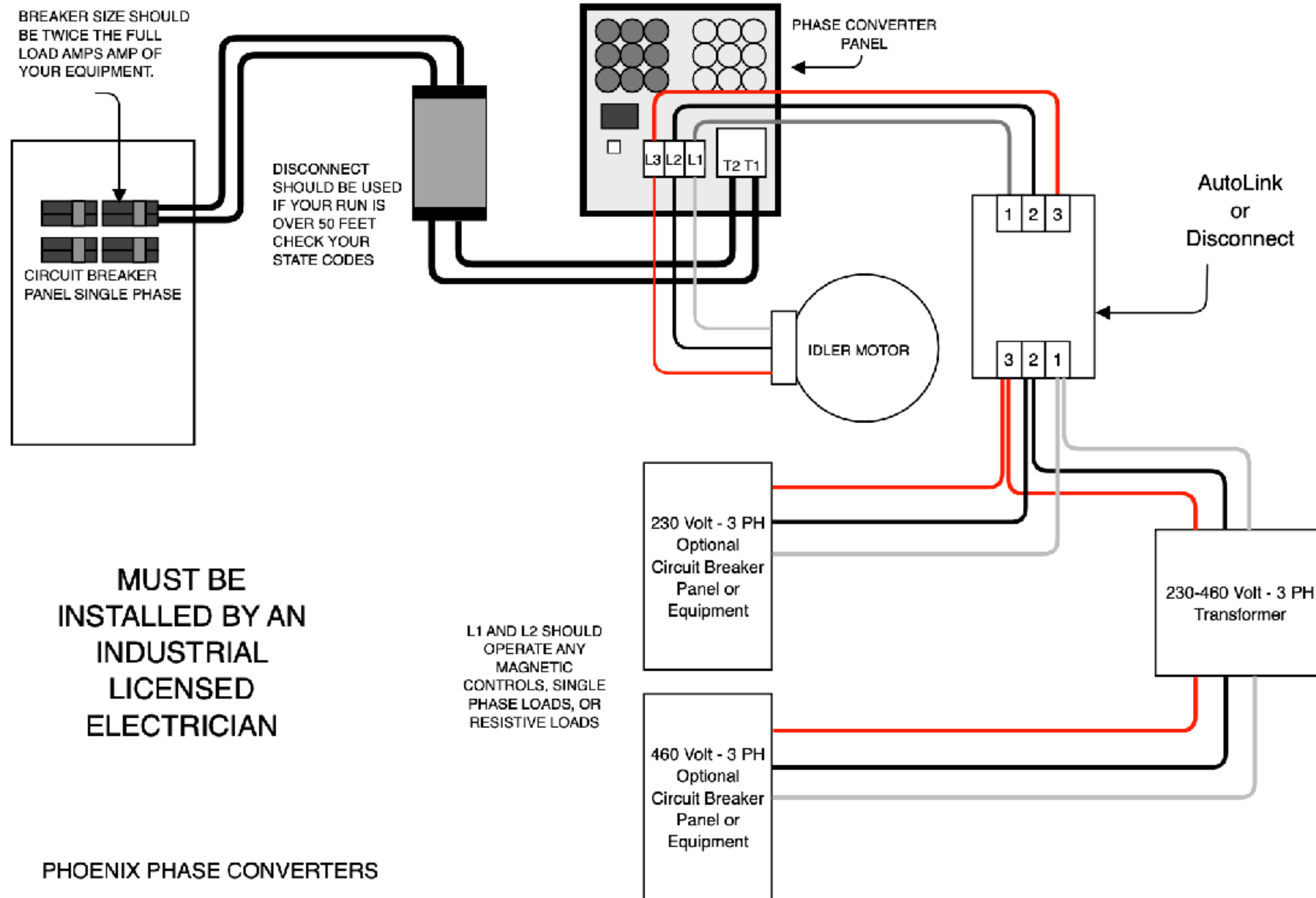
**3D Animation of 9 Wire Idler Motor, Lead 1,7 to L1. Lead 2,8 to L2. Lead 3,9 to L3, Lead 4,5,6 together.**



[Click Here](#)

# PL Model using a AutoLink or disconnect to a transformer.

# Connecting a Transformer to a Phase Converter



When connecting a transformer to a phase converter, you must have a disconnect or a AutoLink in-between the phase converter and transformer, the phase converter must not be started with any loads, that includes transformers.

# 3D Animation Connecting a Transformer to a Phase Converter

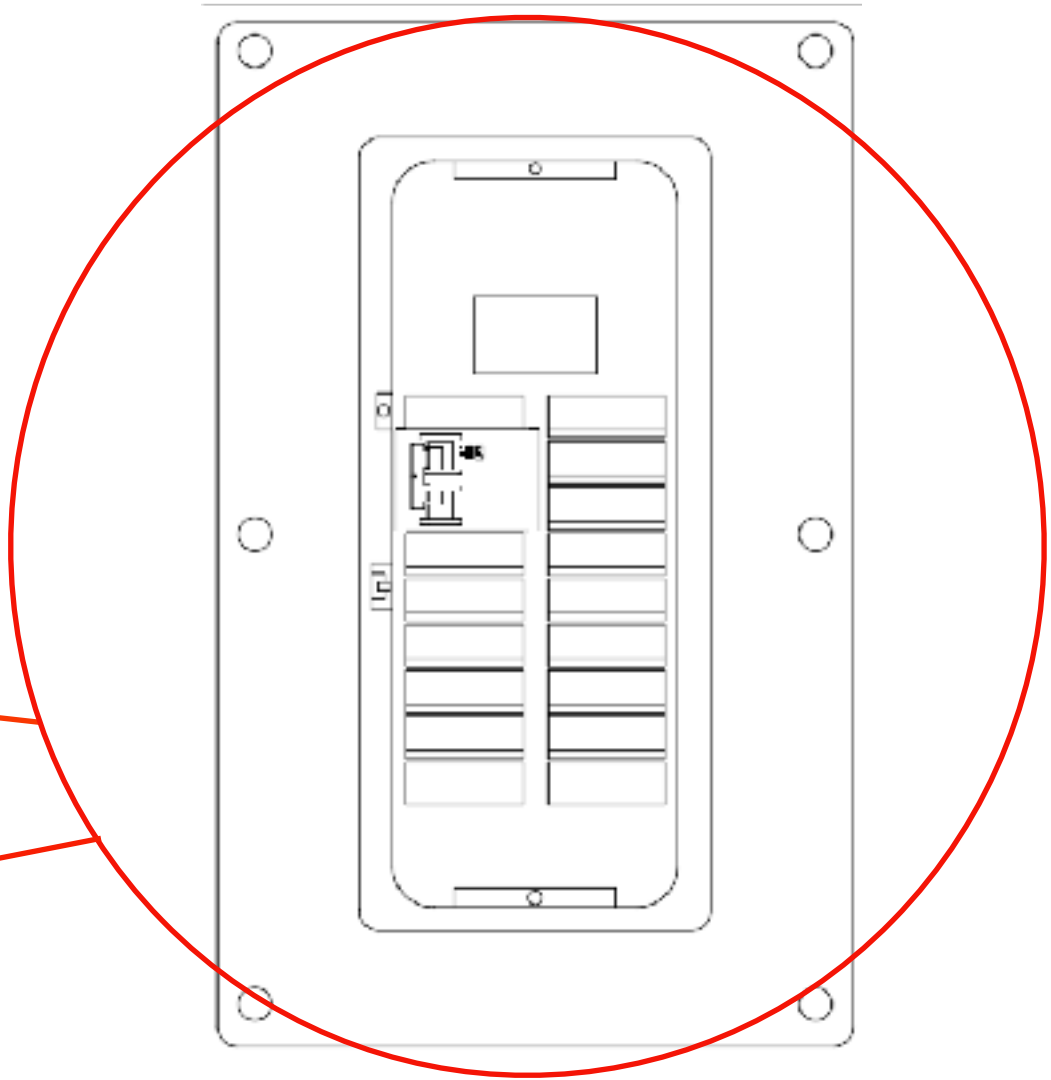
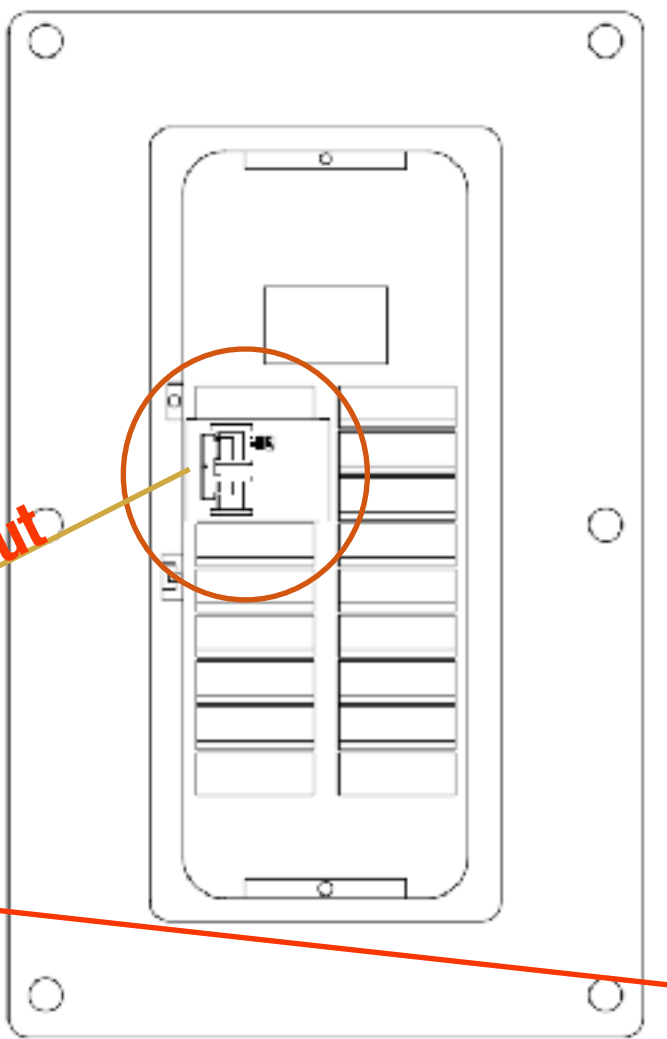
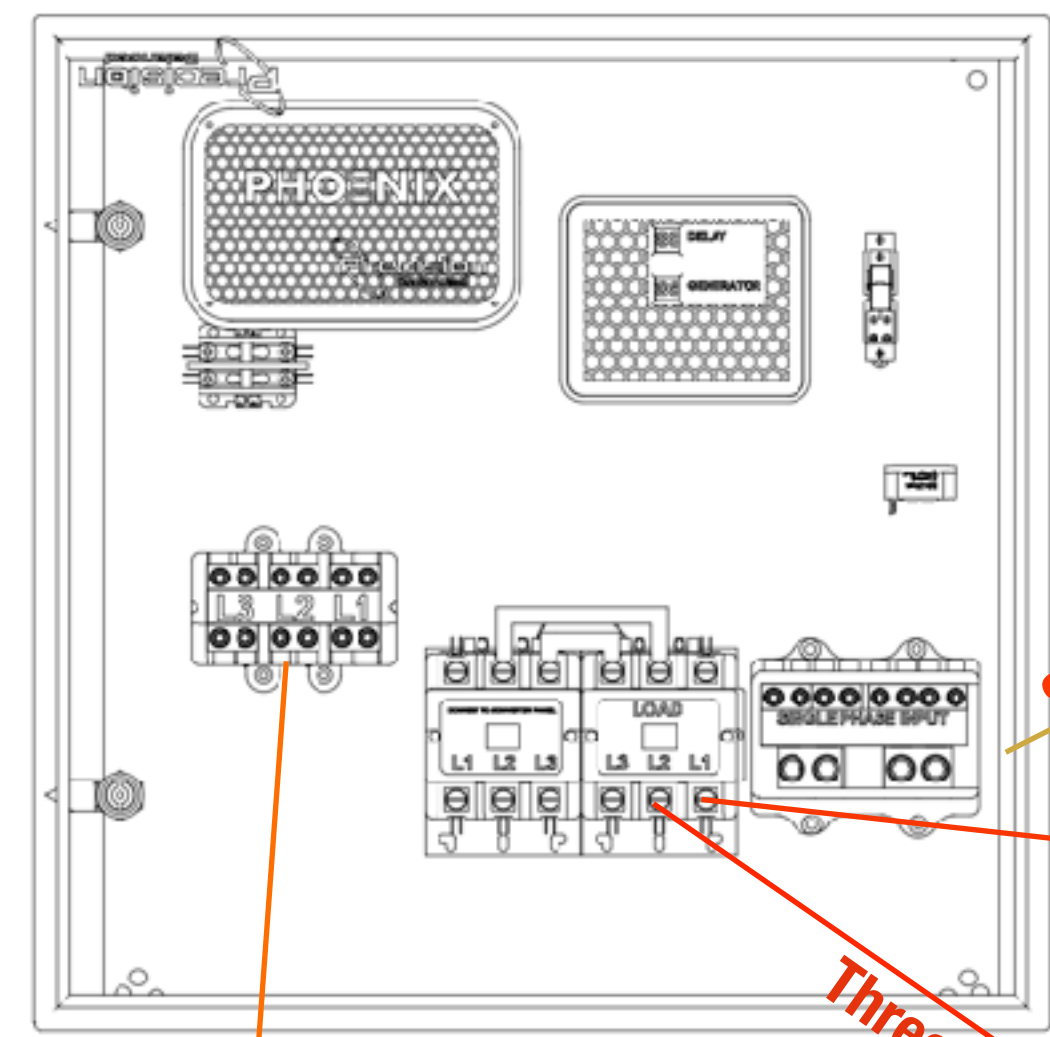


# AUTOSTART WITH BUILT-IN CONVERTER LINE DIAGRAM

AutoStart and Phase Converter Panel

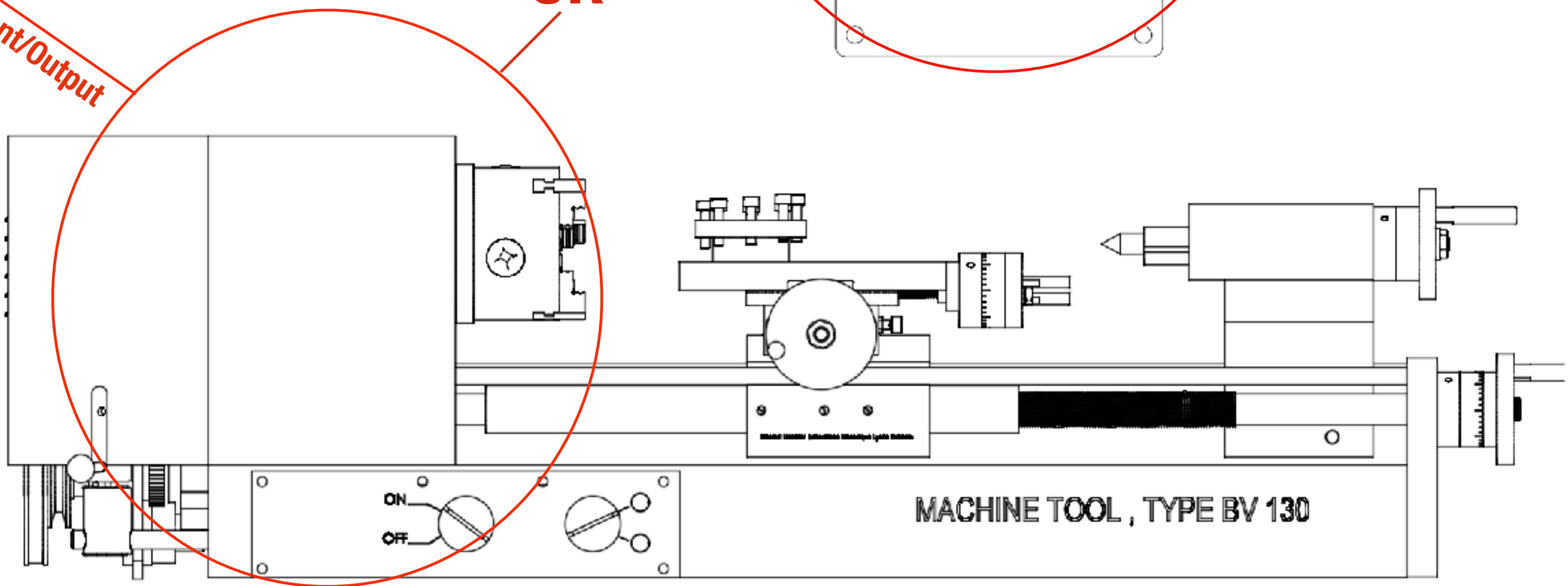
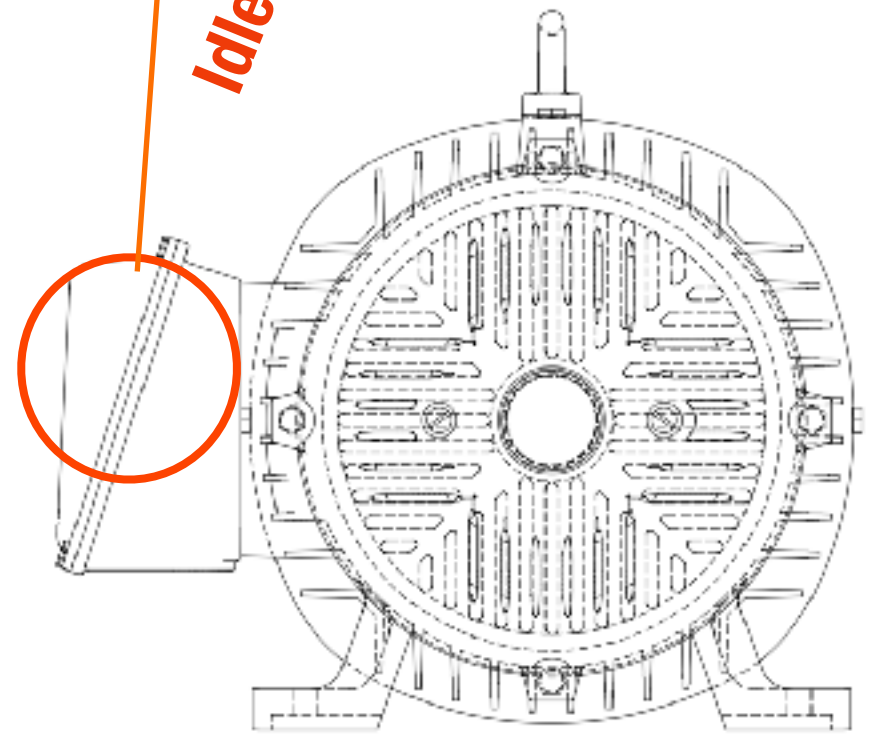
Single Phase Breaker Panel

Three Phase Breaker Panel or Load Center

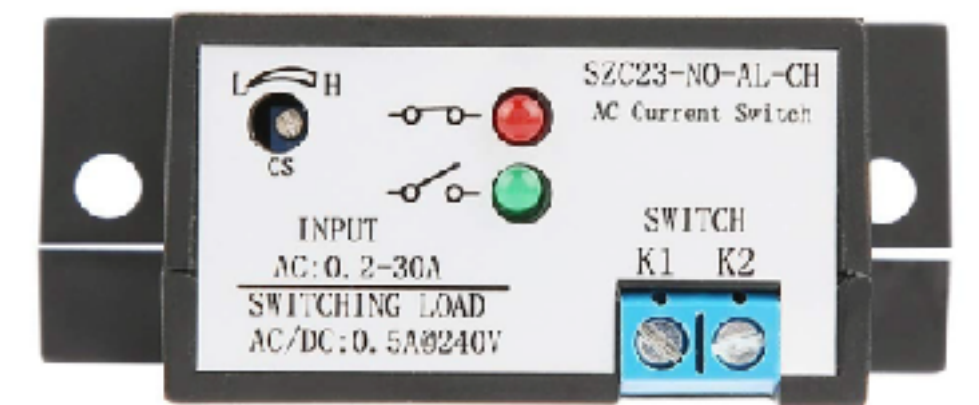
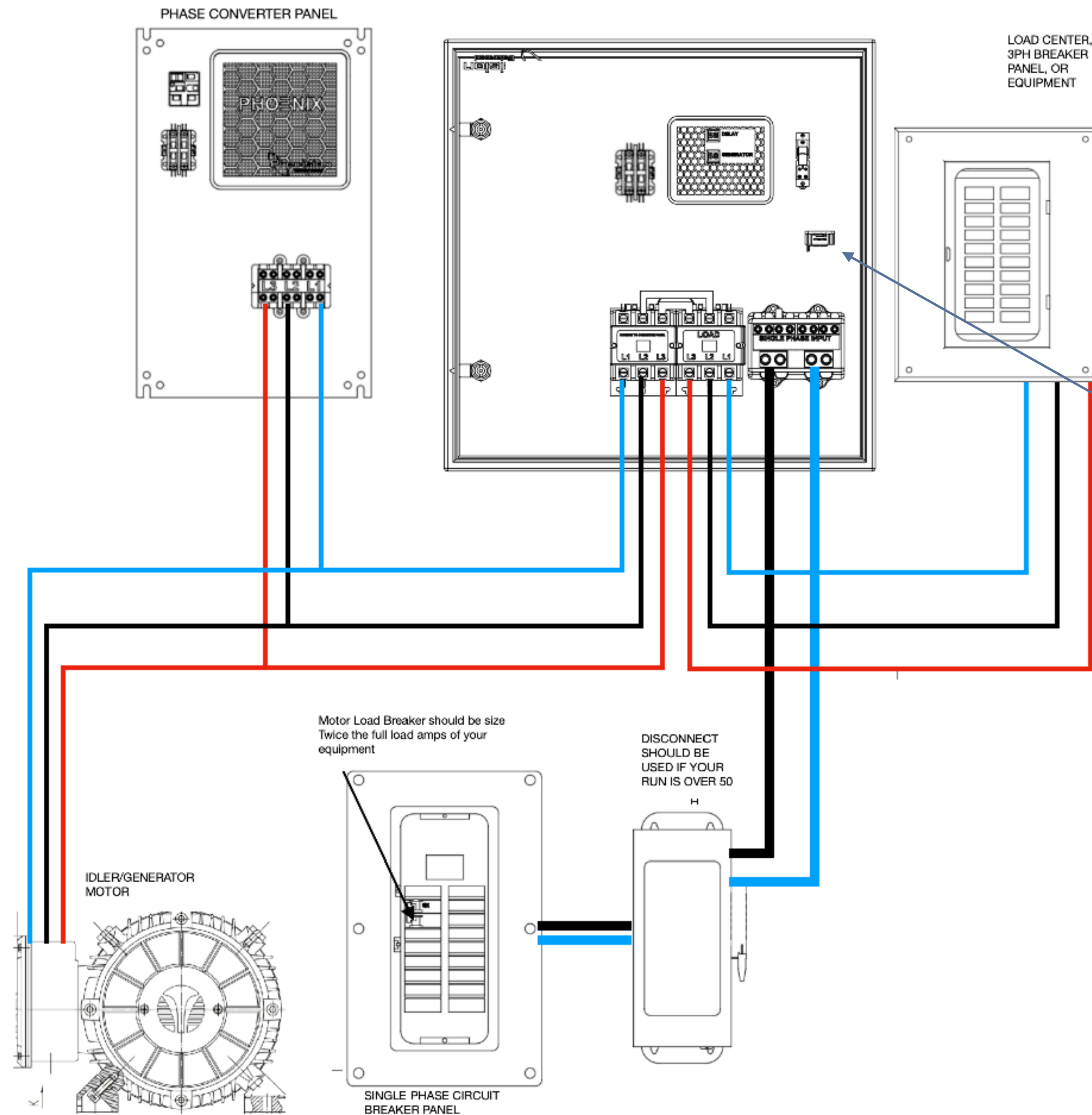


OR

Idler Motor



# AutoStart Phase Converter Separate from the Phase Converter Panel

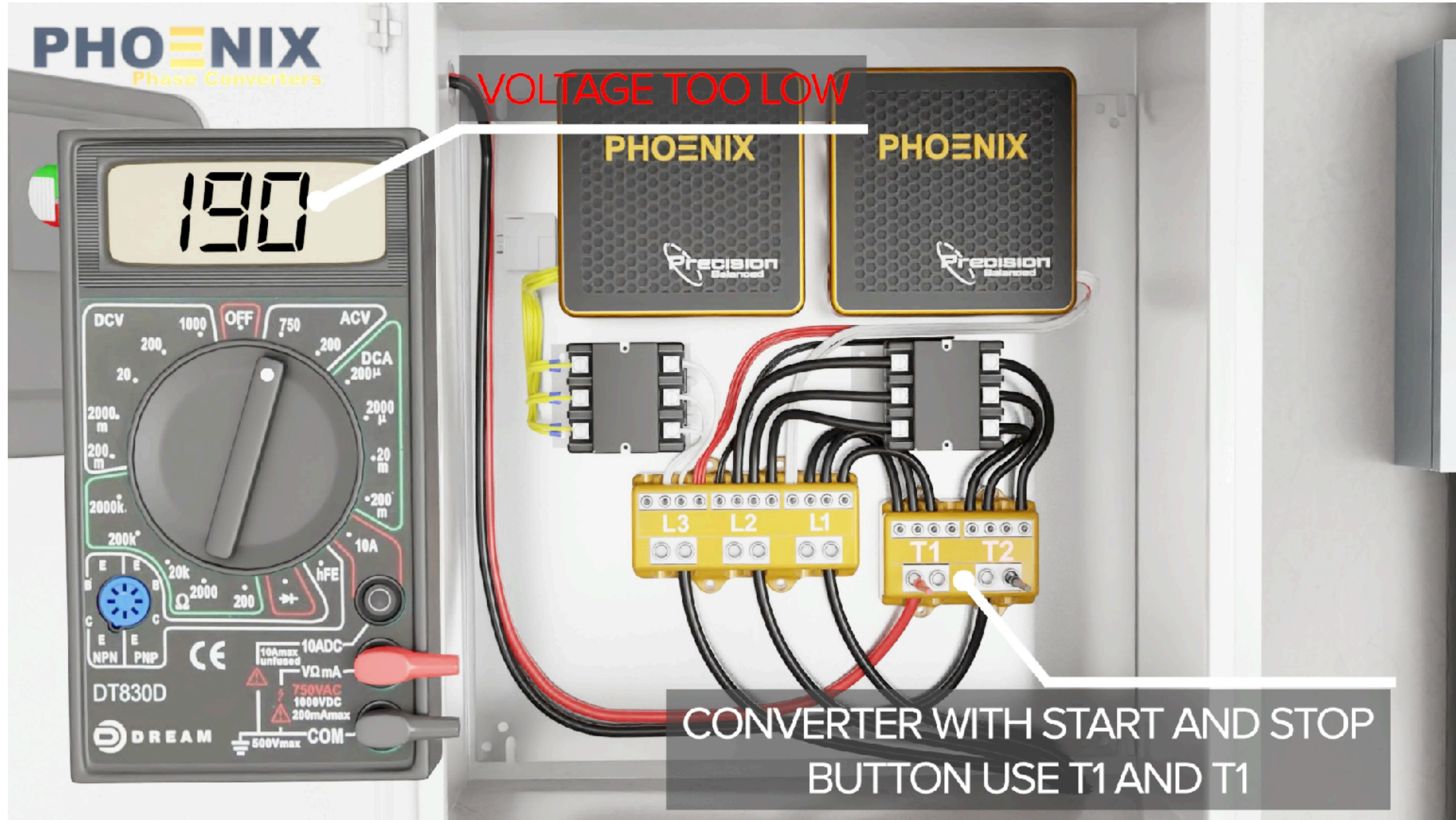


On the current sensor use L and H to adjust the sensitivity detecting your load, or add more loops with the yellow wire provided.



# Checking for Voltage Dropping while Powering ON the Phase Converter.

[Click on the video below.](#)

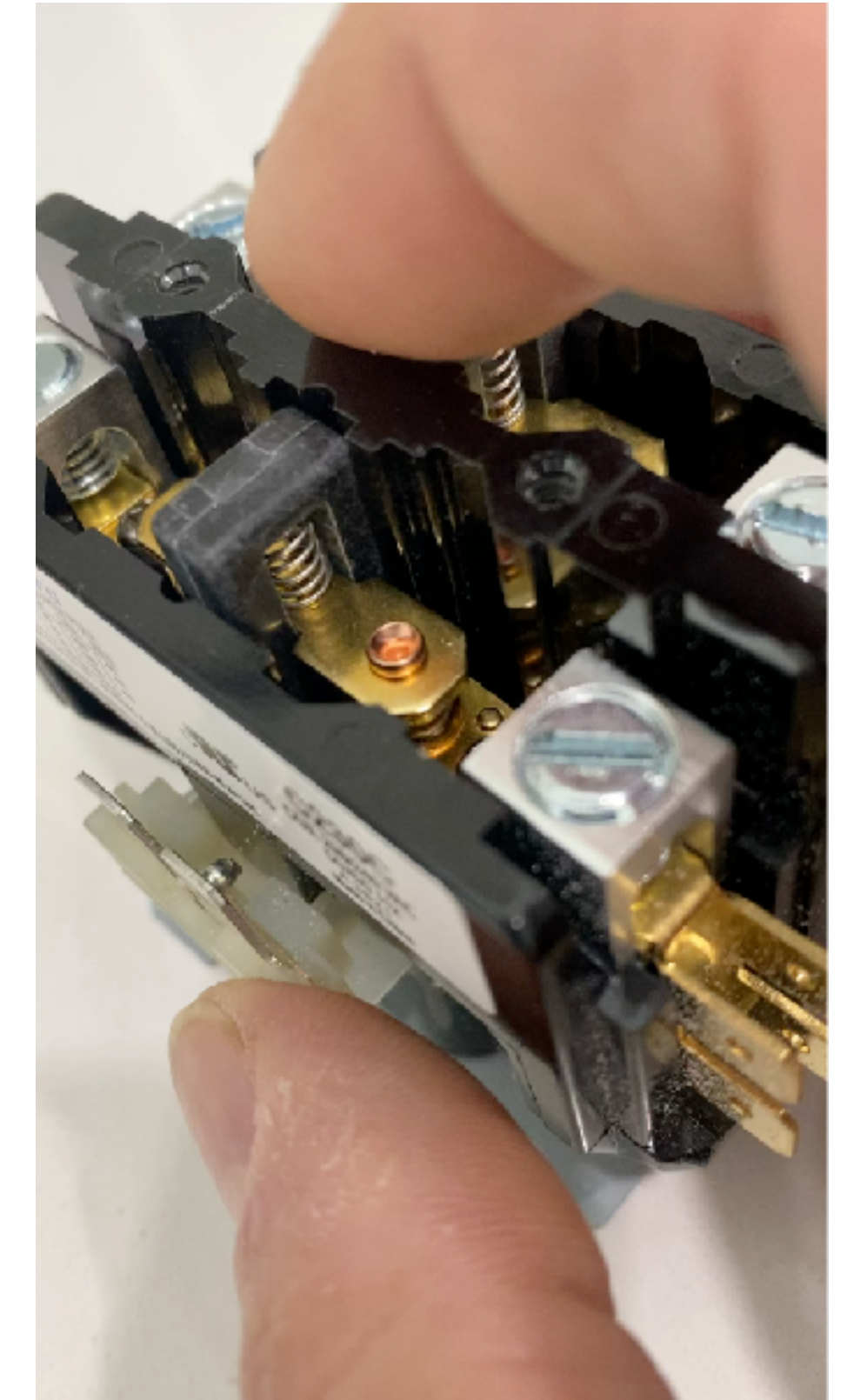
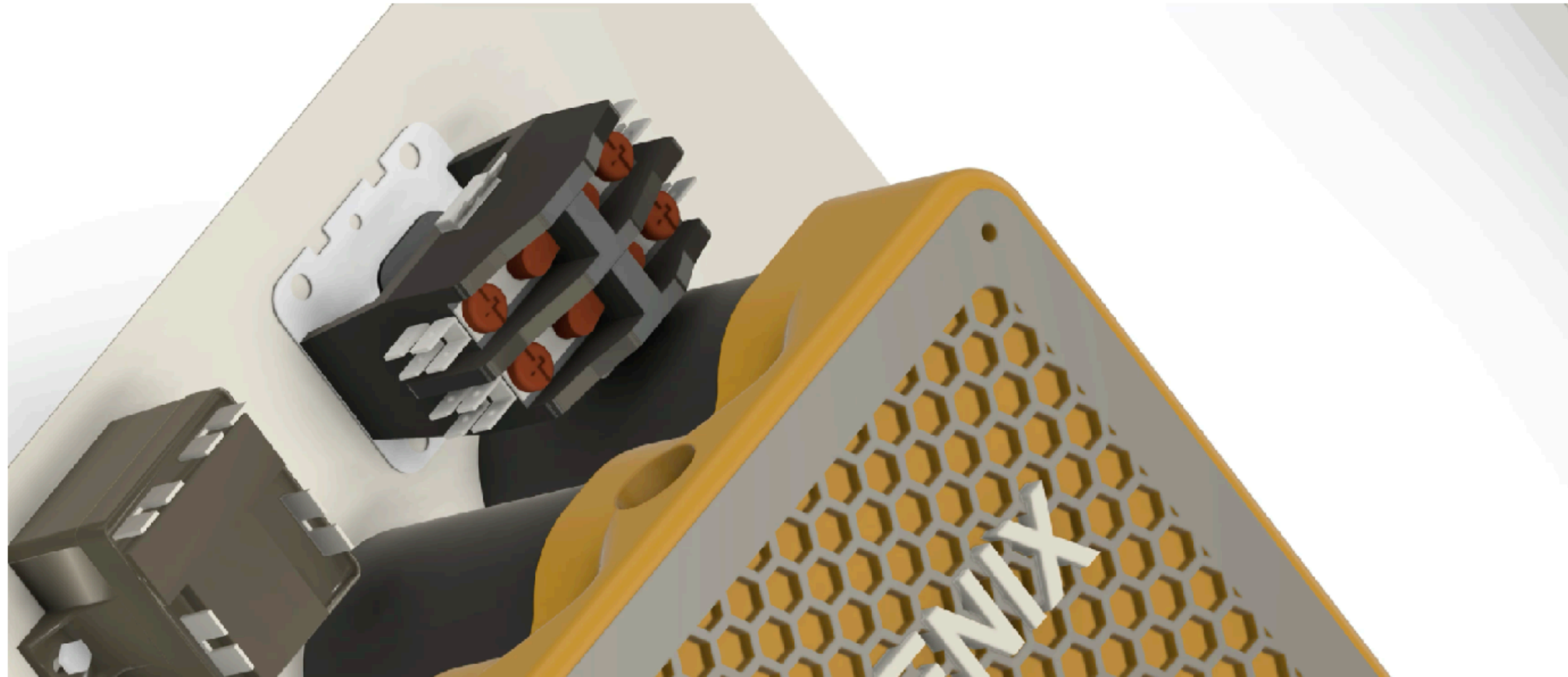


Most common reason for a phase converter not coming up to speed while trying to start is the voltage on your single phase line is dropping, On PL models you want to put a voltmeter on T1 and T2, check the voltage while trying to start the converter, if the voltage is dropping below 215 you could have problems start the phase converter. On NL models put your meter on L1 and L2, watch the video to resolve this issue.

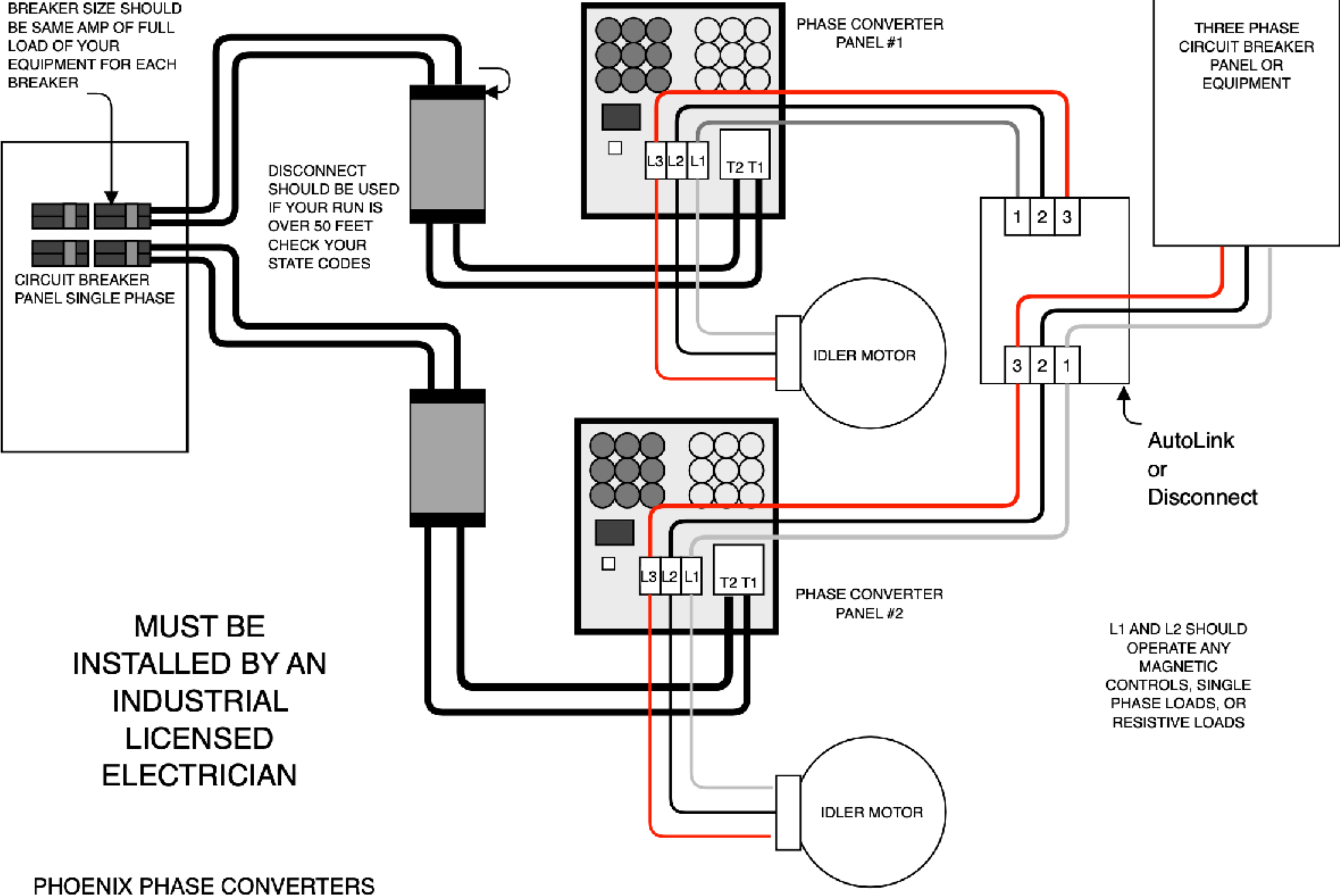
# CHECKING THE START CAPACITOR CONTACTOR

[Click here to find the start contactor in your version converter.](#)

Next click on the video below to check if the contactor is fused together.



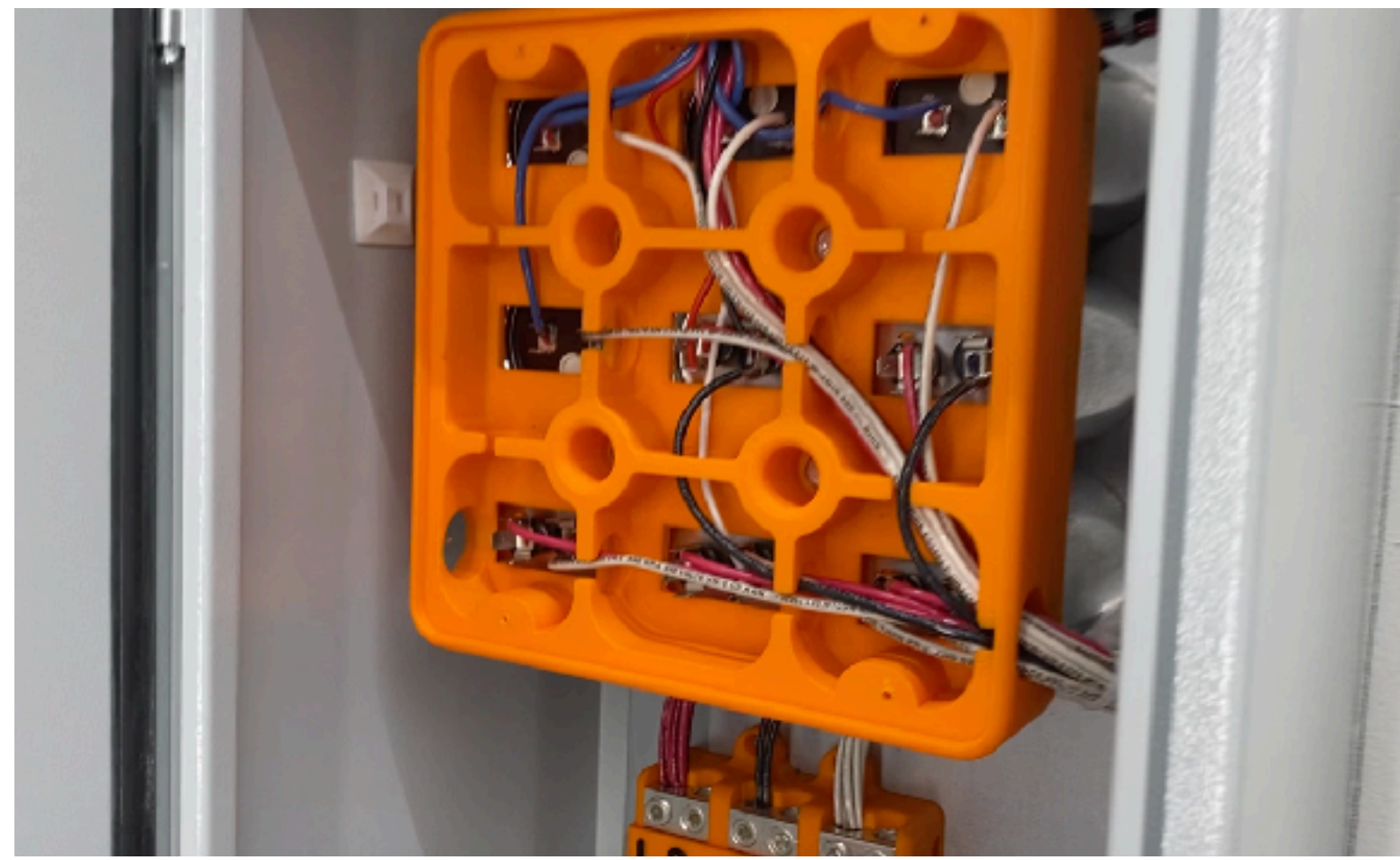
# Combining Two or More Phase Converters together.



## 3D Animation pairing two Phoenix Converters Together



# Checking for a Blown Capacitor



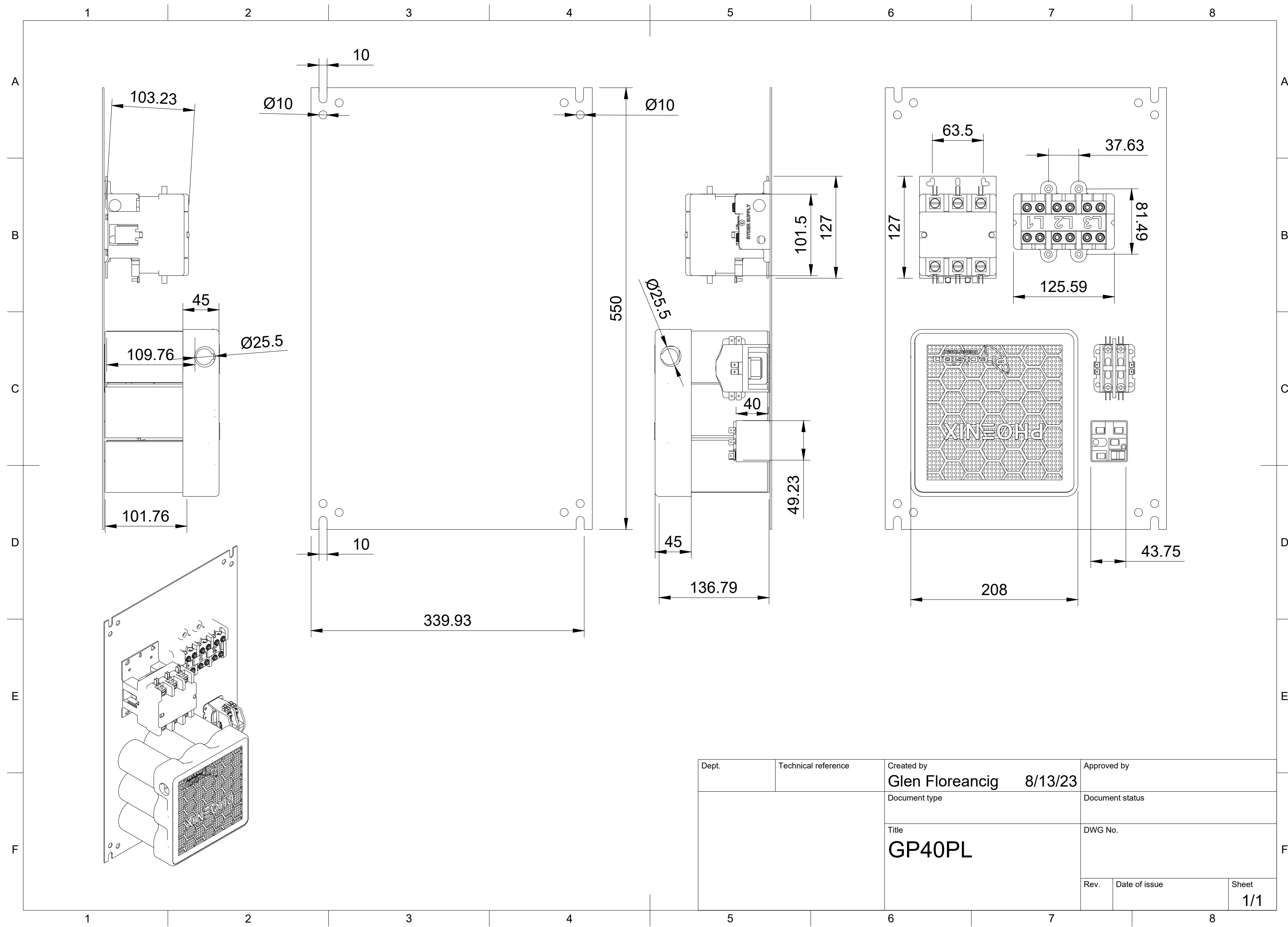
**BAD (replace)**



**GOOD**



This should be preformed by an electrician, capacitors may hold a electrical charge, make sure the phase converter main breaker is off, remove the cover to the capacitor holder, check all the (black capacitors) start caps, check for punctures in the film covering the hole.



# Dimensions

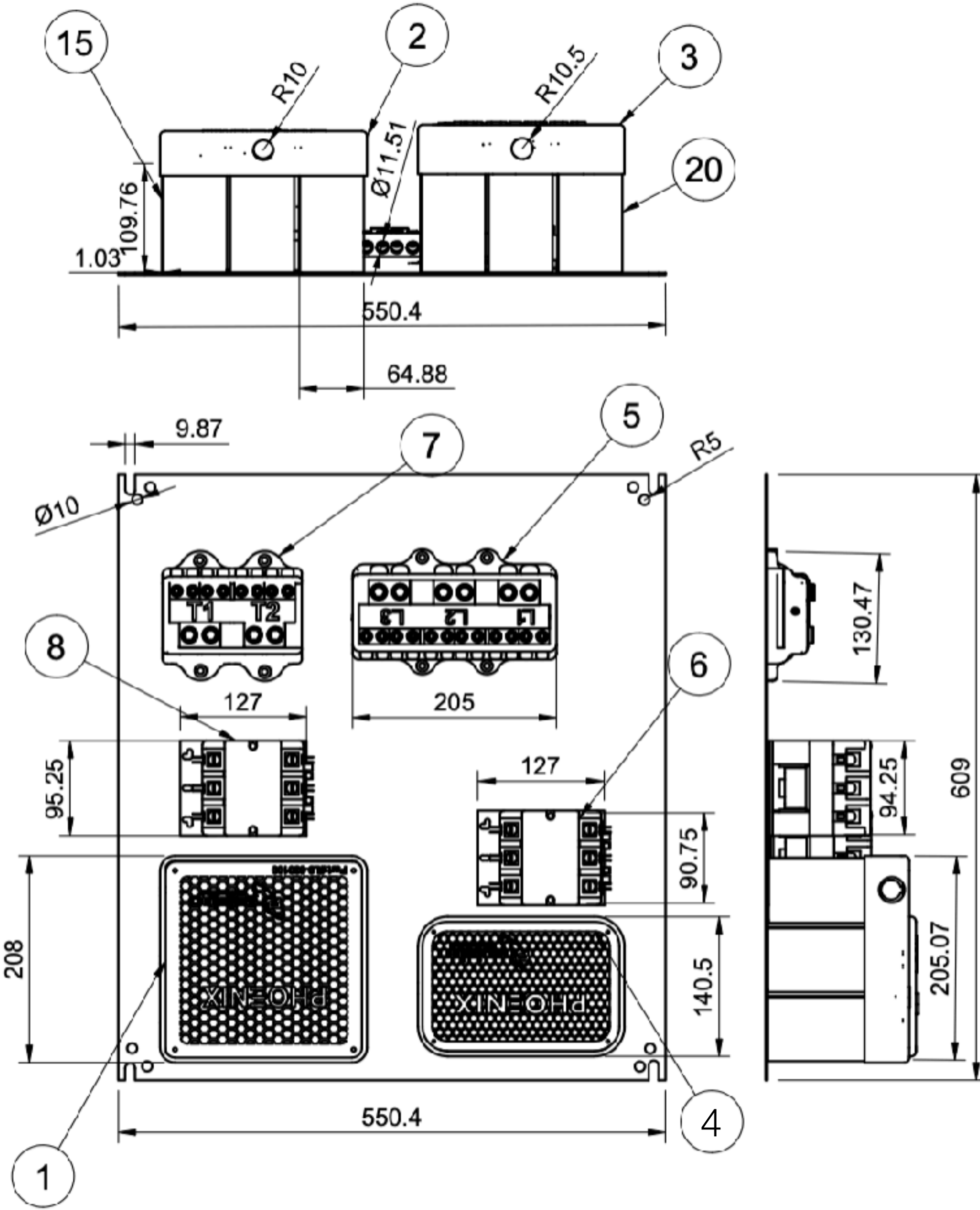
## GP40PL

## GP30PL

## GP25PL

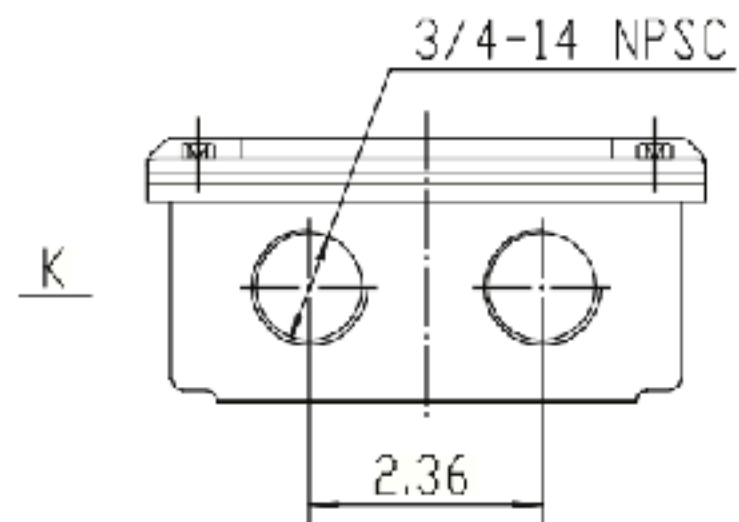
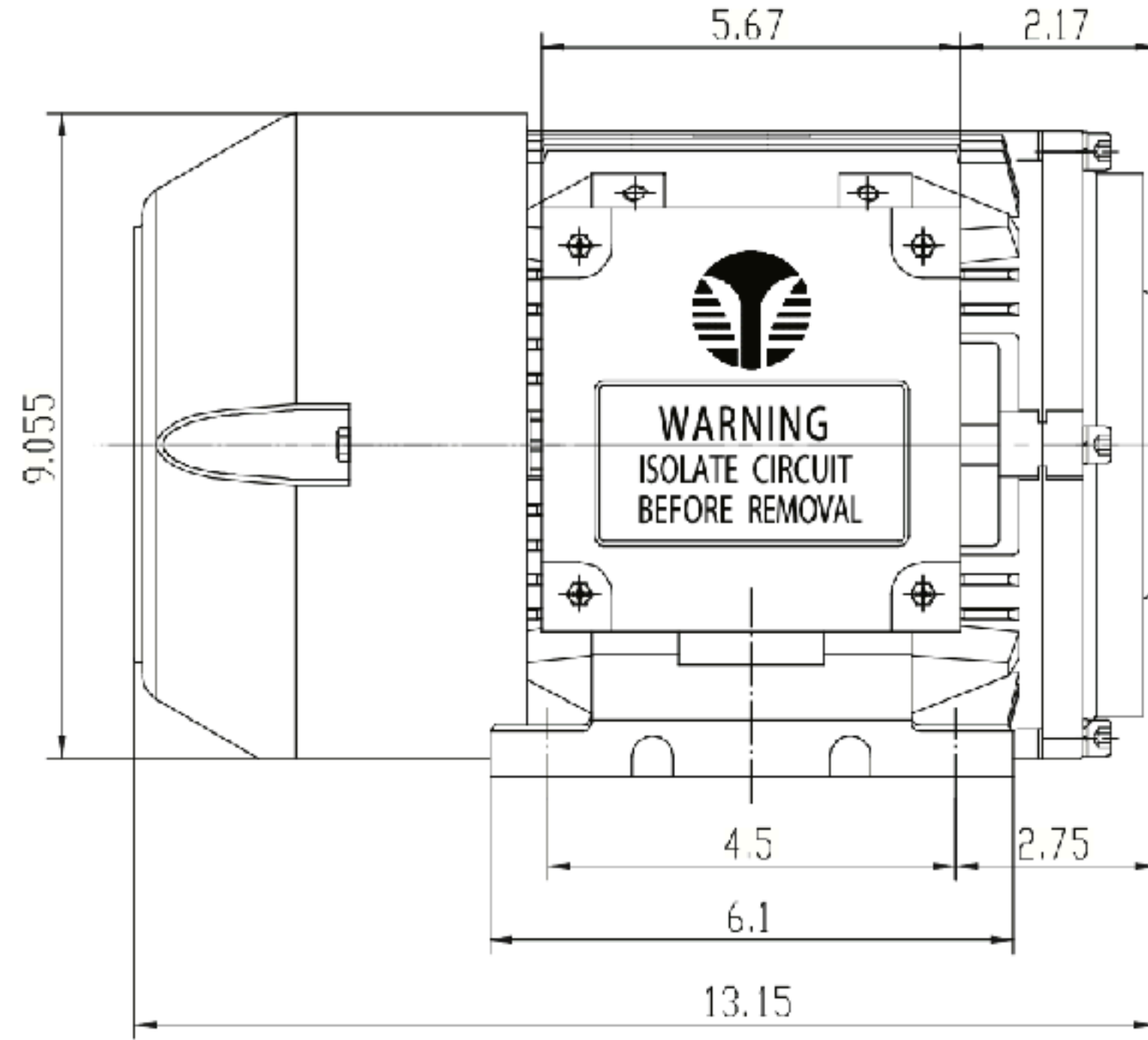
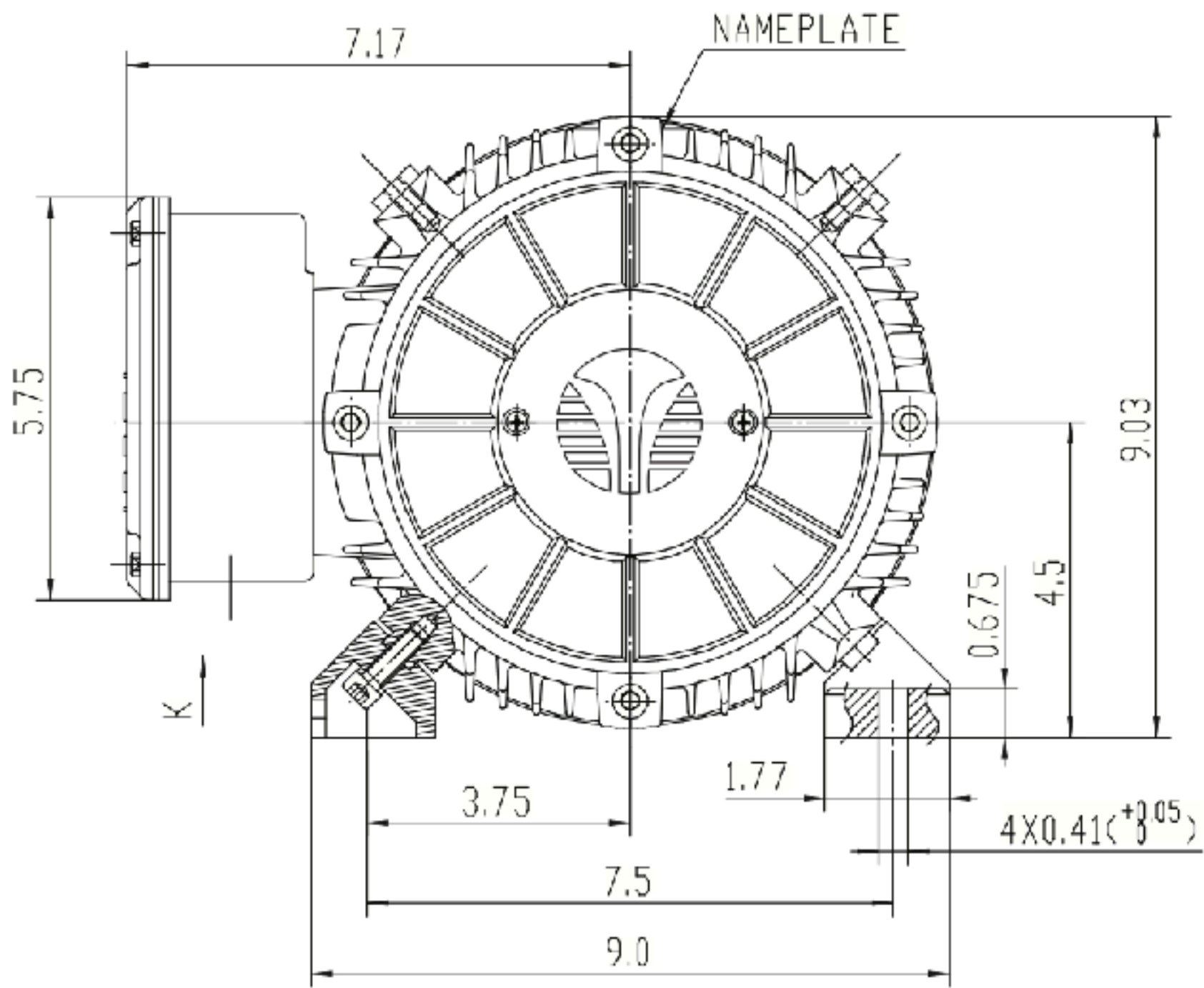


# Dimensions and Parts Lists GP50PL and GP60PL



1	CH9630100	Capacitor Holder 9 Caps
2	CHL9630100	Capacitor Holder Lid 9 Caps
3	CHL6630100	Capacitor Holder Lid 6 Caps 6 Caps
4	CH6630100	Capacitor Holder 6 Caps
5	RYDER360	Three Phase Power Block
6	C375C	Start Capacitor Contactor
7	RYDER260	Single Phase Power Block
8	C390C	Power Contactor
15	TRC100	100 MFD Run Capacitor
20	PTM630	630 MFD Start Capacitor

# 3 HP and 5 HP Idler Motor Dimensions and Weight

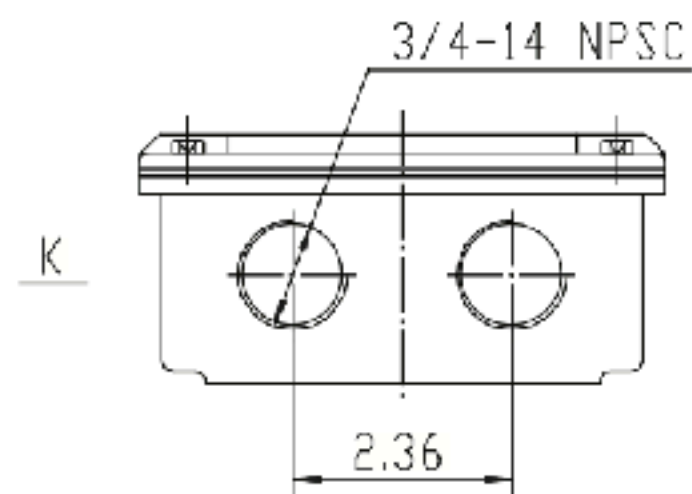
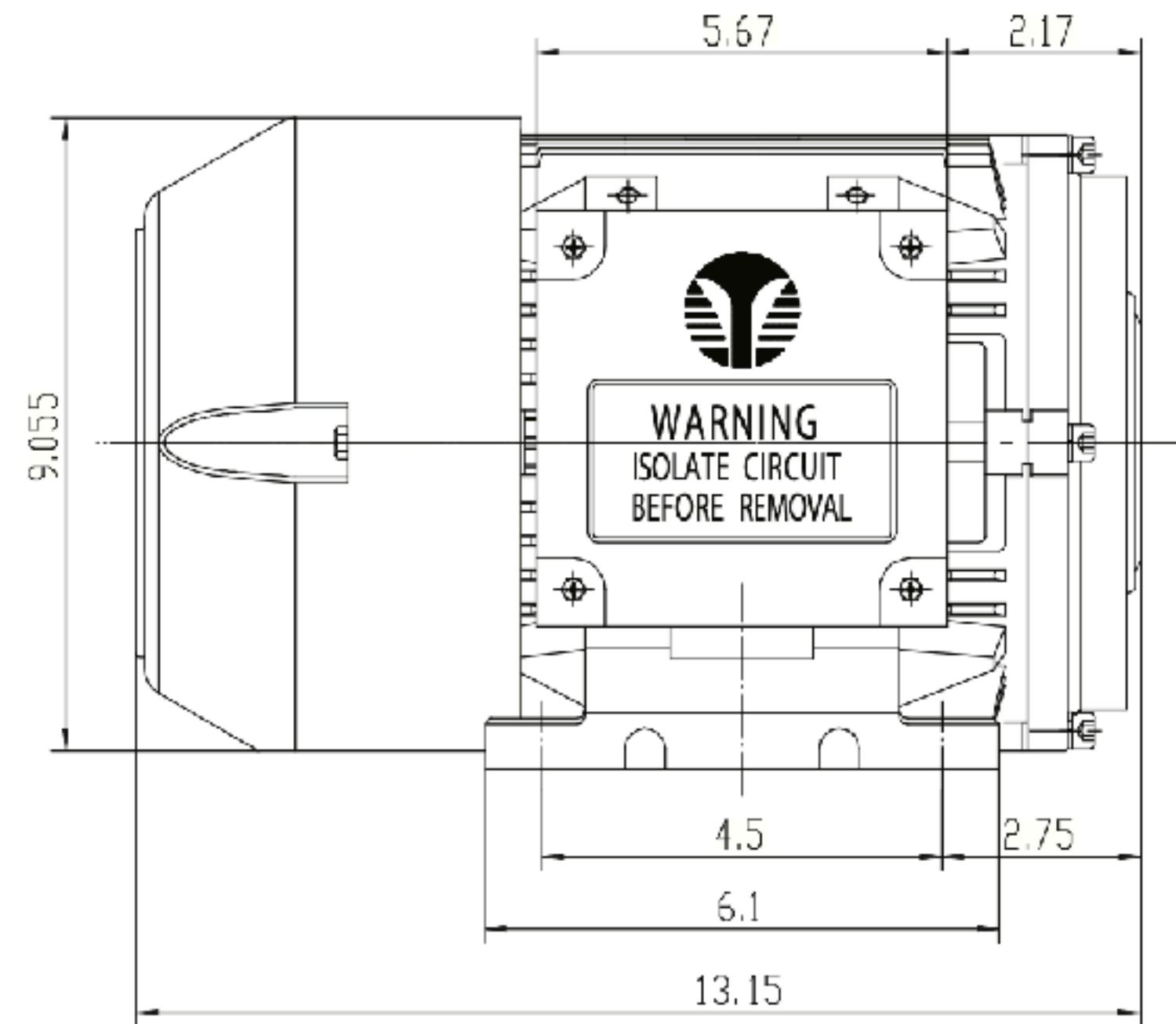
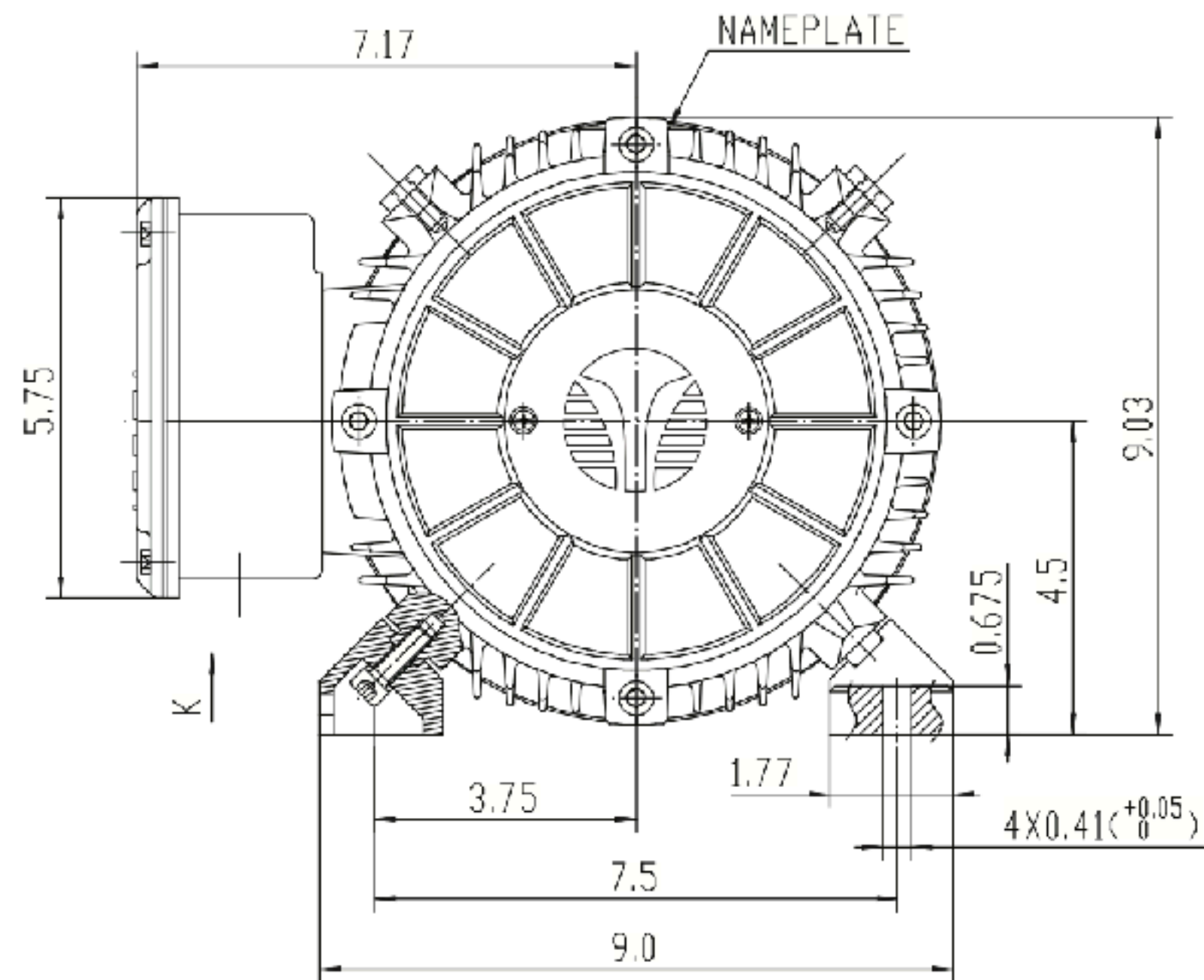


Weight: 3 HP = 94.815 lbs  
Weight: 5 HP = 110.25 lbs





# 7.5 HP Idler Motor Dimensions and Weight

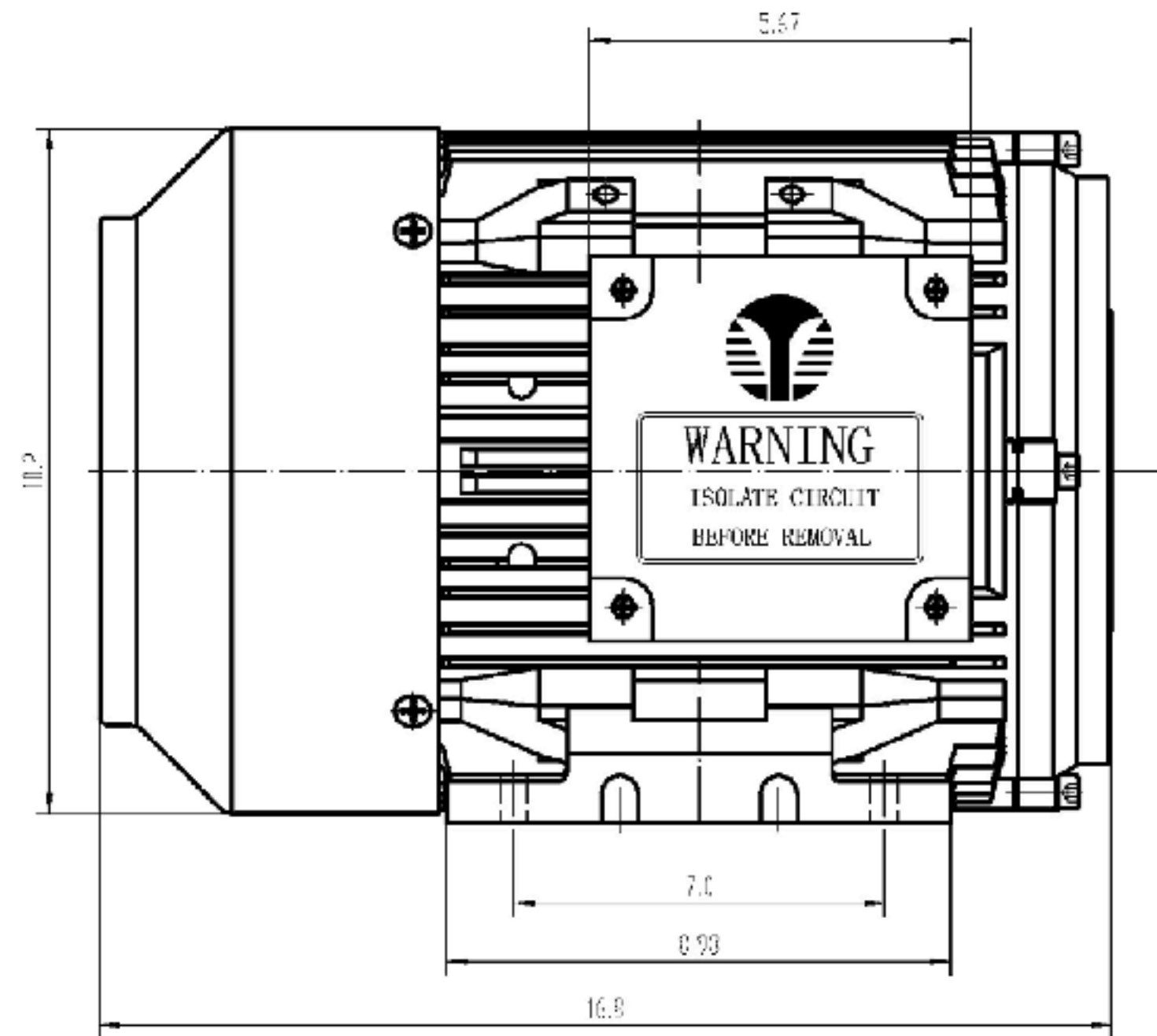
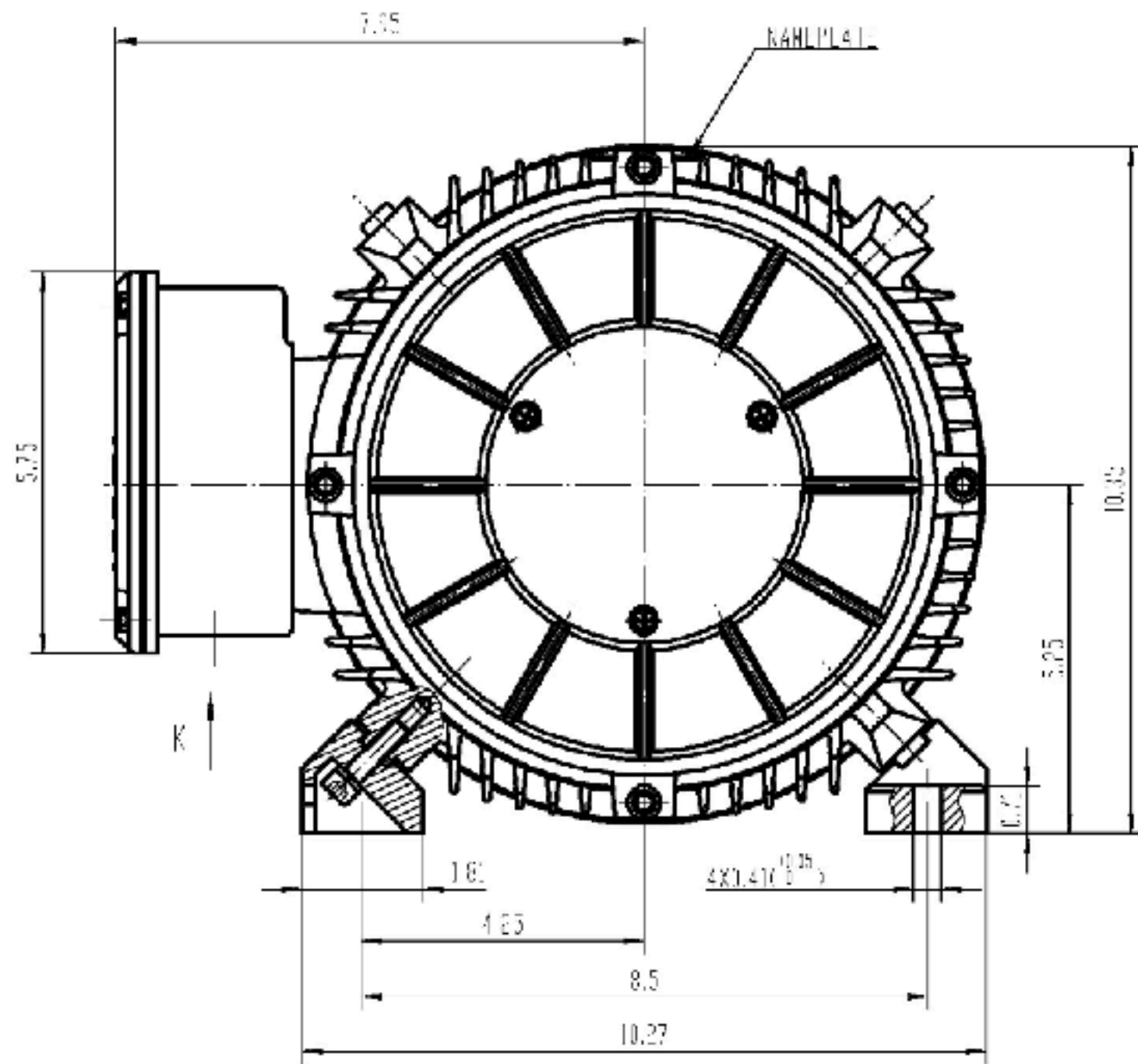


Weight: 158.76 lbs

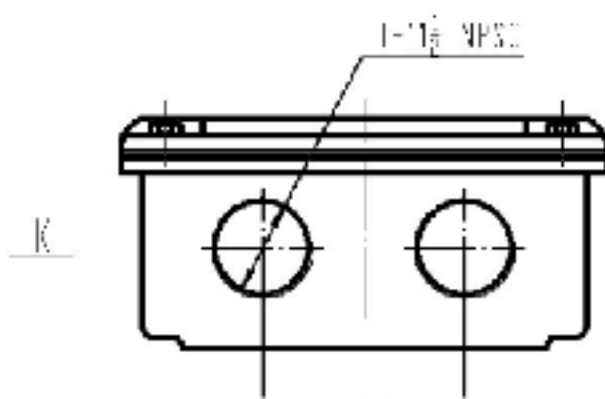
[3D Viewer](#)



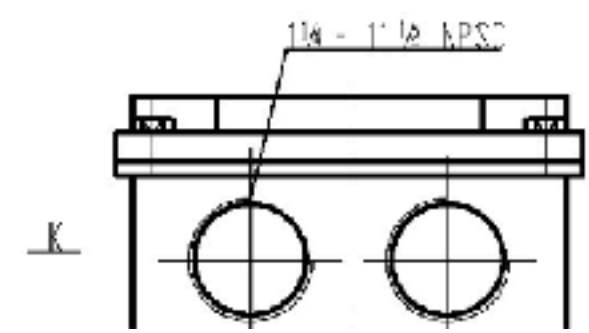
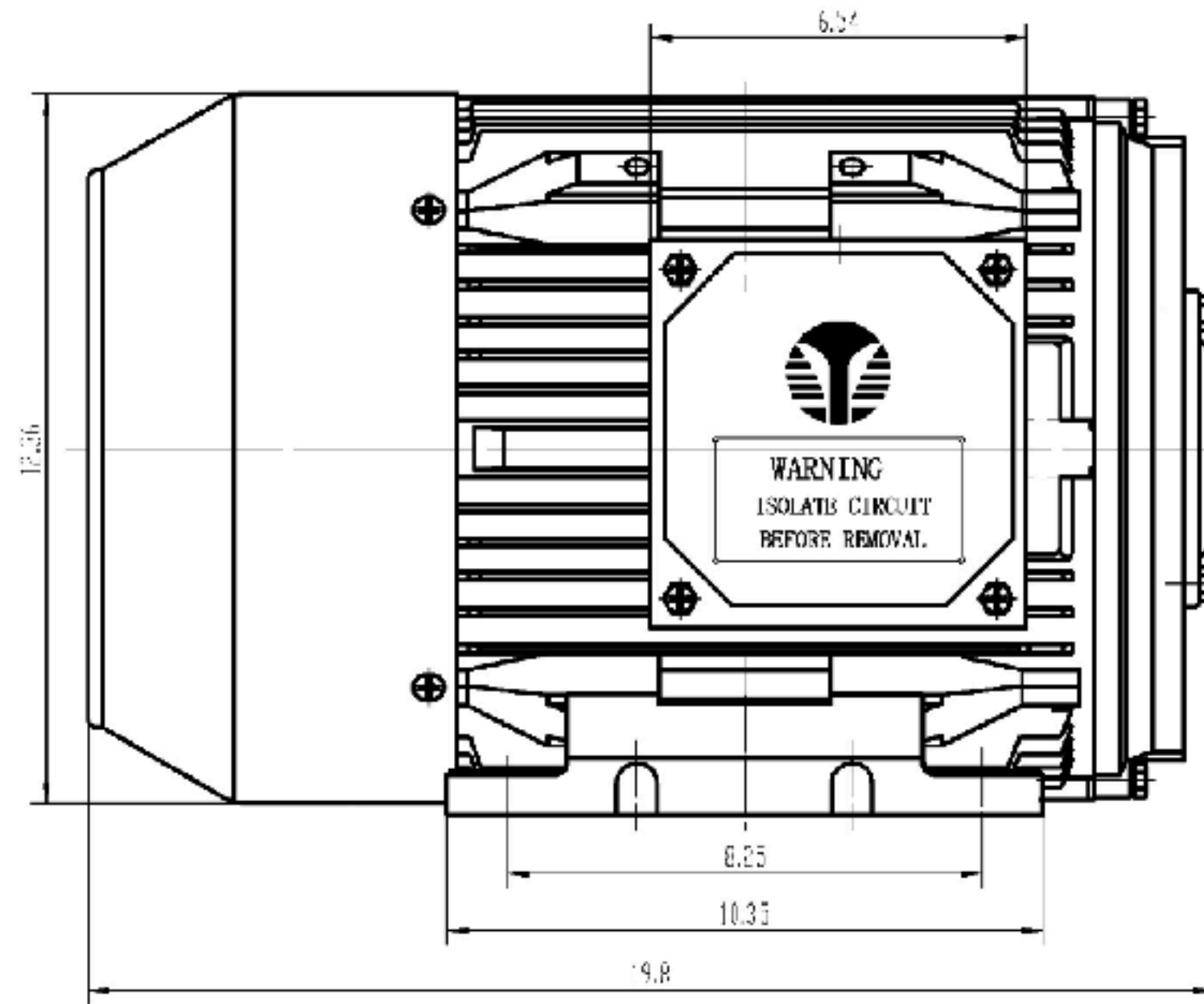
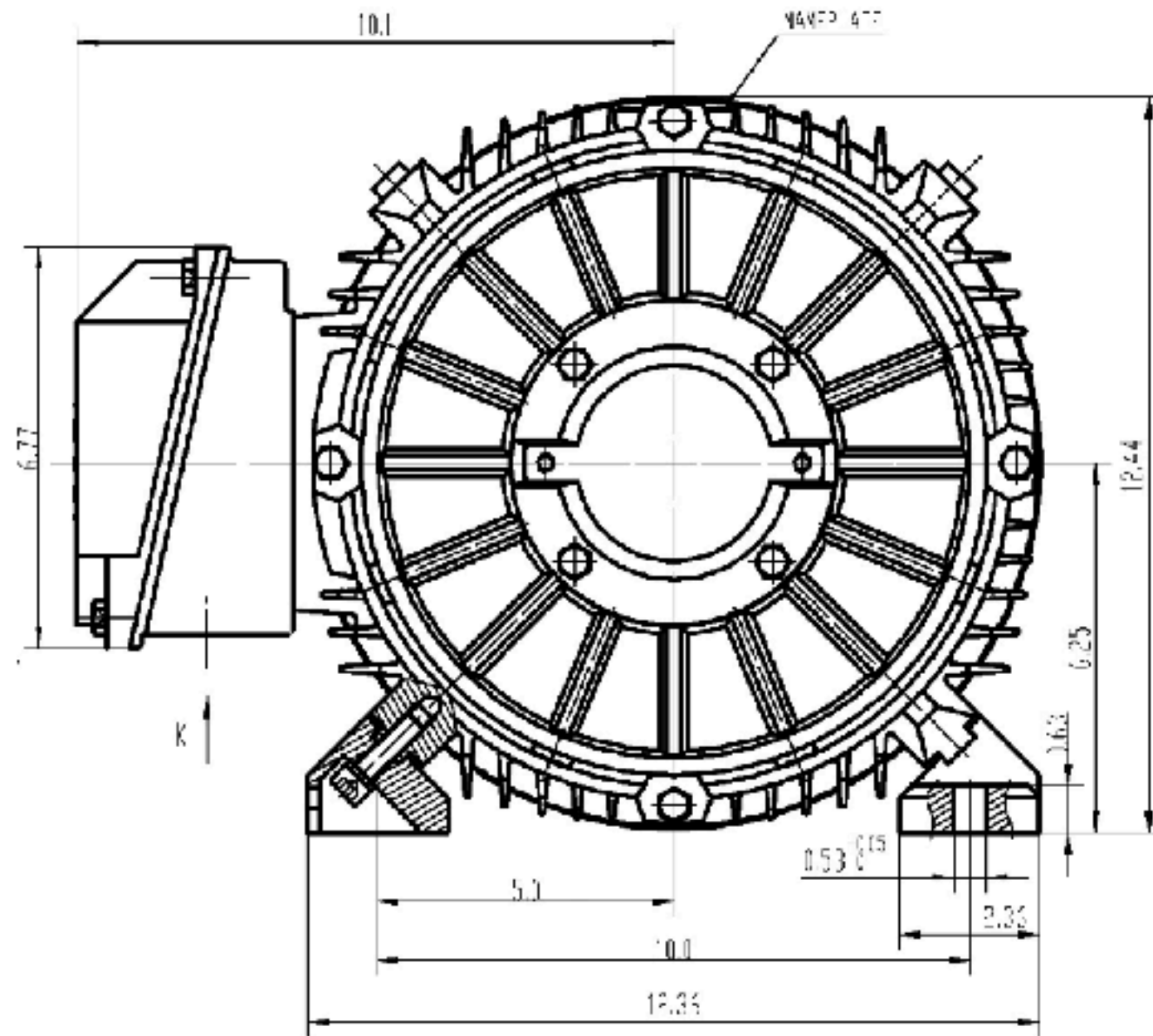
# 10 HP Idler Motor Dimensions and Weight



Weight: 181.9 lbs



# 15 HP and 20 HP Idler Motor Dimensions and Weight

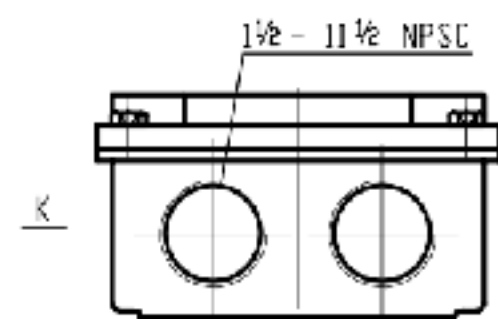
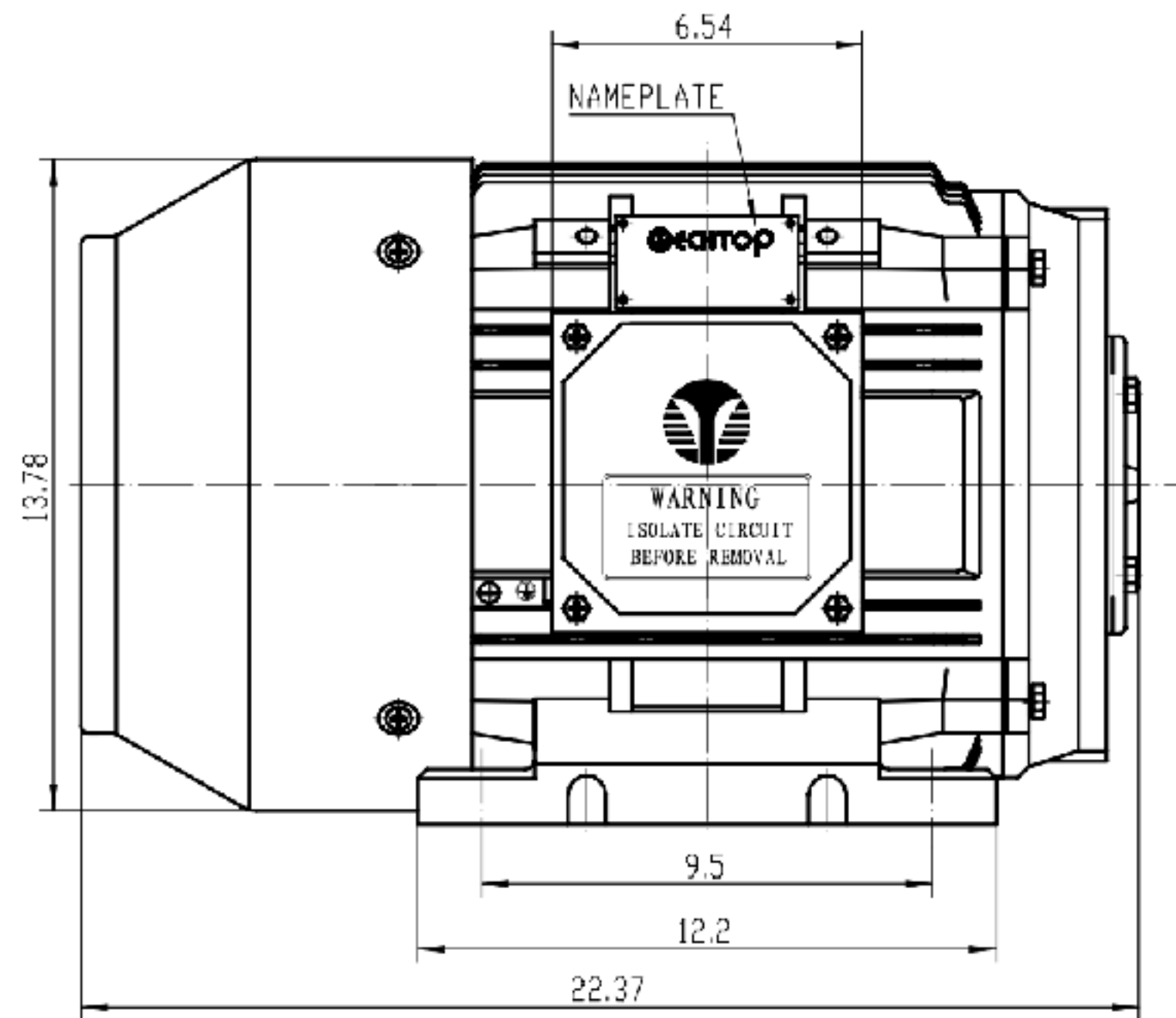
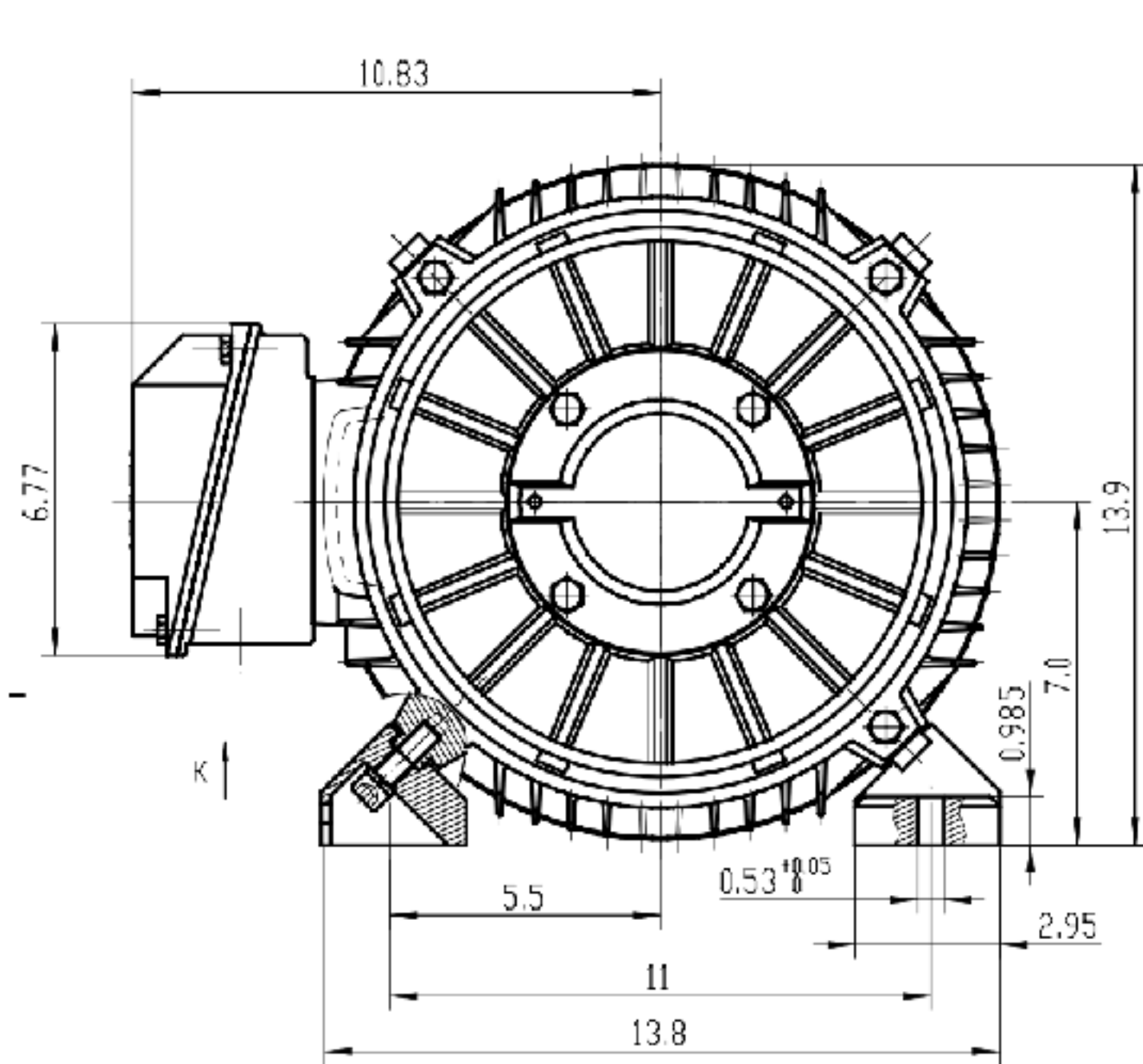


Weight: 15 HP = 278.9 lbs

Weight: 20 HP = 330.75 lbs



## 25 HP and 30 HP Idler Motor Dimensions and Weight



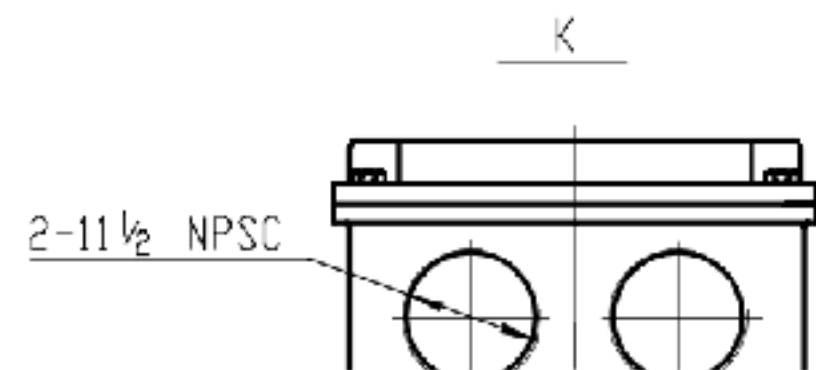
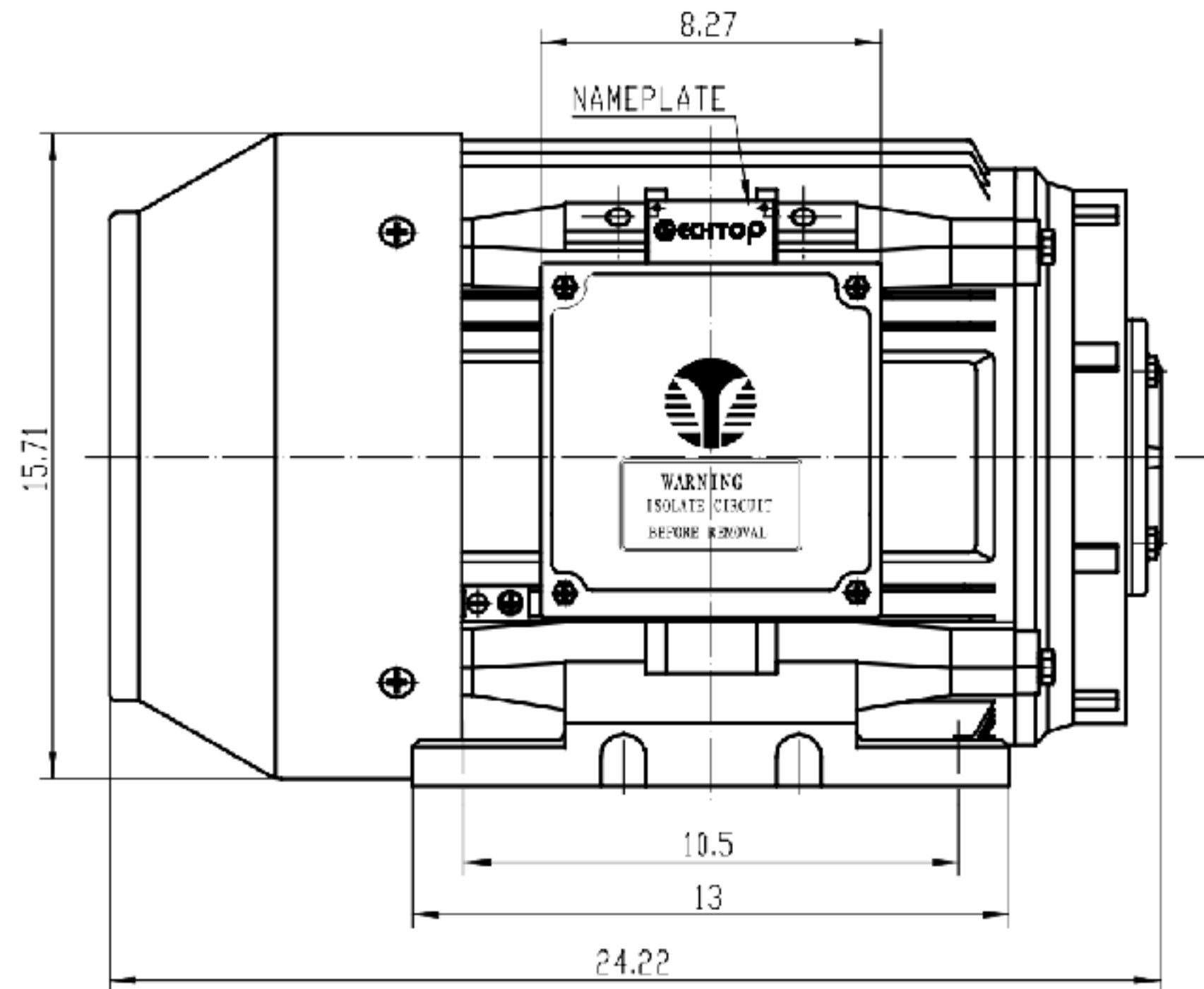
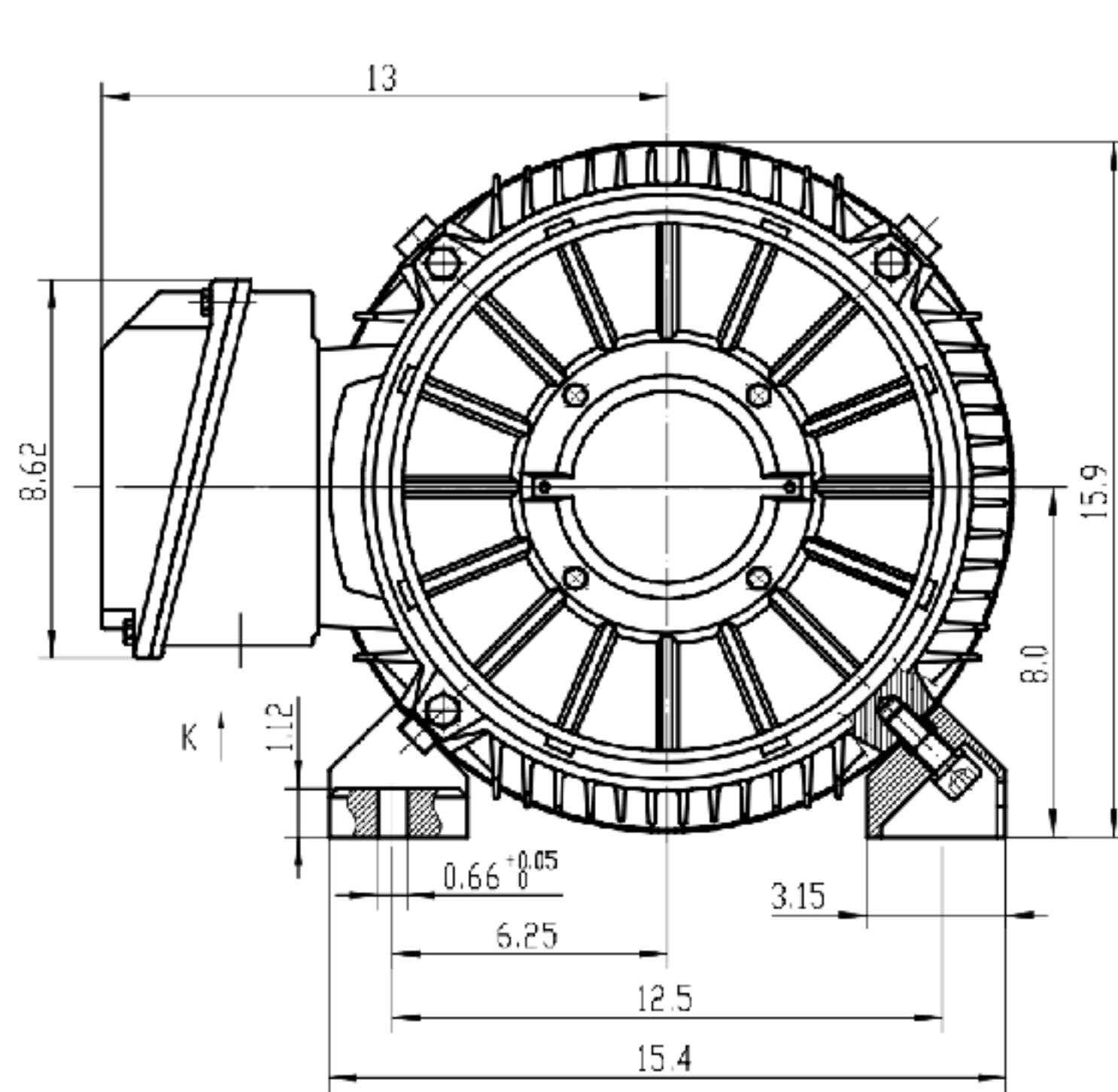
Weight: 25 HP = 330.75

Weight: 30 HP = 396.9 lbs

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# 40 HP and 50 HP Idler Motor Dimensions and Weight

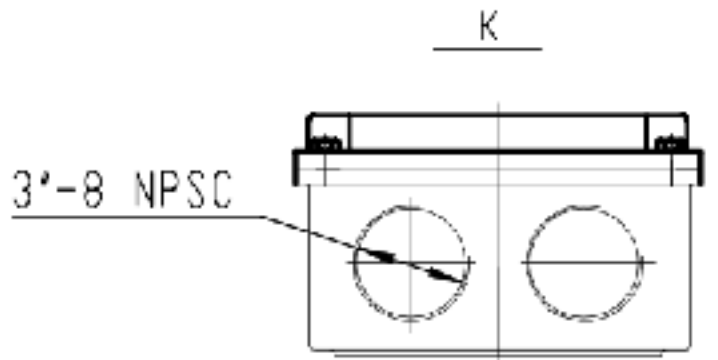
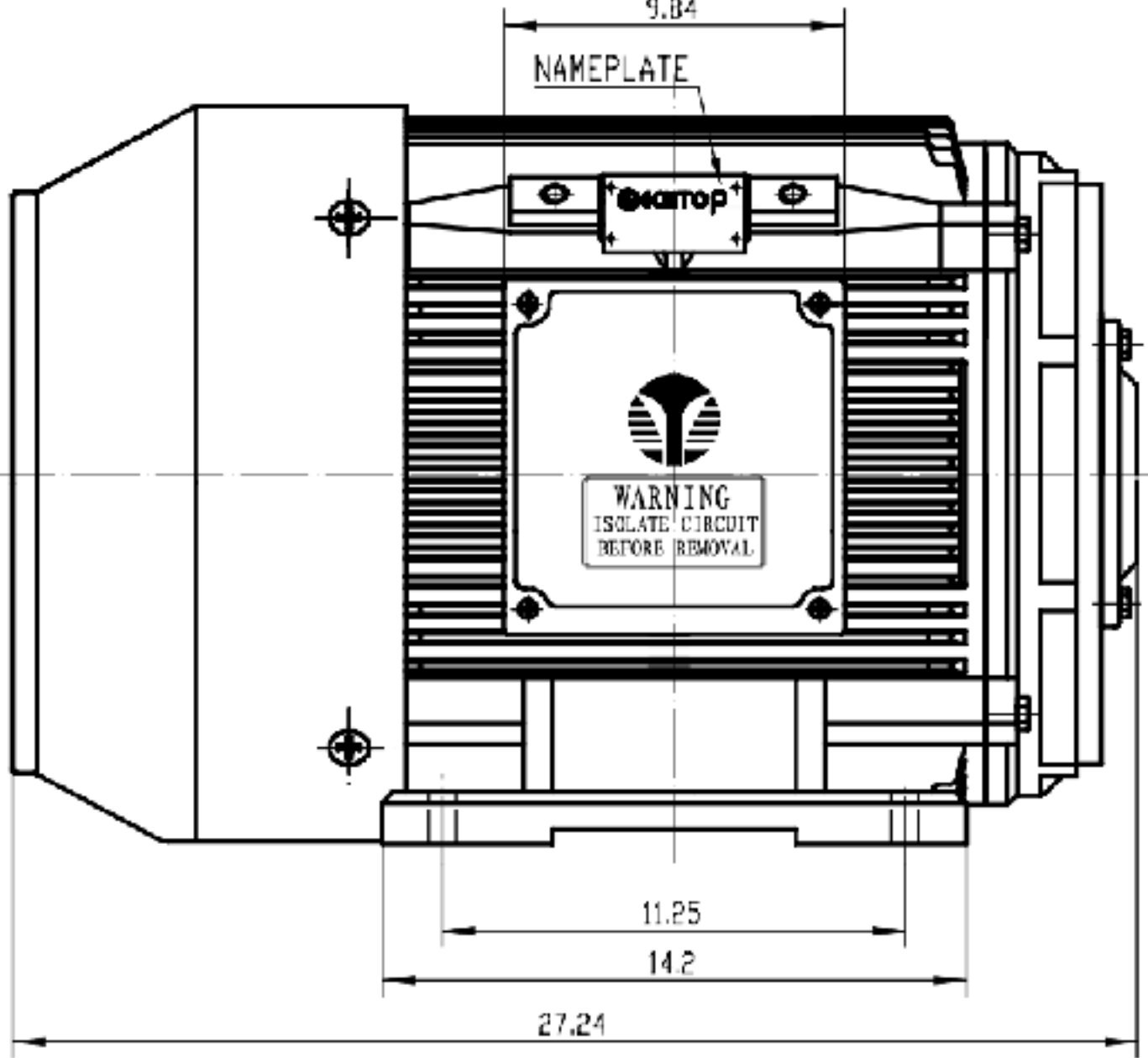
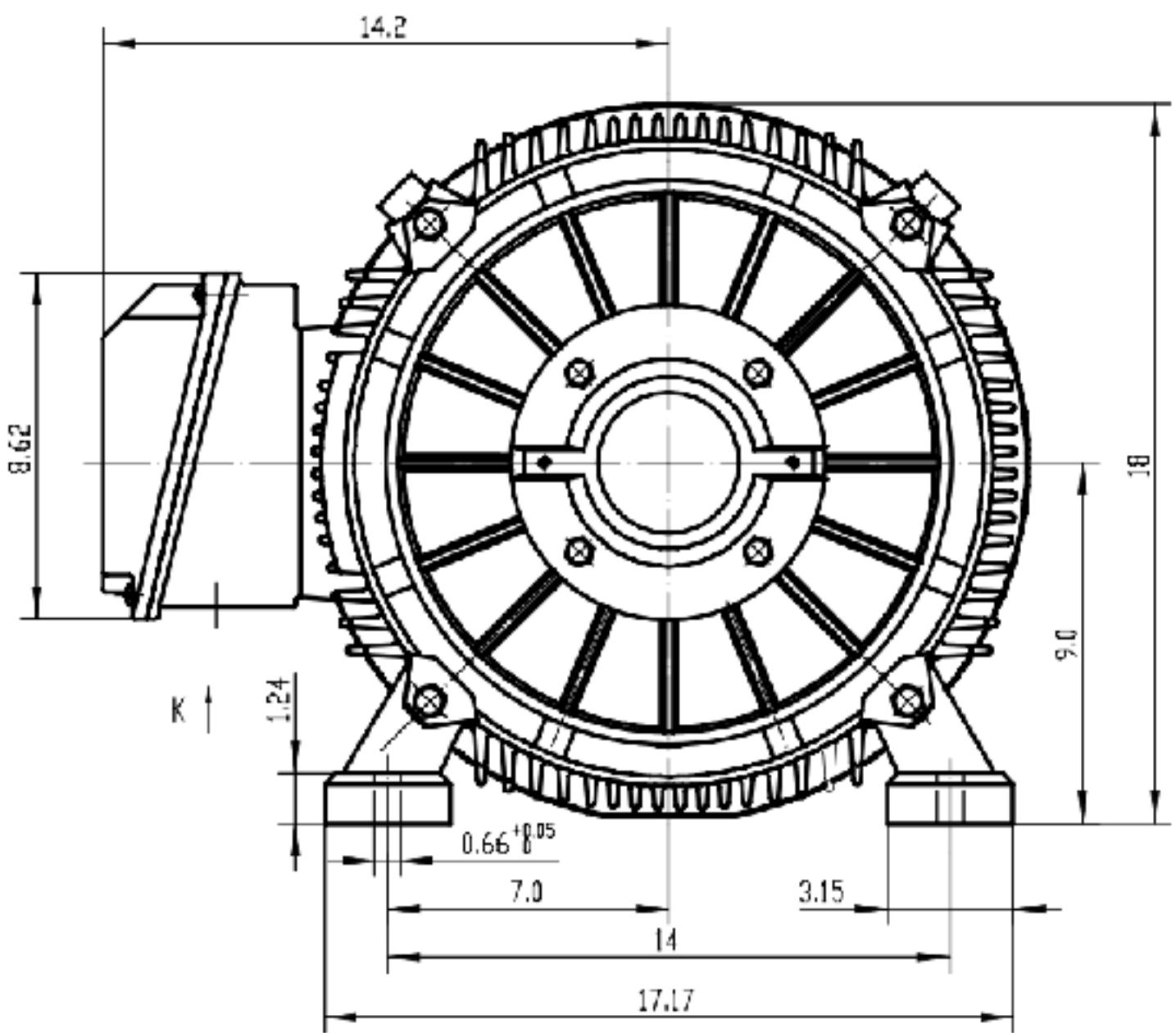


Weight: 40 HP = 539.1 lbs

Weight: 50 HP = 600.8 lbs



# 60 HP and 75 HP Idler Motor Dimensions and Weight



Weight: 60 HP = 782.75 lbs

Weight 75 HP = 873.18 lbs



# KVA, KW to Volts amps chart.

KVA	KW	208V	220V	240V	440V	480V
8	6.3	17.5	16.5	15.2	8.3	8.1
9.4	7.5	26.1	24.7	22.6	12.3	11.3
12.5	10	34.7	33	30.1	16.6	15.1
18.7	15	52	49.5	45	24.9	22.5
25	20	69.5	66	60.2	33.2	24
31.3	25	87	82.5	75.5	41.5	37.8
37.5	30	104	99	90.3	49.8	45.2
50	40	139	132	120	66.5	60
62.5	50	173	165	152	83	81
75	60	208	198	181	99.6	91
93.8	75	261	247	226	123	113
100	80	278	264	240	133	120
125	100	347	330	301	166	150
166	125	433	4134	375	208	188
187	150	520	495	450	249	225
219	175	608	527	527	289	264
250	200	694	660	601	332	301

Useful common charts, transformer amps, converter resistive load amps, HVAC LRA to size to converter HP required.

3 PHASE TRANSFORMER AMPERES			
KVA	208 AMPS	240 AMPS	480 AMPS
3	8.4	7.2	3.1
6	16.7	14.4	7.22
9	27.8	24.1	12
15	41.6	36.1	18
30	83.3	72.2	36.1
45	125	108.4	54.2
75	208.2	180.4	90.2
112.5	312.5	271.6	135.3
150	416.3	360.8	180.4
225	625	541.9	270.7

PHASE CONVERTER SIZE TO A RESISTIVE LOAD, HEATING ELEMENTS, WELDERS, ECT.	
CONVERTER HP	230 VOLTS AMPS
2	4
3	5
5	7
7.5	10
10	14
15	22
20	28
25	35
30	42
40	56
50	70
60	84
75	105
100	135

LRA (LOOKED ROTOR AMPS) MOSTLY USED TO SIZE A CONVERTER TO HVAC UNITS		
HP	LRA (480)	CONVERTER HP REQUIRED
1	30 (15)	3
2	50 (25)	5
3	64 (32)	7.5
5	92 (46)	15
7.5	127 (63)	20
10	162 (81)	25
15	232 (116)	40
20	290 (145)	50
25	365 (182)	60
30	436 (217)	80
40	580 (290)	100





Useful common charts, transformer amps, converter resistive load amps, HVAC LRA to size to converter HP required.

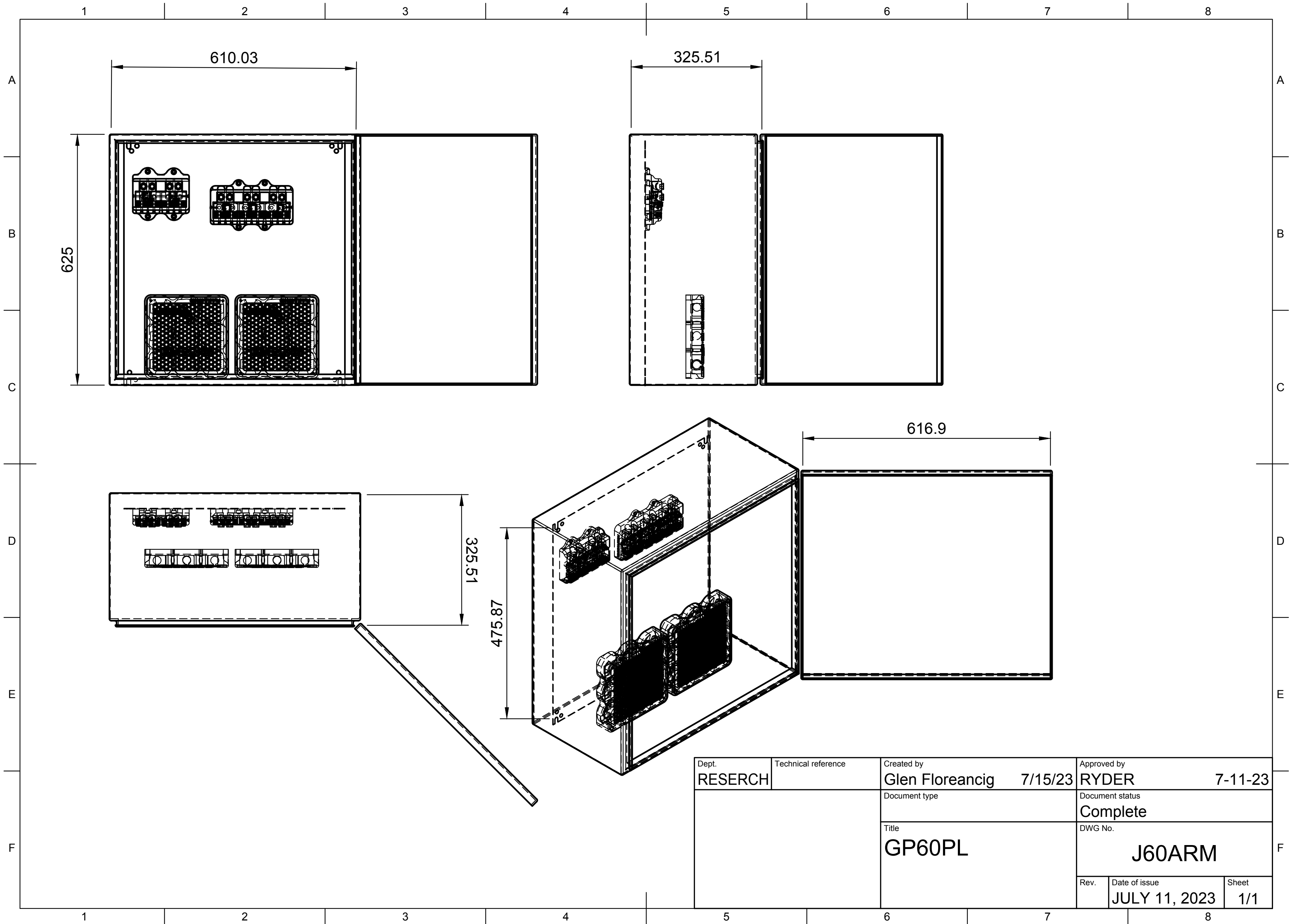
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45	125	108.4	54.2
75	208.2	180.4	90.2
112.5	312.5	271.6	135.3
150	416.3	360.8	180.4
225	625	541.9	270.7

PHASE CONVERTER SIZE TO A RESISTIVE LOAD, HEATING ELEMENTS, WELDERS, ECT.	
CONVERTER HP	230 VOLTS AMPS
2	4
3	5
5	7
7.5	10
10	14
15	22
20	28
25	35
30	42
40	56
50	70
60	84
75	105
100	135

LRA (LOCKED ROTOR AMPS) MOSTLY USED TO SIZE A CONVERTER TO HVAC UNITS		
HP	LRA (460)	CONVERTER HP REQUIRED
1	30 (15)	3
2	50 (25)	5
3	64 (32)	7.5
5	92 (46)	15
7.5	127 (63)	20
10	162 (81)	25
15	232 (116)	40
20	290 (146)	50
25	365 (182)	60
30	436 (217)	80
40	580 (290)	100

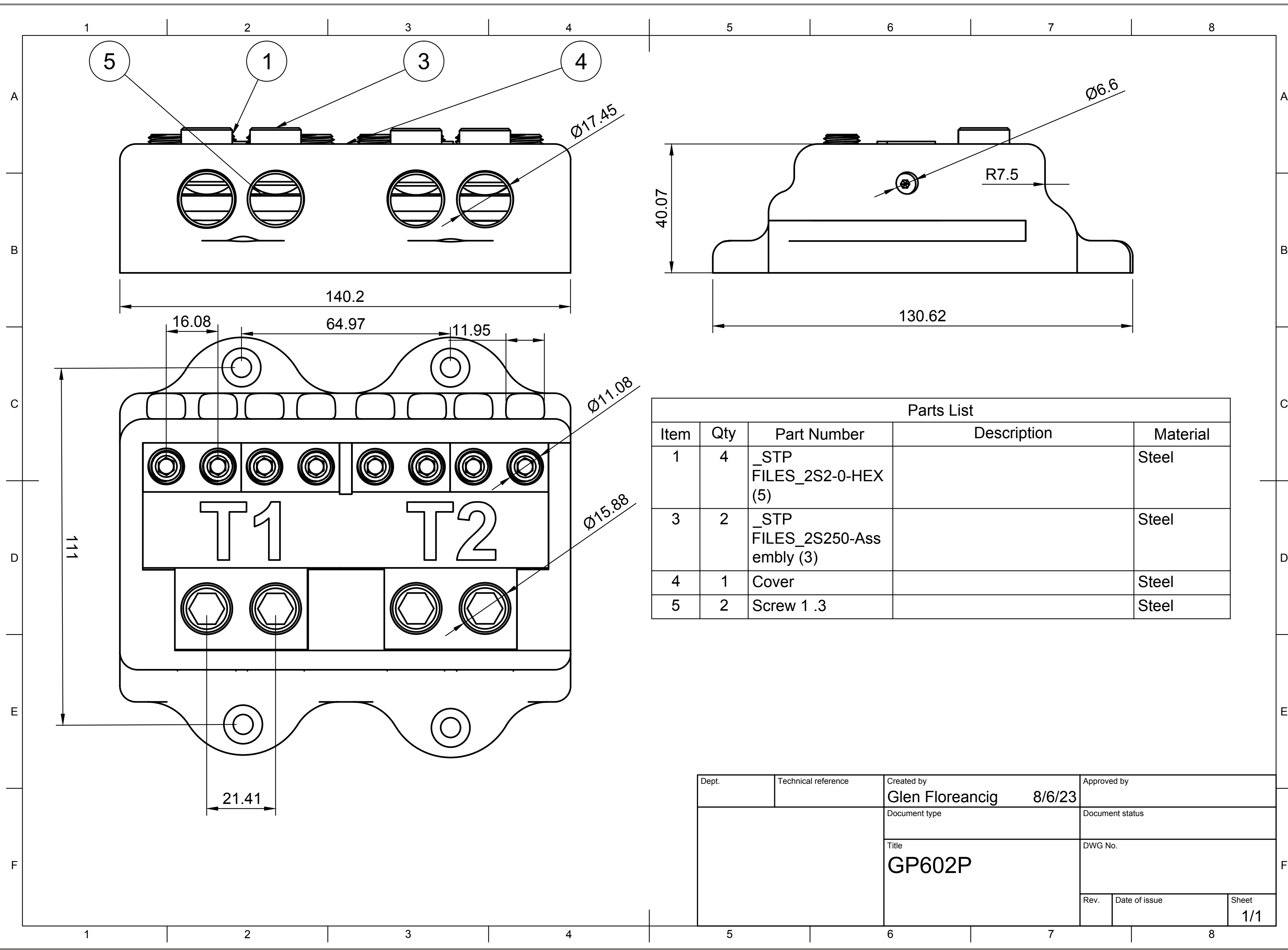
## Three phase motor chart, wire size, conduit, Transformer size if required to change voltage.

HORSEPOWER	220-240 VOLTS				440-480 VOLTS			
	WIRE SIZE	CONDUIT SIZE IN INCHES	FULL LOAD AMPS	KVA TRANSFORMER REQUIRED	WIRE SIZE	CONDUIT SIZE IN INCHES	FULL LOAD AMPS	KVA TRANSFORMER REQUIRED
1	12	3/4	3.6	3	12	3/4	1.0	3
2	12	3/4	6.8	6	12	3/4	3.4	6
3	10	3/4	9.6	6	12	3/4	4.8	6
5	10	3/4	15.2	9	12	3/4	7.6	9
7.5	8	3/4	21	15	12	3/4	11.5	15
10	8	3/4	27	15	12	3/4	14	15
15	6	1	42	30	10	3/4	21	30
20	4	1	52	30	10	3/4	28	30
25	4	1.5	68	45	8	1	34	45
30	3	1.5	80	45	8	1	40	45
40	1	1.5	104	75	6	1	52	75
50	1/0	2	130	75	4	1.5	65	75
60	3/0	2	154	75	3	1.5	77	75
75	250kcmil	2.5	192	112.5	1	1.5	96	112.5
100	350kcmil	3	248	112.5	2/0	2	124	112.5



# Dimensions for Nema 4 Enclosure For GP50, GP60 GP75, GP100

Dept. <b>RESERCH</b>	Technical reference	Created by <b>Glen Floreancig 7/15/23</b>	Approved by <b>RYDER 7-11-23</b>
		Document type	<b>Complete</b>
		Title <b>GP60PL</b>	DWG No. <b>J60ARM</b>
	Rev.	Date of issue <b>JULY 11, 2023</b>	Sheet <b>1/1</b>



# Dimensions and Part List for Single Phase Power Block

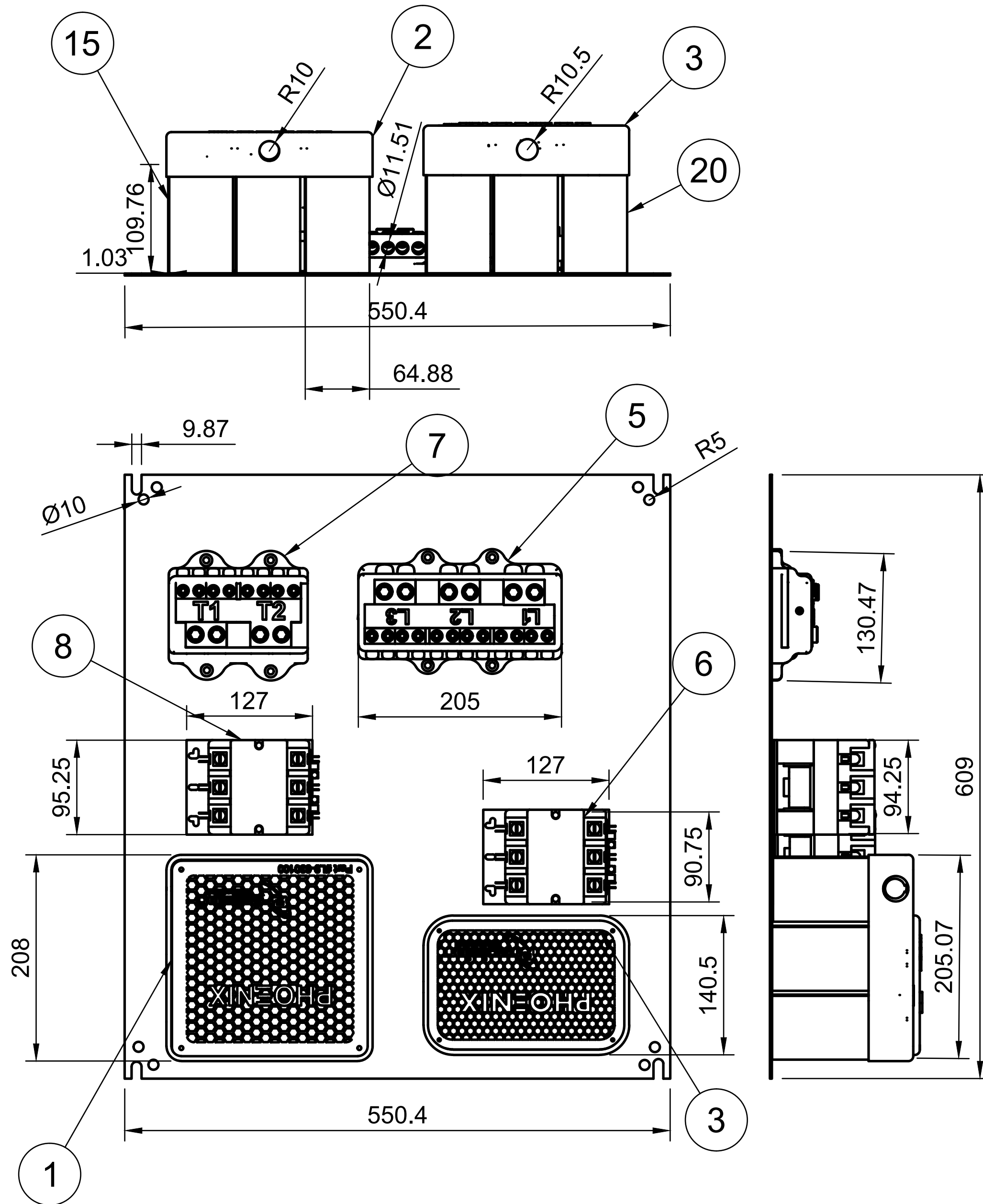
## Part# Ryder602P

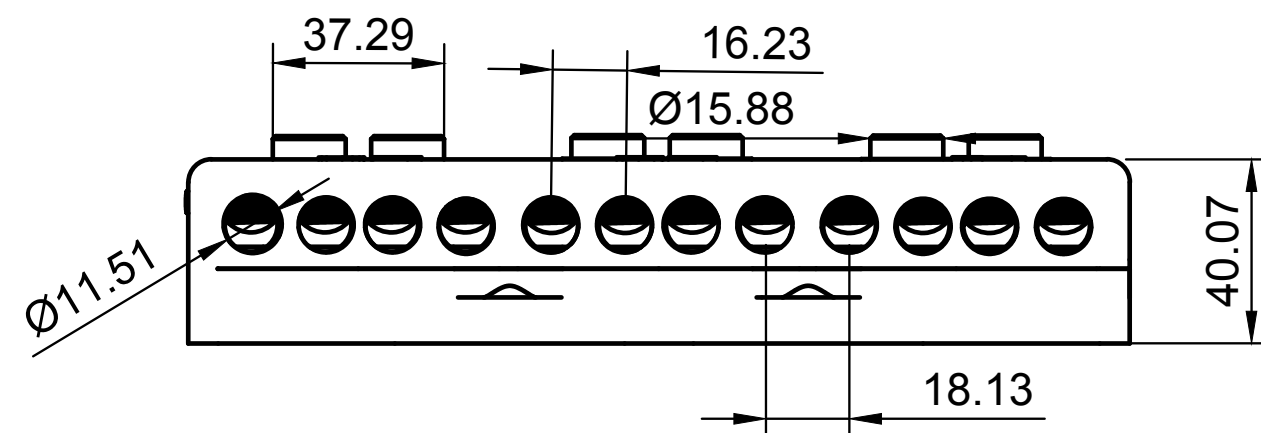
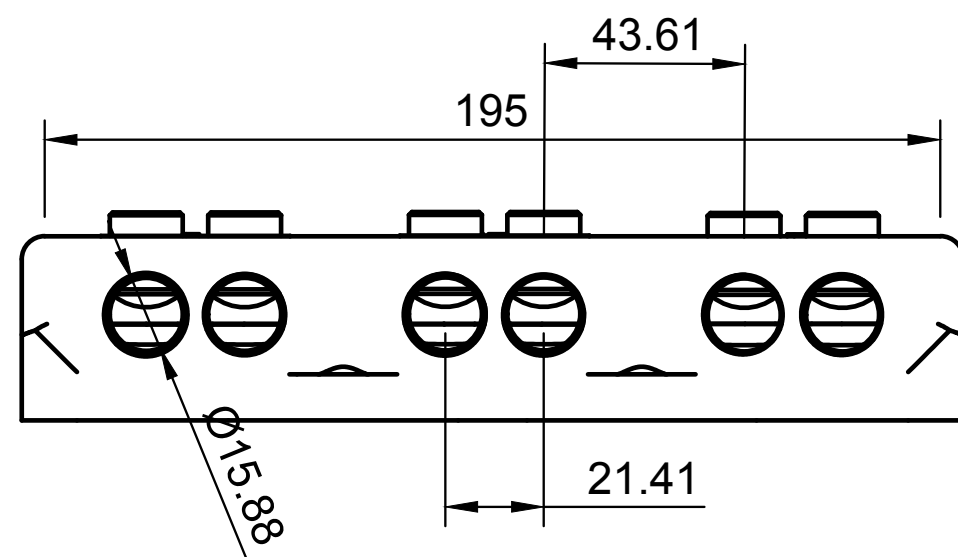
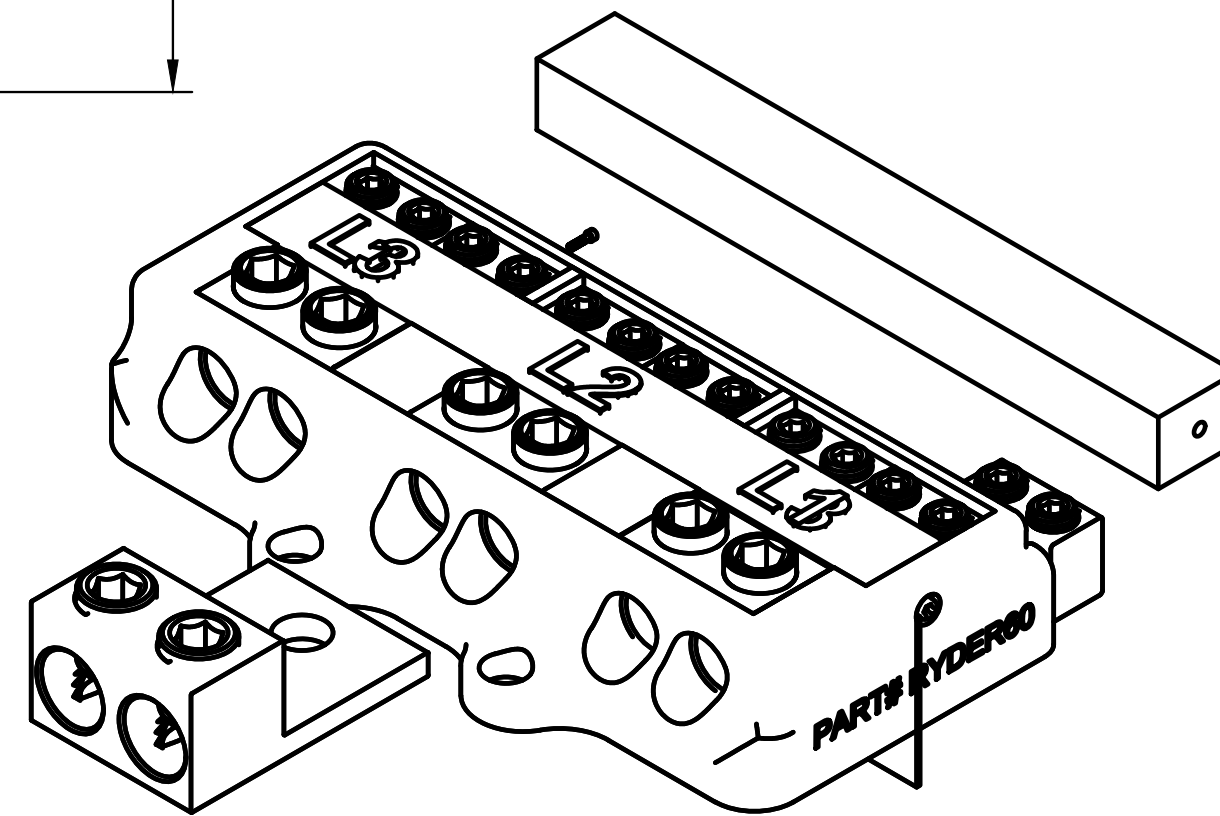
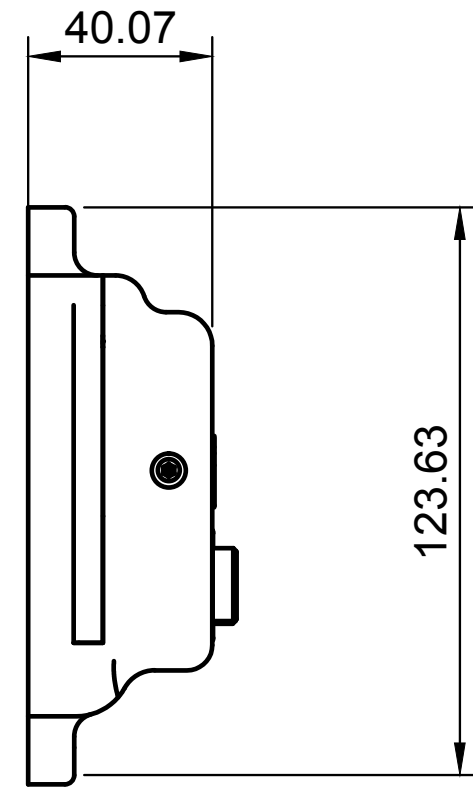
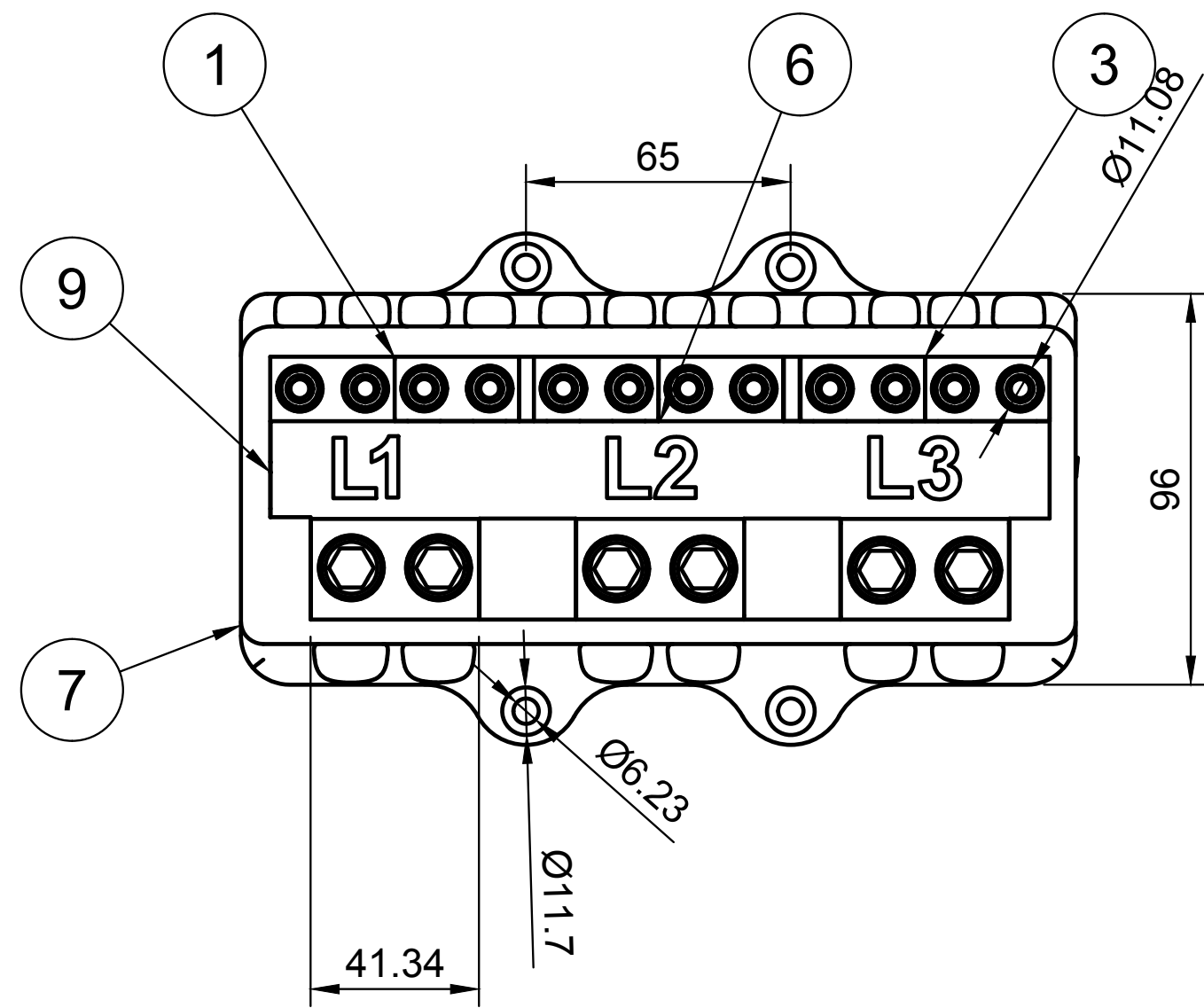
Parts List				
Item	Qty	Part Number	Description	Material
1	4	_STP FILES_2S2-0-HEX (5)		Steel
3	2	_STP FILES_2S250-Ass embly (3)		Steel
4	1	Cover		Steel
5	2	Screw 1 .3		Steel

Dept.	Technical reference	Created by <b>Glen Floreancig</b>	8/6/23	Approved by
		Document type		Document status
		Title <b>GP602P</b>		DWG No.
		Rev.	Date of issue	Sheet <b>1/1</b>

# Dimensions and Part List for GP50PL, and GP60PL

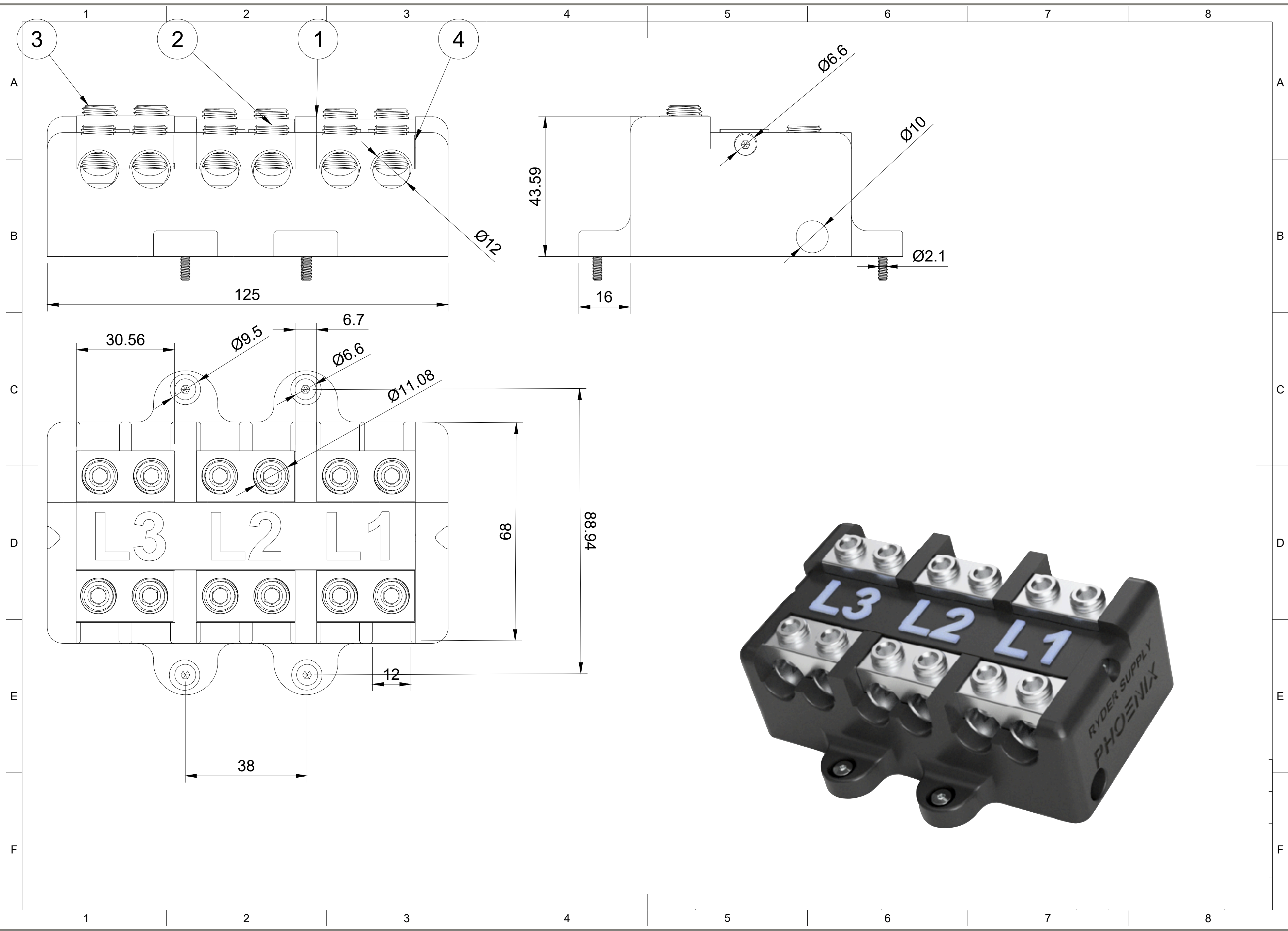
PART#	DESCRIPTION	QUANINTY	Number
SC630	Black Start Cap	6	20
RC100	Silver Run Cap	9	15
SP60	Single Phase Block	1	7
TP60	Three Phase Block	1	5
90-66	Power Relay	1	
C90230	90 AMP Contactor	2	8-6
CH9100-60	Run Cap Holder	1	1
CH6630-60	Start Cap Holder	1	3





# Deminsions and Parts List for Three Phase Power Block Part# RYDER60

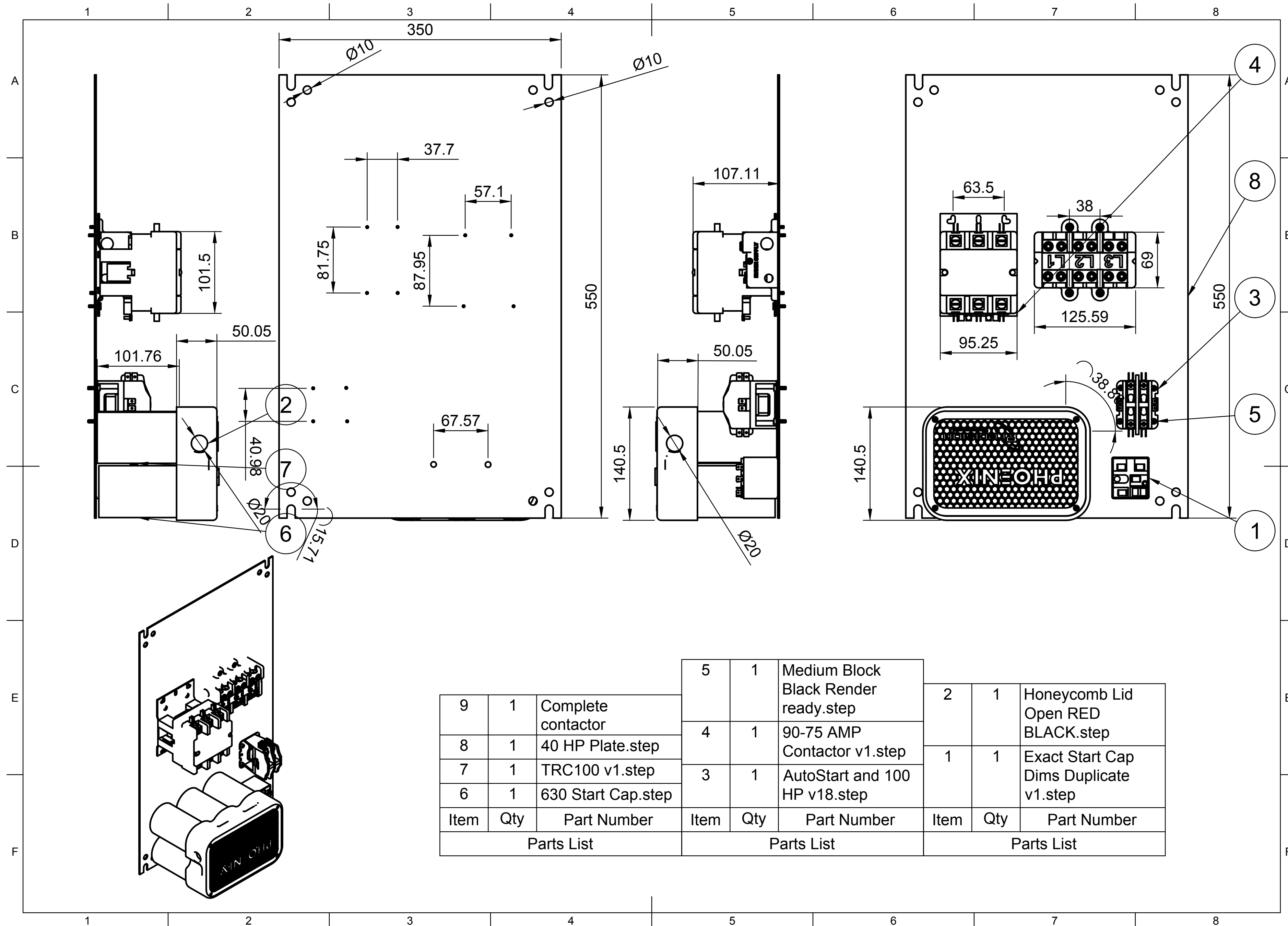
Parts List				
Item	Qty	Part Number	Description	Material
1	6	_STP FILES_2S2-0-HEX (5)	2/0 - 14 AWG  FLEX 1/0-14 AWG	Steel
3	3	_STP FILES_2S250-Asse mbly (3)	250 kcmil (4/0 AWG) double wire lug, 250kcmil (4/0 AWG) - 6 AWG wire range	Steel
6	1	Component8		Steel
7	1	2023 Core 60 Smaller bolt mount	Lug Holder	Steel
9	2	Screw 1 .3		Steel



**Dimensions  
for Three Phase  
Power Block  
Part# Ryder40**

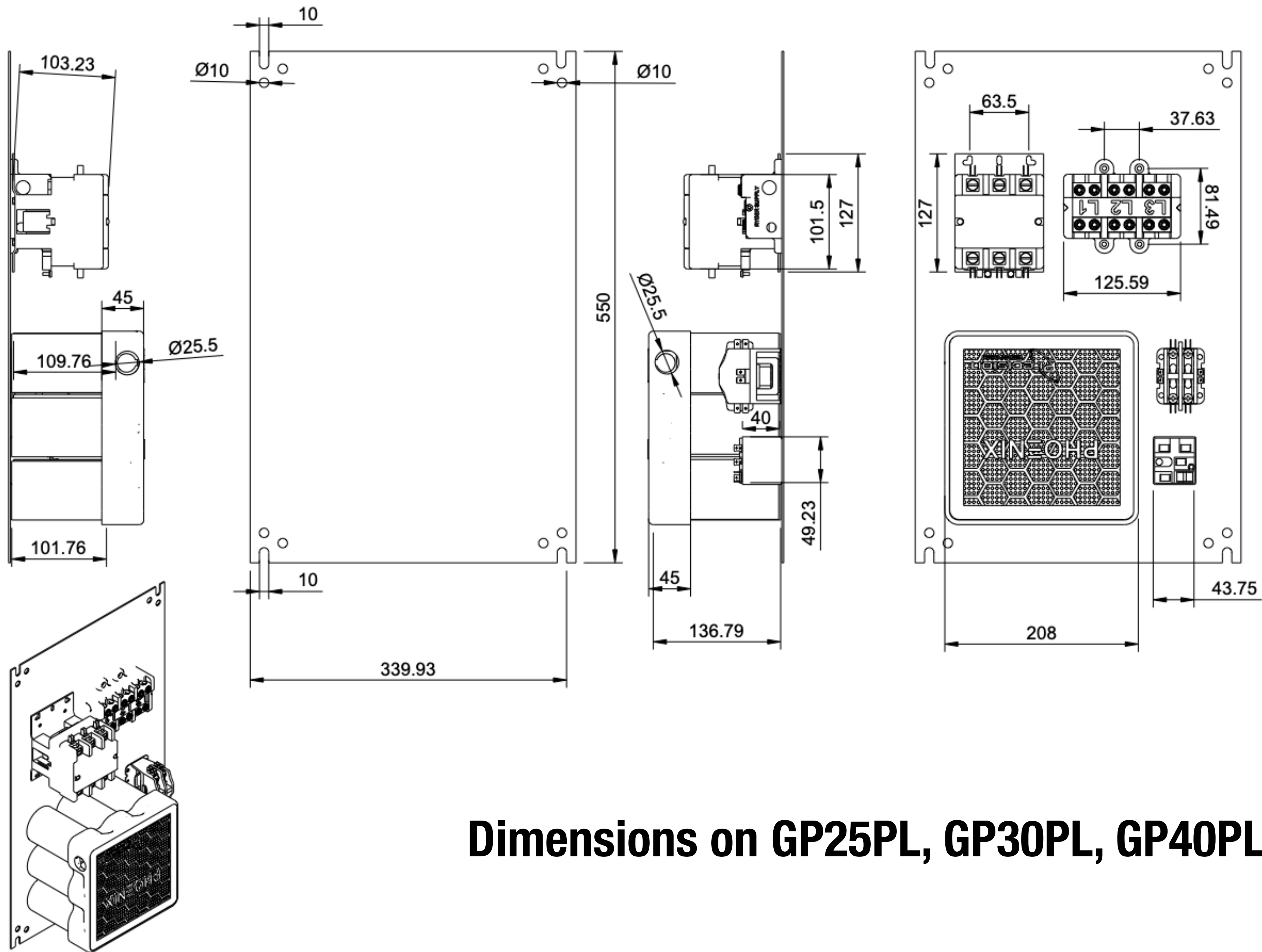


# Dimensions and Parts List for GP15PL and GP20PL

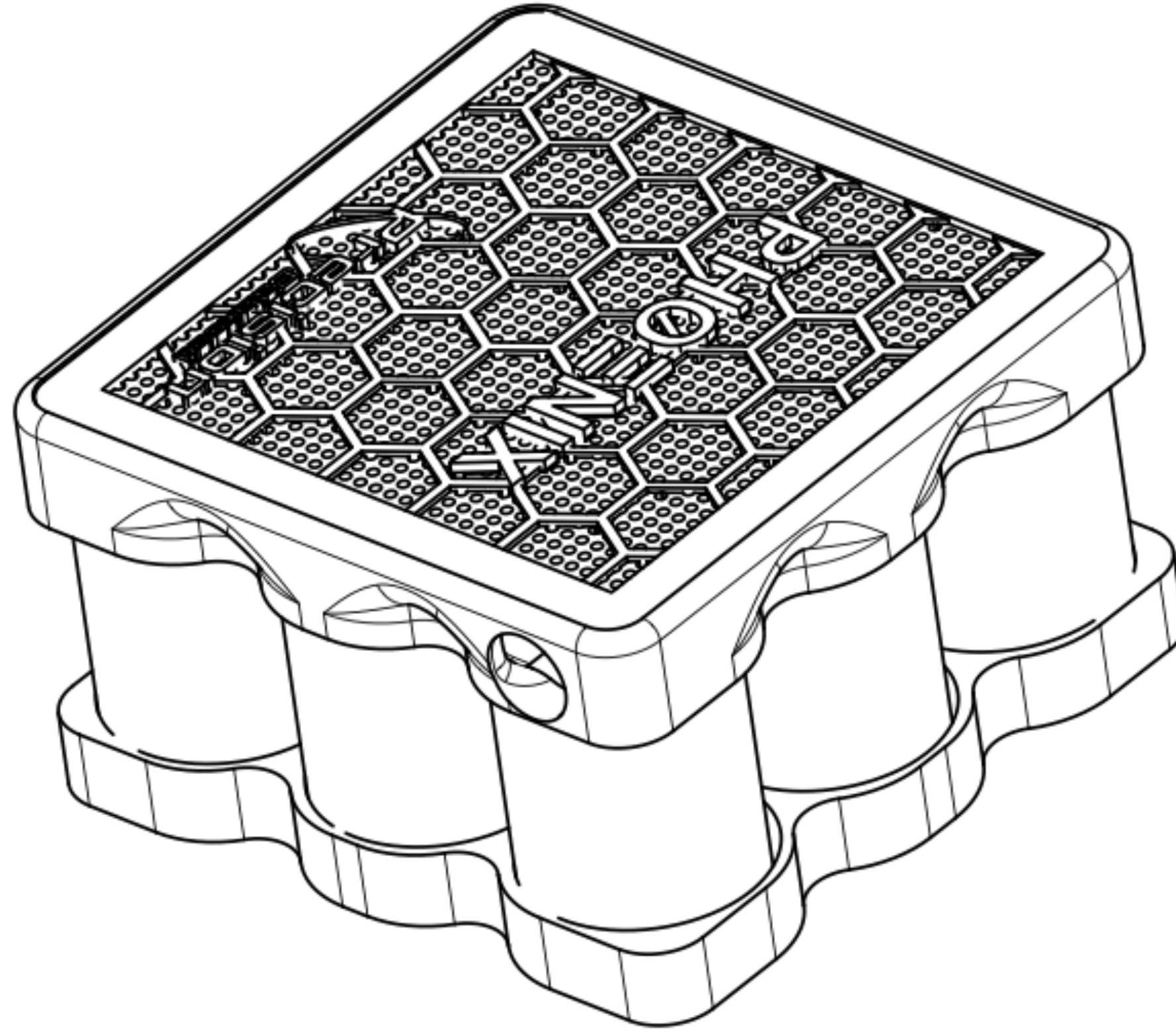
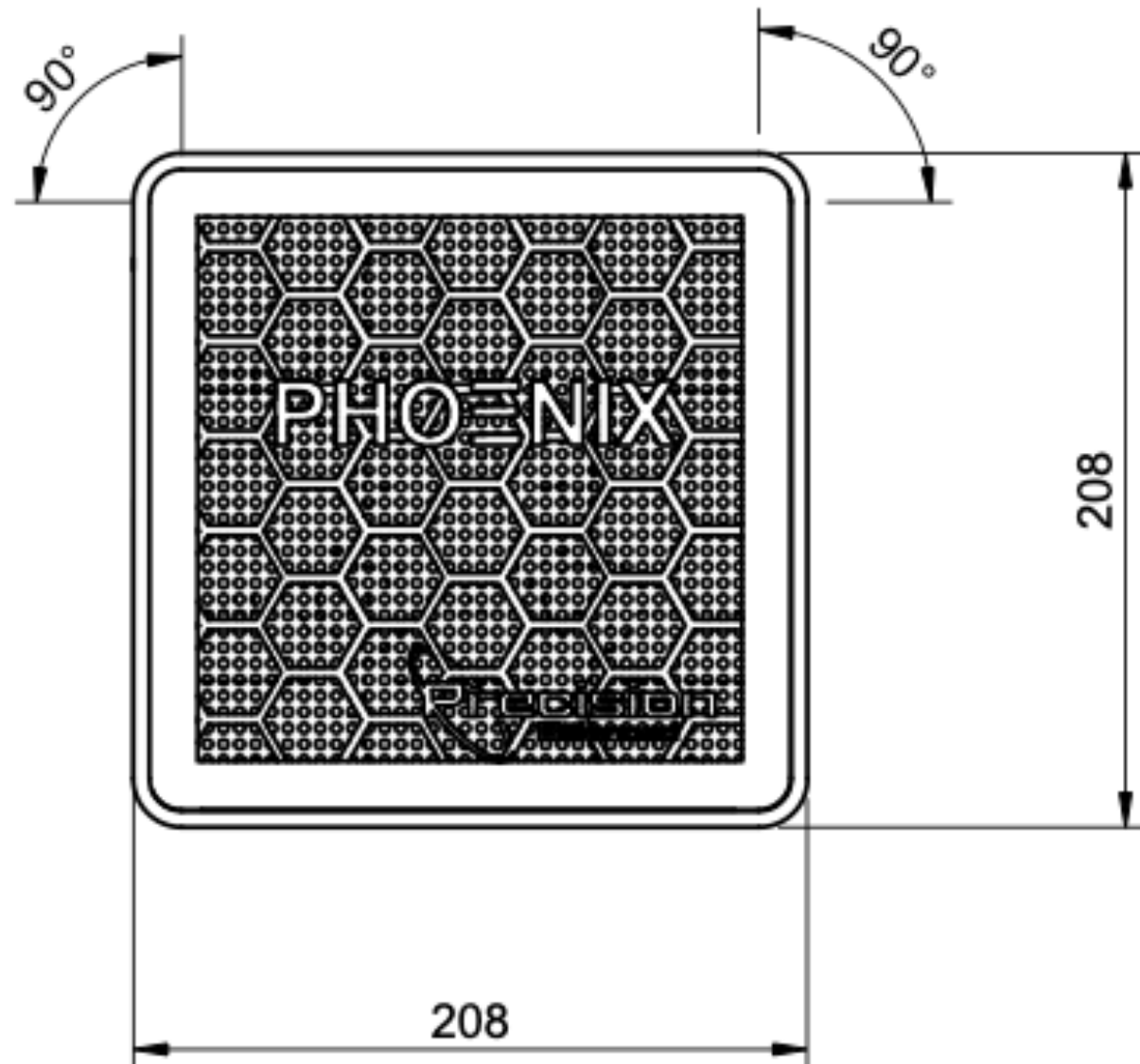
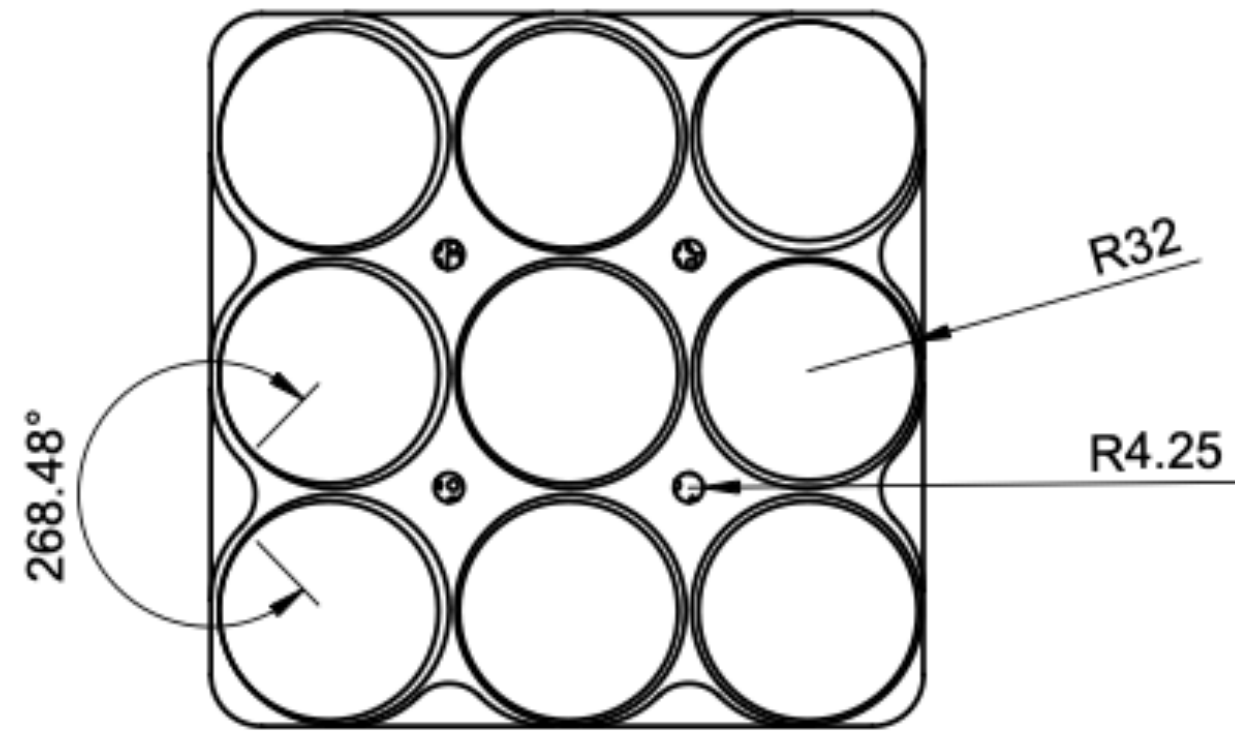
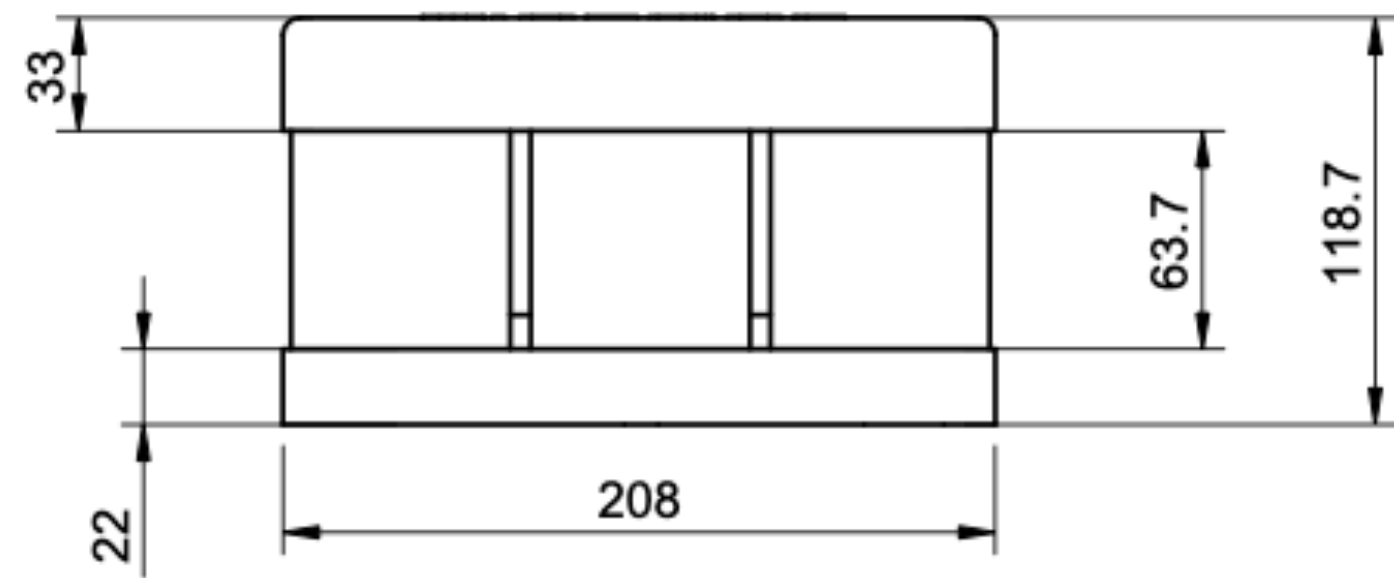


9	1	Complete contactor	5	1	Medium Block Black Render ready.step	2	1	Honeycomb Lid Open RED BLACK.step
8	1	40 HP Plate.step	4	1	90-75 AMP Contactor v1.step	1	1	Exact Start Cap Dims Duplicate v1.step
7	1	TRC100 v1.step	3	1	AutoStart and 100 HP v18.step			
6	1	630 Start Cap.step						
Item	Qty	Part Number	Item	Qty	Part Number	Item	Qty	Part Number
Parts List			Parts List			Parts List		





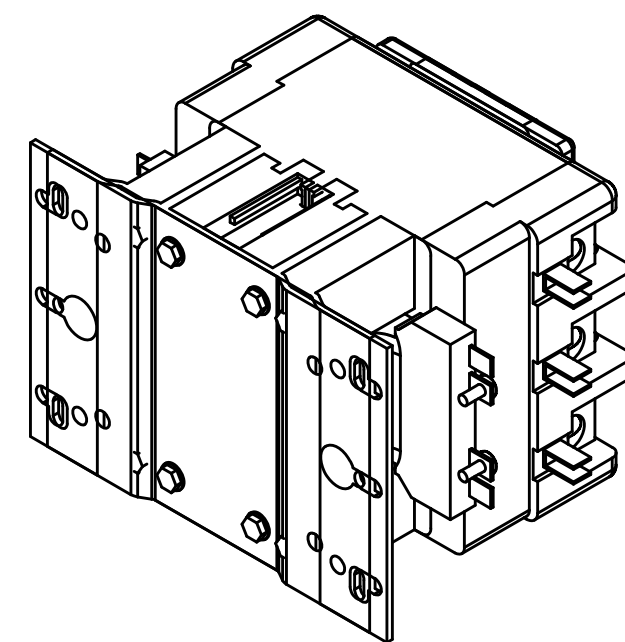
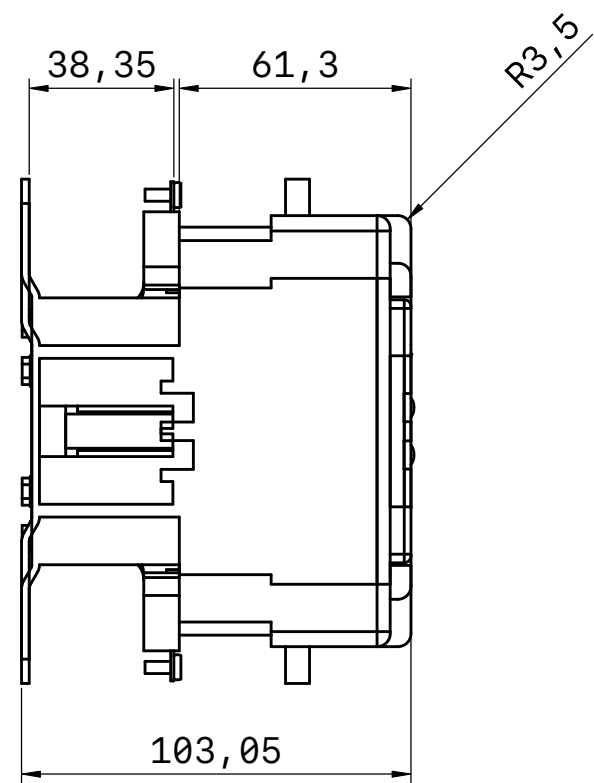
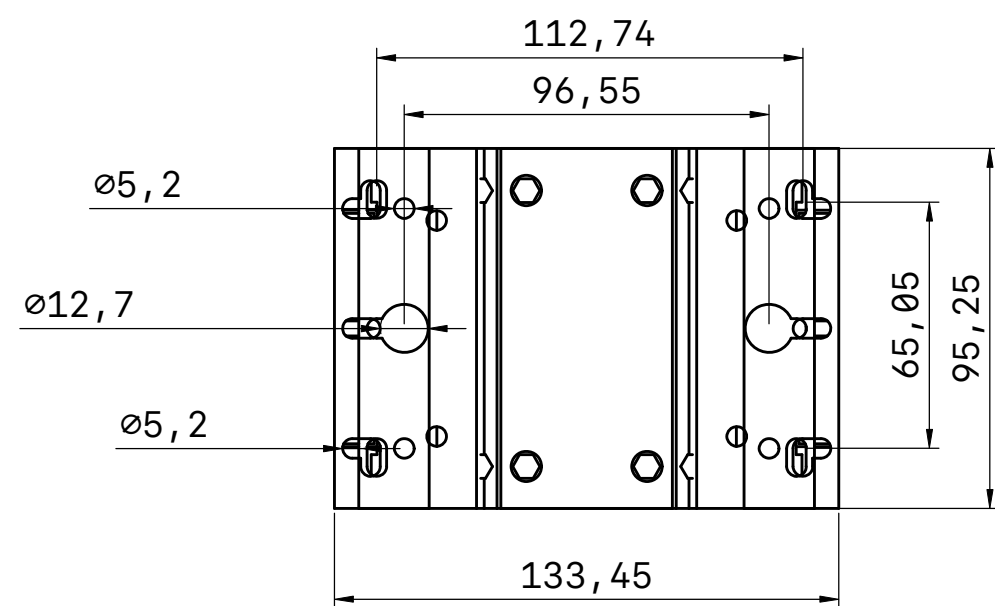
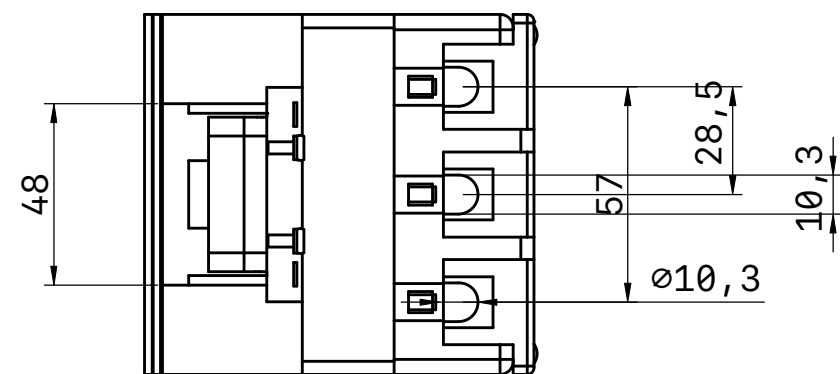
**Dimensions on GP25PL, GP30PL, GP40PL**



# Dimensions and Parts list 9 Bank Capacitor Holder 100 MFD 630 MFD

Parts List			
Item	Qty	Description	Part Number
1	1	Run Capacitor	RC50
2	1	Capacitor Bank Lid	L9-630100
3	1	Top Capacitor Holder	9CCT
4	1	Bottom Capacitor Holder	9CCB
5	4	Start Capacitor	SC630
6	4	Run Capacitor	RC100





TITLE Drawing		
UNITS mm	PROJ. ANG. ⊕	SIZE A3
SCALE 1:2	LAST UPDATED 08/07/23	SHEET 1/1