

HOODZ Day 1-Electric Motor & Basics Training

In association with AAIS


HOODZ[®]
Professional clean. Every time.



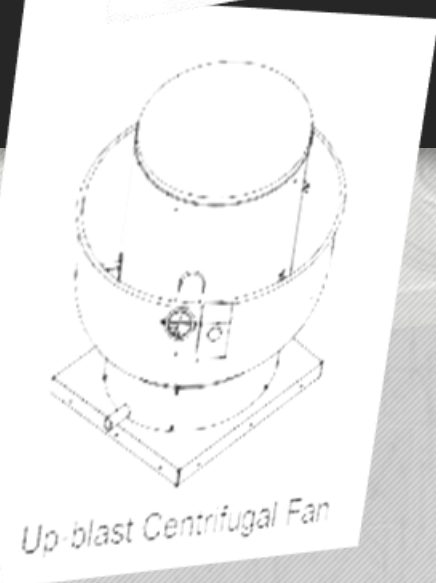
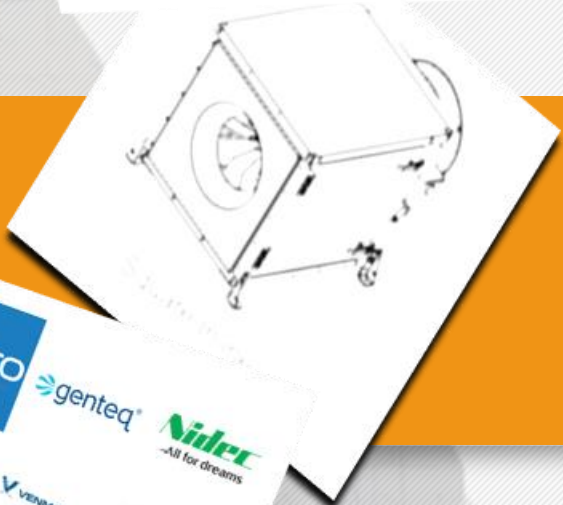
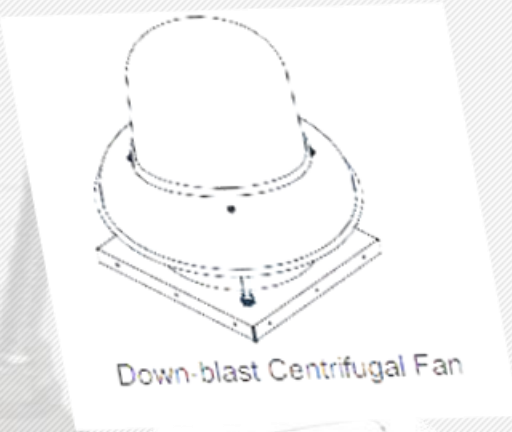
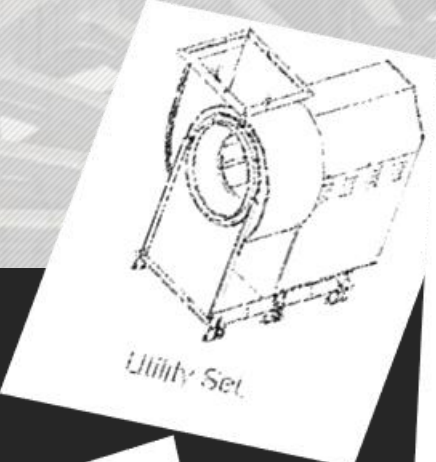
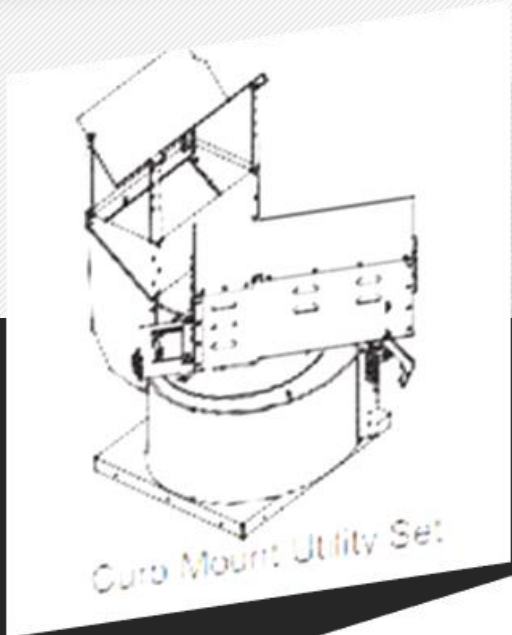

All Around Industry Supply

Welcome to All Around Industry Supply!

- Established April 2016
- Ecommerce Website with 80,000+ parts
- Mission Statement:
 - “At All Around Industry Supply, we are dedicated to being your premier source for top-quality general ventilation parts and units. We strive to be more than just an ecommerce website; we aim to be your trusted partner in the industry. Our team of knowledgeable experts is always ready to provide personalized assistance, guiding you in making informed decisions that best suit your specific needs and requirements. From pre-purchase consultations to post-purchase support, we stand by you, ensuring your utmost satisfaction.”
- Meet the Team!



Line Card & Brands



CONNECTION DIAGRAM

Training Objectives/Schedule

- 3 Day Schedule
 - Hands on training and test to follow each day's presentation
 - Day 1 - Introduction to Kitchen/Commercial Ventilation products/parts
 - Day 2 - How to design install, and troubleshoot Kitchen/Commercial Ventilation products/parts (Mechanical installation)
 - Day 3 - Hands on training and recap
- Upon completion of this training, you will be able to...
 - Modify, configure and replace AC/DC motors
 - Install and wire exhaust fans
 - Troubleshoot/diagnose complete ventilation systems

Kitchen Ventilation Parts and Products



Motors and Electrical

AC Brushless Motors. AC brushless motors are some of the most popular in motion control. ...

DC Brushed Motors. In a DC brushed motor, brush orientation on the stator determines current flow. ...

DC Brushless Motors. ...

Direct Drive. ...

Linear Motors. ...

Servo Motors. ...

Stepper Motors.



Ex Ventilators

- General Ventilation
- **Kitchen Ventilation**
- Gravity Ventilation
- Laboratory Ventilation
- Smoke Control
- Industrial
- Energy Recovery



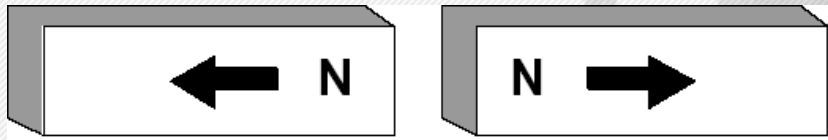
Replacement Parts

- Bearings
- Shafts
- Belts
- Tensioners
- Motors
- Controllers
- Capacitors
- Wire

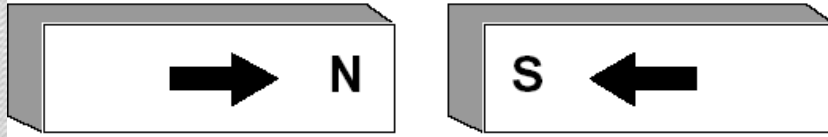


HVAC/R Induction Motors introduction

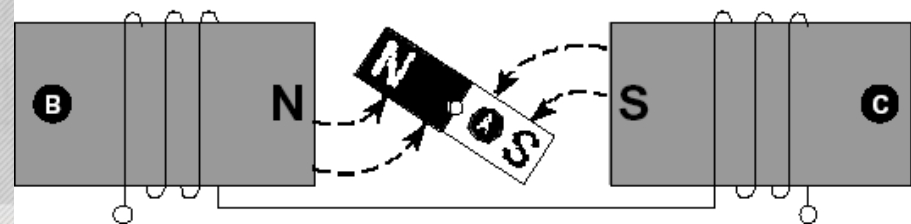
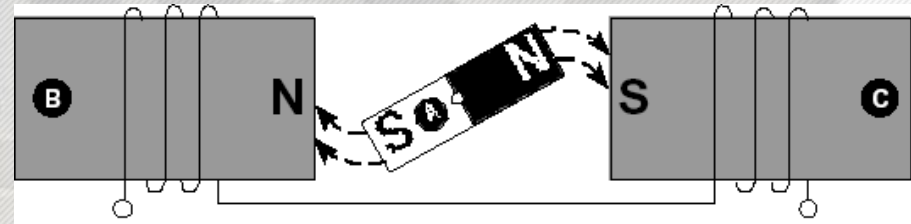




LIKE POLES REPEL



UNLIKE POLES ATTRACT



Motor Types

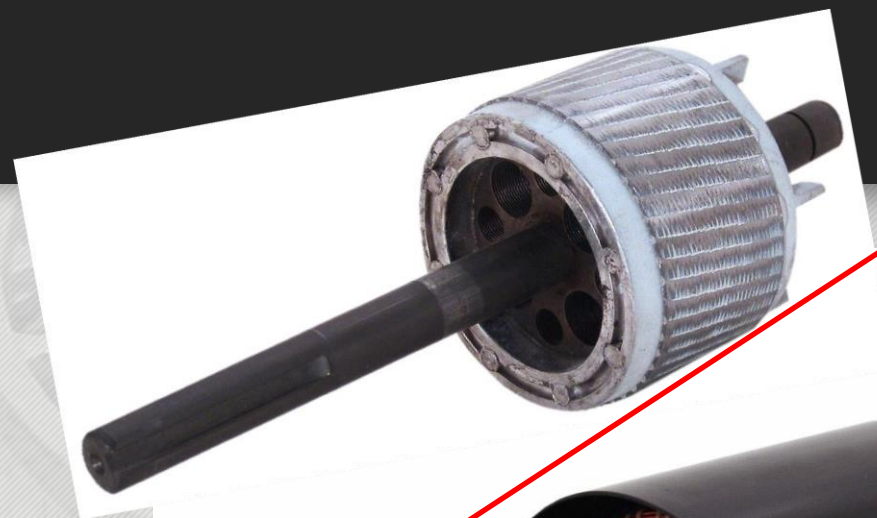
Shaded Pole
Permanent Split Capacitor (PSC)
Split Phase
Capacitor Start
Cap Start / Cap Run
Three Phase

Electronically Commutated (EC or ECM)

- Induction

- Permanent Magnet

Basic Induction Motor Components



End Brackets



Stator



Mounting
Base

Shaded Pole

N



S



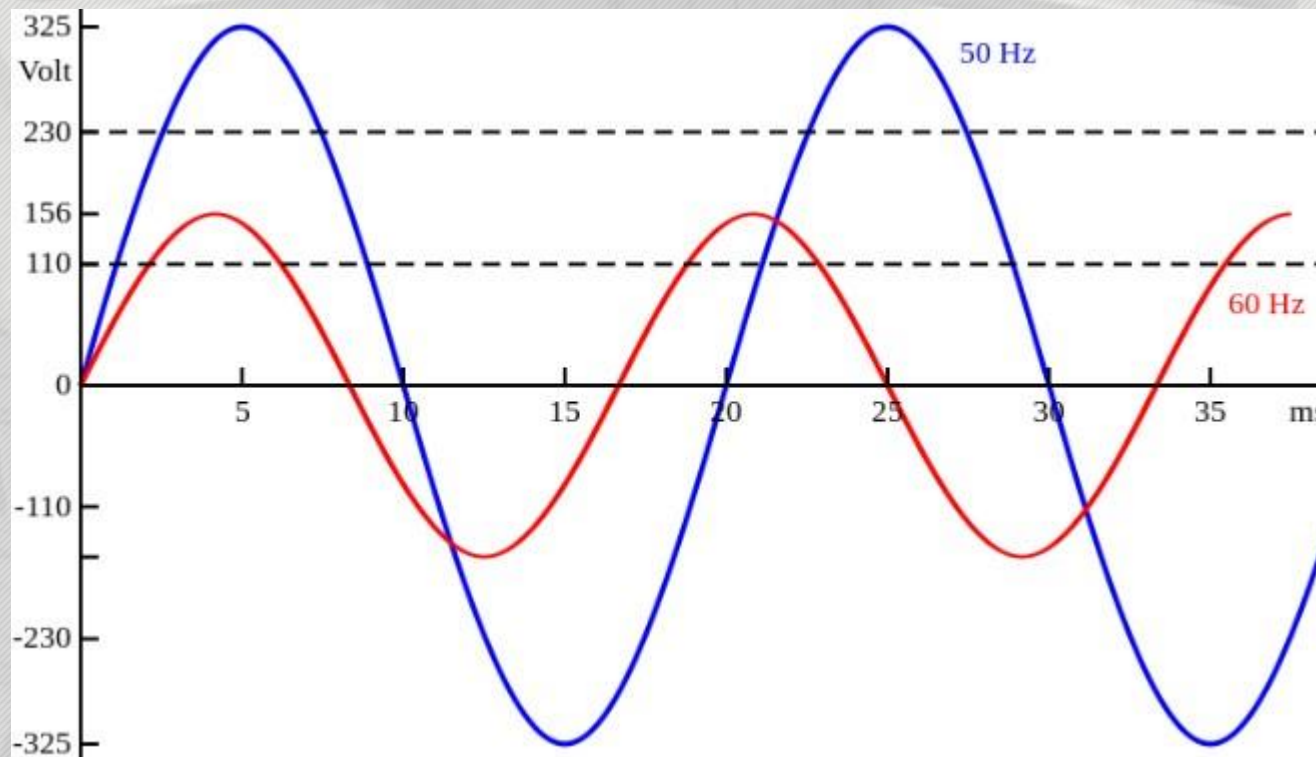
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CONNECTION DIAGRAM

BROWN	CAP
GREEN	RESISTANCE

Frequency

In the United States power is generated at a frequency of 60 cycles.



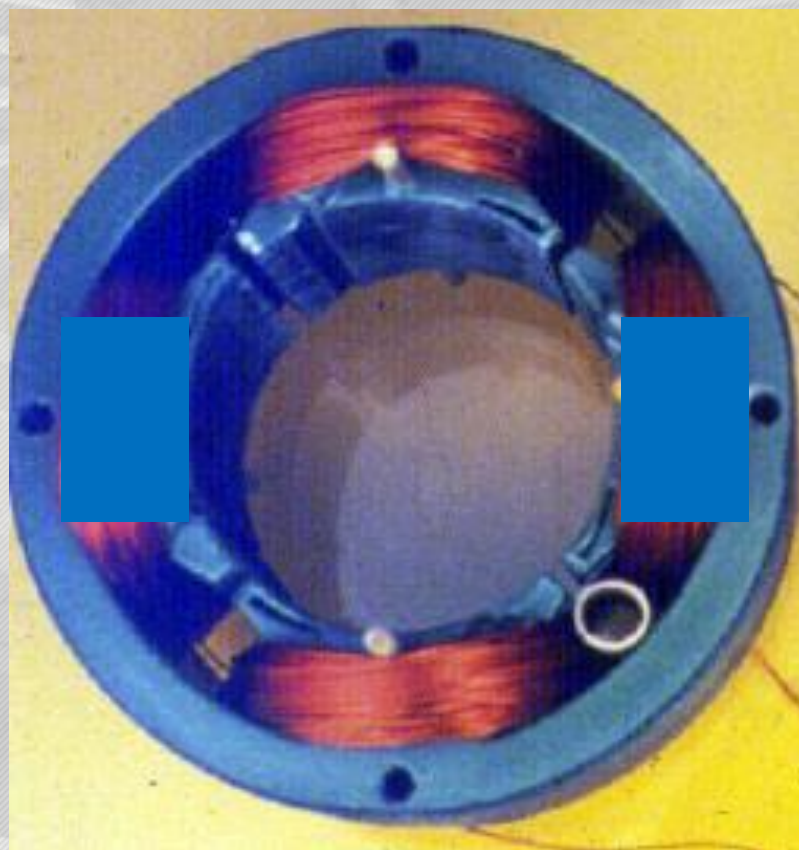
Shaded Pole



CONNECTION DIAGRAM

BROWN	CAP
GREEN	RESISTOR

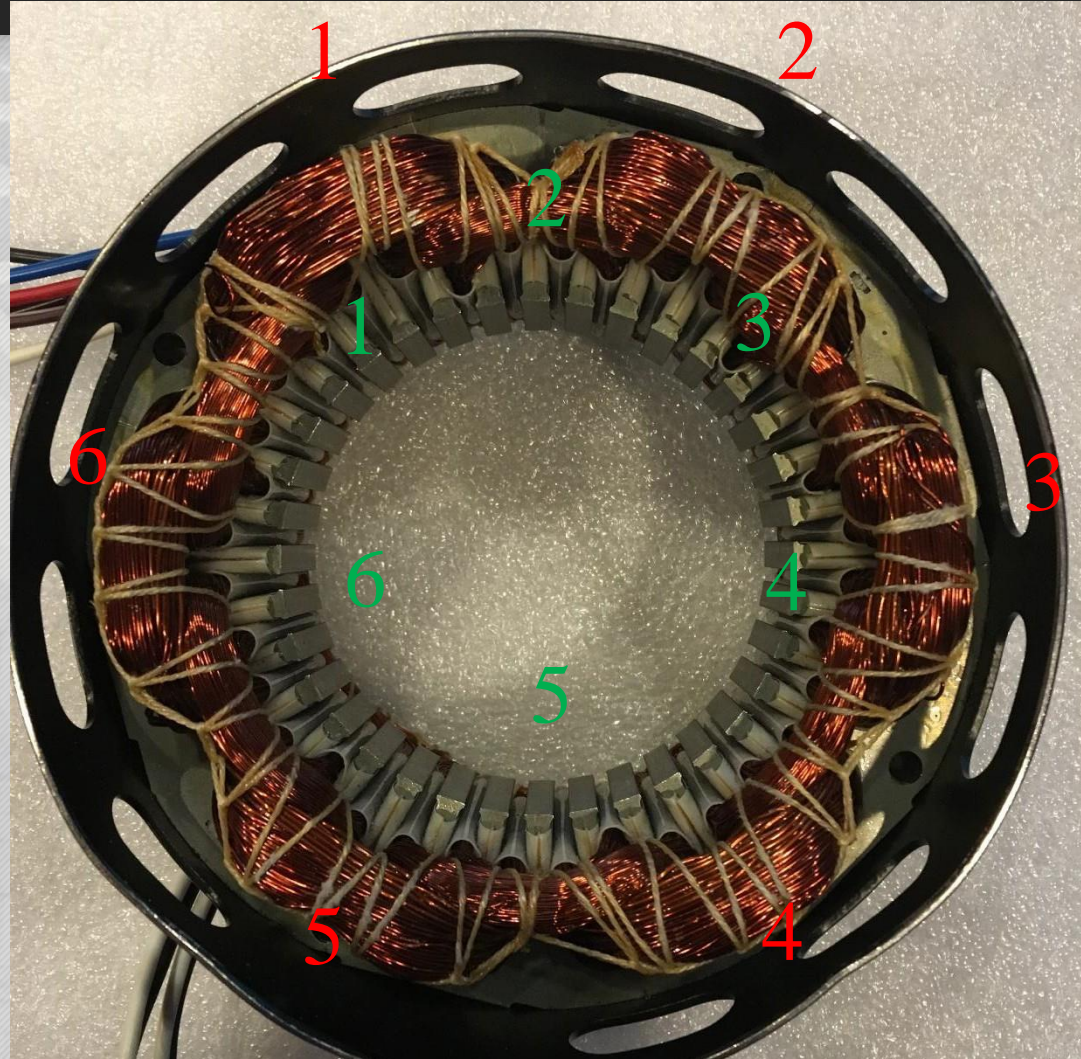
Shaded Pole



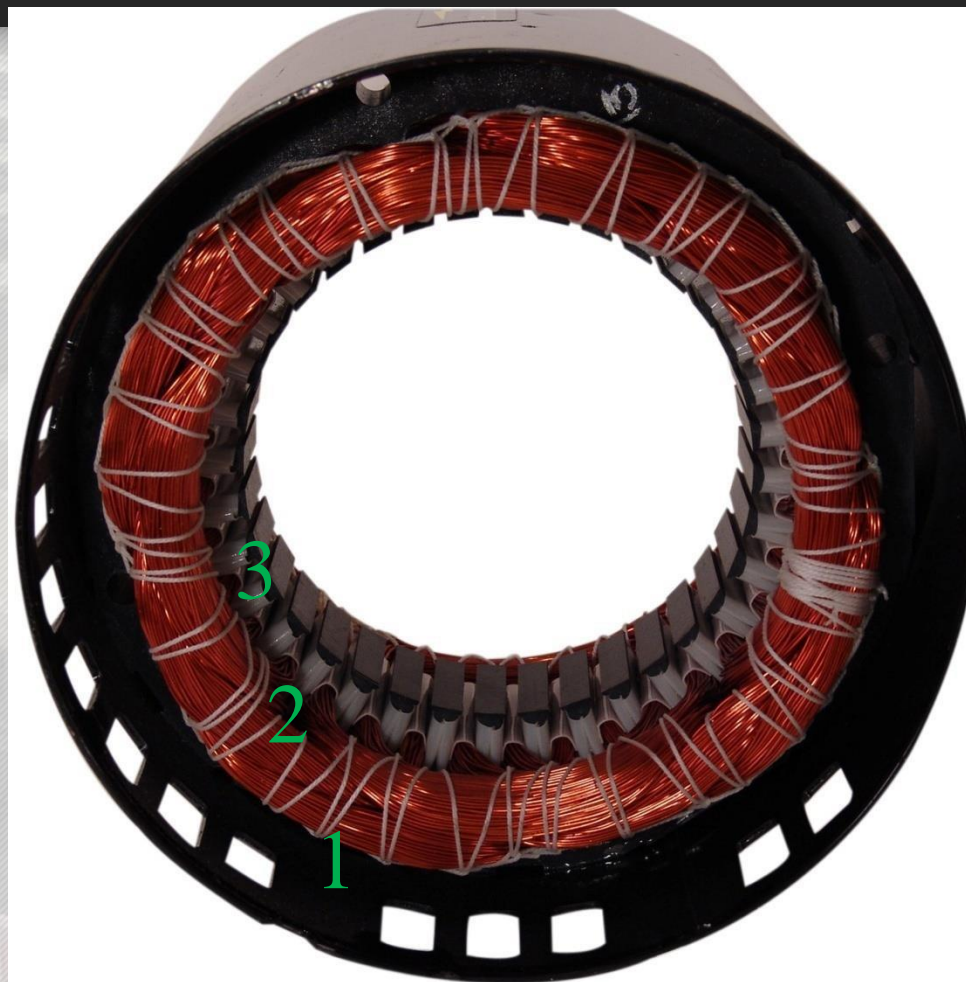
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CONNECTION DIAGRAM
BROWN
GREEN
BLUE
CAP
RESISTOR

PSC Stator



Three Phase Stator



Induction Motor Speeds

Number of Poles	No Load Speed	Typical Loaded Speed
2	3600	3000 – 3450
4	1800	1550 – 1750
6	1200	1050 – 1150
8	900	650 - 850

No Load RPM = (Frequency x 60) / # of Pole Pairs

Or for 60 HZ

No Load RPM = 7200 / # of Poles

Motor Types

- Shaded Pole – 30% Efficient
- PSC – 60% Efficient
- ECM – 65% to 80% Efficient
- 3-Phase – 65% to 90% Efficient



Permanent Split Capacitor (PSC) Air Over



Replacement Motor Amps

- When selecting a replacement
 - \approx +25% of original motor
- When replacement motor is operating
 - Not more than 10% higher than nameplate
 - Not more than 25% lower than nameplate

When checking amps, all doors, panels, guards, filters, and screens must be in place for accurate measurement.

Horsepower:

746 Watts = 1 Horsepower

Watts:

One watt is the rate at which work is done when one ampere of current flows through an electrical potential difference of one volt.

Watts = Volts x Amps

Dictionary.com - (Showing 1 definitions)

(noun)

1. the law that for any circuit the electric current is directly proportional to the voltage and is inversely proportional to the resistance

$$I = E/R$$

$$R = E/I$$

$$E = I \times R$$

Current (I) is measured in amperes (amps or A)

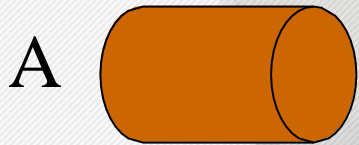
Voltage (E) is measured in volts (V)

Resistance (R) is measured in ohms (Ω)

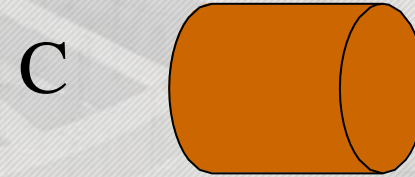
Resistance:

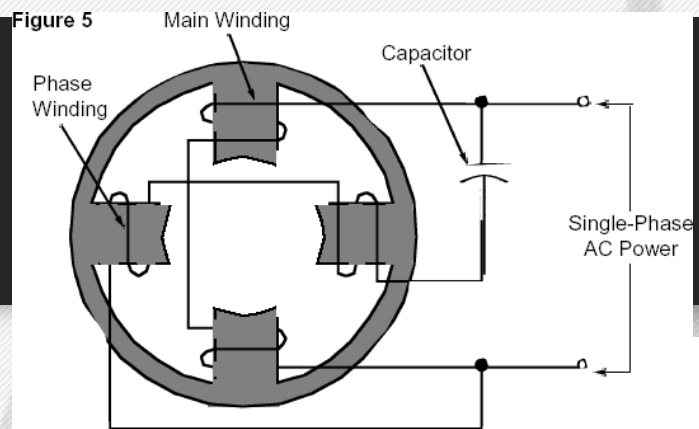
- Resistance increases with:

1) an increase in length



2) a decrease in cross section

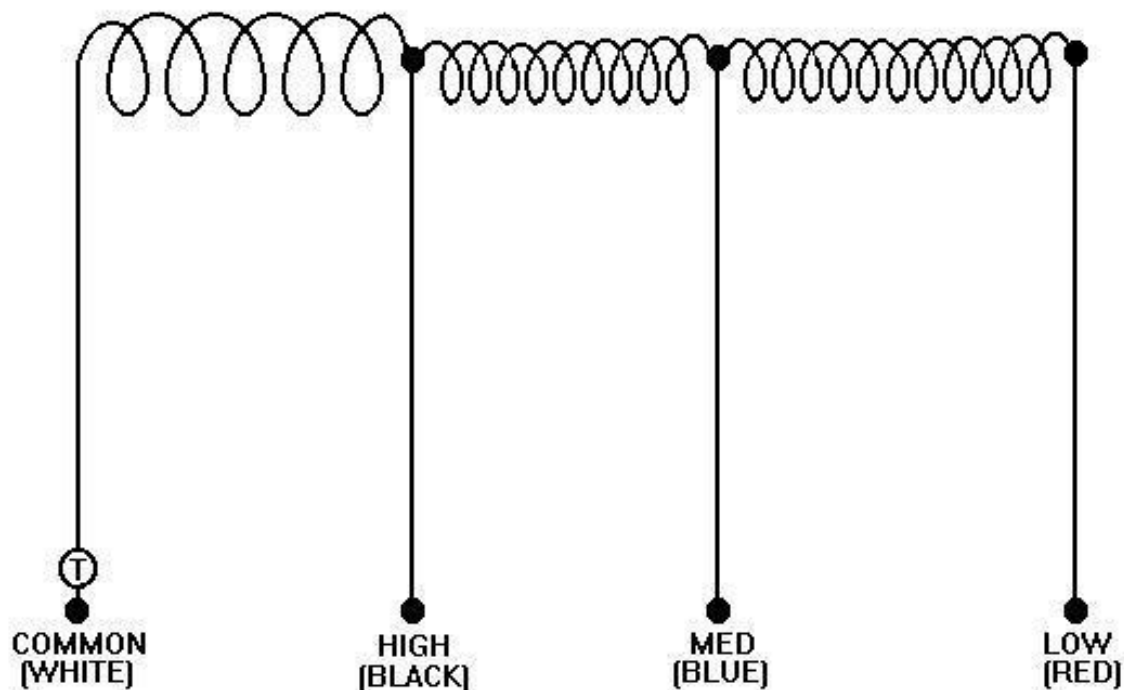




Additional “taps” are added to main winding

Nameplate marked:
1075/3

It’s really a single speed motor and will run close to synchronous speed on all taps - loading will determine speed in unit.



Packard

MOD 45470



HP 3/4-1/2-1/3-1/4-1/5 ROT REV. SER *

RPM 1075/4 SPD TYPE UF

VOLTS 115 PH 1

AMPS 9.1-2.3 MAX LOAD AMPS ----- HZ 60

INS B AMB 40°C AIR-OVER DUTY

CODE FR48Y



THERMALLY PROTECTED

CAP 10/5 MFD 370 VAC

MADE IN CHINA

CONNECTION DIAGRAM

BROWN SEP. CAP.

BROWN/W

WHITE

BLACK HI LINE

BLUE MH

YELLOW ML

RED LO

ROTATION

BLACK BLACK

WHITE WHITE

CWLE

BLACK WHITE

WHITE BLACK

CWLE

HP LABEL

RATING	370V	SPEEDS TO	FLA
MAX	CAPACITOR	USE	
3/4 HP	10.0	HIGH(1085RPM)	9.1
1/2 HP	10.0	HIGH(1140RPM)	6.5
1/3 HP	5/7.5 *	HIGH(1160RPM)	5.5
1/4 HP	5/7.5 *	MED-HI: (1155RPM)	4.0
		MED-LO: (1135RPM)	3.3
		LO: (1095RPM)	3.2
1/5 HP	5/7.5 *	MED-LO: (1150RPM)	3.0
		LO: (1131RPM)	2.6

* USING A 7.5MFD/370V CAPACITOR WILL RESULT IN AN APPROXIMATELY 10% STRONGER MOTOR

5 5/8 Inch Diameter Direct

Features

- Permanent split capacitor
- Continuous air over
- 2 1/2 inch mounting rings
- Class B insulation
- 40°C ambient
- Electrically reversible
- Open enclosure
- Automatic overload

Item ID	H.P.	Volts	RPM	Amps	Speeds	Shaft Dimension (In.)	Length Less Shaft (In.)	Type
Packard								
43581	1/6-1/8-1/10	115	1075	2.50	3	1/2 x 5 1/2	4	PS
43582	1/6-1/8-1/10	208-230	1075	1.40	3	1/2 x 7	4	PS
43583	1/4-1/6-1/8	115	1075	4.40	3	1/2 x 4 1/2	4	PS
43584	1/4-1/6-1/8	208-230	1075	1.70	3	1/2 x 4 1/2	4	PS
43585	1/3-1/4-1/6	115	1075	6.00	3	1/2 x 4 1/2	4 1/4	PS
43586	1/3-1/4-1/6	208-230	1075	2.60	3	1/2 x 4 1/2	4 1/4	PS
43587	1/2-1/3-1/4	115	1075	7.80	3	1/2 x 4 1/2	5 1/8	PS
43588	1/2-1/3-1/4	208-230	1075	3.60	3	1/2 x 4 1/2	5 1/8	PS

General Purpose (Self-Cooling)



CONNECTION DIAGRAM

1081 DESIGN

ST 1072



THERMALLY
PROTECTED

SKCET53ABN



MOD. C48K2N117A3

SER 8K00

VOLTS 115/230 ENCL=DP

HP 3/4 

ROT = CCWPE

PH 1 CODE L

RPM 3450

FR 5&J

HZ 60

MAX
LOAD AMPS 14.6/7.3

SF 1.5

INSUL CLASS B AMB 50 °C

TIME RATING CONT.

TYPE UAC

A.O.SMITH CORP. MEXICO

1081 DESIGN

ST 1072



THERMALLY
PROTECTED

SKCET53ABN



MOD. C48K2N117A3

SER 8K00

VOLTS 115/230

ENCL = DP

HP 3/4

ROT = CCWPE

PH 1

CODE L

RPM 3450

FR 56J

HZ 60

MAX
LOAD

AMPS 14.6/7.3

SF 1.5



INSUL
CLASS

B

AMB 50 °C

TIME
RATING

CONT.



TYPE UAC

A.O.SMITH CORP. MEXICO

HORSEPOWER & SERVICE FACTOR

- **DEFINITION: SERVICE FACTOR IS A MULTIPLIER, WHICH WHEN APPLIED TO THE HP, INDICATES THE TOTAL HP LOAD THE MOTOR CAN CARRY AT RATED VOLTAGE AND FREQUENCY**
- **IN SOME MOTOR APPLICATIONS, THE SERVICE FACTOR REPRESENTS A “SAFETY FACTOR”**

Service Factor

	
	
SER 8K00	
HP 3/4	
PH 1	CODE L
HZ	60
SF	1.5
TIME RATING CONT.	
MEXICO	

HP = $\frac{3}{4}$ or .75

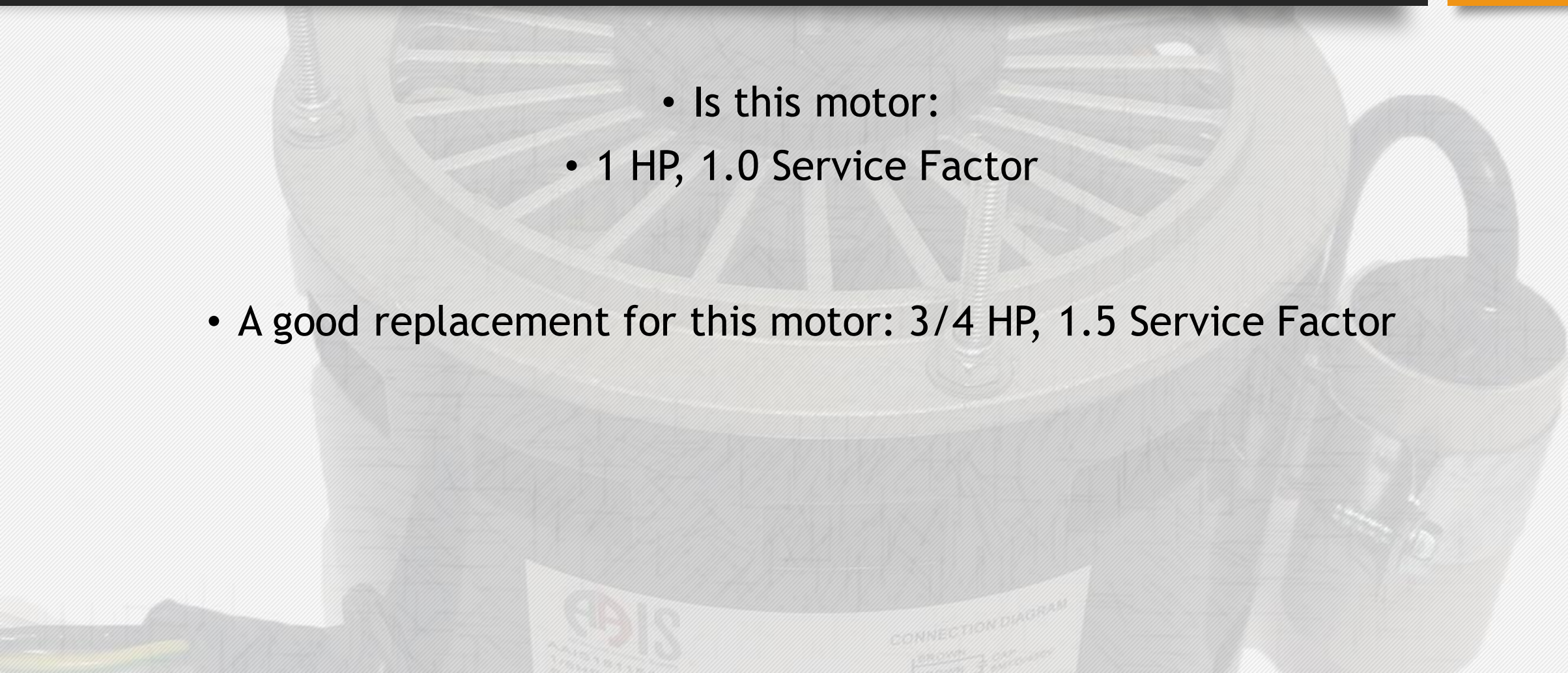
SF = 1.5

The actual HP is:

$.75 \times 1.5 = \underline{1.125 \text{ HP}}$

Horsepower and Service Factor

- Is this motor:
 - 1 HP, 1.0 Service Factor
- A good replacement for this motor: 3/4 HP, 1.5 Service Factor





Horsepower and Service Factor

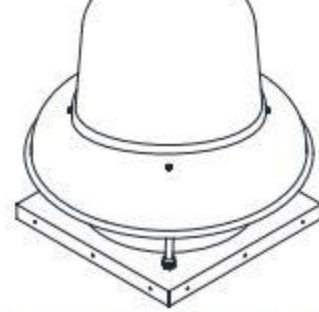
- Is this motor:
 - 1 HP, 1.0 Service Factor
 - $1 \times 1.0 = 1.0$ HP
- A good replacement for this motor: 3/4 HP, 1.5 Service Factor
 - $3/4 \times 1.5 = 1.125$ HP

Electric Motor Summary

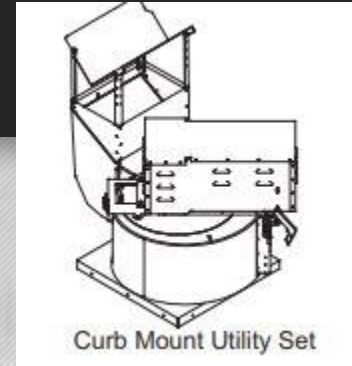
Important Specs:

1081 DESIGN	ST 1072	
THERMALLY PROTECTED	SKCET53ABN	
MOD. C48K2N117A3	SER 8K00	
VOLTS 115/230	ENCL= DP	HP 3/4
ROT = CCWPE	PH 1	CODE L
RPM 3450	FR 56J	HZ 60
MAX LOAD AMPS 14.6/7.3	SF 1.5	
INSUL CLASS B	AMB 50 °C	TIME RATING CONT.
TYPE UAC	A.O.SMITH CORP. MEXICO	

Ventilators



Down-blast Centrifugal Fan

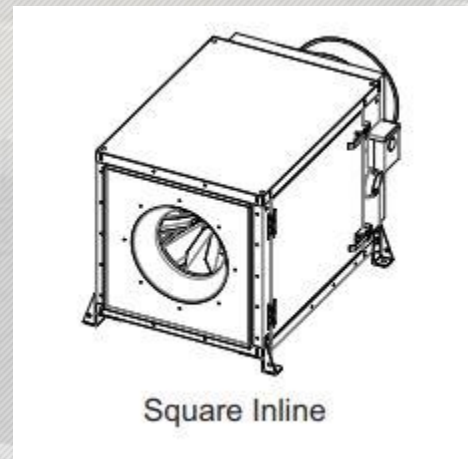


Curb Mount Utility Set

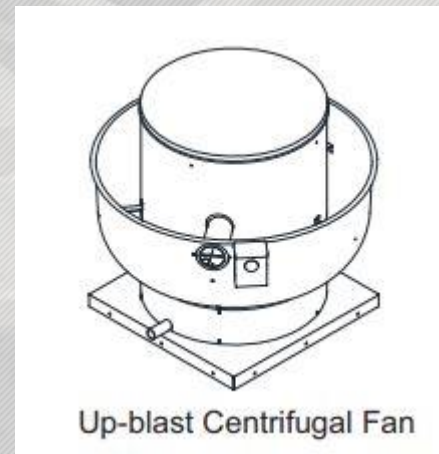


- Affiliation based on contracted services based on technical support, sourcing, and problem resolution via verbal/text communicant methods.
- Including: One/two day/in person person branch lessons, and hands training from All Around Industry Supply technical department and affiliates.
- Contingences open with intent to secure, gain, and protect vendors supplying products/trainings and consumers of agreement on the supplied
- service/product relevant to the subject of partnership/relationship configuration.

General Ventilation (Commercial)
 General Ventilation (Industrial)
 Restaurant
 High Temp
 Smoke Control



Square Inline



Up-blast Centrifugal Fan



Utility Set

Fan & other Replacement Parts

- All Around's overall intent is to break this markets fragmentation and supply all of what is needed to our clientele while maintaining customer relationship orientation, service, support, product updates, product vastness, stable internal employment, overall vendor growth, and a helpful platform/process for all parties to lean on for successful results in any perspective to ultimately satisfy all needs.
- These needs to be in perspective of financial obligations, industry growth, business growth, personal value, and facilitate overall meaning to deserving employees, customers, and vendors that support what is needed to achieve a thriving business that sustains all stated.



BEARINGS
 SHAFTS
 POWER ASSEMBLIES
 PULLEYS / SHEAVES
 HINGES
 ACCESS DOORS
 SILICONE - ADHESIVE
 CURBS

