

# PRODUCT INFORMATION PACKET

**marathon**<sup>®</sup>  
Motors

Model No: 160LTFC6538  
Catalog No: R337A  
20,1800,TEFC,160L,3/60/230/460  
TEFC



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**REGAL**



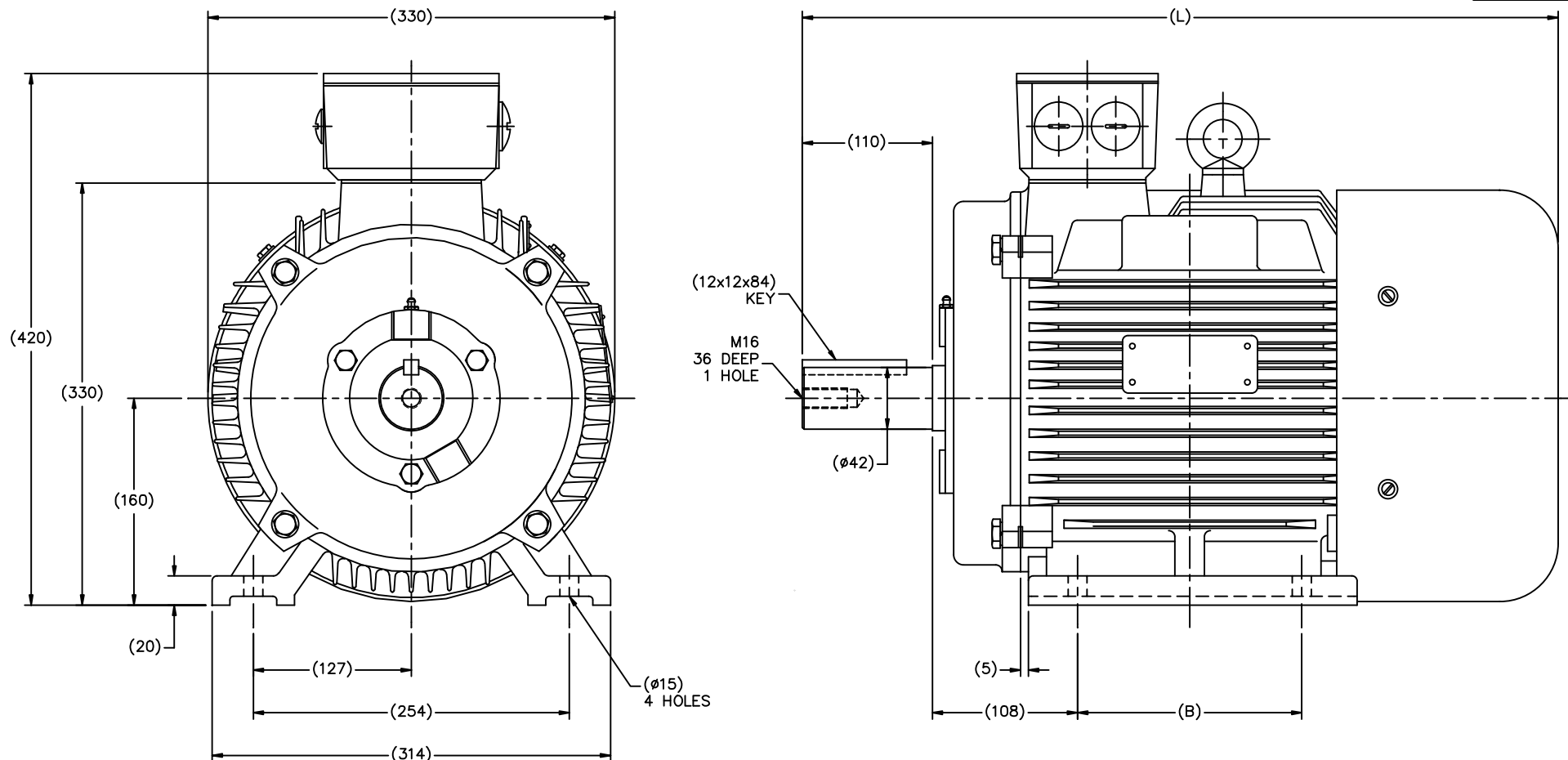
## Nameplate Specifications

|                            |           |                        |            |
|----------------------------|-----------|------------------------|------------|
| Output HP                  | 20 Hp     | Output KW              | 14.9 kW    |
| Frequency                  | 60 Hz     | Voltage                | 230/460 V  |
| Current                    | 49/24.6 A | Speed                  | 1775 rpm   |
| Service Factor             | 1.15      | Phase                  | 3          |
| Efficiency                 | 93 %      | Duty                   | CONTINUOUS |
| Insulation Class           | F         | Design Code            | B          |
| KVA Code                   | G         | Frame                  | 160L       |
| Enclosure                  | TEFC      | Overload Protector     | NOT        |
| Ambient Temperature        | 40 °C     | Drive End Bearing Size | 6309       |
| Opp Drive End Bearing Size | 6209      | UL                     | Recognized |
| CSA                        | Y         | CE                     | Y          |
| IP Code                    | 55        |                        |            |

## Technical Specifications

|                   |                   |                       |                    |
|-------------------|-------------------|-----------------------|--------------------|
| Electrical Type   | SQ CAGE INV RATED | Starting Method       | PWS & YDRUN OR INV |
| Poles             | 4                 | Rotation              | REV                |
| Mounting          | RIGID             | Motor Orientation     | HORIZONTAL         |
| Drive End Bearing | BALL              | Opp Drive End Bearing | BALL               |
| Frame Material    | CAST IRON         | Shaft Type            | STANDARD IEC       |
| Overall Length    | 25.39 in          | Shaft Diameter        | 1.67 in            |
| Shaft Extension   | 4.33 in           | Assembly/Box Mounting | F3                 |
| Outline Drawing   | B-SS622239        | Connection Diagram    | 004172.03ME        |

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|            |           |     |     |
|------------|-----------|-----|-----|
| DF160M1-2R | 193315.60 | 600 | 210 |
| DF160M2-2R | 193318.60 | 600 | 210 |
| DF160M-4R  | 193316.60 | 600 | 210 |
| DF160L-2R  | 193321.60 | 645 | 254 |
| DF160L-4R  | 193319.60 | 645 | 254 |
| DF160M-6R  | 193314.60 | 600 | 210 |
| FRAME      | PART #    | L   | B   |

(MAY NOT BE DRAWN TO SCALE)

(DIMENSIONS ARE IN MILLIMETERS)

| TOLERANCES UNLESS SPECIFIED                                                                                                                                                                                                        |  |          |            | DRAWN MSG 11-17-2010 |  |                      |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------|------------|----------------------|--|----------------------|--|
|                                                                                                                                                                                                                                    |  | DEC.     | METRIC     | CHK                  |  | MJS 11-18-2010       |  |
|                                                                                                                                                                                                                                    |  | .X       | ±2.5       | APPD                 |  | SB 11-18-2010        |  |
|                                                                                                                                                                                                                                    |  | .XX      | ±.76       | SCALE                |  | 5=16                 |  |
|                                                                                                                                                                                                                                    |  | .XXX     | ±.127      | REF                  |  | HEBEI                |  |
|                                                                                                                                                                                                                                    |  | .XXX     | ±.0127     | MAT'L                |  | PREV                 |  |
|                                                                                                                                                                                                                                    |  | CHK      | ANG ±7°30" | FINISH               |  | REV.                 |  |
| NO.                                                                                                                                                                                                                                |  | REVISION | BY & DATE  | RFP 11-18-2010       |  | CAD FILE ss622239    |  |
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|                                                                                                                                                                                                                                    |  |          |            | DIST                 |  | PAGE OF              |  |



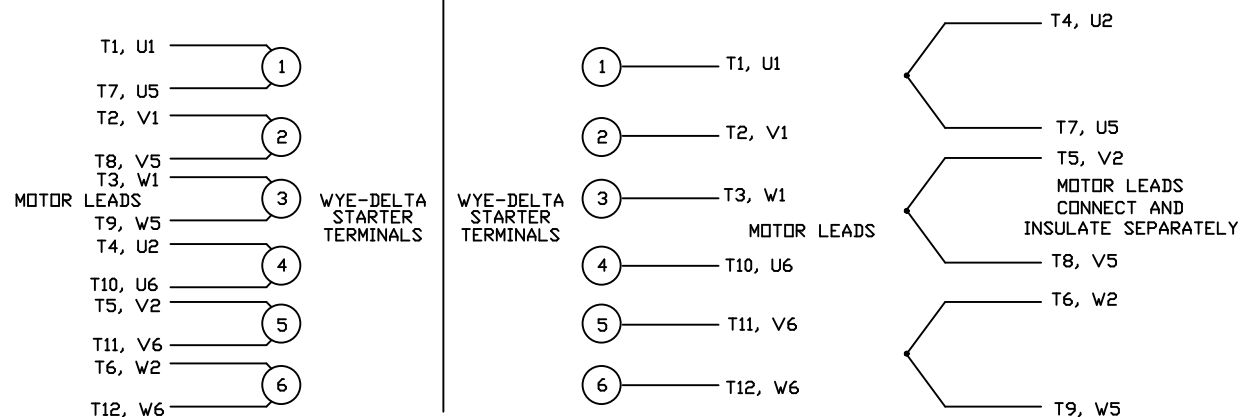
REGAL-BELOIT CORPORATION

TITLE OUTLINE - IEC PREMIUM  
DF160-R (II)

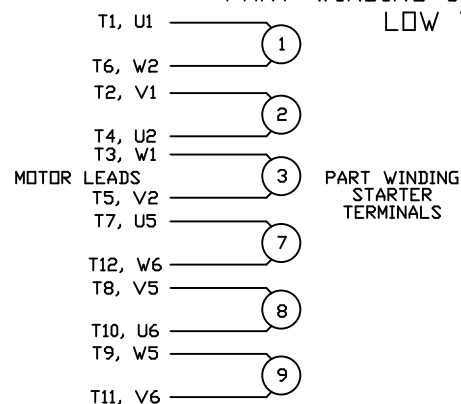
## WYE - DELTA STARTING USEABLE ON 2,4 AND 6 POLE MOTORS.

## LOW VOLTAGE CONNECTION

## HIGH VOLTAGE CONNECTION



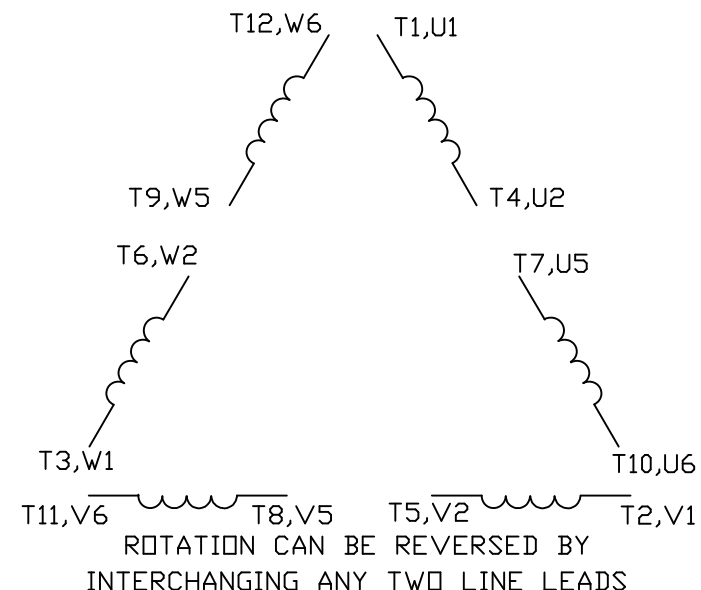
REFER TO THE WYE-DELTA STARTER CONNECTION INSTRUCTIONS FOR PROPER CONNECTION OF POWER LINES TO STARTER.

PART WINDING START USABLE ON 4 & 6 POLE MOTORS  
LOW VOLTAGE CONNECTION ONLY

REFER TO THE PART WINDING STARTER INSTRUCTIONS FOR PROPER CONNECTION OF POWER LINES TO STARTER.

REFER TO THE CUTLER - HAMMER OR EQUIV. FOR PROPER SELECTION OF OVERLOAD HEATER COILS.

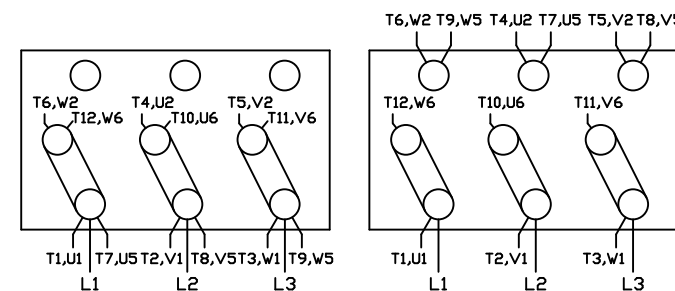
## LINE LEADS



12 LEAD DELTA CONNECTION ACROSS THE LINE START  
(FOR Y START DELTA RUN, REMOVE THE JUMPERS)

LOW VOLTAGE  
(MUST BE REWIRED  
AS SHOWN)

HIGH VOLTAGE  
(FACTORY WIRED FOR HIGH  
VOLTAGE AS SHOWN)



TOLERANCES  
UNLESS SPECIFIED

DEC. INCHES

.X ±.1

.XX ±.01

.XXX ±.005

.XXXX ±.0005

ANG ±1/2°



TITLE DELTA - WYE CONNECTION DIAGRAM  
IEC CAST IRON MOTORS

MAT'L.

FINISH

DRAWN CJW 08/28/02

CHK

APPD

SCALE 1=1

REF

FMF

PREV

NO. REVISION BY & DATE

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RFP

DIST

CAD FILE 00417203ME

SIZE

A

DRAWING NO.

004172-03ME

REV.



P.O. BOX 8003  
WAUSAU, WI 54401-8003  
PH. 715-675-3311

DATA VOLTS: 460

CERTIFICATION DATA SHEET

|                |             |                    |              |
|----------------|-------------|--------------------|--------------|
| CUSTOMER:      |             | CUSTOMER P.O. #:   |              |
| ORDER #:       |             | REFERENCE MODEL #: | 160L TFC6538 |
| CONN. DIAGRAM: | 004172.03ME | CAT #:             | R337A        |
| OUTLINE:       | B-SS62239   | CUSTOMER PART #:   |              |
| WINDING:       | T12904020   | MOUNTING:          | F3           |
| SPEED:         |             |                    |              |

TYPICAL MOTOR PERFORMANCE DATA

| HP          | KW    | SYNC RPM        | FL RPM          | FRAME              | ENCLOSURE       | TYPE        | KVA CODE    | DESIGN            |       |      |     |  |
|-------------|-------|-----------------|-----------------|--------------------|-----------------|-------------|-------------|-------------------|-------|------|-----|--|
| 20          | 14.9  | 1800            | 1775            | 160L               | TEFC            | TFC         | G           | N                 |       |      |     |  |
| PH          | HZ    | VOLTS           | AMPS            | START TYPE         | DUTY            | INSL        | S.F.        | AMB               | ELEV. |      |     |  |
| 3           | 60/50 | 230/460#200/400 | 49/24.6&43/21.5 | PWS & YDRUN OR INV | CONT            | F           | 1.15        | 40                | 3300  |      |     |  |
| F.L. EFF    |       | 93.0            | 3/4 LD EFF      | 93.4               | 1/2 LD EFF      | 92.8        | ELECT. TYPE |                   |       |      |     |  |
| F.L. PF     |       | 83.0            | 3/4 LD PF       | 80.1               | 1/2 LD PF       | 71.6        | 91.7        | SQ CAGE INV RATED |       |      |     |  |
| F.L. TORQUE |       | LR AMPS @ 460 V |                 | L.R. TORQUE        |                 | B.D. TORQUE |             | F.L. RISE (°C)    |       |      |     |  |
| 60.0        | LB-FT | 160             |                 | 109                |                 | 182%        |             | 156               | LB-FT | 260% | 45  |  |
| @ 3 FT.     |       | POWER           | ROTOR WK²       | MAX. LOAD WK²      | SAFE STALL TIME | STARTS/HOUR | MOTOR WGT   |                   |       |      |     |  |
| 75          | DBA   | 84              | 2.97            | LB-FT²             | 0               | LB-FT²      | 20          | SEC.              | 2     | 342  | LB. |  |

\*\*\* SUPPLEMENTAL INFORMATION \*\*\*

| DE BRACKET TYPE |      | ODE BRACKET TYPE | MOUNT TYPE   | MOTOR ORIENTATION | SEVERE DUTY | HAZARDOUS LOCATION     | DRIIP COVER | SCREENS        | PANT          |
|-----------------|------|------------------|--------------|-------------------|-------------|------------------------|-------------|----------------|---------------|
| STANDARD        |      | STANDARD         | RIGID        | HORIZONTAL        | UM SEVERE   | NONE                   | NO          | NONE           | BLUE (ENAMEL) |
| BEARINGS        |      | GREASE           | SHAFT TYPE   | SPECIAL DE        | SPECIAL ODE | SHAFT                  | MATERIAL    | FRAME MATERIAL |               |
| DE              | ODE  | POLYREX EM       | STANDARD IEC | NONE              | NONE        | 1045 HOT ROLLED (C-204 |             |                | CAST IRON     |
| BALL            | BALL |                  |              |                   |             |                        |             |                |               |
| 6309            | 6209 |                  |              |                   |             |                        |             |                |               |

| THERMOSTATS  | PROTECTORS   | WDG RTD's    | BRG RTD's    | THERMISTORS  | CONTROL            | SPACE HEATERS |
|--------------|--------------|--------------|--------------|--------------|--------------------|---------------|
| NONE         | NOT          | NONE         | NONE         | NONE         | FALSE              | NA            |
| R1 (ohms/ph) | R2 (ohms/ph) | X1 (ohms/ph) | X2 (ohms/ph) | Xm (ohms/ph) | VIBRATION (in/sec) | FLOAT         |
| 0            | 0            | 0            | 0            | 0            | 0.080              | ODE           |

|                        |                                                                        |  |  |  |
|------------------------|------------------------------------------------------------------------|--|--|--|
| * N                    | INVERTER TORQUE: CONSTANT 2:1<br>INV. HP SPEED RANGE: 1.5 X BASE SPEED |  |  |  |
| O                      |                                                                        |  |  |  |
| T                      |                                                                        |  |  |  |
| E                      |                                                                        |  |  |  |
| S                      |                                                                        |  |  |  |
| ENCODER: NONE          |                                                                        |  |  |  |
| BRAKE: NONE            |                                                                        |  |  |  |
| FT-LB: NONE            |                                                                        |  |  |  |
| VOLTAGE: NONE          |                                                                        |  |  |  |
| UL: VINS, CONST UL REC |                                                                        |  |  |  |

|                            |                |                               |                                       |
|----------------------------|----------------|-------------------------------|---------------------------------------|
| PREPARED BY: EARL BABBITTS | DATE: 5/5/2017 | INVERTER TORQUE: CONSTANT 2:1 | INV. HP SPEED RANGE: 1.5 X BASE SPEED |
| FORM: 3531 REV_4 2/27/06   |                | UL: VINS, CONST UL REC        | HZ:                                   |

Data Sheet

Date: 5/5/2017

Customer:

Attention:

Submitted by:

EARL BABBITTS



160L TFC6538

Submital

Data @ 460 V

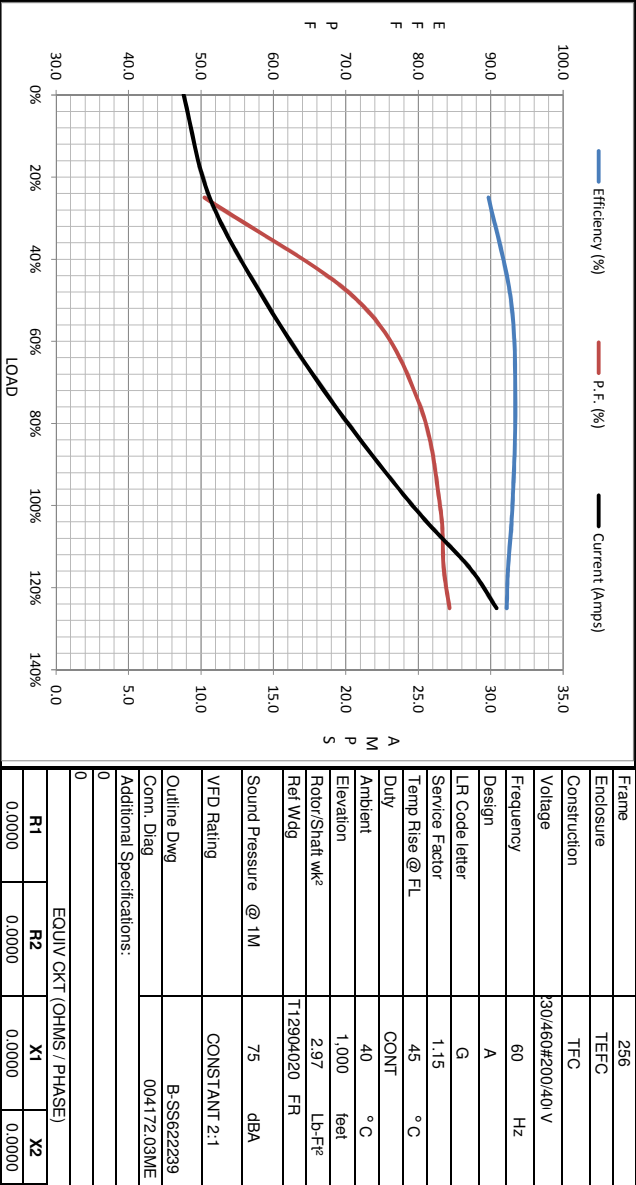
Motor Load Data

| Load           | 0%   | 25%  | 50%  | 75%  | 100% | 115%  | 125% | LR  |
|----------------|------|------|------|------|------|-------|------|-----|
| Current (Amps) | 8.8  | 10.6 | 14.4 | 19.1 | 24.6 | 28.5  | 30.4 | 160 |
| Torque (ft-lb) | 0.00 | 15.0 | 30.0 | 45.0 | 60.0 | 69.0  | 75.0 | 109 |
| RPM            | 1800 | 1795 | 1785 | 1780 | 1775 | 1,770 | 1765 | 0   |
| Efficiency (%) |      | 89.7 | 92.8 | 93.4 | 93.0 | 92.4  | 92.2 |     |
| P.F. (%)       | 5.2  | 50.5 | 71.6 | 80.1 | 83.0 | 83.5  | 84.3 | 0.0 |

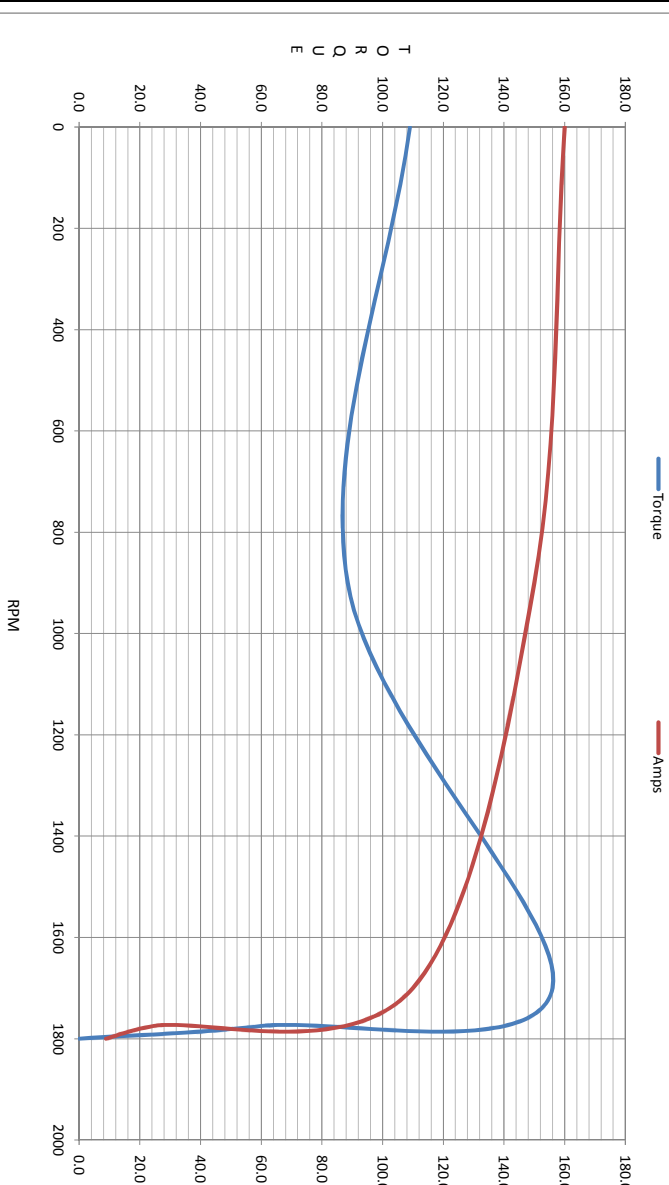
Motor Speed Data

|                | LR  | Pull-Up | BD   | Rated | Idle |
|----------------|-----|---------|------|-------|------|
| Speed (RPM)    | 0   | 900     | 1700 | 1775  | 1800 |
| Current (Amps) | 160 | 150     | 110  | 24.6  | 8.8  |
| Torque (ft-lb) | 109 | 88.5    | 156  | 60.0  | 0.00 |

| Information Block |      |
|-------------------|------|
| HP                | 20.0 |
| Sync. RPM         | 1800 |



Speed - Torque Curve



Date: 5/5/2017  
Customer:   
Attention:   
Submitted by: EARL BABBITTS



Torque Capability Curve

Data @ 460 Volts

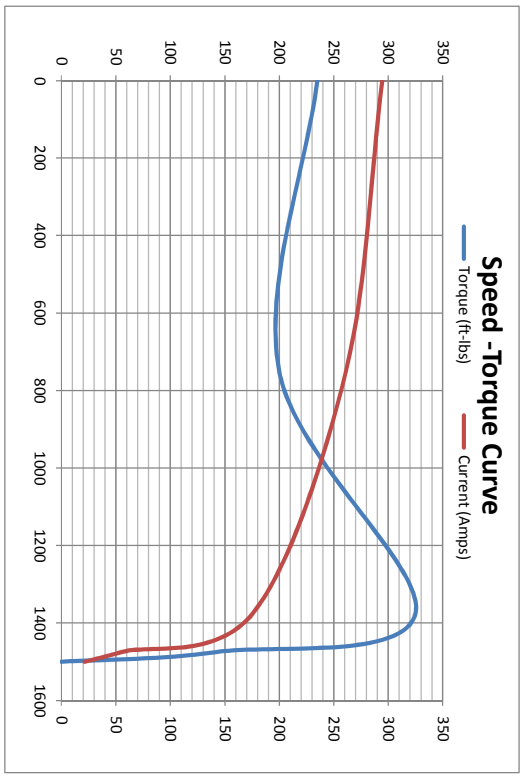
Max RPM Peak

| HP | 0.00 | 0.00 | 20 | 20 | 20 | 125 |
|----|------|------|----|----|----|-----|
|----|------|------|----|----|----|-----|

|                  |      |      |       |       |       |       |
|------------------|------|------|-------|-------|-------|-------|
| Voltage (volts)  | -    | 0    | 460   | 460   | 460   | 460   |
| Frequency (HZ)   | 0    | 0    | 60    | 90    | 91    | 89    |
| RPM              | 0    | 0    | 1,775 | 2,700 | 2,700 | 2,682 |
| Current (Amps)   | 24.6 | 24.6 | 24.6  | 24.6  | 24.6  | 158   |
| Rated Tq (ft-lb) | 60.0 | 60.0 | 60.0  | 39.4  | 39.4  | 245   |
| Peak Tq (ft-lb)  | 144  | 144  | 144   | 59.5  | 59.5  | 60.3  |

Motor Speed Data

|                 | Locked Rotor | Pull-Up | Breakdown | Rated Load | Idle |                 |
|-----------------|--------------|---------|-----------|------------|------|-----------------|
| Speed (RPM)     | 0            | 750     | 1375      | 1475       | 1500 | HP              |
| Current (Amps)  | 295          | 261     | 176       | 55.1       | 21.4 | 20.0            |
| Torque (ft-lbs) | 235          | 200     | 325       | 142        | 0.00 | 1,800           |
|                 |              |         |           |            |      | 256             |
|                 |              |         |           |            |      | TEFC            |
|                 |              |         |           |            |      | 230/460#200/400 |
|                 |              |         |           |            |      | 60 Hz           |
|                 |              |         |           |            |      | CONT            |
|                 |              |         |           |            |      | A               |
|                 |              |         |           |            |      | G               |
|                 |              |         |           |            |      | 4               |
|                 |              |         |           |            |      | 45 °C           |
|                 |              |         |           |            |      | 40 °C           |
|                 |              |         |           |            |      | 1,000 feet      |
|                 |              |         |           |            |      | T12904020       |
|                 |              |         |           |            |      | FR              |
|                 |              |         |           |            |      | 75              |
|                 |              |         |           |            |      | CONSTANT 2:1    |
|                 |              |         |           |            |      | B-SS622239      |
|                 |              |         |           |            |      | 004172.03ME     |
|                 |              |         |           |            |      | 0               |



|                |                 |
|----------------|-----------------|
| HP             | 20.0            |
| Sync. RPM      | 1,800           |
| Frame          | 256             |
| Enclosure      | TEFC            |
| Construction   | 230/460#200/400 |
| Voltage        | 60 Hz           |
| Frequency      | CONT            |
| Duty           | A               |
| Design         | G               |
| LR Code letter | 4               |
| Poles          | 45 °C           |
| Temp Rise @ FL | 40 °C           |
| Ambient        | 1,000 feet      |
| Elevation      | T12904020       |
| Ref Wdg        | FR              |
| R #            | 75              |
| gBA @ 1M       | CONSTANT 2:1    |
| VFD rating     | B-SS622239      |
| OUTLINE:       | 004172.03ME     |
| CONN DIAG:     | 0               |

