Goldline EB Servo Motor

English **Instruction Manual**
中文 **说明书**

Edition: B, August 2021
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English 中文

Original Language is English. All other content is translated from the original language.

or

For safe and proper use, follow these instructions.
Keep them for future reference.

Record of Document Revisions

Revision	Date	Remarks
A	05/2021	Initial release, first edition
B	08/2021	Corrections to part number scheme in Chinese chapter

Trademarks

- Goldline is a registered trademark of Kollmorgen Corporation

Technical changes to improve the performance of the equipment may be made without prior notice!

Table of Contents

1 English

1.1 Introduction

This manual is a general document and is applicable for Goldline EB-Series synchronous servomotors (standard version).

Kollmorgen's brushless motors utilize high-energy Samarium Cobalt or Neodymium Iron Boron magnet technology. These brushless motors consist of permanent magnet rotors and 3-phase Y-stator windings. Brushless motors do not have commutators or associated brushes. These motors run as synchronous motors, meaning the rotor speed is the same as the speed (frequency) of the rotating stator's magnetic field. A brushless resolver is used as the feedback device and is mounted internally as part of the overall motor construction.

Benefits resulting from the typical amplifier and brushless motor construction are:

- Lower rotor inertia permits higher acceleration rates.
- The motor is thermally more efficient since all heat is generated in the stator windings located in the outside shell.
- Higher speed operation and high peak horsepower are achieved. There is no commutation limit.
- Smaller physical motor size for a given horsepower rating.
- Higher reliability and less motor maintenance. There is no commutator or brushes.
- Smooth output torque.

The Catalog data (CD) and Performance Curve (PC) presented in this document are applicable only to corresponding individual motor. They contain such information as maximum operating speed, peak current limits, and values that make the amplifier and motor combinations compatible. Do NOT operate the motor outside the parameters shown on the respective performance curves.

Further information can be found on:

- Kollmorgen website: https://www.kollmorgen.com/
- Kollmorgen Developer Network: https://kdn.kollmorgen.com

1.1.1 Symbols Used

Symbol	Indication
 **DANGER**	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
 **WARNING**	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 **CAUTION**	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates situations which, if not avoided, could result in property damage.
NOTE	This symbol indicates important notes.
	Warning of a danger (general). The type of danger is specified by the text next to the symbol.
	Warning of danger from electricity and its effects.
	Warning of danger from hot surface.
	Warning of suspended loads.

1.2 Safety

This section helps you to recognize and avoid dangers to people and objects.

1.2.1 Important Notes

This Section helps you to recognize and avoid dangers to people and objects.

1.2.1.1 Special Staff Required

Only properly qualified personnel are permitted to perform such tasks as transport, assembly, setup, and maintenance. Qualified specialist staff are persons who are familiar with the transport, installation, assembly, commissioning, and operation of motors and who bring their relevant minimum qualifications to bear on their duties:

- Transport: only by personnel with knowledge of handling electrostatically sensitive components.
- Mechanical Installation: only by mechanically qualified personnel.
- Electrical Installation: only by electrically qualified personnel.
- Setup: only by qualified personnel with extensive knowledge of electrical engineering and drive technology

The qualified personnel must know and observe IEC 60364 / IEC 60664 and national accident prevention regulations.

1.2.1.2 Read The Documentation

Read the available documentation before installation and commissioning. Improper handling of the motor can cause harm to people or damage to property. The operator must therefore ensure that all persons entrusted to work on the motor have read and understood the manual and that the safety notices in this manual are observed.

1.2.1.3 Pay Attention to Technical Data

Adhere to the technical data and the specifications on connection conditions (rating plate and documentation). If permissible voltage values or current values are exceeded, the motors can be damaged, for example by overheating.

1.2.1.4 Perform Risk Assessment

The manufacturer of the machine must generate a risk assessment for the machine, and take appropriate measures to ensure that unforeseen movements cannot cause injury or damage to any person or property. Additional requirements on specialist staff may also result from the risk assessment.

1.2.1.5 Transport Safely

Lift and move motors with more than 20 kg weight only with lifting tools. Lifting unassisted could result in back injury.

1.2.1.6 Secure the Key

Remove any fitted key (if present) from the shaft before letting the motor run without coupled load, to avoid the dangerous results of the key being thrown out by centrifugal forces.

	**CAUTION Hot surface!** The surfaces of the motors can be very hot in operation, according to their protection category. Risk of minor burns! The surface temperature can exceed 100°C. • Measure the temperature, and wait until the motor has cooled down below 40°C before touching it.
	**DANGER Grounding! High Voltages!** It is vital that you ensure that the motor housing is safely earthed to the PE (protective earth) busbar in the switch cabinet. Risk of electric shock. Without low-resistance earthing no personal protection can be guaranteed and there is a risk of death from electric shock. Not having optical displays does not guarantee an absence of voltage. Power connections may carry voltage even if the motor shaft is not rotating. • Do not unplug any connectors during operation. There is a risk of death or severe injury from touching exposed contacts. Power connections may be live even when the motor shaft is not rotating. This can cause flashovers with resulting injuries to persons and damage to the contacts. • After disconnecting the servo amplifier from the supply voltage, wait several minutes before touching any components which are normally live (e.g. contacts, screw connections) or opening any connections. • The capacitors in the servo amplifier can still carry a dangerous voltage several minute safter switching off the supply voltages. To be extra safe, measure the DC-link voltage and wait until the voltage has fallen below 60 V.
	**WARNING Secure hanging loads!** Built-in holding brakes do not ensure functional safety! • Hanging loads (vertical axes) require an additional, external mechanical brake to ensure personnel safety.

1.2.2 Use As Directed

- The EB series of synchronous servomotors is designed especially for drives for factory automation, machine tools, textile and packing machinery and similar with high requirements for dynamics.
- The user is only permitted to operate the motors under the ambient conditions which are defined in this documentation.
- The motors are installed as components in electrical apparatuses or machines and can only be commissioned and put into operation as integral components of such apparatuses or machines.
- The thermal sensor which is integrated in the motor windings must be observed and evaluated.
- The holding brakes are designed as standstill brakes and are not suited for repeated operational, dynamic braking.

1.2.3 Prohibited Use

- The use of Standard Motors is prohibited:
  - directly on mains supply networks,
  - in contact with food and beverage,
  - in environments with caustic and/or electrically conducting acids, bases, oils, vapors, dusts.

- Commissioning the motor is prohibited if the machine in which it was installed:
  - does not meet the requirements of the EC Machinery Directive,
  - does not comply with the EMC Directive,
  - does not comply with the Low Voltage Directive.

- Built-in holding brakes without further equipment must not be used to ensure functional safety
- Do not operate the motor in a hazardous location with any securing screws or covers removed. Do not remove any screws or covers while the motor is in a hazardous location.

1.3 Package

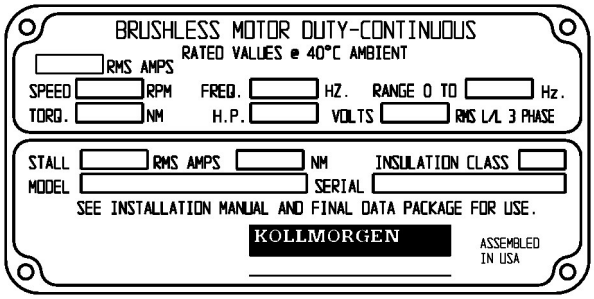
1.3.1 Delivery Package

- Motor from EB series

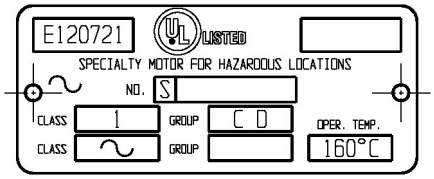
1.3.2 Nameplate

- Each motor ships with two Nameplates.
  - the motor part number and rated values
  - the explosion-proof listing
- A third Nameplate is included for Brake models (optional).
- Year of manufacturing is coded in the serial number. The first two digits of the serial number are the year of manufacturing, e.g. "17" means 2017.

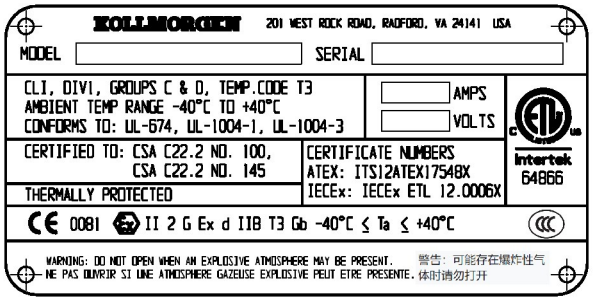
1.3.2.1 EB-Motor Part Number Nameplate



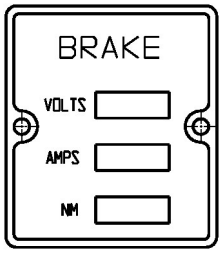
1.3.2.2 EB-Motor UL Version Nameplate



1.3.2.3 EB Motor ATEX/IECEX/CCC/ETL Version Nameplate



1.3.2.4 EB Motor Brake Nameplate



1.3.3 Model Number Description

EB-102-A-11-B2-XXX ATEX

Motor Series
EB series explosion-proof brushless servo motor with Resolver feedback

Frame Size & Stack Length
102
104
106
202
204
206
402
404
406
602
604
606
802
804
806

Winding
A, B, etc.

Connection Option
1 Flying leads, 609mm with 3/4-NPT conduit hold

Mounting Option
1 Standard metric mount, no rear shaft extension

Standard Additions
[blank] No brake
B2 90 VDC fail-safe brake
B3 24 VDC fail-safe brake

Custom
[blank] Standard
Custom variations not affecting controlled features or flame-paths

Approvals ‡
[blank] UL Class 1, Division 1, Groups C and D
ATEX IECEx/ATEX Ex II 2 G Ex d IIBT3 Gb -40°C ≤ Ta ≤ +40°C; CCC

NOTICE

‡ EB motors can be ordered in either **cULus** or **ATEX/IECex + CCC + cETLus** configurations. These configurations, and their corresponding certifications, are mutually exclusive. UL configurations do not have ATEX/IECEx + CCC certifications. ATEX/IECEx+CCC+cETLus have the ETL listed mark instead of the UL listed mark, using equivalent UL and CSA standards.

NOTE

Not all options are available. Availability depends upon the compliance required.

1.3.4 Certifications & Approvals

1.3.4.1 UL

See Model Number Description for models that meet UL. EB-models that meet UL are for use in Class 1, Division 1, Groups C and D hazardous locations.

1.3.4.2 ATEX/IECEx/CCC/ETL

See Model Number Description for models that meet ATEX/IECEx.

- EB-models that meet ATEX/IECEx are for use in IECEx/ATEX **Ex II 2 G Ex d IIB T3 Gb** -40°C ≤ Ta ≤ +40deg°C .
- ATEX/IECEx configurations also include the China Compulsory Certificate (CCC) mark.
- Currently the EB-80x series is not offered in ATEX/IECEx or CCC.

1.3.5 Motor Inspection

Remove the motor from the shipping container being careful not to damage the leadwires extending from the connection fitting. Do not lay the motor on top of the leadwires as it may damage the wires. Visually inspect the motor for any shipping damage that may have occurred.

- Motor frame and exterior covers are to be free of nicks, burrs, or upsets with all motor fasteners in place and tight.
- Output shaft & keyway are to be free of nicks, burrs, or blemishes that would prevent safe assembly of mechanical connections.
- Front endbell flange and mounting pilot are to be free of nicks, burrs, or damage that would prevent proper motor mating or alignment to mounting surfaces and diameters.
- Mounting holes are to be free of damage or debris that would prevent installation of mounting fasteners.
- Leadwires are to be free of nicks, cuts, or cracked insulation that expose bare wire.
- If damage is noted or suspected, notify shipping carrier immediately.

1.4 Mechanical Installation

Dimension drawings can be found in Dimension Drawings.

1.4.1 Important Notes

Only qualified staff with knowledge of mechanical engineering are permitted to assemble the motor.

- Protect the motor from unacceptable stresses. During transport and handling no components must be damaged.
- The site must be free of conductive and aggressive material.
- Ensure an unhindered ventilation of the motors and observe the permissible ambient and flange temperatures. For ambient temperatures above 40°C please consult our applications department beforehand. Ensure that there is adequate heat transfer in the surroundings and the motor flange.
- Motor flange and shaft are especially vulnerable during storage and assembly - so avoid brute force. It is important to use the locking thread which is provided to tighten up couplings, gear wheels or pulley wheels and warm up the drive components, where possible.
- Blows or the use of force will lead to damage to the bearings and the shaft
- Wherever possible, use only backlash-free, frictionally-locking collets or couplings. Ensure correct alignment of the couplings. A displacement will cause unacceptable vibration and the destruction of the bearings and the coupling.
- In all cases, do not create a mechanically constrained motor shaft mounting by using a rigid coupling with additional external bearings (e.g. in a gearbox).
- Take note of the no. of motor poles and the no. of resolver poles (if applicable) and ensure that the correct setting is made in the servo amplifier which is used. An incorrect setting can lead to the destruction of the motor, especially with small motors.
- Avoid axial loads on the motor shaft, as far as possible. Axial loading significantly shortens the life of the motor.
- Check the compliance to the permitted radial and axial forces. Radial and Axial force limits can be found the Motor Specifications sections, see Motor Specifications For EB-10x, Motor Specifications For EB-20x, Motor Specifications For EB-40x, Motor Specifications For EB-60x, or Motor Specifications For EB-80x.

1.5 Electrical Installation

Check that the servo amplifier and motor match each other. Compare the rated voltage and rated current of the unit. Carry out the wiring according to the wiring diagram in the instruction manual of the servo amplifier. The connections to the motor are shown in Leadwire Diagram.

1.5.1 Important Notes

Only staff qualified and trained in electrical engineering are allowed to wire up the motor.

DANGER High Voltages!

- Always make sure that the motors are de-energized during assembly and wiring, i.e. no voltage may be switched on for any piece of equipment which is to be connected.
- There is a risk of death or severe injury from touching exposed contacts. Ensure that the switch cabinet remains turned off (barrier, warning signs etc.). The individual voltages will only be turned on again during setup.
- Never undo the electrical connections to the motor while it is energized. Risk of electric shock! In unfavorable circumstances, electric arcs can arise causing harm to people and damaging contacts.
- A dangerous voltage, resulting from residual charge, can be still present on the capacitors up to 10 minutes after switch-off of the mains supply. Even when the motor is not rotating, control and power leads may be live.
- Measure the DC-link voltage and wait until it has fallen below 60V.

1.5.2 Kollmorgen Servo Drive Options

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

Carry out the wiring according to the wiring diagram in the instruction manual of the servo amplifier. This should include input power, controller, servo amplifier/drive, and motor, and additional external I/O.

Kollmorgen Servo drive Installation manuals may be found at:

- S700: https://www.kollmorgen.com/en-us/products/drives/servo/s700/
- S600: https://www.kollmorgen.com/en-us/products/drives/servo/serviced-drives/s600/
- CD Series and other Serviced drives may be found at Kollmorgen Developer Network: https://kdn.kollmorgen.com
- AKD: https://www.kollmorgen.com/en-us/products/drives/servo/akd/
  - AKD does not offer TAA by default. please contact Kollmorgen Customer Support for further technical guidance, including expected motor performance without the use of TAA algorithms. A White Paper for EB-series use with AKD does exist.
- AKD2G: https://www.kollmorgen.com/en-us/products/drives/servo/akd2g/akd2g-servo-drive/

1.6 Set Up

The procedure for setup is described as an example. A different method may be appropriate or necessary, depending on the application of the equipment.

1. Check the assembly and orientation of the motor.
2. Check the drive components (clutch, gear unit, belt pulley) for the correct seating and setting (observe the permissible radial and axial forces).
3. Check the wiring and connections to the motor and the servo amplifier. Check that the earthing is correct.
4. Test the function of the holding brake, if used. (apply 24 V or 90 V, brake must be released).
5. Check whether the rotor of the motor revolves freely (release the brake, if necessary). Listen for grinding noises.
6. Check that all the required measures against accidental contact with live and moving parts have been carried out.
7. Carry out any further tests which are specifically required for your system.
8. Now commission the drive according to the setup instructions for the servo amplifier.
9. In multi-axis systems, individually commission each drive unit (amplifier and motor).

1.6.1 Servo Amplifier Requirements

- Synchronous Servomotors are operated in drive systems together with a servo amplifier, which may vary by size and operating characteristics (voltage, current, internal Resistance, inductance, rotor inertia, etc.).Typical amplifiers used with Kollmorgen's high performance permanent magnet brushless motors are 3-phase sine wave, pulse-width modulated type. They are fully regenerative four-quadrant bi-directional velocity loop amplifiers.
- Do not install the servo amplifier in a hazardous location.
- Consult the manufacturer of the amplifier to assure operation per the motor's nameplate data.

1.6.2 Typical Servo Amplifier & Power Supply Ratings for EB Motors

Ratings		
Input Power	235 V_{RMS} (L-L) 2-phase (±10%); isolation transformer not required – provided short circuit (inrush) current remains limited to less than 1000 amps. 115 VAC 1-phase control power.	
Output Power	Power Supply DC Bus	325 VDC nominal, no load
	Amplifier: at rated load	230 V_{RMS} (L-L), Nominal ±10%
	Continuous Current (A_{RMS}/Phase)	Intermittent Current (5 sec. max,, 30% duty cycle) (A_{RMS}/Phase)
	As required to produce motors rated current	200% of continuous
Ambient Operating Temperature	0-55° C	
Switching Frequency	10 kHz	
Cooling	Fan, Convection (cold plate)	

1.6.3 Kollmorgen Servo Amplifiers & Torque Angle Advance

The EB series motors were originally designed for use with the CD-Series and SERVOSTAR family of Kollmorgen drives for optimum performance. When combined with the CD/SERVOSTAR digital amplifier series (using Kollmorgen's patented Torque Angle Advance [TAA] algorithms), the system performance provides the most optimized peak torque and speed.

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes TAA.

EB-series motors may be operated with servo drives that do not offer TAA, including alternative Kollmorgen servo drives and third-party drives. This may result in a reduction of torque, specifically at speeds higher than 50% of rated speed. For these scenarios, please contact Kollmorgen Customer Support for further technical guidance, including expected motor performance without the use of TAA algorithms.

1.6.4 Servo Amplifier Wiring

Pinout of the servo amplifier's end can be found in the instruction manual of the servo amplifier.

1.6.4.1 Motor Thermostat

- The motor thermostat is an automatic resetting device that is used to shut the power down from the motor controller should an over temperature condition occur in the motor windings. The thermostat leads should be connected into a latched (lock-out) power down type circuit which will require manual reset.
- Thermostat to be wired with twisted pair.

1.6.4.2 Motor Brake

All motors are optionally available with a holding brake, either 90 VDC brake (Option code "B2"), or 24 VDC failsafe brake (Option Code "B3"). These brake options are spring applied brakes and are integrated into the motors. When this brake is de-energized it blocks the rotor from rotation.

- Energize the brake before switching the motor on and while it is in operation. For proper operation, use an electrical interlock circuit to ensure that the brake is not engaged while the motor is energized.
- For full brake specifications can be found in Technical Data For Brakes.

1.6.5 Troubleshooting

The following table is to be seen as a “First Aid” box. There can be a large number of different reasons for a fault, depending on the particular conditions in your system. The fault causes described below are mostly those which directly influence the motor. Peculiarities which show up in the control loop behaviour can usually be traced back to an error in the parameterization of the servo amplifier. The documentation for the servo amplifier and the setup software provides information on these matters.

For multi-axis systems there may be further hidden reasons for faults.

Fault	Possible cause	Measures to remove the cause of the fault
Motor doesn’t rotate	• Servo amplifier not enabled • Break in setpoint lead • Motor phases in wrong sequence • Brake not released • Drive is mechanically blocked	• Supply ENABLE signal • Check setpoint lead • Correct the phase sequence • Check brake controls • Check mechanism
Motor runs away	• Motor phases in wrong sequence	• Correct the phase sequence
Motor oscillates	• Break in the shielding of the feedback cable • Amplifier gain to high	• Replace feedback cable • Use motor default values
Error message: brake	• Short-circuit in the supply voltage lead to the motor holding brake • Faulty motor holding brake	• Remove the short-circuit • Replace motor
Error message: output stage fault	• Motor cable has short-circuit or earth short • Motor has short-circuit or earth short	• Replace cable • Replace motor
Error message: feedback	• Feedback connector is not properly plugged in • Break in feedback cable, cable crushed or similar	• Check connector • Check cables
Error message: motor temperature	• Motor thermosensor has switched • Loose feedback connector or break in feedback cable	• Wait until the motor has cooled down. Then investigate why the motor becomes so hot. • Check connector, replace feedback cable if necessary
Brake does not grip	• Required holding torque too high • Brake faulty • Motor shaft axially overloaded	• Check the dimensioning • Replace motor • Check the axial load, reduce it. Replace motor, since the bearings have been damaged

2 中文

2.1 简介

本手册是一份通用文件，适用于Goldline EB系列同步伺服电机(标准版)。

科尔摩根的无刷电机采用高能钐钴磁铁或高能钕铁硼磁铁技术。此类无刷电机由永磁转子和3相Y型定子绕组组成。无刷电机没有换向器或相关电刷。此类电机是同步电机，即转子的速度与定子旋转产生磁场的速度(频率)相同。一个无刷旋转变压器用作反馈装置，并作为整个电机结构的一部分安装在内部。

使用典型的放大器和无刷电机结构有以下几点好处：

- 较低的转子惯量可获得更高的加速率。
- 由于所有的热量都由位于外壳的定子绕组产生，因此该电机的热效率更高。
- 可实现更高的速度运转和高峰值扭矩没有换向限制。
- 在一定的额定扭矩下，电机的实际尺寸更小。
- 可靠性更高，电机维护次数更少。没有换向器或电刷。
- 输出扭矩平稳。

本文件中介绍的目录数据(CD)和性能曲线(PC)仅适用于相应的单个电机。包含最大运转速度、峰值电流限制、使放大器和电机组合兼容的数值等信息。注意，不要在各自性能曲线所显示的参数范围外操作电机。

如需了解更多信息，可点击以下网站：

- 科尔摩根官网：https://www.kollmorgen.cn/
- 科尔摩根开发者网络：https://kdn.kollmorgen.cn

2.1.1 所用符号

符号	含义
 危险	表示一种危险情况，如果不加以避免，将会导致人员死亡或严重受伤。
 警告	表示一种危险情况，如果不加以避免，可能会导致人员死亡或严重受伤。
 小心	表示一种危险情况，如果不加以避免，可能会导致人员轻度或中度受伤。
NOTICE	表示如果不避免，可能会导致财产损失。
NOTE	表示重要的注意事项。
	危险警告(通用)。危险类型取决于符号旁边的文字描述。
	用电危险警告。
	表面高温危险警告。
	悬挂负载警告。

2.2 安全性

本节帮助您识别并避免对人员和物体造成伤害的风险。

2.2.1 重要说明

本节帮助您识别并避免对人员和物体造成伤害的风险。

2.2.1.1 需要专业人员

只有具备相应资质的人员才允许执行诸如运输、组装、设置和维护等任务。具备资质的专业人员是指熟悉电机运输、安装、组装、调试和操作且具备履行职责所需的相关最低资质：

- 运输：只能由具有处理静电敏感器件知识的人员执行。
- 机械安装：只能由在机械方面具有资质的人员执行。
- 电气安装：只能由在电气方面具有资格的人员执行。
- 设置：只能由具有电气工程和驱动器技术相关知识的合格人员执行。

具备资质的人员必须了解并遵守 IEC 60364 / IEC 60664 和国家事故预防条例。

2.2.1.2 阅读文档

安装和调试前需阅读可用文档。错误处理电机会对人员造成伤害或损坏财产。因此，操作人员必须确保受托在电机上工作的所有人员都已阅读并理解本手册并遵守本手册中的安全事项。

2.2.1.3 注意技术数据

遵守有关连接条件的技术数据和规格（铭牌和文档）。如果超过允许的电压值或电流值，则会损坏电机，比如出现过热。

2.2.1.4 执行风险评估

机器制造商必须对机器进行风险评估，并采取适当措施来确保意外的移动不会造成任何人身伤害或财产损失。通过风险评估，可能还会对专业人员提出更多要求。

2.2.1.5 安全运输

搬运电机超过20公斤，只能用于起重工具。无辅助的升降会导致背部受伤。

2.2.1.6 确保键销安全

电机在没有耦合负载情况下运行之前，从轴上取下任何已安装的键销(如果有的话)，以避免键销被离心力抛出的危险。

	**小心　表面高温！** 电机在操作过程中，根据它们的防护类别，表面可能会非常烫。当心轻度烧伤！表面温度会超过 100°C。 • 测量温度并等待，直到电机冷却到 40°C 以下再去触碰。
	**危险　接地！高压危险！** 确保电机外壳与开关柜中的保护性接地(PE)母线安全接地至关重要。有触电危险。请确保低电阻接地，否则无法保证人身安全，有触电死亡的危险。 没有光学显示器并不能保证没有电压。即使电机轴不旋转，电源连接处也可能带有电压。 • 在操作过程中，不要拔掉任何连接器的插头。触摸暴露触点有死亡或严重伤害的风险。即使电机轴不旋转，电源连接也可能是带电的。这可能会引起跳火，导致人员受伤、触电损坏。 • 在断开伺服放大器与电源电压的连接后，请等待几分钟后，再触摸任何正常带电的部件(如触电、螺丝连接处)或打开任何连接。 • 伺服放大器中的电容器在关闭电源电压数分钟后仍然可以携带电压，危险。为确保安全，请测量直流母线电压，直到电压降到60V以下。
	**警告　固定悬挂负载！** 内置的制动抱闸并不能确保功能安全！ • 悬挂负载(垂直轴)需要配一个外部机械制动器，以确保人员安全。

2.2.2 依照指示使用

- EB系列同步伺服电机设计专用于工厂自动化、机床、纺织和包装机械以及类似对动态有高要求的驱动。
- 用户只允许在本文件中规定的环境条件下操作电机。
- 电机作为部件安装在电气设备或机器上，只能作为这些设备或机器的集成部件进行调试并投入使用。
- 必须对集成在电机绕组中的热传感器进行观察评估。
- 制动抱闸设计为静止制动器，不适合反复操作、动态制动。

2.2.3 禁止使用

- 以下情况禁止使用标准电机：
  - 禁止直接在主电源网络上使用标准电机；
  - 在与食品和饮料接触时，禁止使用标准电机；
  - 在有腐蚀性和/或导电的酸、碱、油、蒸汽、灰尘的环境中，禁止使用标准电机。

- 以下情况禁止调试电机：
  - 如果安装电机的机器不符合欧共体机械指令的要求，禁止调试电机；
  - 如果安装电机的机器不符合EMC指令的要求，禁止调试电机；
  - 如果安装电机的机器不符合低电压指令的要求，禁止调试电机。

- 为确保功能安全，禁止使用没有其他设备辅助的内置制动抱闸
- 在移出固定螺丝或盖板后，禁止在危险场景操作电机。当电机处于危险场景下，禁止拆卸任何螺丝或盖板。

2.3 包装

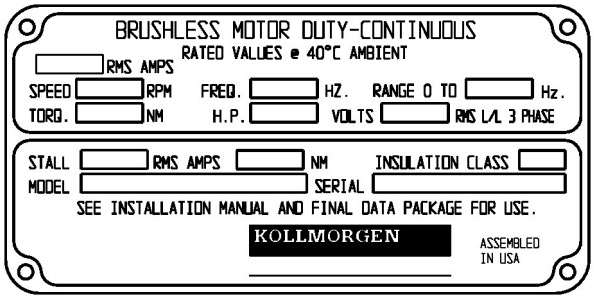
2.3.1 包装内容

- EB系列电机

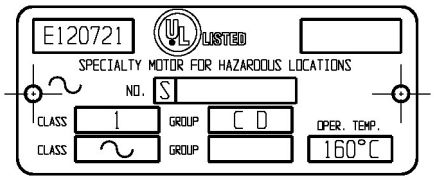
2.3.2 铭牌

- 每个电机运输时都有两个铭牌。
  - 电机零件号和额定值
  - 防爆清单
- 第三个铭牌(可选):制动器型号。
- 制造年份包含在序列号中。序列号的前两个数字是制造年份,例如"17"表示2017年。

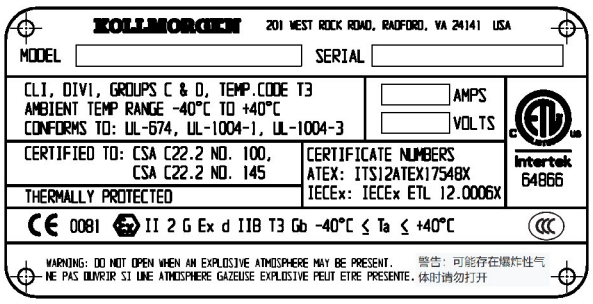
2.3.2.1 EB电机零件编号铭牌



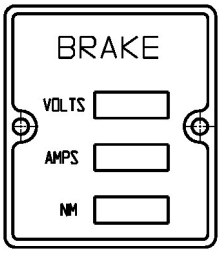
2.3.2.2 EB电机UL 型号铭牌



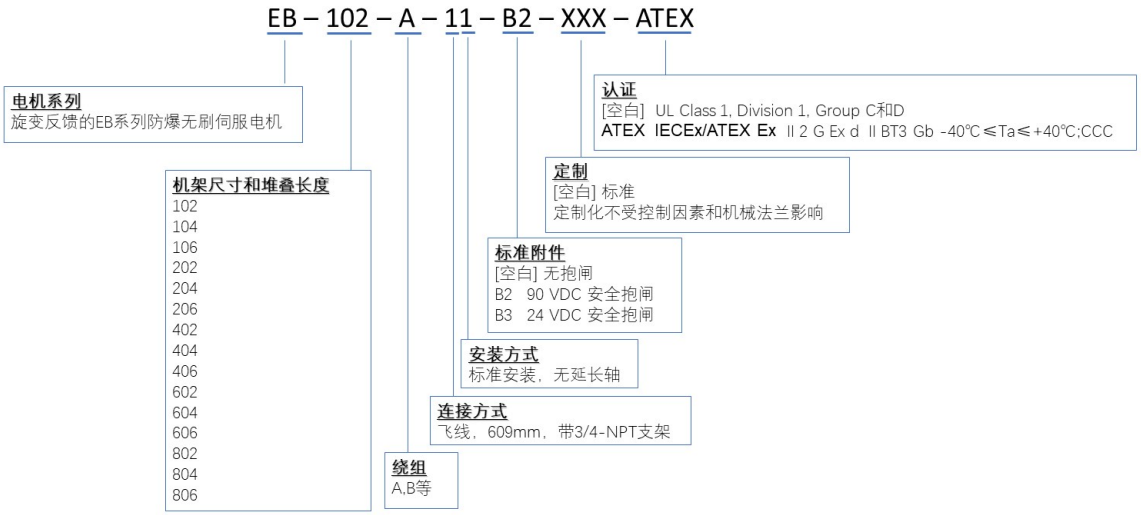
2.3.2.3 EB电机ATEX/IECEX/CCC/ETL型号铭牌



2.3.2.4 EB电机制动器铭牌



2.3.3 型号说明



NOTICE

‡ EB电机可以订购**cULus**或**ATEX/IECex + CCC + cETLus**配置。这些配置及其相应的认证是相互独立的。UL配置不具有ATEX/IECEx + CCC认证。ATEX/IECEx+CCC+cETLus有ETL认证标志，而不是UL认证标志，UL和CSA标准等效。

NOTE

并非所有的选项都可以使用。可用性取决于所需的合规性。

2.3.4 认证和许可

2.3.4.1 UL

参阅型号说明以了解符合UL的型号。符合UL标准的EB型产品可用于“Class 1, Division 1, Groups C 和 D”危险场所。

2.3.4.2 ATEX/IECEx/CCC/ETL

参阅型号说明了解符合ATEX/IECEx的型号。

- 符合ATEX/IECEx要求的EB型号可用于IECEx/ATEX **Ex II 2 G Ex d IIB T3 Gb** -40°C ≤ Ta ≤ +40deg°C。
- ATEX/IECEx配置还包括中国强制认证(CCC) 标志。
- 目前，EB-80x系列没有提供ATEX/IECEx或CCC认证。

2.3.5 电机检查

从运输容器中取出电机，注意不要损坏连接接头伸出的导线。不要把电机倒放压在导线上面，这可能会损坏导线。观察检查电机是否在运输过程中出现损坏。

- 电机框架和外部盖板应无划痕、毛刺或倒转，所有电机紧固件无位移并紧固。
- 输出轴和键槽应无划痕、毛刺或瑕疵，以免妨碍机械连接时的安全装配。
- 前端法兰盘和安装导向器应无划痕、毛刺或损坏，以保证电机安装表面和直径正确匹配或对齐。
- 安装孔应没有损坏或杂物，不能妨碍安装紧固件。
- 导线应无划痕、切口或绝缘层破坏，暴露出裸线。
- 如果发现或怀疑有损坏，请立即通知运输公司。

2.4 机械安装

尺寸图可在Dimension Drawings查看。

2.4.1 重要说明

只有具备机械工程知识的合格工作人员才允许组装电机。

- 保护电机不受过高的压力影响。在运输和处理过程中，不得损坏任何部件。
- 安装场地必须没有导电性和侵蚀性的材料。
- 确保电机通风无阻，并遵守允许的环境温度和法兰温度。如果环境温度超过40°C，请事先咨询我们的应用部门。确保周围环境和电机法兰有足够的热量传递。
- 电机法兰盘和轴在存放和装配过程中特别容易受到影响，所以要避免使用蛮力。重要的是要使用所提供的锁紧螺纹，以拧紧联轴器、齿轮或滑轮，并尽可能地预热驱动部件。
- 打击或使用武力会导致轴承和轴损坏。
- 如果可以，尽量使用无间隙、摩擦锁定的夹头或联轴器。确保联轴器正确对齐。移位将导致震动幅度过大，轴承及联轴器破坏。
- 在任何情况下，不要使用带有额外外部轴承的刚性联轴器(例如在齿轮箱中)，以免造成机械约束的电机轴安装。
- 注意电机的极数和旋转变压器的极数(如果适用)，并确保正确设置使用的伺服放大器。设置错误可能会导致电机损坏，特别是对于小型电机。
- 尽可能避免电机轴上的轴向负载。轴向负载会大大缩短电机的寿命。
- 检查是否符合许可范围内的径向和轴向力。径向和轴向力的限制可以在电机规格部分找到，请参阅Motor Specifications For EB-10x、Motor Specifications For EB-20x、Motor Specifications For EB-40x、Motor Specifications For EB-60x或Motor Specifications For EB-80x。

2.5 电气安装

检查伺服放大器和电机是否相互匹配。比较机组的额定电压和额定电流。按照伺服放大器说明书中的接线图进行接线。电机的连接方式如图所示Leadwire Diagram。

2.5.1 重要说明

只有在电气工程方面有资格和受过培训的工作人员才可以给电机接线。

危险 高压危险!

- 在装配和接线过程中，一定要确保电机断电，即，对于要连接的任何设备，都不能接通电压。
- 触摸暴露触点有死亡或严重伤害的风险。确保开关柜保持关闭状态(屏障、警告标志等)。各个电压只有在设置过程中才会被再次打开。
- 在电机通电的情况下，千万不要解除电气连接。有触电的危险！在不良情况下，会出现电弧，对人造成伤害，并破坏触点。
- 由残余电荷产生的危险电压可能在关闭电源后10分钟内仍存在于电容器上。即使电机不旋转，控制和电源线也可能是带电的。
- 测量直流母线电压，直到下降到60V以下。

2.5.2 Kollmorgen伺服驱动器选项

本文件中所有的EB额定值和性能曲线都是假设在CD/SERVOSTAR驱动下运行，其中包括扭矩角推进(TAA)。更多详情请见Kollmorgen伺服放大器扭矩角推进 。

按照伺服放大器说明书中的接线图进行接线。应包括输入电源、控制器、伺服放大器/驱动器和电机，以及其他外部I/O。

Kollmorgen伺服驱动器的安装手册可在以下网址找到：

- S700: https://www.kollmorgen.com/en-us/products/drives/servo/s700/
- S600: https://www.kollmorgen.com/en-us/products/drives/servo/serviced-drives/s600/
- CD系列和其他经维护的驱动器可以在Kollmorgen开发者网络找到：https://kdn.kollmorgen.cn
- AKD：https://www.kollmorgen.com/en-us/products/drives/servo/akd/
  - AKD默认不提供TAA。请与Kollmorgen客户支持部门联系，以获得进一步的技术指导，包括不使用TAA算法的预期电机性能。查看关于介绍将EB系列与AKD一起使用的白皮书
- AKD2G：https://www.kollmorgen.com/en-us/products/drives/servo/akd2g/akd2g-servo-drive/

2.6 设置

设置程序将以具体示例进行描述。必要时可能需要采用不同的方法，这取决于设备应用场景。

1. 检查电机的装配和方向。
2. 检查驱动部件(离合器、齿轮单元、皮带轮)位置和设置是否正确(注意允许使用范围内的径向和轴向力)。
3. 检查电机和伺服放大器的接线和连接。检查接地是否正确。
4. 测试制动抱闸功能(如果使用)。(应用24V或90V，必须松开制动)。
5. 检查电机转子是否旋转自如(如有必要，松开制动)。听听是否有研磨的声音。
6. 检查所有防止意外接触带电部件和运动部件的规定措施是否已经落实。
7. 任何系统的特殊需求都要进行进一步的测试。
8. 现在根据伺服放大器的设置说明来调试驱动器。
9. 在多轴系统中，单独调试每个驱动单元(放大器和电机)。

2.6.1 伺服放大器的要求

- 同步伺服电机在驱动系统中与伺服放大器一起运行，放大器的大小和运行特性(电压、电流、内部电阻、电感、转子惯性等)可能不同。科尔摩根高性能永磁无刷电机使用的典型放大器是3相正弦波、脉宽调制型。它们是完全再生的四象限双向速度环路放大器。
- 不要将伺服放大器安装在危险的地方。
- 请咨询放大器的制造商，以确保按照电机铭牌上的数据操作。

2.6.2 用于EB电机的典型伺服放大器和电源额定值

额定值		
输入功率	235 V_{RMS}(L-L) 2相(±10%)；不需要隔离变压器，只要短路(侵入)电流保持在1000安培以下。115 VAC单相控制功率。	
输出功率	电源直流母线	标称325 VDC，无负载
	放大器：在额定负载下	230 V_{RMS}(L-L)，标称±10%
	连续电流(A_{RMS}/相位)	间歇性电流 (5秒最长，占空比30%)(A_{RMS}/相位)
	根据需要产生电机的额定电流	200%的连续电流
环境工作温度	0-55° C	
切换频率	10 kHz	
冷却	风扇，对流装置(冷却板)	

2.6.3 Kollmorgen伺服放大器扭矩角推进

EB系列电机最初是为与科尔摩根公司的CD系列和SERVOSTAR系列驱动器一起使用而设计的，具有最佳性能。当与CD/SERVOSTAR数字放大器系列(使用科尔摩根专利的扭矩角推进[TAA]算法)相结合时，系统性能提供最优化的峰值扭矩和速度。

本文件中所有的EB额定值和性能曲线都是假设与CD/SERVOSTAR驱动器一起运行，其中包括TAA。

EB系列电机可与不提供TAA的伺服驱动器一起运行，包括可替换的科尔摩根伺服驱动器和第三方驱动器。这可能导致扭矩减少，特别是在速度高于额定速度50%时。对于这些情况，请联系科尔摩根客户支持，以获得进一步技术指导，包括不使用TAA算法的预期电机性能。

2.6.4 伺服放大器的接线

伺服放大器末端的引脚可在伺服放大器的使用说明书中找到。

2.6.4.1 电机温控器

- 电机温控器是一个自动复位装置，用于在电机绕组出现超温情况时关闭电机控制器的电源。温控器的导线应连接到一个需要手动复位的锁定(锁死)断电型电路。
- 温控器要用双绞线进行布线。

2.6.4.2 电机制动器

所有电机都可以选择使用制动抱闸，包括90VDC制动器(选项代码 "B2")，或24VDC故障安全制动器(选项代码 "B3")。这些制动器选项是弹簧制动，并集成在电机中。当这个制动器断电时，将阻止转子旋转。

- 在接通电机之前，以及在电机运行过程中，给制动器通电。为了正确操作，请使用电气联锁电路，以确保在电机通电时，制动器不被啮合。
- 完整的制动器规格请参见Technical Data For Brakes。

2.6.5 故障排除

下表可视为“急救箱”。引起故障的原因众多，这取决于您系统中的特定条件。下面描述的故障原因大多会直接影响电机。在控制环路行为中出现的特殊情况，通常可以追溯到伺服驱动器参数错误。伺服驱动器和设置软件的文件提供了关于此类事项的信息。

对于多轴系统来说，可能还有更多隐藏的故障原因。

故障	可能原因	消除故障措施
电机不旋转	• 伺服驱动器未启用 • 设定点向导中断 • 电机相位顺序错误 • 制动器未松开 • 驱动器机械性堵塞	• 提供“启用”信号 • 检查设定点向导 • 纠正相序 • 检查制动器控制器 • 检查机械装置
电机失控	• 电机相位顺序错误	• 纠正相序
电机振荡	• 反馈电缆屏蔽层破裂 • 放大器增益过高	• 更换反馈电缆 • 使用电机默认值
错误信息：制动器	• 电机制动抱闸电源电压导线短路 • 电机抱闸故障	• 移除短路 • 更换电机
错误信息：输出段故障	• 电机电缆有短路或接地短路现象 • 电机有短路或接地短路	• 更换电缆 • 更换电机
错误信息：反馈	• 反馈连接器没有正确插入 • 反馈电缆断裂，电缆被压坏或类似情况	• 检查连接器 • 检查电缆
错误信息：电机温度	• 电机温度传感器已切换 • 反馈连接器松动或反馈电缆断裂	• 等待电机冷却。然后调查电机变热原因。 • 检查连接器，必要时更换反馈电缆
制动器不紧	• 要求的保持扭矩太高 • 制动器故障 • 电机轴轴向过载	• 检查扭矩尺寸 • 更换电机 • 检查轴向载荷，减少数值。轴承已损坏，故更换电机

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3 Technical Data

3.1 General Technical Description

Technical data for every motor type can be found in this chapter. See Motor Specifications For EB-10x, Motor Specifications For EB-20x, Motor Specifications For EB-40x, Motor Specifications For EB-60x, and Motor Specifications For EB-80x for more information.

<table>
<tr><td>Ambient temperature (at rated values)</td><td>5...+40°C for site altitude up to 1000m amsl
It is vital to consult our applications department for ambient temperatures above 40°C and encapsulated mounting of the motors.</td></tr>
<tr><td>Permissible humidity (at rated values)</td><td>95% rel. humidity, no condensation</td></tr>
<tr><td>Power De-Rating (Current and Torque)</td><td>for site altitude above 1000m amsl and 40°C:
6% up to 2000m amsl
17% up to 3000m amsl
30% up to 4000m amsl
55% up to 5000m amsl</td></tr>
<tr><td>Ball-bearing life</td><td>≥ 20.000 operating hours</td></tr>
<tr><td>Protection Class</td><td><table><tr><th>Standard Motor</th><th>Connector Option</th><th>Shaft Seal</th><th>Protection class</th></tr><tr><td>EB</td><td>1</td><td>without*</td><td>IP40</td></tr></table>
Shaft seal option is not available for EB Series units.
Code "4" protects from objects greater than 1mm.
Code "0" states the device is not protected against liquid.</td></tr>
<tr><td>Insulation Material class</td><td>The motors come up to insulation material class F according to IEC 60085 (UL1446 class F).</td></tr>
</table>

3.2 Performance Curve Data

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

System torque/speed information is designed to help select the optimum brushless servo motor/drive combination. The nominal values in this data illustrate performance for the recommended motor/controller systems

- The performance characteristics of a brushless servo system (motor/drives combination) are described by a torque/speed operating envelope. As shown above, the shaded areas of the curve indicate the continuous duty and intermittent duty zones of the system.
- The continuous duty zone is bordered by the maximum continuous torque line up to the intersection with the intermittent duty line. The continuous torque line is set by either the motor's maximum rated temperature, or the drives' rated continuous current output, whichever is less. The system voltage limit line is set by the voltage rating of the drives, the line voltage supplied, and the motor winding. The system can operate on a continuous basis anywhere within this area, assuming the ambient temperature is 40°C or less.
- The intermittent duty zone is bordered by the peak torque line and the system voltage limit line. The peak torque line is set by either the drives' peak current rating, which the drive can produce for a limited time, or the maximum rated peak current for the motor, whichever is less. Refer to the Rating Data on the pages that follow. Note: Higher torque levels may be achievable at higher power levels.

Consult Kollmorgen Customer Support for more details. The system voltage limit line is set by the voltage rating of the drive, the line voltage applied and the motor winding. Operation in the intermittent zone must be limited to a duty cycle that will produce an RMS system torque falling within the continuous duty area. The RMS torque value is a function of the magnitude of the intermittent torque and the percentage of the time spent at that torque.

3.3 Motor Specifications For EB-10x

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

Not all windings are available, depending upon the compliance required.

3.3.1 EB-102-A Catalog Data

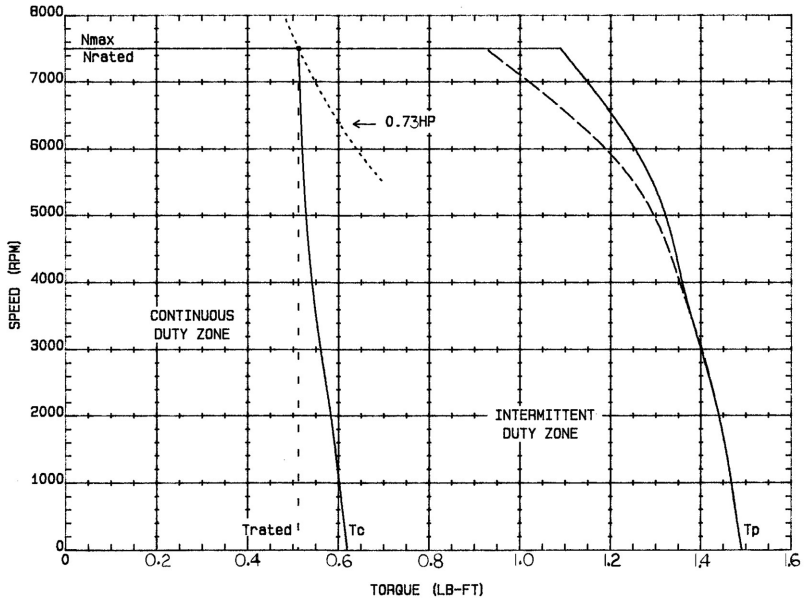
Motor Parameters		Tol	Symbol	Units	Winding Data A
Volts (Line to Line)		Rated	V rtd	Volts RMS	230
* Continuous Torque (stall) @ 40°C Ambient		Nom.	Tc	lb * ft	0.6
				N * m	0.84
Cont. Line Current		Nom.	Ic	amps RMS	2.4
#Maximum Speed		Nom.	N max	RPM	7500
* Peak Torque		Nom.	Tp	lb * ft	1.8
				N * m	2.41
Peak Line Current		Nom.	Ip	amps RMS	7.2
#Theoretical Acceleration		Nom	acc	rad/sec²	78070
#Horsepower		Rated	Hp rtd	HP	0.73
#Speed		Rated	N rtd	RPM	7500
#Torque		Rated	T rtd	lb * ft	0.51
				N * m	0.69
* Torque Sensitivity		+/- 10%	Kt	lb * ft/amp RMS	0.26
				N * m/amp RMS	0.35
		+/- 10%	Kb	Vrms/KRPM	21.32
Max Line to Line Volts		Max	V max	Volts RMS	250
DC Res @ 25°C (line to line)		+/- 10%	Rm	Ohms	6.8
Inductance (line to line)		+/- 30%	Lm	mh	30
Time Constant @ 25°C	Mech	Nom.	Tm	msec	2.54
	Elec	Nom.	Te	msec	4.4
Motor Constant @25°C		Nom.	Km	ft-lb/(watts)^.5	

Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.0000228
		kg * m²	.000031
Weight	Wt	lb	5.5
		kg (f)	2.5
Static Friction	Tf	lb * ft	0.03
		N * m	.040
Thermal Time Constant	TCT	minutes	2
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.002
		N*m/krpm	.002

3.3.2 EB-102-A Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

Motor	Drive	Voltage
EB-102-A	BDS4-203	230 VAC



3.3.3 EB-104-A, B Catalog Data

Motor Parameters				Winding Data A	Winding Data B
Volts (Line to Line)	Rated	V rtd	Volts RMS	230	230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	1.1	1.2
			N * m	1.55	1.57
Cont. Line Current	Nom.	Ic	amps RMS	3	4.2
#Maximum Speed	Nom.	N max	RPM	5600	7500
* Peak Torque	Nom.	Tp	lb * ft	3.2	3.3
			N * m	4.38	4.45
Peak Line Current	Nom.	Ip	amps RMS	9	12.6
#Theoretical Acceleration	Nom	acc	rad/sec²	95000	96500
#Horsepower	Rated	Hp rtd	HP	1.20	1.50
#Speed	Rated	N rtd	RPM	5600	7500
#Torque	Rated	T rtd	lb * ft	1.14	1.06
			N * m	1.55	1.44
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	0.38	0.27
			N * m/amp RMS	0.51	0.37
	+/- 10%	Kb	Vrms/KRPM	31	22.5
Max Line to Line Volts	Max	V max	Volts RMS	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	5.3	2.72
Inductance (line to line)	+/- 30%	Lm	mh	28.1	14.4
Time Constant @ 25°C	Nom.	Tm	msec	1.40	1.40
	Nom.	Te	msec	5.3	5.3

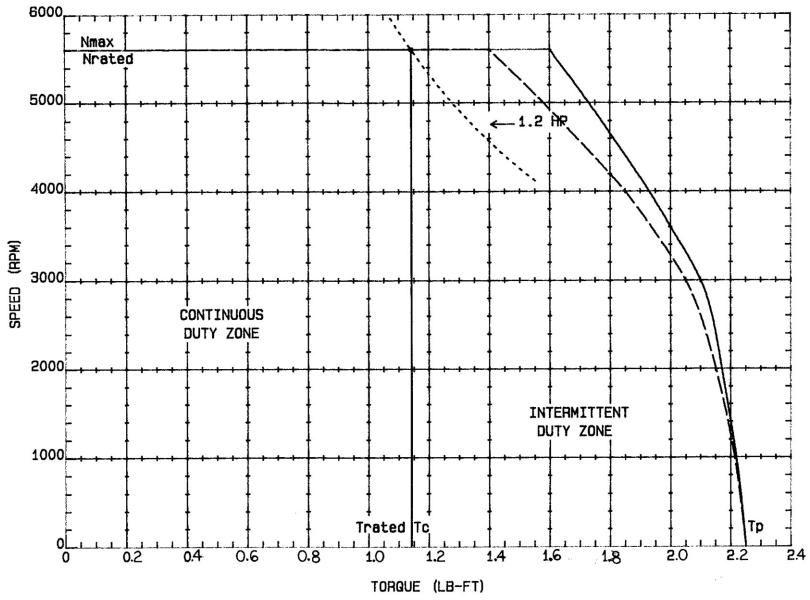
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.000034
		kg * m²	.000046
Weight	Wt	lb	7
		kg (f)	3.2
Static Friction	Tf	lb * ft	0.04
		N * m	.050
Thermal Time Constant	TCT	minutes	3
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.002
		N*m/krpm	.003

3.3.4 EB-104-A, B Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

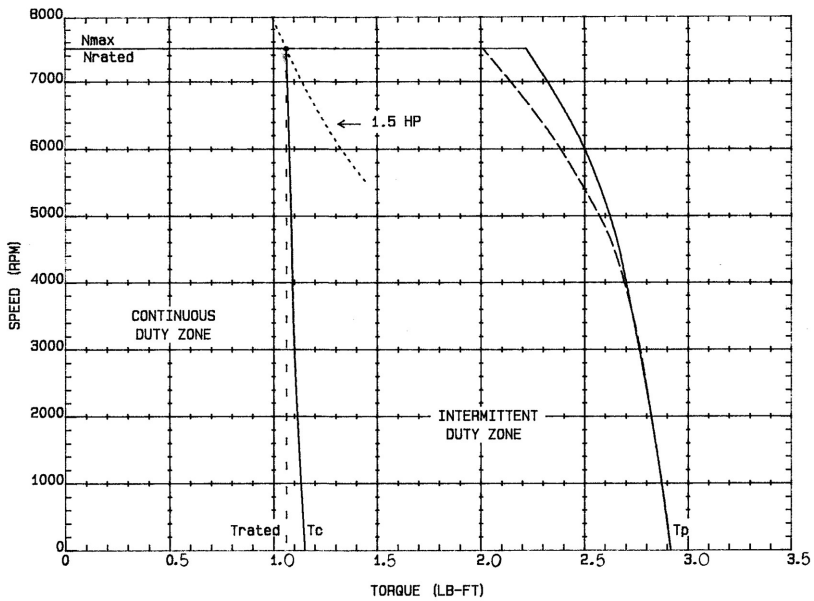
3.3.4.1 EB-104-A

Motor	Drive	Voltage
EB-104-A	BDS5-203	230 VAC



3.3.4.2 EB-104-B

Motor	Drive	Voltage
EB-104-A	BDS5-203	230 VAC



3.3.5 EB-106-A, B Catalog Data

Motor Parameters		Tol	Symbol	Units	Winding Data A	Winding Data B
Volts (Line to Line)		Rated	V rtd	Volts RMS	230	230
* Continuous Torque (stall) @ 40°C Ambient		Nom.	Tc	lb * ft	1.62	1.64
				N * m	2.20	2.22
Cont. Line Current		Nom.	Ic	amps RMS	3.0	6.0
#Maximum Speed		Nom.	N max	RPM	4200	7500
* Peak Torque		Nom.	Tp	lb * ft	4.56	4.69
				N * m	6.18	6.36
Peak Line Current		Nom.	Ip	amps RMS	9.0	18.0
#Theoretical Acceleration		Nom	acc	rad/sec²	80789	83193
#Horsepower		Rated	Hp rtd	HP	1.2	2.0
#Speed		Rated	N rtd	RPM	4200	7500
#Torque		Rated	T rtd	lb * ft	1.50	1.38
				N * m	2.03	1.87
* Torque Sensitivity		+/- 10%	Kt	lb * ft/amp RMS	0.533	0.274
				N * m/amp RMS	0.723	0.372
* Back EMF (Line to Line)		+/- 10%	Kb	Vrms/KRPM	43.7	22.5
Max Line to Line Volts		Max	V max	Volts RMS	250	250
DC Res @ 25°C (line to line)		+/- 10%	Rm	Ohms	6.50	1.60
Inductance (line to line)		+/-30%	Lm	mh	37.5	9.4
Time Constant @ 25°C	Mech	Nom.	Tm	msec	1.4	1.3
	Elec	Nom.	Te	msec	5.8	5.9
Motor Constant @25°C		Nom.	Km	ft-lb/(watts)^.5	.182	.188

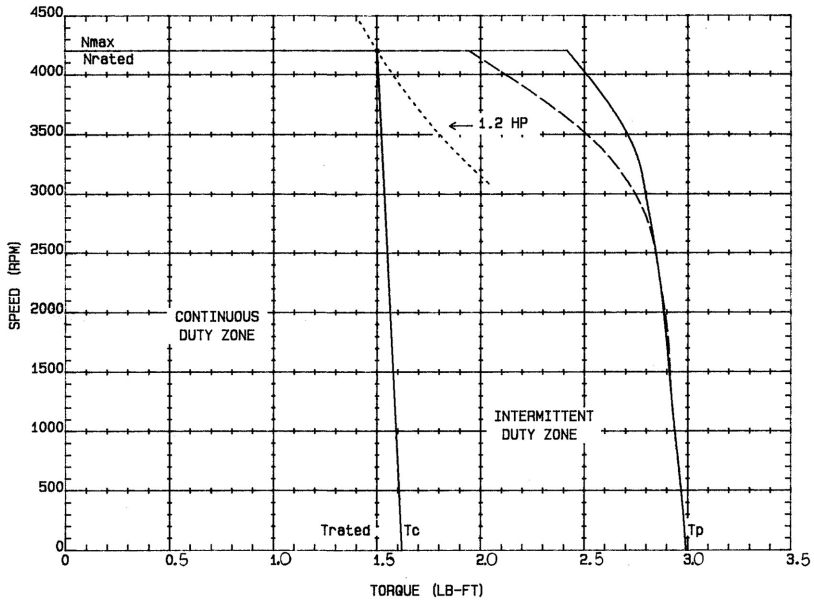
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.0000564
		kg * m²	0.0000765
Weight	Wt	lb	8.5
		kg (f)	3.9
Static Friction	Tf	lb * ft	0.05
		N * m	0.07
Thermal Time Constant	TCT	minutes	12
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.003
		N*m/krpm	.004

3.3.6 EB-106-A, B Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

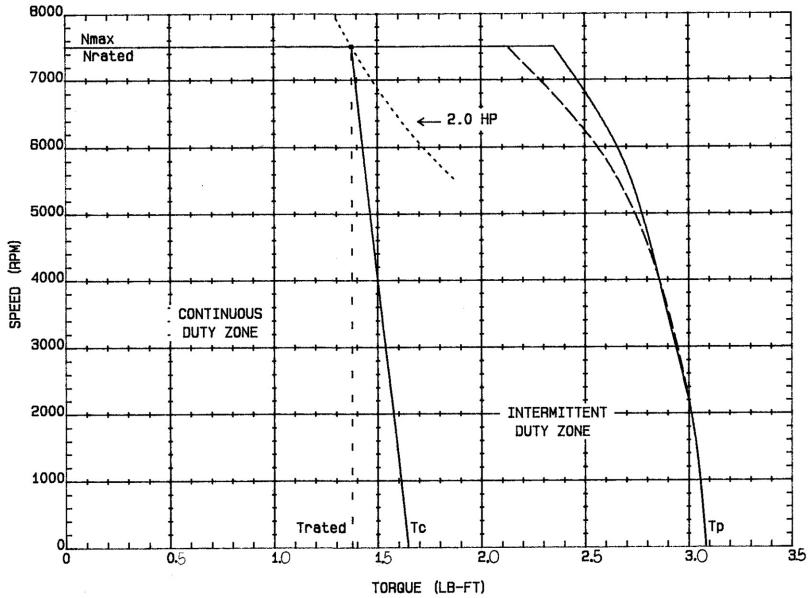
3.3.6.1 EB-106-A

Motor	Drive	Voltage
EB-106-A	BDS4-203	230 VAC



3.3.6.2 EB-106-B

Motor	Drive	Voltage
EB-106-B	BDS4-206	230 VAC



3.4 Motor Specifications For EB-20x

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

Not all windings are available, depending upon the compliance required.

3.4.1 EB-202-A, B, C Catalog Data

Motor Parameters	Tol	Symbol	Units	Winding Data A	B	C
Volts (Line to Line)	Rated	V rtd	Volts RMS	230	230	230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	1.8	1.8	1.8
			N * m	2.50	2.50	2.50
Cont. Line Current	Nom.	Ic	amps RMS	1.9	3	5.1
#Maximum Speed	Nom.	N max	RPM	2500	3800	6200
* Peak Torque	Nom.	Tp	lb * ft	5.2	5.2	5.2
			N * m	7.05	7.05	7.05
Peak Line Current	Nom.	Ip	amps RMS	6.1	9	15.7
#Theoretical Acceleration	Nom	acc	rad/sec²	70750	70750	70750
#Horsepower	Rated	Hp rtd	HP	0.08	1.30	1.80
#Speed	Rated	N rtd	RPM	2500	3800	6200
#Torque	Rated	T rtd	lb * ft	1.61	1.75	1.5
			N * m	2.18	2.37	2.03
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	0.97	0.61	0.36
			N * m/amp RMS	1.32	0.82	0.49
	+/- 10%	Kb	Vrms/KRPM	79.5	49.7	29.6
Max Line to Line Volts	Max	V max	Volts RMS	250	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	17.1	6.3	2.34
Inductance (line to line)	+/- 30%	Lm	mh	185	74	25
Time Constant @ 25°C	Nom.	Tm	msec	1.53	1.39	1.46
	Nom.	Te	msec	10.5	8.3	10.7

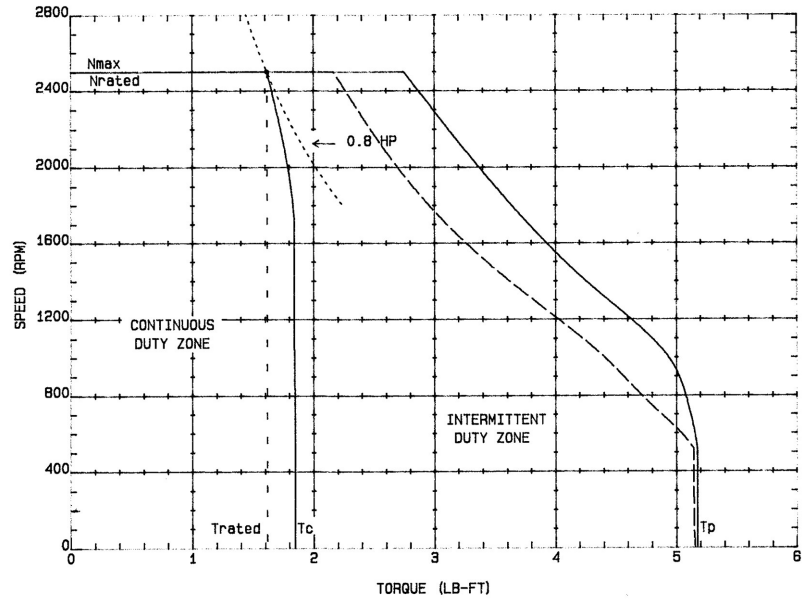
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.0000735
		kg * m²	.000100
Weight	Wt	lb	15
		kg (f)	6.8
Static Friction	Tf	lb * ft	0.005
		N * m	.007
Thermal Time Constant	TCT	minutes	18
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.003
		N*m/krpm	.004

3.4.2 EB-202-A, B, C Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

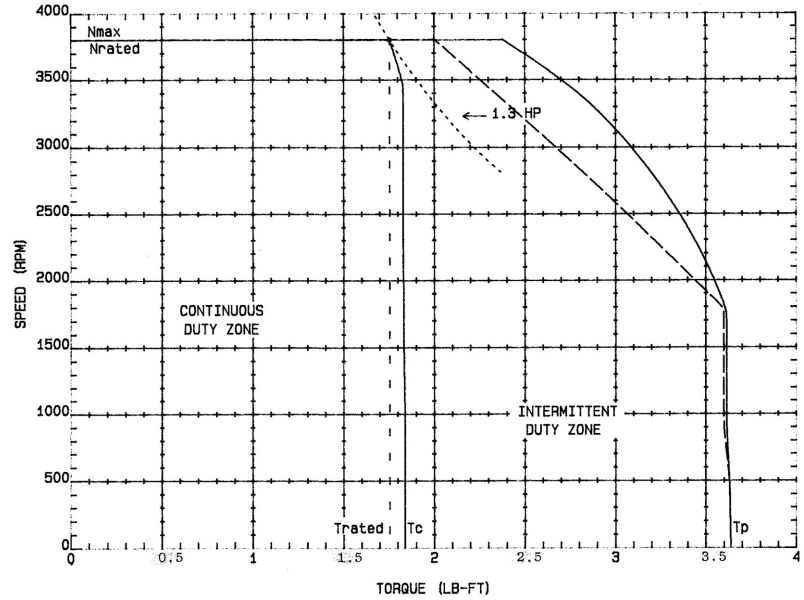
3.4.2.1 EB-202-A

Motor	Drive	Voltage
EB-202-A	BDS4-230/3	230 VAC



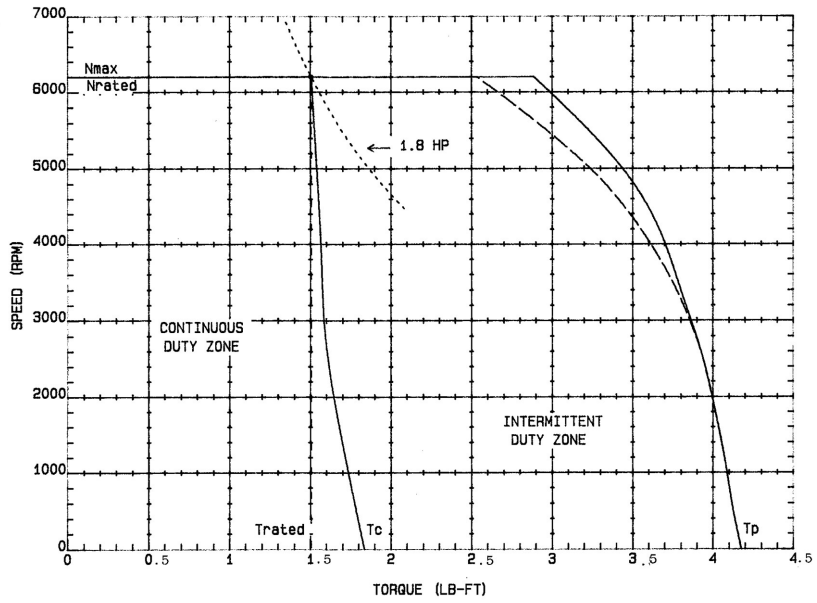
3.4.2.2 EB-202-B

Motor	Drive	Voltage
EB-202-B	BDS4-230/3	230 VAC



3.4.2.3 EB-202-C

Motor	Drive	Voltage
EB-202-C	BDS4-230/6	230 VAC



3.4.3 EB-204-A, B, C Catalog Data

Motor Parameters	Tol	Symbol	Units	Winding Data A	B	C
Volts (Line to Line)	Rated	V rtd	Volts RMS	230	230	230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	3.6	3.6	3.6
			N * m	4.88	4.88	4.88
Cont. Line Current	Nom.	Ic	amps RMS	2.9	5.7	9.9
#Maximum Speed	Nom.	N max	RPM	1900	3600	6200
* Peak Torque	Nom.	Tp	lb * ft	9.4	10.3	9.0
			N * m	12.79	13.99	12.13
Peak Line Current	Nom.	Ip	amps RMS	8.1	17.4	26.1
#Theoretical Acceleration	Nom.	acc	rad/sec²	73969	80950	70199
#Horsepower	Rated	Hp rtd	HP	1.16	2.34	3.69
#Speed	Rated	N rtd	RPM	1900	3600	6200
#Torque	Rated	T rtd	lb * ft	3.2	3.41	3.13
			N * m	4.34	4.62	4.24
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	1.23	0.62	0.36
			N * m/amp RMS	1.66	0.85	0.49
	+/- 10%	Kb	Vrms/KRPM	100.5	51.2	29.6
Max Line to Line Volts	Max	V max	Volts RMS	250	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	9.46	2.48	0.786
Inductance (line to line)	+/- 30%	Lm	mh	133	38	12
Time Constant @ 25°C	Nom.	Tm	msec	0.89	0.90	0.85
	Nom.	Te	msec	14.1	15.3	15.3

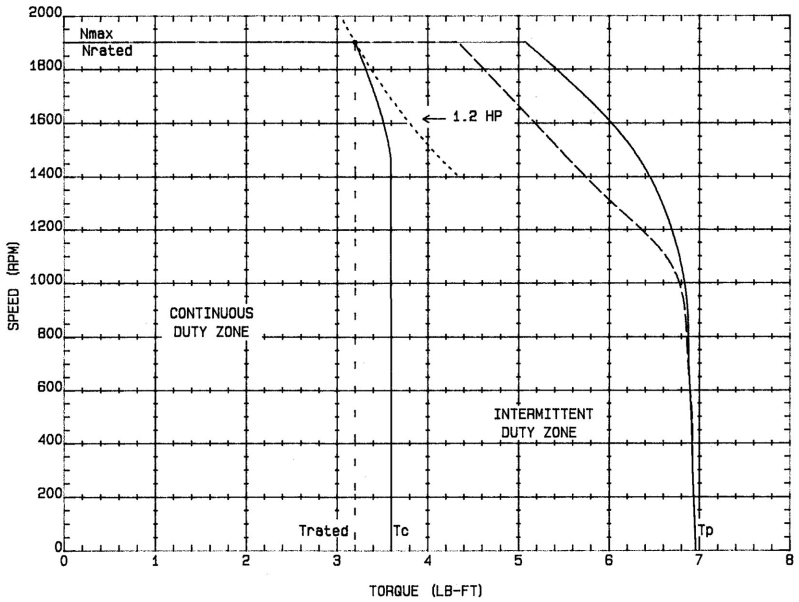
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.0001275
		kg * m²	.000173
Weight	Wt	lb	18
		kg (f)	8.2
Static Friction	Tf	lb * ft	0.005
		N * m	.007
Thermal Time Constant	TCT	minutes	20
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.005
		N*m/krpm	.007

3.4.4 EB-204-A, B, C Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

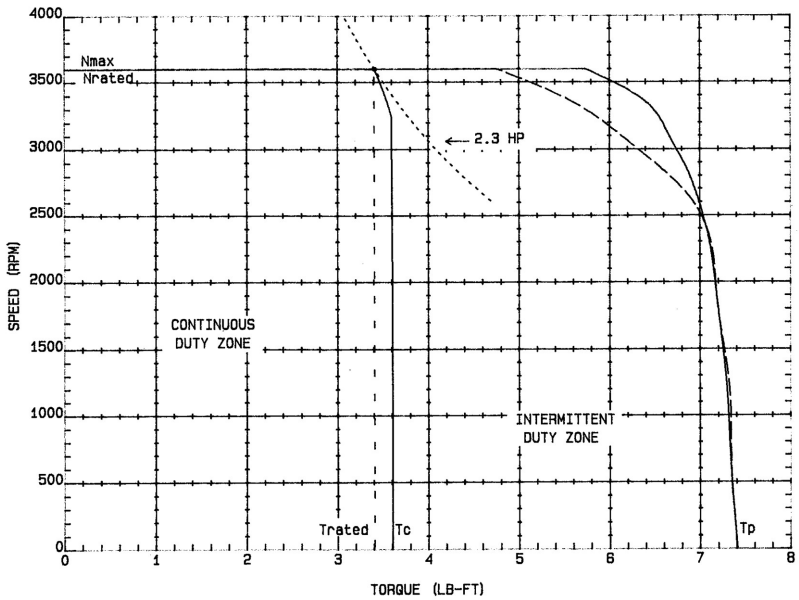
3.4.4.1 EB-204-A

Motor	Drive	Voltage
EB-204-A	BDS4-230/3	230 VAC



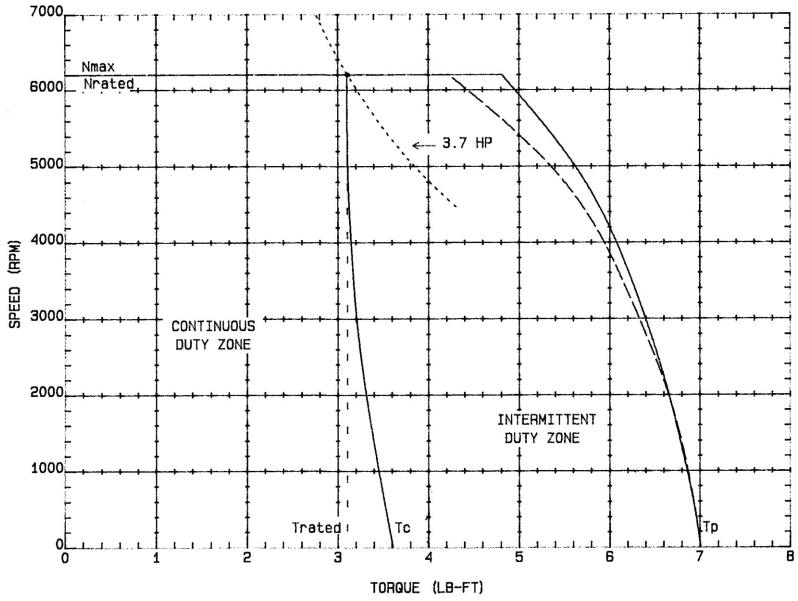
3.4.4.2 EB-204-B

Motor	Drive	Voltage
EB-204-B	BDS4-230/6	230 VAC



3.4.4.3 EB-204-C

Motor	Drive	Voltage
EB-204-C	BDS4-230/10	230 VAC



3.4.5 EB-206-A, B, C, D Catalog Data

Motor Parameters	Tol	Symbol	Units	Winding Data A	B	C	D
Volts (Line to Line)	Rated	V rtd	Volts RMS	230	230	230	230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	4.6	4.6	4.8	4.6
	N * m	N * m	N * m	6.24	6.24	6.44	6.24
Cont. Line Current	Nom.	Ic	amps RMS	2.9	5.8	10.3	14.4
#Maximum Speed	Nom.	N max	RPM	1400	2800	4900	7000
* Peak Torque	Nom.	Tp	lb * ft	14.0	14.0	12.5	14.7
			N * m	19.02	19.02	17.00	19.96
Peak Line Current	Nom.	Ip	amps RMS	9.3	18.6	28.7	48.5
#Theoretical Acceleration	Nom	acc	rad/sec²	75706	75706	67648	79447
#Horsepower	Rated	Hp rtd	HP	1.20	2.45	3.78	4.53
#Speed	Rated	N rtd	RPM	1400	2800	4900	7000
#Torque	Rated	T rtd	lb * ft	4.5	4.6	4.06	3.4
			N * m	6.10	6.24	5.50	4.61
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	1.59	0.79	0.46	0.32
			N * m/amp RMS	2.15	1.08	0.62	0.43
	+/- 10%	Kb	Vrms/KRPM	130.2	65.1	37.7	26.2
Max Line to Line Volts	Max	V max	Volts RMS	250	250	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	8.82	2.32	0.78	0.38
Inductance (line to line)	+/- 30%	Lm	mh	130	32	14	5.3
Time Constant @ 25°C	Nom.	Tm	msec	0.72	0.75	0.76	0.76
	Nom.	Te	msec	14.7	13.8	17.9	13.9

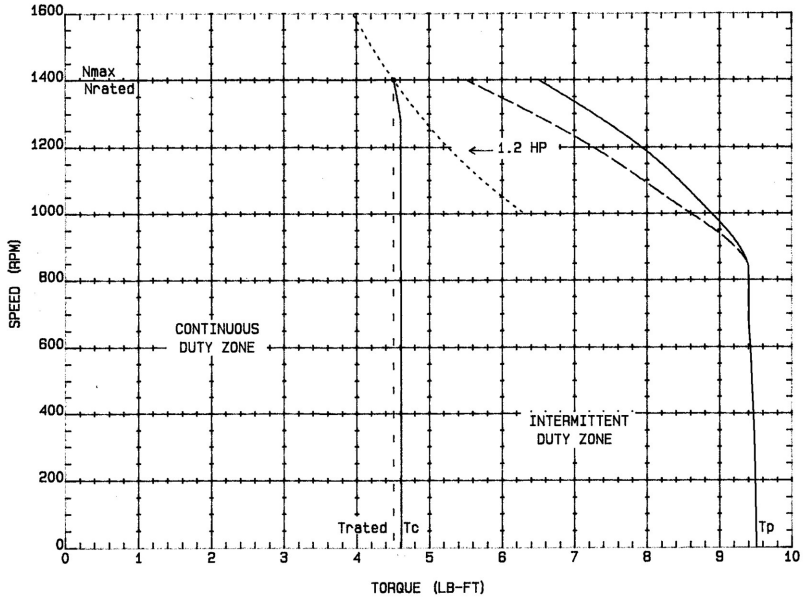
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.0001853
		kg * m²	.000251
Weight	Wt	lb	21
		kg (f)	9.5
Static Friction	Tf	lb * ft	0.005
		N * m	.007
Thermal Time Constant	TCT	minutes	22
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.008
		N*m/krpm	.011

3.4.6 EB-206-A, B, C, D Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

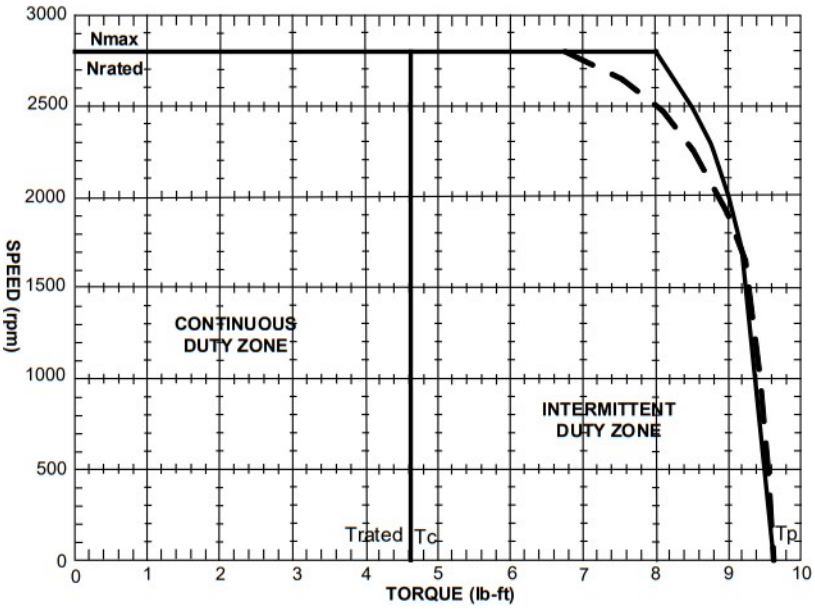
3.4.6.1 EB-206-A

Motor	Drive	Voltage
EB-206-A	BDS4-230/3	230 VAC



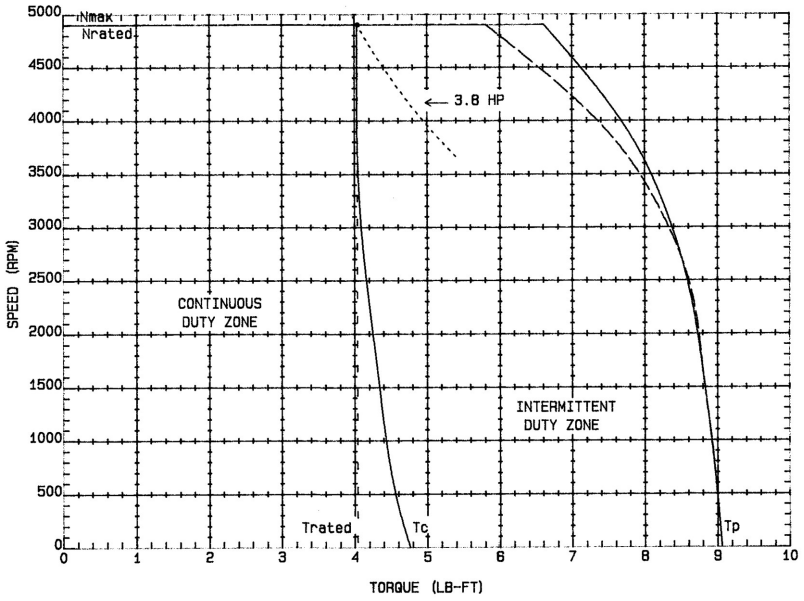
3.4.6.2 EB-206-B

Motor	Drive	Voltage
EB-206-B	BDS5-206	230 VAC



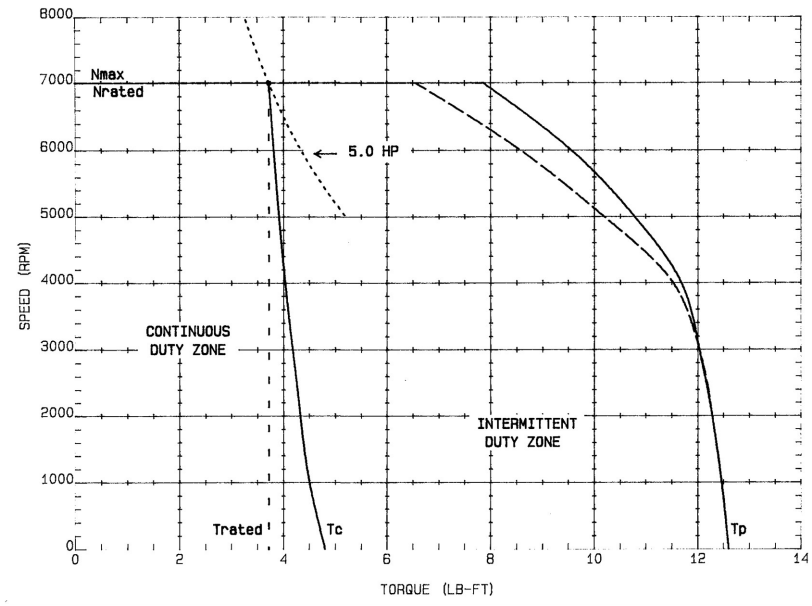
3.4.6.3 EB-206-C

Motor	Drive	Voltage
EB-206-C	BDS4-230/10	230 VAC



3.4.6.4 EB-206-D

Motor	Drive	Voltage
EB-206-D	BDS5-220	230 VAC



3.5 Motor Specifications For EB-40x

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

Not all windings are available, depending upon the compliance required.

3.5.1 EB-402-A, B, C Catalog Data

Motor Parameters	Tol	Symbol	Units	Winding Data A	B	C
Volts (Line to Line)	Rated	V rtd	Volts RMS	230	230	230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	5.0	5.2	4.8
	N * m	N * m	N * m	6.80	7.00	6.50
Cont. Line Current	Nom.	Ic	amps RMS	3	6.4	9.8
#Maximum Speed	Nom.	N max	RPM	1500	3000	5000
* Peak Torque	Nom.	Tp	lb * ft	14.6	14.6	14.6
			N * m	19.80	19.80	19.80
Peak Line Current	Nom.	Ip	amps RMS	9.3	18.8	31.3
#Theoretical Acceleration	Nom	acc	rad/sec²	61344	61344	61344
#Horsepower	Rated	Hp rtd	HP	1.30	2.90	3.80
#Speed	Rated	N rtd	RPM	1500	3000	5000
#Torque	Rated	T rtd	lb * ft	4.5	5	4
			N * m	6.10	6.80	5.40
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	1.66	0.82	0.49
			N * m/amp RMS	2.50	1.11	0.66
	+/- 10%	Kb	Vrms/KRPM	136.1	67.2	40.2
Max Line to Line Volts	Max	V max	Volts RMS	250	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	10.54	2.6	0.97
Inductance (line to line)	+/- 30%	Lm	mh	220	50	21
Time Constant @ 25°C	Nom.	Tm	msec	1.00	1.02	0.06
	Nom.	Te	msec	20.9	19.2	21.6

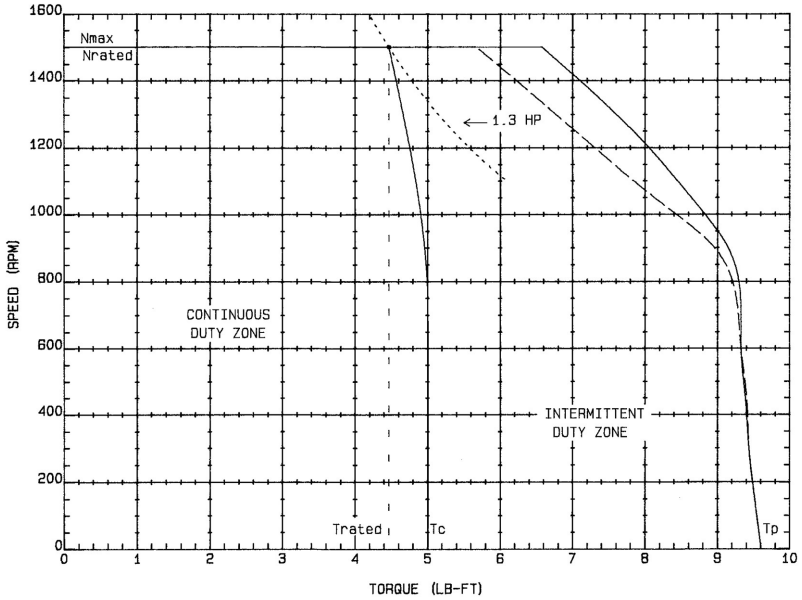
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.000238
		kg * m²	.000323
Weight	Wt	lb	18.5
		kg (f)	8.4
Static Friction	Tf	lb * ft	0.18
		N * m	.240
Thermal Time Constant	TCT	minutes	6
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.011
		N*m/krpm	.015

3.5.2 EB-402-A, B, C Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

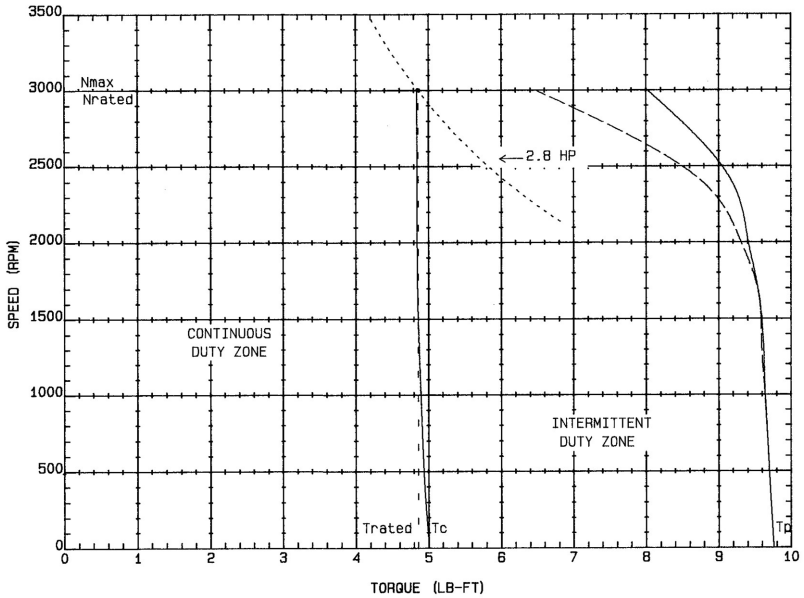
3.5.2.1 EB-402-A

Motor	Drive	Voltage
EB-402-A	BDS4-203H	230 VAC



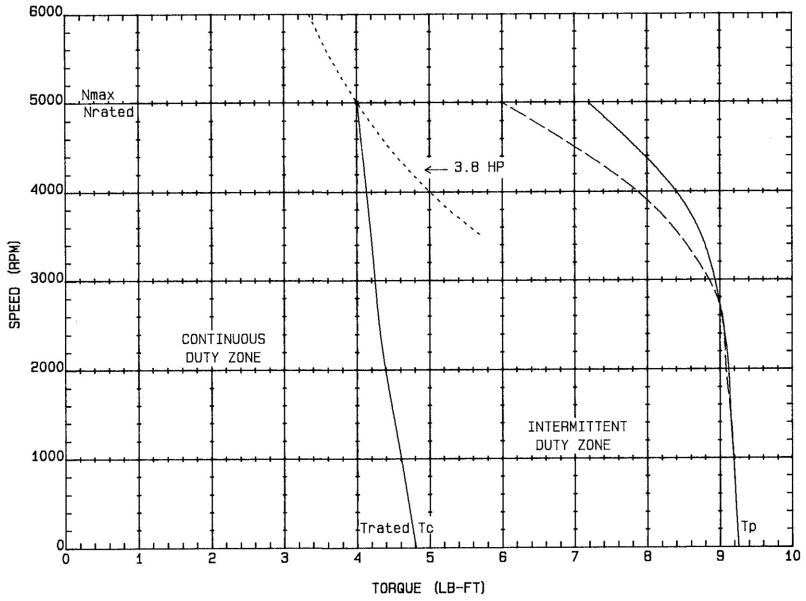
3.5.2.2 EB-402-B

Motor	Drive	Voltage
EB-402-B	BDS4-206H	230 VAC



3.5.2.3 EB-402-C

Motor	Drive	Voltage
EB-402-B	BDS4-210H	230 VAC



3.5.3 EB-404-A, B, C, D Catalog Data

Motor Parameters				Winding Data			
Volts (Line to Line)	Tol Rated	Symbol V rtd	Units Volts RMS	A 230	B 230	C 230	D 230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	9.6	9.8	9.7	9.7
	N * m	N * m	N * m	13.00	13.30	13.10	13.10
Cont. Line Current	Nom.	Ic	amps RMS	6	9.9	19.8	15
#Maximum Speed	Nom.	N max	RPM	1500	2500	5000	3700
* Peak Torque	Nom.	Tp	lb * ft	26.5	27.0	26.0	27.6
			N * m	35.90	36.60	35.30	37.50
Peak Line Current	Nom.	Ip	amps RMS	16.4	28.8	55.9	45
#Theoretical Acceleration	Nom	acc	rad/sec²	54752	55785	53719	57025
#Horsepower	Rated	Hp rtd	HP	2.70	4.50	7.30	6.00
#Speed	Rated	N rtd	RPM	1500	2500	5000	3700
#Torque	Rated	T rtd	lb * ft	9.6	9.4	7.7	8.5
			N * m	13.00	12.70	10.40	11.50
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	1.70	0.99	0.49	0.65
			N * m/amp RMS	2.31	1.34	0.66	0.88
	+/- 10%	Kb	Vrms/KRPM	139.4	81.2	40.2	53
Max Line to Line Volts	Max	V max	Volts RMS	250	250	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	4.1	1.32	0.34	0.63
Inductance (line to line)	+/- 30%	Lm	mh	102	33.5	8.4	15
Time Constant @ 25°C	Nom.	Tm	msec	0.73	0.69	0.72	0.81
	Nom.	Te	msec	24.9	25.4	24.7	23.8

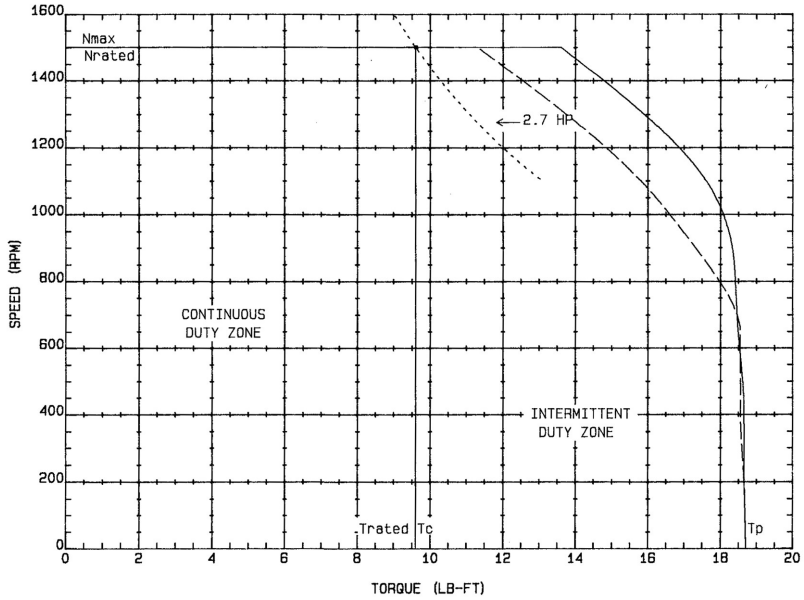
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.000484
		kg * m²	.000656
Weight	Wt	lb	27.5
		kg (f)	12.5
Static Friction	Tf	lb * ft	0.19
		N * m	.260
Thermal Time Constant	TCT	minutes	9
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.013
		N*m/krpm	.018

3.5.4 EB-404-A, B, C, D Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

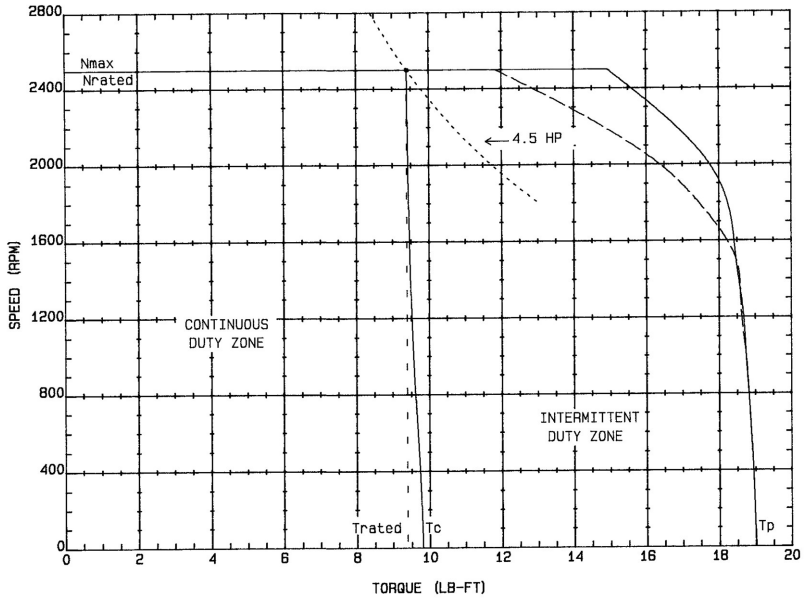
3.5.4.1 EB-404-A

Motor	Drive	Voltage
EB-404-A	BDS4-206H	230 VAC



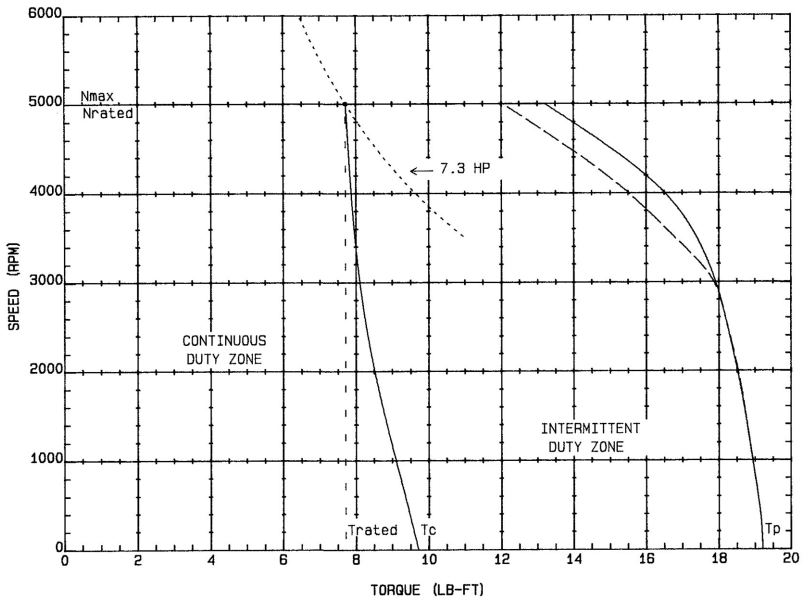
3.5.4.2 EB-404-B

Motor	Drive	Voltage
EB-404-B	BDS4-210H	230 VAC



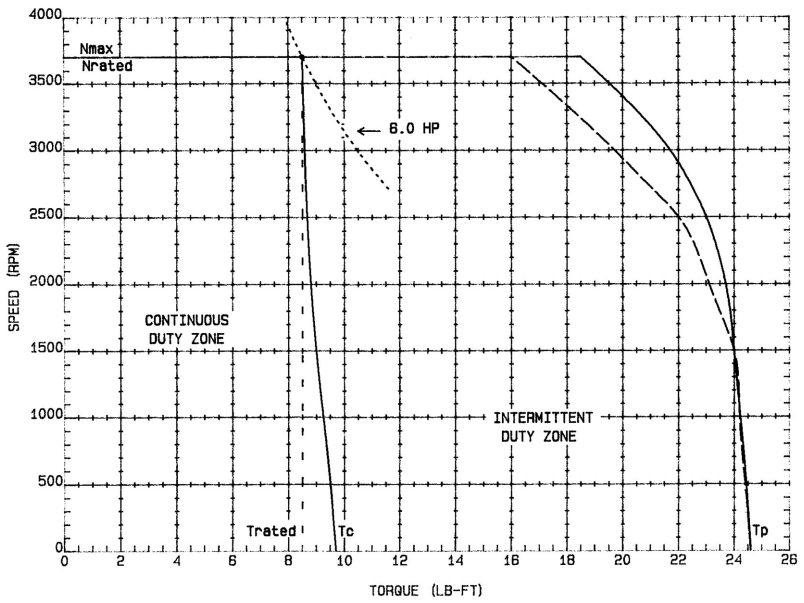
3.5.4.3 EB-404-C

Motor	Drive	Voltage
EB-404-C	BDS4-220H	230 VAC



3.5.4.4 EB-404-D

Motor	Drive	Voltage
EB-404-D	BDS4-220	



3.5.5 EB-406-A, B, C Catalog Data

Motor Parameters	Tol	Symbol	Units	Winding Data A	B	C
Volts (Line to Line)	Rated	V rtd	Volts RMS	230	230	230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	13.0	13.7	12.5
	N * m	N * m	N * m	17.60	18.60	17.00
Cont. Line Current	Nom.	Ic	amps RMS	9.5	19.1	27.2
#Maximum Speed	Nom.	N max	RPM	1700	3200	5000
* Peak Torque	Nom.	Tp	lb * ft	35.8	36.5	35.6
			N * m	48.50	49.50	48.30
Peak Line Current	Nom.	Ip	amps RMS	27.3	53.3	81.4
#Theoretical Acceleration	Nom	acc	rad/sec²	52263	53285	51971
#Horsepower	Rated	Hp rtd	HP	3.90	7.40	9.60
#Speed	Rated	N rtd	RPM	1700	3200	5000
#Torque	Rated	T rtd	lb * ft	12	12.1	10.1
			N * m	16.30	16.40	13.70
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	1.38	0.72	0.46
			N * m/amp RMS	1.87	0.98	0.63
	+/- 10%	Kb	Vrms/KRPM	113.2	58.8	37.7
Max Line to Line Volts	Max	V max	Volts RMS	250	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	1.7	0.44	0.2
Inductance (line to line)	+/- 30%	Lm	mh	42	12	4.8
Time Constant @ 25°C	Nom.	Tm	msec	0.68	0.65	0.67
	Nom.	Te	msec	24.7	27.3	24.0

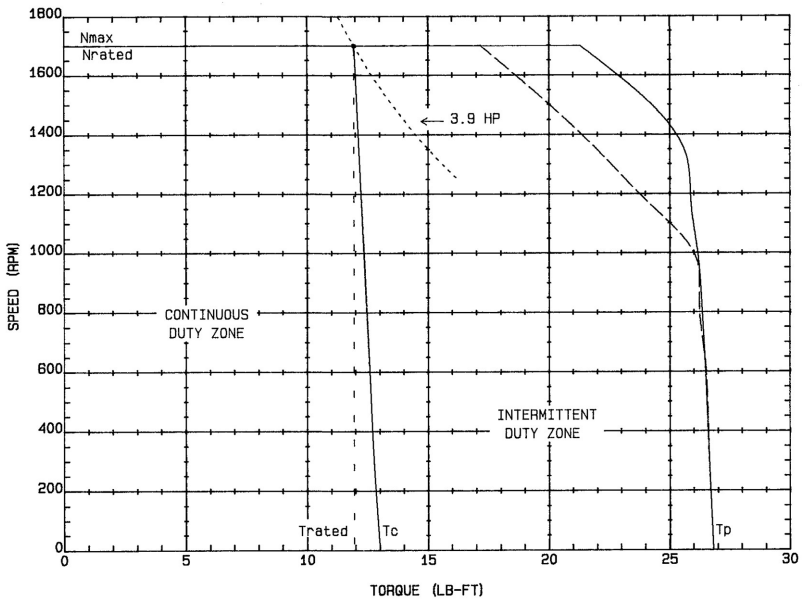
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.00685
		kg * m²	.000929
Weight	Wt	lb	47.6
		kg (f)	21.5
Static Friction	Tf	lb * ft	0.212
		N * m	.287
Thermal Time Constant	TCT	minutes	12
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.015
		N*m/krpm	.020

3.5.6 EB-406-A, B, C Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

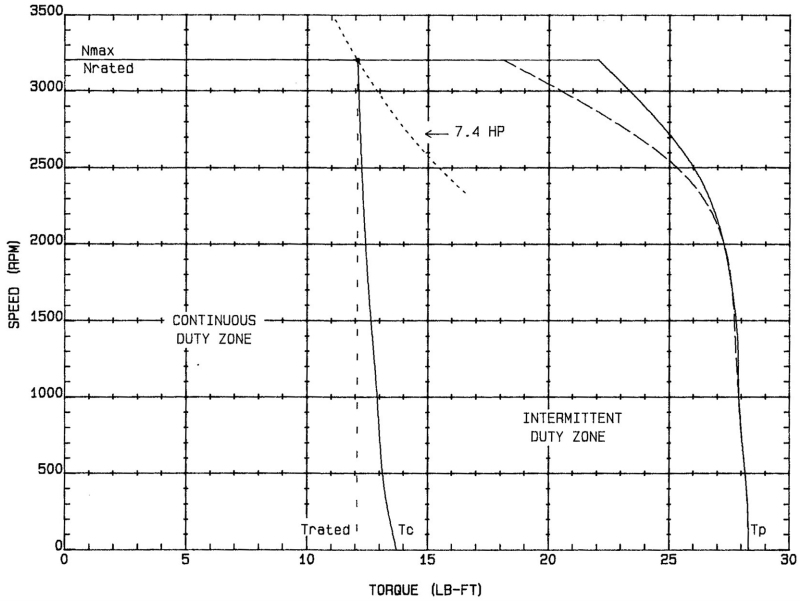
3.5.6.1 EB-406-A

Motor	Drive	Voltage
EB-406-A	BDS4-210H	230 VAC



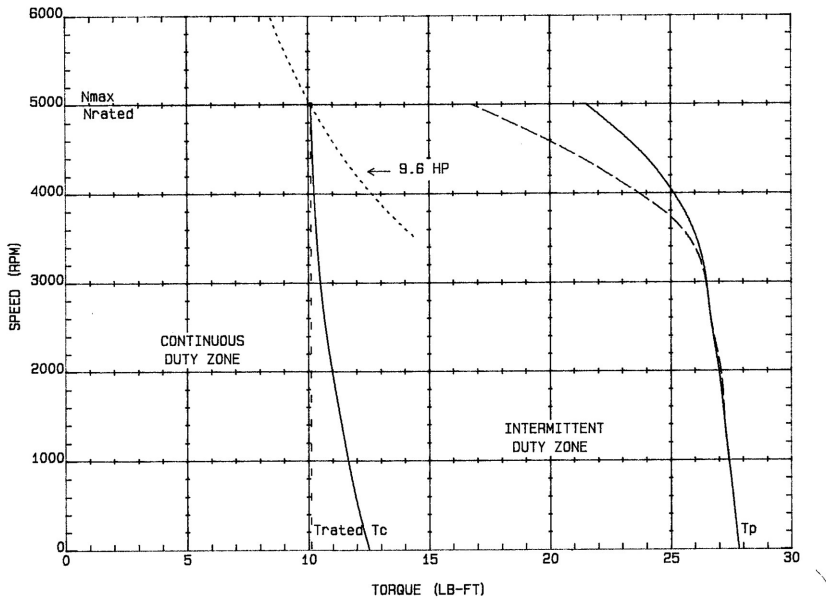
3.5.6.2 EB-406-B

Motor	Drive	Voltage
EB-406-B	BDS4-220H	230 VAC



3.5.6.3 EB-406-C

Motor	Drive	Voltage
EB-406-C	BDS4-230	230 VAC



3.6 Motor Specifications For EB-60x

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

Not all windings are available, depending upon the compliance required.

3.6.1 EB-602-A, B, C Catalog Data

Motor Parameters	Tol	Symbol	Units	Winding Data A	B	C
Volts (Line to Line)	Rated	V rtd	Volts RMS	230	230	230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	13.0	12.8	12.8
	N * m	N * m	N * m	17.63	17.36	17.36
Cont. Line Current	Nom.	Ic	amps RMS	10	20	15
#Maximum Speed	Nom.	N max	RPM	2000	4000	3000
* Peak Torque	Nom.	Tp	lb * ft	37.7	36.7	36.5
			N * m	51.20	49.80	49.50
Peak Line Current	Nom.	Ip	amps RMS	30.5	61.4	45
#Theoretical Acceleration	Nom	acc	rad/sec²	48681	48417	48945
#Horsepower	Rated	Hp rtd	HP	4.40	7.70	6.10
#Speed	Rated	N rtd	RPM	2000	4000	3000
#Torque	Rated	T rtd	lb * ft	11.6	10.1	10.7
			N * m	15.70	13.70	14.50
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	1.30	0.63	0.85
			N * m/amp RMS	1.77	0.85	1.16
	+/- 10%	Kb	Vrms/KRPM	106.8	51.6	70
Max Line to Line Volts	Max	V max	Volts RMS	250	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	1.548	0.382	0.674
Inductance (line to line)	+/- 30%	Lm	mh	32	9	14
Time Constant @ 25°C	Nom.	Tm	msec	0.77	0.81	0.77
	Nom.	Te	msec	20.7	23.6	20.8

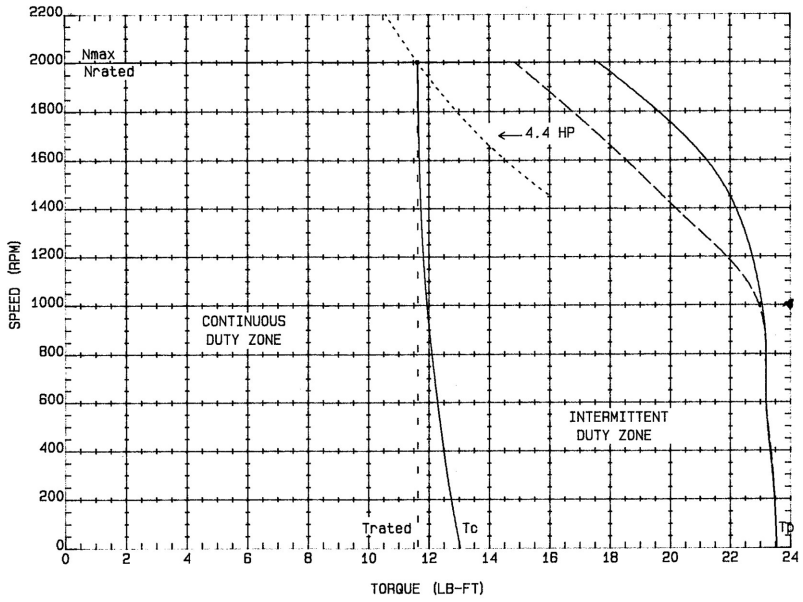
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.000758
		kg * m²	.001028
Weight	Wt	lb	37
		kg (f)	16.8
Static Friction	Tf	lb * ft	0.36
		N * m	.490
Thermal Time Constant	TCT	minutes	12
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.053
		N*m/krpm	.072

3.6.2 EB-602-A, B, C Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

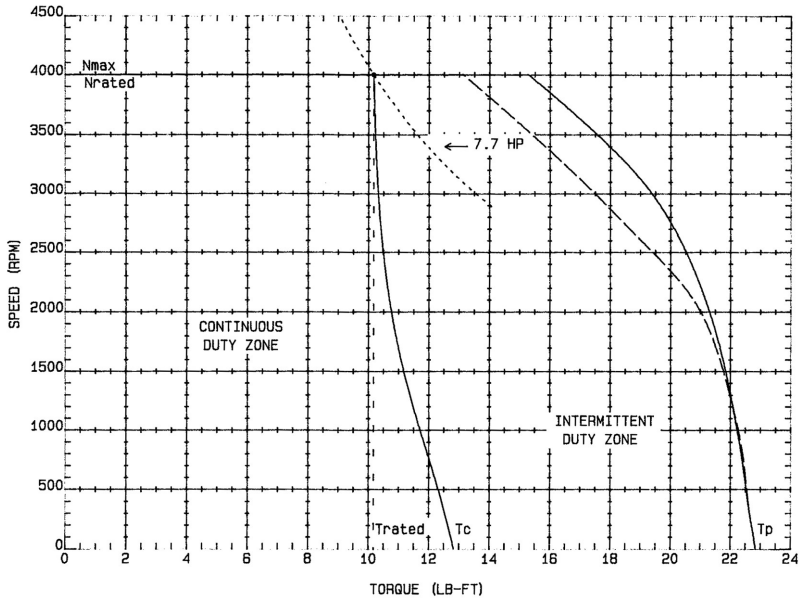
3.6.2.1 EB-602-A

Motor	Drive	Voltage
EB-602-A	BDS4-210	230 VAC



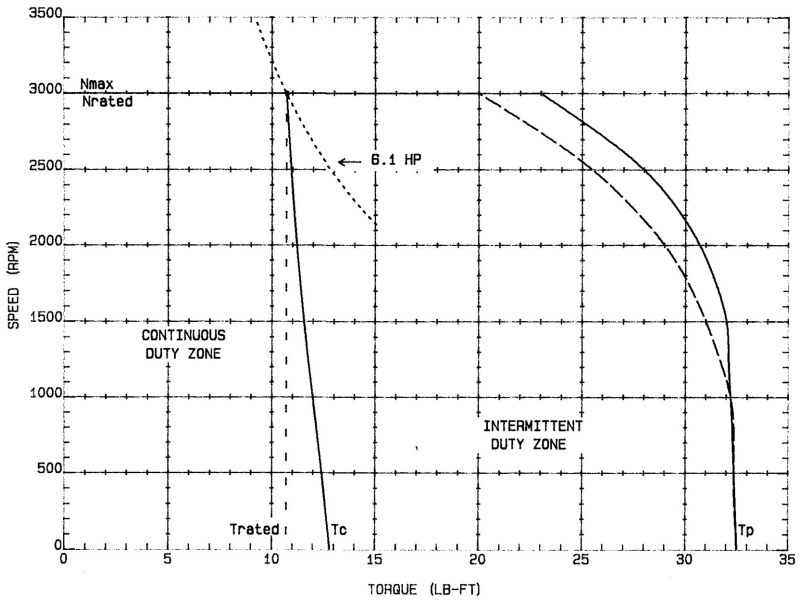
3.6.2.2 EB-602-B

Motor	Drive	Voltage
EB-602-B	BDS4-220	230 VAC



3.6.2.3 EB-602-C

Motor	Drive	Voltage
EB-602-C	BDS4-220	230 VAC



3.6.3 EB-604-A, B, C Catalog Data

Motor Parameters	Tol	Symbol	Units	Winding Data A	B	C
Volts (Line to Line)	Rated	V rtd	Volts RMS	230	230	230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	22.2	22.2	23.0
	N * m	N * m	N * m	30.10	30.10	31.20
Cont. Line Current	Nom.	Ic	amps RMS	19	27.7	39.4
#Maximum Speed	Nom.	N max	RPM	2150	3150	4300
* Peak Torque	Nom.	Tp	lb * ft	63.7	64.7	63.7
			N * m	86.40	87.70	86.40
Peak Line Current	Nom.	Ip	amps RMS	57.4	84.8	114.8
#Theoretical Acceleration	Nom	acc	rad/sec²	42467	43133	42467
#Horsepower	Rated	Hp rtd	HP	8.00	12.00	13.00
#Speed	Rated	N rtd	RPM	2150	3150	4300
#Torque	Rated	T rtd	lb * ft	19.5	20	15.9
			N * m	26.50	27.10	21.60
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	1.17	0.80	0.58
			N * m/amp RMS	1.58	1.09	0.79
	+/- 10%	Kb	Vrms/KRPM	95.78	65.85	47.89
Max Line to Line Volts	Max	V max	Volts RMS	250	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	0.508	0.234	0.126
Inductance (line to line)	+/- 30%	Lm	mh	13.3	6.3	3.3
Time Constant @ 25°C	Nom.	Tm	msec	0.62	0.60	0.61
	Nom.	Te	msec	26.2	26.9	26.2

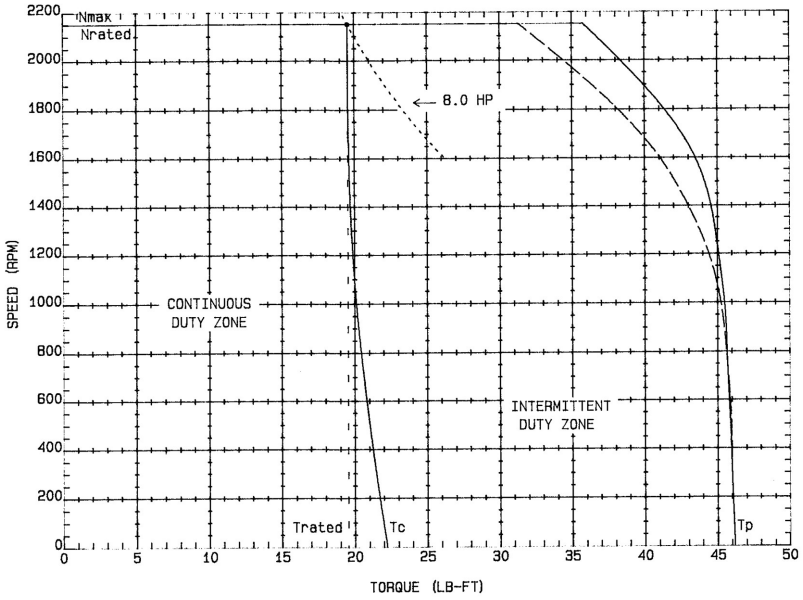
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.0015
		kg * m²	.002034
Weight	Wt	lb	51
		kg (f)	23.1
Static Friction	Tf	lb * ft	0.38
		N * m	.520
Thermal Time Constant	TCT	minutes	14
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.080
		N*m/krpm	.109

3.6.4 EB-604-A, B, C Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

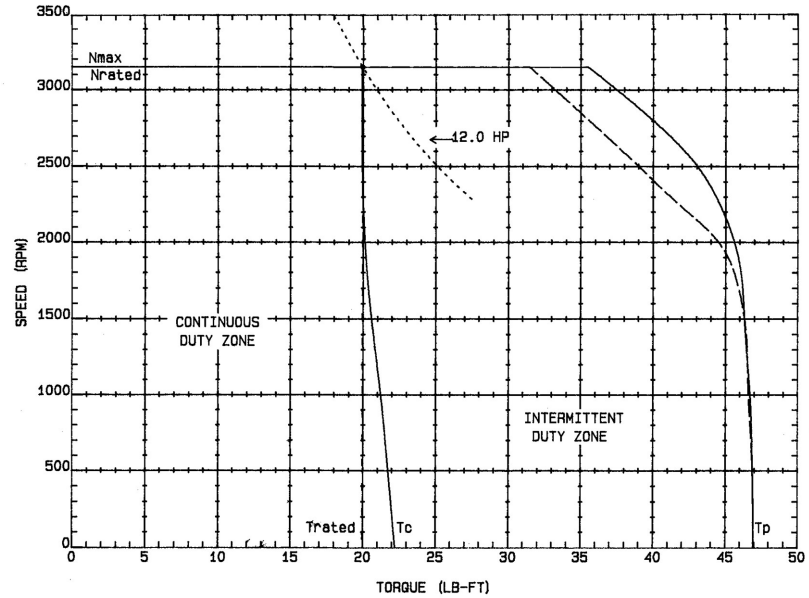
3.6.4.1 EB-604-A

Motor	Drive	Voltage
EB-604-A	BDS4-230/20	230 VAC



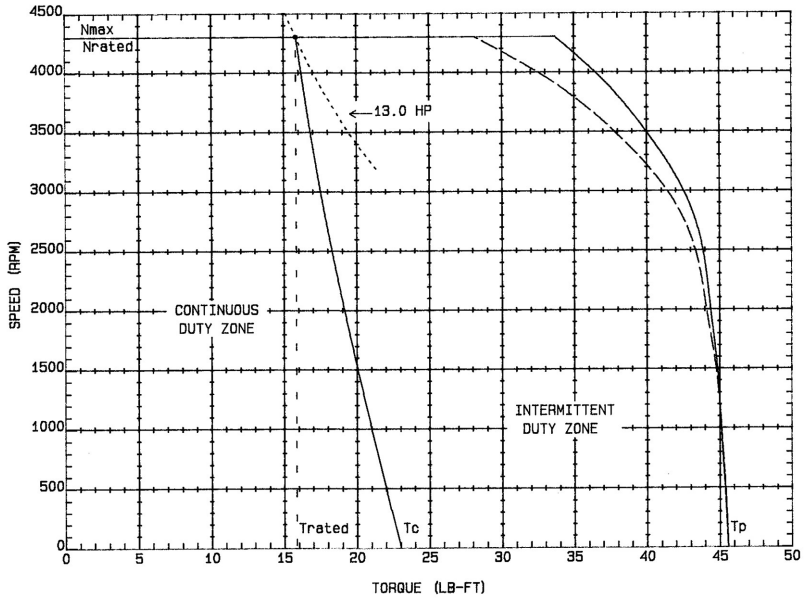
3.6.4.2 EB-604-B

Motor	Drive	Voltage
EB-604-B	BDS4-230	230 VAC



3.6.4.3 EB-604-C

Motor	Drive	Voltage
EB-604-C	BDS4-240	230 VAC



3.6.5 EB-606-A, B, C, D Catalog Data

Motor Parameters	Tol	Symbol	Units	Winding Data A	B	C	D
Volts (Line to Line)	Rated	V rtd	Volts RMS	230	230	230	230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	33.0	33.0	33.0	31.0
	N * m	N * m	N * m	44.80	44.80	44.80	42.03
Cont. Line Current	Nom.	Ic	amps RMS	20	40	54.8	28
#Maximum Speed	Nom.	N max	RPM	1550	3050	4150	2300
* Peak Torque	Nom.	Tp	lb * ft	97.2	93.0	91.6	90.4
			N * m	131.90	126.10	124.30	122.60
Peak Line Current	Nom.	Ip	amps RMS	62	118.6	160	86.2
#Theoretical Acceleration	Nom	acc	rad/sec²	43393	41518	40893	40357
#Horsepower	Rated	Hp rtd	HP	8.80	13.70	14.20	11.00
#Speed	Rated	N rtd	RPM	1550	3050	4150	2300
#Torque	Rated	T rtd	lb * ft	29.7	23.6	18	25.03
			N * m	40.27	32.00	24.40	33.94
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	1.65	0.83	0.60	1.10
			N * m/amp RMS	2.24	1.12	0.82	1.50
	+/- 10%	Kb	Vrms/KRPM	135.4	67.7	49.5	90.5
Max Line to Line Volts	Max	V max	Volts RMS	250	250	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	0.5	0.14	0.076	0.26
Inductance (line to line)	+/- 30%	Lm	mh	15.6	3.8	2.1	7
Time Constant @ 25°C	Nom.	Tm	msec	0.45	0.51	0.52	0.53
	Nom.	Te	msec	31.2	27.1	27.6	26.9

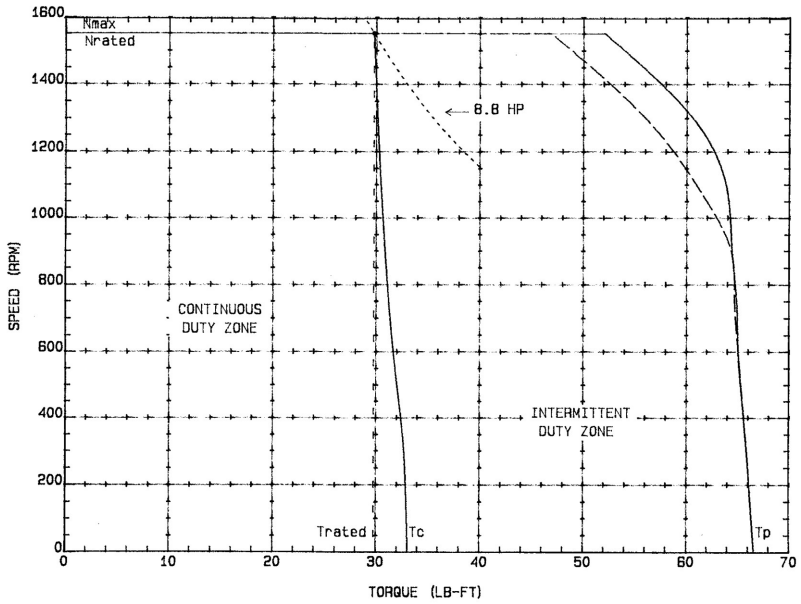
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.00224
		kg * m²	.003040
Weight	Wt	lb	66
		kg (f)	29.9
Static Friction	Tf	lb * ft	0.694
		N * m	.941
Thermal Time Constant	TCT	minutes	16
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.108
		N*m/krpm	.147

3.6.6 EB-606-A, B, C, D Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

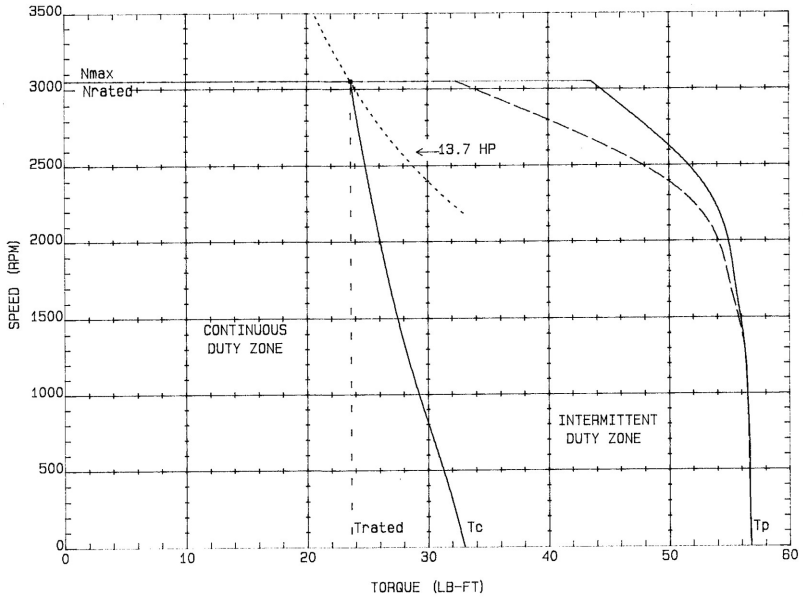
3.6.6.1 EB-606-A

Motor	Drive	Voltage
EB-606-A	BDS4-230/20	230 VAC



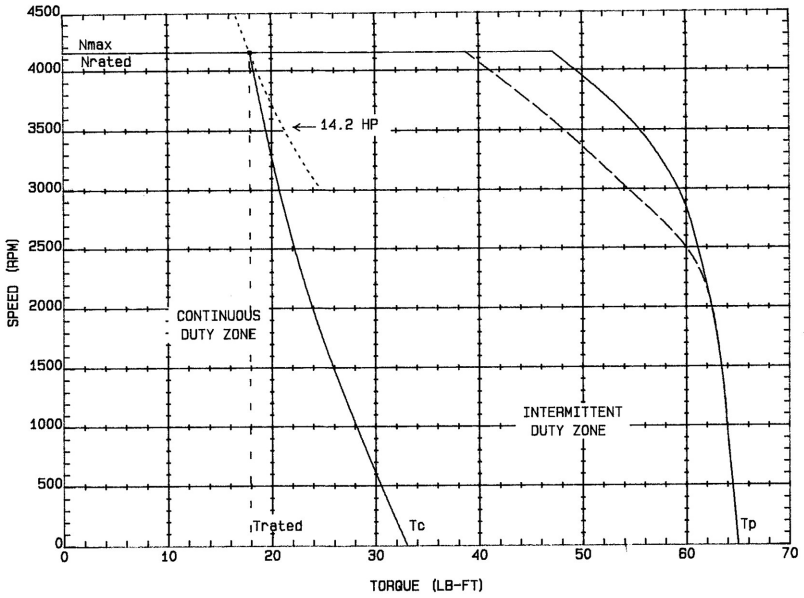
3.6.6.2 EB-606-B

Motor	Drive	Voltage
EB-606-B	BDS3-230/40	230 VAC



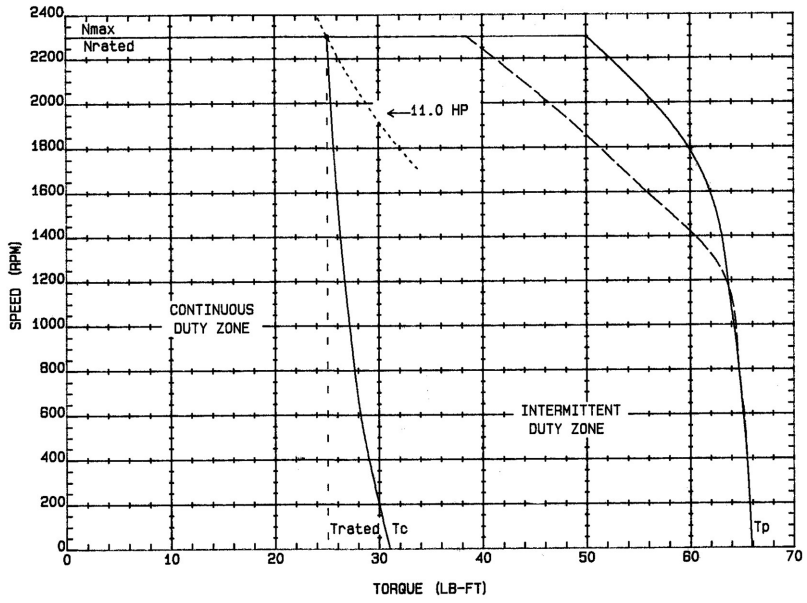
3.6.6.3 EB-606-C

Motor	Drive	Voltage
EB-606-C	BDS4-255	230 VAC



3.6.6.4 EB-606-D

Motor	Drive	Voltage
EB-606-D	BDS4-230	230 VAC



3.7 Motor Specifications For EB-80x

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

Not all windings are available, depending upon the compliance required.

3.7.1 EB-802-A, B Catalog Data

Motor Parameters	Tol	Symbol	Units	Winding Data A	Winding Data B
Volts (Line to Line)	Rated	V rtd	Volts RMS	230	230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	31.0	30.0
	N * m	N * m	N * m	42.00	40.70
Cont. Line Current	Nom.	Ic	amps RMS	24.9	32.4
#Maximum Speed	Nom.	N max	RPM	2000	2750
* Peak Torque	Nom.	Tp	lb * ft	96.0	95.3
			N * m	130.20	129.20
Peak Line Current	Nom.	Ip	amps RMS	81	108.2
#Theoretical Acceleration	Nom	acc	rad/sec²	26667	26472
#Horsepower	Rated	Hp rtd	HP	10.60	13.60
#Speed	Rated	N rtd	RPM	2000	2750
#Torque	Rated	T rtd	lb * ft	27.8	26
			N * m	37.70	35.30
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	1.25	0.93
			N * m/amp RMS	1.69	1.26
	+/- 10%	Kb	Vrms/KRPM	102.3	76
Max Line to Line Volts	Max	V max	Volts RMS	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	0.361	0.2
Inductance (line to line)	+/- 30%	Lm	mh	16.3	9.4
Time Constant @ 25°C	Nom.	Tm	msec	0.92	0.93
	Nom.	Te	msec	45.1	47.0

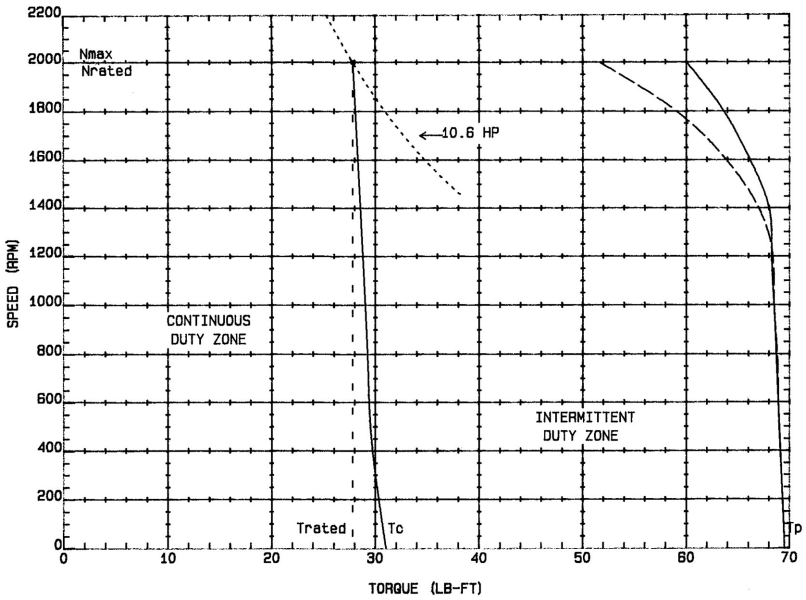
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.0036
		kg * m²	.004880
Weight	Wt	lb	79
		kg (f)	36.0
Static Friction	Tf	lb * ft	0.47
		N * m	.640
Thermal Time Constant	TCT	minutes	0.6
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.175
		N*m/krpm	.237

3.7.2 EB-802-A, B Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

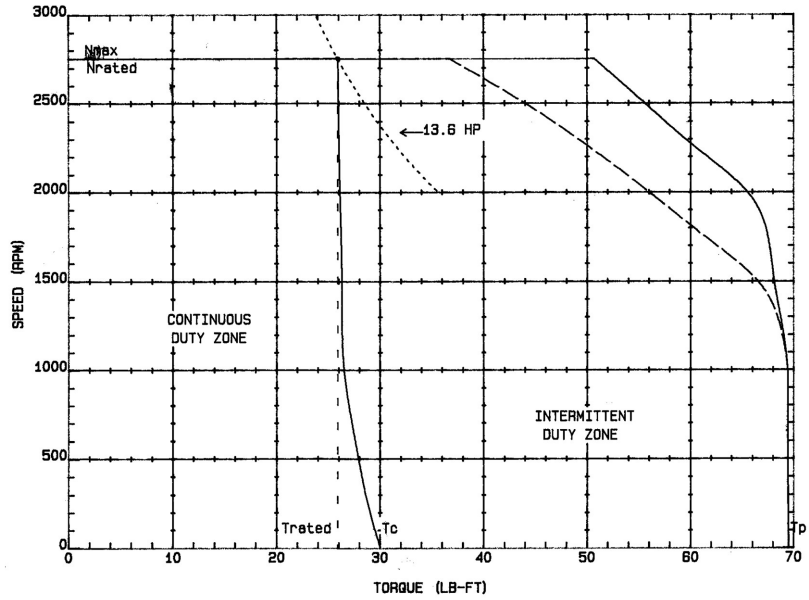
3.7.2.1 EB-802-A

Motor	Drive	Voltage
EB-802-A	BDS4-230	230 VAC



3.7.2.2 EB-802-B

Motor	Drive	Voltage
EB-802-B	BDS4-240	230 VAC



3.7.3 EB-804-A, B Catalog Data

Motor Parameters	Tol	Symbol	Units	Winding Data A	Winding Data B
Volts (Line to Line)	Rated	V rtd	Volts RMS	230	230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	58.0	58.0
	N * m	N * m	N * m	78.70	78.70
Cont. Line Current	Nom.	Ic	amps RMS	35	48
#Maximum Speed	Nom.	N max	RPM	1500	2000
* Peak Torque	Nom.	Tp	lb * ft	171.2	169.5
			N * m	232.10	230.00
Peak Line Current	Nom.	Ip	amps RMS	108.5	147
#Theoretical Acceleration	Nom	acc	rad/sec²	27613	27339
#Horsepower	Rated	Hp rtd	HP	14.50	18.60
#Speed	Rated	N rtd	RPM	1500	2000
#Torque	Rated	T rtd	lb * ft	50.8	48.8
			N * m	68.90	66.20
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	1.66	1.21
			N * m/amp RMS	2.25	1.65
	+/- 10%	Kb	Vrms/KRPM	136.2	99.6
Max Line to Line Volts	Max	V max	Volts RMS	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	0.23	0.129
Inductance (line to line)	+/- 30%	Lm	mh	13	7.2
Time Constant @ 25°C	Nom.	Tm	msec	0.57	0.60
	Nom.	Te	msec	56.5	55.8

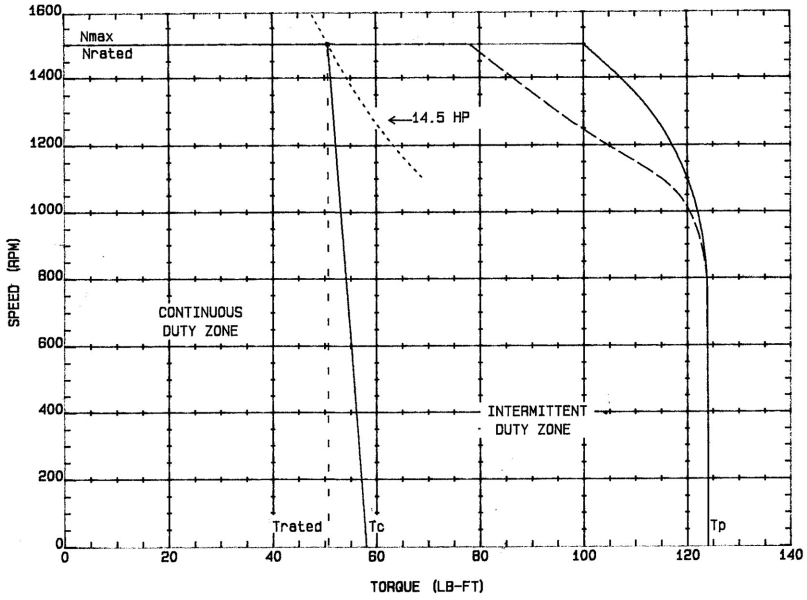
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.0062
		kg * m²	.008400
Weight	Wt	lb	112
		kg (f)	50.6
Static Friction	Tf	lb * ft	0.67
		N * m	.900
Thermal Time Constant	TCT	minutes	0.7
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.221
		N*m/krpm	.300

3.7.4 EB-804-A, B Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

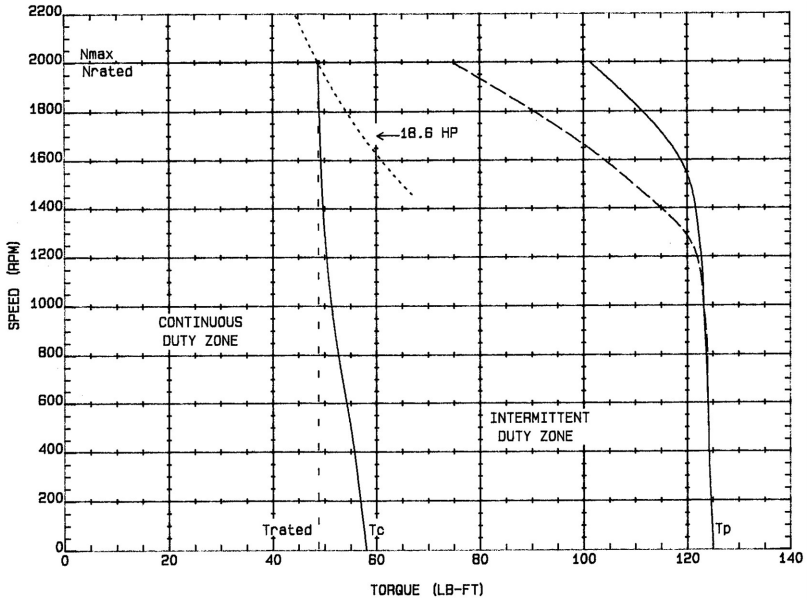
3.7.4.1 EB-804-A

Motor	Drive	Voltage
EB-804-A	BDS4-240	230 VAC



3.7.4.2 EB-804-B

Motor	Drive	Voltage
EB-804-B	BDS4-255	230 VAC



3.7.5 EB-806-A, C Catalog Data

Motor Parameters	Tol	Symbol	Units	Winding Data A	Winding Data C
Volts (Line to Line)	Rated	V rtd	Volts RMS	230	230
* Continuous Torque (stall) @ 40°C Ambient	Nom.	Tc	lb * ft	80.0	80.0
	N * m	N * m	N * m	108.50	108.50
Cont. Line Current	Nom.	Ic	amps RMS	49.1	30
#Maximum Speed	Nom.	N max	RPM	1600	900
* Peak Torque	Nom.	Tp	lb * ft	238.2	267.0
			N * m	323.00	362.00
Peak Line Current	Nom.	Ip	amps RMS	153.8	100
#Theoretical Acceleration	Nom	acc	rad/sec²	25613	28710
#Horsepower	Rated	Hp rtd	HP	21.20	12.00
#Speed	Rated	N rtd	RPM	1600	900
#Torque	Rated	T rtd	lb * ft	69.5	70
			N * m	94.20	95.00
* Torque Sensitivity	+/- 10%	Kt	lb * ft/amp RMS	1.63	2.67
			N * m/amp RMS	2.21	3.62
	+/- 10%	Kb	Vrms/KRPM	133.7	219
Max Line to Line Volts	Max	V max	Volts RMS	250	250
DC Res @ 25°C (line to line)	+/- 10%	Rm	Ohms	0.13	0.34
Inductance (line to line)	+/- 30%	Lm	mh	8	20
Time Constant @ 25°C	Nom.	Tm	msec	0.50	0.51
	Nom.	Te	msec	61.5	59.3

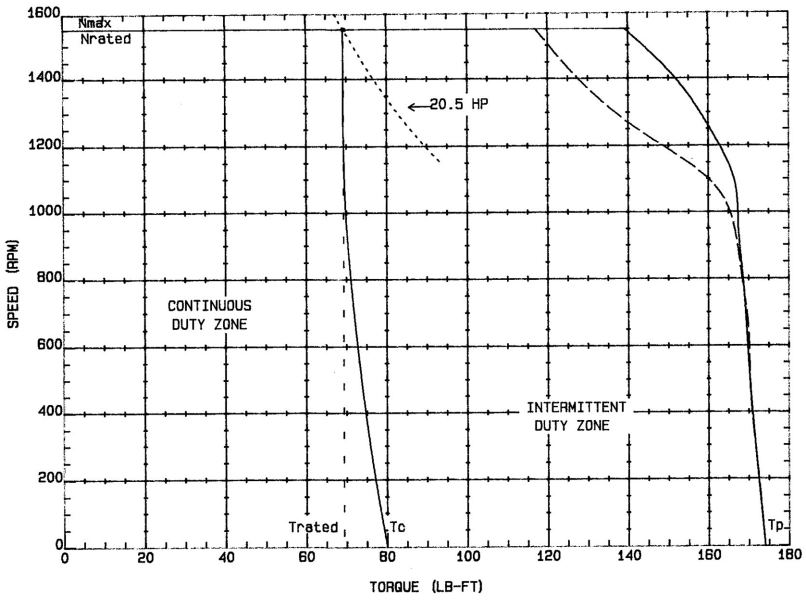
Basic Motor Constants	Symbol	Units	Value
Rotor Inertia	Jm	lb ft sec²	0.0093
		kg * m²	.012600
Weight	Wt	lb	200
		kg (f)	91.0
Static Friction	Tf	lb * ft	1.02
		N * m	1.380
Thermal Time Constant	TCT	minutes	0.8
Viscous Damping Infinite Z Source	Fi	lb*ft/krpm	.267
		N*m/krpm	.362

3.7.6 EB-806-A, C Performance Curves

All EB rated values and performance curves in this document assume operation with CD/SERVOSTAR drives, which includes Torque Angle Advance (TAA). For further details please see Kollmorgen Servo Amplifiers & Torque Angle Advance.

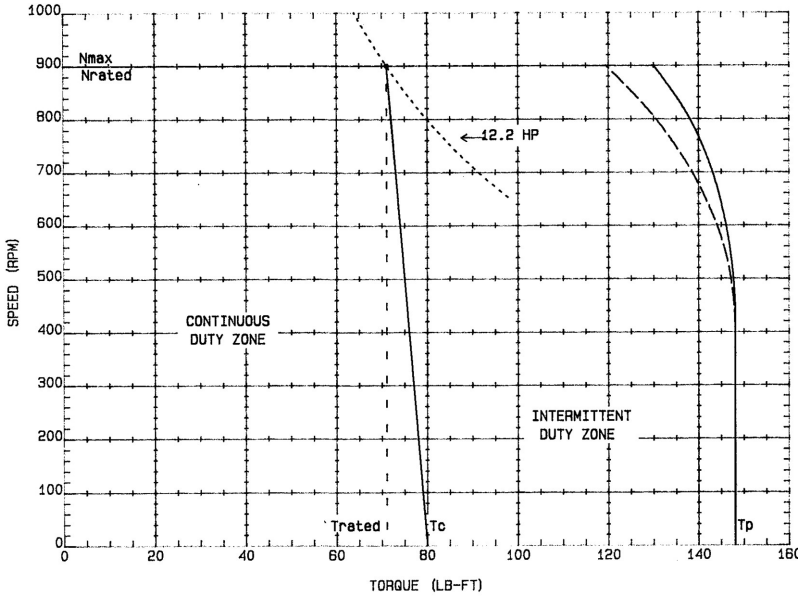
3.7.6.1 EB-806-A

Motor	Drive	Voltage
EB-806-A	BDS4-255	230 VAC



3.7.6.2 EB-806-C

Motor	Drive	Voltage
EB-806-C	BDS4-230	230 VAC



3.8 Technical Data For Brakes

The holding brake is designed to provide static holding torque to the motor shaft with the brake coil de-energized. The brake must first be released (coil energized) prior to commanding motor rotation as determined by its drop-out time. The brake is intended for holding or “parking” of a stationary motor. It is not intended for dynamic braking. There should be absolutely no motion of the rotor when power is removed from the brake coil.

It may be used for a limited number of emergency stop conditions, however such use will eventually cause wear, leading to eventual malfunction of the brake. Number of emergency stops strongly depends on applied load. Contact Kollmorgen for proper calculation of energy that needs to be absorbed during emergency stops in application.

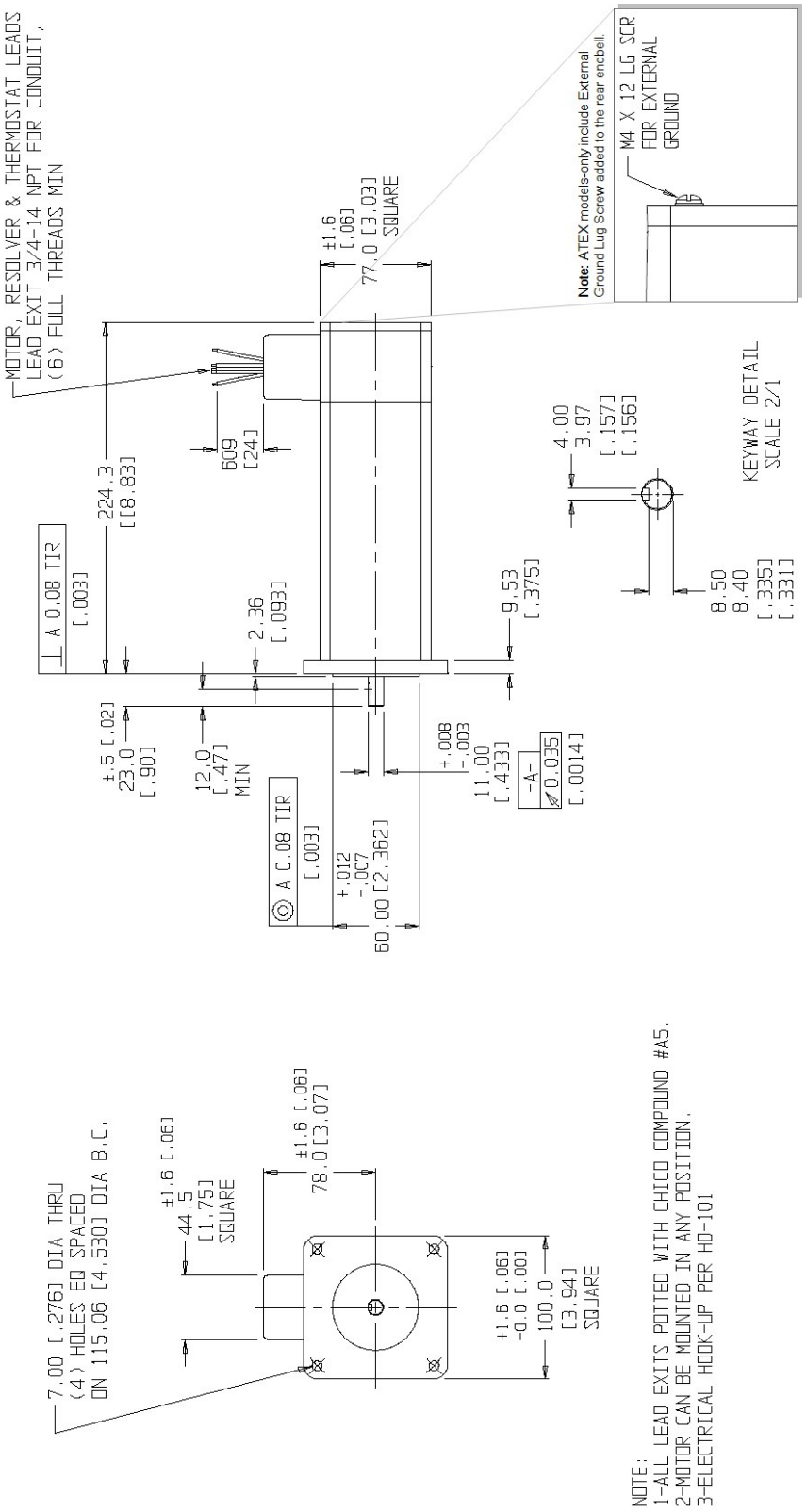
Contamination of the motor internal compartment by oil or other foreign materials will result in failure of the brake. Check the suitability of motor sealing for the working environment.

Motor Family	units	EB-10x		EB-20x		EB-40x		EB-60x, -80x	
Brake Option	-	B2	B3	B2	B3	B2	B3	B2	B3
Nominal Operating Voltage	VDC	90	24	90	24	90	24	90	24
Coil Resistance [@20°C]	ohms	551 ±10%	39.7 ±10%	800 ±10%	46.5 ±10%	387 ±10%	27.37 ±10%	288 ±10%	19.65 ±10%
Response Time	msec	100 (Engagement)							
		200 (Disengagement)		250 (Disengagement)					
MIN Rated Nominal Static Torque	N-m	2.3		6.0		8.0		48	
Brake Temperature Range	°C	-40°C to +60°C							
Maximum Speed	RPM	6000		5000				6000	

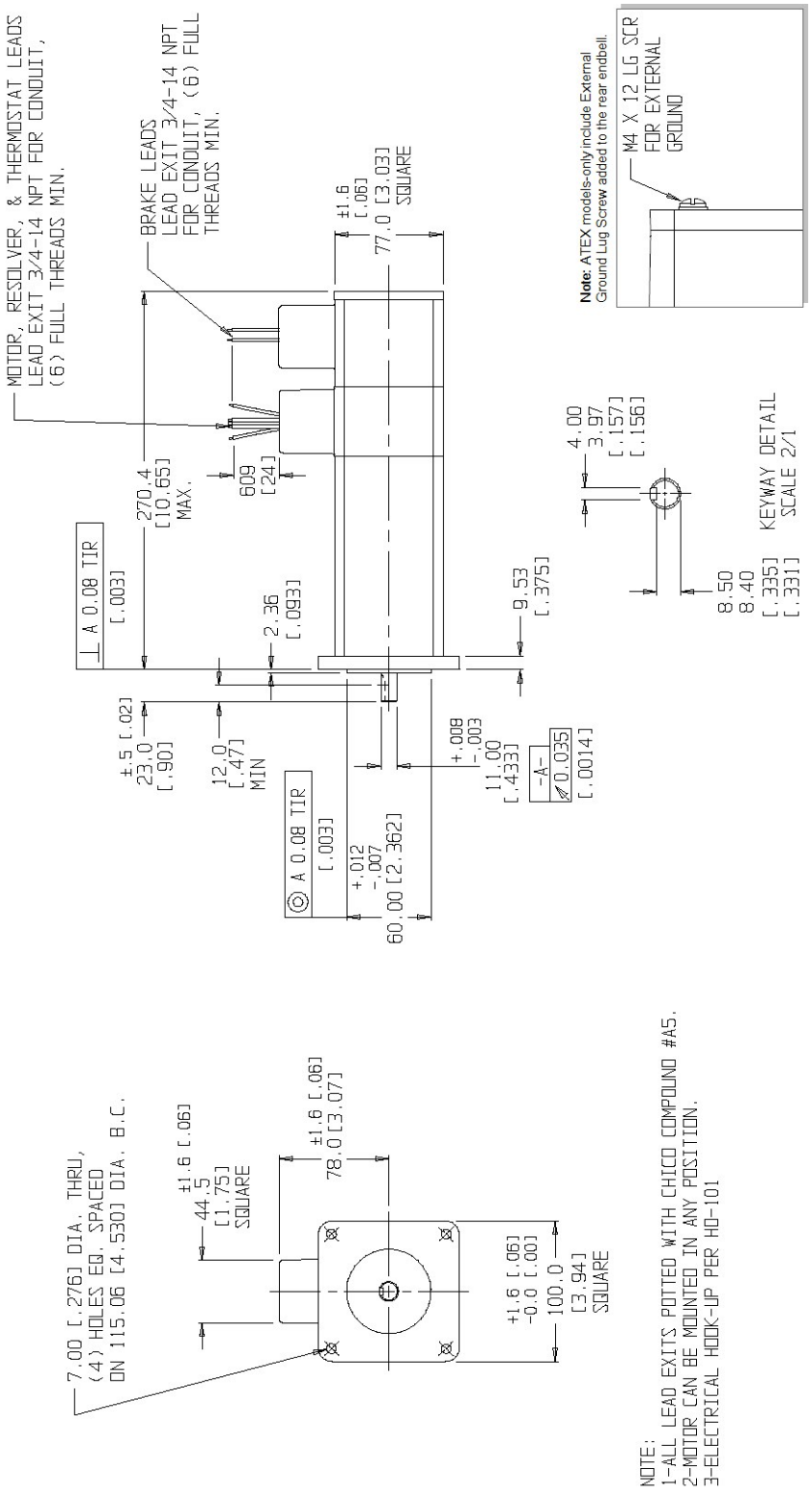
--- / ---

4 Dimension Drawings

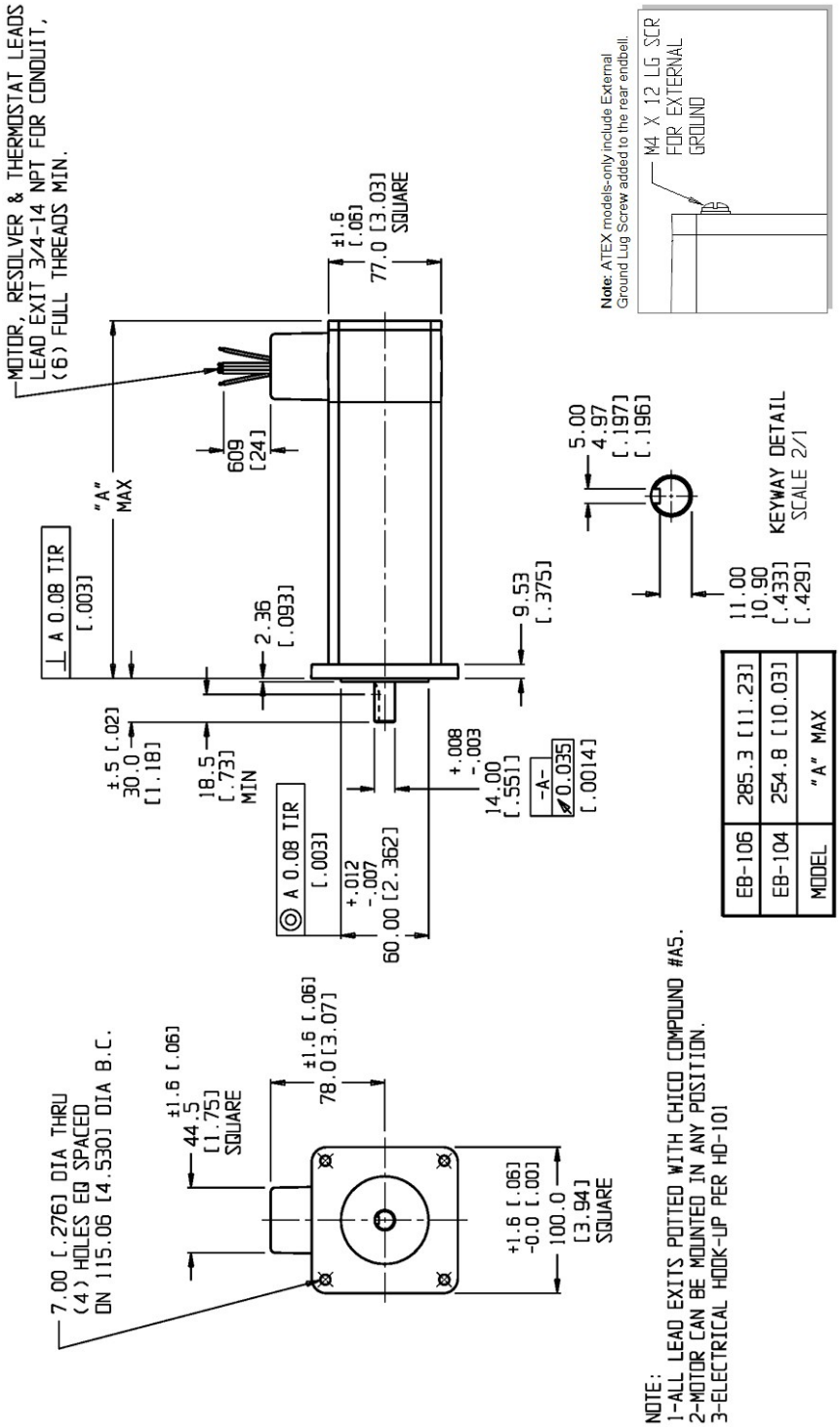
4.1 Motor Dimensions – Outline Drawings EB-102 Non-Brake



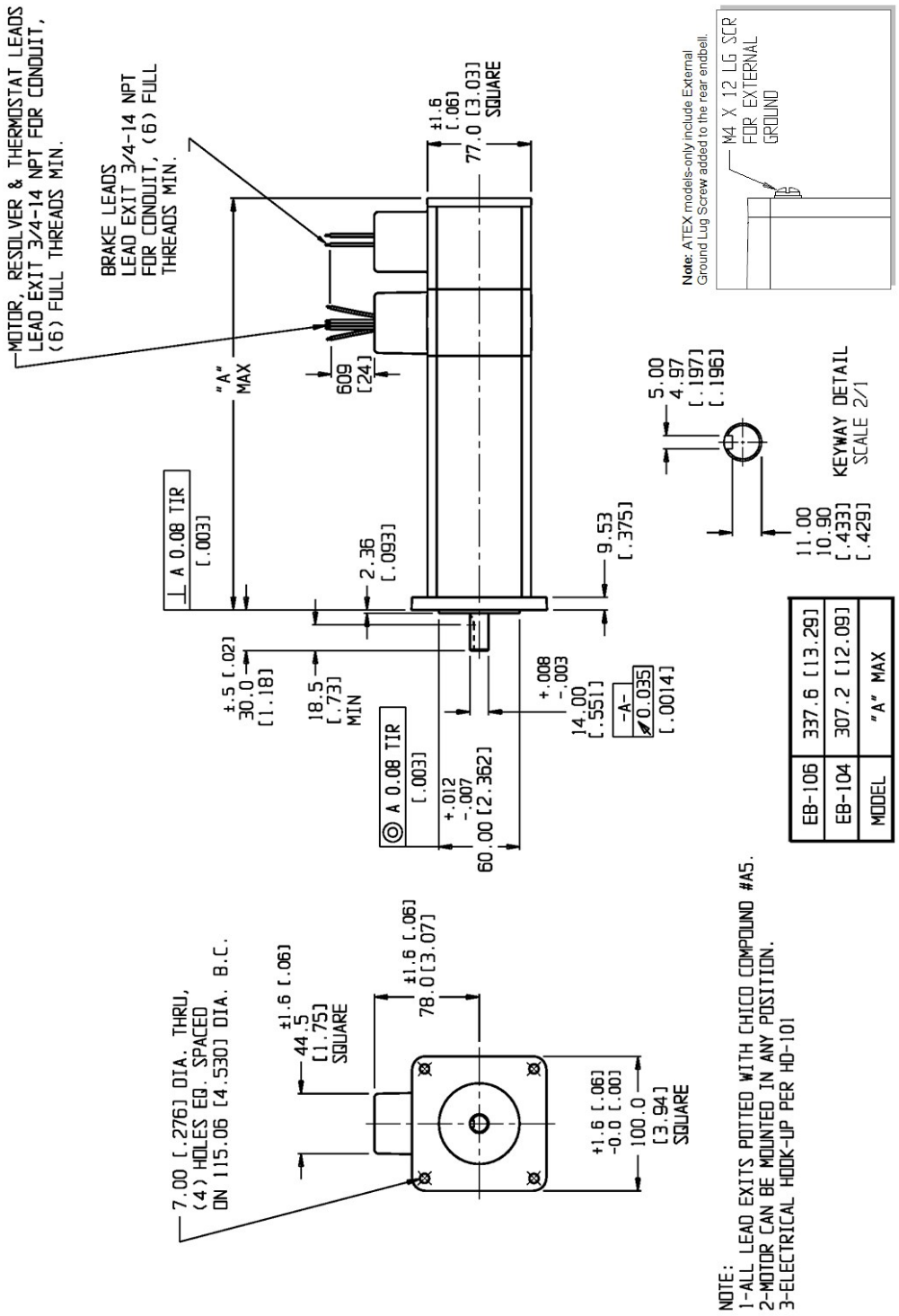
4.2 Motor Dimensions – Outline Drawings EB-102 Brake



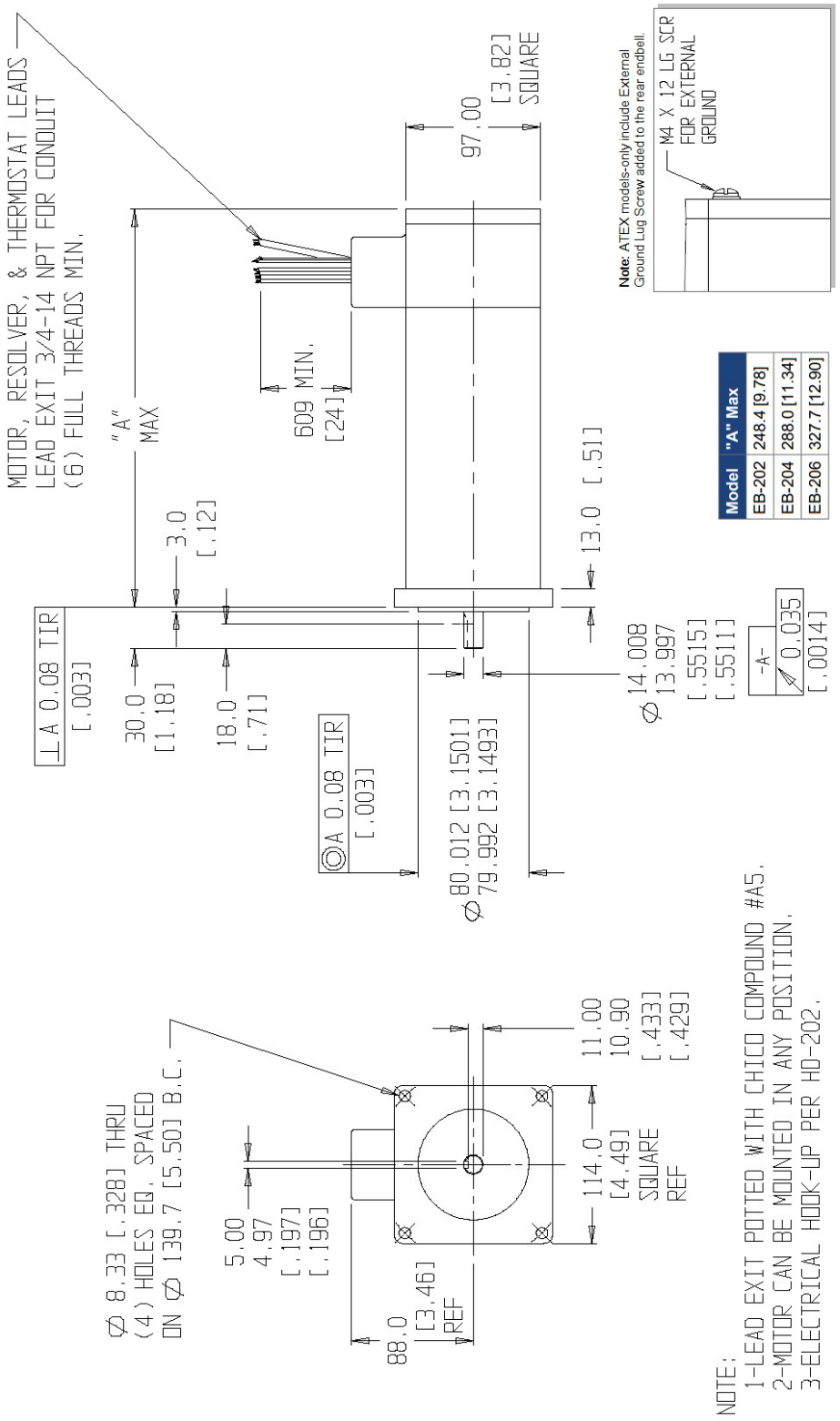
4.3 Motor Dimensions – Outline Drawings EB-104/106 Non-Brake



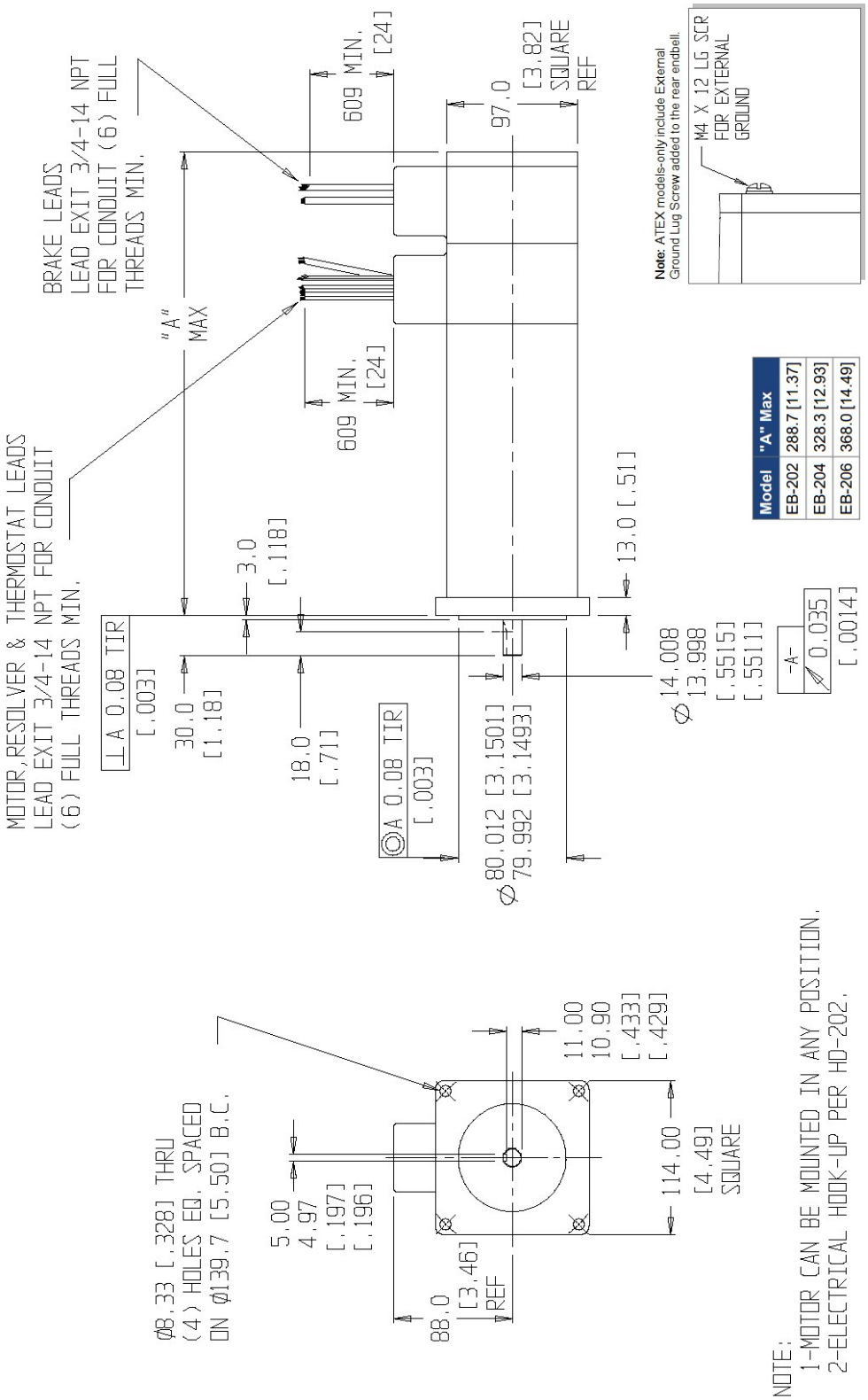
4.4 Motor Dimensions – Outline Drawings EB-104/106 Brake



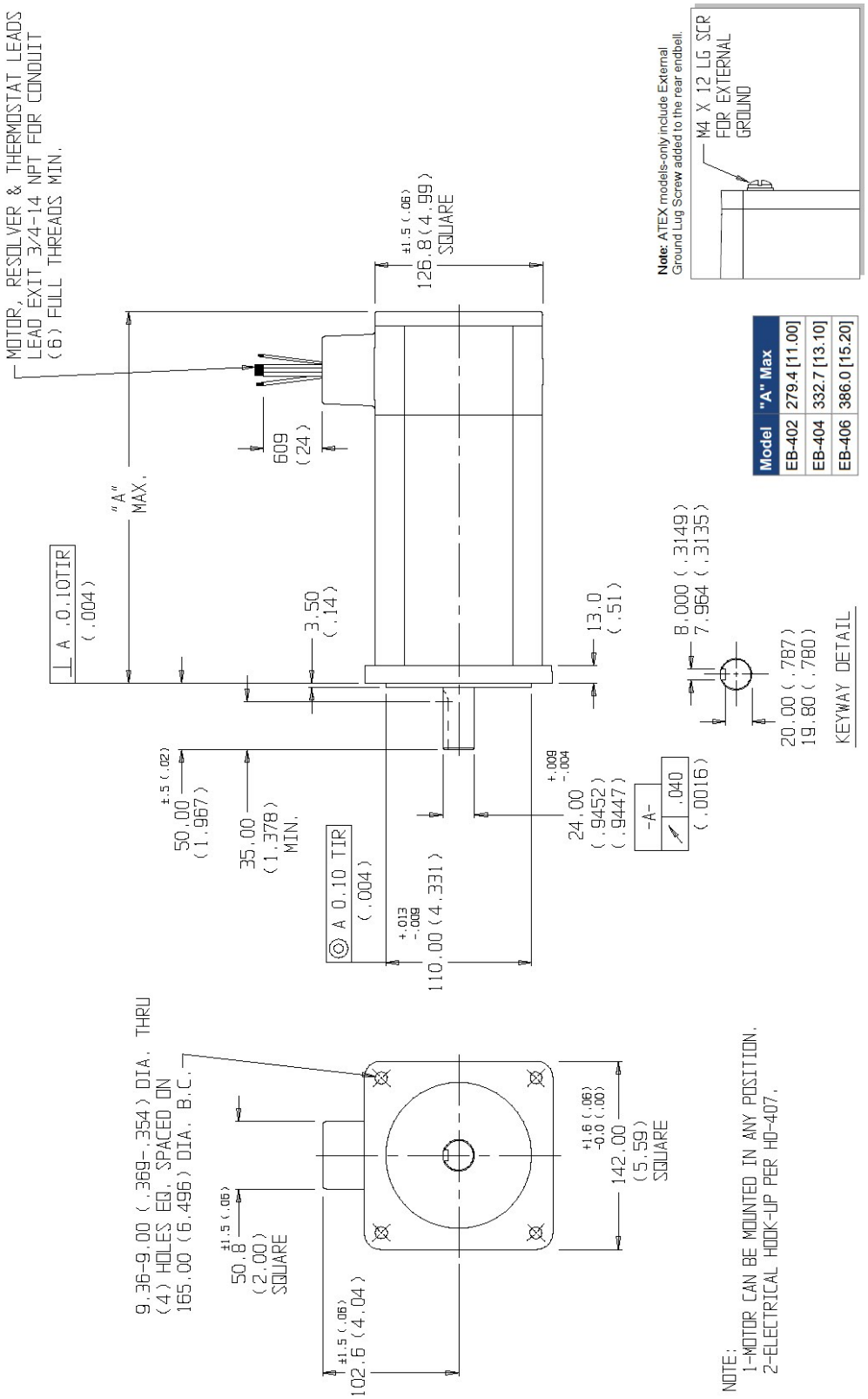
4.5 Motor Dimensions – Outline Drawings EB-20x Non-Brake



4.6 Motor Dimensions – Outline Drawings EB-20x Brake

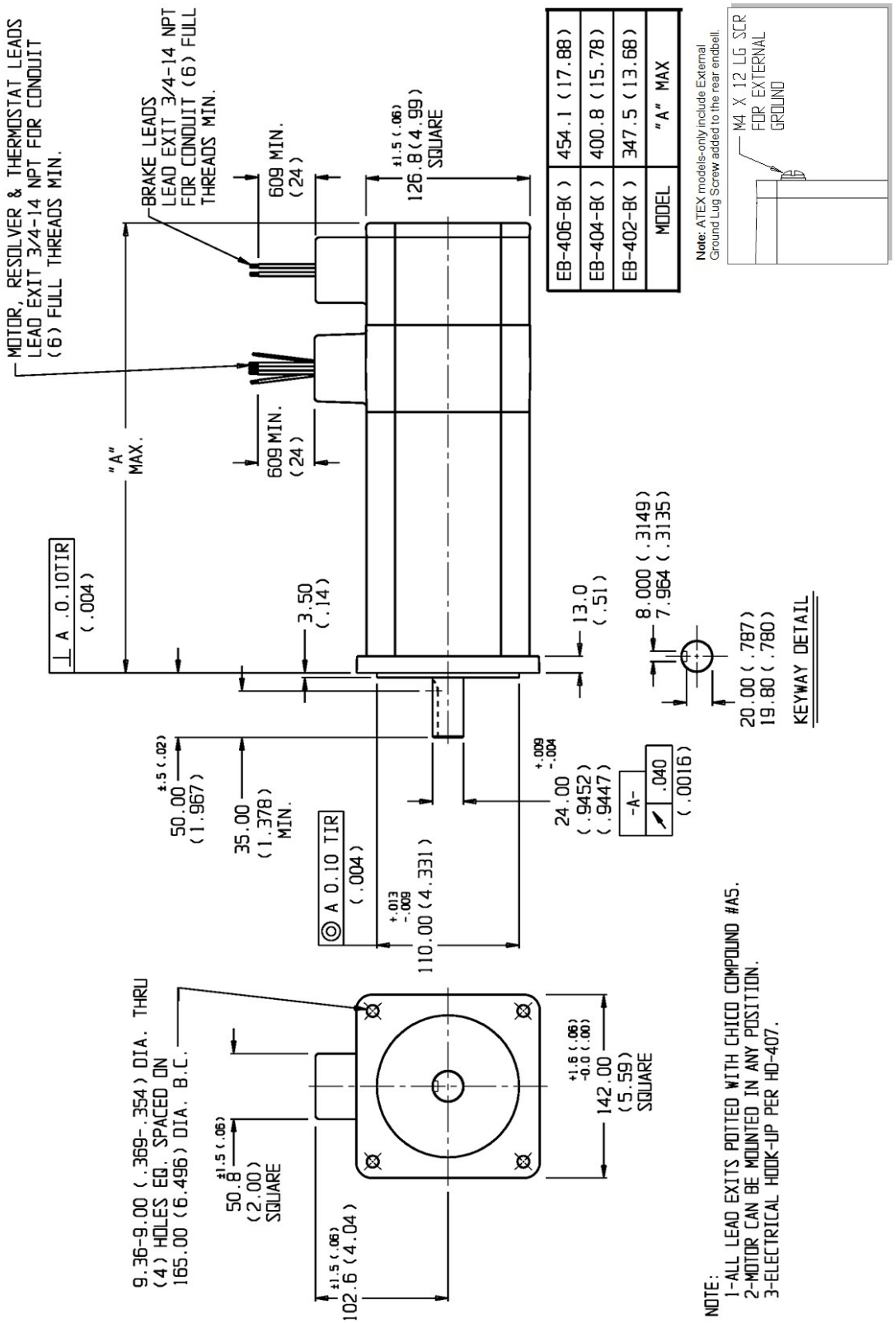


4.7 Motor Dimensions – Outline Drawings EB-40x Non-Brake



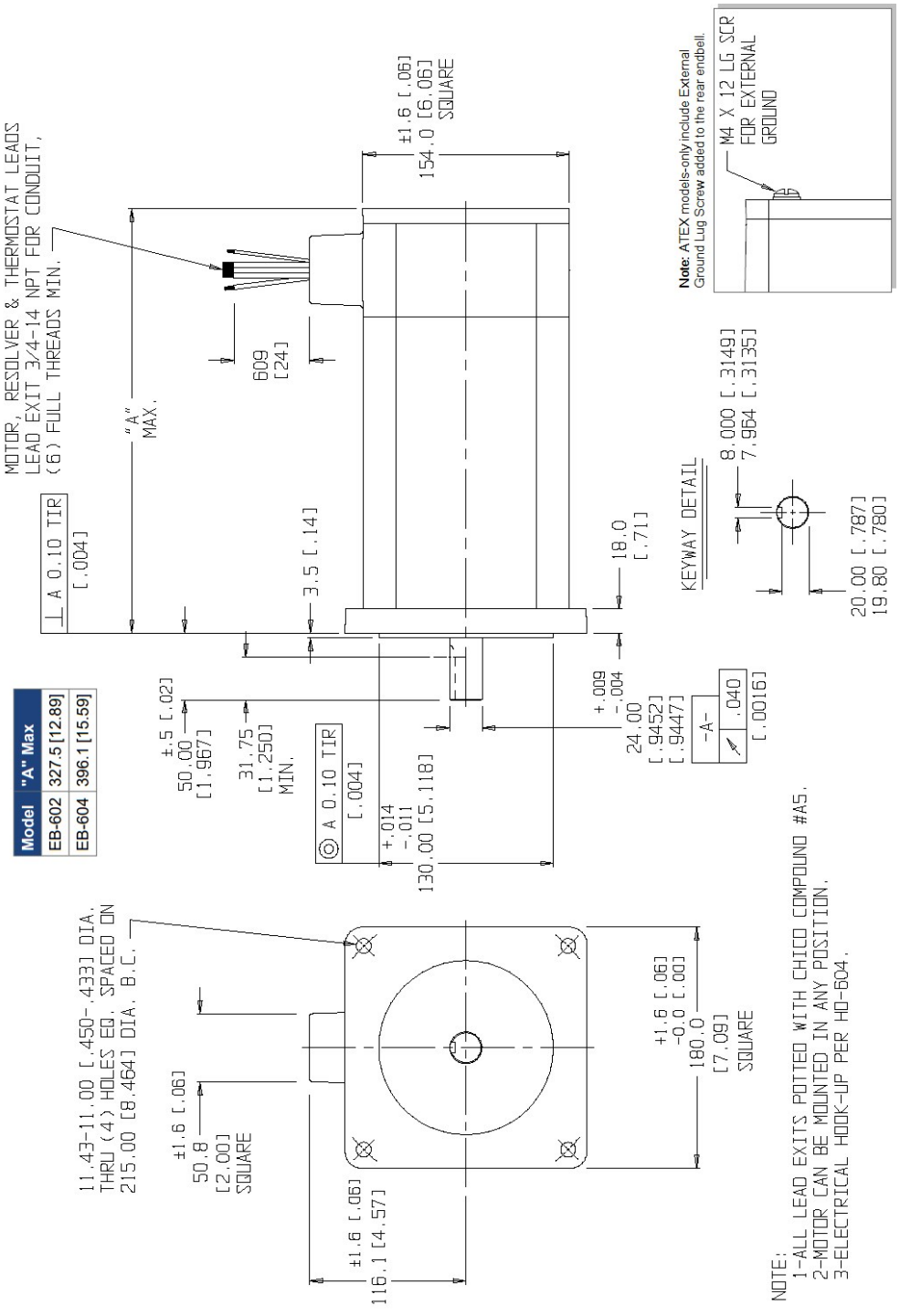
Model	"A" Max
EB-402	279.4 [11.00]
EB-404	332.7 [13.10]
EB-406	386.0 [15.20]

4.8 Motor Dimensions – Outline Drawings EB-40x Brake

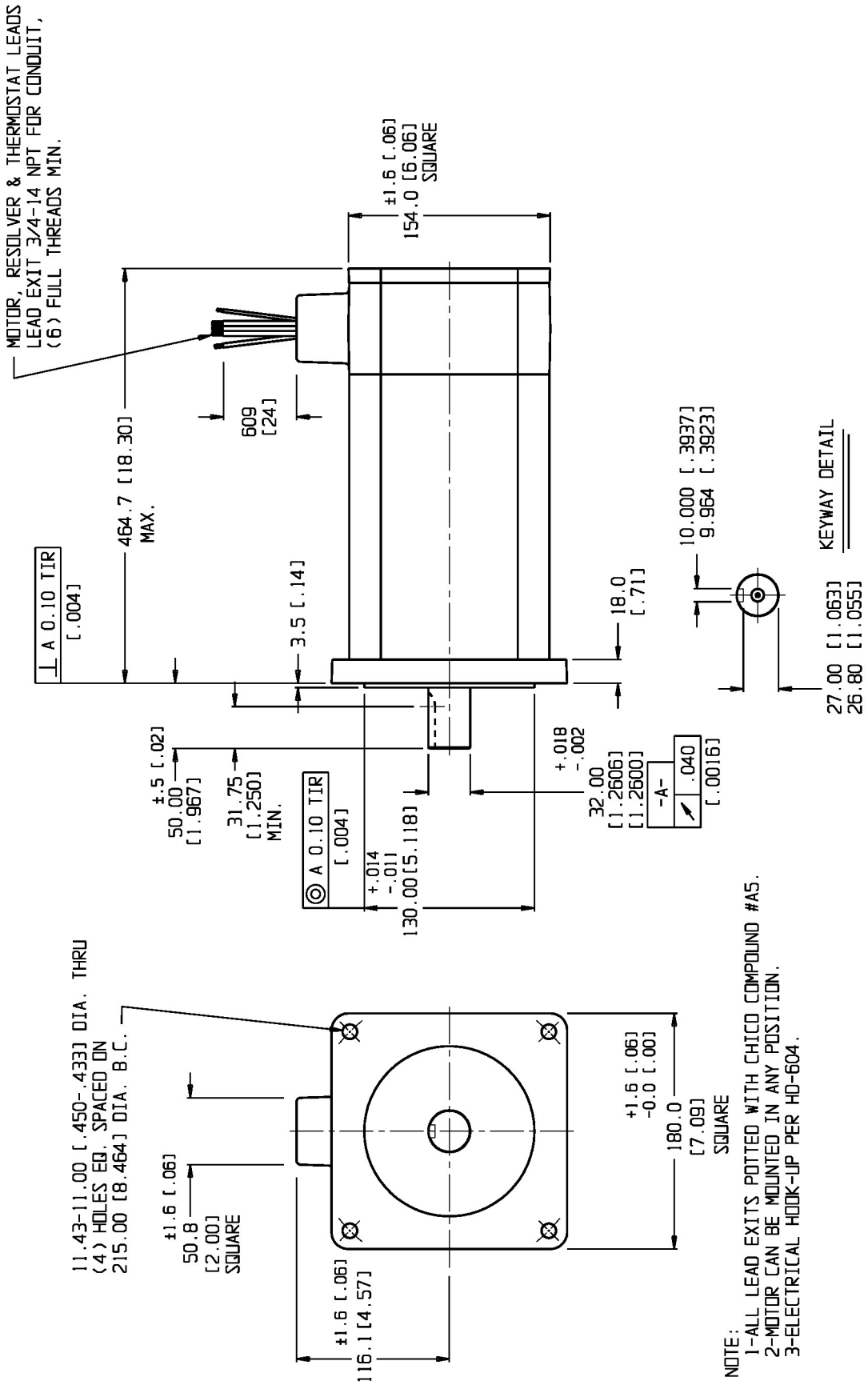


4.9 Motor Dimensions – Outline Drawings EB-60x Non-Brake

4.9.1 EB-602 & EB-604

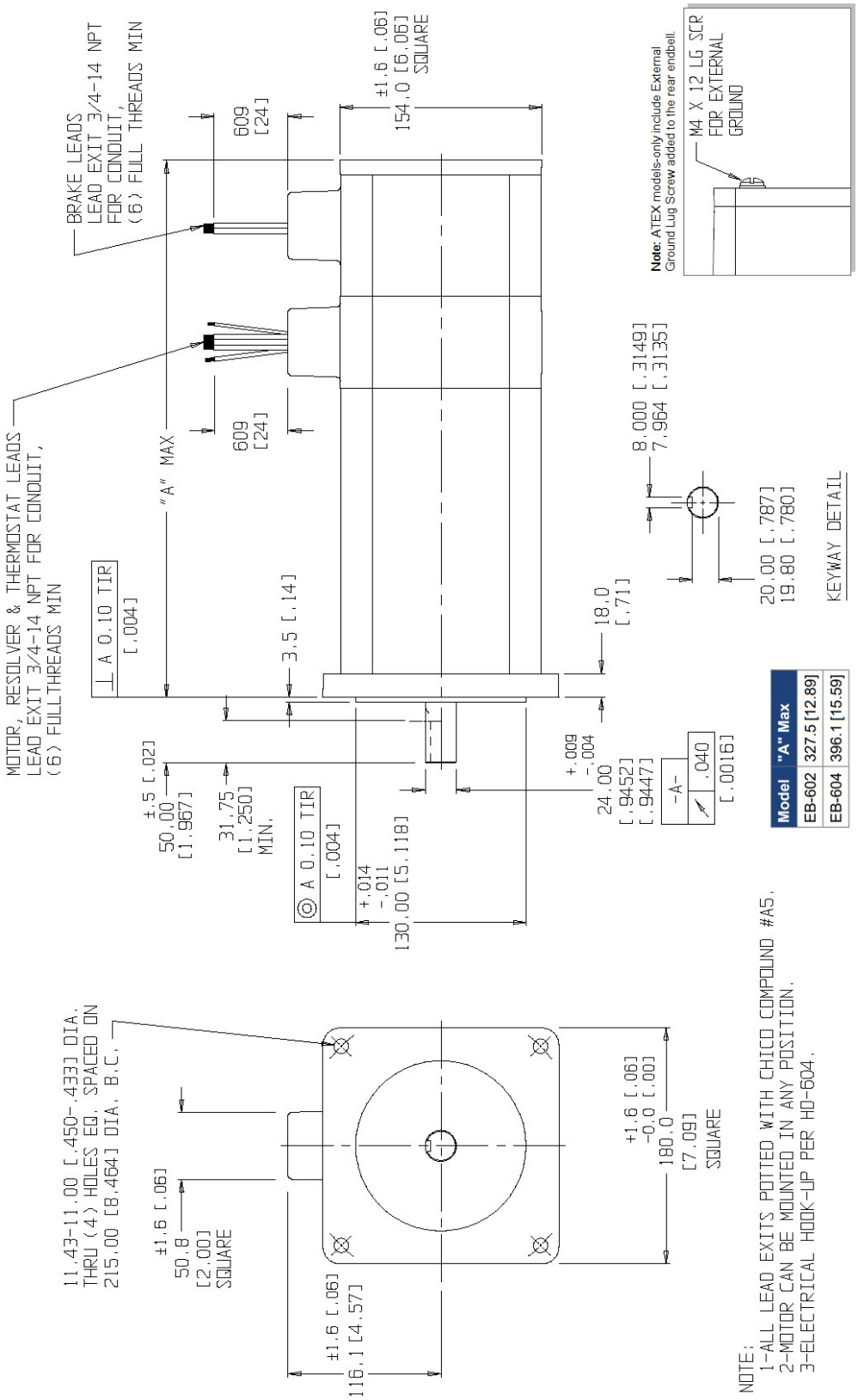


4.9.2 EB-606


MOTOR, RESOLVER & THERMOSTAT LEADS
LEAD EXIT 3/4-14 NPT FOR CONDUIT,
(6) FULL THREADS MIN.
±1.6 [.06]
154.0 [6.06]
SQUARE
609
[24]
464.7 [18.30]
MAX.
⊥ A 0.10 TIR
[.004]
3.5 [.14]
18.0
[.71]
10.000 [.3937]
9.964 [.3923]
KEYWAY DETAIL
27.00 [1.063]
26.80 [1.055]
±.5 [.02]
50.00
[1.967]
31.75
[1.250]
MIN.
◎ A 0.10 TIR
[.004]
+.014
-.011
130.00[5.118]
+.018
-.002
32.00
[1.2606]
[1.2600]
-A-
.040
[.0016]
11.43-11.00 [.450-.433] DIA. THRU
(4) HOLES EQ. SPACED ON
215.00 [8.464] DIA. B.C.
±1.6 [.06]
50.8
[2.00]
SQUARE
±1.6 [.06]
116.1 [4.57]
+1.6 [.06]
-0.0 [.00]
180.0
[7.09]
SQUARE
NOTE:
1-ALL LEAD EXITS POTTED WITH CHICO COMPOUND #A5.
2-MOTOR CAN BE MOUNTED IN ANY POSITION.
3-ELECTRICAL HOOK-UP PER HD-604.

4.10 Motor Dimensions – Outline Drawings EB-60x Brake

4.10.1 EB-602 & EB-604

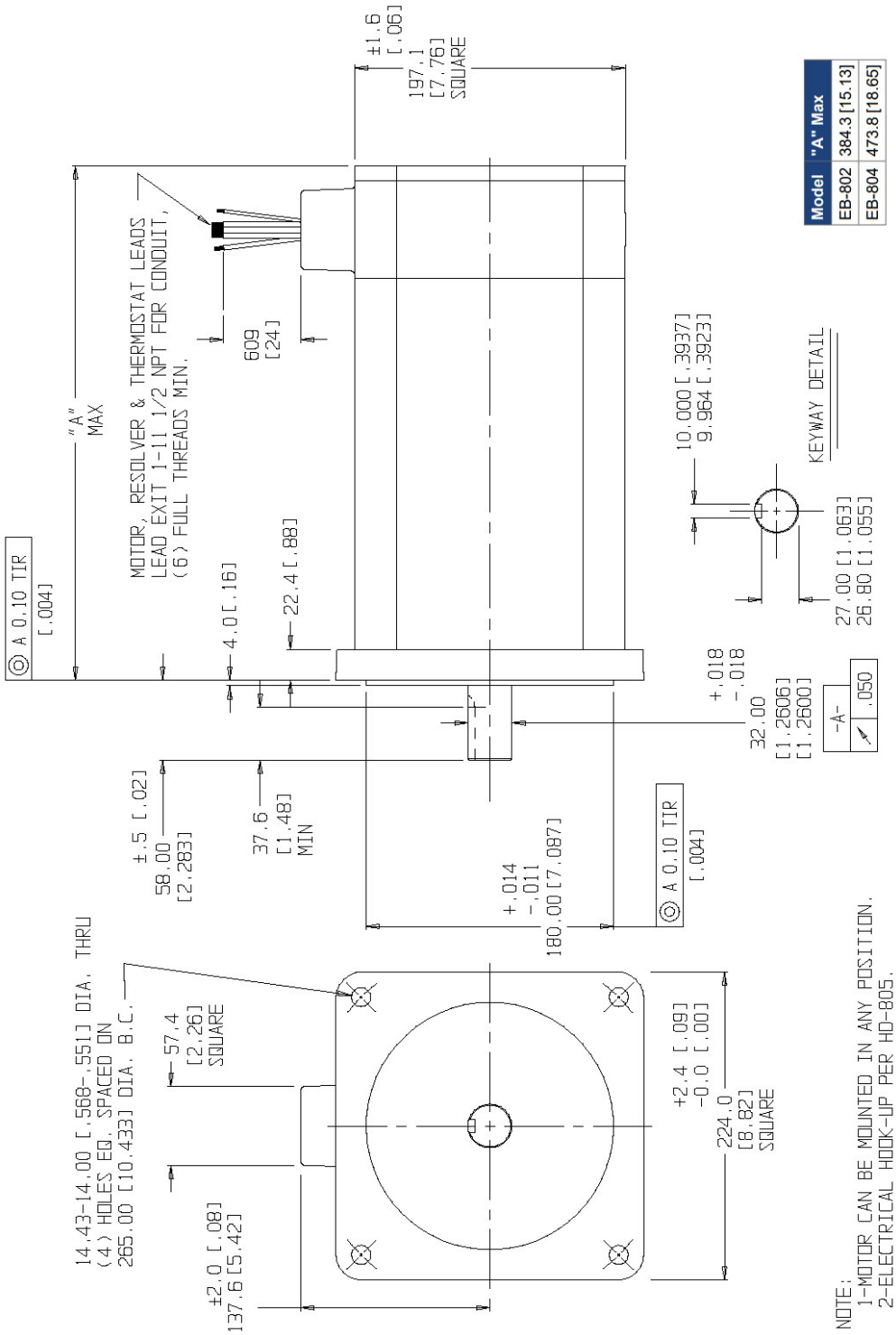


4.10.2 EB-606

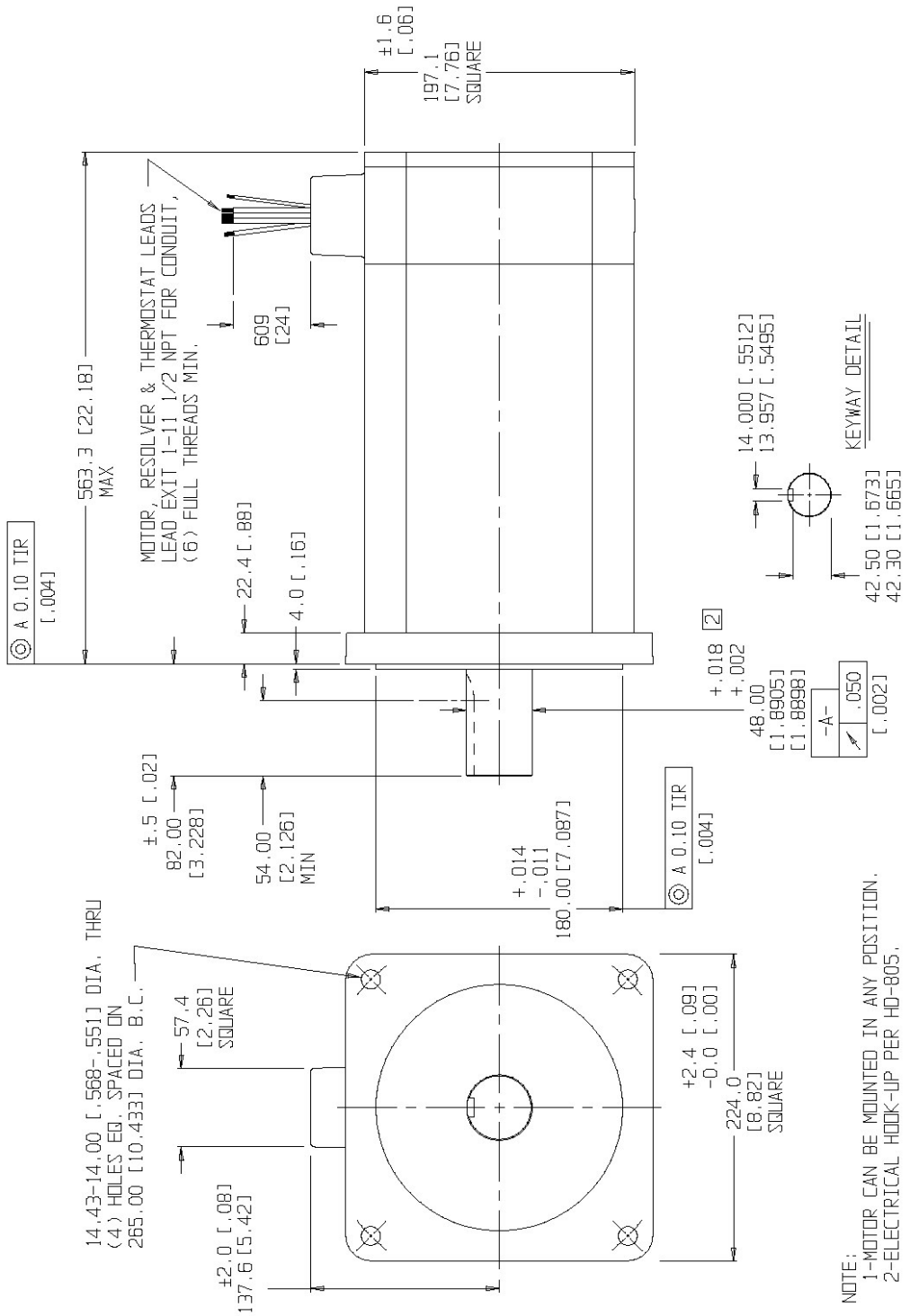
Please contact Kollmorgen Customer Support.

4.11 Motor Dimensions – Outline Drawings EB-80x Non-Brake

4.11.1 EB-802 & EB-804

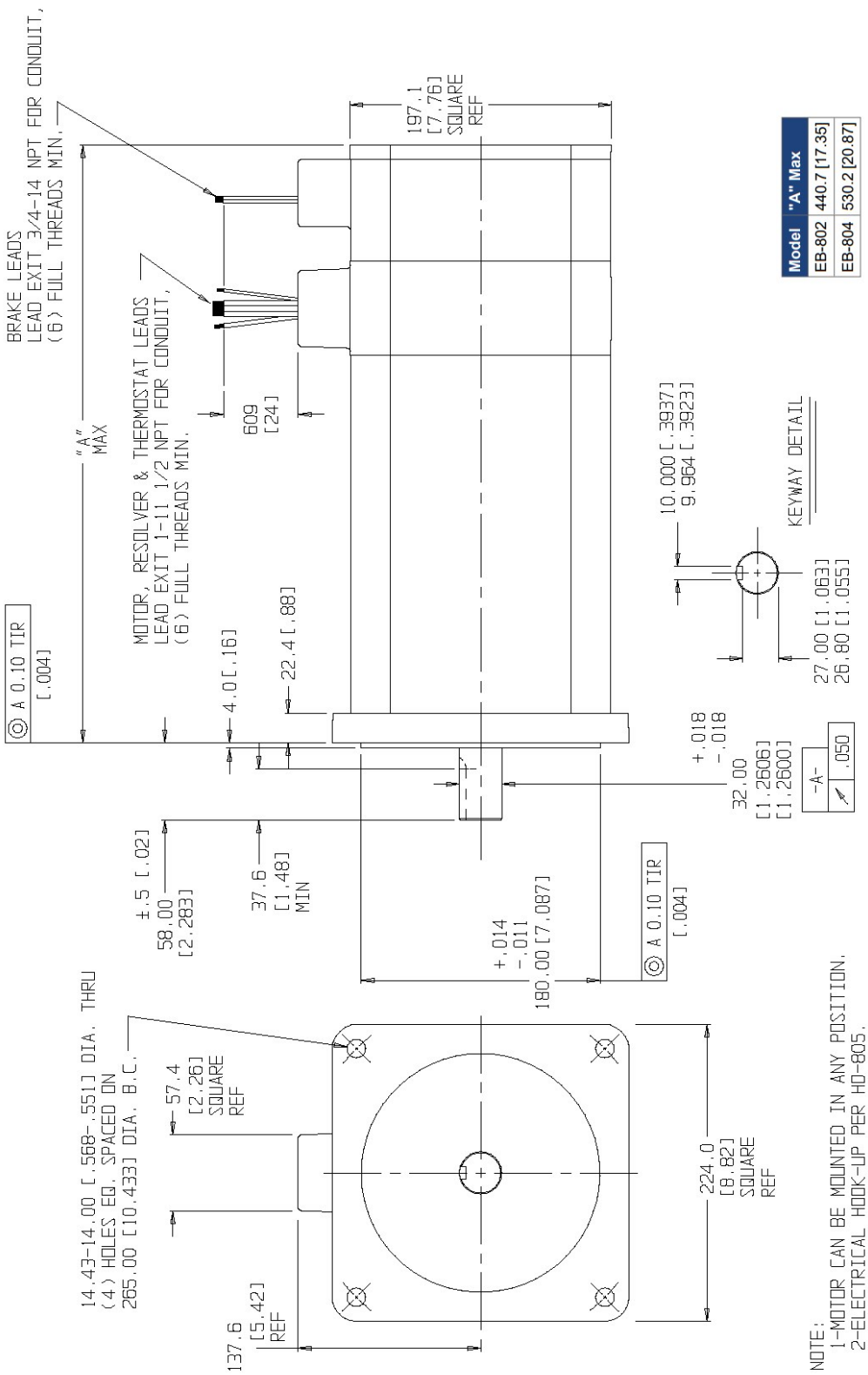


4.11.2 EB-806


±1.6
[.06]
197.1
[7.76]
SQUARE
MOTOR, RESOLVER & THERMOSTAT LEADS
LEAD EXIT 1-11 1/2 NPT FOR CONDUIT,
(6) FULL THREADS MIN.
609
[24]
563.3 [22.18]
MAX
A 0.10 TIR
[.004]
22.4 [.88]
4.0 [.16]
14.000 [.5512]
13.957 [.5495]
KEYWAY DETAIL
42.50 [1.673]
42.30 [1.665]
+.018
+.002
48.00
[1.8905]
[1.8898]
2
-A-
.050
[.002]
±.5 [.02]
82.00
[3.228]
54.00
[2.126]
MIN
+.014
-.011
180.00 [7.087]
A 0.10 TIR
[.004]
14.43-14.00 [.568-.551] DIA. THRU
(4) HOLES EQ. SPACED ON
265.00 [10.433] DIA. B.C.
57.4
[2.26]
SQUARE
±2.0 [.08]
137.6 [5.42]
+2.4 [.09]
-0.0 [.00]
224.0
[8.82]
SQUARE
NOTE;
1-MOTOR CAN BE MOUNTED IN ANY POSITION.
2-ELECTRICAL HOOK-UP PER HD-805.

4.12 Motor Dimensions – Outline Drawings EB-80x Brake

4.12.1 EB-802 & EB-804



Model	"A" Max
EB-802	440.7 [17.35]
EB-804	530.2 [20.87]

4.12.2 EB-806

Please contact Kollmorgen Customer Support.

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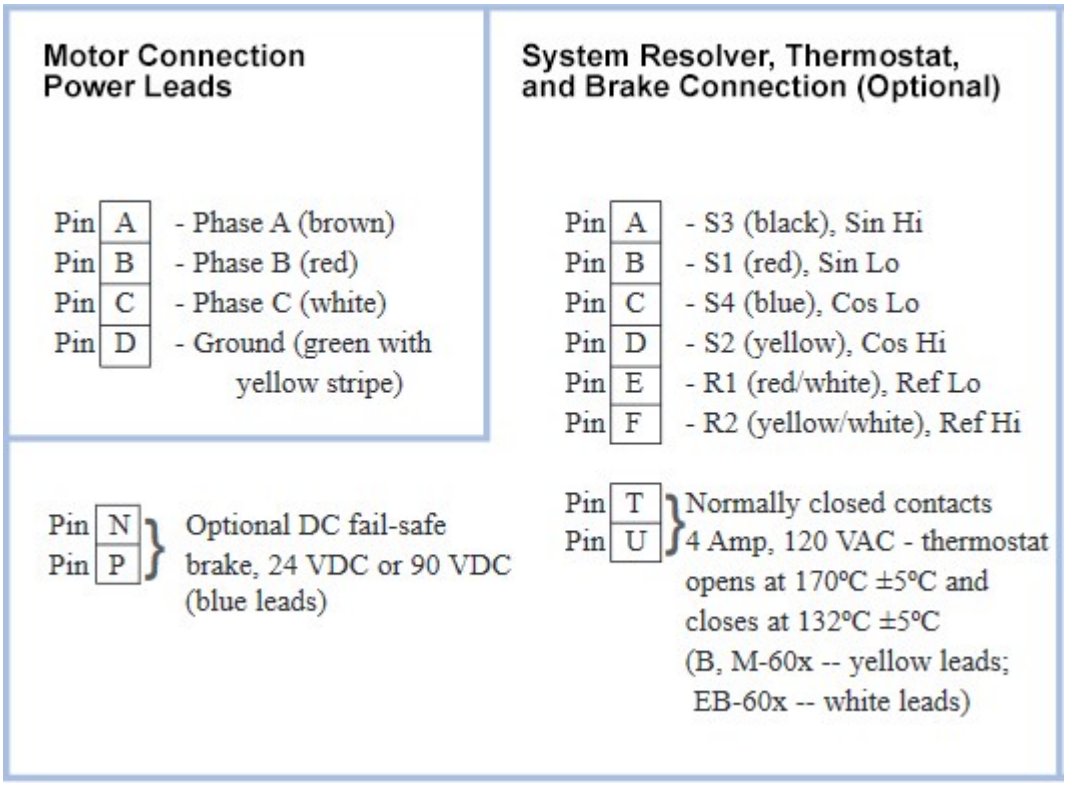
5 Leadwire Diagram



NOTE

- With a phase sequence A, C, B motor rotation shall be CW, facing mounting end.
- Thermostat preset to open at 170°C ±5° C and closed at 127°C ±5° C, normally closed. Contacts rated to 4 amps, 120 VAC.
- Brake Data: Use continuous static holding and emergency dynamic stopping. Type Power On, Brake Off. For ratings see the motor specifications in the Technical Data section.

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6 Approvals & Certifications

Approval or Certification	Certificate Number(s)	Link	What to search for
ATEX	ITS12ATEX17548X	n/a	n/a
CCC			
CE	n/a	https://www.kollmorgen.com/sites/default/files/public_downloads/Kollmorgen%20EU%20Declaration%20of%20Conformity%20Goldline%20B-M.pdf	n/a
cETLus	64866	https://ramuk.intertekconnect.com/WebClients/ITS/DLP/products.nsf/$$Search?OpenForm	`kollmorgen`
IECEx	IEC Ex ETL 12.006X	https://www.iecex-certs.com/#/search	Search for *Equipment and Component Certificates* using the Applicant name `kollmorgen`
UL	EB-10X-20120925-E120721 EB-20X-20141021-E120721 EB-40X-20140915-E120721 EB-60X-20140915-E120721 EB-80X-20140915-E120721	https://iq.ulprospector.com/en	`E120721` Please note that the UL website requires you to register for free.

About KOLLMORGEN

Kollmorgen is a leading provider of motion systems and components for machine builders. Through world-class knowledge in motion, industry-leading quality and deep expertise in linking and integrating standard and custom products, Kollmorgen delivers breakthrough solutions that are unmatched in performance, reliability and ease-of-use, giving machine builders an irrefutable marketplace advantage.

Join the Kollmorgen Developer Network for product support. Ask the community questions, search the knowledge base for answers, get downloads, and suggest improvements.

North America
KOLLMORGEN
201 West Rock Road
Radford, VA 24141, USA

Web: www.kollmorgen.com
Mail: support@kollmorgen.com
Tel.: +1 - 540 - 633 - 3545
Fax: +1 - 540 - 639 - 4162

Europa
KOLLMORGEN Europe GmbH
Pempelfurtstr. 1
40880 Ratingen, Germany

Web: www.kollmorgen.com
Mail: technik@kollmorgen.com
Tel.: +49 - 2102 - 9394 - 0
Fax: +49 - 2102 - 9394 - 3155

South America
KOLLMORGEN
Avenida João Paulo Ablas, 2970
Jardim da Glória, Cotia – SP
CEP 06711-250, Brazil

Web: www.kollmorgen.com
Mail: contato@kollmorgen.com
Tel.: +55 11 4615-6300

China and SEA
KOLLMORGEN Asia
Room 302, Building 5, Lihpao Plaza,
88 Shenbin Road, Minhang District,
Shanghai, China

Web: www.kollmorgen.cn
Mail: sales.china@kollmorgen.com
Tel.: +86 - 400 668 2802