



S200 Selection Guide

High Performance Servo Drives

Industry-Leading Performance In a Small Package



*Helping you build a better machine, **faster.***



Helping you build a better machine, faster.

Danaher Motion -

Helping you build a better machine, faster

Danaher Corporation combined over 30 industry-leading brands such as Kollmorgen, Thomson, Dover, Pacific Scientific, Portescap, Neff, Seidel and Bautz to establish a customer-focused motion control manufacturing company called Danaher Motion. We offer this powerful set of integrated motion control technologies under the Danaher Motion and Thomson brand names. We are a \$1B+ global motion control leader, unique in our ability to marshal decades of application experience and technical innovation to help you build better machines, faster.

Danaher Motion defines high standards of quality, innovation and technology. We enable improved machine performance and reliability while controlling costs. Our global manufacturing footprint, rapid customization and prototyping capabilities drive quick lead times. Unmatched application experience and design expertise empowers you to commission machines faster.

Consider your options in today's market for a motion control partner. Select Danaher Motion and join a team with over 6000 employees, over 60 years of application experience and 2000+ distributor locations around the globe. Danaher Motion serves industries as diverse as semiconductor, aerospace and defense, electric vehicle systems, packaging, printing, medical and robotics. We offer an unparalleled depth and breadth of motion control product solutions through a worldwide service and support infrastructure, field service engineers and support teams available when and where you need them.

The Danaher Business System -

Building sustainable competitive advantage into your business

The Danaher Business System (DBS) was established to increase the value we bring to customers. It is a mature and successful set of tools we use daily to continually improve manufacturing operations and product development processes. DBS is based on the principles of Kaizen which continuously and aggressively eliminate waste in every aspect of our business. DBS focuses the entire organization on achieving breakthrough results that create competitive advantages in quality, delivery and performance – advantages that are passed on to you. Through these advantages Danaher Motion is able to provide you faster times to market as well as unsurpassed product selection, service, reliability and productivity.

Local Support Around the Globe



S200 Series Drives

Industry-Leading Performance In A Small Package



Danaher Motion's S200 brushless servo drives push high performance servo technology into a full range of power applications without having to compromise on reliability or package size. Couple an S200 drive with an AKM servo motor for a complete servo control solution designed to excel in applications such as semiconductor fabrication, electronic assembly, packaging, medical, woodworking and general automation equipment.

Danaher Motion's S200 servo drives are the first all-digital industrial drives with a velocity loop bandwidth of 800 Hz. The drive offers unmatched system throughput and simplified tuning.

The high resolution (24-bit) feedback and high performance (3-5 kHz) current loop bandwidth provide smooth motion and rapid response to optimize machine performance and throughputs.

The Smart Feedback Device with electronic motor nameplate allows plug and play commissioning by eliminating the need for drive parameter set-up and servo loop tuning in most applications.

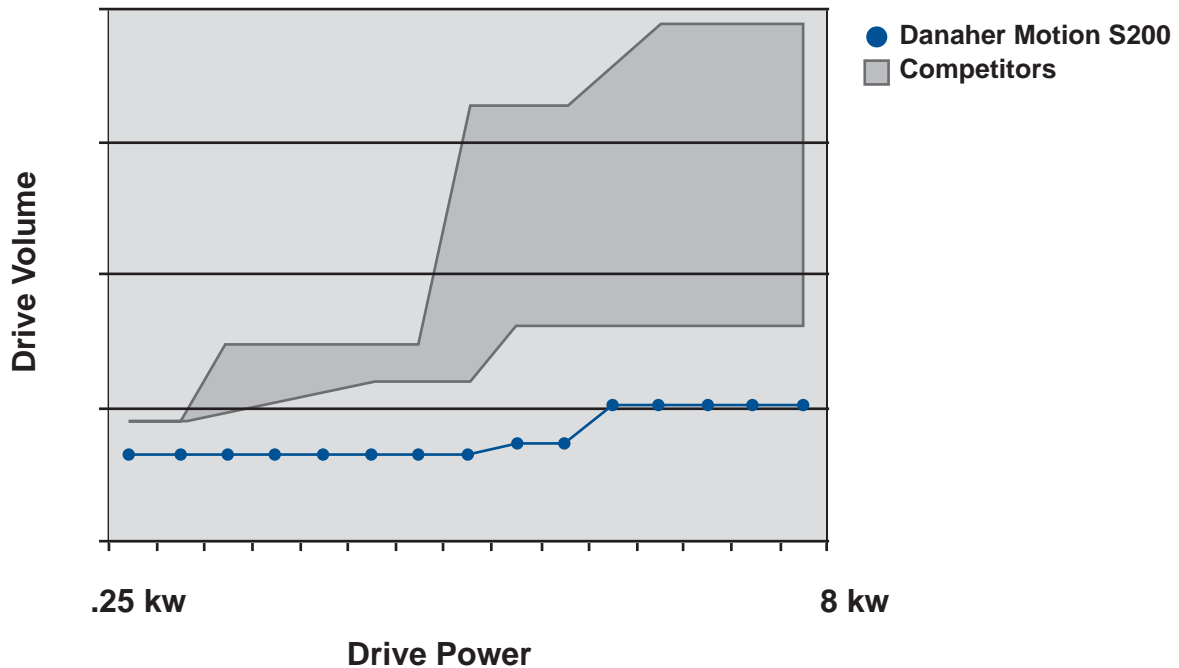
S200 base servo drives come standard with torque and velocity control base, electronic gearing, up to an 18-bit analog reference input, and an encoder equivalent output. The S200 family includes options to support either Indexing or SynqNet based programmable motion control.

Danaher Motion S200 drives are available for AC (120/240 VAC) or DC (20-90 V) operation with current ratings from 1.5 A rms continuous to 96 A rms peak. In fact, this is one of the smallest 30 A drives available. The S200 drives have a compact footprint ranging from English measurements (width X height X depth) 1.1 in X 3.0 in. X 3.9 in. to 4.72 in. X 8.90 in. X 7.48 in. Metric measurements are 28.7 mm X 76 mm X 100.8 mm to 120 mm X 226 mm X 190 mm. They are UL 508C recognized, CE marked, and conform to EN50178 and EN61800-3 standards. They also meet Semi F47.

Separate "Keep Alive" power inputs allow rapid recovery from emergency stop conditions. Optically isolated inputs/outputs, positive locking connectors and full fault protection promise long machine life and immunity to accidental damage. All connectors and LED status indicators are easily accessible from the front of the drive.

If you are looking for a high performance servo drive in a small package, Danaher Motion's S200 drives extend the benefits of servo motion control technology to new levels of machine design.

The S200 has world class power densities



The Danaher Motion S200 series of drives are very compact (high power density), and take up less cabinet space than most servo drives of similar power levels.

Increased Machine Throughput and Longer Life

Servo system performance is synonymous with machine throughput. The S200 family takes servo performance to new heights.

- Industry-leading current loop bandwidth up to 5 KHz and velocity loop bandwidth up to 800 Hz means machine throughput can be increased by as much as 2 to 3 times.
- Robust design including full fault protection, locking connectors and optical isolation promise greater machine "up-time".
- Smooth motion, a benefit of sinusoidal current control and high resolution (24-bit) feedback, minimizes harsh torque disturbances that can cut short the life of mechanical components.
- Both the AC and the DC input drives are equipped with separate control power input to speed recovery from "E-Stop" conditions.

Reduced Engineering and Support Time

The S200 drive family has dramatically simplified tuning, a very friendly Graphical User Interface and plug and play compatibility with Danaher Motion motors.

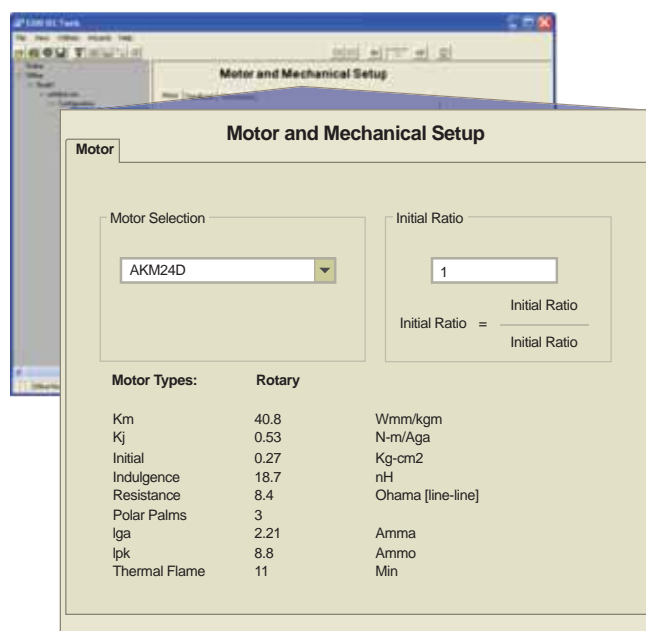
- The drive automatically sets the current and velocity loop parameters, greatly reducing the need for drive tuning. The benefit is out of the box "Plug-and-Play" and auto tuning set-up.
- Windows-based Graphical User Interface models the tree format found in Explorer so learning is quick and easy.
- Easy to debug with full fault diagnostics reduce engineering support time.
- SynqNet option available for seamless integration into multi axis systems.
- Indexing option for basic point-to-point and absolute moves.

Reduced Overall Cost

The S200 design requires fewer components helping to lower the overall machine cost.

- S200 drive family and the AKM motor family linked with the new “value” line of cables – dependable Danaher Motion quality now at a lower price.
- All drive software is included with every S200 Drive.
- Single supplier of AC or DC input brushless servo drives and motors and stepper drives and motors reduce vendor list management.

Setup is a simple, quick, 5 step process. Smart Feedback Device with motor ID automatically sets up motor parameters



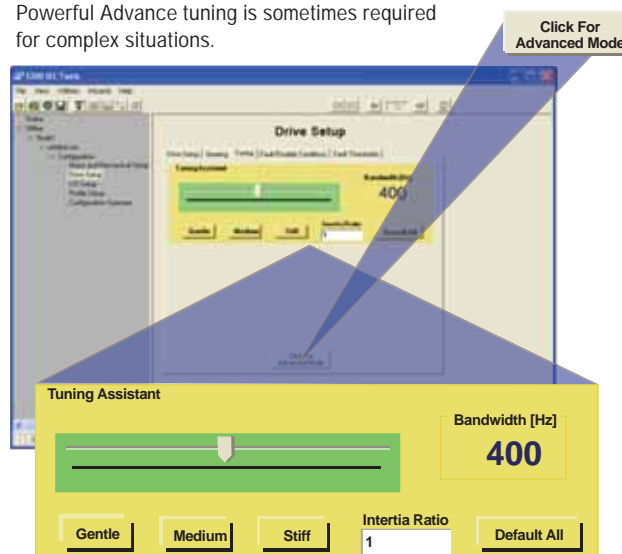
Optimize Cabinet Space

The Danaher Motion S200 series of drives are very compact (high power density), and take up less cabinet space than most servo drives of similar power levels.

User Friendly

Simple Graphical User Interface is designed to expedite the set up process. The S200 high performance drive with the world class AKM motors auto tunes for most applications. If you wish to fine tune, the intuitive Windows® Explorer-like interface makes it very easy to do so.

An Advanced tuning option is also available. Powerful Advance tuning is sometimes required for complex situations.



Tuning is as easy as moving a slider bar. This works for most applications.

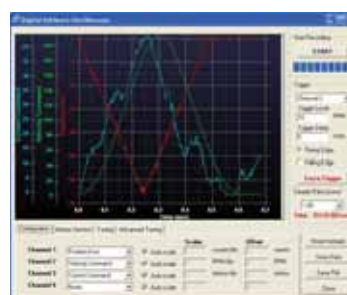
S200 Features

- Functionality
 - Base Unit – Torque, Velocity, Step and Direction Input
 - Indexer – Velocity, Step and Direction (encoder following) Input, Programmable Indexing, and Absolute or Incremental move types
- Interface
 - Base Unit – Analog (+/- 10V), Step and Direction, Encoder input (pulse following)
 - Indexer – Step and Direction, Encoder input (pulse following)
 - SynqNet – SynqNet (assumes the use of a controller)
- Power – All are 1.5 A rms cont. to 48 A rms cont. low power DC input, 115VAC or 230 VAC, high power 230 VAC input
- Size – Ultra compact
- I/O
 - Base Unit – 1 Analog in, 2 Analog out, 5 digital in, 2 digital out, encoder in and out (in for pulse following only – not for motor feedback) – All digital I/O are Optically Isolated
 - Indexer – 2 Analog out, 10 digital in, 3 digital out, encoder in and out- All digital I/O Optically Issolated

- Certifications - All are UL, cUL, CSA, CE and RoHS



- Feedback Supported
 - Base Unit – Smart Feedback Device – 24 bit resolution
 - Indexer – Smart Feedback Device (24 bit resolution), Comcoder
 - SynqNet – Smart Feedback Device (24 bit resolution), Comcoder, Industry Leading 1v Pk/Pk analog encoder, Digital EnDat 2.1
- The S200 Indexer has a Digital Oscilloscope which facilitates System Tuning which facilitates System Tuning, allowing settling times down to or below 1 mS

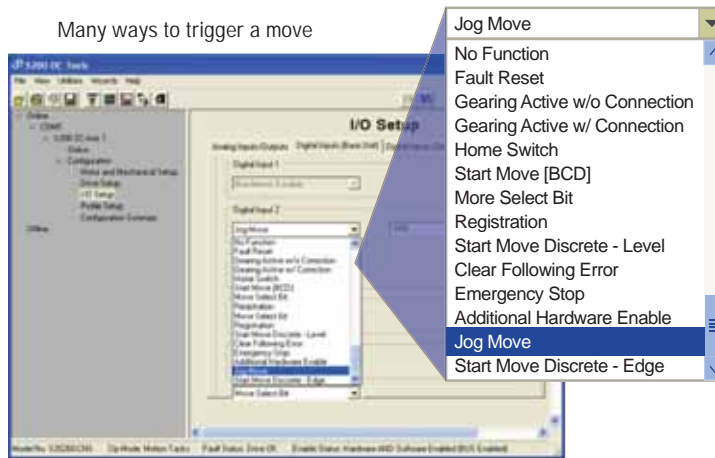


S200 Indexer Factory Installed Option Available

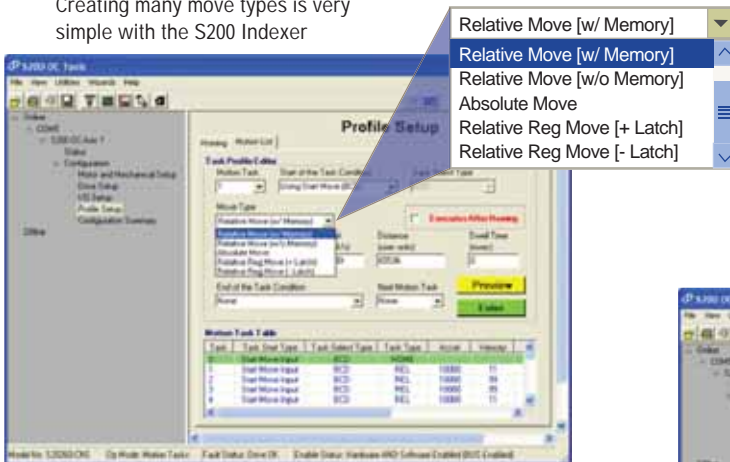
S200-CNS Features

- Velocity, Position, Electronic Gearing, and Programmable Indexing standard
- Indexing - 180 unique motion tasks can be defined and initiated via the serial port or discrete inputs.
- Relative, Absolute, Simple Registration, and Home motion tasks can be easily setup and executed.
- Individual motion tasks can be linked or blended with each other (piece wise profiles).
- Digital Oscilloscope Functions for improved tuning
- Built-in CANopen / DeviceNet™ Communication bus
- Auto configuration for AKM motors from the Smart Feedback Device.

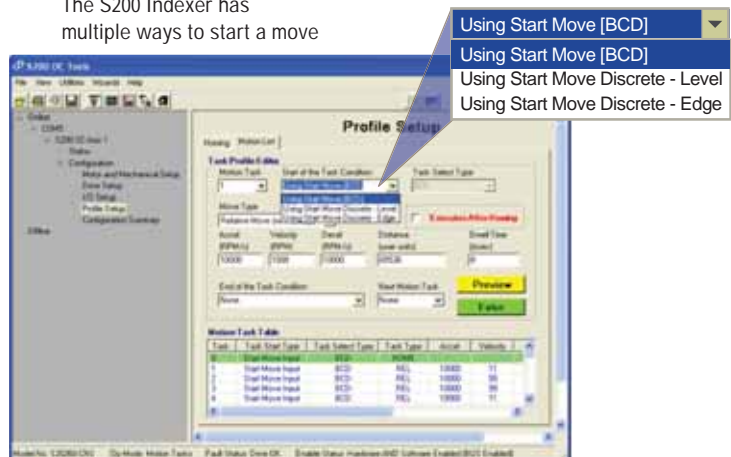
Many ways to trigger a move



Creating many move types is very simple with the S200 Indexer



The S200 Indexer has multiple ways to start a move



Specifications

Drive Amplifier		S20330	S20630	S20260	S20360	S20660	S21260	S22460	S24860
Input Voltage	Control Logic	10 - 90 VDC			85-265 VAC, 47 to 420 Hz, 1 phase				
	Motor Bus Voltage	20-90 VDC		90-265 VAC, 47 to 420 Hz, 1 or 3 phase		120-264 VAC, 47 to 420 Hz, 1 or 3 phase-	120-264 VAC, 47 to 420 Hz, 3 phase		
Output Current	Peak Current Time (Sec.)	3							
	Peak (A RMS)	9	18	4.5	9	18	30	48	96
	Continuous Current @ 40 deg. C ambient (A RMS)	3	6	1.5	3	6	12	24	48
	Continuous Current @ 30 deg. C ambient (A RMS)	4.5	7.5	2.3	4.5	9.0	15	30	>52
Performance	Current Loop BW	5 kHz			3 kHz				
	Effective Carrier Frequency	31.2 kHz		20.8 kHz		16 kHz			
	Velocity Loop BW (Base drive and SynqNet option)	800Hz							
	Velocity Loop BW (Indexer Family)	400Hz							
	Update Rate	1.25 MHz							
	Analog Input Command	0 - +/- 10 Vdc 18-bit resolution							
Nominal Shaft Power at 40 deg C Ambient		125W	250W	200W	500W	1000W	4000W	8000W	16000W
Emulated Encoder Output	Max Output Line Frequency	2.5 MHz							

SmartFeedback Device

Resolution	Resolution/Rev	24 bits = 0.0013 arc min
Absolute Accuracy	AKM1	+/- 16 arc min = 10.4 bits/rev
	AKM2, 3, 4 or 5	+/- 9 arc min = 11.2 bits/rev

Accessories

Connector Kits:

CK-S200-MF	Motor Power and Feedback mating connectors for AC or DC units, for customers building cables
CK-S200-IP-DC	I/O and input Power mating connectors for base DC drive
CK-S200-IP-DC-TB	I/O and input Power mating connectors for base DC drive, Terminal Block adaptor supplied for I/O connector.
CK-S200-IP-AC	I/O and input Power mating connectors for S20260-VTS, S20360-VTS and S20660-VTS
CK-S200-IP-ACL	S200 Connector Kit - I/O and input power mating connectors for base S21260, S22460 and S24860
CK-S200-IP-AC-TB	I/O and input Power mating connectors for base AC drive, Terminal Block adaptor supplied for I/O connector.
CK-S200-IP-ACL-TB	Connector Kit - I/O and input power mating connectors for base AC drive & terminal block adaptor for I/O connector
CK-S200-CNDN	Index Option card and I/O mating connectors
CK-S200-CNDN-TB	Index Option card and I/O mating connectors, Terminal Block adaptors supplied for the I/O and feedback connector
CK-S200-SQ	SynqNet option card I/O, Auxiliary feedback mates
CK-S200-SQ-TB	SynqNet option card I/O, Auxiliary feedback terminal block adaptors
768-026902-01	Terminal Block adaptor for I/O connector

Existing CK-S200-IP-AC, CK-S200-IP-AC-TB apply only to 1.5, 3, or 6A drive: S20260, S20360, S20660

Option Card:

The S200 is designed to support a factory installed option card. Several versions are available today to support indexing with position loop closure, CANOpen, DeviceNet™™ or SynqNet field busses.

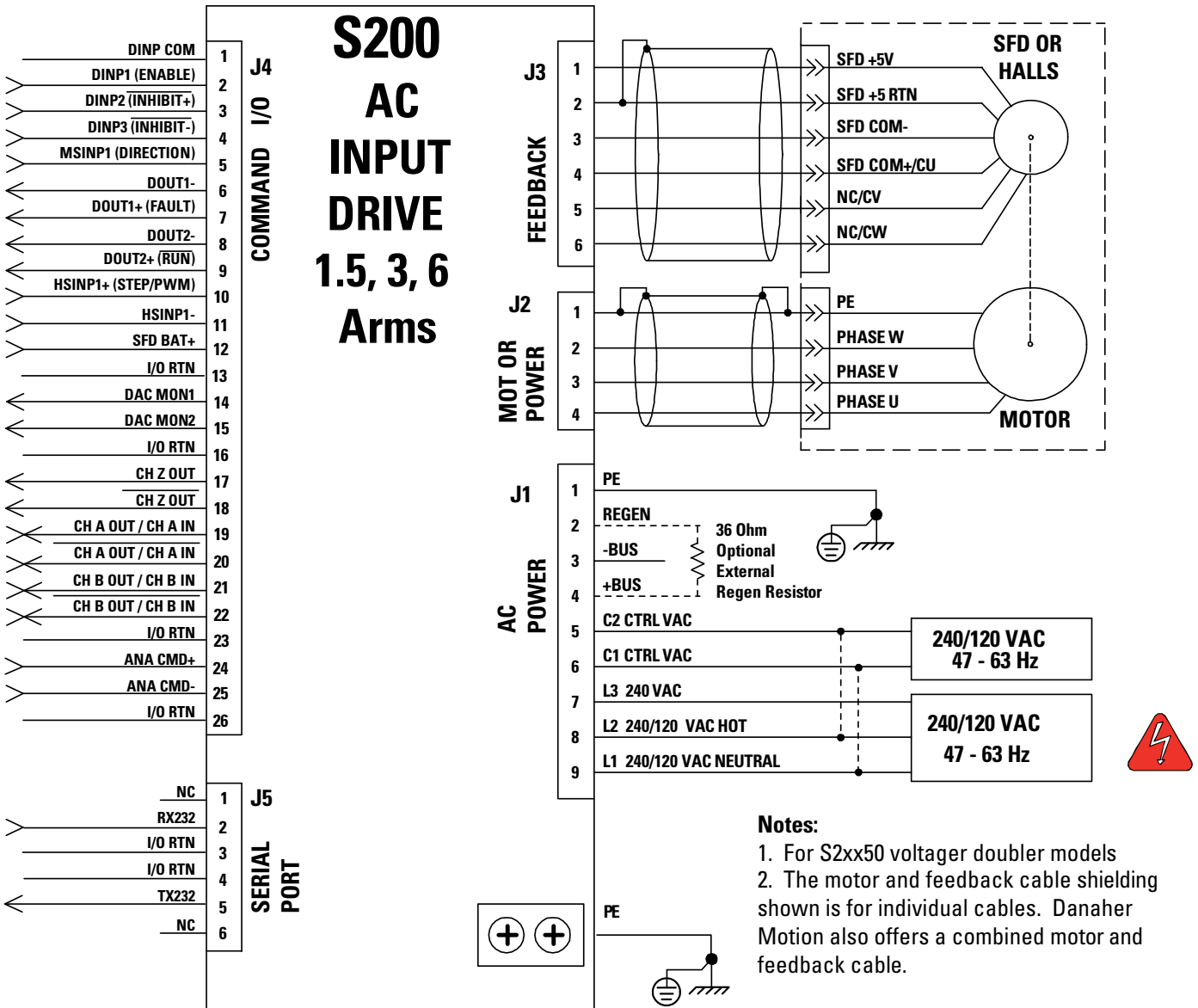
Cables

P7S2-232-9D	RS232 serial communication cable D B9 to ModJack - 6 feet
CF-DC0111N-XX-X	Feedback cable "value series" - Molex connector at the motor end to IEEE1394 connector at drive end for Smart Feedback Device support
CF-DA0111N-XX-X	Feedback Cable "value series" - Euro connector at the motor end to IEEE1394 connector at the drive end for Smart Feedback Device support
CP-102AACN-XX-X	Power Cable "value series" - Molex connector at the motor end to S200 crimp pin pluggable connector at the drive end.
CP-102AAAN-XX-X	Power Cable "value series" - Euro connector at the motor end to S200 crimp pin pluggable connector at the drive end.
CC-D01C02N-XX-X	Composite Cable "value series" - single Molex connector at the motor end to IEEE1394 connector and S200 crimp pin pluggable connector at the drive end for Smart Feedback Device and power support in a single cable.
CC-D01A02N-XX-X	Composite Cable "value series" - Euro style connector for power and feedback at the motor end to IEEE1394 connector and S200 crimp pin pluggable connector at the drive end for Smart Feedback Device and power support in a single cable. Only available on AKM3 and AKM4 series motors.
CP-105CCAN-XX-X	S21260 Power to AKM Euro
CP-105CDAN-XX-X	S21260 Power to AKM Euro with brake.

Note: Use XX to designate cable length in whole meters and -X to order half meter increments.
Example: "CC-D01A02N-03-5"

S200 Wiring Diagrams

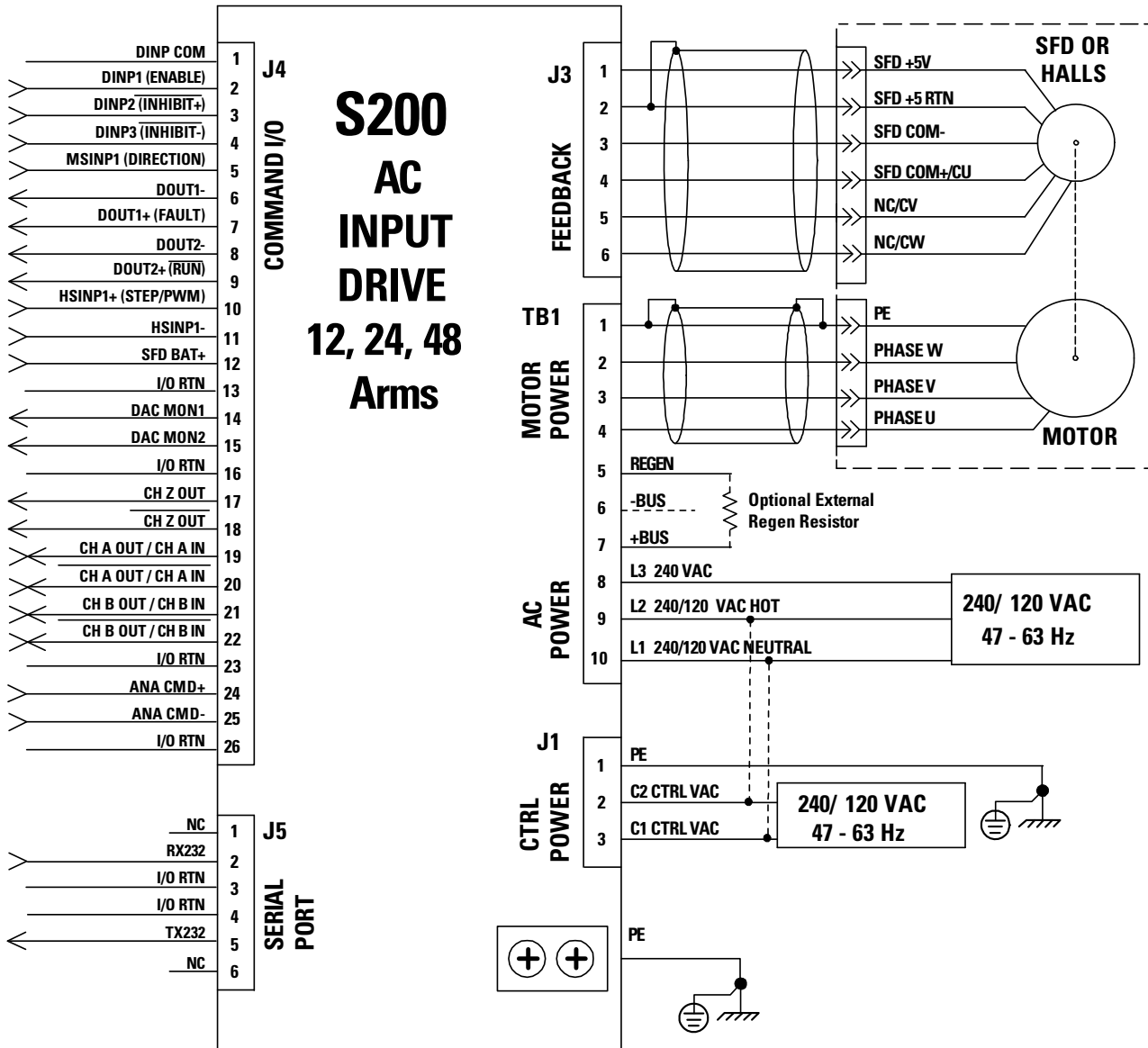
AC drives- 1.5, 3, and 6 Amps (S20260-VTS, S20360-VTS, S20660-VTS)



S200 Wiring Diagrams

AC Drives

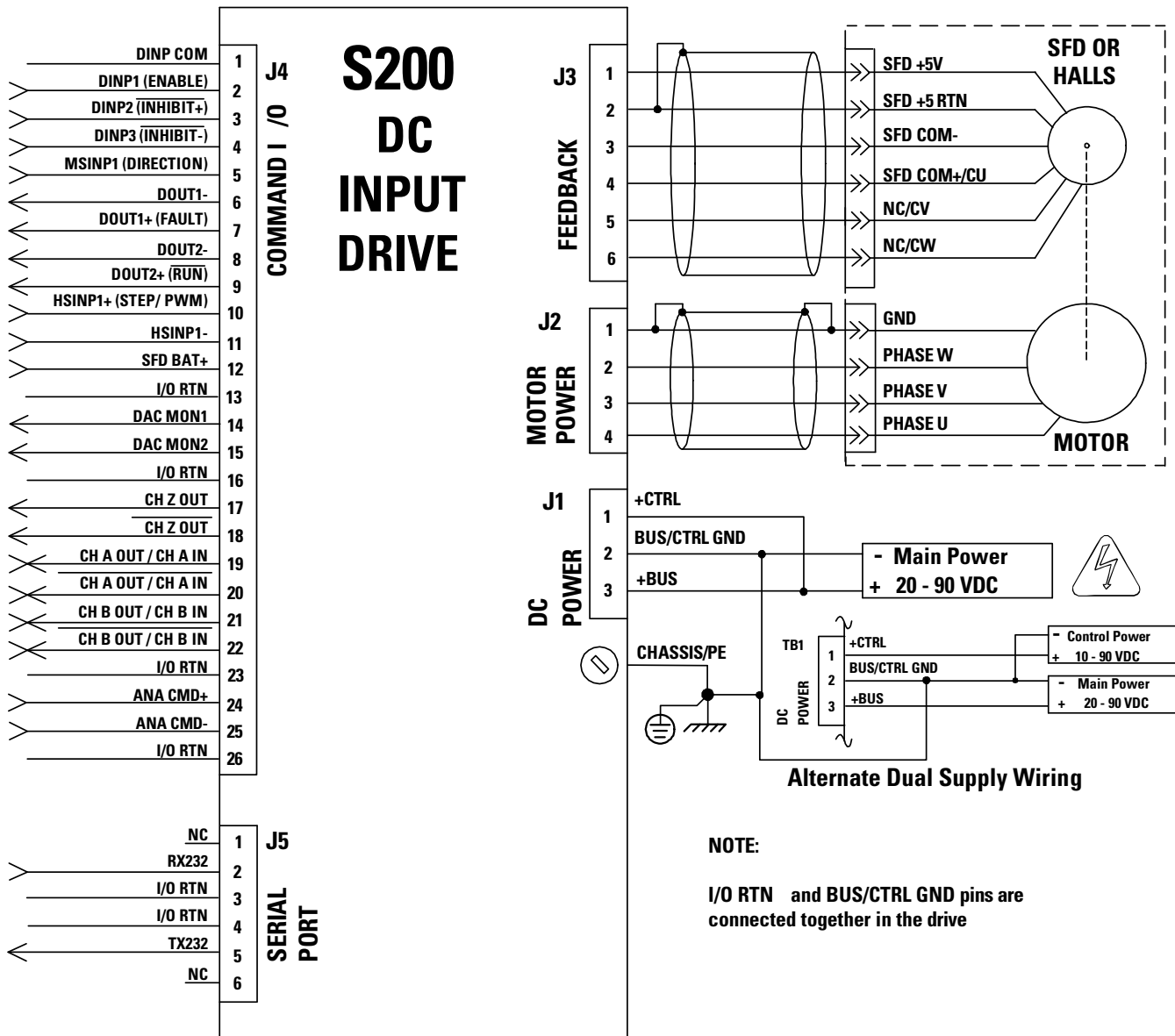
12, 24, and 48 Arms (S21260-VTS, S22460-VTS, and S24860-VTS)



S200 Wiring Diagrams

DC Drive

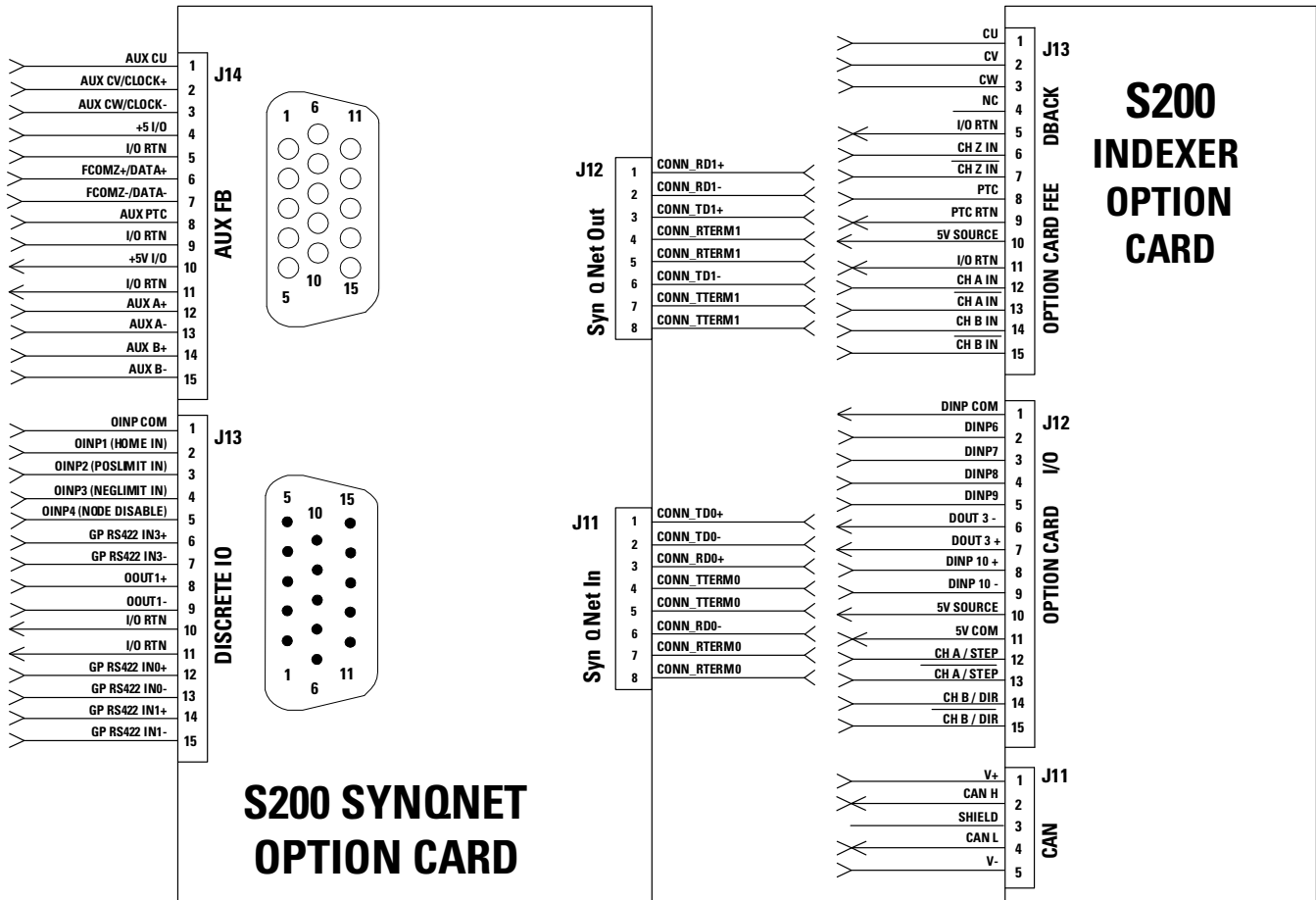
3 and 6 Arms (S20330-VTS, S20630-VTS)



Factory Installed Options

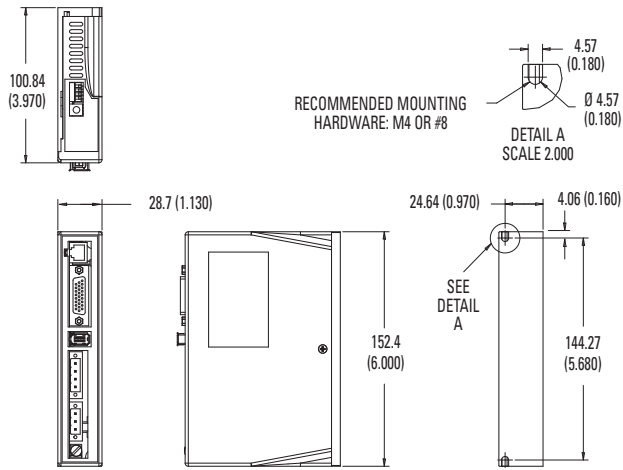
SynqNet Option
S2xxxx-SRS, S2xxxx-SDS

Indexer Option
S2xxxx-CNS, S2xxxx-DNS



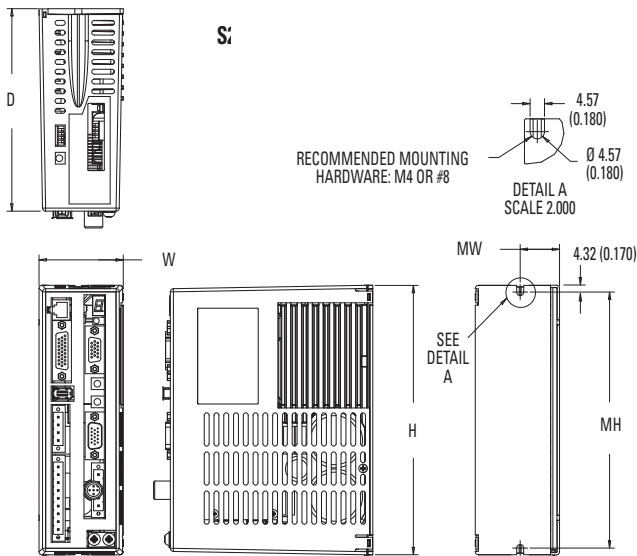
Factory Installed Options

S200 DC Base Mounting



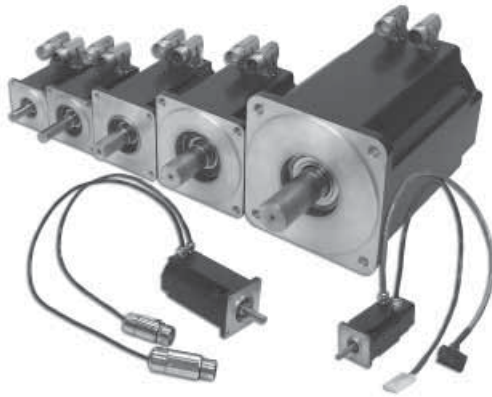
* Option cards make drive width 48.3mm (1.90in)

S200 AC Base/Option Card Mounting



* Option card does not increase width of drive.

Model Number	H Height in (mm)	W Width in (mm)	D Depth in (mm)	MH Mounting in (mm)	MW Mounting in (mm)	Customer Cabinet Depth in	I cont Arms	I peak Arms
S20260-xxx	6.89 (175)	2.16 (54.8)	5.18 (131.6)	6.55 (166.4)	1.01 (25.56)	8 in	1.5	4.5
S20360-xxx	6.89 (175)	2.16 (54.8)	5.18 (131.6)	6.55 (166.4)	1.01 (25.56)	8 in	3	9
S20660-xxx	6.89 (175)	2.16 (54.8)	5.18 (131.6)	6.55 (166.4)	1.01 (25.56)	8 in	6	18
S21260-xxx	6.97 (177)	2.99 (76)	5.98 (152)			8 in	12	30
S22460-xxx	7.72 (196)	3.94 (100)	7.48 (190)			10 in	24	48
S24860-xxx	TBD	TBD	TBD	TBD	TBD	TBD	48	96



The advanced Danaher Motion AKM high performance motor series offers a wide range of mounting, connectivity, feedback and other options. These motors offer superb flexibility to meet application needs with:

- 7 frame sizes
- 25 frame/stack combinations
- 77 'standard' windings
- Fail-safe brakes
- Shaft seals
- Shaft & mounting variations
- Custom windings
- Connectivity

AKM motors offer extremely high torque, density and acceleration

Torque

0.16 to 53 N-m continuous stall torque (1.4 to 470 lb-in) in 25 frame/stack combinations. Specific torques are often available from multiple frame sizes to optimize mounting and inertia matching capabilities.

Speed

Speeds to 8000 rpm meet high speed application requirements. Windings specifically tailored to lower speeds are also available.

Voltage

AKM motors can be applied to all standard global voltages. Windings are specifically tailored to 75 VDC, 120, 240, 400 and 480 VAC.

Mounting

Multiple mounting standards are available to meet common European, North American, and Japanese standards.

Feedback

Recommended feedback device for the base S200 is the SFD (Smart Feedback Device).

Smoothness

Smooth performance results from low-cog, low-harmonic distortion magnetic designs.

Connectivity

Rugged, rotatable IP65 connectors and low cost Molex plugs are both available to provide flexibility. Single connectors/Plugs (combined power and feedback) are also available to minimize motor and cable cost (SFD only).

Thermal

Windings are rated conservatively at 100°C rise over a 40°C ambient while using 155°C (class F) insulation materials. Motors meet all UR, cUR and CE requirements and include thermistors. Thermal ratings at 60°C rise are also provided to meet the needs of specific applications.

Danaher Motion Cables Offer The Complete Solution

Factory cables are provided for your convenience and offer high reliability to keep your application running day and night. The new "Value" line provides a cost saving option for applications that don't require long distances or encounter extreme environmental conditions. Included in our new "Value" line

is a composite cable that combines power and feedback in one cable to aid in faster machine commissioning. Please consult your local sales person or contact the Danaher Motion Customer Support Center to decide which cable option is best suited for your application.

Ordering Information:

Mating connectors MUST be ordered separately

Servo Drive Family

S2 = S200 series brushless

Current Rating

- 02 = 1.5 Arms continuous, 4.5 Arms peak¹
- 03 = 3 Arms continuous, 9 Arms peak
- 06 = 6 Arms continuous, 18 Arms peak¹
- 12 = 12 Arms continuous, 30 Arms peak
- 24 = 24 Arms continuous, 48 Arms peak^{1, 2}
- 48 = 48 Arms continuous, 96 Arms peak^{1, 2}

Voltage Range

- 3 = 20 - 90 VDC
- 6 = 120/240 VAC
- 5 = 120 VAC/Voltage Doubling

Electrical Options

0 = None

S2 03 3 0 - VT S - xxx

Customization

Omit field for standard configurations

Feedback Device Support

- For units w/ VT Functionality option
- S = Smart Feedback Device / Halls
- For units w/ CN Functionality option
- S = Smart Feedback Device / Comcoder

Functionality

- VT = Velocity/Torque modes
- SR = SynqNet option with RJ45 connectors
- SD = SynqNet option with MicroD connectors
- CN = Indexing option with CANOpen
- DN = Indexing option with DeviceNet

Notes:

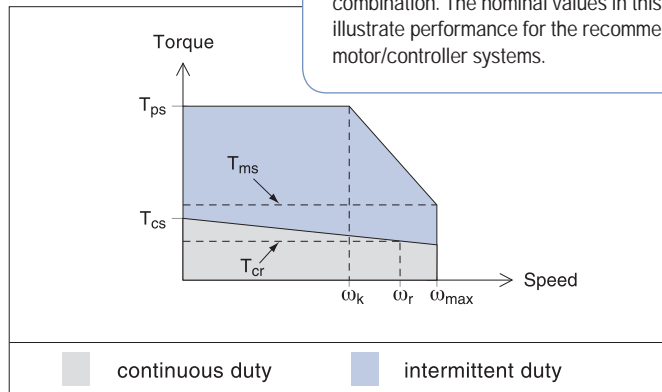
- 1 Not available with units having DC input voltage.
- 2 Available in Q1 2008

How To Build A Servo Drive & Motor System

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

Definitions

- T_{ps} - Peak stall torque for system
- T_{ms} - Peak torque at maximum speed
- T_{cs} - Continuous torque at stall
- T_{cr} - Continuous rated torque (torque at rated power)
- ω_{max} - Maximum speed
- ω_r - Rated speed (speed at rated power)
- ω_k - Speed at knee in peak envelope (intersection of system peak torque with voltage limit line)



Recommended Motor/Drive Systems, 75 VDC bus

Servo Motor Model	Servo Drive Model	Peak Stall Torque T_{ps} ① N-m (lb-in)	Peak Torque at Max. Speed T_{ms} N-m (lb-in)	Cont. Stall Torque T_{cs} N-m (lb-in)	Cont. Rated Torque T_{cr} N-m (lb-in)	Speed at Knee ω_k rpm	Rated Speed ω_r rpm	Maximum Speed ω_{max} rpm	Cont. Stall Current I_{cs} A _{rms}	Current@Peak Torque I_{ps} A _{rms}	Inertia ^② J kg-cm ² (lb-in-s ² x 10 ⁻³)
AKM11E	S20330	0.50 (4.45)	0.28 (2.47)	0.19 (1.64)	0.18 (1.56)	3,890	6,000	8,000	2.91	9.0	0.017 (0.015)
AKM12E	S20330	0.90 (8.00)	0.0 (0.0)	0.30 (2.69)	0.30 (2.68)	1,400	3,000	7,190	2.72	9.0	0.031 (0.027)
AKM13D	S20330	1.25 (11.1)	0.0 (0.0)	0.40 (3.55)	0.40 (3.55)	no knee	2,000	4,750	2.4	9.0	0.045 (0.040)
AKM21E	S20330	1.21 (10.7)	0.0 (0.0)	0.48 (4.23)	0.46 (4.06)	1,320	2,000	5,050	3.0	9.0	0.107 (0.095)
AKM21G	S20630	1.44 (12.7)	0.0 (0.0)	0.50 (4.43)	0.46 (4.05)	2,350	4,000	7,800	4.87	18.0	0.107 (0.095)
AKM22E	S20330	2.30 (20.3)	0.0 (0.0)	0.87 (7.71)	0.85 (7.55)	no knee	1,000	2,540	2.73	9.0	0.161 (0.142)
AKM22G	S20630	2.66 (23.6)	0.0 (0.0)	0.88 (7.79)	0.84 (7.39)	1,050	2,500	4,420	4.82	18.0	0.161 (0.142)
AKM23F	S20630	3.88 (34.4)	0.0 (0.0)	1.18 (10.4)	1.15 (10.1)	240	1,500	2,940	4.31	17.2	0.216 (0.191)
AKM24F	S20630	4.65 (41.2)	0.0 (0.0)	1.42 (12.6)	1.39 (12.3)	no knee	1,000	2,210	3.89	15.6	0.27 (0.239)
AKM31E	S20330	3.24 (28.6)	0.0 (0.0)	1.20 (10.6)	1.19 (10.6)	52	750	1,990	2.99	9.0	0.33 (0.292)
AKM31H	S20630	3.36 (29.7)	0.0 (0.0)	1.23 (10.9)	1.20 (10.6)	1,480	2,000	3,790	5.85	18.0	0.33 (0.292)
AKM32H	S20630	6.22 (55.1)	0.0 (0.0)	2.10 (18.6)	2.06 (18.2)	600	1,200	2,090	5.5	18.0	0.59 (0.522)
AKM33H	S20630	8.56 (75.8)	0.0 (0.0)	2.88 (25.5)	2.82 (25.0)	300	800	1,550	5.62	18.0	0.85 (0.752)
AKM41H	S20630	5.48 (48.5)	0.0 (0.0)	2.06 (18.2)	1.99 (17.6)	580	1,000	2,190	5.6	18.0	0.81 (0.717)

Recommended Motor/Drive Systems, 120 VAC, 160 VDC bus

AKM11B	S20260	0.59 (5.27)	0.20 (1.76)	0.18 (1.62)	0.18 (1.60)	1,230	4,000	8,000	1.16	4.5	0.017 (0.015)
AKM11C	S20260	0.51 (4.49)	0.32 (2.82)	0.19 (1.64)	0.18 (1.56)	4,600	6,000	8,000	1.45	4.5	0.017 (0.015)
AKM12C	S20260	0.85 (7.49)	0.08 (0.67)	0.31 (2.73)	0.30 (2.67)	3,120	4,000	8,000	1.50	4.5	0.031 (0.027)
AKM12E	S20360	0.90 (8.0)	0.09 (7.93)	0.30 (2.69)	0.27 (2.42)	8,000	8,000	8,000	2.72	9.0	0.031 (0.027)
AKM13C	S20260	1.16 (10.2)	0.0 (0.0)	0.41 (3.62)	0.41 (3.60)	2,110	3,000	6,170	1.48	4.5	0.045 (0.040)
AKM13D	S20360	1.37 (12.1)	0.62 (5.47)	0.40 (3.55)	0.36 (3.23)	4,410	7,000	8,000	2.4	9.0	0.045 (0.040)
AKM21C	S20260	1.17 (10.4)	0.0 (0.0)	0.46 (4.03)	0.43 (3.83)	1,810	2,500	5,630	1.50	4.5	0.107 (0.095)
AKM21E	S20360	1.21 (10.7)	0.70 (6.19)	0.48 (4.23)	0.40 (3.52)	5,330	7,000	8,000	3.0	9.0	0.107 (0.095)
AKM22C	S20260	2.34 (20.7)	0.0 (0.0)	0.84 (7.48)	0.83 (7.32)	110	1,000	2,830	1.39	4.5	0.161 (0.142)
AKM22E	S20360	2.42 (21.4)	0.0 (0.0)	0.87 (7.71)	0.81 (7.13)	2,200	3,500	5,410	2.73	9.0	0.161 (0.142)
AKM22G	S20660	2.66 (23.6)	1.10 (9.69)	0.88 (7.79)	0.74 (6.51)	4,430	7,000	8,000	4.82	18.0	0.161 (0.142)
AKM23C	S20260	3.15 (27.8)	0.0 (0.0)	1.13 (10.0)	1.11 (9.81)	no knee	1,000	2,130	1.41	4.5	0.216 (0.191)
AKM23D	S20360	3.84 (34.0)	0.0 (0.0)	1.16 (10.2)	1.12 (9.93)	530	1,500	3,270	2.19	8.8	0.216 (0.191)
AKM24D	S20360	4.76 (42.1)	0.0 (0.0)	1.41 (12.4)	1.36 (12.0)	400	1,500	2,710	2.21	8.8	0.27 (0.239)
AKM31E	S20360	3.24 (28.6)	0.0 (0.0)	1.20 (10.6)	1.17 (10.4)	1,900	2,500	4,240	2.99	9.0	0.33 (0.292)
AKM31H	S20660	3.36 (29.7)	0.19 (1.66)	1.23 (10.9)	0.97 (8.59)	4,530	6,000	8,000	5.85	18.0	0.33 (0.292)
AKM32D	S20360	7.05 (62.4)	0.0 (0.0)	2.04 (18.0)	2.00 (17.7)	35	1,000	1,870	2.23	8.9	0.59 (0.522)
AKM41E	S20360	5.33 (47.2)	0.0 (0.0)	2.02 (17.8)	1.94 (17.2)	740	1,200	2,430	2.85	9.0	0.81 (0.717)

① Peak torque ratings are for 3 seconds.

② Includes smart feedback device inertia.

Recommended Motor/Drive Systems, 240 VAC, 320 VDC bus

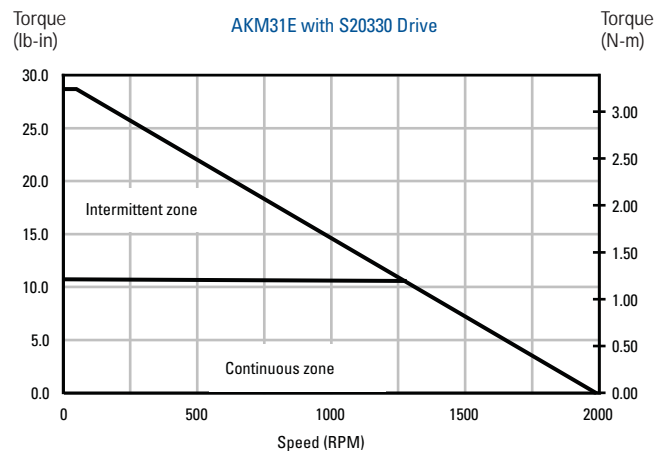
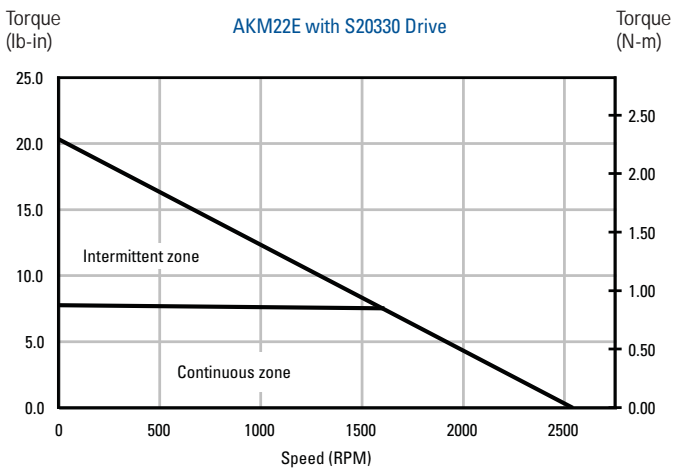
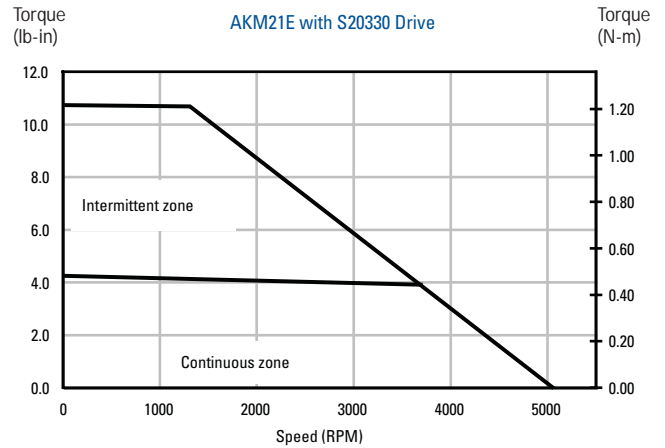
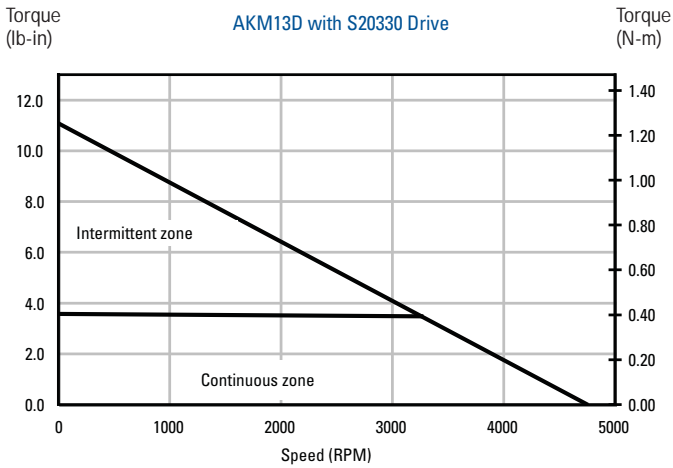
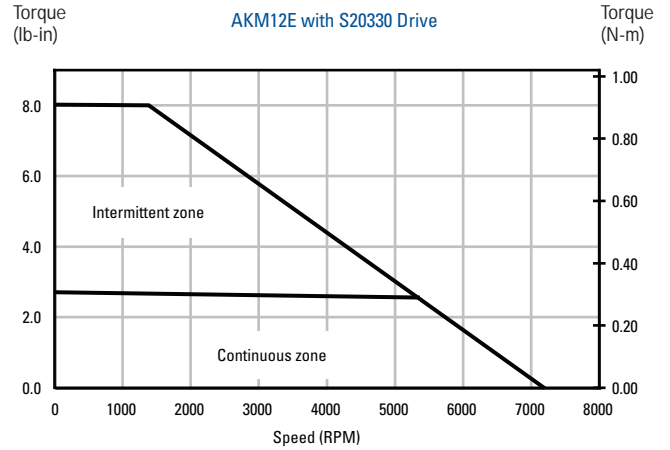
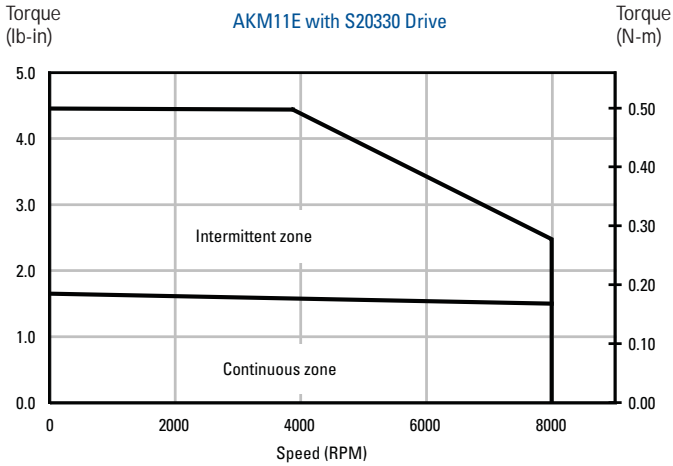
Servo Motor Model	Servo Drive Model	Peak Stall Torque T_{ps} N-m (lb-in)	Peak Torque at at Max. Speed T_{ms} N-m (lb-in)	Cont. Stall Torque T_{cs} N-m (lb-in)	Cont. Rated Torque T_{cr} N-m (lb-in)	Speed at Knee ω_k rpm	Rated Speed ω_r rpm	Maximum Speed ω_{max} rpm	Cont. Stall Current I_{cs} A _{rms}	Current@Peak Torque I_{ps} A _{rms}	Inertia ^② J kg-cm ² (lb-in-s ² × 10 ⁻³)
AKM11B	S20260	0.59 (5.27)	0.59 (5.23)	0.18 (1.62)	0.17 (1.47)	8,000	8,000	8,000	1.16	4.5	0.017 (0.015)
AKM12C	S20260	0.85 (7.49)	0.84 (7.42)	0.31 (2.73)	0.28 (2.45)	8,000	8,000	8,000	1.50	4.5	0.031 (0.027)
AKM13C	S20260	1.16 (10.2)	1.07 (9.48)	0.41 (3.62)	0.36 (3.22)	7,600	8,000	8,000	1.48	4.5	0.045 (0.040)
AKM21C	S20260	1.17 (10.4)	0.76 (6.73)	0.46 (4.03)	0.37 (3.25)	5,810	8,000	8,000	1.50	4.5	0.107 (0.095)
AKM22C	S20260	2.34 (20.7)	0.0 (0.0)	0.84 (7.48)	0.78 (6.92)	2,420	3,500	5,660	1.39	4.5	0.161 (0.142)
AKM22E	S20360	2.42 (21.4)	1.62 (14.3)	0.87 (7.71)	0.70 (6.18)	5,980	8,000	8,000	2.73	9.0	0.161 (0.142)
AKM23C	S20260	3.2 (28.4)	0.0 (0.0)	1.13 (10.0)	1.08 (9.52)	1,830	2,500	4,270	1.41	4.5	0.216 (0.191)
AKM23D	S20360	3.84 (34.0)	0.0 (0.0)	1.16 (10.2)	1.03 (9.08)	2,950	5,000	6,540	2.19	8.8	0.216 (0.191)
AKM23F	S20660	3.88 (34.4)	3.27 (29.0)	1.18 (10.4)	0.94 (8.28)	6,910	8,000	8,000	4.31	17.2	0.216 (0.191)
AKM24C	S20260	3.94 (34.9)	0.0 (0.0)	1.38 (12.2)	1.32 (11.7)	1,620	2,000	3,540	1.42	4.5	0.27 (0.239)
AKM24D	S20360	4.76 (42.1)	0.0 (0.0)	1.41 (12.4)	1.29 (11.4)	2,520	4,000	5,420	2.21	8.8	0.27 (0.239)
AKM24F	S20660	4.82 (42.7)	2.42 (21.4)	1.42 (12.6)	1.12 (9.91)	5,350	8,000	8,000	3.89	15.6	0.27 (0.239)
AKM31C	S20260	3.34 (29.6)	0.0 (0.0)	1.15 (10.2)	1.12 (9.94)	1,630	2,500	4,060	1.37	4.5	0.33 (0.292)
AKM31E	S20360	3.24 (28.6)	0.78 (6.92)	1.2 (10.6)	0.95 (8.41)	4,970	6,000	8,000	2.99	9.0	0.33 (0.292)
AKM32C	S20260	5.74 (50.8)	0.0 (0.0)	2.0 (17.7)	1.95 (17.2)	970	1,500	2,470	1.44	4.5	0.59 (0.522)
AKM32D	S20360	7.05 (62.4)	0.0 (0.0)	2.04 (18.0)	1.93 (17.1)	1,580	2,500	3,750	2.23	8.9	0.59 (0.522)
AKM32H	S20660	6.22 (55.1)	2.87 (25.4)	2.1 (18.6)	1.45 (12.8)	5,920	7,000	8,000	5.50	18.0	0.59 (0.522)
AKM33C	S20260	7.83 (69.3)	0.0 (0.0)	2.71 (24.0)	2.64 (23.4)	640	1,000	1,850	1.47	4.5	0.85 (0.752)
AKM33E	S20360	8.95 (79.3)	0.0 (0.0)	2.79 (24.7)	2.62 (23.2)	1,570	2,000	3,140	2.58	9.0	0.85 (0.752)
AKM33H	S20660	8.56 (75.8)	0.0 (0.0)	2.88 (25.5)	2.27 (20.1)	4,550	5,500	6,630	5.62	18.0	0.85 (0.752)
AKM41C	S20260	5.12 (45.3)	0.0 (0.0)	1.95 (17.3)	1.88 (16.6)	890	1,200	2,560	1.46	4.5	0.81 (0.717)
AKM41E	S20360	5.33 (47.2)	0.0 (0.0)	2.02 (17.8)	1.82 (16.1)	2,110	3,000	4,850	2.85	9.0	0.81 (0.717)
AKM41H	S20660	5.48 (48.5)	3.84 (34.0)	2.06 (18.2)	1.62 (14.3)	4,390	6,000	6,000	5.60	18.0	0.81 (0.717)
AKM42E	S20360	9.72 (86.0)	0.0 (0.0)	3.42 (30.3)	3.12 (27.6)	1,230	1,800	2,740	2.74	9.0	1.45 (1.28)
AKM42G	S20660	11.0 (97.0)	0.0 (0.0)	3.53 (31.2)	2.90 (25.7)	2,170	3,500	4,660	4.80	18.0	1.45 (1.28)
AKM42J	S21260	10.7 (94.5)	6.60 (58.4)	3.56 (31.5)	2.38 (21.0)	4,160	6,000	6,000	8.40	30.0	1.45 (1.28)
AKM43E	S20360	13.6 (120)	0.0 (0.0)	4.70 (41.6)	4.24 (37.6)	910	1,500	2,000	2.76	9.0	2.09 (1.85)
AKM43G	S20660	15.2 (134)	0.0 (0.0)	4.80 (42.5)	4.00 (35.4)	1,710	2,500	3,470	4.87	18.0	2.09 (1.85)
AKM43K	S21260	13.6 (120)	5.50 (48.7)	4.90 (43.4)	2.62 (23.2)	4,070	6,000	6,000	9.60	30.0	2.09 (1.85)
AKM44E	S20360	16.5 (146)	0.0 (0.0)	5.76 (51.0)	5.20 (46.0)	800	1,200	1,680	2.85	9.0	2.73 (2.42)
AKM44G	S20660	18.6 (165)	0.0 (0.0)	5.88 (52.0)	4.90 (43.4)	1,520	2,000	2,890	5.00	18.0	2.73 (2.42)
AKM44J	S21260	18.1 (160)	0.0 (0.0)	6.0 (53.1)	3.84 (34.0)	3010	4,000	5,010	8.80	30.0	2.73 (2.42)
AKM51G	S20660	11.7 (104)	0.0 (0.0)	4.75 (42.1)	4.03 (35.6)	1900	2,500	3,480	4.48	14.5	3.42 (3.03)
AKM51K	S21260	12.0 (106)	4.52 (40.0)	4.90 (43.4)	2.35 (20.8)	3,830	5,500	6,000	9.40	28.3	3.42 (3.03)
AKM52G	S20660	21.5 (191)	0.0 (0.0)	8.43 (74.6)	7.69 (68.1)	1,090	1,500	1,920	4.72	14.2	6.22 (5.51)
AKM52K	S21260	21.9 (194)	0.0 (0.0)	8.60 (76.1)	6.80 (60.2)	2,360	3,000	3,690	9.30	27.8	6.22 (5.51)
AKM52M	S21260	17.7 (157)	0.0 (0.0)	7.88 (69.7)	4.76 (42.2)	3,980	4,500	5,230	12.0	30.0	6.22 (5.51)
AKM53G	S20660	29.7 (263)	0.0 (0.0)	11.4 (101)	10.7 (94.5)	840	1,000	1,440	4.77	14.3	9.12 (8.07)
AKM53K	S21260	30.2 (267)	0.0 (0.0)	11.6 (103)	10.1 (89.0)	1870	2,000	2,780	9.40	28.1	9.12 (8.07)
AKM53M	S21260	23.4 (207)	0.0 (0.0)	10.2 (90.1)	7.81 (69.1)	3,270	3,000	4,050	12.0	30.0	9.12 (8.07)
AKM54P	S22460	26.0 (230)	9.19 (81.3)	11.4 (101)	5.88 (52.0)	4,500	5,000	5,570	19.1	48.0	9.12 (8.07)
AKM54K	S21260	38.4 (340)	0.0 (0.0)	14.4 (127)	12.7 (112)	1,570	1,800	2,290	9.70	29.2	11.9 (10.6)
AKM54N	S22460	34.6 (306)	11.7 (104)	14.1 (125)	9.85 (87.2)	3,300	3,500	4,320	17.8	48.0	11.9 (10.5)
AKM54L	S21260	31.2 (276)	0.0 (0.0)	13.5 (120)	11.0 (97.4)	2,430	2,500	3,040	12.0	30.0	11.9 (10.6)
AKM62K	S21260	30.1 (267)	0.0 (0.0)	12.2 (108)	10.4 (92.0)	1,470	2,000	2,700	9.60	28.7	16.9 (15.0)
AKM62P	S22460	27.1 (240)	7.15 (63.3)	12.3 (109)	8.1 (71.7)	3,400	4,500	5,250	18.8	48	16.9 (15.0)
AKM62M	S21260	24.1 (213)	0.0 (0.0)	10.9 (96.5)	8.51 (75.3)	2,550	3,000	3,770	12.0	30.0	16.9 (15.0)
AKM63K	S21260	42.6 (377)	0.0 (0.0)	16.8 (149)	14.9 (131)	1,200	1,500	2,020	9.90	29.7	24.2 (21.4)
AKM63M	S21260	33.3 (295)	0.0 (0.0)	14.8 (131)	12.4 (110)	2,040	2,000	2,770	12.0	30.0	24.2 (21.4)
AKM63N	S22460	40.2 (356)	11.6 (103)	17.0 (150)	13.0 (115)	2,300	3,000	3,500	17.4	48.0	24.2 (21.4)
AKM64K	S21260	53.5 (473)	0.0 (0.0)	20.8 (184)	19.2 (170)	930	1,200	1,510	9.20	27.5	31.6 (28.0)
AKM64L	S21260	44.4 (393)	0.0 (0.0)	19.7 (174)	17.3 (153)	1,530	1,500	2,080	12.0	30.0	31.6 (28.0)
AKM64P	S22460	46.7 (413)	15.7 (139)	20.4 (180)	16.0 (142)	2,300	2,500	3,120	18.6	48.0	31.6 (28.0)
AKM65K	S21260	64.5 (571)	0.0 (0.0)	24.8 (219)	22.8 (202)	860	1,000	1,350	9.80	29.4	40.0 (35.4)
AKM65M	S21260	50.5 (447)	0.0 (0.0)	22.1 (195)	19.3 (171)	1,440	1,500	1,860	12.0	30.0	40.0 (35.4)
AKM65N	S22460	64.5 (571)	0.0 (0.0)	24.3 (215)	19.8 (175)	1,750	2,000	2,500	17.8	48.0	40.0 (35.4)
AKM72M	S21260	63.6 (563)	0.0 (0.0)	27.7 (245)	24.2 (215)	1,000	1,200	1,480	12.0	30.0	64.5 (57.1)
AKM72P	S22460	68.4 (605)	19.7 (174)	29.4 (260)	23.8 (211)	1,425	1,800	2,170	18.7	48.0	64.5 (57.1)
AKM73M	S21260	85.9 (760)	0.0 (0.0)	37.1 (328)	33.5 (297)	800	800	1,110	12.0	30.0	92.1 (81.5)
AKM73P	S22460	93.4 (827)	28.5 (252)	41.6 (368)	34.7 (307)	1,100	1,300	1,610	19.5	48.0	92.1 (81.5)
AKM74L	S21260	114 (1010)	0.0 (0.0)	49.3 (436)	45.7 (404)	590	600	830	12.0	30.0	120 (106)

① Peak torque ratings are for 3 seconds.

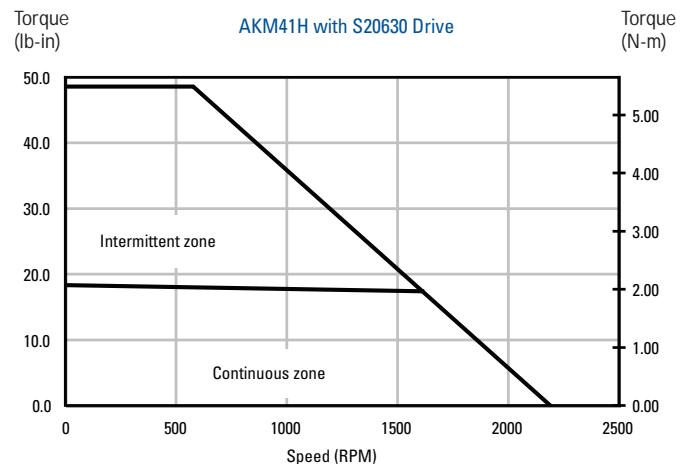
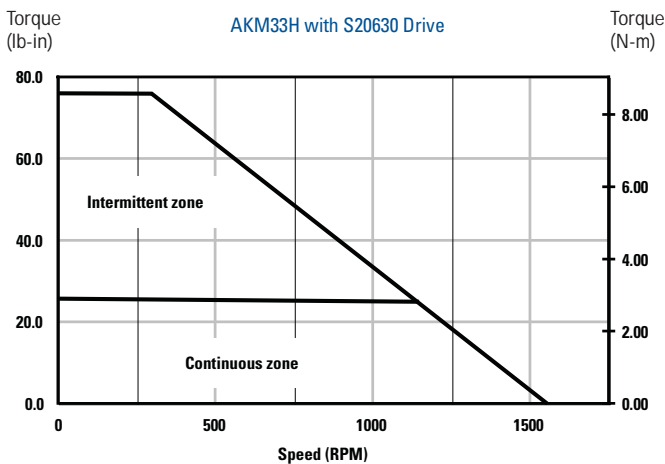
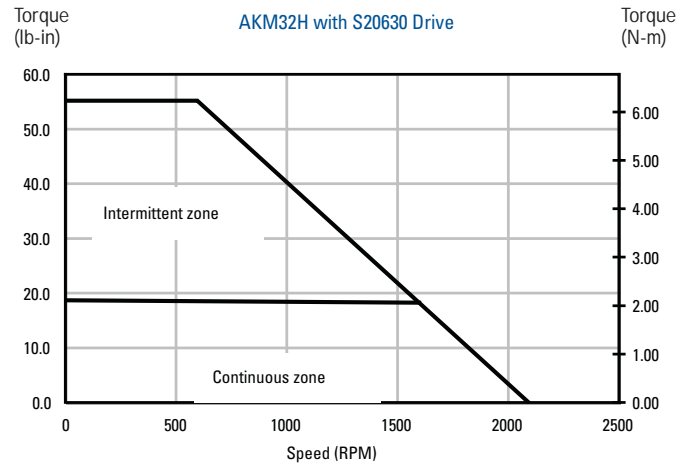
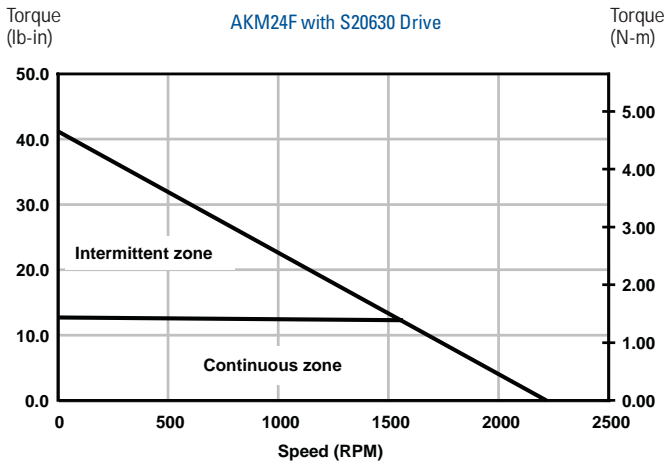
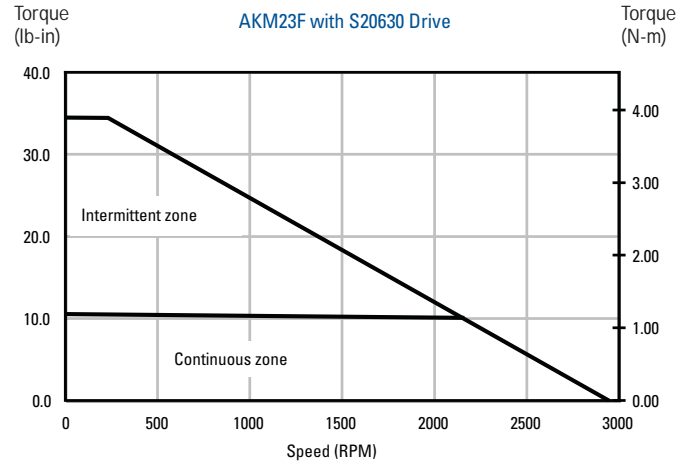
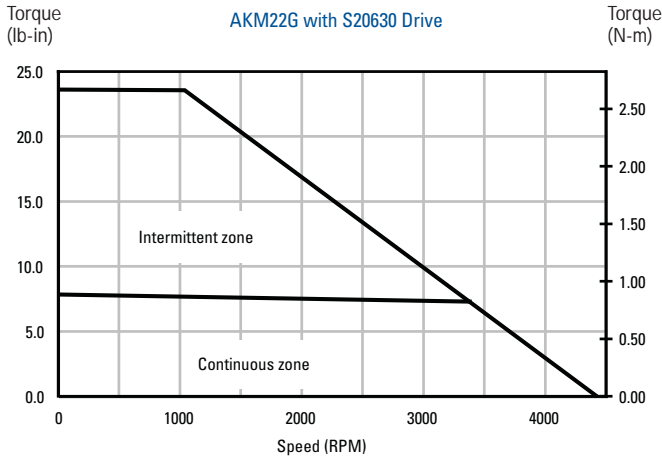
② Includes smart feedback device inertia.

Selecting the correct Servo Motor and Drive combination is essential for proper servo system performance. Danaher Motion's Motioneering® Sizing and Selection Software simplifies proper servo system sizing. Motioneering® will allow you to simulate real world machine and motion requirements and select the optimum mechanical solution or servo and/or stepper motor and drive system. You can download your complimentary copy of Motioneering® from www.danahermotion.com. The following torque speed curves represent some of our more popular motor/drive combinations and are helpful to estimate approximate system performance. These systems curves are not appropriate for motor drive system selection.

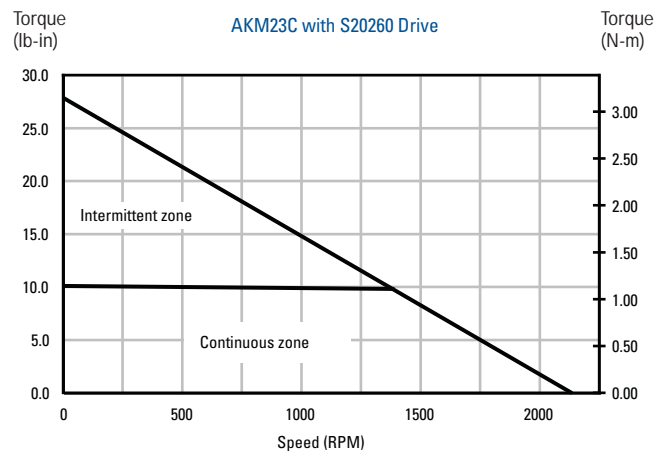
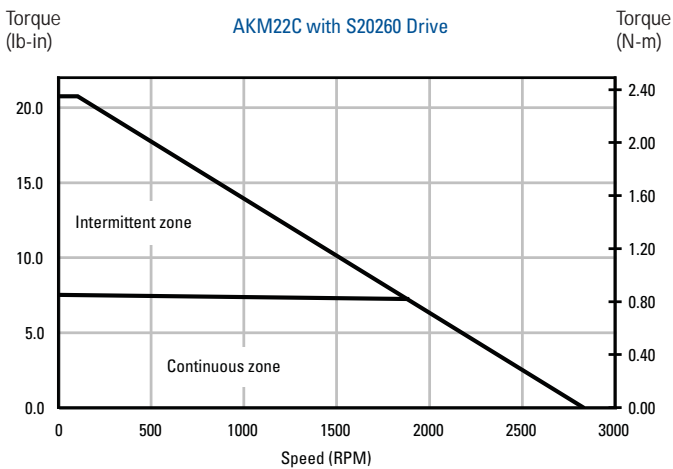
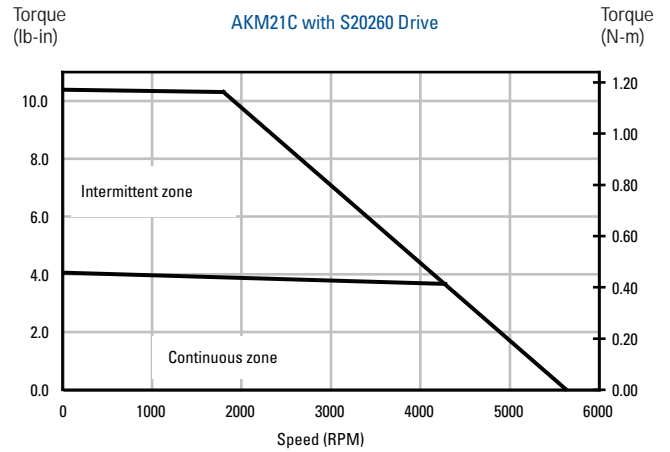
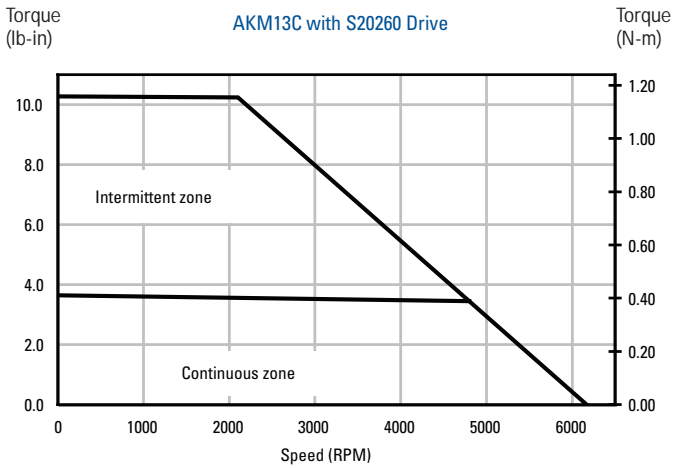
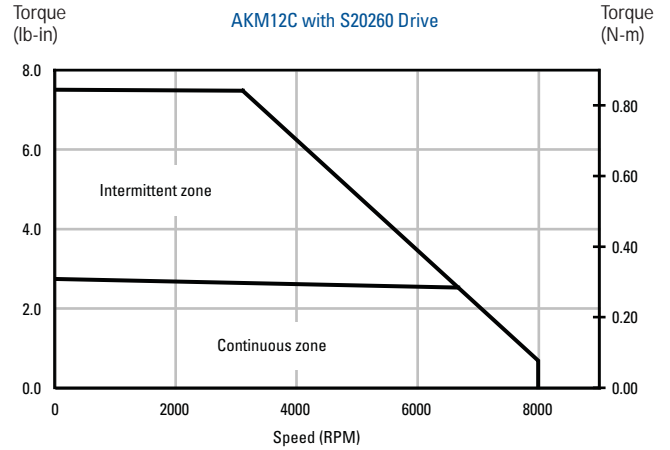
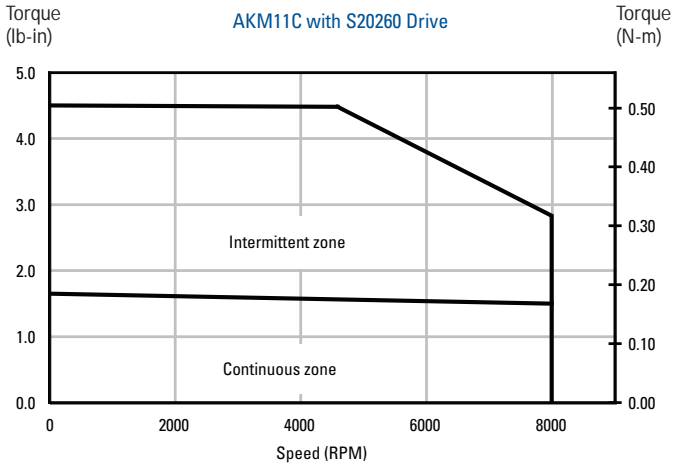
DC System Torque Speed Curves



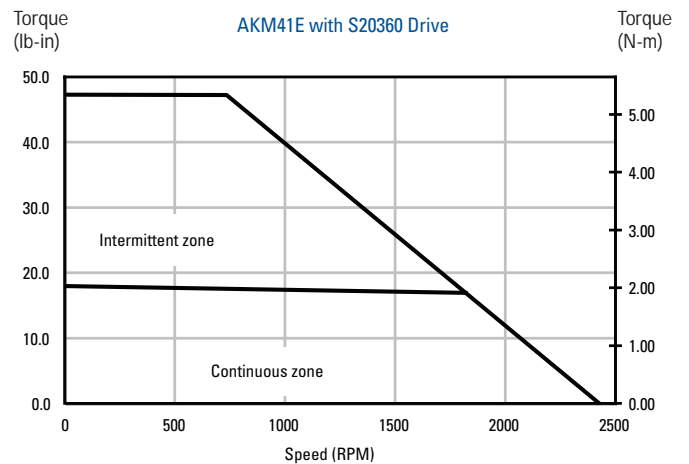
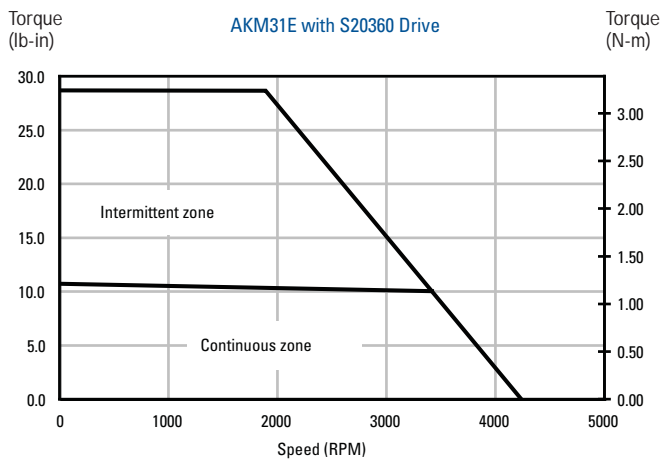
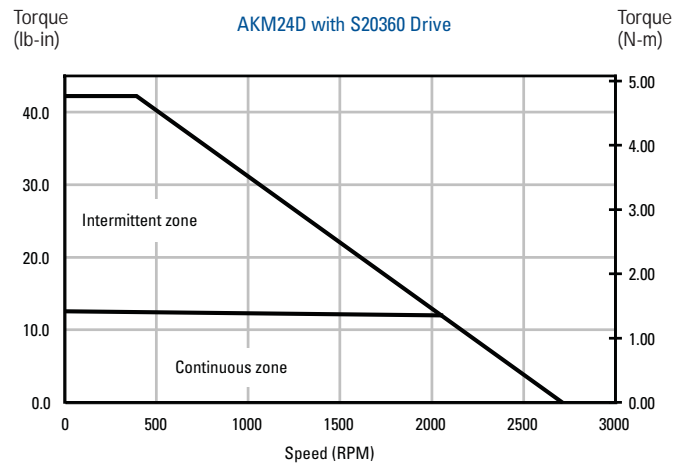
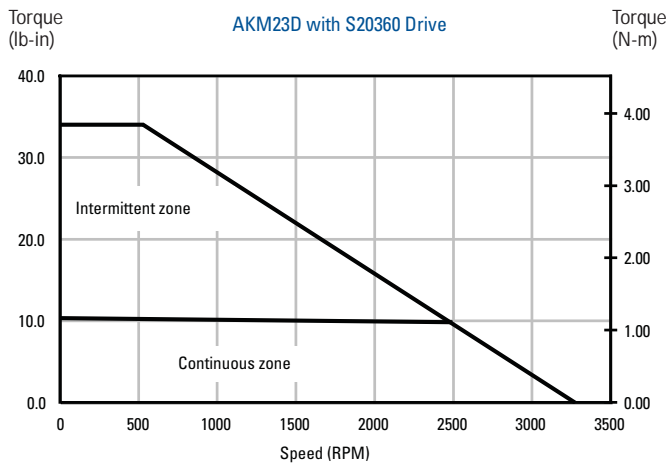
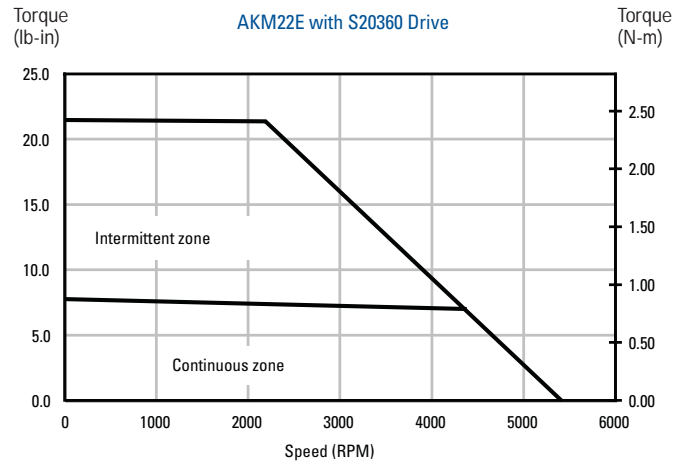
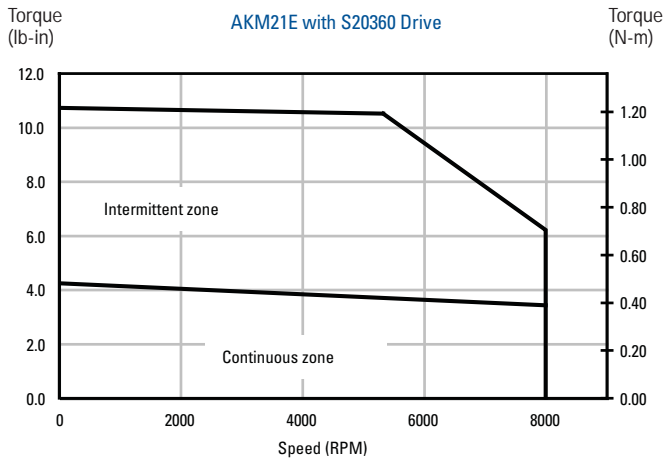
DC System Torque Speed Curves (cont.)



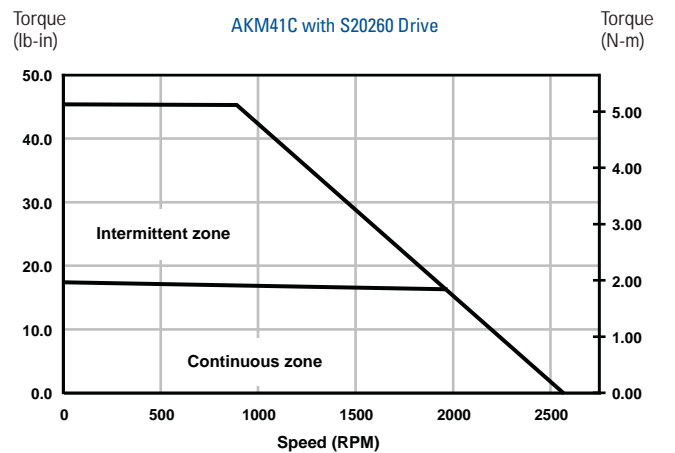
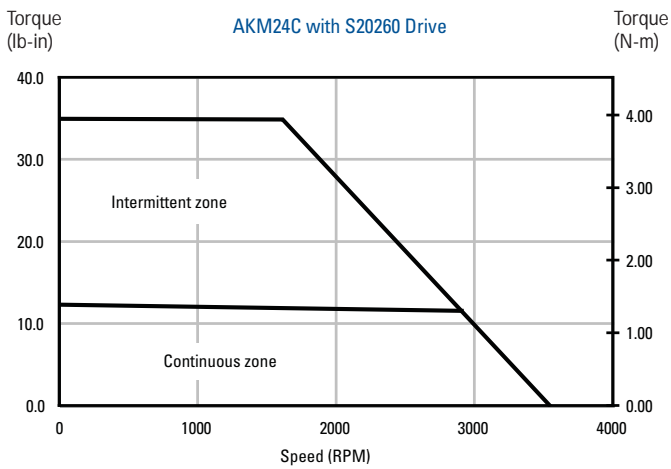
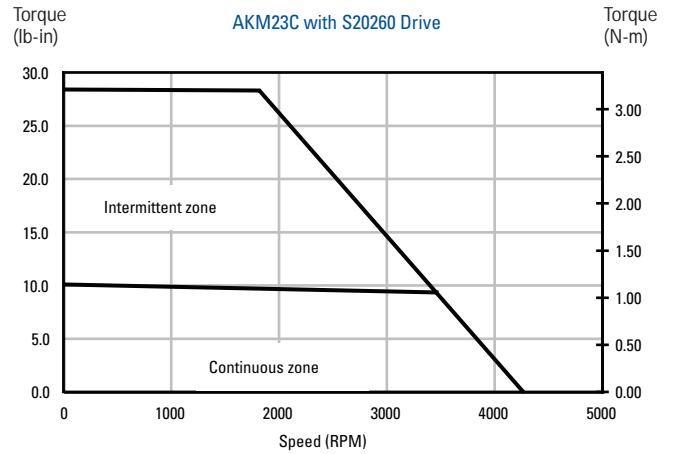
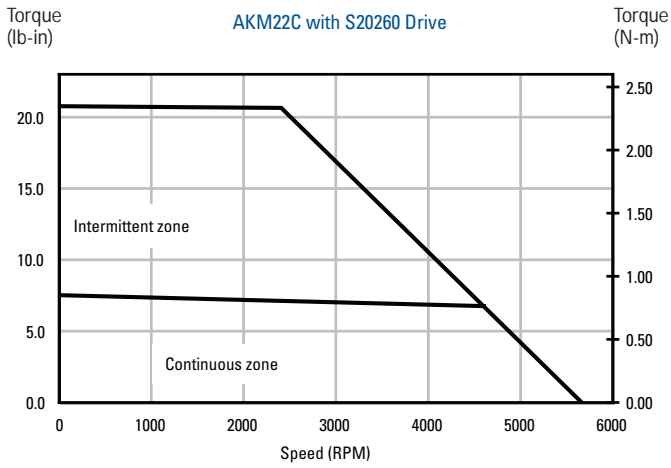
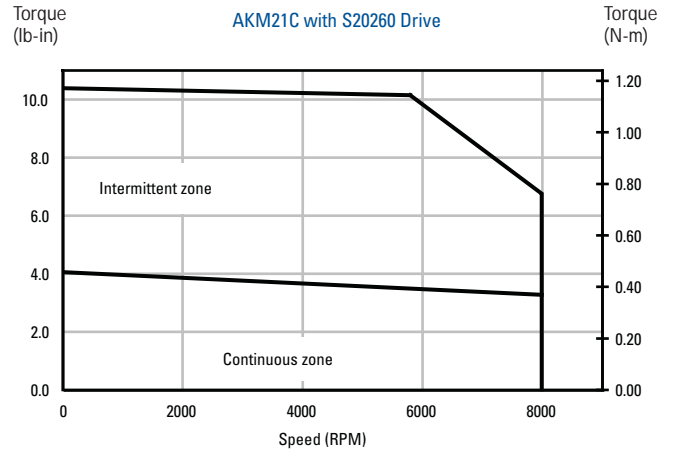
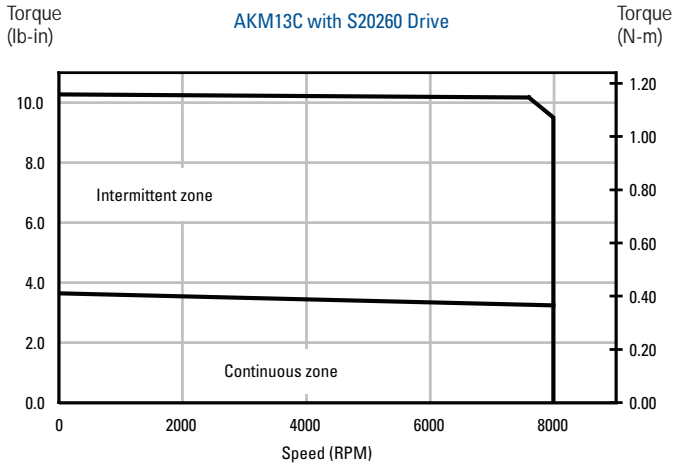
120 Volt AC System Torque Speed Curves



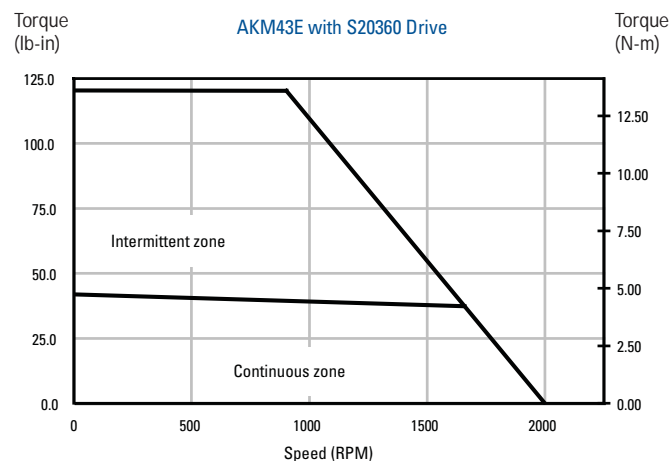
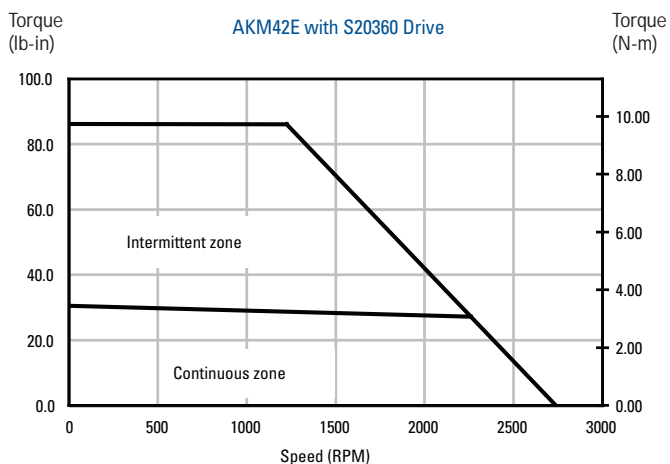
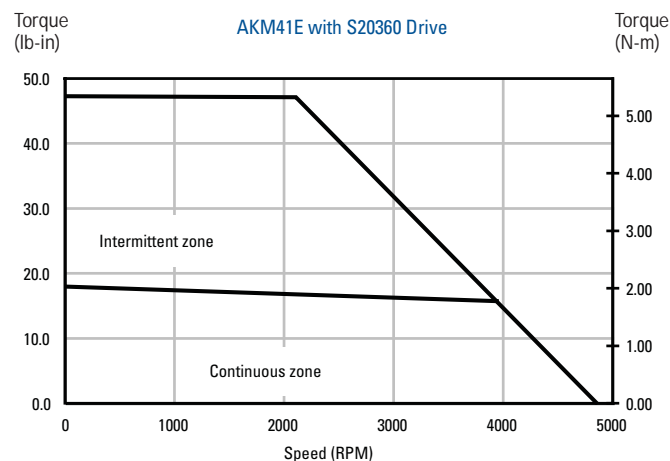
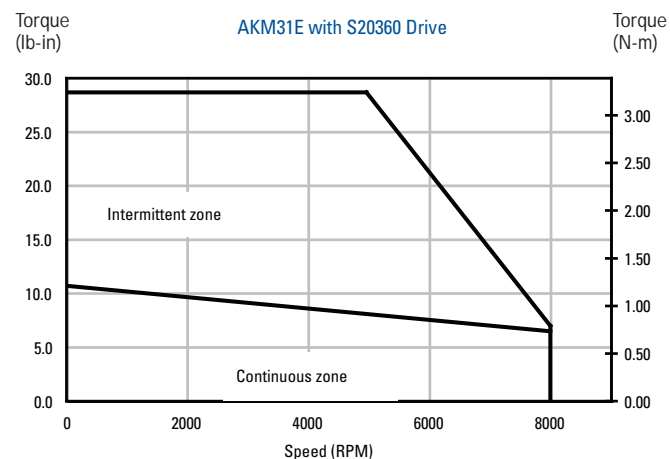
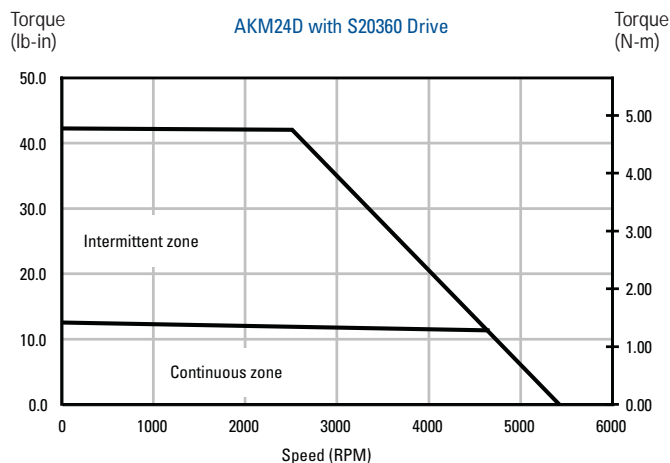
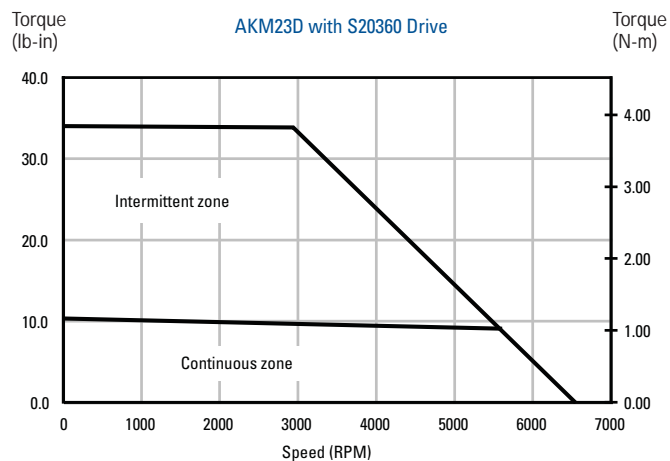
120 Volt AC System Torque Speed Curves (cont.)



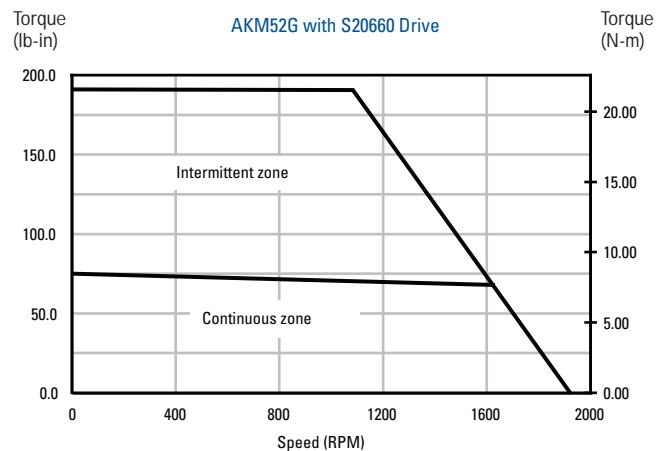
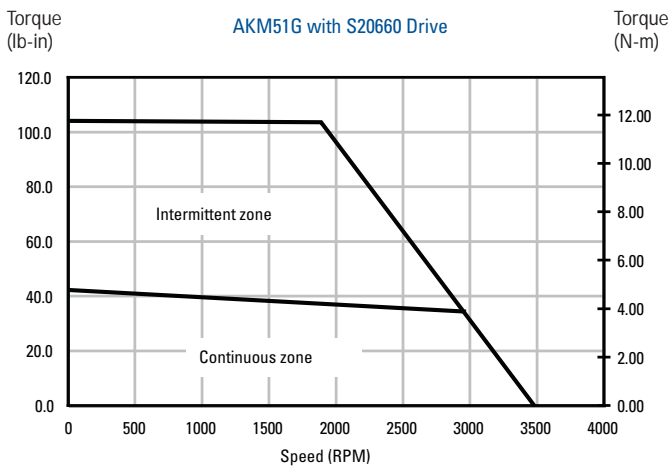
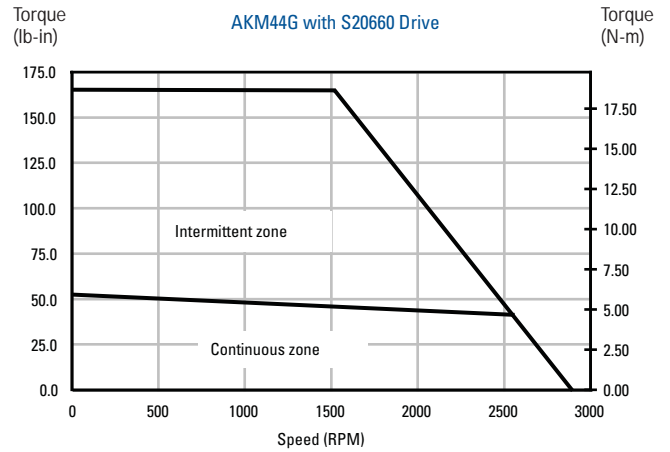
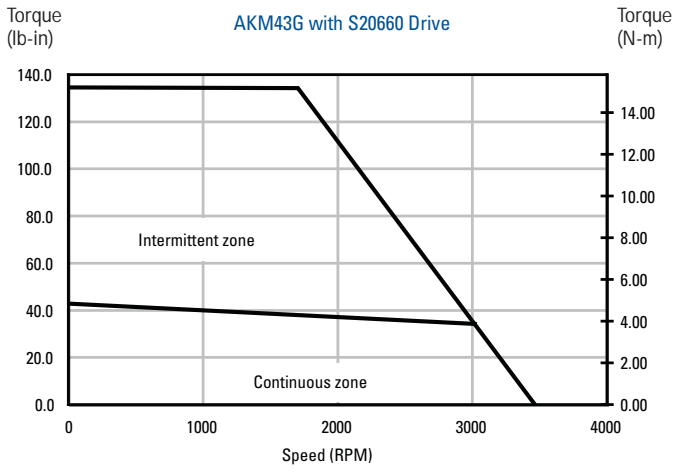
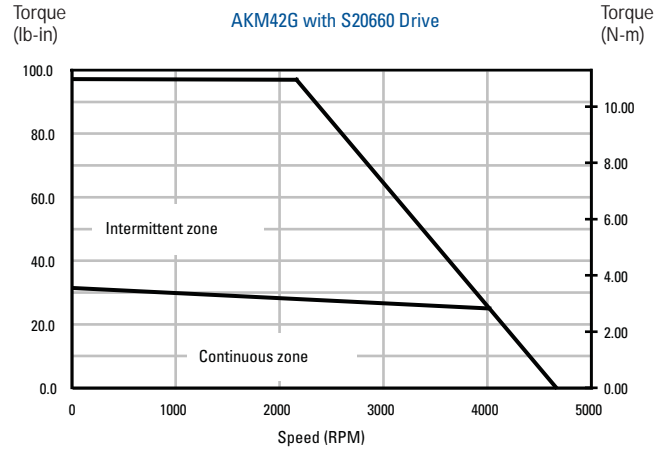
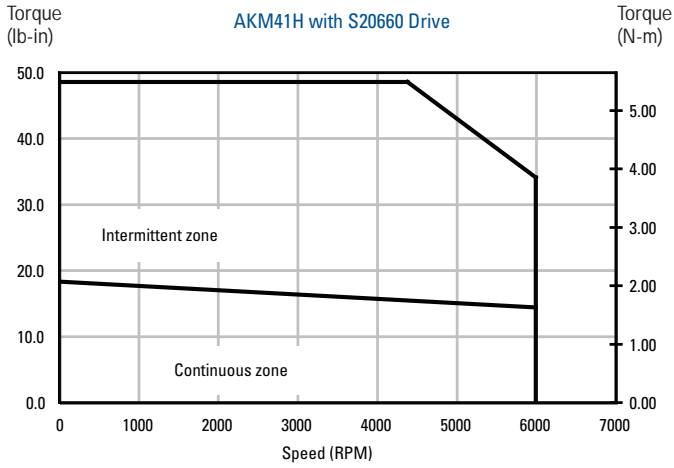
240 Volt AC System Torque Speed Curves



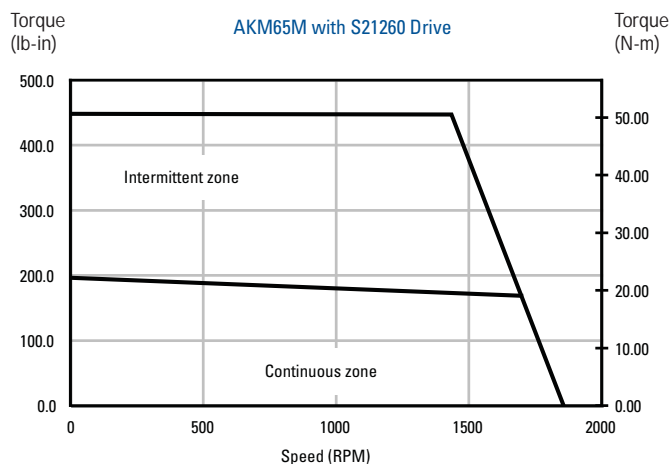
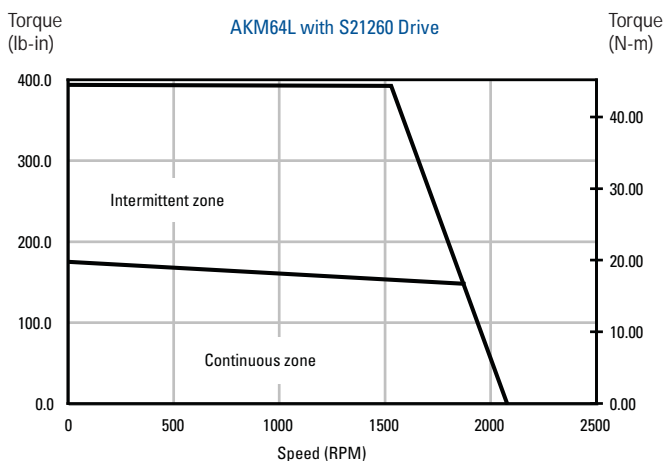
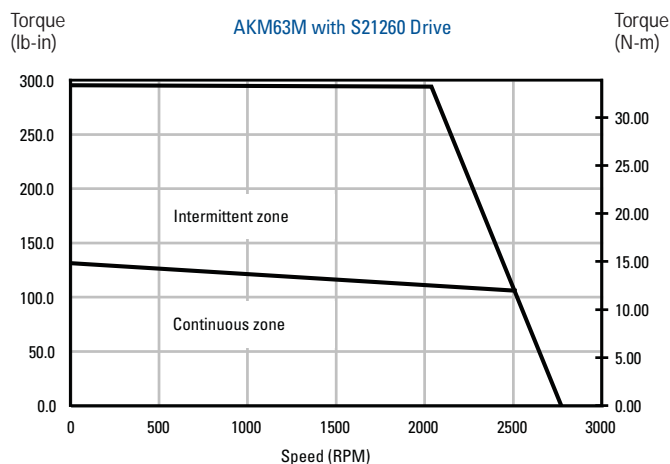
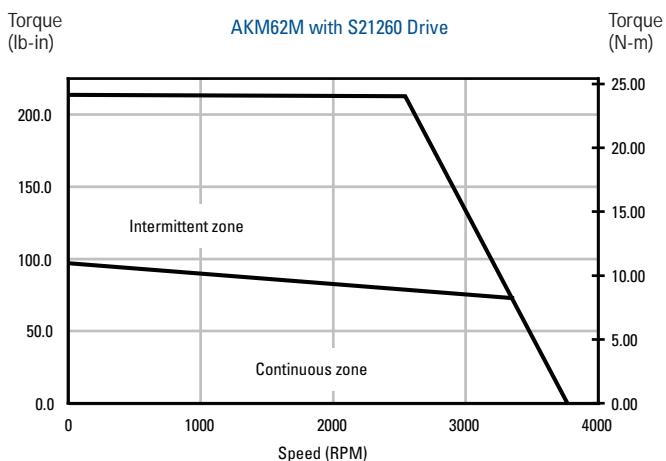
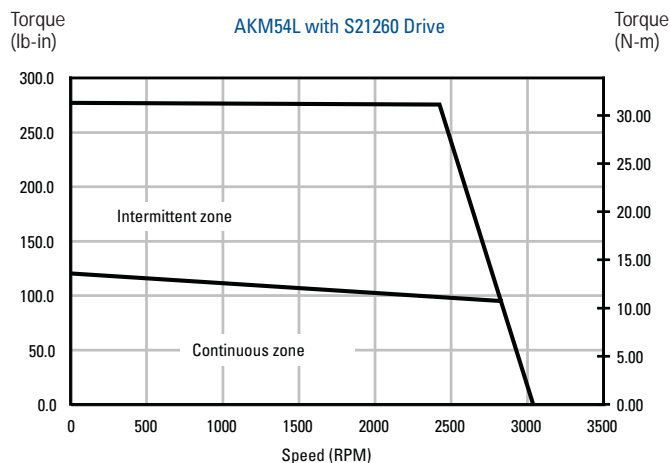
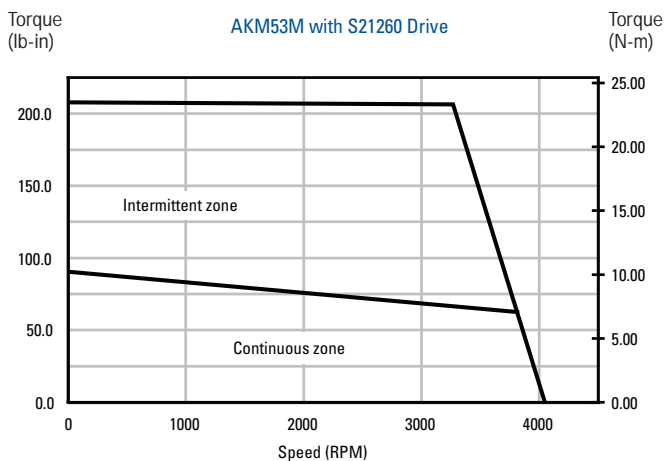
240 Volt AC System Torque Speed Curves (cont.)



240 Volt AC System Torque Speed Curves (cont.)



240 Volt AC System Torque Speed Curves (cont.)



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