# PositionServo

## Compact and Powerful Servo Controllers

2008 Plant Engineering PRODUCT of the YEAR WINNER

**Flexible, simple, economical**


NOW WITH MotionView OnBoard

Lenze AC Tech

# Our promise

## Commitment to Simplicity

By making the PositionServo easy to install, set up and program, we provide the ideal motor control solution for both OEM designers and electrical system engineers. An innovative and removable EPM memory chip allows fast programming of multiple drives either before or after installation, and the simple, intuitive front panel display facilitates on-site operation.

## Commitment to Quality

From product design to manufacture, service and training, quality is at the foundation of Lenze-AC Tech's corporate philosophy. A quality product is built of superior materials by highly skilled personnel equipped with state-of-the art instruments. And a quality product is backed by expert training, knowledgeable sales representatives and experienced repair personnel. Continuous life cycle improvement fueled by our pledge to our Customers drives our technology forward. We feel so strongly about quality that each of our products is backed with a two-year warranty.

## Commitment to Innovation

We pride ourselves on delivering products to the market that are designed to meet specific customer needs. Our broad portfolio of innovative products covers very simple variable speed applications through complex motion control. Each product is positioned so that our customers pay only for the level of technology their particular application requires. The PositionServo provides both the basic torque control of a simple servo drive and the full programmability of a high-level motion controller.

## Commitment to Technical Support

Experienced engineers are on hand to help customers at all levels solve their problems and find the best solutions for their applications. End users can also be assured that Lenze-AC Tech is always there throughout the life cycle of it's products. Technical info, literature and manuals are available from a multi-language website or the worldwide network of Lenze-AC Tech branches and certified distributors.

## Commitment to Performance

Each Lenze-AC Tech product is in a class by itself when it comes to performance. We are not satisfied with average performance. The PositionServo's smooth performance derives from a very low torque ripple, quick settling time, 64-bit indexing and more. The PositionServo did not reach the marketplace until it outperformed our competitors and exceeded our own rigorous performance requirements. By using the most innovative components, we are able to provide this level of performance at a great value.

## Our Promise

At Lenze-AC Tech it is not good enough to deliver on part of a promise. All of our products including the PositionServo deliver the entire package: Value, Quality, Innovation, Simplicity and Performance.

# Digital Synchronous (Brushless) Servo Motor Control

Looking to bridge that gap between sophisticated control and ease-of-use? Now you can get all of the high-end servo performance in a simple-to-use package. For centralized or decentralized servo control, look no further than the PositionServo.

| Power | Control | I/O | Feedback | Communications | Software |
|---|---|---|---|---|---|
| 0.4 - 7.5 kW @240VAC | Velocity | 12 digital inputs | Encoder | Ethernet TCP/IP | MotionView OnBoard |
| 0.8 - 7.5 kW @480VAC | Torque | 5 digital outputs | Resolver | Modbus TCP/IP | |
| | Position | 2 analog inputs | | EtherNet/IP | |
| | | 1 analog output | | RS-485 MODBUS | |
| | | | | CANopen | |
| | | | | DeviceNet | |
| | | | | PROFIBUS DP | |

# PositionServo Contents



***PositionServo with programming capability, & even more features***

## PositionServo
## Servo drive/controller

The PositionServo is the one drive that has it all. From basic torque control to full programmability, you choose your level of control.

As a distributed drive/controller solution, avoid all of the costly cables and connections and put the power of the motion controller in the same package as the drive.

The PositionServo can perform along with the most high-level motion controllers, but with a simple-to-use interface and clean Ethernet connection.

If a centralized control scheme is preferred; the PositionServo will outperform most torque or velocity amplifiers. It is also packed with many features, all this for a great price!

Model 940: Encoder-based PositionServo (E94P)

Model 941: Resolver-based PositionServo (E94R)

2008 Plant Engineering PRODUCT of the YEAR WINNER

CONTROL ENGINEERING 2006 ENGINEERS' CHOICE AWARDS

## Powerful Innovation

### When do I use the PositionServo?

- For torque, velocity and step & direction control.
  - When you are sending your drive a +/- 10V or Step & Direction signal.
- If you have a ratio following application.
  - When your axis is following an encoder signal.
- For high performing distributed control.
  - When you want a motion controller and drive in one compact package.
- If you want ONE product that can do it all!
  - The PositionServo can operate as a basic drive or a stand-alone fully programmable drive/controller.

# PositionServo Features

## *Motion Control Features*

- 64-bit indexing/positioning (incremental, absolute, registered, or segmented moves)
- Linear or S-Curve accel and decel
- “Real-time” Oscilloscope
- Free DLL library and program examples

## *Drive Features*

- Torque, velocity and position control
- Electronic gearing
- UL, cUL, CE(LVD & EMC)
- ISO13849-1 safety standard (optional)
- Two-year warranty

## *Inputs/Outputs*

- 11 Programmable + 1 dedicated digital input
- 4 Programmable + 1 dedicated digital output
- 2 Programmable analog inputs
- 1 Programmable analog output

## *Communication Features*

- Free MotionView OnBoard
- RJ-45 Standard Ethernet Modbus TCP/IP, Ethernet IP
- Optional DeviceNet, RS485 PPP or Modbus RTU slave, CANopen, PROFIBUS-DP

## *Power Features*

### Standard Drives

- 80 – 528 VAC input
- 2 – 18 Amps continuous rms current
- 300% peak current

### Doubler Drives

- When operating at 120VAC, Doubler Drives can run 240VAC motors at full speed.

## *Feedback Options*

- Integrated Encoder
- Integrated Resolver
- Optional Second Encoder Module

## *Compatible Motors*

- MAS and MCS Series
- Third party AC permanent magnet synchronous (brushless) motors
- Encoder or resolver feedback

MotionView® OnBoard

All configuration and programming software is INSIDE the drive. Software is always with you, when you need it.

## EPM • Electronic Programming Module - Removable Memory

The EPM is the drive’s memory (programs and parameters).
The EPM saves time and money. It’s as easy as 1, 2, 3…
1. Create your program and parameters in your first drive.
2. Use the EPM Programmer to make multiple copies of the EPM.
3. Insert the copied EPMs into your non-programmed drives, and they are instantly programmed.

**Imagine being able to fully program a servo drive in minutes.**

**Even with no servo experience. And with no power to the drive.**

# Specifications

| Continuous Current (rms) | 2A | 4A | 6A | 8A | 9A | 10A | 12A | 18A |
|---|---|---|---|---|---|---|---|---|
| **Drive Input Voltage** | | | | | | | | 3Ø Only |
| 80-264 VAC, 1Ø or 3Ø w/out EMC Filter* | E94_020Y2N_ _ | E94_040Y2N_ _ | | E94_080Y2N_ _ | | E94_100Y2N_ _ | E94_120Y2N_ _<br>E94_120Y2C_ _ | E94_180T2N_ _<br>E94_180T2C_ _ |
| 80-264 VAC, 1Ø w/integrated EMC Filter | E94_020S2F_ _ | E94_040S2F_ _ | | E94_080S2F_ _ | | E94_100S2F_ _ | | |
| 320-528 VAC, 3Ø w/out EMC Filter* | E94_020T4N_ _ | E94_040T4N_ _ | E94_060T4N_ _<br>E94_060T4C_ _ | | E94_090T4N_ _<br>E94_090T4C_ _ | | | |
| 45-264 VAC Input, 1Ø 240 VAC Max Output w/out EMC Filter | E94_020S1N_ _ | E94_040S1N_ _ | | | | | | |
| Input Frequency | 48 - 62 Hz | | | | | | | |
| 24V External Input (Keep Alive) | 24VDC +/-20% | | | | | | | |
| * **External Filter Options** | Footprint E94ZF04T4A1 | Footprint E94ZF07T4A1 | Sidemount E94ZF10T4A1 | Footprint E94ZF15T4A1 | Sidemount E94ZF12T4A2 | Footprint E94ZF15T4A2 | Sidemount (1Ø) E94ZF24S2A1 | |
| **Drive Ouput** | | | | | | | | |
| Continuous Power @ 240VAC | 800 Watts | 1.7 kW | | 3.3 kW | | 4.2 kW | 5.0 kW | 7.5 kW |
| Continuous Power @ 480VAC | 1.7 kW | 3.3 kW | 5.0 kW | | 7.5 kW | | | |
| Peak Current (rms) Overload** | 6 Amps | 12 Amps | 18 Amps | 24 Amps | 27 Amps | 30 Amps | 36 Amps | 54 Amps |
| **Peak Current (rms) Capability | Adjustable up to 300% X continuous current (rms) rating @ 8 kHz for 2 sec<br>Adjustable up to 250% X continuous current (rms) rating @ 16 kHz for 2 sec | | | | | | | |
| **Performance**<br>Servo Output | Encoder-based Drive Accuracy: ± 1 Encoder Count<br>Resolver-based Drive Accuracy: ± 1.32 Arc-Minutes (14-bit resolution)<br>Commutation: Sinusoidal | | | | | | | |
| **Torque Operation Mode** | Reference: ± 10VDC, 16-bit; scalable<br>Torque Range: 100:1<br>Update rate: 65 µs | | | | | | | |
| **Velocity Operation Mode** | Reference: ± 10VDC, 16-bit; scalable<br>Regulation: ± 1RPM<br>Update rate: 512 µs<br>Speed Range: 5000:1 with 4096 ppr encoder | | | | | | | |
| **Position Operation Mode** | Reference: 0 to 2 MHz, scalable master to reference ratio<br>Minimum Pulse Width: 500 nanoseconds<br>Update rate: 512 µs | | | | | | | |
| **Inputs/Outputs** | | | | | | | | |
| 11 Programmable Digital Inputs | 5-24VDC, optically isolated | | | | | | | |
| 1 Dedicated Digital Input-Enable | 5-24VDC, optically isolated | | | | | | | |
| 4 Programmable Digital Outputs | 5-24VDC @ 15mA, optically isolated open collector | | | | | | | |
| 1 Dedicated Digital Output-Ready | 5-24VDC @ 15mA, optically isolated open collector | | | | | | | |
| 2 Analog Inputs | one +/- 10V differential,16-bit and one +/- 10V differential, 10-bit | | | | | | | |
| 1 Analog Output | ± 10V single-ended, 10-bit | | | | | | | |
| **Feedback**<br>Encoder Input<br>Resolver Input | Up to 2MHz<br>12 – bit resolution | | | | | | | |
| **Communications**<br>Standard<br>Optional | RJ-45 Standard Ethernet Modbus TCP/IP, Ethernet IP<br>DeviceNet, RS485 PPP or Modbus RTU Slave, CANopen, PROFIBUS-DP | | | | | | | |
| **Standards** | UL, cUL, CE(LVD & EMC), CTick<br>ISO13849-1 Safety Standard (optional) | | | | | | | |

## Command Sets

Below is an example list of some of the extensive command set available on the PositionServo.

| KEYWORD | Description |
|---|---|
| ASSIGN | Assign Input As Index Bit |
| DEFINE | Define name |
| DISABLE | Turns servo OFF |
| DO/UNTIL | Do/Until |
| ENABLE | Enables servo |
| END | END program |
| EVENT | Starts Event handler |
| ENDEVENT | END of Event handler |
| EVENT ON/OFF | Turn events on or off |
| EVENTS ON/OFF | Globally Enables/disables events |
| FAULT | User generated fault |
| GOTO | Go To Label |
| GOSUB | Go To subroutine |
| HALT | Halt the program execution |
| JUMP | Jump to label from Event handler |
| ICONTROL ON/OFF | Enables interface control |
| IF | If/Then/Else |
| MOVE | Move |
| MOVED | Move Distance |
| MOVEP | Move to Position |
| MOVEDR | Registered Distance Move |
| MOVEPR | Registered Position Move |
| MDV | Segment Move |
| MOTION SUSPEND | Suspend Motion |
| MOTION RESUME | Resume Motion |
| ON FAULT/ENDFAULT | Resume Fault Handler |
| REGISTRATION ON | Registration On |
| RESUME | Resume from Fault Handler |
| RETURN | Return from subroutine |
| SEND/SEND TO | Send network variable(s) value |
| STOP MOTION [Quick] | Stop Motion |
| VELOCITY ON/OFF | Velocity Mode |
| WAIT | Wait |
| WHILE/ENDWHILE | While |

## Pick and Place Program Example

```
;******************************** HEADER ********************************
;Title:            Pick and Place example program
;Author:           Product Manager
;Description:      This is a simple program that picks up a part,
;                  moves it to a set position and place it

;*****************************  I/O List  *****************************
;                  Input A1          -  not used
;                  Input A2          -  not used
;                  Input A3          -  Enabled
;                  Input A4          -  not used
;                  Input B1          -  not used
;                  Input B2          -  not used
;                  Input B3          -  not used
;                  Input B4          -  not used
;                  Input C1          -  not used
;                  Input C2          -  not used
;                  Input C3          -  not used
;                  Input C4          -  not used
;
;                  Output 1          -  Pick Arm
;                  Output 2          -  Gripper
;                  Output 3          -  not used
;                  Output 4          -  not used


;********************** Initialize and Set Variables ******************
UNITS = 1
ACCEL = 75
DECEL =75
MAXV = 10
APOS = 0
;******************************** Events ******************************

;                  Set Events handling here

;***************************** Main Program ***************************
RESET_DRIVE:
WAIT UNTIL IN_A3   ;Wait until the Enable switch is made before continuing
ENABLE             ;Enable the Drive
PROGRAM_START:
MOVEP  0           ;Move to Pick position
OUT1 = 1           ;Turn on output 1 on to extend Pick arm
WAIT TIME 1000     ;Delay 1 sec to extend arm
OUT2 = 1           ;Turn on output 2 to Engage gripper
WAIT TIME 1000     ;Delay 1 sec to Pick part
OUT1 = 0           ;Turn off output 1 to Retract Pick arm
MOVEP 100          ;Move to Place position
OUT1 = 1           ;Turn on output 1 on to extend Pick arm
WAIT TIME 1000     ;Delay 1 sec to extend arm
OUT2 = 0           ;Turn off output 1 to Disengage gripper
WAIT TIME 1000     ;Delay 1 sec to Place part
OUT1 = 0           ;Retract Pick arm
GOTO PROGRAM_START
END
;***************************** Sub-Routines ***************************

;                  Enter Sub-Routine code here

;************************* Fault Handler Routine **********************
;                  Enter Fault Handler code here
ON FAULT
ENDFAULT
```

## Command Flexibility

Every resource on the drive is accessible via a variable or flag.

Including:

- System Status/Monitoring
- I/O Status/Manipulation
- Motion Control/Monitoring
- PID Gain Sets
- Communications Set-up/Monitoring
- Homing Functionality

# MotionView® OnBoard

MotionView OnBoard is your configuration and programming software that resides INSIDE the drive. Simply attach an Ethernet cable and use any web browser to get up and running.

- Plug and play servo technology
  - Software always available, whenever you need it
  - No more downloading software or installing from CDs
- Advanced debugging tools

***MotionView Features:***

- Statement-Based language
- "Typeless" unified, 64-bit operands
- Compiled Java-style byte code execution
- BASIC-like semantic programming
- Multipass compiler
- 64-bit Arithmetic precision
- Multi-configuration real-time oscilloscope

# Drive Model Number Designation Code

| E94 | P | 020 | S | 2 | F | E | X |
|---|---|---|---|---|---|---|---|

**Electrical Products in the 94 Series**

**Drive Type:**
- P = Encoder-based PositionServo Model 940
- R = Resolver-based PositionServo Model 941

**Drive Rating in Amps:**

| | |
|---|---|
| 020 = 2 Amps | 090 = 9 Amps |
| 040 = 4 Amps | 100 = 10 Amps |
| 060 = 6 Amps | 120 = 12 Amps |
| 080 = 8 Amps | 180 = 18 Amps |

**Input Phase:**
- S = Single Phase
- Y = Single or Three Phase
- T = Three Phase

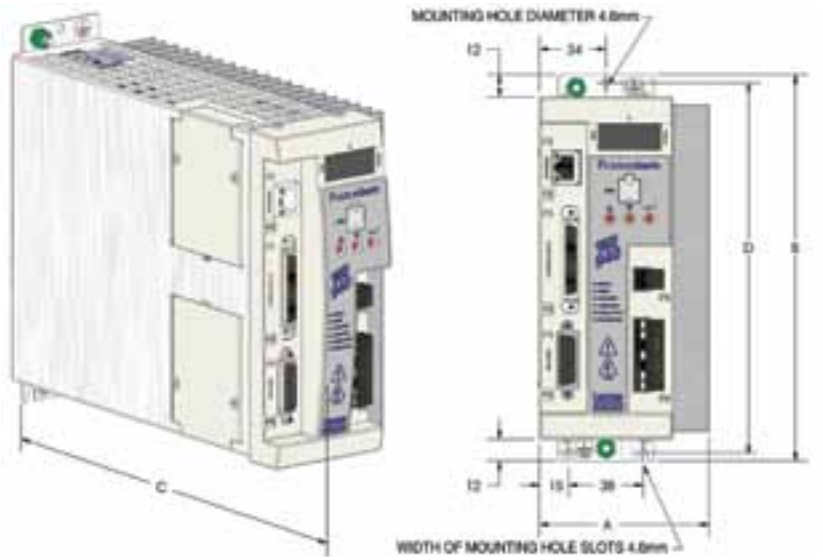
Input Voltage:
- 1 = 120VAC Doubler (120V-1~ in/240V-3~ out), 240 VAC (240V-1~ in/240V-3~ out)
- 2 = 200/240 VAC
- 4 = 400/480 VAC

**Line Filter:**
- N = No Line Filter*, Standard Heat Sink
- C = No Line Filter*, Cold Plate Option
- F = Integrated Line Filter (1 phase only), Standard Heat Sink

**Feedback:**
- E = Incremental Encoder (must have E94P)
- R = Resolver (must have E94R)

**Safety Option:**
- X = MotionView on CD, no ISO13849-1 safety compliance
- M = MotionView OnBoard, no ISO13849-1 safety compliance
- S = MotionView OnBoard with ISO13849-1 safety compliance

* For 3-phase EMC installation, PositionServo EMC footprint/side mount filters are required.




| Dimensions | | | | | |
|---|---|---|---|---|---|
| **Type** | **A** (mm) | **B** (mm) | **C** (mm) | **D** (mm) | **Weight** (kg) |
| E94_020S1N_M | 68 | 190 | 190 | 182 | 1.1 |
| E94_040S1N_M | 69 | 190 | 190 | 182 | 1.2 |
| E94_020S2F_M | 68 | 190 | 235 | 182 | 1.3 |
| E94_040S2F_M | 69 | 190 | 235 | 182 | 1.5 |
| E94_080S2F_M | 87 | 190 | 235 | 182 | 1.9 |
| E94_100S2F_M | 102 | 190 | 235 | 182 | 2.2 |
| E94_020Y2N_M | 68 | 190 | 190 | 182 | 1.3 |
| E94_040Y2N_M | 69 | 190 | 190 | 182 | 1.5 |
| E94_080Y2N_M | 95 | 190 | 190 | 182 | 1.9 |
| E94_100Y2N_M | 114 | 190 | 190 | 182 | 2.2 |
| E94_120Y2N_M/E94_120Y2C | 68 | 190/197 | 235/214 | 182 | 1.5/1.4 |
| E94_180T2N_M/E94_180Y2C | 68 | 242/248 | 235/193 | 233/232 | 2.0/1.7 |
| E94_020T4N_M | 68 | 190 | 190 | 182 | 1.5 |
| E94_040T4N_M | 95 | 190 | 190 | 182 | 1.9 |
| E94_060T4N_M/E94_060T4C | 68 | 190/197 | 235/214 | 182 | 1.4/1.5 |
| E94_090T4N_M/E94_090T4C | 68 | 242/248 | 235/193 | 233/232 | 2.0/1.7 |

**PART NUMBER KEY**

**P** = Model 940 Encoder-based drive
**R** = Model 941 Resolver-based drive

**X** = MotionView on CD, no ISO13849-1 safety compliance
**M** = MotionView OnBoard, no ISO13849-1 safety compliance
**S** = MotionView OnBoard, with ISO13849-1 safety compliance

**E94P020Y2NEM**

**E** = Incremental encoder (must have E94P drive)
**R** = Standard resolver (must have E94R drive)

| Environment Ratings | |
|---|---|
| Vibration | 2 g (10 - 2000 Hz) |
| Ambient Operating Temperature Range | 0 to 40°C |
| Ambient Storage Temperature Range | -10 to 70°C |
| Temperature Drift | 0.1% per °C rise |
| Humidity | 5 - 90% non-condensing |
| Altitude | 1500 m/5000 ft [derate by 1% per 300m (1000 ft) above 1500m (5000 ft)] |

## P3 | Controller Interface
50-pin SCSI

| Pin | Name | Function |
|---|---|---|
| 1 | MA+ | Master Encoder A+ / Step+ input |
| 2 | MA- | Master Encoder A- / Step- input |
| 3 | MB+ | Master Encoder B+ / Direction+ input |
| 4 | MB- | Master Encoder B- / Direction- input |
| 5 | GND | Drive Logic Common |
| 6 | +5V | +5V Output (max 100mA) |
| 7 | BA+ | Buffered Encoder Output: Channel A+ |
| 8 | BA- | Buffered Encoder Output: Channel A- |
| 9 | BB+ | Buffered Encoder Output: Channel B+ |
| 10 | BB- | Buffered Encoder Output: Channel B- |
| 11 | BZ+ | Buffered Encoder Output: Channel Z+ |
| 12 | BZ- | Buffered Encoder Output: Channel Z- |
| 13-19 | | Empty |
| 20 | AIN2+ | Positive (+) of Analog signal input |
| 21 | AIN2- | Negative (-) of Analog signal input |
| 22 | ACOM | Analog common |
| 23 | AO1 | Analog output |
| 24 | AIN1+ | Positive (+) of Analog signal input |
| 25 | AIN1 - | Negative (-) of Analog signal input |
| 26 | IN_A_COM | Digital input group A COM terminal |
| 27 | IN_A1 | Digital input A1 |
| 28 | IN_A2 | Digital input A2 |
| 29 | IN_A3 | Digital input A3 |
| 30 | IN_A4 | Digital input A4 |
| 31 | IN_B_COM | Digital input group B COM terminal |
| 32 | IN_B1 | Digital input B1 |
| 33 | IN_B2 | Digital input B2 |
| 34 | IN_B3 | Digital input B3 |
| 35 | IN_B4 | Digital input B4 |
| 36 | IN_C_COM | Digital input group C COM terminal |
| 37 | IN_C1 | Digital input C1 |
| 38 | IN_C2 | Digital input C2 |
| 39 | IN_C3 | Digital input C3 |
| 40 | IN_C4 | Digital input C4 |
| 41 | RDY+ | Ready output Collector |
| 42 | RDY- | Ready output Emitter |
| 43 | OUT1-C | Programmable output #1 Collector |
| 44 | OUT1-E | Programmable output #1 Emitter |
| 45 | OUT2-C | Programmable output #2 Collector |
| 46 | OUT2-E | Programmable output #2 Emitter |
| 47 | OUT3-C | Programmable output #3 Collector |
| 48 | OUT3-E | Programmable output #3 Emitter |
| 49 | OUT4-C | Programmable output #4 Collector |
| 50 | OUT4-E | Programmable output #4 Emitter |

## P1 | Input Power
4-pin Removable Terminal Block

| | | Standard Models | | Doubler Models |
|---|---|---|---|---|
| Pin | Name | Function | Name | Function |
| 1 | PE | Protective Earth (Ground) | PE | Protective Earth (Ground) |
| 2 | L1 | AC Power in | N | AC Power Neutral (120V Doubler only) |
| 3 | L2 | AC Power in | L1 | AC Power in |
| 4 | L3 | AC Power in (3~ models only) | L2/N | AC Power in (non-doubler operation) |

## P2 | Communications
RJ-45 Ethernet Port

## P4 | Primary Feedback

| | Encoder 15-pin D-shell | | Resolver 9-pin D-shell | |
|---|---|---|---|---|
| Pin | Name | Function | Name | Function |
| 1 | EA+ | Channel A+ | Ref+ | Resolver reference connection |
| 2 | EA- | Channel A- | Ref- | |
| 3 | EB+ | Channel B+ | N/C | No connection |
| 4 | EB- | Channel B- | Cos+ | Resolver Cosine connections |
| 5 | EZ+ | Channel Z+ | Cos- | |
| 6 | EZ- | Channel Z- | Sin+ | Resolver Sine connections |
| 7 | GND | Ground | Sin- | |
| 8 | SHLD | Shield | PTC+ | Thermal sensor |
| 9 | PWR | +5VDC | PTC- | |
| 10 | HA- | Hall A- | | |
| 11 | HA+ | Hall A+ | | |
| 12 | HB+ | Hall B+ | | |
| 13 | HC+ | Hall C+ | | |
| 14 | HB- | Hall B- | | |
| 15 | HC- | Hall C- | | |

## P5 | 24VDC "Keep Alive"
2-pin Removable Terminal Block

| Pin | Name | Function |
|---|---|---|
| 1 | +24 VDC | Positive 24 VDC Input |
| 2 | Return | 24V power supply return |

## P6 | Brake and DC Bus
5-pin Removable Terminal Block

| Pin | Name | Function |
|---|---|---|
| 1 | B+ | Positive DC Bus / Brake Resistor |
| 2 | B+ | |
| 3 | BR | Brake Resistor |
| 4 | B- | Negative DC Bus |
| 5 | B- | |

## P12 | Optional Secondary Encoder
9-pin D-shell

| Pin | Name | Function |
|---|---|---|
| 1 | E2B+ | Second Encoder Channel B+ Input |
| 2 | E2A- | Second Encoder Channel A- Input |
| 3 | E2A+ | Second Encoder Channel A+ Input |
| 4 | +5v | Supply voltage for Second Encoder |
| 5 | COM | Supply common |
| 6 | E2Z- | Second Encoder Channel Z- Input |
| 7 | E2Z+ | Second Encoder Channel Z+ Input |
| 8 | N/C | No Connection |
| 9 | E2B- | Second Encoder Channel B- Input |

## P8 | Safety Function
6-pin Removable Terminal Block

| Pin | Name | Function |
|---|---|---|
| 1 | Bypass Voltage | ISO13849-1 Bypass Voltage (+24VDC) |
| 2 | Bypass COM | ISO13849-1 Bypass Common |
| 3 | Safety Status | ISO13849-1 Safety Status |
| 4 | Safety Input1 | ISO13849-1 Safety Input 1 (+24VDC to Enable) |
| 5 | Safety COM | ISO13849-1 Safety Common |
| 6 | Safety Input2 | ISO13849-1 Safety Input 2 (+24VDC to Enable) |

## P7 | Motor Power
6-pin Removable Terminal Block

| Pin | Name | Function |
|---|---|---|
| 1 | T1 | Thermistor (PTC) Input |
| 2 | T2 | Thermistor (PTC) Input |
| 3 | U | Motor Power Out |
| 4 | V | Motor Power Out |
| 5 | W | Motor Power Out |
| 6 | PE | Protective Earth (Chassis Ground) |

## Digital Synchronous (brushless) and Asynchronous (brushed) Servo Motors

Lenze - AC Tech offers a variety of brushless and brushed servo motors to fit your application.
A variety of motors means you never have to pay for more than what you need.
Use the selection chart below to get started. Each motor is paired up with the PositionServo so you can get the perfect performance.

| |  |  |  |
|---|---|---|---|
| | **MAS** | **MCS** | **MD** |
| Power Range | 200 W – 1 kW | 250 W – 5 kW | 250 W – 5.9 kW |
| Input Voltage | 120/240VAC | 240/480 VAC | 480 VAC |
| Connectors | Flying leads | Intercontec | Intercontec |
| Feedback | Encoder Only | Resolver or Encoder | Resolver |
| Speed | Up to 4500 rpm | Up to 6000 rpm | Up to 6000 rpm |
| Ratings | IP55 | IP54, IP65 | IP54, IP65 |
| Motor Poles | 4 | 8 | 6 |

### Don't see the exact motor you want?

The MAS, MCS, and MD motors are the premiere motors to complete your PositionServo Solution. If you are looking for a different flange or cable, adding a gearbox or brake, or just want your motor painted a certain color, please contact your local Lenze-AC Tech representative for additional or custom options.

## MAS Series

Economical, High Performing

The MAS Series of motors are your low-cost, yet high-performing solution. When you don't want to pay for any extras, look no further than the MAS Series of motors. When combined with the PositionServo, you will have our exceptional performing solution at an exceptionally low price.

## MAS Series Features

- Synchronous AC brushless servo motors
- 200W to 1kW Power
- 120/240 VAC
- Metric-mounting flange
  54mm, 76mm, 86mm
- 2000 PPR encoder feedback (pre-quad)
- UL, CE
- IP55
- 4-pole
- Two-year warranty

# MAS Servo Motor

| | MAS | 05 | D | 30 - | B | B0 |
|---|---|---|---|---|---|---|
| **MAS Series Servo Motor** | | | | | | |
| **Frame Size**<br>05 = 54<br>07 = 76<br>08 = 80 | | | | | | |
| **Stack:**<br>C = 30<br>D = 40<br>E = 50<br>H = 80 | | | | | | |
| **Rated Speed:**<br>30 = 3000 RPM | | | | | | |
| **Connector Configuration:**<br>B = Flying Leads [Power] and DB-15 [M] [Feedback]<br>C = CPC [Power] and DB-15 [M] [Feedback]<br>D = M17 [Power] and DB-15 [M] [Feedback]<br>M = M17 [Power] and M17 [Feedback] | | | | | | |
| **Brake:**<br>B0 = No Brake | | | | | | |

Example: MAS08E30-DB0

| AVAILABLE MOTORS |
|---|
| MAS05D30-_B0 |
| MAS07C30-_B0 |
| MAS08E30-_B0 |
| MAS08H30-_B0 |

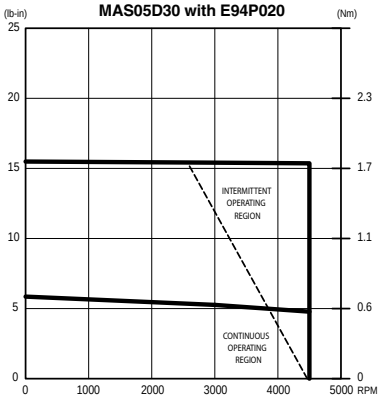


# MAS Specifications

| Parameter | Units | MAS05D30 | MAS07C30 | MAS08E30 | MAS08H30 |
|---|---|---|---|---|---|
| Max bus voltage | VDC | 340 | 340 | 340 | 340 |
| Rated power | kW | 0.2 | 0.4 | 0.75 | 1.0 |
| Rated speed | RPM | 3000 | | | |
| Maximum speed | RPM | 4500 | | | |
| Rated torque | N-m | 0.64 | 1.27 | 2.38 | 3.19 |
| | lb-In | 5.64 | 11.28 | 21.09 | 28.21 |
| Continuous stall torque | N-m | 0.69 | 1.37 | 2.94 | 3.92 |
| | lb-In | 6.08 | 12.15 | 26.04 | 34.72 |
| Peak torque | N-m | 1.96 | 3.92 | 8.82 | 11.76 |
| | lb-In | 17.36 | 34.72 | 78.12 | 104.16 |
| Rated current | Arms | 2.10 | 3.8 | 7.70 | 8.6 |
| Continuous stall current | Arms | 2.2 | 4.0 | 9.1 | 9.7 |
| Peak current | Arms | 5.5 | 10 | 23.7 | 25.7 |
| Torque constant $K_t$ | N-m/Arms | 0.340 | 0.375 | 0.349 | 0.431 |
| | lb-In/Arms | 3.009 | 3.319 | 3.008 | 3.814 |
| Voltage constant $K_e$ | V/kRPM | 35.6 | 39.3 | 36.5 | 45.1 |
| Inductance (ø - ø) | mH | 19.40 | 13.20 | 5.0 | 4.80 |
| Resistance (ø - ø) | Ohm | 6.80 | 3.30 | 0.86 | 0.82 |
| Rotor interia | kg - $m^2$ | 1.73E-05 | 7.40E-05 | 1.93E-04 | 2.65E-04 |
| | lbs-In-$sec^2$ | 1.53E-04 | 6.55E-04 | 1.70E-03 | 2.35E-03 |
| Motor weight | kg | 1.07 | 2.1 | 3.9 | 5.05 |
| | lb | 2.36 | 4.63 | 8.60 | 11.14 |
| Encoder | | 5VDC Encoder, 2000 ppr (pre-quad) | | | |
| Motor Poles | | 4 | | | |

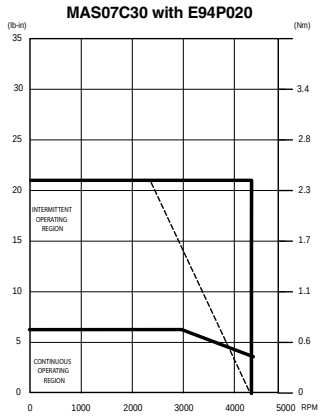
# Motor Speed-Torque Performance Curves

## PositionServo with MAS Series Motors - 120/240 VAC - 54, 76 and 86mm



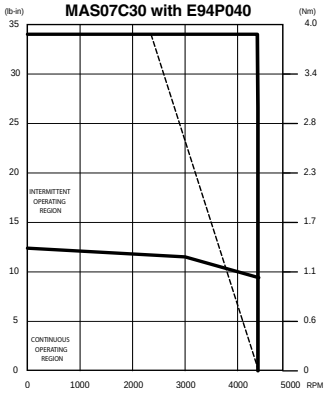

### MAS05D30-_ _ _ with E94P020_ _ _E_

| Motor | Connectors | | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|---|
| Models | Power | Feedback | Power | Feedback | Input Voltage | Models | |
| MAS05D30-BB0 | FL | DB15 [M] | | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | 45…264V 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P020S1NEM*<br>E94P020S2FEM*<br>E94P020Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the "M" in the part number with an "S" |
| MAS05D30-CB0 | CPC | DB15 [M] | EWLM_ _ _FC1NA | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | | | |
| MAS05D30-DB0 | M17 | DB15 [M] | EWLB_ _ _FD1NA | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | | | |
| MAS05D30-MB0 | M17 | M17 | EWLB_ _ _FD1NA | EWLE_ _ _AD1NA<br>_ _ _ = meter length (002, 005, 010) | | | |



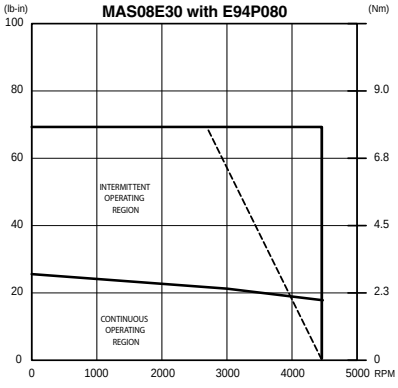

### MAS07C30-_ _ _ with E94P020_ _ _E_

| Motor | Connectors | | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|---|
| Models | Power | Feedback | Power | Feedback | Input Voltage | Models | |
| MAS07C30-BB0 | FL | DB15 [M] | | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | 45…264V 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P020S1NEM*<br>E94P020S2FEM*<br>E94P020Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the "M" in the part number with an "S" |
| MAS07C30-CB0 | CPC | DB15 [M] | EWLM_ _ _FC1NA | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | | | |
| MAS07C30-DB0 | M17 | DB15 [M] | EWLB_ _ _FD1NA | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | | | |
| MAS07C30-MB0 | M17 | M17 | EWLB_ _ _FD1NA | EWLE_ _ _AD1NA<br>_ _ _ = meter length (002, 005, 010) | | | |




### MAS07C30-_ _ _ with E94P040_ _ _E_

| Motor | Connectors | | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|---|
| Models | Power | Feedback | Power | Feedback | Input Voltage | Models | |
| MAS07C30-BB0 | FL | DB15 [M] | | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | 45…264V 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P040S1NEM*<br>E94P040S2FEM*<br>E94P040Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the "M" in the part number with an "S" |
| MAS07C30-CB0 | CPC | DB15 [M] | EWLM_ _ _FC1NA | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | | | |
| MAS07C30-DB0 | M17 | DB15 [M] | EWLB_ _ _FD1NA | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | | | |
| MAS07C30-MB0 | M17 | M17 | EWLB_ _ _FD1NA | EWLE_ _ _AD1NA<br>_ _ _ = meter length (002, 005, 010) | | | |



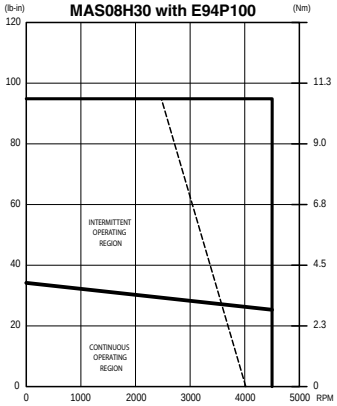

### MAS08E30-_ _ _ with E94P080_ _ _E_

| Motor | Connectors | | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|---|
| Models | Power | Feedback | Power | Feedback | Input Voltage | Models | |
| MAS08E30-BB0 | FL | DB15 [M] | | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P080S2FEM*<br>E94P080Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the "M" in the part number with an "S" |
| MAS08E30-CB0 | CPC | DB15 [M] | EWLM_ _ _FC1NA | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | | | |
| MAS08E30-DB0 | M17 | DB15 [M] | EWLB_ _ _FD1NA | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | | | |
| MAS08E30-MB0 | M17 | M17 | EWLB_ _ _FD1NA | EWLE_ _ _AD1NA<br>_ _ _ = meter length (002, 005, 010) | | | |

***KEY:***
240 VAC
120 VAC

# Motor Speed-Torque Performance Curves

## PositionServo with MAS Series Motors - 120/240 VAC - 86mm




### MAS08H30-_ _ _ with E94P100_ _ _E_

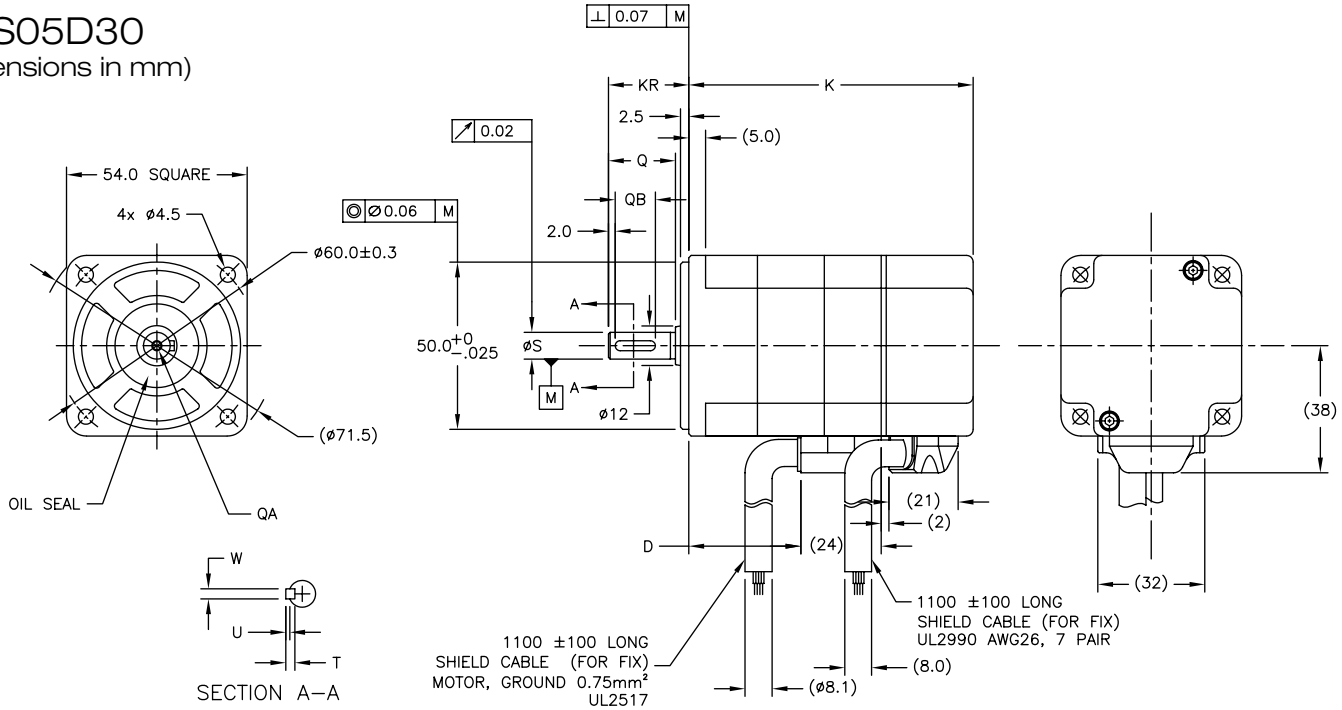
| Motor | Connectors | | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|---|
| Models | Power | Feedback | Power | Feedback | Input Voltage | Models | |
| MAS08H30-BB0 | FL | DB15 [M] | | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P100S2FEM*<br>E94P100Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the "M" in the part number with an "S" |
| MAS08H30-CB0 | CPC | DB15 [M] | EWLM_ _ _FC1NA | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | | | |
| MAS08H30-DB0 | M17 | DB15 [M] | EWLB_ _ _FD1NA | EWLE_ _ _AB1NA<br>_ _ _ = meter length (002, 005, 010) | | | |
| MAS08H30-MB0 | M17 | M17 | EWLB_ _ _FD1NA | EWLE_ _ _AD1NA<br>_ _ _ = meter length (002, 005, 010) | | | |

***KEY:***
240 VAC
120 VAC

# MAS Size: 54 mm

## MAS05D30

(Dimensions in mm)

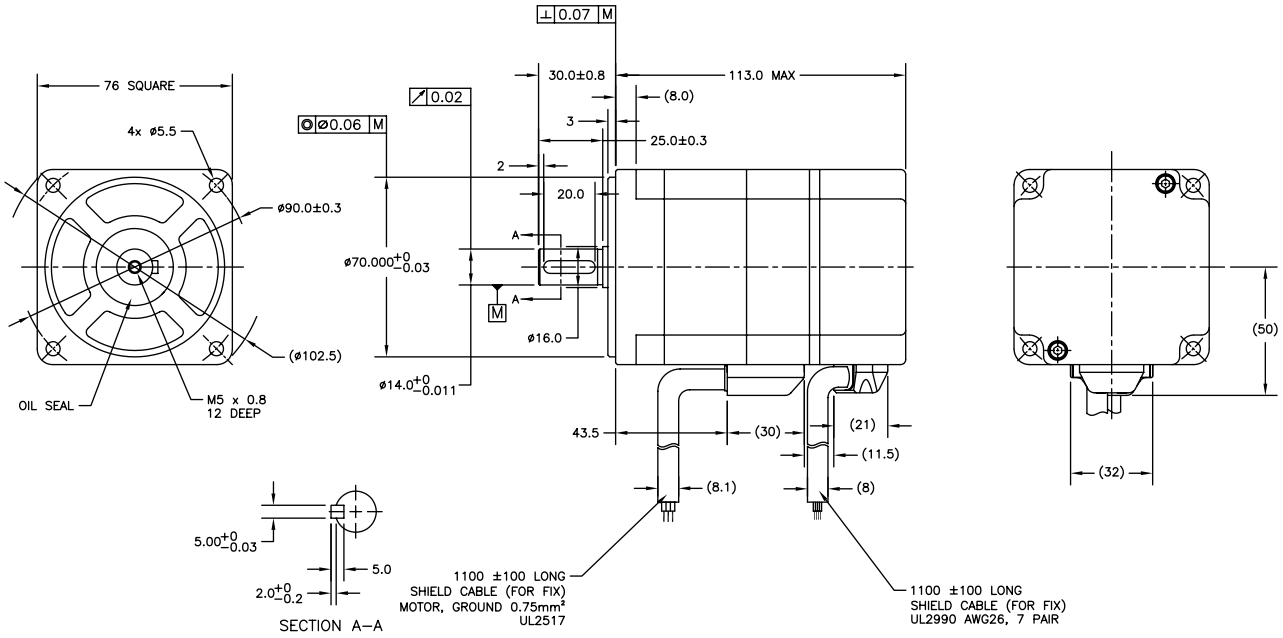



| Dimension | K | KR | Q | QA | QB | ØS | D | T | U | W |
|---|---|---|---|---|---|---|---|---|---|---|
| MAS05D30 | 105 | 30+/-0.9 | 25+/-0.4 | M4 X 0.7 10 Depth | 20 | 11 +0 -0.0011 | 52.5 | 4 | 1.5 - 0.2 | 4 +0 -0.0011 |

# MAS Size: 76 mm

## MAS07C30

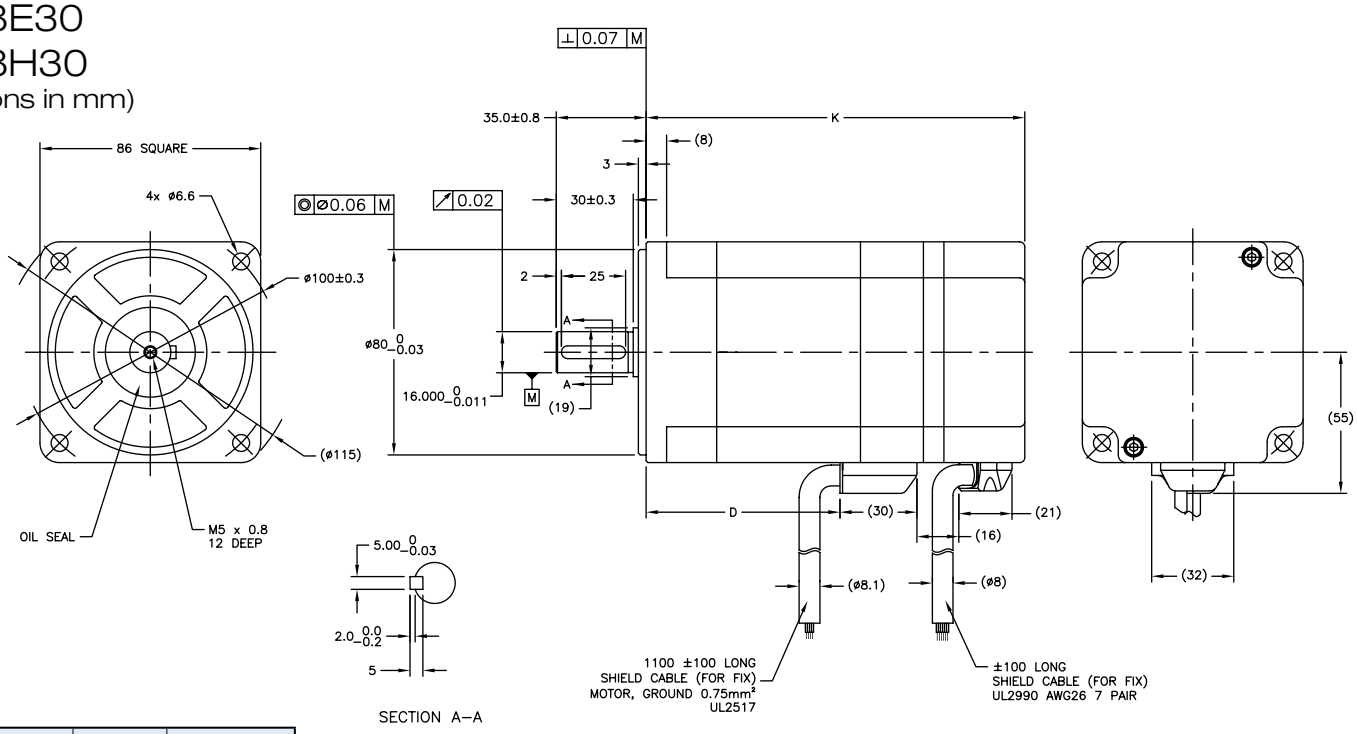
(Dimensions in mm)



# MAS Size: 86 mm

## MAS08E30
## MAS08H30

(Dimensions in mm)




| Dimension | K | D |
|---|---|---|
| MAS08E30 | 149 | 75.5 |
| MAS08H30 | 172 | 98.5 |

# MAS Motor Wiring

| MAS Flying Lead Encoder Connections | |
|---|---|
| **SIGNAL** | **COLOR** |
| +DC 5V | RED |
| GROUND | BLACK |
| A+ CHANNEL OUTPUT (EN) | PURPLE |
| A- CHANNEL OUTPUT (EN) | GREEN |
| B+ CHANNEL OUTPUT (EN) | BLUE |
| B- CHANNEL OUTPUT (EN) | BROWN |
| I+ CHANNEL OUTPUT (EN) | WHITE |
| I- CHANNEL OUTPUT (EN) | YELLOW |
| HALL A+ CHANNEL OUTPUT (EN) | GREEN/BLACK |
| HALL A- CHANNEL OUTPUT (EN) | PURPLE/BLACK |
| HALL B+ CHANNEL OUTPUT (EN) | BLUE/BLACK |
| HALL B- CHANNEL OUTPUT (EN) | BROWN/BLACK |
| HALL C+ CHANNEL OUTPUT (EN) | RED/BLACK |
| HALL C- CHANNEL OUTPUT (EN) | YELLOW/BLACK |
| CASE EARTH | SHIELD |

| MAS Flying Lead Power Connections | |
|---|---|
| **SIGNAL** | **COLOR** |
| U | Red |
| V | Black |
| W | White |
| Earth Ground | Green |

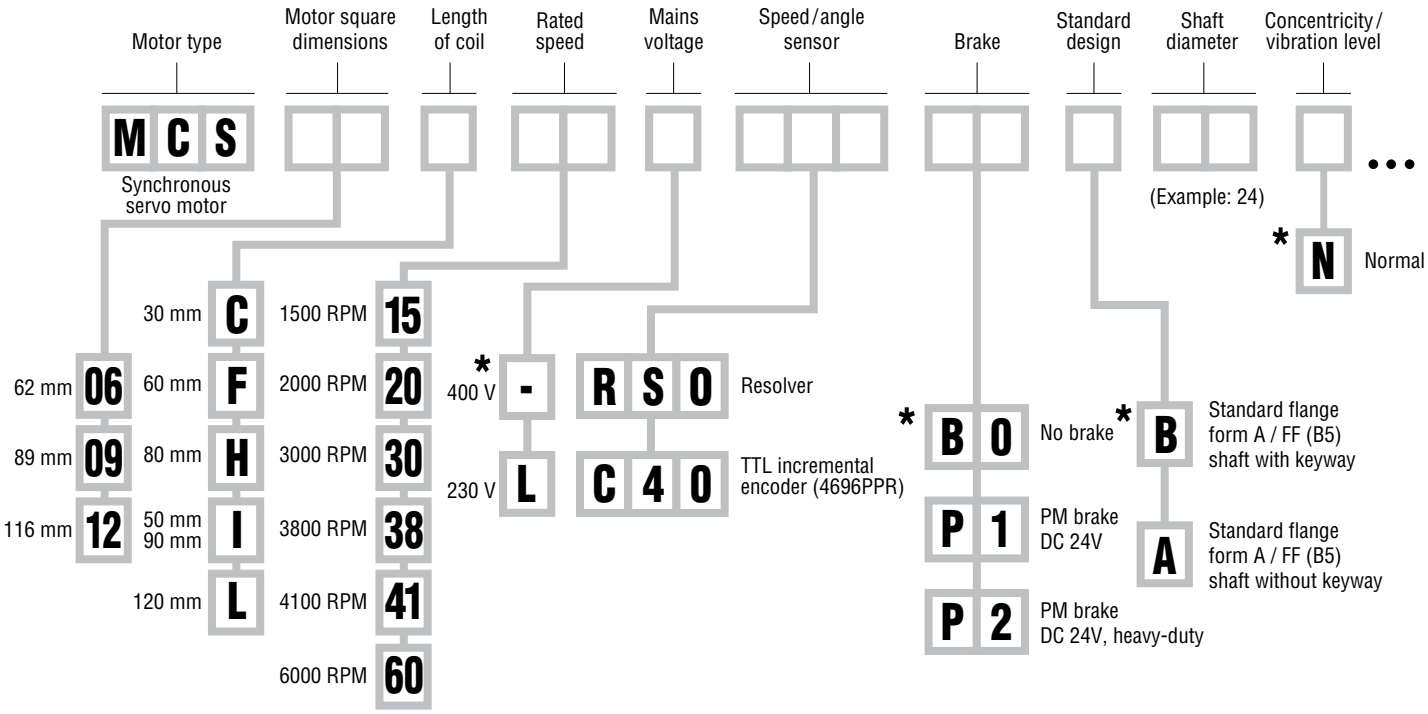
# MCS Series

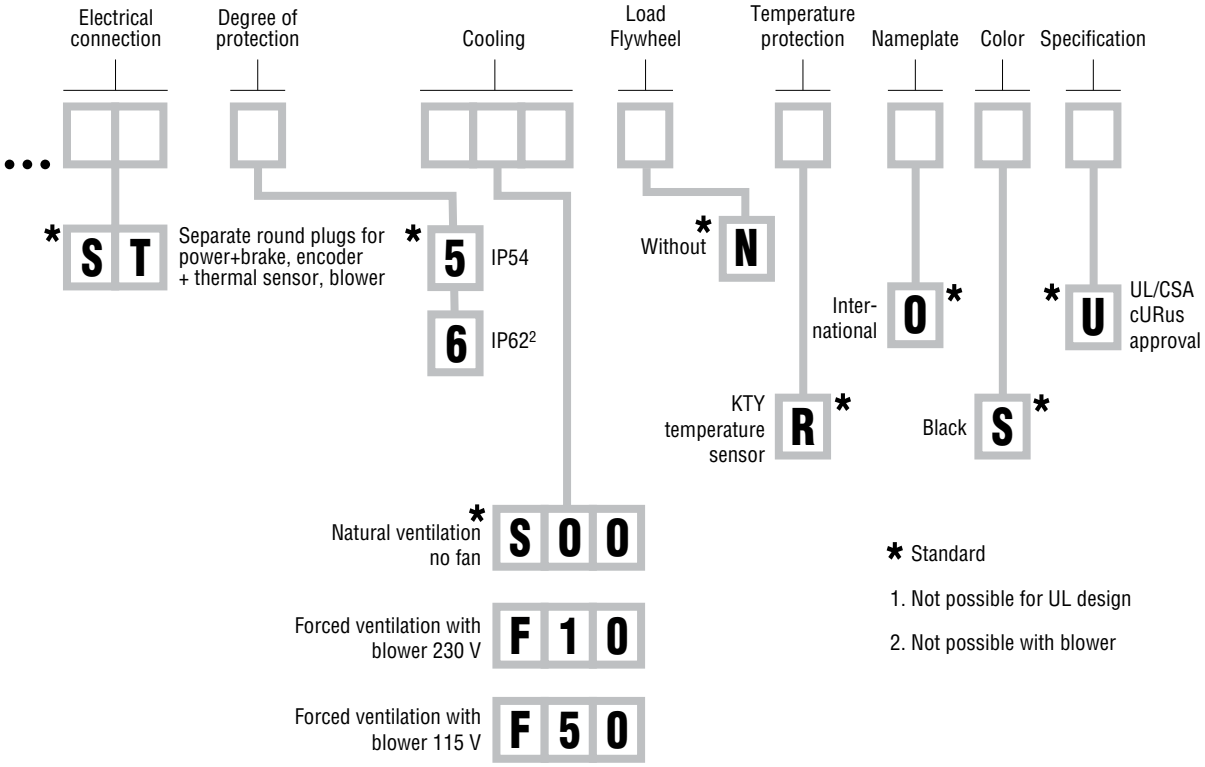
Low Inertia, High Power

The MCS Series of motors are characterized by an extremely low moment of inertia and an incredibly high overload capacity. The motors are designed for high power and demanding applications. Choose from a variety of frame sizes, feedback choices and accessories to create the system that is right for you.

## MCS Series Features

- Synchronous AC brushless servo motors
- 250W to 5kW Power
- 240/480 VAC
- IEC Metric-mounting flange
  62mm, 89mm, 116mm
- Resolver feedback
  Encoder optional (4096 PPR)
- UL, CE
- IP54
- Optional IP65
- Intercontec connectors
- 8-pole
- Optional 24VDC brake
- Two-year warranty




Electrical connection
Degree of protection
Cooling
Load Flywheel
Temperature protection
Nameplate
Color
Specification
• • •
* S T
Separate round plugs for power+brake, encoder + thermal sensor, blower
* 5
IP54
6
IP62[2]
Without * N
Inter-national O *
KTY temperature sensor R *
Black S *
* U
UL/CSA cURus approval
Natural ventilation no fan * S 0 0
Forced ventilation with blower 230 V F 1 0
Forced ventilation with blower 115 V F 5 0
* Standard
1. Not possible for UL design
2. Not possible with blower



| Parameter* | Units | MCS06C41L | MCS06C60L | MCS06F41L | MCS06F60L | MCS06I41L | MCS06I60L |
|---|---|---|---|---|---|---|---|
| Max mains voltage | VDC | 340 | 340 | 340 | 340 | 340 | 340 |
| Rated power | kW | 0.25 | 0.31 | 0.51 | 0.57 | 0.64 | 0.75 |
| Rated speed | RPM | 4050 | 6000 | 4050 | 6000 | 4050 | 6000 |
| Maximum speed* | RPM | 8000 | 8000 | 8000 | 8000 | 8000 | 8000 |
| Rated torque | N-m | 0.60 | 0.50 | 1.20 | 0.90 | 1.50 | 1.20 |
| | lb-In | 5.31 | 4.42 | 10.62 | 7.96 | 13.27 | 10.62 |
| Continuous stall torque | N-m | 0.80 | 0.80 | 1.50 | 1.50 | 2.00 | 2.00 |
| | lb-In | 7.08 | 7.08 | 13.27 | 13.27 | 17.70 | 17.70 |
| Peak torque | N-m | 2.40 | 2.40 | 4.40 | 4.40 | 6.20 | 6.20 |
| | lb-In | 21.24 | 21.24 | 38.94 | 38.94 | 54.87 | 54.87 |
| Rated current | Arms | 2.5 | 4.0 | 2.9 | 3.4 | 2.9 | 3.6 |
| Continuous stall current | Arms | 2.5 | 4.3 | 2.9 | 3.8 | 3.1 | 4.2 |
| Peak current | Arms | 10.8 | 18.5 | 10.5 | 16.5 | 11.8 | 16.0 |
| Torque constant at 150°C $K_t$ | N-m/Arms | 0.33 | 0.19 | 0.62 | 0.40 | 0.64 | 0.48 |
| | lbs-In/Arms | 2.92 | 1.68 | 5.49 | 3.54 | 5.66 | 4.25 |
| Voltage constant $K_e$ (ph-ph) | V/kRPM | 21.50 | 12.5 | 34.5 | 22.2 | 38 | 28.5 |
| Inductance (per phase) | mH | 12.8 | 4.3 | 15.9 | 6.9 | 15.1 | 9.3 |
| Resistance (per phase) | Ohm | 4.0 | 1.45 | 3.7 | 1.5 | 3.1 | 1.7 |
| Rotor interia | kg - $m^2$ | 1.40E-05 | 1.04E-05 | 2.20E-05 | 2.20E-05 | 3.00E-05 | 3.00E-05 |
| | lbs-In-$sec^2$ | 1.24E-04 | 1.24E-04 | 1.95E-04 | 1.95E-04 | 2.65E-04 | 2.65E-04 |
| Motor weight | kg | 1.8 | 1.8 | 2.2 | 2.2 | 2.9 | 2.9 |
| | lb | 3.97 | 3.97 | 4.85 | 4.85 | 6.39 | 6.39 |
| Motor poles | 8 | | | | | | |

| Parameter* | Units | MCS09D41L | MCS09D60L | MCS09F38L | MCS09F60L | MCS09H41L | MCS09H60L | MCS09L41L |
|---|---|---|---|---|---|---|---|---|
| Max bus voltage | VDC | 340 | 340 | 340 | 340 | 340 | 340 | 340 |
| Rated power | kW | 1.0 | 1.1 | 1.2 | 1.5 | 1.6 | 1.9 | 1.9 |
| Rated speed | RPM | 4050 | 6000 | 3750 | 6000 | 4050 | 6000 | 4050 |
| Maximum speed* | RPM | 7000 | 7000 | 7000 | 7000 | 7000 | 7000 | 7000 |
| Rated torque | N-m | 2.30 | 1.80 | 3.10 | 2.40 | 3.80 | 3.00 | 4.5 |
| | lb-In | 20.35 | 15.93 | 27.43 | 21.24 | 33.63 | 26.55 | 39.82 |
| Continuous stall torque | N-m | 3.30 | 3.30 | 4.20 | 4.20 | 5.50 | 5.50 | 7.50 |
| | lb-In | 29.20 | 29.20 | 37.17 | 37.17 | 48.67 | 48.67 | 66.37 |
| Peak torque | N-m | 9.50 | 9.50 | 15.00 | 15.00 | 20.00 | 20.00 | 32.00 |
| | lb-In | 84.07 | 84.07 | 132.74 | 132.74 | 176.99 | 176.99 | 283.19 |
| Rated current | Arms | 4.6 | 7.0 | 5.0 | 7.9 | 6.8 | 8.0 | 8.4 |
| Continuous stall current | Arms | 5.3 | 10.3 | 6.0 | 10.5 | 8.5 | 12 | 12.4 |
| Peak current | Arms | 20 | 39 | 30 | 53 | 40 | 57 | 64 |
| Torque constant at 150°C $K_t$ | N-m/Arms | 0.62 | 0.32 | 0.70 | 0.40 | 0.65 | 0.46 | 0.60 |
| | lb-In/Arms | 5.49 | 2.83 | 6.19 | 3.54 | 5.75 | 4.07 | 5.31 |
| Voltage constant $K_e$ (ph-ph) | V/kRPM | 35.6 | 18.3 | 40 | 22.8 | 37.8 | 26.6 | 35.9 |
| Inductance (per phase) | mH | 6.3 | 1.7 | 6.2 | 2.0 | 4.0 | 2.0 | 2.5 |
| Resistance (per phase) | Ohm | 1.2 | 0.6 | 0.9 | 0.28 | 0.6 | 0.24 | 0.30 |
| Rotor interia | kg - $m^2$ | 1.10E-04 | 1.10E-04 | 1.50E-04 | 1.50E-04 | 1.90E-04 | 1.90E-04 | 2.80E-04 |
| | in-lbs-$sec^2$ | 9.74E-04 | 9.74E-04 | 1.33E-03 | 1.33E-03 | 1.68E-03 | 1.68E-03 | 2.48E-03 |
| Motor weight | kg | 4.3 | 4.3 | 5.2 | 5.2 | 6.1 | 6.1 | 7.9 |
| | lb | 9.48 | 9.48 | 11.47 | 11.47 | 13.45 | 13.45 | 17.42 |
| Motor poles | 8 | | | | | | | |

* Motor performance does not always reflect system performance. System performance can be found in the following speed-torque curves.

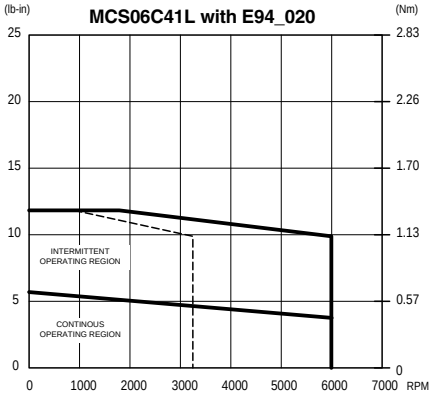


| Parameter* | Units | MCS12D20L | MCS12D41L | MCS12H15L | MCS12H30L | MCS12L20L |
|---|---|---|---|---|---|---|
| Max bus voltage | VDC | 340 | 340 | 340 | 340 | 340 |
| Rated power | kW | 1.1 | 1.8 | 1.6 | 2.5 | 2.8 |
| Rated speed | RPM | 1950 | 4050 | 1500 | 3000 | 1950 |
| Maximum speed* | RPM | 6000 | 6000 | 6000 | 6000 | 6000 |
| Rated torque | N-m | 5.50 | 4.30 | 10.00 | 8.00 | 13.50 |
| | lb-In | 48.67 | 38.05 | 88.50 | 70.80 | 119.47 |
| Continuous stall torque | N-m | 6.4 | 6.4 | 11.4 | 11.4 | 15.0 |
| | lb-In | 56.64 | 56.64 | 100.88 | 100.88 | 132.74 |
| Peak torque | N-m | 18 | 18 | 29 | 29 | 56 |
| | lb-In | 159.29 | 159.29 | 256.64 | 256.64 | 495.58 |
| Rated current | Arms | 5.2 | 8.8 | 7.8 | 10.5 | 11.8 |
| Continuous stall current | Arms | 5.5 | 10.7 | 8.2 | 13.5 | 12.4 |
| Peak current | Arms | 20 | 40 | 24 | 39 | 57 |
| Torque constant at 150°C $K_t$ | N-m/Arms | 1.17 | 0.60 | 1.4 | 0.86 | 1.21 |
| | lb-In/Arms | 10.35 | 5.31 | 12.39 | 7.61 | 10.71 |
| Voltage constant $K_e$ (ph-ph) | V/kRPM | 68.6 | 35 | 86.50 | 53 | 76.90 |
| Inductance (per phase) | mH | 13.0 | 3.4 | 10.5 | 4.0 | 5.5 |
| Resistance (per phase) | Ohm | 1.45 | 0.37 | 0.97 | 0.33 | 0.37 |
| Rotor interia | kg - $m^2$ | 4.00E-04 | 4.00E-04 | 7.30E-04 | 7.30E-04 | 1.06E-03 |
| | in-lbs-$sec^2$ | 3.54E-03 | 3.54E-03 | 6.46E-03 | 6.46E-03 | 9.38E-03 |
| Motor weight | kg | 6.4 | 6.4 | 9.5 | 9.5 | 12.6 |
| | lb | 14.11 | 14.11 | 20.95 | 20.95 | 27.78 |
| Motor poles | 8 | | | | | |

* Motor performance does not always reflect system performance. System performance can be found in the following speed-torque curves.

# Motor Speed-Torque Performance Curves

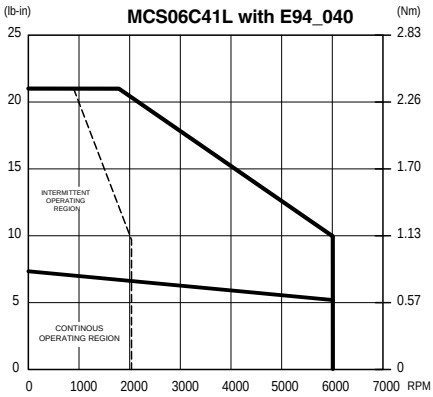
## PositionServo with MCS Series Motors - 120/240 VAC - 60mm




### MCS06C41L with E94_020_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06C41LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P020S1NEM*<br>E94P020S2FEM*<br>E94P020Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS06C41LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R020S1NRM*<br>E94R020S2FRM*<br>E94R020Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

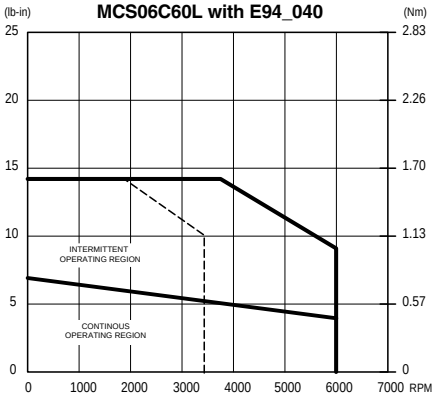
** Voltage Doubler Drive offers 240VAC output when 120VAC input is applied.




### MCS06C41L with E94_040_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06C41LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P040S1NEM*<br>E94P040S2FEM*<br>E94P040Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS06C41LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R040S1NRM*<br>E94R040S2FRM*<br>E94R040Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

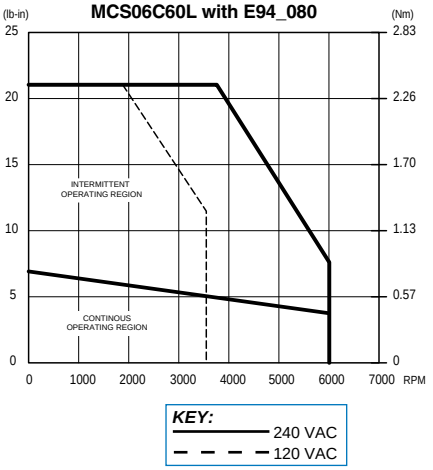
** Voltage Doubler Drive offers 240VAC output when 120VAC input is applied.




### MCS06C60L with E94_040_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06C60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P040S1NEM*<br>E94P040S2FEM*<br>E94P040Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS06C60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R040S1NRM*<br>E94R040S2FRM*<br>E94R040Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

** Voltage Doubler Drive offers 240VAC output when 120VAC input is applied.

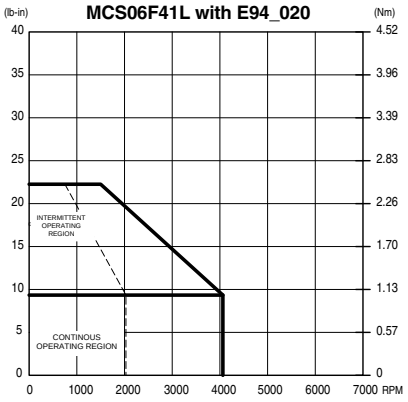



### MCS06C60L with E94_080_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06C60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P080S2FEM*<br>E94P080Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS06C60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R080S2FRM*<br>E94R080Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

# Motor Speed-Torque Performance Curves

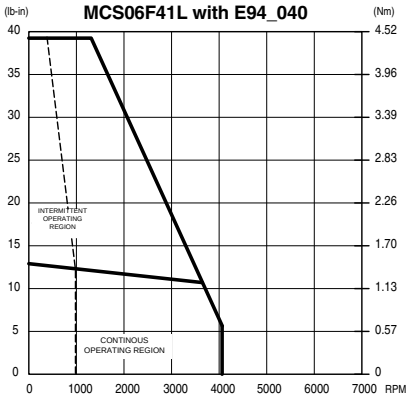
## PositionServo with MCS Series Motors - 120/240 VAC - 60mm




### MCS06F41L with E94_020_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06F41LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P020S1NEM*<br>E94P020S2FEM*<br>E94P020Y2NEX* | *To order a drive that meets theISO13849-1 safety standard replace the “M” in the part number with an “S |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS06F41LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R020S1NRM*<br>E94R020S2FRM*<br>E94R020Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

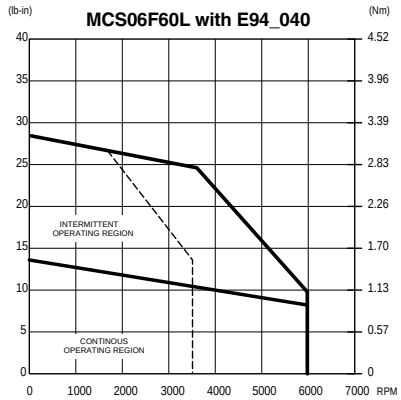
** Voltage Doubler Drive offers 240VAC output when 120VAC input is applied.




### MCS06F41L with E94_040_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06F41LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P040S1NEM*<br>E94P040S2FEM*<br>E94P040Y2NEM* | *To order a drive that meets theISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS06F41LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R040S1NRM*<br>E94R040S2FRM*<br>E94R040Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

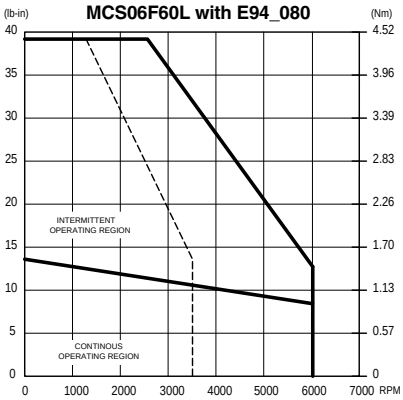
** Voltage Doubler Drive offers 240VAC output when 120VAC input is applied.




### MCS06F60L with E94_040_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06F60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P040S1NEM*<br>E94P040S2FEM*<br>E94P040Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS06F60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R040S1NRM*<br>E94R040S2FRM*<br>E94R040Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

** Voltage Doubler Drive offers 240VAC output when 120VAC input is applied.

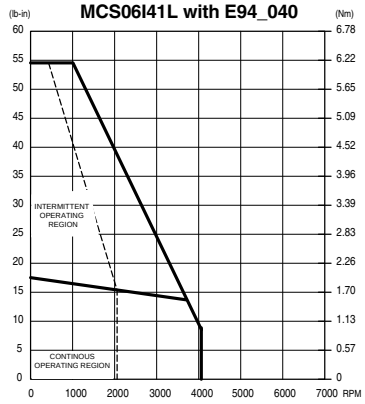



### MCS06F60L with E94_080_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06F60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P080S2FEM*<br>E94P080Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS06F60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R080S2FRM*<br>E94R080Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

***KEY:***
240 VAC
120 VAC

### MCS06I41L with E94_040

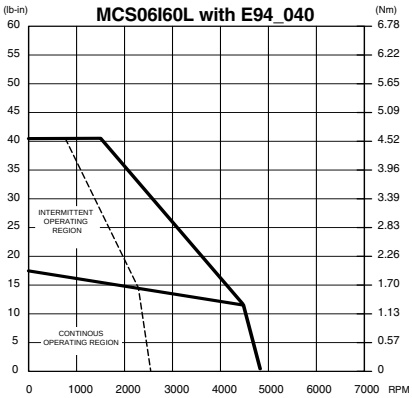



### MCS06I41L with E94_040_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06I41LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P040S1NEM*<br>E94P040S2FEM*<br>E94P040Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS06I41LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R040S1NRM*<br>E94R040S2FRM*<br>E94R040Y2NRM* | |

** Voltage Doubler Drive offers 240VAC output when 120VAC input is applied.

### MCS06I60L with E94_040

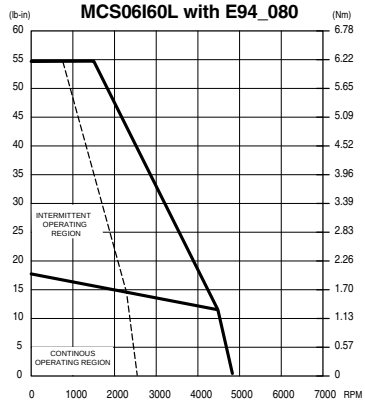



### MCS06I60L with E94_040_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06I60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P040S1NEM*<br>E94P040S2FEM*<br>E94P040Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS06I60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R040S1NRM*<br>E94R040S2FRM*<br>E94R040Y2NRM* | |

** Voltage Doubler Drive offers 240VAC output when 120VAC input is applied.

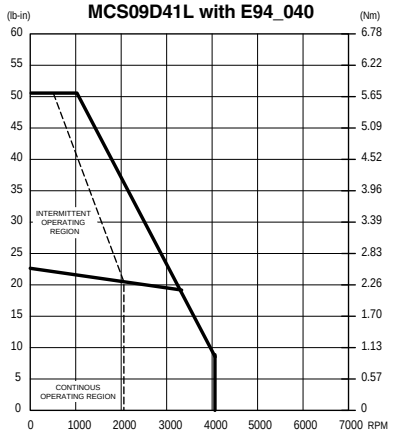
### MCS06I60L with E94_080




### MCS06I60L with E94_080_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06I60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P080S2FEM*<br>E94P080Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS06I60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R080S2FRM*<br>E94R080Y2NRM* | |

### MCS09D41L with E94_040




### MCS09D41L with E94_040_ _ _ _ _

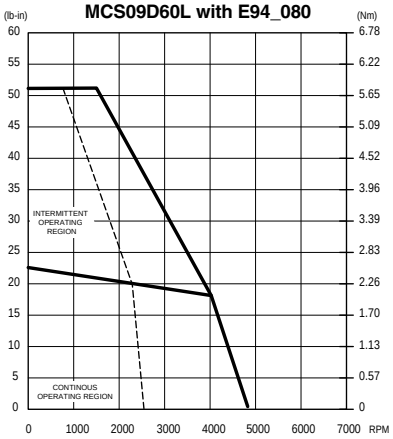
| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09D41LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P040S1NEM*<br>E94P040S2FEM*<br>E94P040Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS009D41LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 45…264V** 1Ø<br>80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R040S1NRM*<br>E94R040S2FRM*<br>E94R040Y2NRM* | |

** Voltage Doubler Drive offers 240VAC output when 120VAC input is applied.

***KEY:***
240 VAC
120 VAC

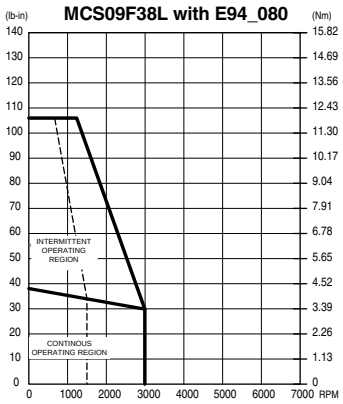
# Motor Speed-Torque Performance Curves

## PositionServo with MCS Series Motors - 120/240 VAC - 90mm



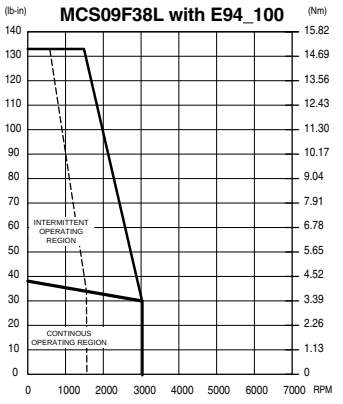

### MCS09D60L with E94_080_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09D60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P080S2FEM*<br>E94P080Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09D60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R080S2FRM*<br>E94R080Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |



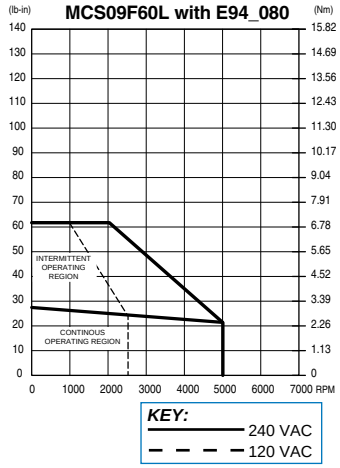

### MCS09F38L with E94_080_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09F38LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P080S2FEM*<br>E94P080Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09F38LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R080S2FRM*<br>E94R080Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |




### MCS09F38L with E94_100_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09F38LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P100S2FEM*<br>E94P100Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09F38LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R100S2FRM*<br>E94R100Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

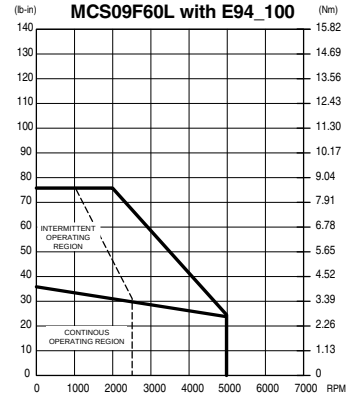



### MCS09F60L with E94_080_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09F60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P080S2FEM*<br>E94P080Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09F60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R080S2FRM*<br>E94R080Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

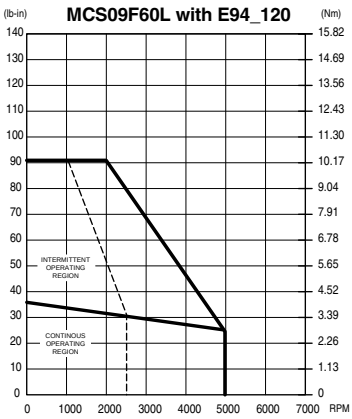
# Motor Speed-Torque Performance Curves

## PositionServo with MCS Series Motors - 120/240 VAC - 90mm



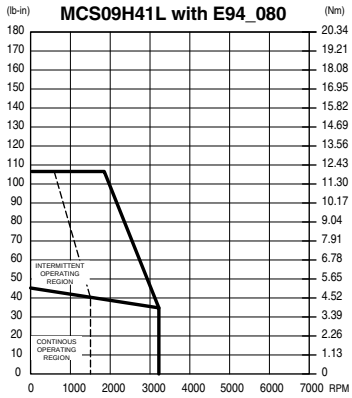

### MCS09F60L with E94_100_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09F60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P100S2FEM*<br>E94P100Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS09F60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R100S2FRM*<br>E94R100Y2NRM* | |



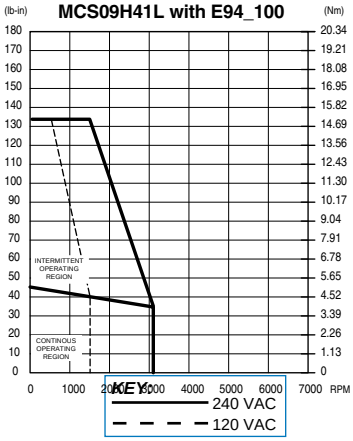

### MCS09F60L with E94_120_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09F60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94P120Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS09F60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94R120Y2NRM* | |



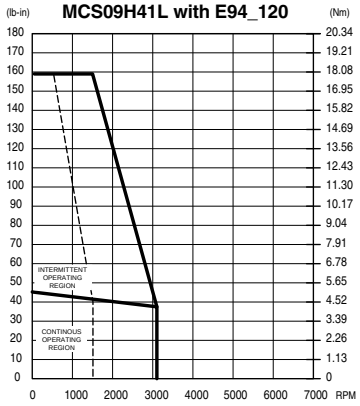

### MCS09H41L with E94_080_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09H41LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P080S2FEM*<br>E94P080Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS09H41LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R080S2FRM*<br>E94R080Y2NRM* | |



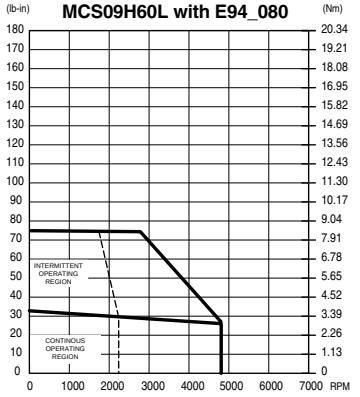

### MCS09H41L with E94_100_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09H41LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P100S2FEM*<br>E94P100Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS09H41LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R100S2FRM*<br>E94R100Y2NRM* | |



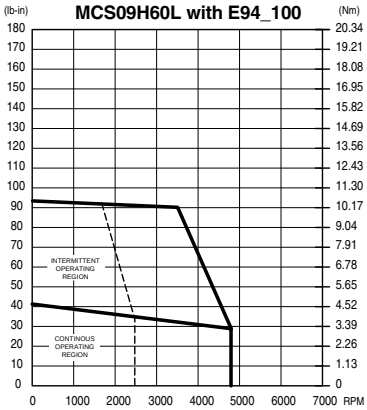

### MCS09H41L with E94_120_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09H41LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 80…264V 1Ø, 3Ø | E94P120Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09H41LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 80…264V 1Ø, 3Ø | E94R120Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |



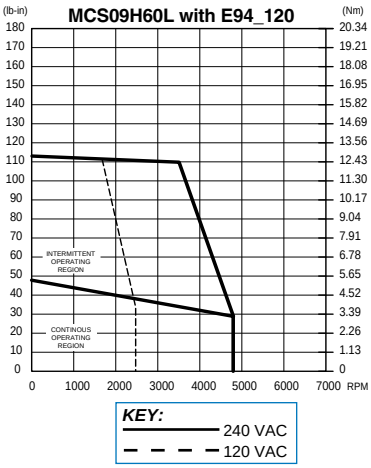

### MCS09H60L with E94_080_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09H60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P080S2FEM*<br>E94P080Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09H60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R080S2FRM*<br>E94R080Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |



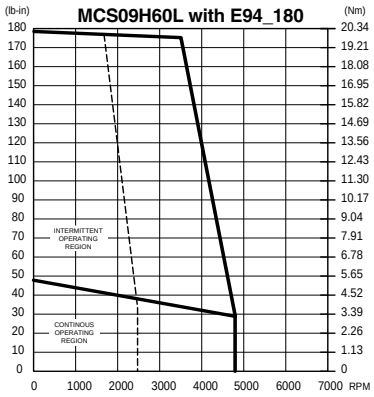

### MCS09H60L with E94_100_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09H60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P100S2FEM*<br>E94P100Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09H60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R100S2FRM*<br>E94R100Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |



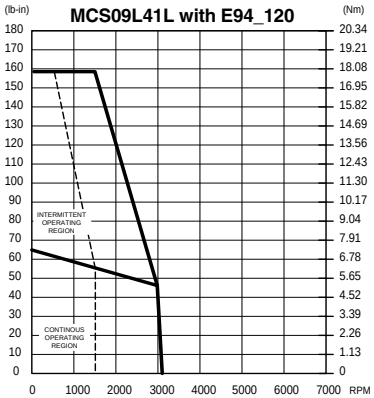

### MCS09H60L with E94_120_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09H60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 80…264V 1Ø, 3Ø | E94P120Y2NEM* | *To order a drive that meets theISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09H60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 80…264V 1Ø, 3Ø | E94R120Y2NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |



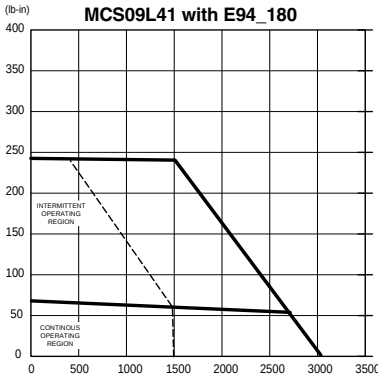

## MCS09H60L with E94_180_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09H60LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94P180Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS09H60LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94R180Y2NRM* | |



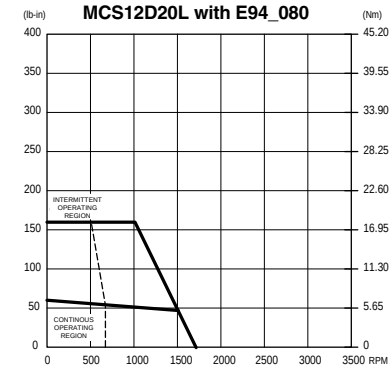

## MCS09L41L with E94_120_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09L41LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94P120Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS09L41LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94R120Y2NRM* | |




## MCS09L41 with E94_180_ _ _ _ _

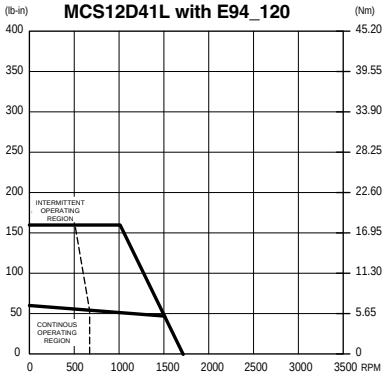
| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09L41LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94P180Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS09L41LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94R180Y2NRM* | |




## MCS12D20L with E94_080_ _ _ _ _

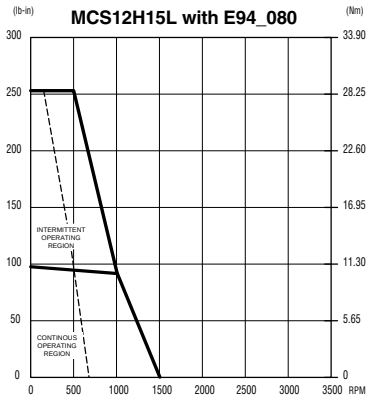
| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12D20LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P080S2FEM*<br>E94P080Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12D20LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R080S2FRM*<br>E94R080Y2NRM* | |

***KEY:***
240 VAC
120 VAC



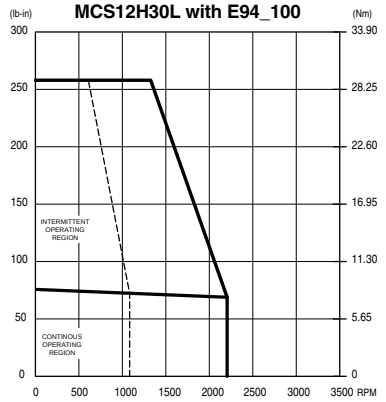

### MCS12D41L with E94_120_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12D41LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94P120Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12D41LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94R120Y2NRM* | |



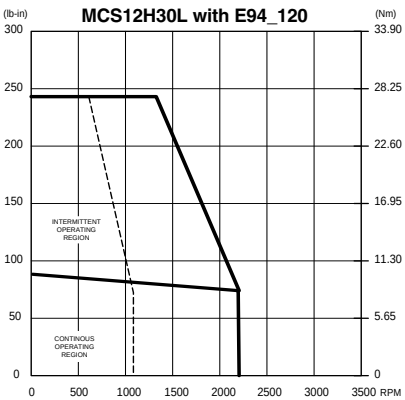

### MCS12H15L with E94_080_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12H15LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P080S2FEM*<br>E94P080Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12H15LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R080S2FRM*<br>E94R080Y2NRM* | |




### MCS12H30L with E94_100_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12H30LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P100S2FEM*<br>E94P100Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12H30LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R100S2FRM*<br>E94R100Y2NRM* | |



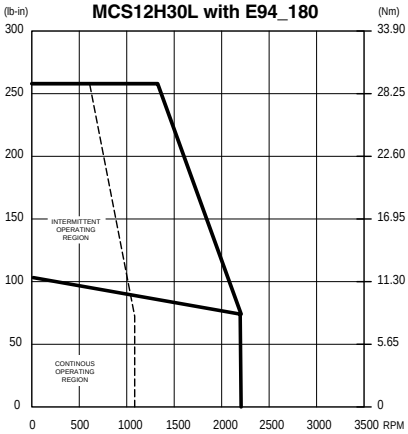

### MCS12H30L with E94_120_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12H30LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94P120Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12H30LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94R120Y2NRM* | |

***KEY:***
240 VAC
120 VAC

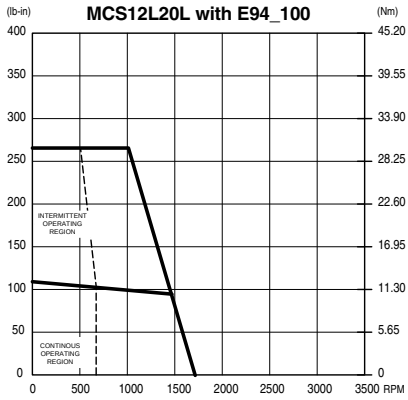
# Motor Speed-Torque Performance Curves

## PositionServo with MCS Series Motors - 120/240 VAC - 120mm



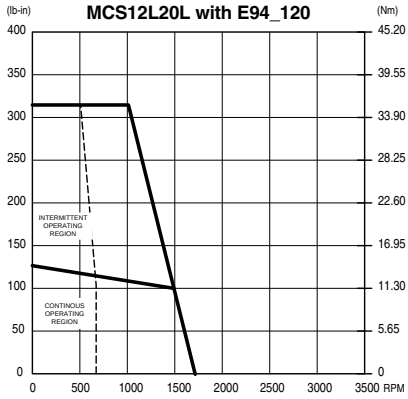

### MCS12H30L with E94_180_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12H30LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94P180Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12H30LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94R180Y2NRM* | |



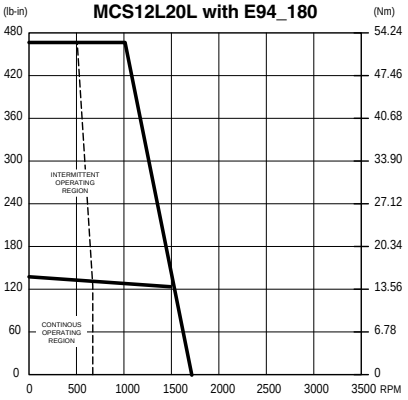

### MCS12L20L with E94_100_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12L20LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94P100S2FEM*<br>E94P100Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12L20LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø<br>80…264V 1Ø, 3Ø | E94R100S2FRM*<br>E94R100Y2NRM* | |




### MCS12L20L with E94_120_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12L20LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94P120Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12L20LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94R120Y2NRM* | |




### MCS12L20L with E94_180_ _ _ _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12L20LC40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94P180Y2NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12L20LRSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 80…264V 1Ø, 3Ø | E94R180Y2NRM* | |

***KEY:***
240 VAC
120 VAC



| Parameter* | Units | MCS06C41- | MCS06C60- | MCS06F41- | MCS06F60- | MCS06I41- | MCS06I60- |
|---|---|---|---|---|---|---|---|
| Max mains voltage | VDC | 680 | 680 | 680 | 680 | 680 | 680 |
| Rated power | kW | 0.25 | 0.31 | 0.51 | 0.57 | 0.64 | 0.75 |
| Rated speed | RPM | 4050 | 6000 | 4050 | 6000 | 4050 | 6000 |
| Maximum speed* | RPM | 8000 | 8000 | 8000 | 8000 | 8000 | 8000 |
| Rated torque | N-m | 0.6 | 0.5 | 1.2 | 0.9 | 1.5 | 1.2 |
| | lb-In | 5.31 | 4.42 | 10.62 | 7.96 | 13.27 | 10.62 |
| Continuous stall torque | N-m | 0.8 | 0.8 | 1.5 | 1.5 | 2 | 2 |
| | lb-In | 7.08 | 7.08 | 13.27 | 13.27 | 17.70 | 17.70 |
| Peak torque | N-m | 2.4 | 2.4 | 4.4 | 4.4 | 6.2 | 6.2 |
| | lb-In | 21.24 | 21.24 | 38.94 | 38.94 | 54.87 | 54.87 |
| Rated current | Arms | 1.3 | 2.4 | 1.5 | 2.5 | 1.6 | 2.9 |
| Continuous stall current | Arms | 1.3 | 2.5 | 1.5 | 2.9 | 1.7 | 3.4 |
| Peak current | Arms | 5.4 | 10.8 | 5.3 | 10.5 | 5.9 | 11.8 |
| Torque constant at 150°C $K_t$ | N-m/Arms | 0.66 | 0.33 | 1.05 | 0.53 | 1.21 | 0.6 |
| | lb-In/Arms | 5.84 | 2.92 | 9.29 | 4.69 | 10.71 | 5.31 |
| Voltage constant $K_e$ (ph-ph) | V/kRPM | 36.6 | 18.3 | 60.1 | 30 | 73.4 | 36.7 |
| Rotor interia | kg - $m^2$ | 1.40E-5 | 1.40E-5 | 2.20E-5 | 2.20E-5 | 3.00E-5 | 3.00E-5 |
| | lbs-In-$sec^2$ | 1.24E-4 | 1.24E-4 | 1.95E-4 | 1.95E-4 | 2.66E-4 | 2.66E-4 |
| Motor weight | kg | 1.8 | 1.8 | 2.2 | 2.2 | 2.9 | 2.9 |
| | lb | 3.97 | 3.97 | 4.85 | 4.85 | 6.39 | 6.39 |

| Parameter* | Units | MCS09D41- | MCS09D60- | MCS09F38- | MCS09F60- | MCS09H41- | MCS09H60- | MCS09L41- |
|---|---|---|---|---|---|---|---|---|
| Max bus power | VDC | 680 | 680 | 680 | 680 | 680 | 680 | 680 |
| Rated power | kW | 1 | 1.1 | 1.2 | 1.5 | 1.6 | 1.9 | 1.9 |
| Rated speed | RPM | 4050 | 6000 | 3750 | 6000 | 4050 | 6000 | 4050 |
| Maximum speed* | RPM | 7000 | 7000 | 7000 | 7000 | 7000 | 7000 | 7000 |
| Rated torque | N-m | 2.3 | 1.8 | 3.1 | 2.4 | 3.8 | 3 | 4.5 |
| | lb-In | 20.35 | 15.93 | 27.43 | 21.24 | 33.63 | 26.55 | 39.82 |
| Continuous stall torque | N-m | 3.3 | 3.3 | 4.2 | 4.2 | 5.5 | 5.5 | 7.5 |
| | lb-In | 29.20 | 29.20 | 37.17 | 37.17 | 48.67 | 48.67 | 66.37 |
| Peak torque | N-m | 9.5 | 9.5 | 15 | 15 | 20 | 20 | 32 |
| | lb-In | 84.07 | 84.07 | 132.74 | 132.74 | 176.99 | 176.99 | 283.19 |
| Rated current | Arms | 2.3 | 3.8 | 2.5 | 4.5 | 3.4 | 6 | 4.2 |
| Continuous stall current | Arms | 2.60 | 5.30 | 3 | 6 | 4.3 | 8.5 | 6.20 |
| Peak current | Arms | 10 | 20 | 15 | 30 | 20 | 40 | 32 |
| Torque constant at 150°C $K_t$ | N-m/Arms | 1.25 | 0.62 | 1.4 | 0.7 | 1.29 | 0.65 | 1.21 |
| | lb-In/Arms | 11.06 | 5.49 | 12.39 | 6.19 | 11.42 | 5.75 | 10.71 |
| Voltage constant $K_e$ (ph-ph) | V/kRPM | 71.20 | 35.60 | 79.8 | 39.9 | 75.7 | 37.8 | 71.70 |
| Rotor interia | kg - $m^2$ | 1.10E-4 | 1.10E-4 | 1.50E-4 | 1.50E-4 | 1.90E-4 | 1.90E-4 | 2.80E-4 |
| | lbs-In-$sec^2$ | 9.74E-4 | 9.74E-4 | 1.33E-3 | 1.33E-3 | 1.68E-3 | 1.68E-3 | 2.48E-3 |
| Motor weight | kg | 4.30 | 4.30 | 5.2 | 5.2 | 6.1 | 6.1 | 7.90 |
| | lb | 9.48 | 9.48 | 11.47 | 11.47 | 13.45 | 13.45 | 17.42 |

* Motor performance does not always reflect system performance. System performance can be found in the following speed-torque curves.



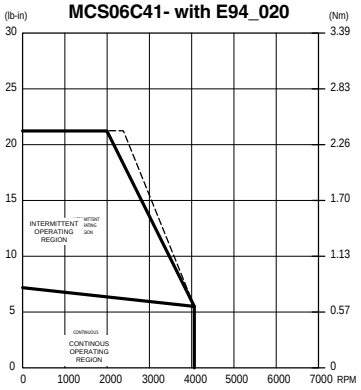
| Parameter* | Units | MCS12D20- | MCS12D41- | MCS12H15- | MCS12H35- | MCS12L20- | MCS12L41- |
|---|---|---|---|---|---|---|---|
| Max mains voltage | VDC | 680 | 680 | 680 | 680 | 680 | 680 |
| Rated power | kW | 1.1 | 1.8 | 1.6 | 2.8 | 2.8 | 4.7 |
| Rated speed | RPM | 1950 | 4050 | 1500 | 3525 | 1950 | 4050 |
| Maximum speed* | RPM | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 |
| Rated torque | N-m | 5.5 | 4.3 | 10 | 7.5 | 13.5 | 11 |
| | lb-In | 48.67 | 38.05 | 88.50 | 66.37 | 119.47 | 97.35 |
| Continuous stall torque | N-m | 6.4 | 6.4 | 11.4 | 11.4 | 15 | 15 |
| | lb-In | 56.64 | 56.64 | 100.88 | 100.88 | 132.74 | 132.74 |
| Peak torque | N-m | 18 | 18 | 29 | 29 | 56 | 56 |
| | lb-In | 159.29 | 159.29 | 256.64 | 256.64 | 495.58 | 495.58 |
| Rated current | Arms | 2.6 | 4.5 | 3.8 | 5.7 | 5.9 | 10.2 |
| Continuous stall current | Arms | 2.7 | 5.5 | 4.1 | 8.2 | 6.2 | 12.4 |
| Peak current | Arms | 10 | 20 | 12 | 24 | 28 | 57 |
| Torque constant at 150°C $K_t$ | N-m/Arms | 2.34 | 1.17 | 2.79 | 1.4 | 2.42 | 1.21 |
| | lb-In/Arms | 20.71 | 10.35 | 24.69 | 12.39 | 21.42 | 10.71 |
| Voltage constant $K_e$ (ph-ph) | V/kRPM | 137.3 | 68.6 | 172.9 | 86.5 | 149.2 | 74.6 |
| Rotor interia | kg - $m^2$ | 4.00E-4 | 4.00E-4 | 7.30E-4 | 7.30E-4 | 1.06E-3 | 1.06E-3 |
| | lbs-In-$sec^2$ | 3.54E-3 | 3.54E-3 | 6.46E-3 | 6.46E-3 | 9.38E-3 | 9.38E-3 |
| Motor weight | kg | 6.4 | 6.4 | 9.5 | 9.5 | 12.6 | 12.6 |
| | lb | 14.11 | 14.11 | 20.95 | 20.95 | 27.78 | 27.78 |

| Parameter* | Units | MCS14D15- | MCS14D36- | MCS14H15- | MCS19F14- |
|---|---|---|---|---|---|
| Max bus power | VDC | 680 | 680 | 680 | 680 |
| Rated power | kW | 1.45 | 2.8 | 2.5 | 4 |
| Rated speed | RPM | 1500 | 3600 | 1500 | 1425 |
| Maximum speed* | RPM | 6000 | 6000 | 6000 | 4000 |
| Rated torque | N-m | 9.2 | 7.5 | 16 | 27 |
| | lb-In | 81.42 | 66.37 | 141.59 | 238.94 |
| Continuous stall torque | N-m | 11 | 11 | 21 | 32 |
| | lb-In | 97.35 | 97.35 | 185.84 | 283.19 |
| Peak torque | N-m | 29 | 29 | 55 | 86 |
| | lb-In | 256.64 | 256.64 | 486.73 | 761.06 |
| Rated current | Arms | 4.5 | 7.5 | 6.6 | 8.6 |
| Continuous stall current | Arms | 5 | 10 | 8.5 | 9.9 |
| Peak current | Arms | 17 | 33 | 26 | 31 |
| Torque constant at 150°C $K_t$ | N-m/Arms | 2.19 | 1.09 | 2.48 | 3.23 |
| | lb-In/Arms | 19.38 | 9.65 | 21.95 | 28.58 |
| Voltage constant $K_e$ (ph-ph) | V/kRPM | 128.5 | 64.2 | 152.6 | 194.5 |
| Rotor interia | kg - $m^2$ | 8.10E-4 | 8.10E-4 | 1.42E-3 | 6.50E-3 |
| | lbs-In-$sec^2$ | 7.17E-3 | 7.17E-3 | 1.26E-2 | 5.75E-2 |
| Motor weight | kg | 10.7 | 10.7 | 15.5 | 23 |
| | lb | 23.59 | 23.59 | 34.18 | 50.72 |

* Motor performance does not always reflect system performance. System performance can be found in the following speed-torque curves.

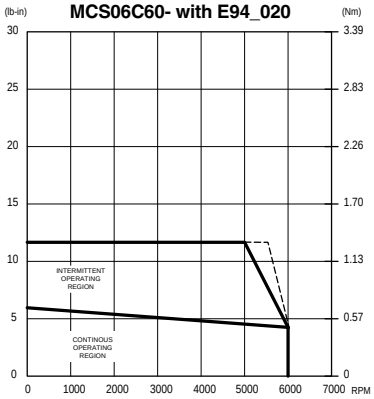
# Motor Speed-Torque Performance Curves

## PositionServo with MCS Series Motors - 400/480 VAC - 60mm



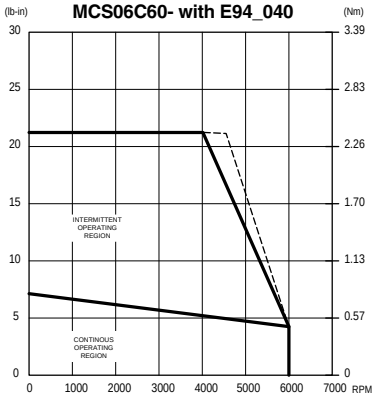

### MCS06C41- with E94_020T4N _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06C41-C40 | Encoder | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P020T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS06C41-RSO | Resolver | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R020T4NRM* | |



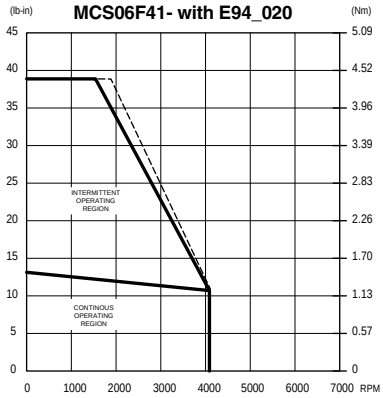

### MCS06C60- with E94_020T4N _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06C60-C40 | Encoder | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P020T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS06C60-RSO | Resolver | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R020T4NRM* | |




### MCS06C60- with E94_040T4N _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06C60-C40 | Encoder | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P040T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS06C60-RSO | Resolver | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R040T4NRM* | |




### MCS06F41- with E94_020T4N _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06F41-C40 | Encoder | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P020T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS06F41-RSO | Resolver | EWLB_ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R020T4NRM* | |

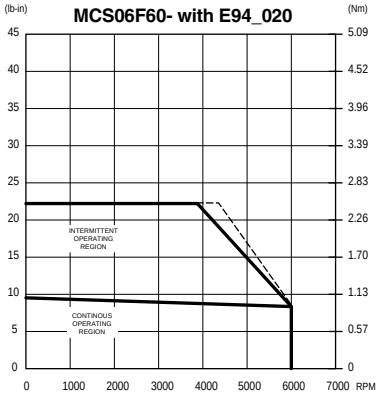
***KEY:***

——— 400 VAC

– – – – 480 VAC

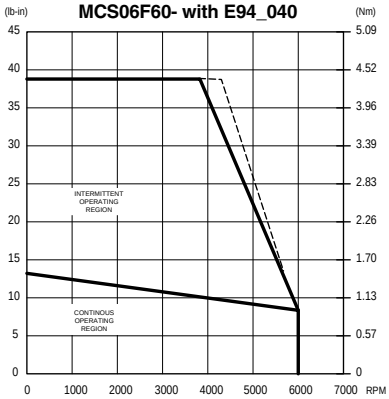
# Motor Speed-Torque Performance Curves

## PositionServo with MCS Series Motors - 400/480 VAC - 60mm



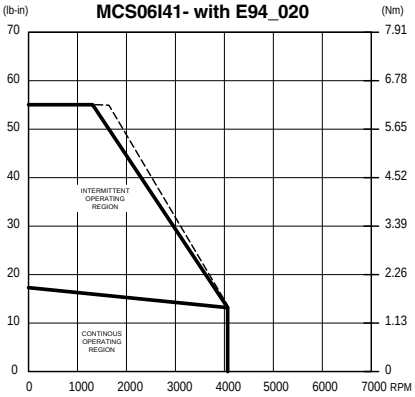

### MCS06F60- with E94_020T4N _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06F60-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P020T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS06F60-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R020T4NRM* | |



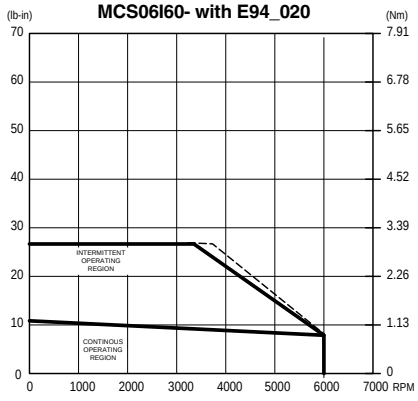

### MCS06F60- with E94_040T4N _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06F60-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P040T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS06F60-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R040T4NRM* | |




### MCS06I41- with E94_020T4N _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06I41-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P020T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS06I41-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R020T4NRM* | |



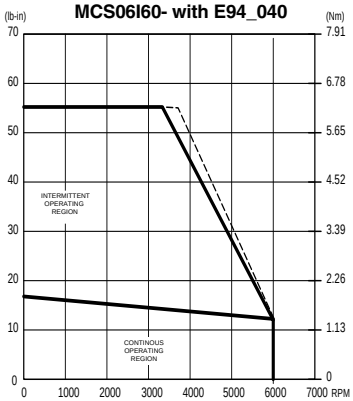

### MCS06I60- with E94_020T4N _ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06I60-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P020T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS06I60-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R020T4NRM* | |

***KEY:***

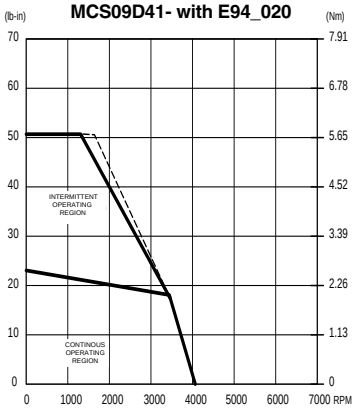
——— 400 VAC

– – – – 480 VAC



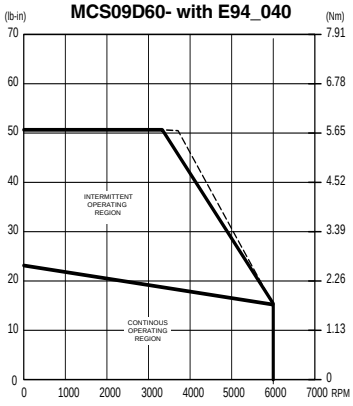

### MCS06I60- with E94_040T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS06I60-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P040T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS06I60-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R040T4NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |



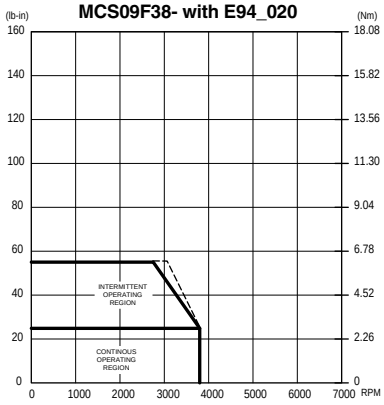

### MCS09D41- with E94_020T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09D41-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P020T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09D41-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R020T4NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |




### MCS09D60- with E94_040T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09D60-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P040T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09D60-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R040T4NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |




### MCS09F38- with E94_020T4N_ _

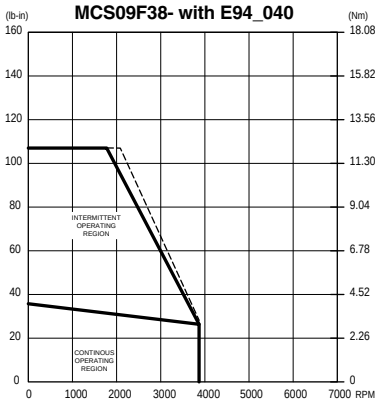
| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09F38-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P020T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09F38-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R020T4NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

***KEY:***

——— 400 VAC

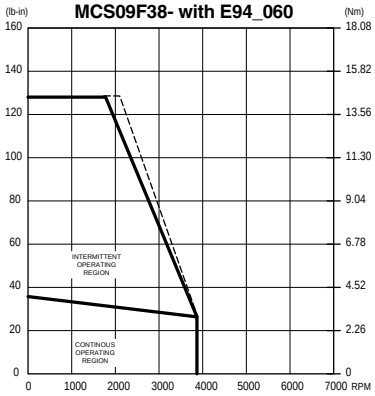
– – – – 480 VAC





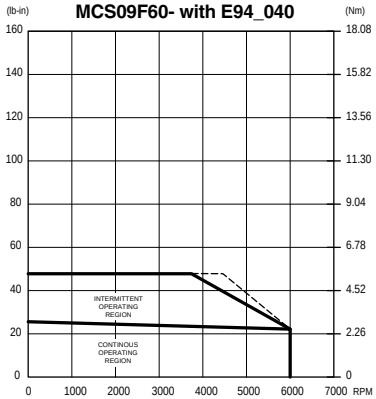

### MCS09F38- with E94_040T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09F38-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P040T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09F38-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R040T4NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |



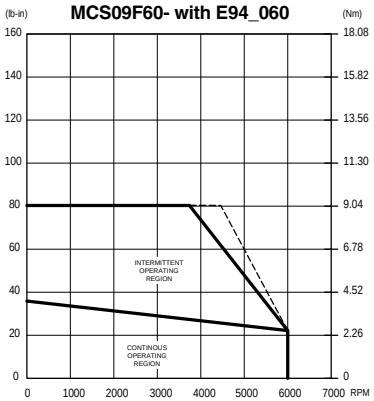

### MCS09F38- with E94_060T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09F38-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P060T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09F38-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R060T4NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |




### MCS09F60- with E94_040T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09F60-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P040T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09F60-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R040T4NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |




### MCS09F60- with E94_060T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09F60-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P060T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09F60-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R060T4NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

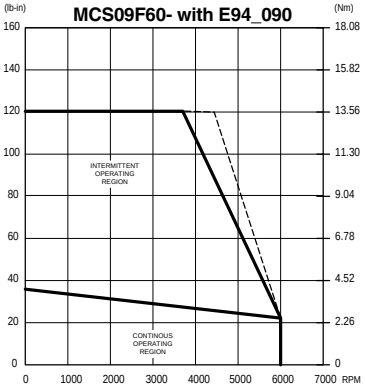
***KEY:***

——— 400 VAC

– – – – 480 VAC

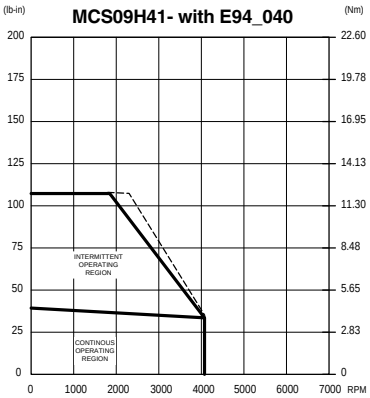
# Motor Speed - Torque Performance Curves

## PositionServo with MCS Series Motors - 400/480 VAC - 90mm



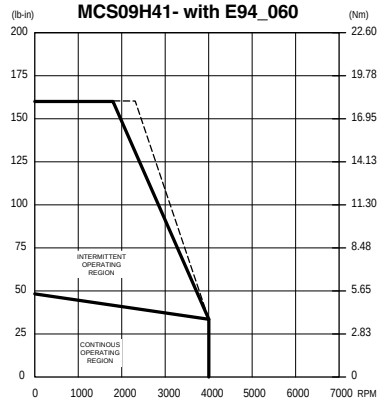

### MCS09F60- with E94_090T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09F60-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P090T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09F60-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |



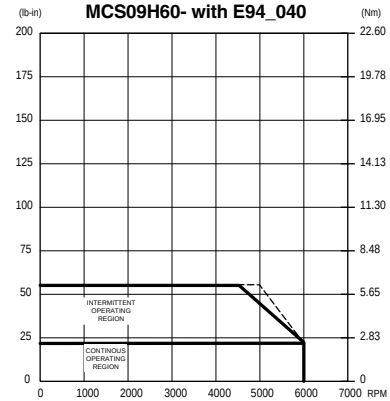

### MCS09H41- with E94_040T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09H41-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P040T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09H41-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R040T4NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |




### MCS09H41- with E94_060T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09H41-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P060T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09H41-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R060T4NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |




### MCS09H60- with E94_040T4N_ _

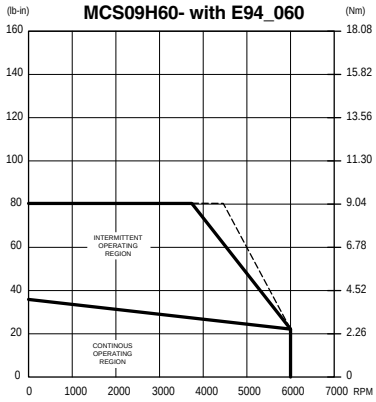
| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09H60-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P040T4NEM* | *To order a drive that meets theISO13849-1 safety standard replace the “M” in the part number with an “S” |
| | | _ _ _ = meter length (002, 005, 010) | | | | |
| MCS09H60-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R040T4NRM* | |
| | | _ _ _ = meter length (002, 005, 010) | | | | |

***KEY:***

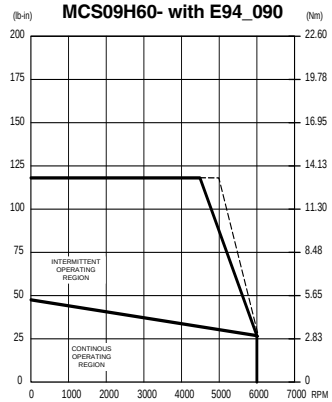
——— 400 VAC

– – – – 480 VAC

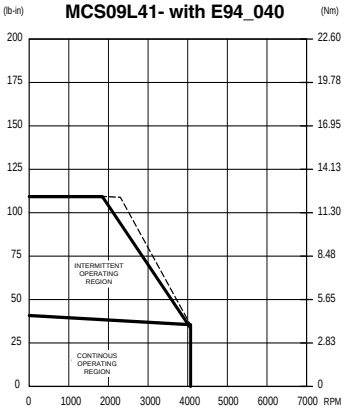
### MCS09H60- with E94_060



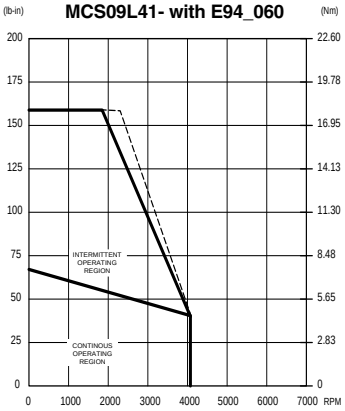

### MCS09H60- with E94_090




### MCS09L41- with E94_040




### MCS09L41- with E94_060




***KEY:***

——— 400 VAC

– – – – 480 VAC

### MCS09H60- with E94_060T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09H60-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P060T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS09H60-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R060T4NRM* | |

### MCS09H60- with E94_090T4N_ _

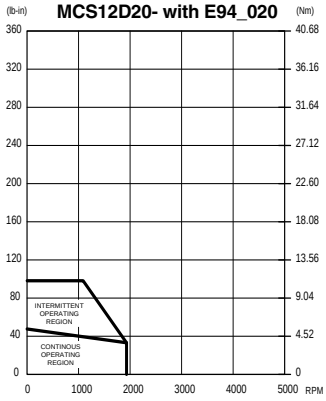
| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09H60-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P090T4NEM* | *To order a drive that meets theISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS09H60-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R090T4NRM* | |

### MCS09L41- with E94_040T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09L41-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P040T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS09L41-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R040T4NRM* | |

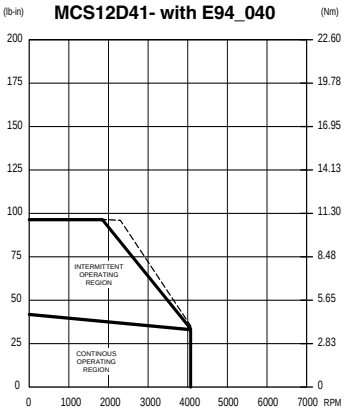
### MCS09L41- with E94_060T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS09L41-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P060T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS09L41-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R060T4NRM* | |



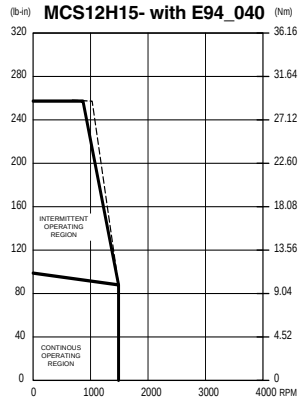

### MCS12D20- with E94_020T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12D20-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P020T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12D20-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R020T4NRM* | |



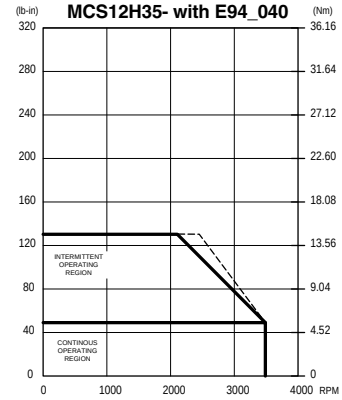

### MCS12D41- with E94_040T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12D41-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P040T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12D41-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R040T4NRM* | |




### MCS12H15- with E94_040T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12H15-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P040T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12H15-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R040T4NRM* | |



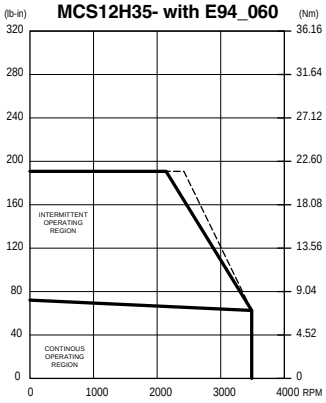

### MCS12H35- with E94_040T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12H35-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P040T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12H35-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R040T4NRM* | |

***KEY:***
400 VAC
480 VAC

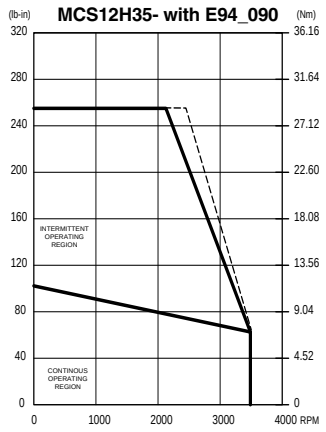
# Motor Speed - Torque Performance Curves

## PositionServo with MCS Series Motors - 400/480 VAC - 120mm



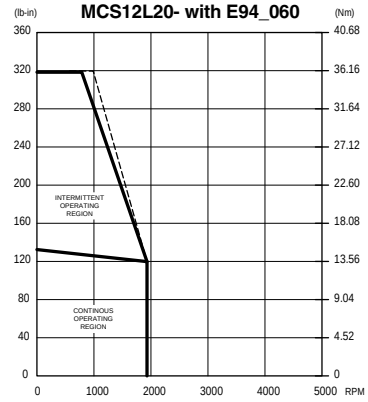

### MCS12H35- with E94_060T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12H35-C40 | Encoder | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P060T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12H35-RSO | Resolver | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R060T4NRM* | |



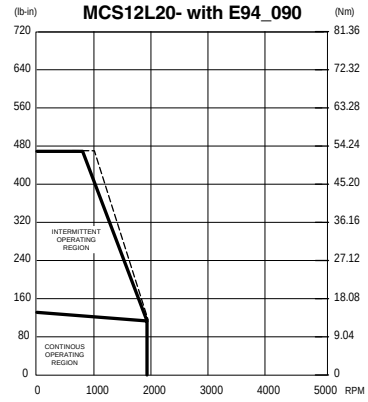

### MCS12H35- with E94_090T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12H35-C40 | Encoder | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P090T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12H35-RSO | Resolver | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | |




### MCS12L20- with E94_060T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12L20-C40 | Encoder | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P060T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “X” in the part number with an “S” |
| MCS12L20-RSO | Resolver | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R060T4NRM* | |



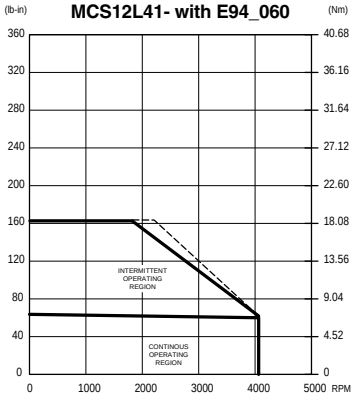

### MCS12L20- with E94_090T4N_ _

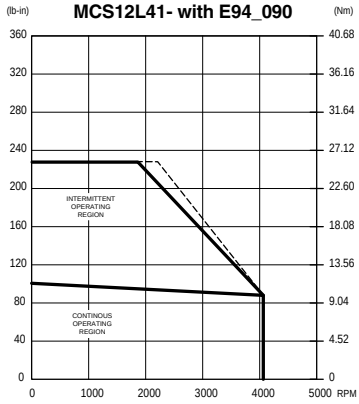
| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12L20-C40 | Encoder | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P090T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12L20-RSO | Resolver | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | |

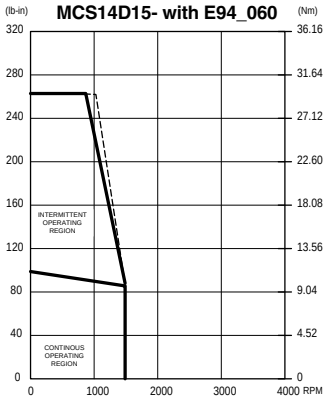
***KEY:***

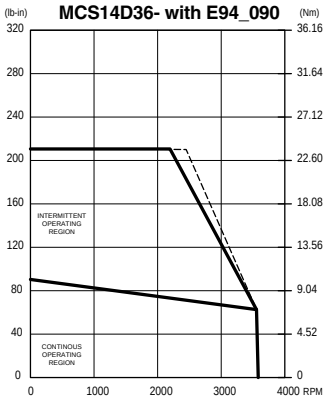
——— 400 VAC

– – – – 480 VAC




***KEY:***
400 VAC
480 VAC

### MCS12L41- with E94_060T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12L41-C40 | Encoder | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P060T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12L41-RSO | Resolver | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R060T4NRM* | |

### MCS12L41- with E94_090T4N_ _

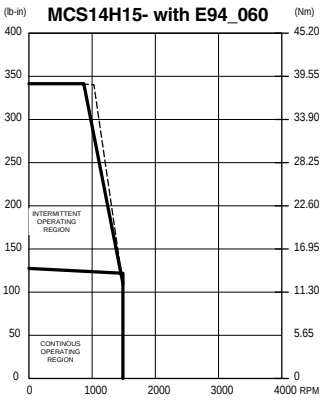
| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS12L41-C40 | Encoder | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P090T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS12L41-RSO | Resolver | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | |

### MCS14D15- with E94_060T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS14D15-C40 | Encoder | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P060T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “X” in the part number with an “S” |
| MCS14D15-RSO | Resolver | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R060T4NRM* | |

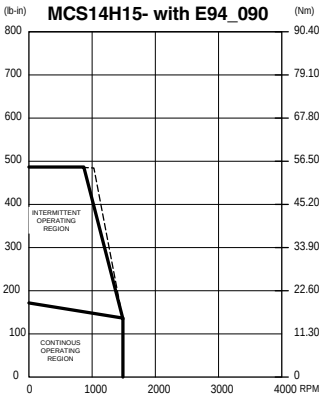
### MCS14D36- with E94_090T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS14D36-C40 | Encoder | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLE_ _ _AE1NA | 400…480V 3Ø | E94P090T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS14D36-RSO | Resolver | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | |



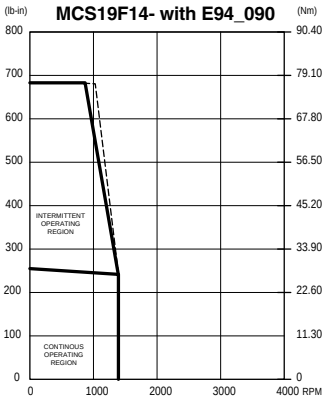

### MCS14H15- with E94_060T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS14H15-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P060T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS14H15-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R060T4NRM* | |




### MCS14H15- with E94_090T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS14H15-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P090T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS14H15-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R090T4NRM* | |

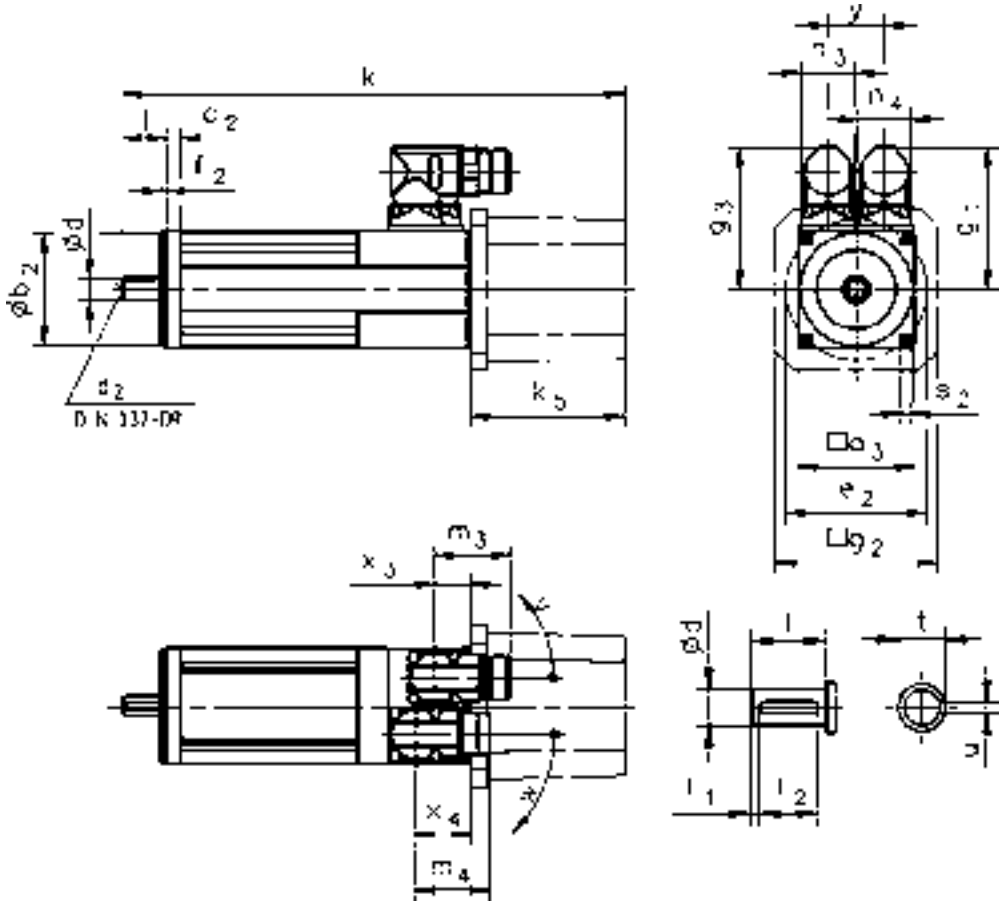



### MCS19F14- with E94_090T4N_ _

| Motor | Connectors | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | Feedback | Power | Feedback | Input Voltage | Drive Models | |
| MCS19F14-C40 | Encoder | EWLB_ _ _FE1NA | EWLE_ _ _AE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94P090T4NEM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MCS19F14-RSO | Resolver | EWLB_ _ _FE1NA | EWLR_ _ _BE1NA<br>_ _ _ = meter length (002, 005, 010) | 400…480V 3Ø | E94R090T4NRM* | |

**KEY:**
——— 400 VAC
– – – – 480 VAC

# Motors without Fans



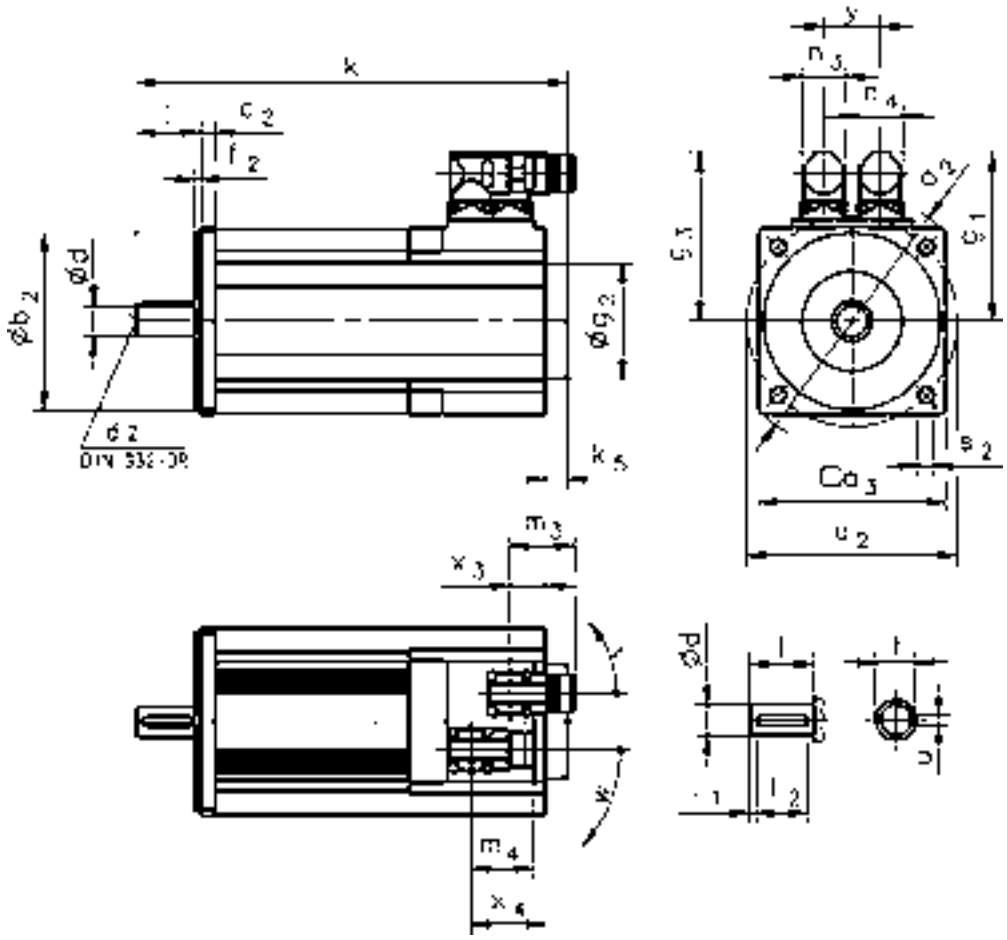

| | | MCS06C... | MCS06F... | MCS06I... |
|---|---|---|---|---|
| ...RSO B0 | k | 155 | 185 | 215 |
| ...RSO P□ | k | 174 | 204 | 234 |
| ...RSO | $k_5$ | 0 | | |
| | $g_2$ | - | | |
| ...SR□/E□□/C40 B0 | k | 237 | 267 | 297 |
| ...SR□/E□□/C40 P□ | k | 255 | 285 | 315 |
| ...SR□ / E□□ / C40 | $k_5$ | 82 | | |
| | $g_2$ | 86 | | |

| | MCS06... |
|---|---|
| $g_1$ | 76 |
| $g_3$ | 76 |
| $x_3$ | 19 |
| $x_4$ | 29 |
| $m_3$ | 40 |
| $m_4$ | 40 |
| $n_3$ | 28 |
| $n_4$ | 28 |
| y | 30 |
| v | 190° |
| w | 230° |

| | | MCS06... |
|---|---|---|
| d | k6 | 11 |
| $d_2$ | | M4 |
| l | | 23 |
| $l_1$ | | 2 |
| $l_2$ | | 18 |
| t | | 12.5 |
| u | | 4 |

| | | MCS06... |
|---|---|---|
| $a_2$ | | - |
| $a_3$ | | 62 |
| $b_2$ | j6 | 60 |
| $c_2$ | | 8 |
| $e_2$ | | 75 |
| $f_2$ | | 2.5 |
| $s_2$ | | 5.5 |

# Motors without Fans




| | | MCS09D... | MCS09F... | MCS09H... | MCS09L... | MCS12D... | MCS12H... | MCS12L... |
|---|---|---|---|---|---|---|---|---|
| ...RSO B0 | k | 213 | 233 | 253 | 293 | 228 | 268 | 308 |
| ...RSO P□ | k | 233 | 253 | 273 | 313 | 248 | 288 | 328 |
| ...RSO | $k_5$ | 13 | | | | 14 | | |
| | $g_2$ | 67 | | | | 72 | | |
| ...SR□/E□□/C40 B0 | k | 264 | 284 | 304 | 344 | 277 | 317 | 357 |
| ...SR□/E□□/C40 P□ | k | 284 | 304 | 324 | 364 | 297 | 337 | 377 |
| ...SR□ / E□□ / C40 | $k_5$ | 64 | | | | 63 | | |
| | $g_2$ | 81 | | | | 89 | | |

| | | MCS14D... | MCS14H... | MCS14L... | MCS14P... | MCS19F... | MCS19J... | MCS19P... |
|---|---|---|---|---|---|---|---|---|
| ...RSO B0 | k | 251 | 291 | 331 | 371 | 280 | 320 | 380 |
| ...RSO P□ | k | 279 | 319 | 359 | 399 | 314 | 364 | 424 |
| ...RSO | $k_5$ | 24 | | | | 15 | | |
| | $g_2$ | 78 | | | | | | |
| ...SR□/E□□/C40 B0 | k | 301 | 341 | 381 | 421 | 329 | 369 | 429 |
| ...SR□/E□□/C40 P□ | k | 329 | 369 | 409 | 449 | 363 | 413 | 473 |
| ...SR□ / E□□ / C40 | $k_5$ | 74 | | | | 64 | | |
| | $g_2$ | 101 | | | | | | |



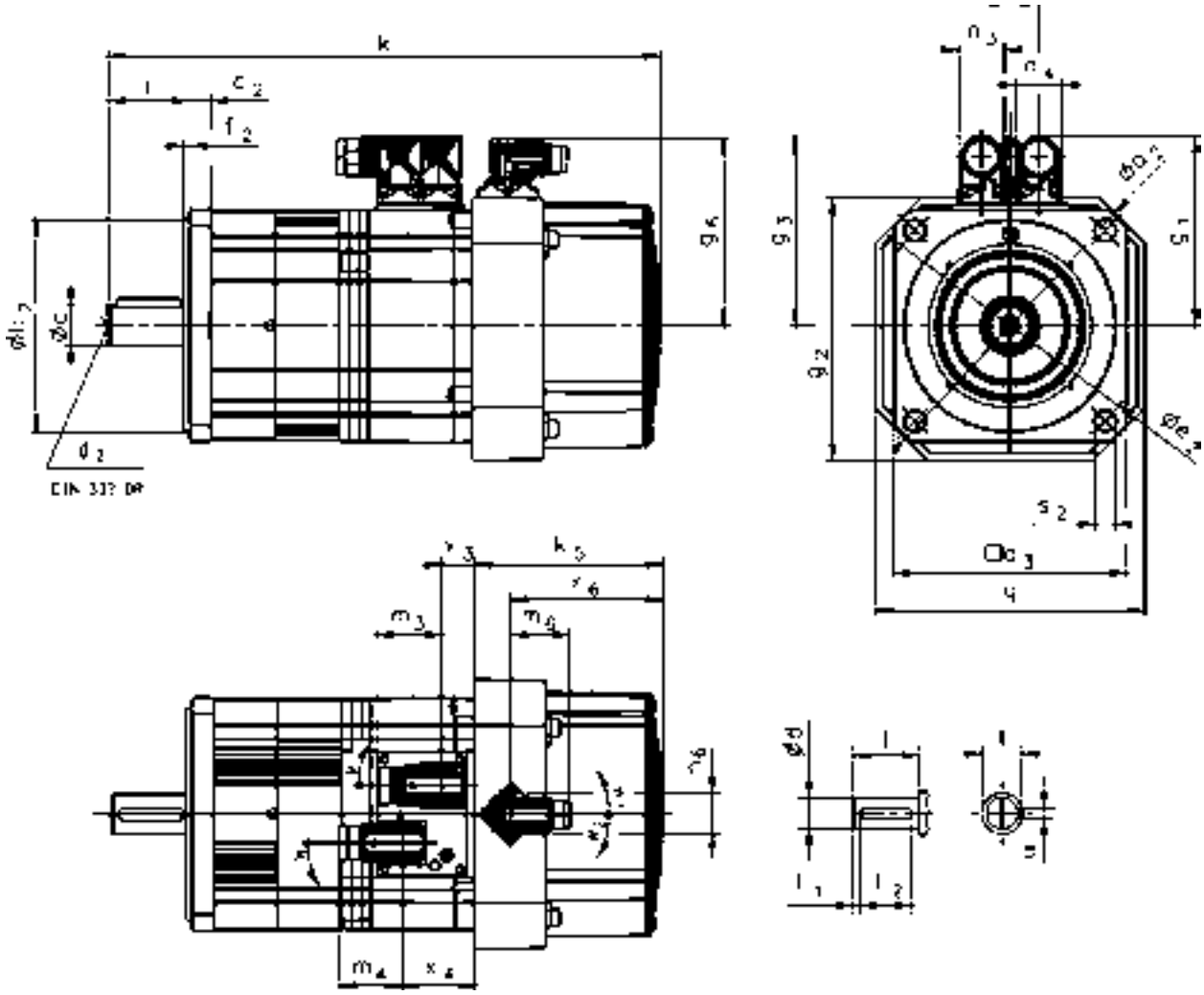
| | MCS09... | MCS12... | MCS14D... | MCS14H... | MCS14L15 | MCS14L32 | MCS14P14 |
|---|---|---|---|---|---|---|---|
| $g_1$ | 90 | 105 | 116 | 116 | 116 | 147 | 116 |
| $g_3$ | 90 | 105 | 116 | 116 | 116 | 116 | 116 |
| $x_3$ | 20 | 22 | 24 | 24 | 24 | 29 | 24 |
| $x_4$ | 44 | 46 | 48 | 48 | 48 | 36 | 48 |
| $m_3$ | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| $m_4$ | 40 | 40 | 40 | 40 | 40 | 75 | 40 |
| $n_3$ | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| $n_4$ | 28 | 28 | 28 | 28 | 28 | 45 | 28 |
| y | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| v | 195° | 195° | 195° | 195° | 195° | 180° | 195° |
| w | 260° | 260° | 260° | 260° | 260° | 205° | 260° |

| | MCS14P32 | MCS19F14 | MCS19F30 | MCS19J14 | MCS19J30 | MCS19P14 | MCS19P30 |
|---|---|---|---|---|---|---|---|
| $g_1$ | 147 | 141 | 172 | 141 | 172 | 141 | 172 |
| $g_3$ | 116 | 141 | 141 | 141 | 141 | 141 | 141 |
| $x_3$ | 29 | 24 | 29 | 24 | 29 | 24 | 29 |
| $x_4$ | 36 | 48 | 36 | 48 | 36 | 48 | 36 |
| $m_3$ | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| $m_4$ | 75 | 40 | 75 | 40 | 75 | 40 | 75 |
| $n_3$ | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| $n_4$ | 45 | 28 | 45 | 28 | 45 | 28 | 45 |
| y | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| v | 180° | 195° | 180° | 195° | 180° | 195° | 180° |
| w | 205° | 260° | 205° | 260° | 205° | 260° | 205° |

| | | MCS09... | MCS12... | MCS14... | MCS19... |
|---|---|---|---|---|---|
| d | k6 | 14 | 19 | 24 | 28 |
| $d_2$ | | M5 | M6 | M8 | M10 |
| l | | 30 | 40 | 50 | 60 |
| $l_1$ | | 2.5 | 4 | 5 | 5 |
| $l_2$ | | 25 | 32 | 40 | 50 |
| t | | 16 | 21.5 | 27 | 31 |
| u | | 5 | 6 | 8 | 8 |

| | | MCS09... | MCS12... | MCS14... | MCS19... |
|---|---|---|---|---|---|
| $a_2$ | | 120 | 160 | 188 | 250 |
| $a_3$ | | 89 | 116 | 143 | 192 |
| $b_2$ | j6 | 80 | 110 | 130 | 180 |
| $c_2$ | | 8 | 9 | 13 | 11 |
| $e_2$ | | 100 | 130 | 165 | 215 |
| $f_2$ | | 3 | 3.5 | 3.5 | 4 |
| $s_2$ | | 7 | 10 | 12 | 14 |

## Motors with Blower



| | | MCS12D... | MCS12H... | MCS12L... | MCS14D... | MCS14H... |
|---|---|---|---|---|---|---|
| ...RSO B0 | k | 301 | 341 | 381 | 339 | 379 |
| ...RSO P□ | k | 321 | 361 | 401 | 368 | 408 |
| ...RSO | $k_5$ | 92 | | | 115 | |
| ...SR□/E□□/C40 B0 | k | 344 | 384 | 424 | 392 | 432 |
| ...SR□/E□□/C40 P□ | k | 364 | 404 | 444 | 421 | 461 |
| ...SR□ / E□□ / C40 | $k_5$ | 135 | | | 169 | |
| | g | 140 | | | 167 | |
| | $g_2$ | 140 | | | 163 | |

| | | MCS14L... | MCS14P... | MCS19F... | MCS19J... | MCS19P... |
|---|---|---|---|---|---|---|
| ...RSO B0 | k | 419 | 459 | 387 | 427 | 487 |
| ...RSO P□ | k | 448 | 488 | 421 | 471 | 531 |
| ...RSO | $k_5$ | 115 | | 126 | | |
| ...SR□/E□□/C40 B0 | k | 472 | 512 | 425 | 465 | 525 |
| ...SR□/E□□/C40 P□ | k | 501 | 541 | 459 | 509 | 569 |
| ...SR□ / E□□ / C40 | $k_5$ | 169 | | 165 | | |
| | g | 167 | | 212 | | |
| | $g_2$ | 163 | | 210 | | |



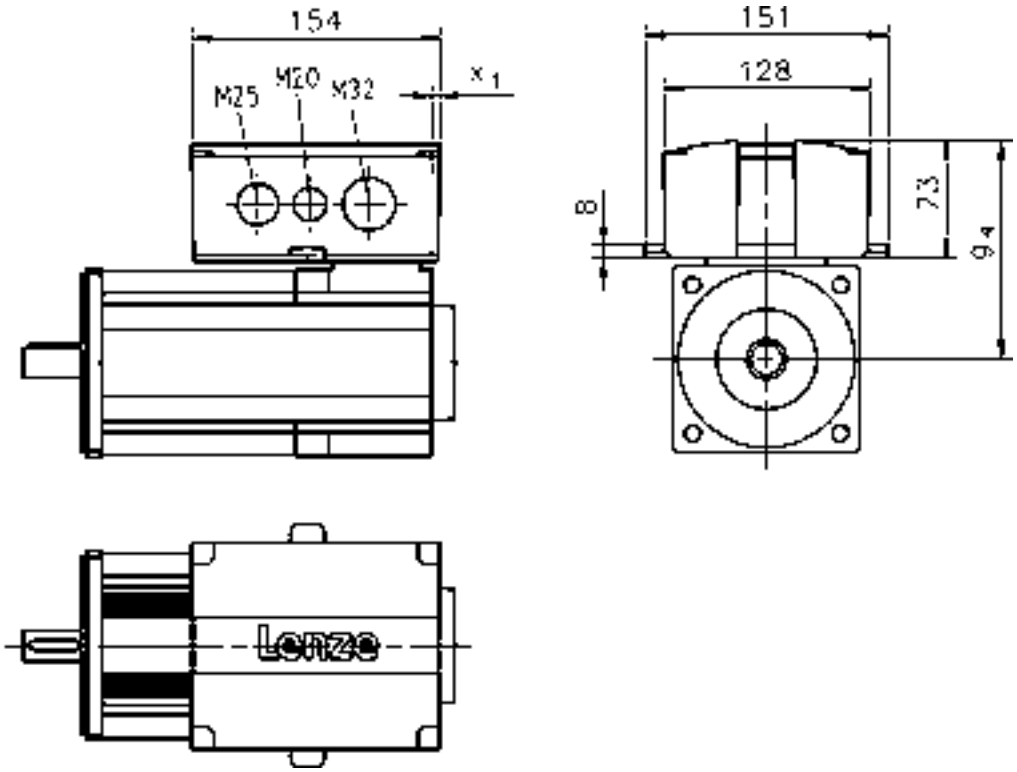
| | MCS12... | MCS14D... | MCS14H12 | MCS14H28 | MCS14L14 | MCS14L30 | MCS14P11 |
|---|---|---|---|---|---|---|---|
| $g_1$ | 105 | 116 | 147 | 116 | 147 | 116 | 147 |
| $g_3$ | 105 | 116 | 116 | 116 | 116 | 116 | 116 |
| $g_6$ | 107 | 115 | 115 | 115 | 115 | 115 | 115 |
| $x_3$ | 16 | 21 | 24 | 21 | 24 | 21 | 24 |
| $x_4$ | 40 | 45 | 31 | 45 | 31 | 45 | 31 |
| $x_6$ | 67 | 93 | 93 | 93 | 93 | 93 | 93 |
| $m_3$ | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| $m_4$ | 40 | 40 | 75 | 40 | 75 | 40 | 75 |
| $m_6$ | 37 | 37 | 37 | 37 | 37 | 37 | 37 |
| $n_3$ | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| $n_4$ | 28 | 28 | 45 | 28 | 45 | 28 | 45 |
| $n_6$ | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| y | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| v | 160° | 160° | 170° | 160° | 170° | 160° | 170° |
| w | 160° | 160° | 160° | 160° | 160° | 160° | 160° |
| $w_1$ | 120° | 120° | 120° | 120° | 120° | 120° | 120° |
| $w_2$ | 130° | 130° | 130° | 130° | 130° | 130° | 130° |

| | MCS14P26 | MCS19F12 | MCS19F29 | MCS19J12 | MCS19J29 | MCS19P12 | MCS19P29 |
|---|---|---|---|---|---|---|---|
| $g_1$ | 116 | 141 | 172 | 172 | 172 | 172 | 172 |
| $g_3$ | 116 | 141 | 141 | 141 | 141 | 141 | 141 |
| $g_6$ | 115 | 148 | 148 | 148 | 148 | 148 | 148 |
| $x_3$ | 21 | 19 | 24 | 24 | 24 | 24 | 24 |
| $x_4$ | 45 | 43 | 31 | 31 | 31 | 31 | 31 |
| $x_6$ | 93 | 96 | 96 | 96 | 96 | 96 | 96 |
| $m_3$ | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| $m_4$ | 40 | 40 | 75 | 75 | 75 | 75 | 75 |
| $m_6$ | 37 | 37 | 37 | 37 | 37 | 37 | 37 |
| $n_3$ | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| $n_4$ | 28 | 28 | 45 | 45 | 45 | 45 | 45 |
| $n_6$ | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| y | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| v | 160° | 160° | 170° | 170° | 170° | 170° | 170° |
| w | 160° | 160° | 160° | 160° | 160° | 160° | 160° |
| $w_1$ | 120° | 120° | 120° | 120° | 120° | 120° | 120° |
| $w_2$ | 130° | 130° | 130° | 130° | 130° | 130° | 130° |

| | | MCS12... | MCS14... | MCS19... |
|---|---|---|---|---|
| d | k6 | 19 | 24 | 28 |
| $d_2$ | | M6 | M8 | M10 |
| l | | 40 | 50 | 60 |
| $l_1$ | | 4 | 5 | 5 |
| $l_2$ | | 32 | 40 | 50 |
| t | | 21.5 | 27 | 31 |
| u | | 6 | 8 | 8 |

| | | MCS12... | MCS14... | MCS19... |
|---|---|---|---|---|
| $a_2$ | | 160 | 188 | 250 |
| $a_3$ | | 116 | 143 | 192 |
| $b_2$ | j6 | 110 | 130 | 180 |
| $c_2$ | | 9 | 13 | 11 |
| $e_2$ | | 130 | 165 | 215 |
| $f_2$ | | 3.5 | 3.5 | 4 |
| $s_2$ | | 10 | 12 | 14 |

## Motors with Terminal Box




| | MCS09...S00 | MCS12...S00 | MCS14...S00 | MCS19...S00 |
|---|---|---|---|---|
| $g_4$ | 121 | 136 | 147 | 172 |
| $x_1$ | 8 | 5 | 3 | |

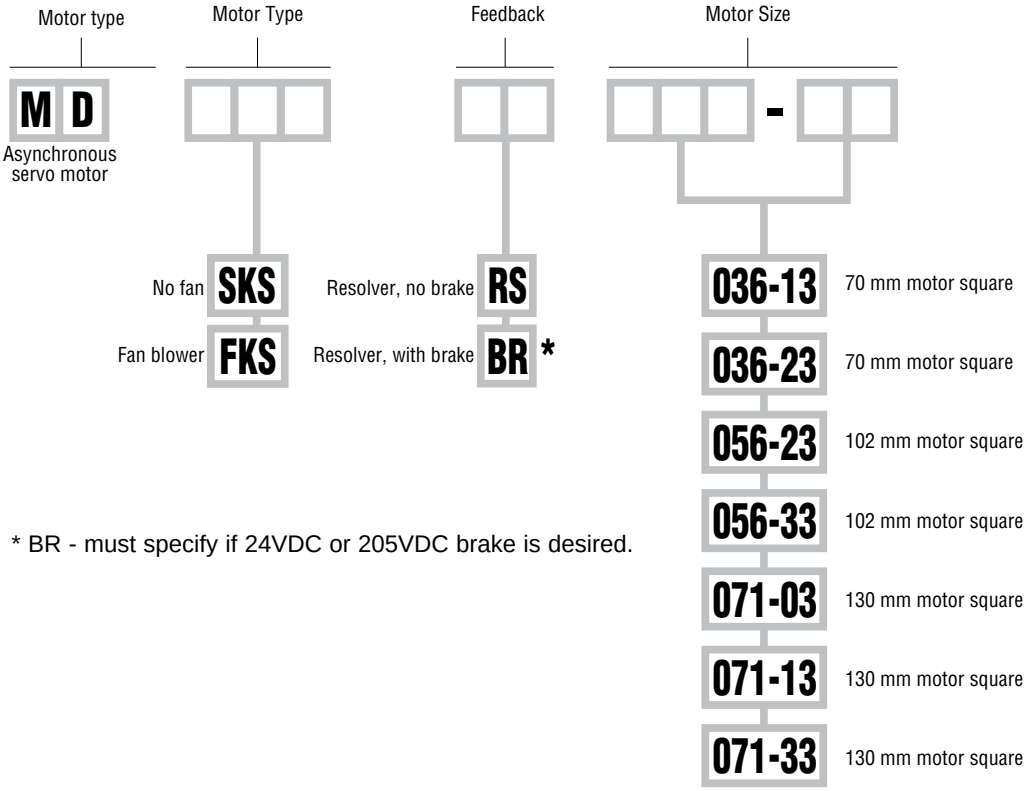
## MD Series

Low Inertia, Higher Power

The MDS Series of motors are similar to the MCS motors and are characterized by an extremely low moment of inertia and an incredibly high overload capacity. The motors are designed 400/480 VAC demanding applications that require resolver feedback.

## MD Series Features

- Synchronous AC brushless servo motors
- 250W to 5.9kW Power
- 480 VAC
- Resolver feedback
- UL, CE
- IP54
- Optional IP65
- Intercontec connectors
- 6-pole
- Optional 24VDC brake
- Two-year warranty



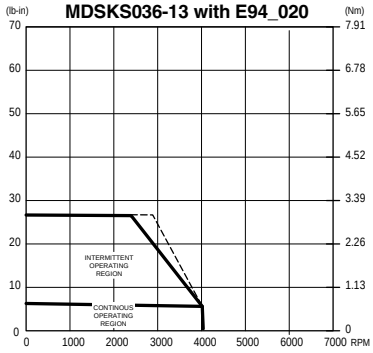

* BR - must specify if 24VDC or 205VDC brake is desired.



| Parameter* | Units | MDSKS_ _036-13 | MDSKS_ _036-23 | MDSKS_ _056-23 | MDSKS_ _056-33 |
|---|---|---|---|---|---|
| Max bus voltage | VDC | 680 | 680 | 680 | 680 |
| Rated power | kW | 0.25 | 0.54 | 1.1 | 1.8 |
| Rated speed | RPM | 4000 | 4000 | 3800 | 4000 |
| Maximum speed* | RPM | 8000 | 8000 | 5500 | 5500 |
| Rated torque | N-m | 0.6 | 1.3 | 2.8 | 4.2 |
| | lb-In | 5.31 | 11.50 | 24.78 | 37.17 |
| Continuous stall torque | N-m | 0.7 | 1.5 | 3.2 | 4.7 |
| | lb-In | 6.19 | 13.27 | 28.32 | 41.59 |
| Peak torque | N-m | 3.1 | 7.2 | 11.6 | 17.2 |
| | lb-In | 27.43 | 63.72 | 102.65 | 152.21 |
| Rated current | Arms | 0.9 | 1.1 | 2.3 | 3.6 |
| Continuous stall current | Arms | 0.9 | 1.3 | 2.6 | 4 |
| Peak current | Arms | 5 | 7.5 | 10 | 16 |
| Torque constant at 150°C $K_t$ | N-m/Arms | 0.72 | 1.2 | 1.23 | 1.18 |
| | lb-In/Arms | 6.37 | 10.62 | 10.88 | 10.44 |
| Voltage constant $K_e$ (ph-ph) | V/kRPM | 47.2 | 74.5 | 78.1 | 74.6 |
| Rotor interia | kg - $m^2$ | 2.20E-5 | 3.60E-5 | 1.20E-4 | 1.80E-4 |
| | lbs-In-$sec^2$ | 1.95E-4 | 3.19E-4 | 1.06E-3 | 1.59E-3 |
| Motor weight | kg | 1.5 | 2.1 | 5.3 | 6.3 |
| | lb | 3.31 | 4.63 | 11.69 | 13.89 |
| Motor poles | 8 | | | | |

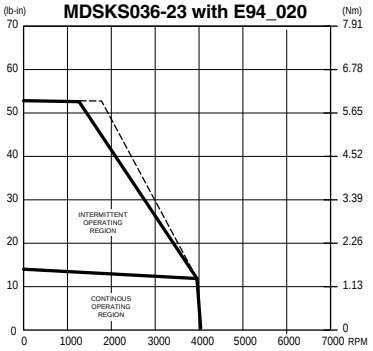
| Parameter* | Units | MDSKS_ _071-03 | MDSKS_ _071-13 | MDSKS_ _071-33 | MDFKS_ _071-03 | MDFKS_ _071-13 | MDFKS_ _071-33 |
|---|---|---|---|---|---|---|---|
| Max bus voltage | VDC | 680 | 680 | 680 | 680 | 680 | 680 |
| Rated power | kW | 2 | 3.2 | 4.6 | 2.6 | 4.1 | 5.9 |
| Rated speed | RPM | 3400 | 3700 | 3600 | 3300 | 3600 | 3500 |
| Maximum speed* | RPM | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 |
| Rated torque | N-m | 5.7 | 8.3 | 12.3 | 7.7 | 11.7 | 17 |
| | lb-In | 50.44 | 73.45 | 108.85 | 68.14 | 103.54 | 150.44 |
| Continuous stall torque | N-m | 6.7 | 10 | 14.7 | 8.8 | 13.3 | 19.3 |
| | lb-In | 59.29 | 88.50 | 130.09 | 77.88 | 117.70 | 170.80 |
| Peak torque | N-m | 23.6 | 35.2 | 52 | 23.6 | 35.2 | 52 |
| | lb-In | 208.85 | 311.50 | 460.18 | 208.85 | 311.50 | 460.18 |
| Rated current | Arms | 4.2 | 7 | 10 | 5.6 | 9.2 | 13.1 |
| Continuous stall current | Arms | 4.90 | 8.40 | 11.9 | 6.6 | 11.1 | 15.6 |
| Peak current | Arms | 19 | 32 | 45 | 19 | 32 | 45 |
| Torque constant at 150°C $K_t$ | N-m/Arms | 1.37 | 1.19 | 1.24 | 1.33 | 1.2 | 1.24 |
| | lb-In/Arms | 12.12 | 10.53 | 10.97 | 11.77 | 10.62 | 10.97 |
| Voltage constant $K_e$ (ph-ph) | V/kRPM | 93.00 | 84.50 | 88.2 | 93 | 84.5 | 88.2 |
| Rotor inertia | kg - $m^2$ | 6.00E-4 | 8.00E-4 | 1.00E-3 | 6.00E-4 | 8.00E-4 | 1.00E-3 |
| | in-lbs-$sec^2$ | 5.31E-3 | 7.08E-3 | 8.85E-3 | 5.31E-3 | 7.08E-3 | 8.85E-3 |
| Motor weight | kg | 8.90 | 10.90 | 13 | 10.2 | 12.2 | 12.2 |
| | lb | 19.62 | 24.03 | 28.66 | 22.49 | 26.90 | 26.90 |
| Motor poles | 8 | | | | | | |

* Motor performance does not always reflect system performance. System performance can be found in the following speed-torque curves.



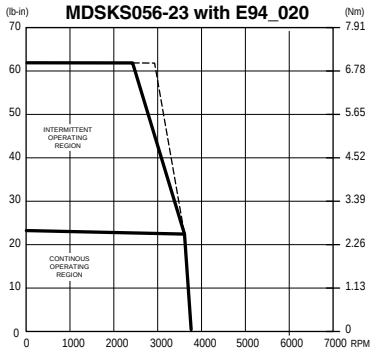

### MDSKS_ _036-13 with E94_020T4N_ _

| Motor | Brake | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | | Power | Feedback | Input Voltage | Drive Models | |
| MDSKSBR036-13 | Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R020T4NRM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MDSKSRS036-13 | No Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R020T4NRM* | |



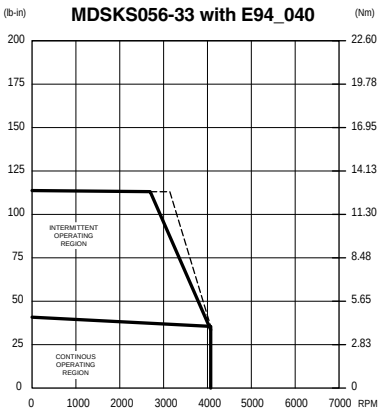

### MDSKS_ _036-23 with E94_020T4N_ _

| Motor | Brake | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | | Power | Feedback | Input Voltage | Drive Models | |
| MDSKSBR036-23 | Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R020T4NRM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MDSKSRS036-23 | No Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R020T4NRM* | |



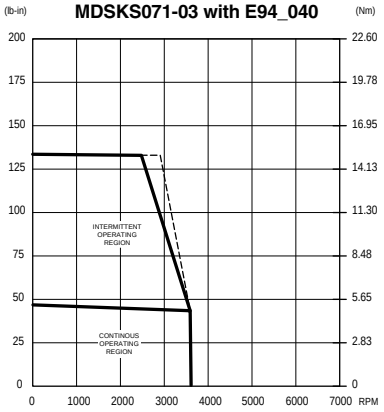

### MDSKS_ _056-23 with E94_020T4N_ _

| Motor | Brake | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | | Power | Feedback | Input Voltage | Drive Models | |
| MDSKSBR056-23 | Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R020T4NRM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MDSKSRS056-23 | No Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R020T4NRM* | |



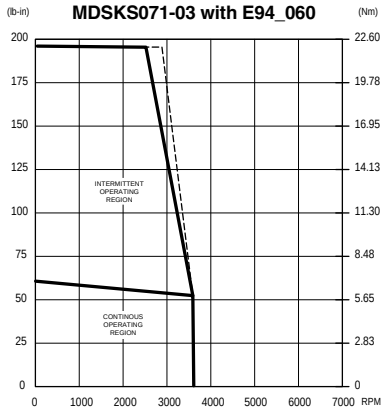

### MDSKS_ _056-33 with E94_040T4N_ _

| Motor | Brake | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | | Power | Feedback | Input Voltage | Drive Models | |
| MDSKSBR056-33 | Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R040T4NRM* | *To order a drive that meets the ISO13849-1 safety standard replace the “M” in the part number with an “S” |
| MDSKSRS056-33 | No Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R040T4NRM* | |



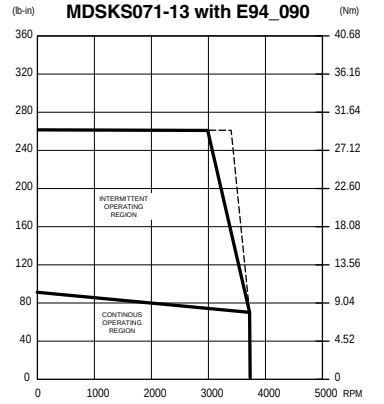

### MDSKS_ _071-03 with E94_040T4N_ _

| Motor | Brake | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | | Power | Feedback | Input Voltage | Drive Models | |
| MDSKSBR071-03 | Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R040T4NRM* | *To order a drive that meets the ISO13849-1 safety standard replace the "M" in the part number with an "S" |
| MDSKSRS071-03 | No Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R040T4NRM* | |



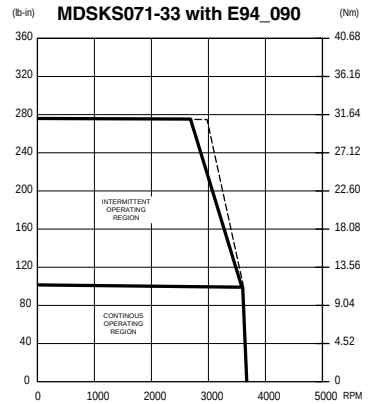

### MDSKS_ _071-03 with E94_060T4N_ _

| Motor | Brake | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | | Power | Feedback | Input Voltage | Drive Models | |
| MDSKSBR071-03 | Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R060T4NRM* | *To order a drive that meets the ISO13849-1 safety standard replace the "M" in the part number with an "S" |
| MDSKSRS071-03 | No Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R060T4NRM* | |



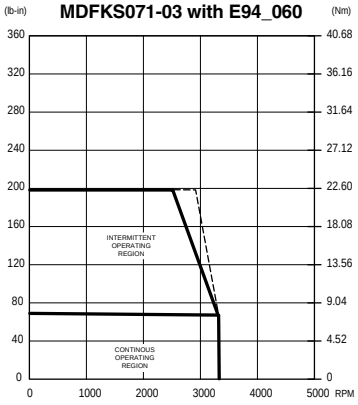

### MDSKS_ _071-13 with E94_090T4N_ _

| Motor | Brake | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | | Power | Feedback | Input Voltage | Drive Models | |
| MDSKSBR071-13 | Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | *To order a drive that meets the ISO13849-1 safety standard replace the "M" in the part number with an "S" |
| MDSKSRS071-13 | No Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | |



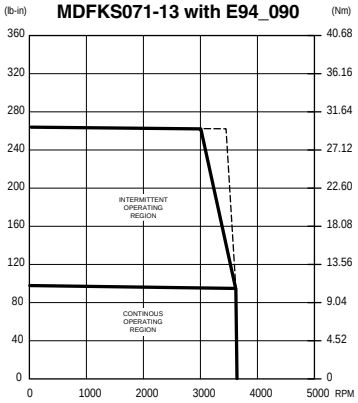

### MDSKS_ _071-33 with E94_090T4N_ _

| Motor | Brake | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | | Power | Feedback | Input Voltage | Drive Models | |
| MDSKSBR071-33 | Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | *To order a drive that meets the ISO13849-1 safety standard replace the "M" in the part number with an "S" |
| MDSKSRS071-33 | No Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | |



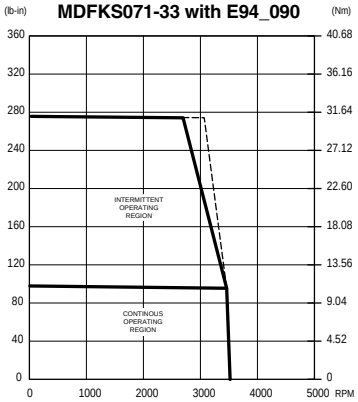

### MDFKS_ _071-03 with E94_060T4N_ _

| Motor | Brake | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | | Power | Feedback | Input Voltage | Drive Models | |
| MDFKSBR071-03 | Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R060T4NRM* | *To order a drive that meets the ISO13849-1 safety standard replace the "M" in the part number with an "S" |
| MDFKSRS071-03 | No Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R060T4NRM* | |




### MDFKS_ _071-13 with E94_090T4N_ _

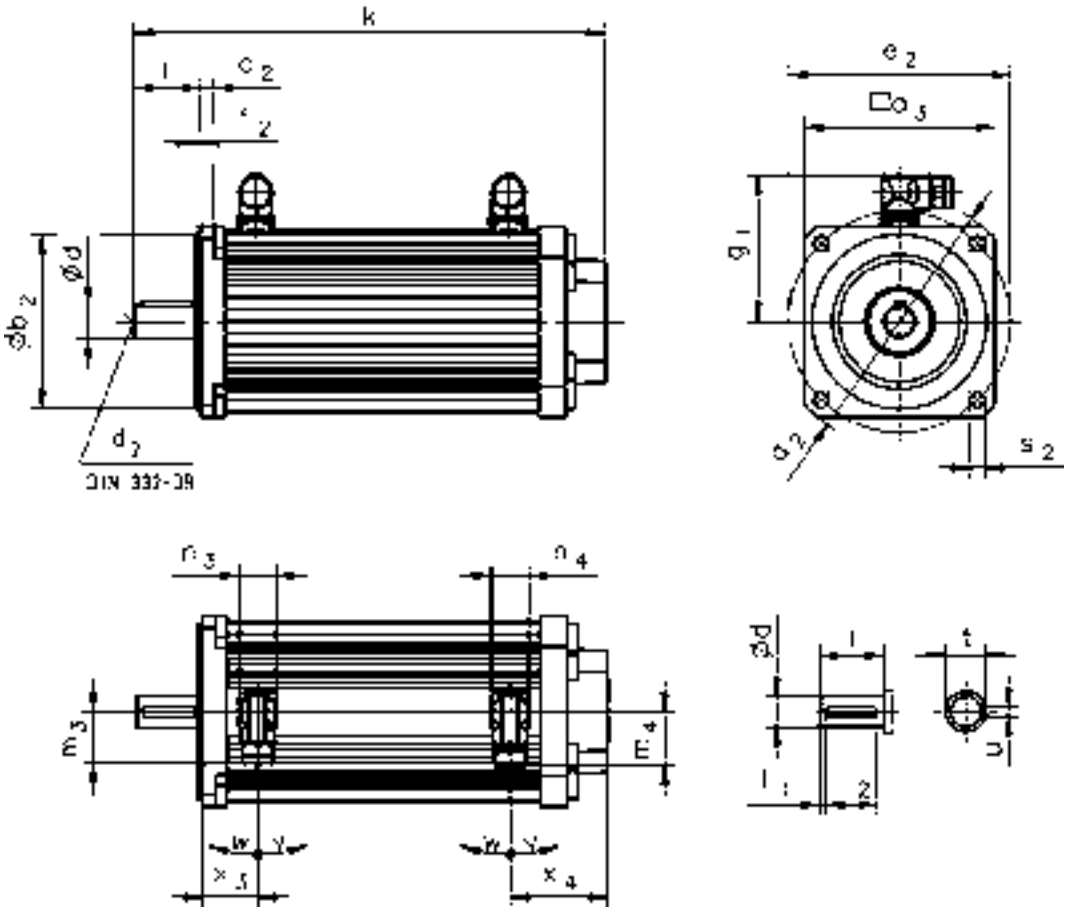
| Motor | Brake | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | | Power | Feedback | Input Voltage | Drive Models | |
| MDFKSBR071-13 | Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | *To order a drive that meets the ISO13849-1 safety standard replace the "M" in the part number with an "S" |
| MDFKSRS071-13 | No Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | |




### MDFKS071-33 with E94_090T4N_ _

| Motor | Brake | Intermediate Cables | | Drives | | |
|---|---|---|---|---|---|---|
| Models | | Power | Feedback | Input Voltage | Drive Models | |
| MDFKSBR071-33 | Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | *To order a drive that meets the ISO13849-1 safety standard replace the "M" in the part number with an "S" |
| MDFKSRS071-33 | No Brake | EWLB_ _ _FE1NA<br>_ _ _ = meter length (002, 005, 010) | EWLR_ _ _BE1NA | 400…480V 3Ø | E94R090T4NRM* | |

# Motors Without Fans




| MDSKS□□ | | 036-13 | 036-23 | 056-23 | 056-33 | 071-03 | 071-13 | 071-33 |
|---|---|---|---|---|---|---|---|---|
| RS | k | 166 | 190 | 240.5 | 275.5 | 259 | 294 | 329 |
| | $x_3$ | 81 | 105 | 34 | | 37 | | |
| | $x_4$ | 22 | | 58 | | 56.5 | | |

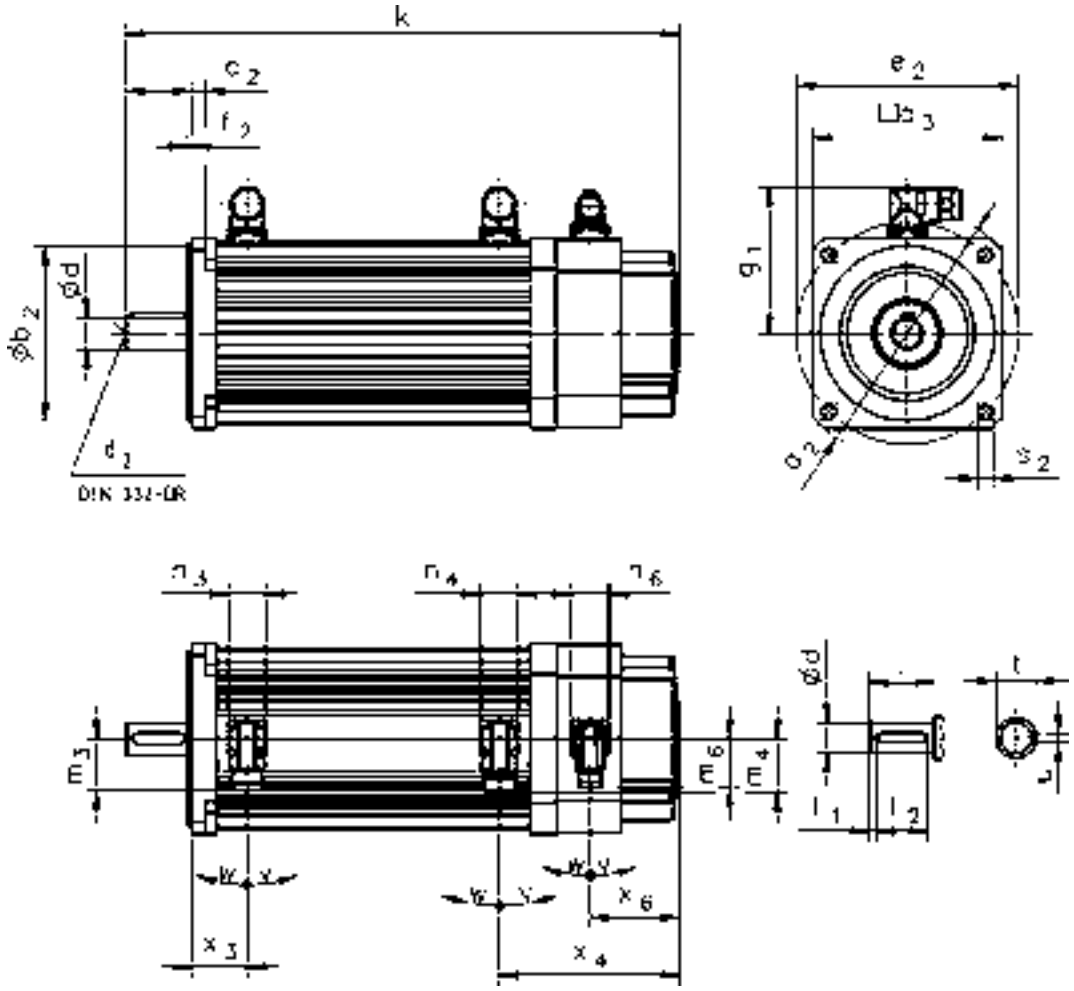


| MDSKS□□ | | 036-13 | 056-23 | 071-03 |
|---|---|---|---|---|
| | | 036-23 | 056-33 | 071-13 |
| | | | | 071-33 |
| | $g_1$ | 76.5 | 89.5 | 102 |
| | $n_3$ | 28 | | |
| | $n_4$ | 28 | | |
| | $m_3$ | 40 | | |
| | $m_4$ | 40 | | |
| | v | 195 ° | | |
| | w | 80 ° | | |

| MDSKS□□ | | | 036-13 | 056-23 | 071-03 |
|---|---|---|---|---|---|
| | | | 036-23 | 056-33 | 071-13 |
| | | | | | 071-33 |
| | d | k6 | 11 | 14 | 19 |
| | $d_2$ | | M4 | M5 | M6 |
| | l | | 23 | 30 | 40 |
| | $l_1$ | | 3 | 2.5 | 2 |
| | $l_2$ | | 18 | 25 | 36 |
| | u | | 4 | 5 | 6 |
| | t | | 12.5 | 16 | 21.5 |

| MDSKS□□ | | | 036-13 | 056-23 | | 071-03 | |
|---|---|---|---|---|---|---|---|
| | | | 036-23 | 056-33 | | 071-13 | |
| | | | | | | 071-33 | |
| | | | B5 | | B14 | B5 | B14 |
| | | | | A120 | C105 | A160 | C160 |
| | | | FF75 | FF100 | FT85 | FF130 | FT130 |
| | $a_2$ | | 87 | 120 | | 160 | |
| | $a_3$ | | 70 | 102 | | 130 | |
| | $b_2$ | j6 | 60 | 80 | 70 | 110 | |
| | $c_2$ | | 14 | 8 | | 9 | |
| | $e_2$ | | 75 | 100 | 85 | 130 | |
| | $f_2$ | | 2.5 | 3 | 2.5 | 3.5 | |
| | $s_2$ | | 6 | 7 | M6 | 9 | M8 |

## Motors with Blower




| MDFKS□□ | | 071-03 | 071-13 | 071-33 |
|---|---|---|---|---|
| RS | k | 327 | 362 | 397 |
| | $x_3$ | 37 | | |
| | $x_4$ | 124.5 | | |
| | $x_6$ | 73 | | |

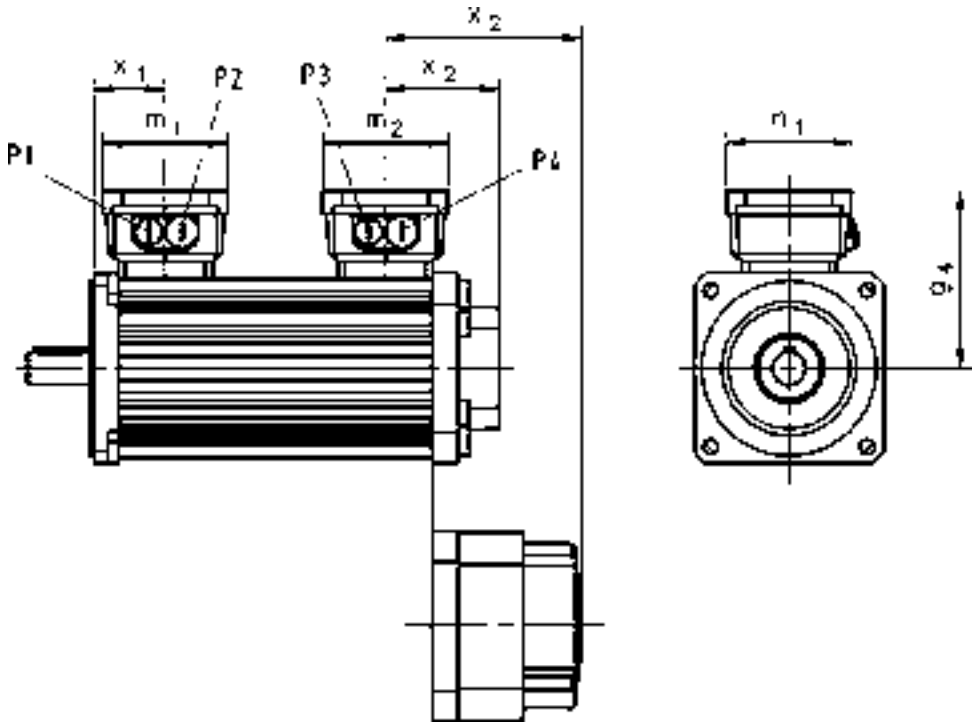


| MDFKS□□ | | 071-03 |
|---|---|---|
| | | 071-13 |
| | | 071-33 |
| | $g_1$ | 102 |
| | $n_3$ | 28 |
| | $n_4$ | 28 |
| | $n_6$ | 28 |
| | $m_3$ | 40 |
| | $m_4$ | 40 |
| | $m_6$ | 37 |
| | v | 195 ° |
| | w | 80 ° |

| MDFKS□□ | | | 071-03 |
|---|---|---|---|
| | | | 071-13 |
| | | | 071-33 |
| | d | k6 | 19 |
| | $d_2$ | | M6 |
| | l | | 40 |
| | $l_1$ | | 2 |
| | $l_2$ | | 36 |
| | u | | 6 |
| | t | | 21.5 |

| MDFKS□□ | | | 071-03 | |
|---|---|---|---|---|
| | | | 071-13 | |
| | | | 071-33 | |
| | | | B5 | B14 |
| | | | A160 | C160 |
| | | | FF130 | FT130 |
| | $a_2$ | | 160 | |
| | $a_3$ | | 130 | |
| | $b_2$ | j6 | 110 | |
| | $c_2$ | | 9 | |
| | $e_2$ | | 130 | |
| | $f_2$ | | 3.5 | |
| | $s_2$ | | 9 | M8 |

# Motors with Terminal Box




| MDSKS□□ | | 056-23 | 056-33 | 071-03 | 071-13 | 071-33 |
|---|---|---|---|---|---|---|
| MDFKS□□ | | | | 071-03 | 071-13 | 071-33 |
| | $g_4$ | 109 | | 121 | | |
| | $m_1$ | 93 | | | | |
| | $m_2$ | 93 | | | | |
| | $n_1$ | 93 | | | | |
| | $x_1$ | 54 | | 57 | | |
| | P1 | M16x1.5 | | | | |
| | P2 | M20x1.5 | | | | |
| | P3 | M16x1.5 | | | | |
| | P4 | M20x1.5 | | | | |

| MDSKS□□ | | 056-23 | 056-33 | 071-03 | 071-13 | 071-33 |
|---|---|---|---|---|---|---|
| RS | $x_2$ | 63 | 78 | 68.5 | 76.5 | |

| MDFKS□□ | | 071-03 | 071-13 | 071-33 |
|---|---|---|---|---|
| RS | $x_2$ | 136.5 | 144.5 | |



The PositionServo offers numerous accessories to complete your motion control system.
The following pages describe all of the options available to you:

- EPM Programmer
- Communication Modules
- Feedback Modules
- Breakout Modules
- EMC Filters
- Dynamic Braking Resistors

# EPM Programmer and Accessories

| EPM Programmer | |
|---|---|
| **Item Number** | **Description** |
| EEPM1RA | EPM Programmer |
| EEPM2WA | White EPM bulk pack (12) |

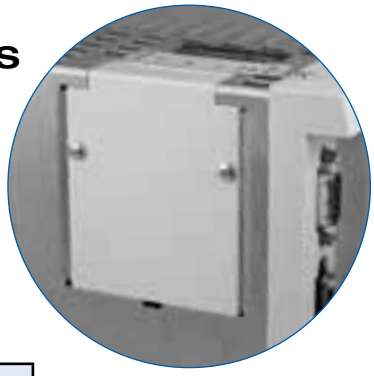
## The EPM - Your Unique Advantage

The EPM (Electronic Programming Module) is your drive's removable memory chip.

***EPM Advantages***

- Quickly duplicate complete servo configuration files.
- After initial set-up, configure more servos without prior servo knowledge or without needing to power up the drive.
- To update a servo in the field, simply remove the current EPM and replace it with a new EPM.

# Communication, Feedback and Breakout Modules



| Communication Modules | |
|---|---|
| **Item Number** | **Description** |
| E94ZACAN1 | CANopen Communication Module |
| E94ZARS41 | RS-485 Communication Module |
| E94ZADVN1 | DeviceNet Communication Module |
| E94ZAPFB1 | PROFIBUS-DP Communication Module |

| Feedback Modules | |
|---|---|
| **Item Number** | **Description** |
| E94ZAENC1 | Second Encoder Feedback Module |

| Breakout Modules | |
|---|---|
| **Item Number** | **Description** |
| E94ZAHBK2 | Motor Brake Terminal Block & SCSI [F] I/O Module |
| E94ZATBO2 | Terminal Block I/O Module |
| E94ZASCA2 | Panel Saver SCSI [F] I/O Module for Encoder |
| E94ZASCA3 | Panel Saver Module for Resolver |

CANopen Communication Module

RS-485 Communication Module

DeviceNet Communication Module

PROFIBUS-DP Communication Module

Second Encoder Feedback Module

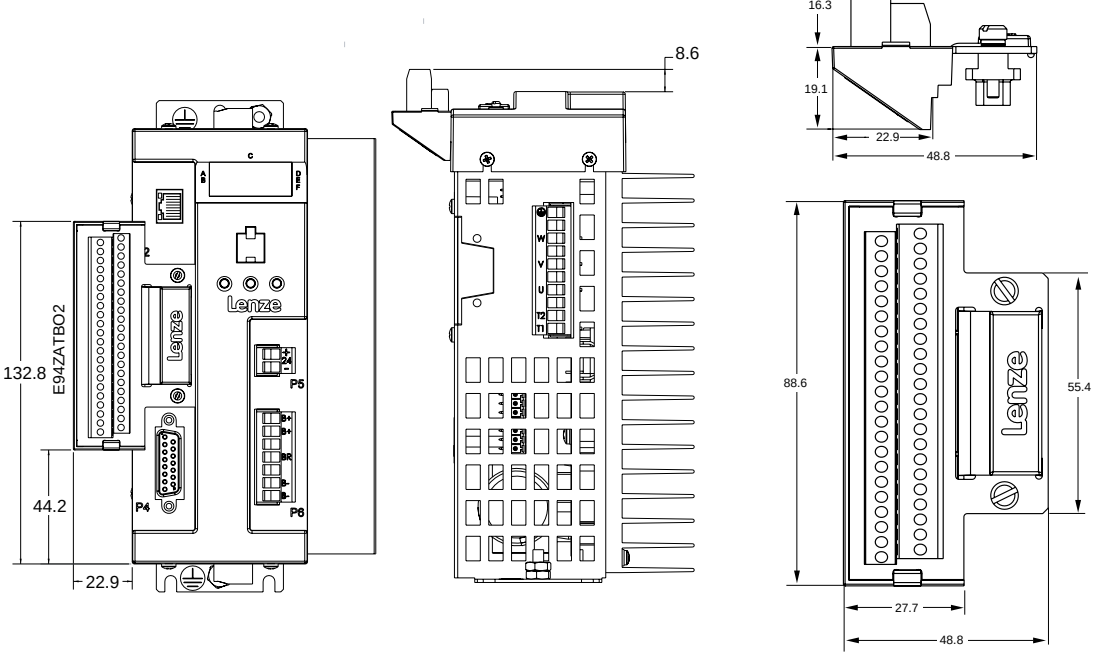
## Designation Codes:

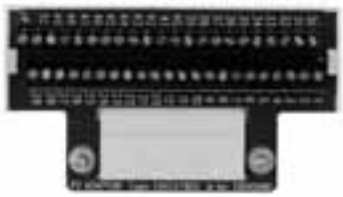
| | E94Z | A | CAN | 1 |
|---|---|---|---|---|
| **Electrical Option in the PositionServo** | | | | |
| **Option Type** | | | | |
| A = Communication, Feedback or Breakout Module | | | | |
| **Option Type (Option Type A):** | | | | |
| CAN = CANopen Communication Module | | | | |
| RS4 = RS-485 Communication Module | | | | |
| DVN = DeviceNet Communication Module | | | | |
| PFB = PROFIBUS-DP Communication Module | | | | |
| ENC = 2nd Encoder Feedback Module | | | | |
| HBK = Motor Brake Terminal Block I/O Module | | | | |
| TBO = Terminal Block I/O Module | | | | |
| SCA = Panel Saver I/O Module | | | | |
| **Variations:** | | | | |
| 1 = 1st Variation, 2 = 2nd Variation, . . . | | | | |

## Breakout Module

| Item Number | Description |
|---|---|
| E94ZATBO2 | 50-Pin Screw Terminal Block, PositionServo |

Dimensions are in mm

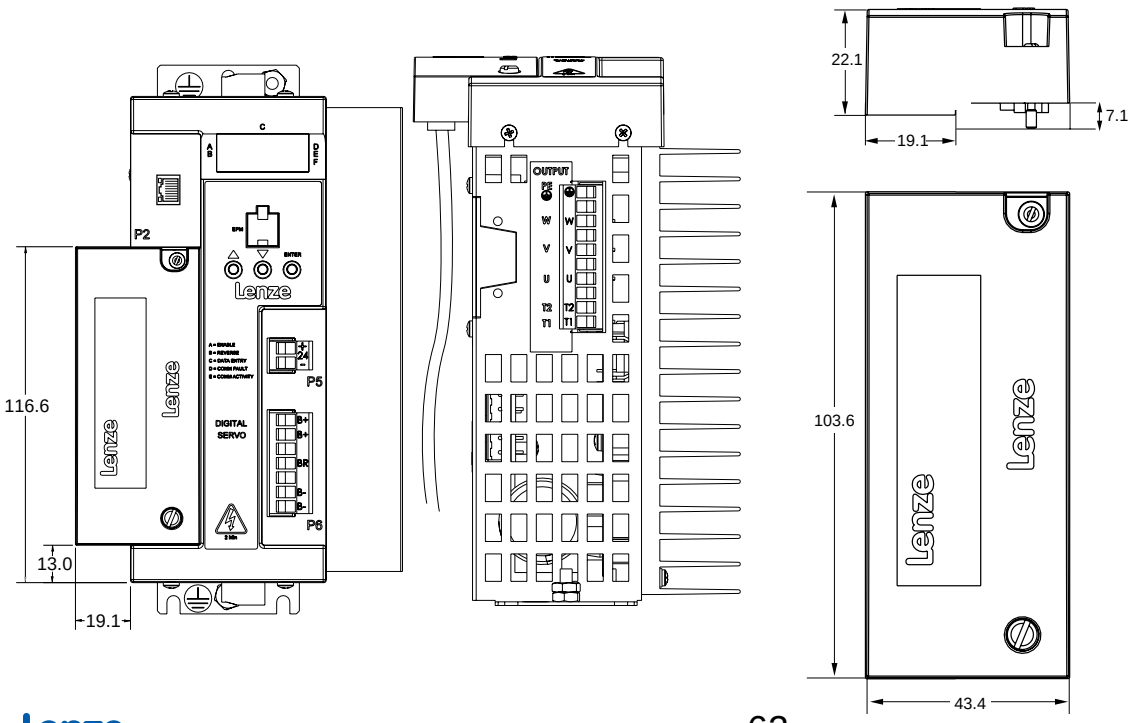


- Direct wiring to screw terminals for all 50 pins on the P3 Controller Interface
- Excellent for accessing individual control I/O for test or ease of installation

## Breakout Module

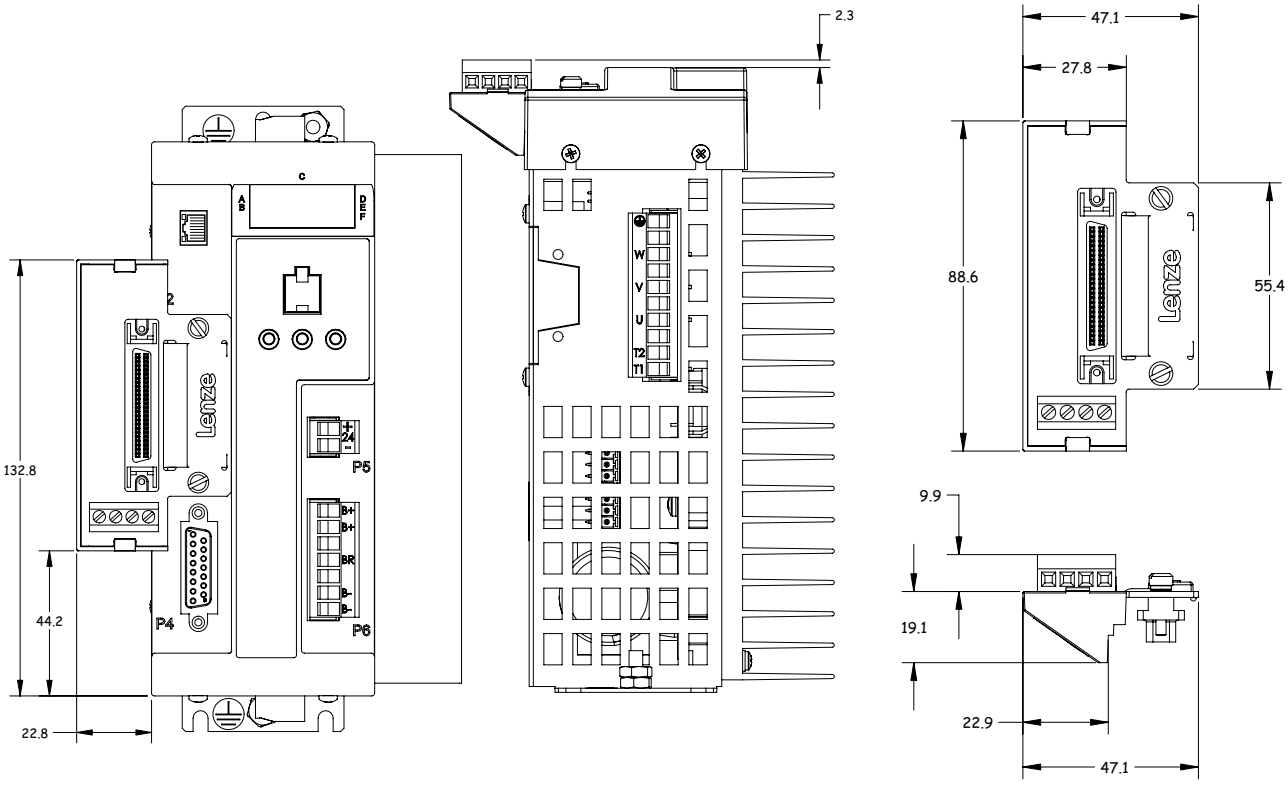
| Item Number | Description |
|---|---|
| E94ZASCA2 | Panel Saver Module with SCSI [F] I/O connection and DB15 Encoder connection, PositionServo 940 |
| E94ZASCA3 | Panel Saver Module with SCSI [F] I/O connection and DB9 Resolver connection, PositionServo 941 |




- Mounts directly to the face of the drive and provides alternate connection points to the P3 and P4 connectors
- Allows for control cabling to be routed parallel to the drive for applications where panel depth is a concern

# Breakout Module

| Item Number | Description |
|---|---|
| E94ZAHBK2 | 50-Pin SCSI Connector with 4-Pin Screw Terminal for Motor Brake |




- Mounts directly to P3 controller interface connector and provides screw terminal access to supply 24VDC for controlling a motor holding brake.
- Output 2 is dedicated for controlling motor holding brake functions via the 4-pin screw terminal. The additional control I/O pins from P3 are accessible via the 50-pin SCSI connector located at P3A.

## PositionServo EMC Filters:

| EMC Filters | | | | |
|---|---|---|---|---|
| **Mounting** | **Item Number** | **Compatible Drives** | **Phase** | **Filter Output Current [In]** |
| Footprint | E94ZF04T4A1 | E94_020Y2N, E94_020T4N | 3Ø Only | 4.4 |
| Footprint | E94ZF07T4A1 | E94_040Y2N, E94_040T4N | 3Ø Only | 6.9 |
| Footprint | E94ZF15T4A1 | E94_080Y2N | 3Ø Only | 15 |
| Footprint | E94ZF15T4A2 | E94_100Y2N | 3Ø Only | 15 |
| Side Mount | E94ZF10T4A1 | E94_060T4N, E94_060T4C | 3Ø Only | 10.0 |
| Side Mount | E94ZF12T4A2 | E94_090T4N, E94_090T4C | 3Ø Only | 12.0 |
| Side Mount | E94ZF24S2A1 | E94_120Y2N, E94_120Y4C | 1Ø Only | 24.0 |

## EMC Filters Designation Code:

| E94Z | F | 04 | T | 4 | A1 |
|---|---|---|---|---|---|

**Electrical Option in the PositionServo**

**Filter Type:**
F = EMC Filter

**Filter Current Rating in Amps**
04 = 4.4 Amps 07 = 6.9 Amps 10 = 10 Amps 12 = 12 Amps 15 = 15 Amps 24 = 24 Amps

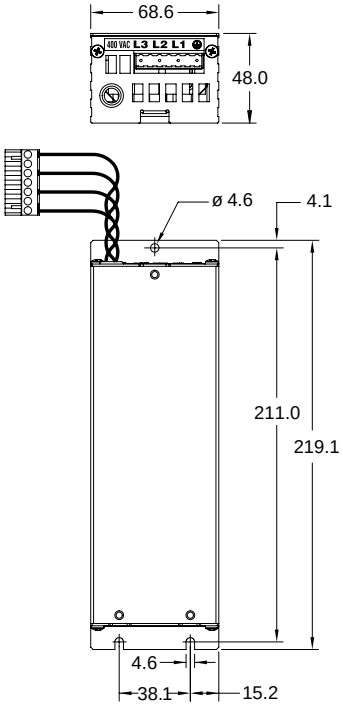
**Input Phase**
S = Single Phase
T = Three Phase

**Max. Voltage:**
2 = 240 VAC
4 = 400/480 VAC

**Degree of Filtering/Variation**
A1 = Industrial/1st Variation
A2 = Industrial/2nd Variation

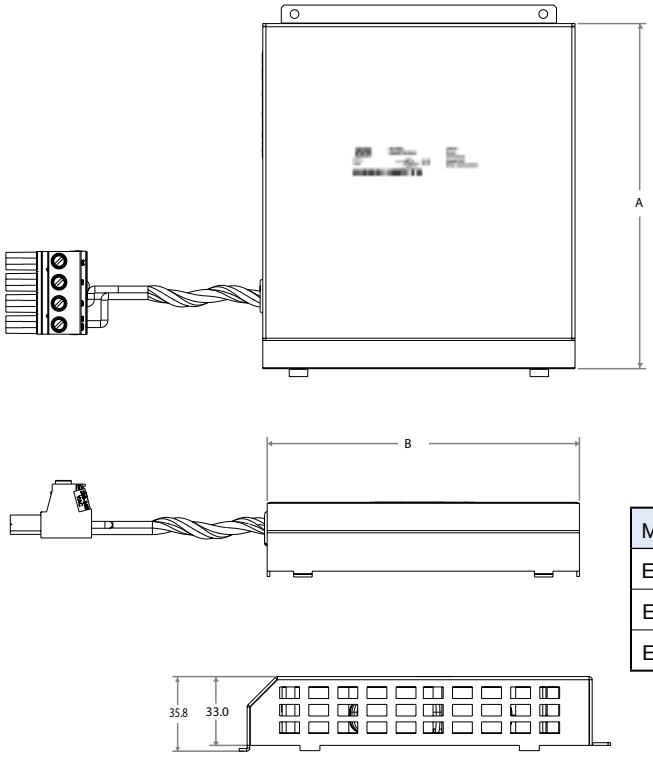
## Footprint Filter

Dimensions are in mm




| Model Number | Drive Compatibility | $I_n$(A) | m (kg) |
|---|---|---|---|
| E94ZF04T4A1 | E94_020Y2N, E94_020T4N | 4.4 | 0.8 |
| E94ZF07T4A1 | E94_040T2N, E94_040T4N | 6.9 | |
| E94ZF15T4A1 | E94_080Y2N | 15.0 | |
| E94ZF15T4A2 | E94_100Y2N | 15.0 | |

## Sidemount Filter




| Model Number | Drive Compatibility | A (mm) | B (mm) | $I_n$(A) | m (kg) |
|---|---|---|---|---|---|
| E94ZF24S2A1 | E94_120Y2N (1Ø), E94_120Y2C (1Ø) | 165.6 | 149.9 | 24.0 | 0.6 |
| E94ZF10T4A1 | E94_060T4N, E94_060T4C | 165.6 | 149.9 | 10.0 | |
| E94ZF12T4A2 | E94_090T4N, E94_090T4C | 145.3 | 200.7 | 12.0 | |

The E94ZB series of dynamic braking resistors can be used to keep the bus voltage rise below the shutdown level of the over voltage protection. Bus voltage rise may happen when a rotating load is decelerated or a load is descending vertically. In this situation, the mechanical energy stored in the load is converted back to electrical energy in the motor. This process is called regeneration.

# Dynamic Braking Resistors:

| Resistor Model | R, Ohm | Rated Continuous Power on Heat Sink, Watts |
|---|---|---|
| **E94ZB15A300A** | 15 | 300 |
| **E94ZB20A150A** | 20 | 150 |
| **E94ZB30A150A** | 30 | 150 |
| **E94ZB40A080A** | 40 | 80 |
| **E94ZB45A300A** | 45 | 300 |
| **E94ZB75A150A** | 75 | 150 |
| **E94ZBF0A080A** | 150 | 80 |

**Note:**

1.) The rated continuous power with heat sink is measured when the resistor is mounted vertically on an aluminum plate (200x200x3mm) at the room temperature 25ºC. Derate the continuous power for the following conditions:

| Ambient Temperature | Derate the Rated Power | |
|---|---|---|
| | With aluminum plate (200X200X3mm) | Without aluminum plate (i.e., Free Air) |
| 25 ºC | No derating | Derate by 20% |
| 40 ºC | Derate by 5% | Derate by 25% |

2.) The continuous power supplied to the resistor shall not exceed the continuous power rating of the resistor.

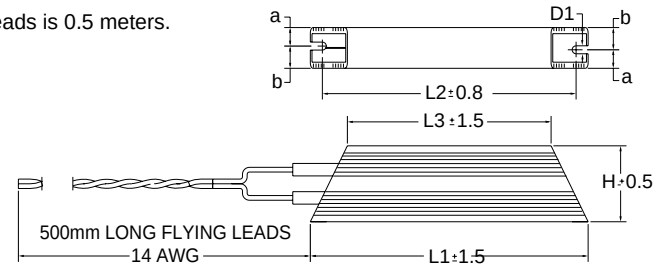
3.) The surface temperature can reach up to 200ºC.
**WARNING!** Do not put any flammable material close to the resistor.

4.) Resistors must be vertically mounted on heat sink or metal plate for adequate cooling and safe operation.

**Dynamic Brake Resistor Dimensions:**

| Model Number | Dimensions (mm) | | | | | | | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| | L1 | L2 | L3 | H | D1±0.3 | W = a + b | | |
| | | | | | | a | b | |
| E94ZB15A300A | 215 | 196 | 175 | 60 | 5.3 | 13 | 17 | 0.60 |
| E94ZB20A150A | 210 | 197 | 170 | 41 | 4.3 | 10 | 12 | 0.29 |
| E94ZB30A150A | 210 | 197 | 170 | 41 | 4.3 | 10 | 12 | 0.29 |
| E94ZB40A080A | 150 | 137 | 110 | 41 | 4.3 | 10 | 12 | 0.19 |
| E94ZB45A300A | 215 | 196 | 175 | 60 | 5.3 | 13 | 17 | 0.60 |
| E94ZB75A150A | 210 | 197 | 170 | 41 | 4.3 | 10 | 12 | 0.29 |
| E94ZBF0A080A | 150 | 137 | 110 | 41 | 4.3 | 10 | 12 | 0.19 |

*The length of the flying leads is 0.5 meters.




# PositionServo Drive Compatibility Between Resistors

| Compatible Drive Models | Resistor Model |
|---|---|
| E94_020S1N, E94_040S1N<br>E94_020S2F, E94_040S2F<br>E94_020Y2N, E94_040Y2N | **E94ZB40A080A** |
| E94_120Y2N, E94_120Y2C | **E94ZB30A150A** |
| E94_080S2F, E94_100S2F<br>E94_080Y2N, E94_100Y2N | **E94ZB20A150A** |
| E94_020T4N | **E94ZBF0A080A** |
| E94_040T4N, E94_050T4N, E94_060T4N, E94_060T4C | **E94ZB75A150A** |
| E94_090T4N, E94_090T4C | **E94ZB45A300A** |
| E94_180T2N, E94_180T2C | **E94ZB15A300A** |

# ISO13849-1 Safety Circuit

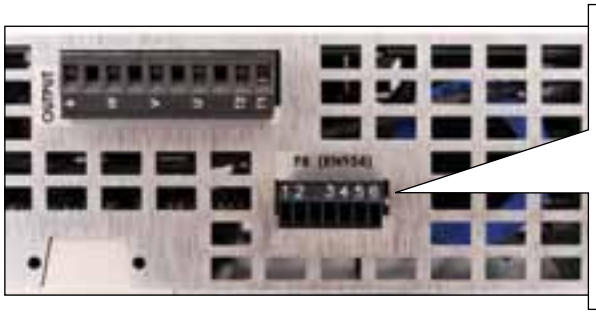
PositionServo drives with suffixes “ES” and “RS” include a safety circuit that allows the drive output to the motor to be disabled so that the drive cannot generate torque in the motor. This safety function, termed “Safe Standstill”, meets the requirements of ISO13849-1 (previously EN954-1 Safety of Machinery – Safety-related Parts of Control Systems.)

This function provides a highly reliable disable function of the drive where no single component failure will cause the drive to enable and complies with the ISO13849-1 safety standard.

### ISO13849-1: the five categories for safety-related parts of control systems

- **Category B**
  The basic category. The occurrence of a fault can lead to loss of safety function;
- **Category 1**
  Improved resistance to faults is achieved predominantly by selection and application of components. This is achieved by using well-tried components and well-tried safety principles.
- **Category 2**
  Improved performance is required. This is achieved by using all the principles stated in Category 1 together with designing the control system so that the safety-related functions are checked at suitable intervals by the machine control system. This check will be made at machine start-up and at other periods as determined by the risk assessment. After detection of a fault, a safe state will be maintained until the fault has been cleared.
- **Category 3**
  A single fault will not lead to loss of a safety function. This requires the application of all the principles of previously mentioned categories B, 1, and 2 together with the safety-related parts of the control system being designed so that a single fault in any of these parts does not lead to a loss of the safety function.
- **Category 4**
  All faults will be detected and there is protection against an accumulation of faults which needs to be specified. The safety-related parts of the control need to be designed so the a single fault does not lead to a loss of safety function and the single fault will be detected at or before the next demand for the safety function.

This option is located at the base of the PositionServo drive and must be configured at the factory prior to shipment.



**P8 PIN ASSIGNMENTS (SAFETY FUNCTION)**

| Pin | Name | Function |
|---|---|---|
| 1 | Bypass Voltage | ISO13849-1 Bypass Voltage (+24VDC) |
| 2 | Bypass COM | ISO13849-1 Bypass Common |
| 3 | Safety Status | ISO13849-1 Safety Status |
| 4 | Safety Input1 | ISO13849-1 Safety Input 1 (+24VDC to Enable) |
| 5 | Safety COM | ISO13849-1 Safety Common |
| 6 | Safety Input2 | ISO13849-1 Safety Input 2 (+24VDC to Enable) |



Putting your system together is now simple. The following pages give details and specifications for all of the PositionServo and motor system cables. Refer to the tables below as a quick reference guide.

## Motor System Cables

| Motor Family | Motor Power Cables | Encoder Cables | Resolver Cables |
|---|---|---|---|
| MAS | EWLM_ _ _FC1NA<br>EWLB_ _ _FD1NA | EWLE_ _ _AB1NA<br>EWLE_ _ _AD1NA | NA |
| MCS | EWLB_ _ _FE_NA | EWLE_ _ _AE1NA | EWLR_ _ _BE1NA |

## Additional System Cables

| Cable | Description |
|---|---|
| EWLE_ _ _CF1NA | 2nd Encoder Feedback Cable |
| EWLN002SF1NA | 2 meter I/O Expansion Cable |

## Cable Model Number Designation Code

| EWL | M | 005 | F | D | 1NA |
|---|---|---|---|---|---|

**Electrical Cable**

**Cable Configuration:**

- M = Power Cable for Servo Motor
- B = Power Cable for Servo Motor with Mechanical Brake
- E = Control Cable for Encoder Feedback
- R = Control Cable for Resolver Feedback
- N = Control: I/O Expansion Cable

**Cable Length [meters]:**

- 002 = 2.5 meters
- 005 = 5 meters
- 010 = 10 meters

**Connector Type [Drive End]:**

- A = DB-15 [M]
- B = DB-9 [M]
- C = DB-9 [F]
- F = Flying Leads
- S = SCSI (50-pin)

**Connector Type [Feedback/Motor End]:**

- B = DB-15 [F]
- C = CPC Connector
- D = IP65 M17 Plug [F]
- E = IP65 M23 Plug [F]
- F = Flying leads

Variations/Cable Construction:

1NA = 1st Variation/Normal Construction

2NA = 2nd Variation/Normal Construction

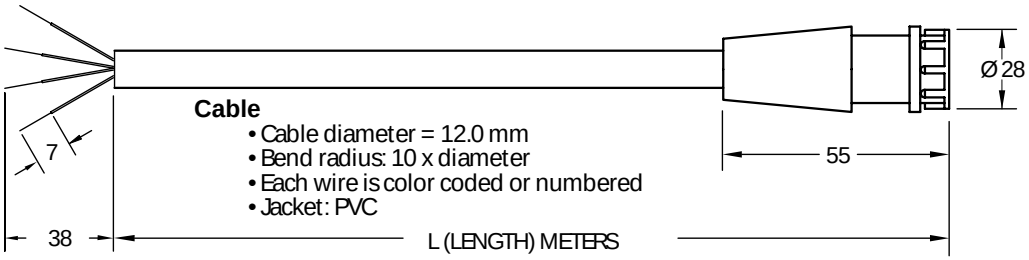
## *Power Cables – CPC Connector*

| Model # | Specifications | Length |
|---|---|---|
| EWLM002FC1NA: | 1.3 mm²/16 AWG power cable, <= 12 amps drive output current | L = 2.5 meters |
| EWLM005FC1NA: | 1.3 mm²/16 AWG power cable, <= 12 amps drive output current | L = 5.0 meters |
| EWLM010FC1NA: | 1.3 mm²/16 AWG power cable, <= 12 amps drive output current | L = 10.0 meters |

Dimensions are in millimeters.

**Drive End**
Flying Leads

**Motor End**
CPC Connector




**Cable**
- Cable diameter = 12.0 mm
- Bend radius: 10 x diameter
- Each wire is color coded or numbered
- Jacket: PVC

| COMPATIBLE MOTORS |
|---|
| MAS_ _ _ _ _-CB0 |

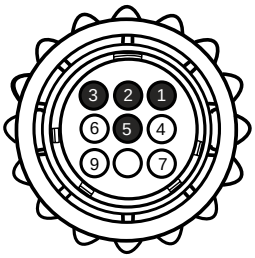
### Flying Leads - wiring to Position Servo Drive

P7 on PositionServo Drive — Flying Leads

| Terminal Name | |
|---|---|
| PE | GRN/YEL |
| W | WHITE or BLACK 3 |
| V | BLACK or BLACK 2 |
| U | RED or BLACK 1 |
| $T_2$ | |
| $T_1$ | |

### CPC Connector

401-227 conn., plug, CPC 13-9 round Tyco #206708-1, Qty. 1
401-228 conn., plug, CPC 16-18 AWG Tyco #66101-3, Qty. 4
Z0000-0005 clamp, cable




WARNING: Do not connect U, V, W wires to PTC Input! Severe damage to the drive will result.

| PIN | WIRE COLOR/NUMBER | TERMINAL NAME |
|---|---|---|
| 1 | RED or BLACK 1 | U (R) |
| 2 | BLACK or BLACK 2 | V (S) |
| 3 | WHITE or BLACK 3 | W (T) |
| 4 | | |
| 5 | GRN/YEL | PE |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |

## *Power Cables – M17 Connector [Motor] to flying leads [Drive]*

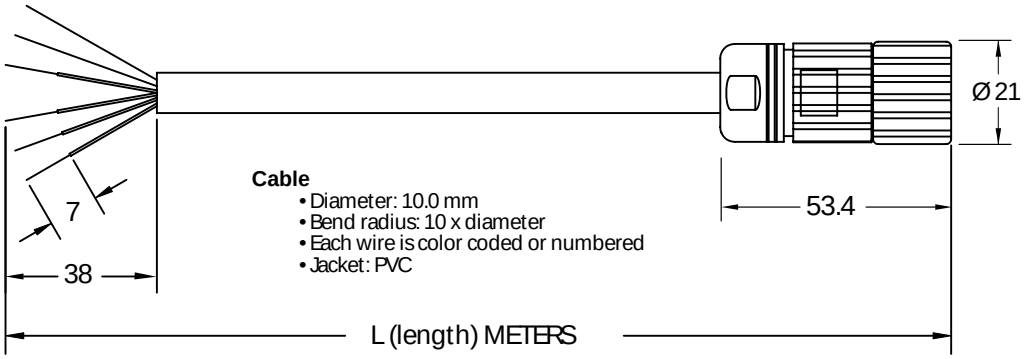
| Model # | Specifications | Length |
|---|---|---|
| EWLB002FD1NA: | 1.3 mm²/16 AWG power cable, <= 12 amps drive output current | *L = 2.5 meters |
| EWLB005FD1NA: | 1.3 mm²/16 AWG power cable, <= 12 amps drive output current | *L = 5.0 meters |
| EWLB010FD1NA: | 1.3 mm²/16 AWG power cable, <= 12 amps drive output current | *L = 10.0 meters |

*Length includes brake leads. These cables can be used for both brake and non-brake motors.

Dimensions are in millimeters.

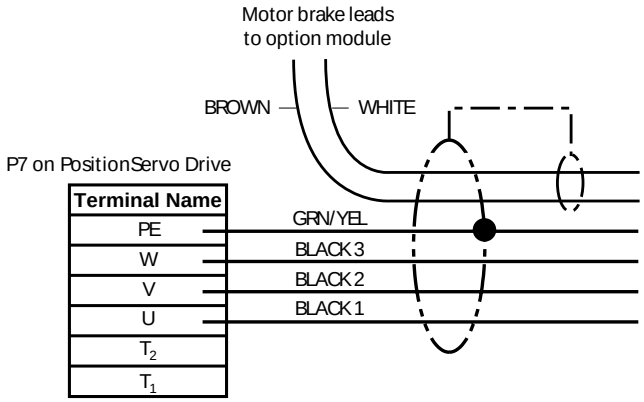
**Drive End**
Flying Leads

**Motor End**
M17 Connector



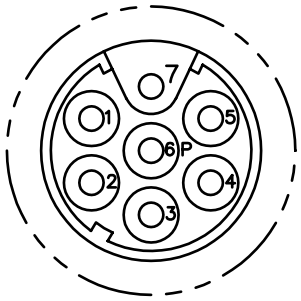

| COMPATIBLE MOTORS |
|---|
| MAS_ _ _ _ _-DB0 |
| MAS_ _ _ _ _-MB0 |

### Flying Leads - wiring to Position Servo Drive




### M17 Connector

401-210 Intercontec #BSTA880FR0886001A000




WARNING: Do not connect U, V, W wires to PTC Input! Severe damage to the drive will result.

| PIN | WIRE COLOR/NUMBER | TERMINAL NAME |
|---|---|---|
| 1 | WHITE | MOTOR BRAKE + |
| 2 | BROWN | MOTOR BRAKE - |
| 3 | | |
| 4 | BLACK 1 | U (R) |
| 5 | BLACK 2 | V (S) |
| 6 | BLACK3 | W (T) |
| 7 | GRN/YEL | PE |

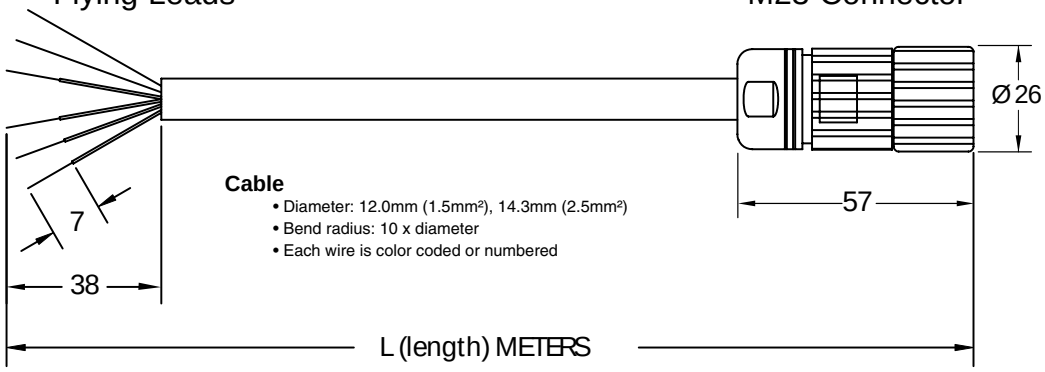
| Power Cables – M23 Connector [Motor] to flying leads [Drive] | | |
|---|---|---|
| **Model #** | **Specifications** | **Length** |
| EWLB002FE1NA: | 1.5 mm²/16 AWG power cable, <= 12 amps drive output current | *L = 2.5 meters |
| EWLB005FE1NA: | 1.5 mm²/16 AWG power cable, <= 12 amps drive output current | *L = 5.0 meters |
| EWLB010FE1NA: | 1.5 mm²/16 AWG power cable, <= 12 amps drive output current | *L = 10.0 meters |

*Length includes brake leads. These cables can be used for both brake and non-brake motors.

Dimensions are in millimeters.

**Drive End**
Flying Leads

**Motor End**
M23 Connector



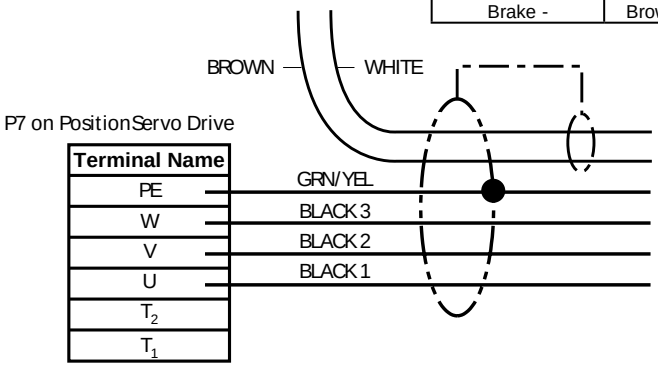

**Cable**
- Diameter: 12.0mm (1.5mm²), 14.3mm (2.5mm²)
- Bend radius: 10 x diameter
- Each wire is color coded or numbered

| COMPATIBLE MOTORS |
|---|
| MCS06 (size 60 mm) |
| MCS09 (size 90 mm) |
| MCS12 (size 120 mm) |

## Flying Leads - wiring to PositionServo Drive

Motor brake leads to option module

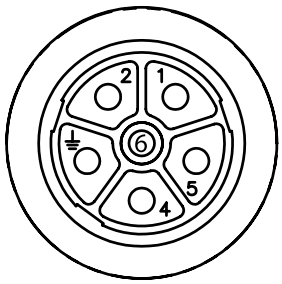
| TERMINAL NAMES ON E94ZAHBK2 | WIRE COLOR |
|---|---|
| Brake + | White |
| Brake - | Brown |




WARNING: Do not connect U, V, W wires to PTC Input! Severe damage to the drive will result.

## M23 Connector

401-231 Intercontec #BSTA107FR03580036000




| PIN | WIRE COLOR/NUMBER | TERMINAL NAME |
|---|---|---|
| 1 | WHITE | MOTOR BRAKE + |
| 2 | BROWN | MOTOR BRAKE - |
| 3 | GRN/YEL | PE |
| 4 | BLACK 1 | U (R) |
| 5 | BLACK 2 | V (S) |
| 6 | BLACK 3 | W (T) |

## *Power Cables – M23 Connector [Motor] to flying leads [Drive]*

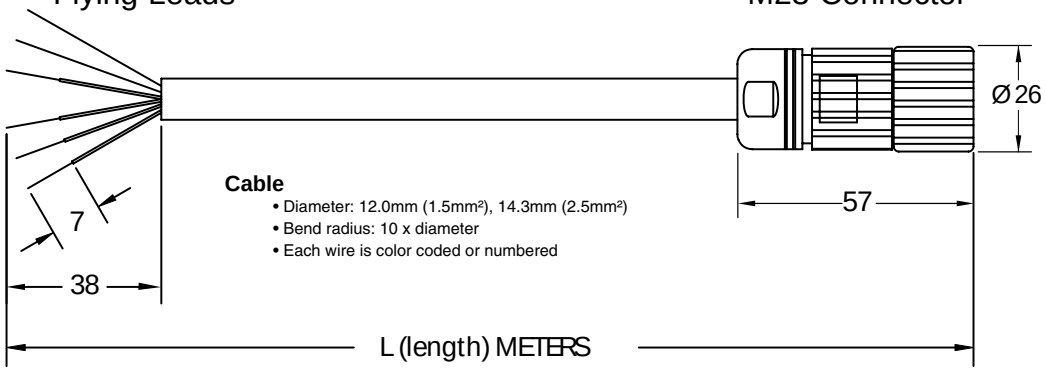
| Model # | Specifications | Length |
|---|---|---|
| EWLB002FE2NA: | 2.5 mm²/14 AWG power cable, <= 17.4 amps drive output current | *L = 2.5 meters |
| EWLB005FE2NA: | 2.5 mm²/14 AWG power cable, <= 17.4 amps drive output current | *L = 5.0 meters |
| EWLB010FE2NA: | 2.5 mm²/14 AWG power cable, <= 17.4 amps drive output current | *L = 10.0 meters |

*Length includes brake leads. These cables can be used for both brake and non-brake motors.

Dimensions are in millimeters.

**Drive End**
Flying Leads

**Motor End**
M23 Connector



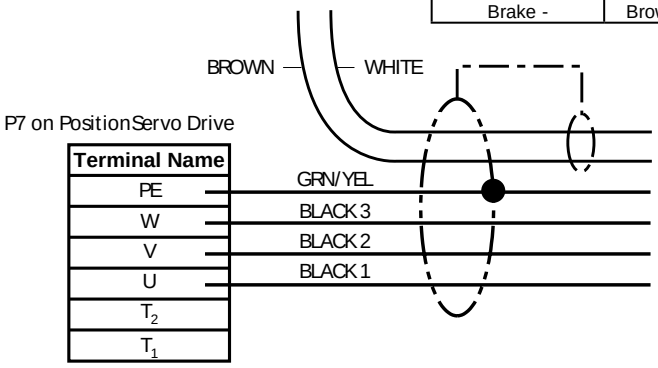

**Cable**
- Diameter: 12.0mm (1.5mm²), 14.3mm (2.5mm²)
- Bend radius: 10 x diameter
- Each wire is color coded or numbered

| COMPATIBLE MOTORS |
|---|
| MCS14 (size 140 mm) |
| MCS19 (size 190 mm) |

### Flying Leads - wiring to PositionServo Drive

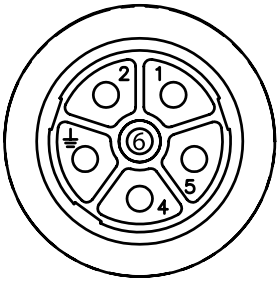
Motor brake leads to option module

| TERMINAL NAMES ON E94ZAHBK2 | WIRE COLOR |
|---|---|
| Brake + | White |
| Brake - | Brown |




### M23 Connector

401-231 Intercontec #BSTA107FR03580036000




| PIN | WIRE COLOR/NUMBER | TERMINAL NAME |
|---|---|---|
| 1 | WHITE | MOTOR BRAKE + |
| 2 | BROWN | MOTOR BRAKE - |
| 3 | GRN/YEL | PE |
| 4 | BLACK 1 | U (R) |
| 5 | BLACK 2 | V (S) |
| 6 | BLACK 3 | W (T) |

WARNING: Do not connect U, V, W wires to PTC Input! Severe damage to the drive will result.

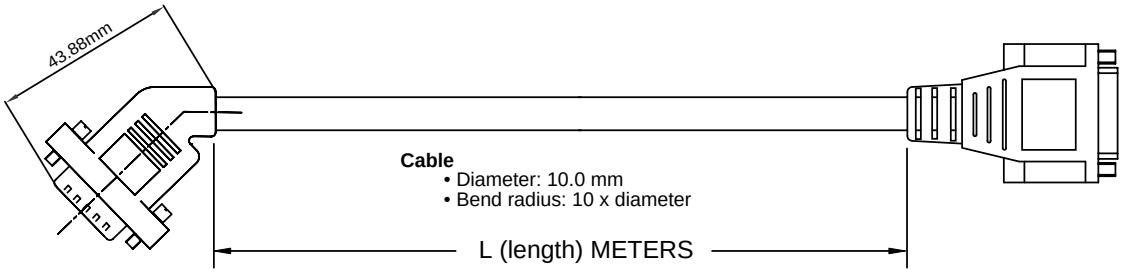
## *Encoder Cables – DB-15 Connectors*

| Model # | Specifications | Length |
|---|---|---|
| EWLE002AB1NA: | DB-15 [M] connector on drive end, DB-15 [F] connector on motor end | L = 2.5 meters |
| EWLE005AB1NA: | DB-15 [M] connector on drive end, DB-15 [F] connector on motor end | L = 5.0 meters |
| EWLE010AB1NA: | DB-15 [M] connector on drive end, DB-15 [F] connector on motor end | L = 10.0 meters |

**Drive End**
DB-15 [M]

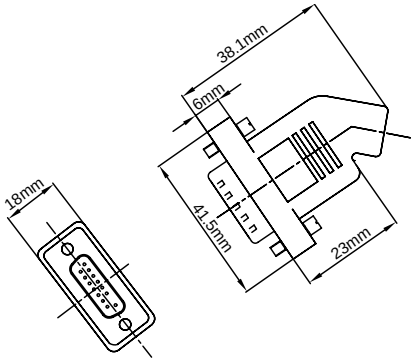
**Motor End**
DB-15 [F]

Dimensions are in millimeters.

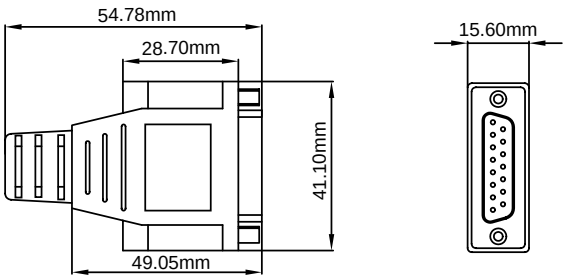



| COMPATIBLE MOTORS |
|---|
| MAS Motors (MAS_ _ _ _ _ _ -BB0) |
| MAS Motors (MAS_ _ _ _ _ _ -CB0) |
| MAS Motors (MAS_ _ _ _ _ _ -DB0) |

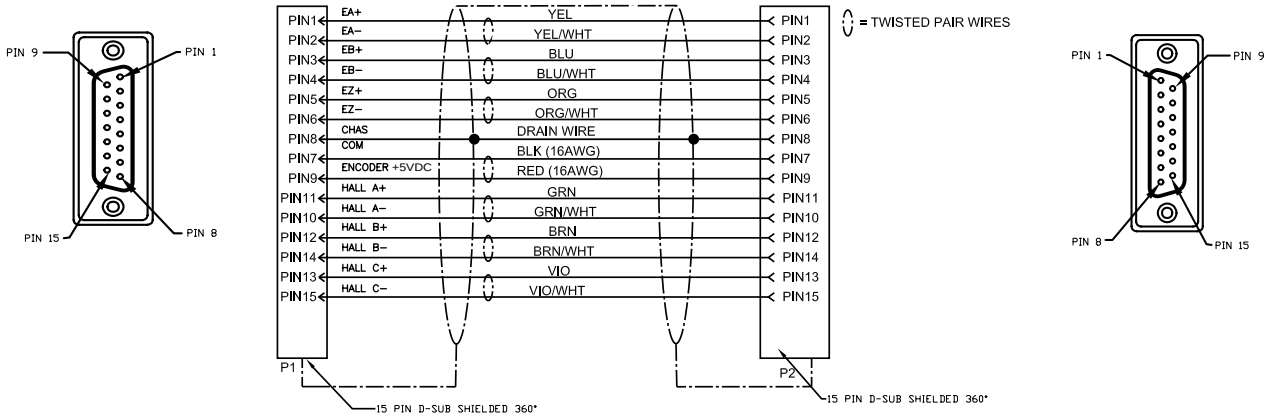
### DB-15 [F] Connector




### DB-15 [M] Connector Dimensions



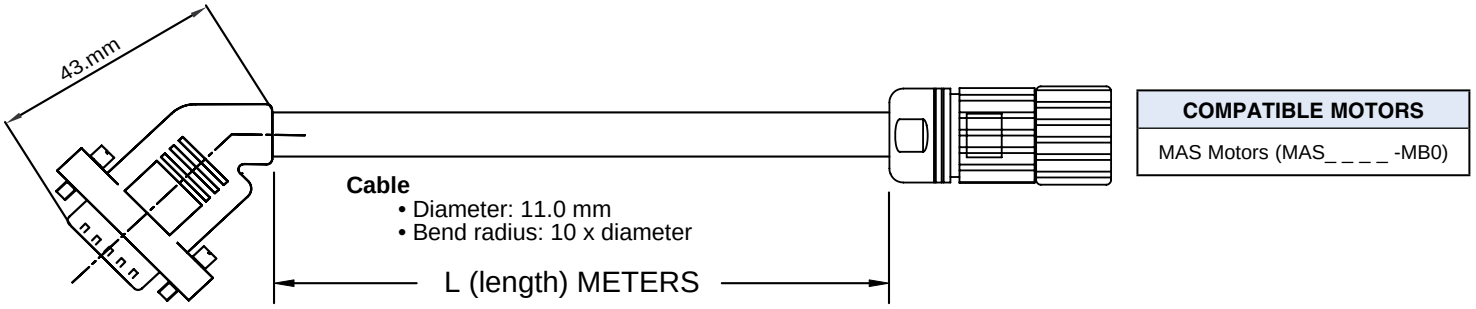

### Pin Outs



| *Encoder Cables – M17 [Motor] and DB-15 [Drive] connectors* | | |
|---|---|---|
| **Model #** | **Specifications** | **Length** |
| EWLE002AD1NA: | DB-15 [M] connector on drive end, M17 [F] connector on motor end | L = 2.5 meters |
| EWLE005AD1NA: | DB-15 [M] connector on drive end, M17 [F] connector on motor end, | L = 5.0 meters |
| EWLE010AD1NA: | DB-15 [M] connector on drive end, M17 [F] connector on motor end | L = 10.0 meters |

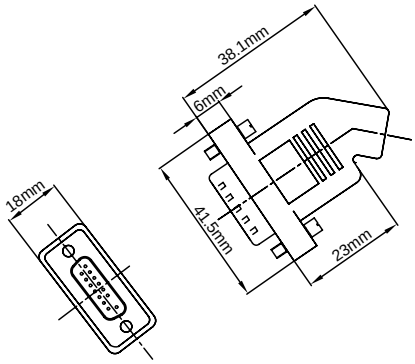
**Drive End**
DB-15 [M] Connector

**Motor End**
M17 [F] Connector



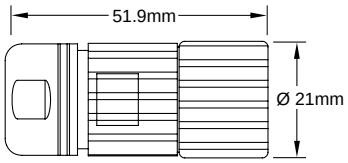

| COMPATIBLE MOTORS |
|---|
| MAS Motors (MAS_ _ _ _ -MB0) |

## DB-15 [M] Connector Dimensions

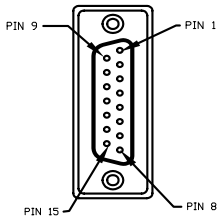


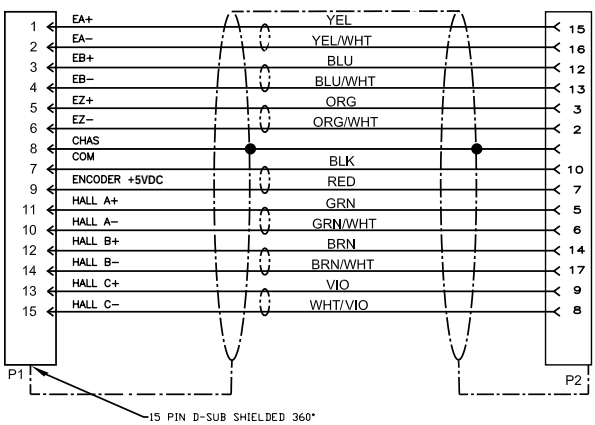

## M17 Connector

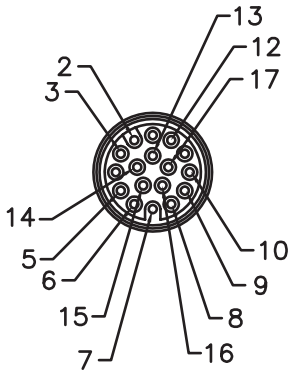
401-212 Intercontec # ASTA876FR1086001A000, Qty. 1




## Pin Outs



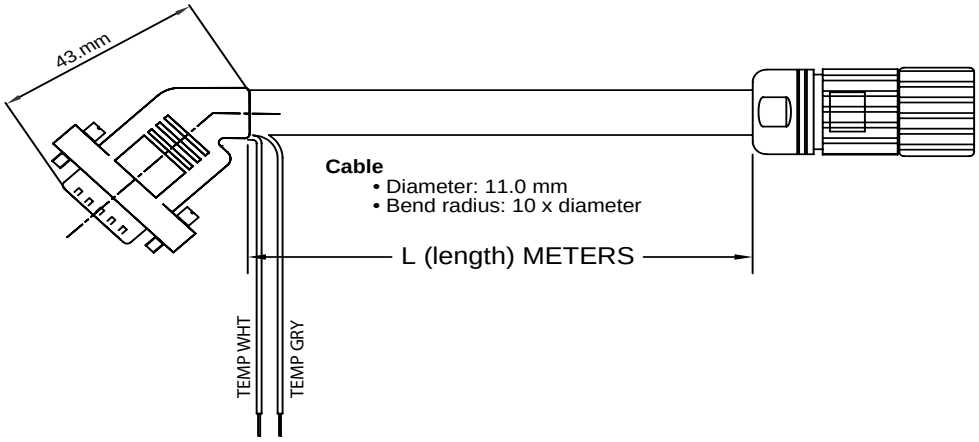



| Encoder Cables – M23 [Motor] and DB-15 [Drive] connectors | | |
|---|---|---|
| **Model #** | Specifications | Length |
| EWLE002AE1NA: | DB-15 [M] connector on drive end, M23 connector on motor end | L = 2.5 meters |
| EWLE005AE1NA: | DB-15 [M] connector on drive end, M23 connector on motor end | L = 5.0 meters |
| EWLE010AE1NA: | DB-15 [M] connector on drive end, M23 connector on motor end | L = 10.0 meters |

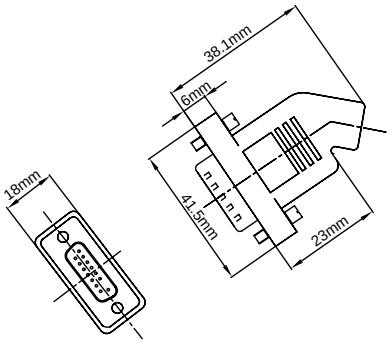
**Drive End**
DB-15 [M] Connector

**Motor End**
M23 Connector



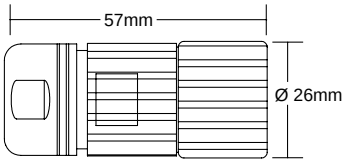

| COMPATIBLE MOTORS |
|---|
| All MCS Encoder Motors (MCS_ _ _ _ _ _ _ C40) |

## DB-15 [M] Connector Dimensions

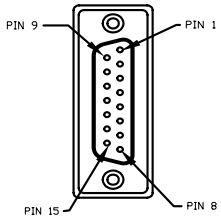


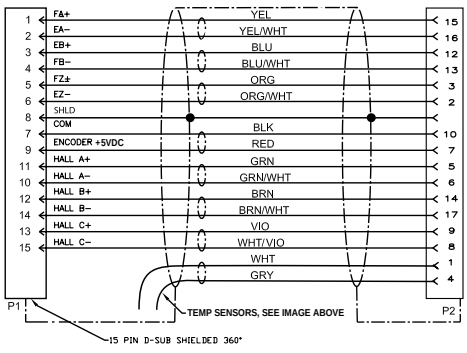

## M23 Connector

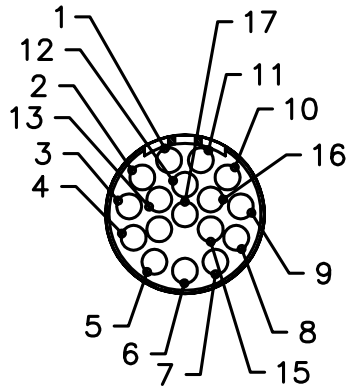
401-224 Intercontec # ASTA035FR01610035000, Qty. 1

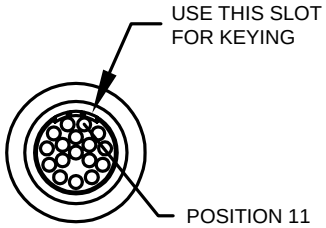



## Pin Outs



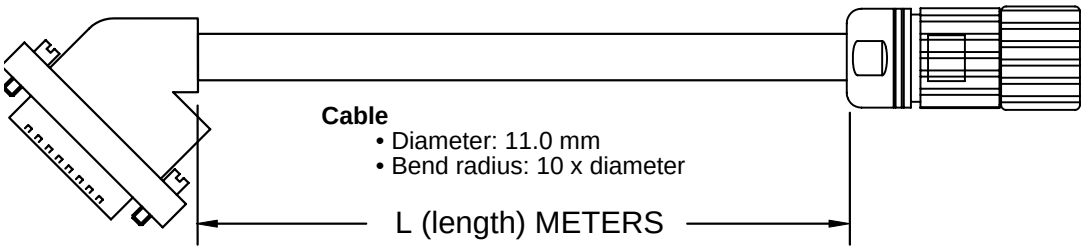



| Resolver Cable - M23 [Motor] and DB-9 [Drive] Connectors | | |
|---|---|---|
| **Model #** | **Specifications** | **Length** |
| EWLR002BE1NA: | DB-9 [M] connector on drive end, M23 connector on motor end | L = 2.5 meters |
| EWLR005BE1NA: | DB-9 [M] connector on drive end, M23 connector on motor end | L = 5.0 meters |
| EWLR010BE1NA: | DB-9 [M] connector on drive end, M23 connector on motor end | L = 10.0 meters |

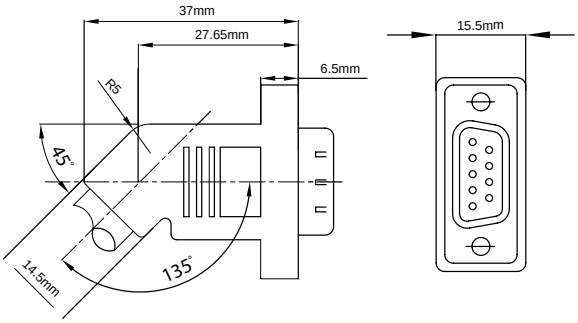
**Drive End**
DB-9 [M] Connector

**Motor End**
M23 Connector



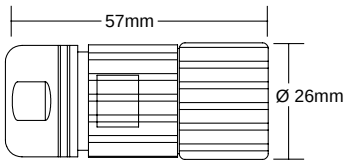

| COMPATIBLE MOTORS |
|---|
| All MCS Resolver Motors (MCS_____RM0M) |

## Connector Dimensions

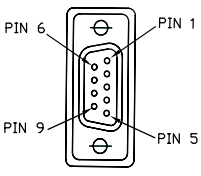


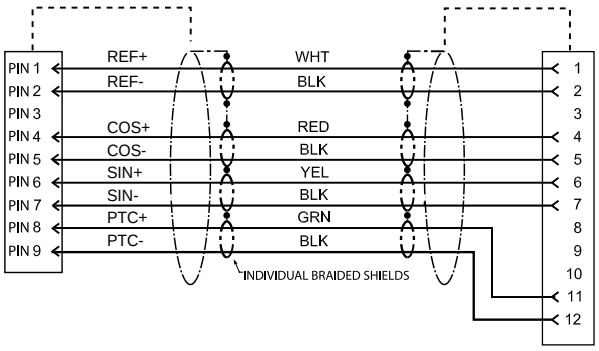

## M23 Connector

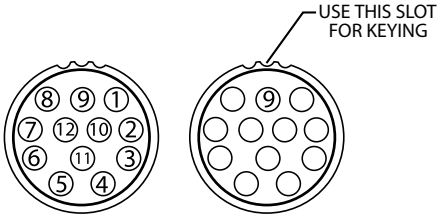
401-238 Intercontec # ASTA021FR01610035000, Qty. 1




## Pin Outs



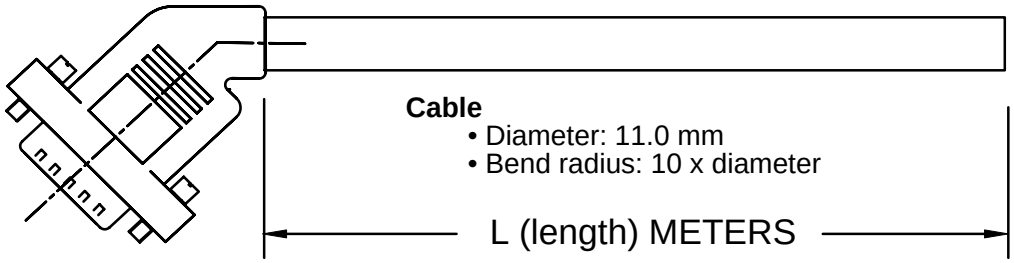



| *2nd Encoder Cable - DB-9 [Drive] Connector to flying leads* | | |
|---|---|---|
| **Model #** | **Specifications** | **Length** |
| EWLE002CF1NA: | DB-9 [F] connector on drive end to flying leads | L = 2.5 meters |
| EWLE005CF1NA: | DB-9 [F] connector on drive end to flying leads | L = 5.0 meters |
| EWLE010CF1NA: | DB-9 [F] connector on drive end to flying leads | L = 10.0 meters |

Dimensions are in millimeters.

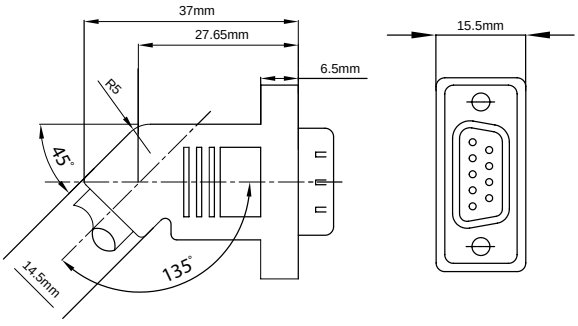
**Drive End**
DB-9 [F] Connector

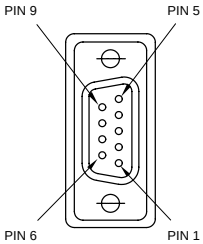
**Motor End**
Flying Leads

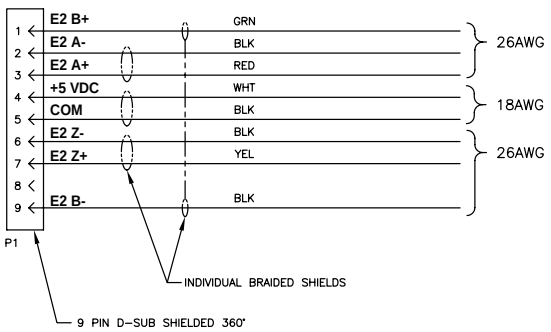



**Connector Dimensions**

**Flying Leads**



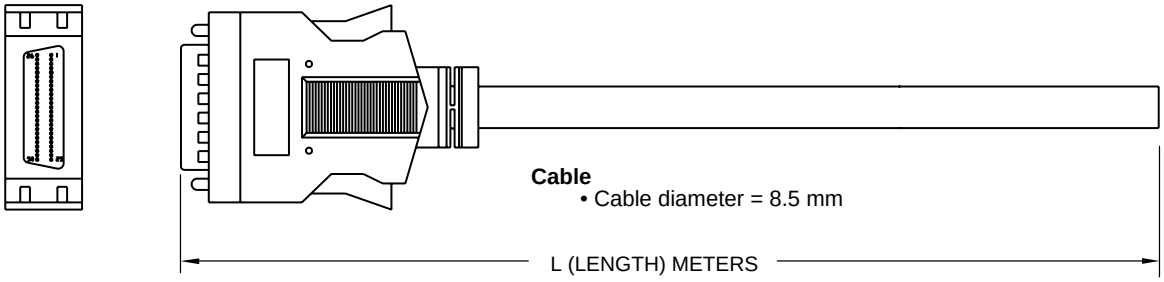



## *I/O Expansion Cable*

| Model # | Specifications | Length |
|---|---|---|
| EWLN002SF1NA: | 50-pin SCSI [M] on drive end to flying leads | L = 2.0 meters |

**Drive End**
SCSI (50 pin) [M] Connector

Flying Leads




**P3 Pin Assignments (Controller Interface)**

| Pin | Name | Function | Color |
|---|---|---|---|
| 1 | MA+ | Master Encoder A+ / Step+ input (2) | Yellow |
| 2 | MA- | Master Encoder A- / Step- input (2) | Yellow/Black |
| 3 | MB+ | Master Encoder B+ / Direction+ input (2) | Red |
| 4 | MB- | Master Encoder B- / Direction- input (2) | Red/Black |
| 5 | GND | Drive Logic Common | Brown |
| 6 | 5+ | +5V output (max 100mA) | Brown/White |
| 7 | BA+ | Buffered Encoder Output: Channel A+ (1) | Light Blue |
| 8 | BA- | Buffered Encoder Output: Channel A- (1) | Light Blue/Black |
| 9 | BB+ | Buffered Encoder Output: Channel B+ (1) | Light Blue/Green |
| 10 | BB- | Buffered Encoder Output: Channel B- (1) | Light Blue/Yellow |
| 11 | BZ+ | Buffered Encoder Output: Channel Z+ (1) | Green |
| 12 | BZ- | Buffered Encoder Output: Channel Z- (1) | Green/Black |
| 13-19 | | Empty | |
| 20 | AIN2+ | Positive (+) of Analog signal input | Gray/Green |
| 21 | AIN2- | Negative (-) of Analog signal input | Gray/Yellow |
| 22 | ACOM | Analog common | White/Yellow |
| 23 | AO | Analog output (max 10 mA) | White/Green |
| 24 | AIN1+ | Positive (+) of Analog signal input | Light Green/Red |
| 25 | AIN1 - | Negative (-) of Analog signal input | Green/Blue |
| 26 | IN_A_COM | Digital input group ACOM terminal (3) | Light Blue/Blue |
| 27 | IN_A1 | Digital input A1 | Light Blue/Red |
| 28 | IN_A2 | Digital input A2 | Pink/Red |
| 29 | IN_A3 | Digital input A3 (3) | Pink/Blue |
| 30 | IN_A4 | Digital input A4 | Blue/White |
| 31 | IN_B_COM | Digital input group BCOM terminal | Gray/Red |
| 32 | IN_B1 | Digital input B1 | Gray/Blue |
| 33 | IN_B2 | Digital input B2 | White/Black |
| 34 | IN_B3 | Digital input B3 | Pink/Black |
| 35 | IN_B4 | Digital input B4 | Violet/White |
| 36 | IN_C_COM | Digital input group CCOM terminal | Green/White |
| 37 | IN_C1 | Digital input C1 | Light Green/Blue |
| 38 | IN_C2 | Digital input C2 | Gray/Black |
| 39 | IN_C3 | Digital input C3 | Orange/Black |
| 40 | IN_C4 | Digital input C4 | Pink/Yellow |
| 41 | RDY+ | Ready output Collector | Yellow/Red |
| 42 | RDY- | Ready output Emitter | Yellow/Blue |
| 43 | OUT1-C | Programmable output #1 Collector | Red/White |
| 44 | OUT1-E | Programmable output #1 Emitter | Red/Blue |
| 45 | OUT2-C | Programmable output #2 Collector | White/Red |
| 46 | OUT2-E | Programmable output #2 Emitter | White/Blue |
| 47 | OUT3-C | Programmable output #3 Collector | Light Green |
| 48 | OUT3-E | Programmable output #3 Emitter | Light Green/Black |
| 49 | OUT4-C | Programmable output #4 Collector | Light Green/Yellow |
| 50 | OUT4-E | Programmable output #4 Emitter | Light Green/Green |
| | | SCSI Connector Case (shield) | Black |



| Servo Drives | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Item Number | Nominal Input Voltage | Phase | Output Current [IN] | Output Current [IMAX] | EMC Filter | Test Motor | Lead Length [m] | EN61800-3:2004 Compliance Category |
| E94_020S2F_ _ | 200/240V | 1 | 2 | 6 | Integral | MCS06C41L | 2.5<br>5<br>10 | C2, C3 |
| E94_040S2F_ _ | 200/240V | 1 | 4 | 12 | Integral | MCS06F40L | 2.5<br>5<br>10 | C2, C3 |
| E94_080S2F_ _ | 200/240V | 1 | 8 | 24 | Integral | MCS09F60L | 2.5<br>5<br>10 | C2, C3 |
| E94_100S2F_ _ | 200/240V | 1 | 10 | 30 | Integral | MCS12L20L | 2.5<br>5<br>10 | C2, C3 |
| E94_020Y2N_ _ | 200/240V | 3 | 2 | 6 | E94ZF04T4A1 | MCS06C41L | 2.5<br>5<br>10 | C2, C3 |
| E94_040Y2N_ _ | 200/240V | 3 | 4 | 12 | E94ZF07T4A1 | MCS06F60L | 2.5<br>5<br>10 | C2, C3 |
| E94_080Y2N_ _ | 200/240V | 3 | 8 | 24 | E94ZF15T4A1 | MCS09F60L | 2.5<br>5<br>10 | C2, C3 |
| E94_120Y2N_ _ | 200/240V | 1 | 12 | 36 | E94ZF24S2A1 | MCS12L20L | 2.5<br>5<br>10 | C2, C3 |
| E94_020T4N_ _ | 400/480V | 3 | 2 | 6 | E94ZF04T4A1 | MCS06F41- | 2.5<br>5<br>10 | C2, C3 |
| E94_040T4N_ _ | 400/480V | 3 | 4 | 12 | E94ZF07T4A1 | MCS09F60- | 2.5<br>5<br>10 | C2, C3 |
| E94_060T4N_ _ | 400/480V | 3 | 6 | 18 | E94ZF10T4A1 | MCS12L20- | 2.5<br>5<br>10 | C2, C3 |
| E94_090T4N_ _ | 400/480V | 3 | 9 | 27 | E94ZF12T4A2 | MCS12L20- | 2.5<br>5<br>10 | C2, C3 |

**NOTES:**

1. Carrier frequency set at 8 and 16 kHz during compliance testing.
2. Please refer to PositionServo Users Manual for proper EMC installation guidlines.
3. Consult factory for lead lengths above 10 meters.
4. Consult factory for C1 compliance.



| Comparable Levels of Emmission Limits | EMC Emmission Standards: Comparison Table | | |
|---|---|---|---|
| | **EN61800-3:2004** | **EN61800-3/A11:2000** | **EN55011** |
| | Category: C1 | 1st Environment Unrestricted Distribution | Group 1 Class B |
| | Category: C2 | 1st Environment Restricted Distribution | Group 1 Class A |
| | Category: C3 | 2nd Environment Unrestricted Distribution | Group 2 Class A |
| | Category: C4 | 2nd Environment Restricted Distribution | Not Applicable |

**DEFINITIONS:**

- **EMC:** Electromagnetic Compatibility: referring to:

  **Emissions limits:** Prescribed limits of radiated and line-conducted Emissions of various frequencies.

  **Immunity requirements:** Levels of disturbances, at or below which, equipment must continue to operate.

- **EN 61800-3: 2004** - The standard for EMC requirements for adjustable speed electrical Power Drive Systems (PDS). A **PDS** installation includes a Drive, feeders, auxiliaries and motor, but not driven equipment. This standard applies to a drive system. Other equipment that contains a drive and is covered by product-specific standard must also meet the product standard.

  **First Environment:** A domestic premises or an area where the AC power supply system also supplies buildings used for domestic purposes. (e.g. commercial premises in a residential building.)

  **Second Environment:** Any environment where the AC power supply system has no connection to domestic premises.

  **Category C1:** A PDS with rated voltage of less than 1000 volts and intended for use in the First Environment (domestic connection).

  **Category C2:** A PDS which is neither plug-in, nor movable, nor with rated voltage over 1000 volts, and which, if installed in the First Environment, is intended to be installed and commissioned by a person or organization skilled in power drive systems including EMC aspects.

  **Category C3:** A PDS with rated voltage of less than 1000 volts and intended for use in the Second Environment but not the First Environment.

  **Category C4:** A PDS with rated voltage over 1000 volts or 400 Amps, or intended for complex systems (e.g. IT supply) in the Second Environment.

- **EN 61800-3/A11: 2000** - Superseded by EN 61800-3:2004.

- **EN55011** - Standard for Emissions Limits for Industrial, Scientific and Medical equipment (ISM). This is often known as base or family emissions standard, used where other specific standards do not apply. Here equipment is classified into two Groups, defined below. Each of these Groups has two Classes which correspond to the “Environment” terms defined above. These four Group-Class categories define limits of conducted and radiated emissions. Groups and Classes are as follows:

  **Group 1:** Equipment in which RF energy is generated or used in otherwise providing the function of the equipment.

  **Group 2:** Equipment in which RF energy is generated and/or used in the form of electromagnetic radiation for treatment of a material.

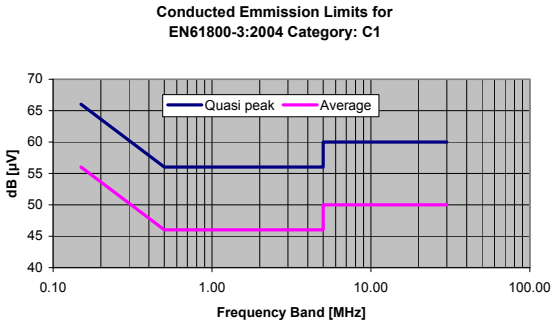
  **Class B:** Same meaning as First Environment definition above (domestic connection).

  **Class A:** Same meaning as Second Environment definition above.

## EN61800-3:2004 Conducted & Radiated Emmission Limits for First Environment Installations

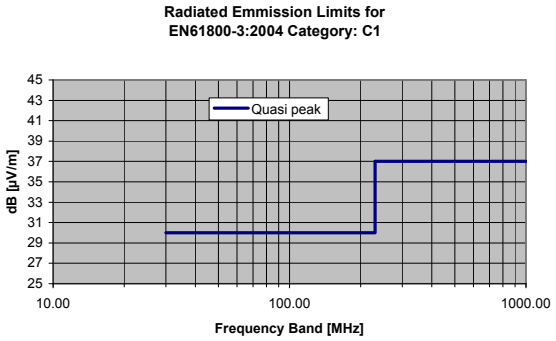
**Conducted Emmission Limits for Category: C1**

| Frequency Band Mhz | Quasi peak dB (µV) | Average dB (µV) |
|---|---|---|
| 0.15 | 66 | 56 |
| 0.50 | 56 | 46 |
| 0.50 | 56 | 46 |
| 5.00 | 56 | 46 |
| 5.00 | 60 | 50 |
| 30.00 | 60 | 50 |




**Radiated Emmission Limits for Category: C1**

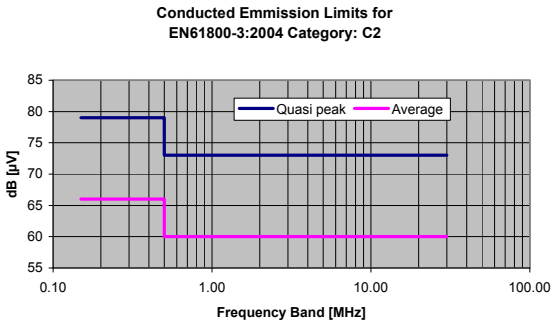
| Frequency Band Mhz | Quasi peak dB (µV/m) |
|---|---|
| 30.00 | 30 |
| 230.00 | 30 |
| 230.00 | 37 |
| 1000.00 | 37 |




## EN61800-3:2004 Conducted & Radiated Emmission Limits for First Environment Installations

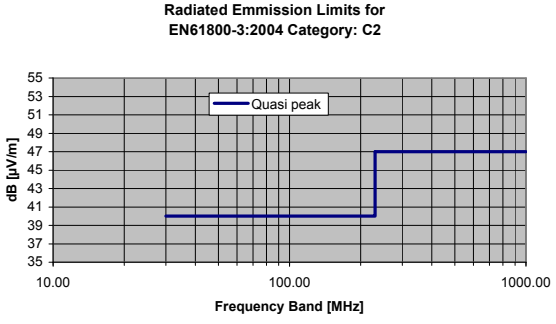
**Conducted Emmission Limits for Category: C2**

| Frequency Band Mhz | Quasi peak dB (µV) | Average dB (µV) |
|---|---|---|
| 0.15 | 79 | 66 |
| 0.50 | 79 | 66 |
| 0.50 | 73 | 60 |
| 5.00 | 73 | 60 |
| 5.00 | 73 | 60 |
| 30.00 | 73 | 60 |




**Radiated Emmission Limits for**

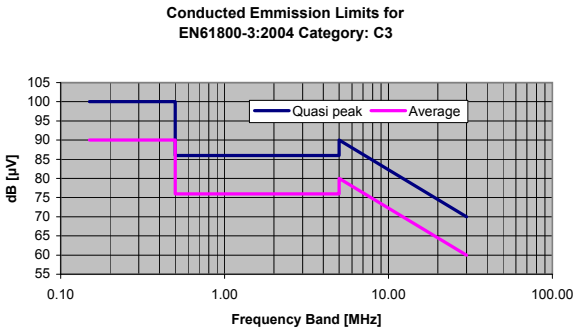
| Frequency Band Mhz | Quasi peak dB (µV/m) |
|---|---|
| 30.00 | 40 |
| 230.00 | 40 |
| 230.00 | 47 |
| 1000.00 | 47 |



## EN61800-3:2004 Conducted & Radiated Emmission Limits for Second Environment Installations

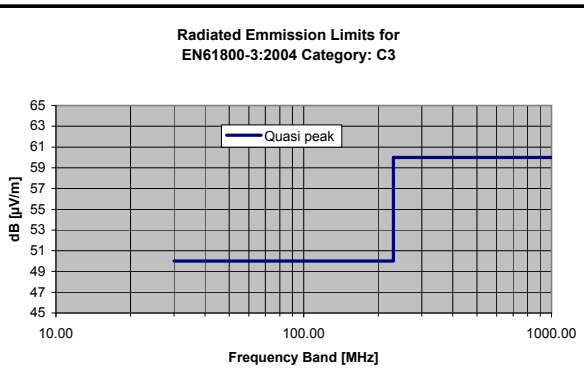
**Conducted Emmission Limits for Category: C3**

| Frequency Band Mhz | Quasi peak dB (µV) | Average dB (µV) |
|---|---|---|
| 0.15 | 100 | 90 |
| 0.50 | 100 | 90 |
| 0.50 | 86 | 76 |
| 5.00 | 86 | 76 |
| 5.00 | 90 | 80 |
| 30.00 | 70 | 60 |




**Radiated Emmission Limits for Category: C3**

| Frequency Band Mhz | Quasi peak dB (µV/m) |
|---|---|
| 30.00 | 50 |
| 230.00 | 50 |
| 230.00 | 60 |
| 1000.00 | 60 |



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