

Tech Note #35

Title: S/E-Series servodrives and A/B/C/E-Series motors compatibility with
D/DE-Series servodrives and DA/DB/DE-Series motors

Date: March 11, 1997

Purpose:

Explain the software and hardware compatibility issues involved when converting applications from S/E-Series servodrives and A/B/C/E-Series motors to D/DE-Series servodrives and DA/DB/DE-Series motors.

Description:

To replace an S/E-Series servodrive and A/B/C/E-Series motor with a D/DE-Series servodrive and DA/DB/DE-Series motor you will need to do the following:

1. Select a DA/DB/DE-Series motor to replace your A/B/C/E-Series motor (explained in Step 1: Selecting a DA/DB/DE-Series servomotor);
2. Select the appropriate D/DE-Series servodrive, and mounting rack adapter for DE-Series servodrives (explained in Step 2: Selecting a D/DE-Series servodrive);
3. Select the appropriate motor and axis interface cables (explained in Step 3: Selecting cables);
4. Update your motion controller configuration parameter values (explained in Step 4: Update the motion controller configuration parameter values).

Hardware compatibility:

Step 1: Selecting a DA/DB/DE-Series servomotor

Attached is a spreadsheet (A/B/C/E-Series and DA/DB/DE-Series Motor Comparison) which provides an overview of the A/B/C/E-Series motors and S/E-Series servodrives, and the proposed replacement DA/DB/DE-Series motors and D/DE-Series servodrives. The proposed replacement motors and servodrives listed in this spreadsheet are only recommendations. You should carefully review your application to insure that the motor and servodrive you select will meet your mechanical mounting and performance requirements.

Refer to the attached Motor Comparison spreadsheet for the mechanical and torque differences between the A/B/C/E-Series and DA/DB/DE-Series motors. If the recommended DA/DB/DE-Series motor does not meet your application's torque requirements, switch to the next higher torque motor available. For an existing application, you can accurately determine the actual motor torque by monitoring the analog torque monitor test point (T-MON on the E-Series servodrive, pin 4 of TM3 on the S-Series servodrive) with an oscilloscope (refer to the S and E-Series Installation and Operation manuals for further information).

The A/B/C/E-Series motors in the spreadsheet have different inertias than their recommended DA/DB/DE-Series replacements. As part of selecting the a DA/DB/DE-Series motor, review your applications inertia requirements and insure that this change in motor inertia will not result in a significant reduction in load stability.

The following table (Table 1) is a brief overview of the mechanical mounting differences between A/B/C/E-Series motors and the recommended DA/DB//DE-Series replacements. For a more detailed comparison, refer to the attached A/B/C/E-Series vs. DA/DB/DE-Series Motor Comparison spreadsheet. Refer to the D/DE-Series Installation & Operation Manual for actual motor dimensional information (these drawings are more up to date than the dimensional drawings in the ORION Product Guide).

A/B/C/E-Series Motor	DA/DB/DE-Series Motor	DA/DB/DE-Series			
		Bolt Pattern	Pilot Diameter	Shaft Diameter	Total Length
MAC-E002A1	MAC-DE003A1	Smaller	Same	Same	Shorter
MAC-E003B1	MAC-DE003A1	Smaller	Same	Same	Shorter
MAC-E007C1	MAC-DE008C1	Same	Same	Same	Shorter
MAC-E010D1	MAC-DE008C1	Same	Same	Same	Shorter
MAC-E002A2	MAC-DE003A2	Smaller	Same	Same	Shorter
MAC-E003B2	MAC-DE003A2	Smaller	Same	Same	Shorter
MAC-E007C2	MAC-DE011C2	Same	Same	Same	Shorter
MAC-E009G2	MAC-DE011C2	Same	Same	Same	Shorter
MAC-E010D2	MAC-DE011C2	Same	Same	Same	Shorter
MAC-E015H2	MAC-DE021D2	Larger	Larger	Larger	Shorter
MAC-E016E2	MAC-DE021D2	Larger	Same	Same	Shorter
MAC-E023F2	MAC-DE021D2	Larger	Same	Same	Shorter
MAC-E030J2	MAC-DE042E2*	Larger	Same	Larger	Shorter
MAC-A010A	MAC-DE011C2	Same	Same	Same	Shorter
MAC-A015B	MAC-DE021D2	Larger	Larger	Larger	Shorter
MAC-A030C	MAC-DA030F	Smaller	Smaller	Larger	Shorter
MAC-A055D	MAC-DA055G	Smaller	Smaller	Larger	Shorter
MAC-A110F	MAC-DA110J	Smaller	Smaller	Larger	Shorter
MAC-B010A	MAC-DE011C2	Smaller	Smaller	Same	Shorter
MAC-B020A	MAC-DE021D2	Larger	Larger	Larger	Shorter
MAC-B025B	MAC-DB025L	Same	Same	Same	Shorter
MAC-B050C	MAC-DB055M	Same	Same	Same	Shorter
MAC-B080D	MAC-DB080N	Same	Same	Same	Shorter
MAC-B110E	MAC-DB100P	Same	Same	Same	Shorter
MAC-B200F	MAC-DB200Q	Same	Same	Same	Shorter
MAC-C290F	MAC-DB300R	Same	Same	Same	Shorter
MAC-B330G	MAC-DB330S	Same	Same	Larger	Shorter
MAC-C410G	MAC-DB465T	Same	Same	Same	Shorter
MAC-C560H	MAC-DB700U	Larger	Larger	Same	Shorter

* - three phase 230 VAC input power only

Table 1, Motor mechanical compatibility overview

Step 2: Selecting a D/DE-Series servodrive

Each DA/DB/DE-Series motor has a matching servodrive. Once you have selected a DA/DB/DE-Series motor, you can select the matching servodrive from the A/B/C/E-Series vs. DA/DB/DE-Series Motor Comparison spreadsheet. Table 2 is a comparison of the S/E-Series and D/DE-Series servodrive overall dimensions (excluding the mounting rack for E-Series). Refer to the ORION Product guide for further servodrive dimensional information.

Servodrive Model		Height (H)		Width (W)		Depth (D)	
E-Series	DE-Series	S/E-Series	D/DE-Series	S/E-Series	D/DE-Series	S/E-Series	D/DE-Series
SAC-E01A1	SAC-DE02A1	9.84	8.66	2.95	2.36	9.84	8.46
SAC-E02B1	SAC-DE02A1	9.84	8.66	3.94	2.36	9.84	8.46
SAC-E03C1	SAC-DE04C1	9.84	8.66	3.94	2.95	9.84	10.39
SAC-E04D1	SAC-DE04C1	9.84	8.66	3.94	2.95	9.84	10.39
SAC-E01A2	SAC-DE01A2	9.84	8.66	2.95	2.36	9.84	8.46
SAC-E02B2	SAC-DE01A2	9.84	8.66	2.95	2.36	9.84	8.46
SAC-E03C2	SAC-DE03C2	9.84	8.66	3.94	2.36	9.84	10.39
SAC-E03G2	SAC-DE03C2	9.84	8.66	3.94	2.95	9.84	10.39
SAC-E03H2	SAC-DE03C2	9.84	8.66	3.94	2.95	9.84	10.39
SAC-E04D2	SAC-DE04D2	9.84	8.66	3.94	2.95	9.84	10.39
SAC-E05E2	SAC-DE04D2	9.84	8.66	3.94	2.95	9.84	10.39
	SAC-D04C*	9.84	9.84	5.31	4.33	9.84	8.86
SAC-E06F2	SAC-DE04D2	9.84	8.66	5.31	2.95	9.84	10.39
	SAC-D08D*	9.84	9.84	5.31	4.33	9.84	8.86
SAC-E08J2	SAC-D12E*	9.84	9.84	5.31	4.33	9.84	8.86
SAC-S03A	SAC-D04C	13.78	9.84	6.00	4.33	7.30	8.86
SAC-S04B	SAC-D08D	13.78	9.84	6.00	4.33	7.30	8.86
SAC-S08C	SAC-D08F	13.78	9.84	6.00	4.33	7.30	8.86
SAC-S12D	SAC-D19G	13.78	9.84	6.00	5.31	7.30	8.86
SAC-S26F	SAC-D37J	17.72	9.84	6.00	8.27	7.30	8.86
SAC-S03A	SAC-D04C	13.78	9.84	6.00	4.33	7.30	8.86
SAC-S03A	SAC-D08D	13.78	9.84	6.00	4.33	7.30	8.86
SAC-S04B	SAC-D08L	13.78	9.84	6.00	4.33	7.30	8.86
SAC-S08C	SAC-D08M	13.78	9.84	6.00	4.33	7.30	8.86
SAC-S12D	SAC-D12N	13.78	9.84	6.00	4.33	7.30	8.86
SAC-S19E	SAC-D19P	17.72	9.84	6.00	5.31	7.30	8.86
SAC-S26F	SAC-D37Q	17.72	9.84	6.00	8.27	7.30	8.86
SAC-S26F	SAC-D37R	17.72	9.84	6.00	8.27	7.30	8.86
SAC-S33G	SAC-D47S	17.72	13.78	6.00	9.06	10.40	9.25
SAC-S33G	SAC-D55T	17.72	13.78	6.00	9.06	10.40	9.25
SAC-S45H	SAC-D59U	17.72	17.72	7.20	10.24	11.10	11.22

* - three phase 230 VAC input power

Table 2, Servodrive dimension comparison

Mounting adapters are available for mounting DE-Series servodrives in E-Series chassis.

Table 3 is an overview of the DE-Series servodrives and their corresponding mounting adapter part numbers. NOTE: D-Series servodrives are panel mountable only, and cannot be mounted in E-Series chassis.

DE-Series Servodrive	Mounting Adapter
SAC-DE01__/_	SAC-DE-ER/60
SAC-DE02__/_	SAC-DE-ER/60
SAC-DE03__/_	SAC-DE-ER/75
SAC-DE04__/_	SAC-DE-ER/75

Table 3, DE-Series Servodrive Mounting Adapters

Step 3: Selecting cables

The following is a summary of the cabling considerations when switching from S/E-Series servodrives and A/B/C/E-Series motors to D/DE-Series servodrives and DA/BD/DE-Series motors.

1. The axis interface cables used with the S/E-Series servodrives and motors are not compatible with D/DE-Series servodrives. Refer to the ORION Product Guide for a complete listing of the axis interface cables for the D/DE-Series servodrives.
2. The motor cables used with A/B/C/E-Series motors are not compatible with DE-Series motors. Refer to the ORION Product Guide for a complete listing of the DE-Series motor cables.
3. The encoder cables for an E-Series motor can also be used for a DE-Series motor with the same encoder type (incremental or absolute). You will find that the orientation of the encoder connector (CN2) on the DE-Series servodrives is opposite that of the E-Series servodrives, causing a tight fit between the encoder (CN2) and axis interface (CN1) cable connectors. You might want to open the connector shell on the servodrive end of the E-Series encoder cable, and remove the knockout tab on the opposite side of the shell. Then reassemble the connector shell so that the cable doesn't interfere with the axis interface cable connector.
4. Motor cables used with A/B/C/E-Series motors can be used with DA and DB-Series motors, however, the wire lugs may have to be modified to fit the D-Series servodrive. Refer to the ORION Product guide for a complete listing of the DA and DB-Series motor cables. Refer to Table 4 for an outline of the A/B/C/E-Series motor cables that can be modified for use with DA and DB-Series motors.
5. Encoder cables used with A/B/C/E-Series motors are not compatible with DA/DB-Series motors. Refer to the ORION Product Guide for a complete listing of the DA/DB-Series encoder cables.

DA/DB Motor	A/B/C/E Cable	DA/DB Cable
MAC-DA030F	CBL-SMAC1 CBL-SMAC2	CBL-DMAC1
MAC-DA055G	CBL-SMAC1 CBL-SMAC2	CBL-DMAC1
MAC-DA090H	CBL-SMAC6	CBL-DMAC2
MAC-DA110J	CBL-SMAC6	CBL-DMAC2
MAC-DA140K	CBL-SMAC6	CBL-DMAC3
MAC-DB025L	CBL-SMAC1 CBL-SMAC2	CBL-DMAC1
MAC-DB055M	CBL-SMAC1 CBL-SMAC2	CBL-DMAC1
MAC-DB080N	CBL-SMAC1 CBL-SMAC2	CBL-DMAC1
MAC-DB100P	CBL-SMAC5	CBL-DMAC4
MAC-DB200Q	CBL-SMAC6	CBL-DMAC2
MAC-DB300R	CBL-SMAC6	CBL-DMAC3
MAC-DB330S	CBL-SMAC7	CBL-DMAC5
MAC-DB465T	none	CBL-DMAC6
MAC-DB700U	none	CBL-DMAC6

Table 4, A/B/C/E-Series vs. DA/DB-Series Motor Cables Compatibility

Table 5 outlines the axis interface cables required when using D/DE-Series servodrives with a Generation III or ORION motion controller. Refer to the attached axis interface cable drawings for further information.

Servodrive	Generation III		ORION™	
	Axis Interface Cable	Axis Interface to Terminal Block Cable	Axis Interface Cable	Axis Interface to Terminal Block Cable
SAC-DE____/I	CBL-GN3-ADE/nn	CBL-GN3-ADET/nn	CBL-ADE/nn	CBL-ADET/nn
SAC-D____/I	CBL-AD/nn	CBL-ADT/nn	CBL-AD/nn	CBL-ADT/nn

Table 5, DE-Series Axis Interface Cables

Unlike the S/E-Series and D-Series servodrives, the **DE-Series servodrives do not supply 24 VDC power for use by the servodrive interlock circuitry**. If you are using a DE-Series servodrive with a Generation III Model 20/40 motion controller you must use the CBL-GN3-ADE axis interface cable. This cable has two additional conductors which are to be connected to a +24 VDC power supply, which is for use by the servodrive interlock circuitry. If you are connecting several DE-Series servodrives to a single Generation III controller, you may need to use an intermediate terminal block for the servodrive interlock +24 VDC power supply wiring. Refer to the attached CBL-GN3-ADE Wiring and CBL-GN3-ADET drawings for further information.

When using either a D-Series or DE-Series servodrive with an ORION Model 30/50/70 motion controller, you must configure the DSP Axis Module jumpers for operation with

the appropriate servodrive. The factory default configuration of an ORION DSP Axis Module is for D-Series operation, where the servodrive supplies the interlock circuitry power, and must be changed for DE-Series operation. Refer to the Servodrive Interface Configuration Jumpers section (Installation chapter) of the ORION Installation and Operation Manual for further information. No jumper configuration change is required when using a D-Series or DE-Series servodrive with a Generation III motion controller.

Software Compatibility:

Step 4: Update the motion controller configuration parameter values

Converting from S/E-Series servodrives and A/B/C/E-Series motors to D/DE-Series servodrives and DA/DB/DE-Series motors will require modification to the motor/load parameters and user units, and possibly to the range variables, operating parameters, and tuning parameters as well. The following steps should be followed to update these parameters in the MP.CONFIG subroutine.

NOTE: The following steps assume that you are replacing an A/B/C/E-Series motor and servodrive with a DA/DB/DE-Series motor and D/DE-Series servodrive, without changing the load mechanics (gear ratios, load inertias, etc.). If this is not the case, you may need to make additional changes to the configuration parameters (not described in this bulletin).

1. Using the MotionPRO Gen III Configuration utility (<F6>) either execute your MP.CONFIG routine in the controller and "Read Current values from the controller", or "Load Values from a File. If you "Read Current values from the controller", select "Save to File" from the "Configuration" menu and save the original parameters to disk (file name: OLDCNFG.BAS) before continuing.
2. Select each of the screens listed in the "Configuration" menu (Motor/Load Parameters, User Units, Range Variables, Operating Parameters, and Tuning Parameters), and record all the parameter values for all axes, you will need these for later reference. When you are done recording the parameter values for all axes on each screen, press <ESC> to return to the "Configuration" menu.

As you are editing parameters, as outlined in this bulletin, it may be necessary to scale the new parameter value to eliminate any significant fractional remainder.

This can be done by multiplying both the User Units and Motor Units values by the same number (e.g. 10, 100, etc.), to move the decimal place to right.

Motor/Load Parameters

DA/DB/DE-Series motors have a different motor configuration than the A/B/C/E-Series motors they are replacing. The A/B/C/E-Series vs. DA/DB/DE-Series MotionPRO Motor Configuration Data table, included with this bulletin, provides a list of all the motor configuration parameters and their values for both A/B/C/E-Series and DA/DB/DE-Series motors. You will need to update your motor configuration using the following steps through MotionPRO.

To obtain a free upgrade to the latest version of MotionPRO, which has an updated Motor Selection including DA/DB/DE-Series servomotors, contact your ORMEC Sales and Applications Engineer.

1. Select the "Motor/Load Parameters" screen.
2. Edit the motor and load parameters to match the values listed in the E-Series/DE-Series MotionPRO Motor Configuration Data table for the corresponding DE-Series motor. If you have MotionPRO version 2.2a (or later) you can do this quickly by selecting "Motor Model Number", pressing <ENTER>, and selecting the appropriate motor from the list.
3. Press <ESC> when you are finished.

User Units for converted axis

The User Units for the axis which is being converted from A/B/C/E-Series motors and drives to DE-Series will need to be edited, the steps in this section apply only to a converted axis.

In the following discussion of the User Units conversion, the *New* and *Old* parameter prefixes refer to the DA/DB/DE-Series and A/B/C/E-Series motor parameters respectively.

1. Select the "User Units" screen.
2. Edit the value of the "Axis Position, Motor Units" using the following formula:
$$\text{New Motor Units} = \text{New Encoder Res} * (\text{Old Motor Units}) / \text{Old Encoder Res}$$
3. Edit the value of the "Machine/Axis Speed Limit, Motor Units" parameter using the following formula:
$$\text{New Motor Units} = \text{New Max Mtr Spd} * (\text{Old Motor Units}) / \text{Old Max Mtr Spd}^1$$
4. The "Machine/Motor Accel Limit, Motor Units" may have been changed as a result of switching motors, due to the change in the maximum acceleration based on the DA/DB/DE-Series motor parameters. You should check both the "Machine/Motor Accel Limit, User Units" and "Motor Units" and edit them as needed to maintain the appropriate ratio.
5. If the converted axis is a "follower" (an axis which is "geared" to a "pacer" axis) you will have to edit the "Gear Speed Multipliers, Input" using the following formula:
$$\text{New Input} = \text{New Encoder Res} * \text{Old Input} / \text{Old Encoder Res}$$
6. Press <ESC> when you are finished.

User Units for follower axes

The User Units for "follower" axes may need to be edited, the steps in this section apply only to "follower" axes which are using MotionDATA from a "pacer" axis that has been converted from an A/B/C/E-Series to a DA/DB/DE-Series servomotor.

1. Select the "User Units" screen.

¹ In this case the *Old* Maximum Motor Speed refers to the Maximum Motor Speed previously specified on the "Motor/Load Parameters" screen for the E-Series motor being replaced (you recorded this value earlier).

2. Edit the value of the "Position Transducer Resolution, Pacer" using the following formula:

$$\text{New Pacer} = \text{New Encoder Res} * (\text{Old Pacer}) / \text{Old Encoder Res}$$

3. Edit the value of the "Pacer Position, Motor Units" using the following formula:

$$\text{New Motor Units} = \text{New Encoder Res} * (\text{Old Motor Units}) / \text{Old Encoder Res}$$

4. Edit the "Gear Speed Multipliers, Output" using the following formula:

$$\text{New Output} = \text{New Encoder Res} * \text{Old Output} / \text{Old Encoder Res}$$

5. Press <ESC> when you are finished.

Range Variables

1. Select the "Range Variables" screen.
2. MotionPRO may change the "Maximum Allowable Machine Parameters, Speed", "Acceleration", "Deceleration", and "Drive Output" Range Variables based on the new Motor/Load parameters, you should verify that these values are correct. If you have edited the "Machine/Motor Accel Limits" User Units, you may have to change the "Acceleration" and "Deceleration" Range Variables to account for these changes.
3. Press <ESC> when you are finished.

Operating Parameters

No changes should be required to the Operating Parameters.

Tuning Parameters

Changes may be required to the Tuning Parameters if the motor inertia is most of the load.

Application Program

The following parameters may be modified by making changes to the "Configuration" screens parameter values (MP.CONFIG). You should search your application program for these variables and verify the calculations that use them are valid.

Motor/Load Parameters

CNT.REV@ INERTIA@ TRQ.GAIN@ MTR.SPD.LIM@

User Units

PCT.REV@ USR.SPD.LIM@ POS.MUL@ POS.DIV@
PPS.MUL@ PPS.DIV@ MTR.ACL.LIM@ USR.ACL.LIM@
PCR.SPD.LIM@ INSPD.MUL@ OUTSPD.MUL@

Range Variables

SPD.MAX@ DRV.MAX@ ACL.MAX@ DCL.MAX@
DCL.ERR@ PERR.MAX@ PERR.INPOS@

Operating Parameters

POS.MOD@ STL.FWD@ STL.REV@
ELS1.LOW@ ELS1.HIGH@ ELS2.LOW@ ELS2.HIGH@
ELS3.LOW@ ELS3.HIGH@

Tuning Parameters

VEL.GAIN@ VLTC@ KVI@ KP@
KPI@ KAF@ KVF@

A/B/C/E-Series vs. DA/DB/DE-Series Motor Comparison

A/B/C/E-Series									DA/DB/DE-Series								
Motor	Servodrive	Bolt Pattern (inches)	Pilot (inches)	Shaft (mm)	Length (inches)	Inertia (lb-in-sec ² x10 ⁻³)	Cont. Torque (lb-in)	Peak Torque (lb-in)	Motor	Servodrive	Bolt Pattern (inches)	Pilot (inches)	Shaft (mm)	Length (inches)	Inertia (lb-in-sec ² x10 ⁻³)	Cont. Torque (lb-in)	Peak Torque (lb-in)
MAC-E002A1	SAC-E01A1	3.15	1.97	8	4	0.07	1.62	4.22	MAC-DE003A1/I	SAC-DE02A1/I	2.76	1.97	8	2.3	0.06	2.8	8.4
MAC-E003B1	SAC-E02B1	3.15	1.97	8	4.69	0.11	3.24	8.44	MAC-DE003A1/I	SAC-DE02A1/I	2.76	1.97	8	2.3	0.06	2.8	8.4
MAC-E007C1	SAC-E03C1	3.54	2.76	14	4.98	0.45	6.5	16.9	MAC-DE006B1/I	SAC-DE03B1/I	3.54	2.76	14	2.5	0.19	5.6	17
MAC-E010D1	SAC-E04D1	3.54	2.76	14	5.93	0.68	9.7	25.3	MAC-DE008C1/I	SAC-DE04C1/I	3.54	2.76	14	3.3	0.31	8.4	25
MAC-E002A2	SAC-E01A2	3.15	1.97	8	4	0.07	1.62	4.22	MAC-DE003A2/I	SAC-DE01A2/I	2.76	1.97	8	2.3	0.06	2.8	8.4
MAC-E003B2	SAC-E02B2	3.15	1.97	8	4.69	0.11	3.24	8.44	MAC-DE003A2/I	SAC-DE01A2/I	2.76	1.97	8	2.3	0.06	2.8	8.4
MAC-E007C2	SAC-E03C2	3.54	2.76	14	4.98	0.45	6.5	16.9	MAC-DE006B2/I	SAC-DE02B2/I	3.54	2.76	14	2.5	0.19	5.6	17
MAC-E009G2	SAC-E03G2	3.54	2.76	14	5.85	0.45	9.6	26	MAC-DE011C2/I	SAC-DE03C2/I SAC-D04C/I	3.54	2.76	14	3.3	0.31	11	34
MAC-E010D2	SAC-E04D2	3.54	2.76	14	5.93	0.68	9.7	25.3	MAC-DE011C2/I	SAC-DE03C2/I SAC-D04C/I	3.54	2.76	14	3.3	0.31	11	34
MAC-E015H2	SAC-E03H2	3.54	2.76	14	6.71	0.67	15	36	MAC-DE021D2/I	SAC-DE04D2/I SAC-D08D/I	5.71	4.33	16	3.2	1.87	21	63
MAC-E016E2	SAC-E05E2	5.12	4.33	16	6.67	2.41	16.2	42.2	MAC-DE021D2/I	SAC-DE04D2/I SAC-D08D/I	5.71	4.33	16	3.2	1.87	21	63
MAC-E023F2	SAC-E06F2	5.12	4.33	16	7.58	3.3	22.7	59.1	MAC-DE021D2/I	SAC-DE04D2/I SAC-D08D/I	5.71	4.33	16	3.2	1.87	21	63
MAC-E030J2	SAC-E08J2	5.12	4.33	16	7.83	2.5	30	65	MAC-DE042E2/I	SAC-D12E/I	5.71	4.33	19	4.3	3.57	42	127
MAC-A010A	SAC-S03A	3.54	2.76	14	5.9	0.45	10	26	MAC-DE011C2/I	SAC-D04C/I	3.54	2.76	14	3.3	0.31	11	34
MAC-A015B	SAC-S04B	3.54	2.76	14	6.7	0.67	15	36	MAC-DE021D2/I	SAC-D08D/I	5.71	4.33	16	3.2	1.87	21	63
MAC-A030C	SAC-S08C	5.12	4.33	16	7.8	2.5	30	65	MAC-DA030F/I	SAC-D08F/I	4.53	3.74	24	5.9	1.54	28	84
MAC-A055D	SAC-S12D	5.71	4.33	19	10.2	2.9	55	122	MAC-DA055G/I	SAC-D19G/I	4.53	3.74	24	7.8	2.82	56	169
MAC-A110F	SAC-S26F	7.87	4.5	22	11.7	5.1	110	257	MAC-DA110J/I	SAC-D37J/I	5.71	4.33	28	9.3	8.5	112	336
MAC-B010A	SAC-S03A	3.94	3.15	14	6	1.1	10	26	MAC-DE011C2/I	SAC-D04C/I	3.54	2.76	14	3.3	0.31	11	34
MAC-B020A	SAC-S03A	3.94	3.15	14	7.8	1.8	20	52	MAC-DE021D2/I	SAC-D08D/I	5.71	4.33	16	3.2	1.87	21	63
MAC-B025B	SAC-S04B	5.71	4.33	19	8	12	26	80	MAC-DB025L/I	SAC-D08L/I	5.71	4.33	19	5.4	6.41	26	79
MAC-B050C	SAC-S08C	5.71	4.33	19	10.2	21.5	53	135	MAC-DB055M/I	SAC-D08M/I	5.71	4.33	19	6.3	12.3	54	122
MAC-B080D	SAC-S12D	5.71	4.33	22	13.7	32.5	80	220	MAC-DB080N/I	SAC-D12N/I	5.71	4.33	22	7.3	18.2	79	207
MAC-B110E	SAC-S19E	7.87	4.5	35	10.7	59.1	110	302	MAC-DB100P/I	SAC-D19P/I	7.87	4.5	35	6.5	28.1	102	254
MAC-B200F	SAC-S26F	7.87	4.5	35	11.4	97.2	200	480	MAC-DB200Q/I	SAC-D37Q/I	7.87	4.5	35	7.5	40.7	199	404
MAC-C290F	SAC-S26F	7.87	4.5	35	16.3	127	290	570	MAC-DB300R/I	SAC-D37R/I	7.87	4.5	35	8.9	59.8	303	630
MAC-B330G	SAC-S33G	7.87	4.5	35	14.8	127	330	675	MAC-DB330S/I	SAC-D47S/I	7.87	4.5	42	10.2	78.8	333	776
MAC-C410G	SAC-S33G	7.87	4.5	42	24.2	213	410	818	MAC-DB465T/I	SAC-D55T/I	7.87	4.5	42	13.2	111	466	1,050
MAC-C560H	SAC-S45H	7.87	4.5	42	28	213	560	945	MAC-DB700U/I	SAC-D59U/I	9.25	7.87	42	13.3	249	696	1,550

A/B/C/E-Series MotionPRO Motor Configuration Data						
Motor Model	Pos. Trans. Res.	Rated Torque	Peak Torque	Drive Input at	Motor Inertia	Max. Motor
	counts/rev	in-lbs	in-lbs	volts	in-lb-sec ²	RPM
MAC-E002A1	6,000	1.41	4.22	8.98	0.000068	4,020
MAC-E002A2	6,000	1.41	4.22	8.98	0.000068	4,500
MAC-E003B1	6,000	2.81	8.44	9.01	0.00011	4,020
MAC-E003B2	6,000	2.81	8.44	9.01	0.00011	4,500
MAC-E007C1	6,000	5.63	16.9	9.01	0.00045	4,020
MAC-E007C2	6,000	5.63	16.9	9.01	0.00045	4,500
MAC-E009G2	6,000	9.00	26.0	8.67	0.00045	4,020
MAC-E010D1	6,000	8.45	25.3	8.98	0.00068	4,020
MAC-E010D2	6,000	8.45	25.3	8.98	0.00068	4,500
MAC-E015H2	6,000	13.0	36.0	8.31	0.00067	4,020
MAC-E016E2	6,000	14.1	42.2	8.98	0.0024	4,500
MAC-E023F2	6,000	19.7	59.1	8.99	0.0033	4,020
MAC-E030J2	6,000	23	65	8.48	0.0025	4,020
MAC-A010A	6,000	9.00	26	8.67	0.000450	4,020
MAC-A015B	6,000	13.0	36	8.31	0.00067	4,020
MAC-A030C	6,000	23	65	8.48	0.0025	4,020
MAC-A055D	6,000	44	122	8.32	0.0029	4,020
MAC-A110F	6,000	88	257	8.76	0.0051	4,020
MAC-B010A	24,000	8.80	26	8.86	0.0011	2,505
MAC-B020A	24,000	18.0	52	8.67	0.0018	2,505
MAC-B025B	24,000	25.5	80	9.41	0.0120	2,505
MAC-B050C	24,000	50	135	8.10	0.0215	2,505
MAC-B080D	24,000	76	220	***	@0	2,505
MAC-B110E	24,000	103	302	8.80	0.0591	2,505
MAC-B200F	24,000	168	480	8.57	0.0972	2,505
MAC-B330G	24,000	255	675	7.94	0.1270	2,505
MAC-C290F	24,000	258	570	6.63	0.1270	2,002
MAC-C410G	24,000	381	818	6.44	0.2130	2,002
MAC-C560H	24,000	518	945	5.47	0.2130	1,500

DA/DB/DE-Series MotionPRO Motor Configuration Data						
Motor Model	Pos. Trans. Res.	Rated Torque	Peak Torque	Drive Input at	Motor Inertia	Max. Motor
	counts/rev	in-lbs	in-lbs	volts	in-lb-sec ²	RPM
MAC-DE003A1/I	8,160	2.8	8.4	9.000	0.000057	4,500
MAC-DE003A2/I	8,160	2.8	8.4	9.000	0.000057	4,500
MAC-DE006B1/I	8,160	5.6	17	9.110	0.000185	4,500
MAC-DE006B2/I	8,160	5.6	17	9.110	0.000185	4,500
MAC-DE008C1/I	8,160	8.4	25	8.929	0.000308	4,500
MAC-DE011C2/I	8,160	11	34	9.273	0.000308	4,500
MAC-DE021D2/I	8,160	21	63	9.000	0.00187	4,500
MAC-DE042E2/I	8,160	42	127	9.071	0.00357	4,500
MAC-DA030F/I	16,320	28	84	9.000	0.00154	4,500
MAC-DA033G/I	16,320	56	169	9.054	0.00282	4,500
MAC-DA090H/I	16,320	87	260	8.966	0.0062	4,500
MAC-DA110J/I	16,320	112	336	9.000	0.0085	4,500
MAC-DA140K/I	16,320	140	422	9.043	0.0109	4,500
MAC-DB025L/I	32,640	25	79	9.480	0.00641	3,000
MAC-DB055M/I	32,640	48	122	7.625	0.0123	3,000
MAC-DB080N/I	32,640	74	207	8.392	0.0182	3,000
MAC-DB100P/I	32,640	102	254	7.471	0.0281	3,000
MAC-DB200Q/I	32,640	165	404	7.345	0.0407	3,000
MAC-DB300R/I	32,640	252	630	7.500	0.0598	3,000
MAC-DB330S/I	32,640	310	776	7.510	0.0788	3,000
MAC-DB465T/I	32,640	425	1,050	7.412	0.111	3,000
MAC-DB700U/I	32,640	620	1,550	7.500	0.249	2,000





