

XSM Series  
Brushless Servo  
Motor Manual

# Use of Motors

Servo motors are intended to drive machinery. As such, they must be part of a controlled system that includes a transistorized electronic amplifier. They are not intended for direct connection to the power supply or for use with thyristor drives. Instructions in the amplifier and control system manuals must be observed; this document does not replace those instructions.

Unless specified otherwise, servo motors are intended for use in a normal industrial environment without exposure to excessive or corrosive moisture or abnormal ambient temperatures. The exact operating conditions may be established by referring to the date for the motor. The mating of motors to machinery is a skilled operation; disassembly or repair must not be attempted. In the event that a motor fails to operate correctly, contact the place of purchase for return instructions.

## Safety Notes

There are some possible hazards associated with the use of motors. The following precautions should be observed. Specific Warnings and Cautions are listed under the heading "Motor Installation."

**Installation and Maintenance:** Installation and maintenance or replacement must be carried out by suitably qualified service personnel, paying particular attention to possible electrical and mechanical hazards.

**Weight:** Large motors are generally heavy and the center of gravity may be offset. When handling, take appropriate precautions and use suitable lifting equipment. Beware of sharp edges; use protective gloves when handling such assemblies.

**Flying leads:** Ensure that flying or loose leads are suitably restrained to prevent snagging or entanglement before carrying motors with such leads.

**Generation:** If the motor is driven mechanically, it may generate hazardous voltages at its power input terminals. The power connector must be suitably guarded to prevent a possible shock hazard.

**Loose motors:** When running an unmounted motor, ensure that the rotating shaft is adequately guarded and the motor is physically restrained to prevent it from moving. Remove the key which otherwise could fly out when the motor is running.

**Damaged cables:** Damage to cables or connectors may cause an electrical hazard. Ensure there is no damage before energizing the system.

**Supply:** Servo motors must not be directly connected to a power supply; they require an electronic drive system. Consult the instructions for the drive system before energizing or using the motor.

**Brakes:** The brakes that are included on motors are holding brakes only and are not to be used as a mechanical restraining device for safety purposes.

**Safety requirements:** The safe incorporation of this product into a machine system is the responsibility of the machine designer, who should comply with the local safety requirements at the place where the machine is to be used. In Europe, this is likely to be the Machinery Directive.

**Mechanical connection:** Motors must be connected to the machine with a torsionally rigid coupler or a reinforced timing belt. Couplers which are not rigid will cause difficulty in achieving an acceptable response from the control system. Couplings and pulleys must be tight, as the high dynamic performance of a servo motor can easily cause couplings to slip and thereby damage the shaft and cause instability. Care must be taken in aligning couplings and tightening belts so that the motor is not subjected to significant bearing loads or premature bearing wear will occur. Once connected to a load, tuning will be affected. A system turned without a load will probably require retuning once a load is applied.

**Connectors:** Ensure power is removed before making or removing any connection. Motor connectors should not be connected or disconnected while power is applied.

# XSM Motor Data

MOTOR		XSM	XSM	XSM	XSM	XSM	XSM	XSM	XSM	
		100-14-502	100-14-302	100-27-502	100-27-352	100-37-502	115-42-502	115-53-502		
<b>Winding Data (1)</b>										
Ke Voltage constant (2)	V/krpm	52	80	52	72	52	52	52		
Poles		8								
Winding Resistance phase to phase	Ohms ±10%	4.7	12	1.8	3.9	1.2	1.0	0.63		
Winding Inductance phase to phase	mH	25	55	12	24	7.5	5.6	3.6		
Dielectric Rating		Power connections (R, S, and T) to ground: 1800 VAC RMS 50/60 Hz for 1 second								
<b>Mechanical Data</b>										
Rotor Moment of Inertia	kg-m <sup>2</sup>	0.000042	0.000042	0.000076	0.000076	0.00011	0.00026	0.00038		
	lb-in-s <sup>2</sup>	0.00037	0.00037	0.00067	0.00067	0.00097	0.0023	0.0034		
Net Weight	kg	2.6	2.6	3.6	3.6	4.6	4.2	5.5		
	lb	5.7	5.7	7.9	7.9	10	9.3	12		
Shipping Weight	kg	3.0	3.0	4.0	4.0	5.0	5.0	6.4		
	lb	6.6	6.6	8.8	8.8	11	11	14		
Shaft Material		Steel, Grade 1144								

MOTOR		XSM	XSM	XSM	XSM	XSM	XSM	XSM	XSM	XSM
		115-55-352	130-53-502	130-53-402	130-72-402	130-74-282	130-90-302	130-90-502	165-95-402	165-172-402
<b>Winding Data (1)</b>										
Ke Voltage constant (2)	V/krpm	76	52	62	62	92	86	158	65	65
Poles		8								
Winding Resistance phase to phase	Ohms ±10%	1.3	.58	0.88	0.51	1.2	0.75	2.6	.4	.167
Winding Inductance phase to phase	mH	7.5	5.6	7.6	4.7	12	7.5	3.0	7.0	3.3
Dielectric Rating		Power connections (R, S, and T) to ground: 1800 VAC RMS 50/60 Hz for 1 second								
<b>Mechanical Data</b>										
Rotor Moment of Inertia	kg-m <sup>2</sup>	0.00038	0.00027	0.00027	0.00038	0.00038	0.00050	0.00050	.00078	.00147
	lb-in-s <sup>2</sup>	0.0034	0.0024	0.0024	0.0034	0.0034	0.0044	0.0044	.0069	.013
Net Weight	kg	5.5	5.9	5.9	7.3	7.3	8.6	8.6	9.8	15
	lb	12	13	13	16	16	19	19	21.5	33
Shipping Weight	kg	6.4	6.8	6.8	8.2	8.2	9.5	9.5	11.3	16.5
	lb	14	15	15	18	18	21	21	24.8	36.3
Shaft Material		Steel, Grade 1144								

(1) Specifications are at 20 to 30°C

(2) 0 to peak value of volts, phase to phase

STORAGE AND OPERATING CONDITIONS	
Ambient Temperature: 0 to 40°C (32 to 104°F)	
Storage Temperature: -30 to 70°C (-22 to 158°F)	
Relative Humidity: 5 to 95% non-condensing	

Note: Engineering specification drawings are available from Giddings & Lewis for each motor model.

## XSM Motor Data

MOTOR		XSM 100-14-504	XSM 100-27-504	XSM 100-37-504	XSM 115-42-504	XSM 115-58-504	XSM 130-50-504	XSM 130-73-404
<b>Winding Data (1)</b>								
Ke Voltage constant (2)	V/krpm	96	96	96	100	100	96	115
Poles		8	8	8	8	8	8	8
Winding Resistance phase to phase	Ohms ±10%	20	7.5	4.61	3.8	2.4	2.5	2.0
Winding Inductance phase to phase	mH	93	42	28	21	13	21	18
Dielectric Rating		2350	2350	2350	2350	2350	2350	2350
<b>Mechanical Data</b>								
Rotor Moment of Inertia	kg-m <sup>2</sup>	.000044	.000078	.00012	.00026	.00038	.00028	.0004
	lb-in-s <sup>2</sup>	0.00037	.00069	.001	.0023	.0033	.0024	.0036
Net Weight	kg	2.7	3.7	4.6	4.3	5.5	5.9	7.3
	lb	5.8	8.0	10.0	9.4	12.0	13.0	16.0
Shipping Weight	kg	3.1	4.1	5.0	5.0	6.4	6.8	8.2
	lb	6.7	8.9	11.0	11.0	14.0	15.0	18.0
Shaft Material		1144 Steel	1144 Steel	1144 Steel	1144 Steel	1144 Steel	1144 Steel	1144 Steel
MOTOR		XSM 130-73-304	XSM 130-90-304	XSM 95-404	XSM 165-172- 404	XSM 215-325- 304	XSM 215-425- 304	XSM 215-531- 304
<b>Winding Data (1)</b>								
Ke Voltage constant (2)	V/krpm	180	158	130	130	168	168	168
Poles		8	8	8	8	8	8	8
Winding Resistance phase to phase	Ohms ±10%	4.2	2.6	1.49	.65	.349	.254	.189
Winding Inductance phase to phase	mH	41	25	27	13	11	7.2	5.5
Dielectric Rating		2350	2350	2350	2350	2350	2350	2350
<b>Mechanical Data</b>								
Rotor Moment of Inertia	kg-m <sup>2</sup>	.0004	.00052	.000783	.00147	.004	.0058	.00775
	lb-in-s <sup>2</sup>	.0036	.0046	.0069	.013	.0354	.051	.0685
Net Weight	kg	7.3	8.6	9.8	15.0	26.8	35	40.25
	lb	16.0	19.0	21.5	33.0	59.0	77	89
Shipping Weight	kg	8.2	9.5	11.3	16.5	28.7	36.8	42.7
	lb	18.0	21.0	24.8	36.3	63.5	81	94
Shaft Material		1144 Steel	1144 Steel	1144 Steel	1144 Steel	1144 Steel	1144 Steel	1144 Steel

(1) Specifications are at 20 to 30°C

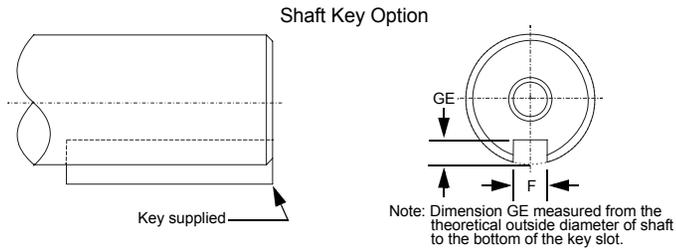
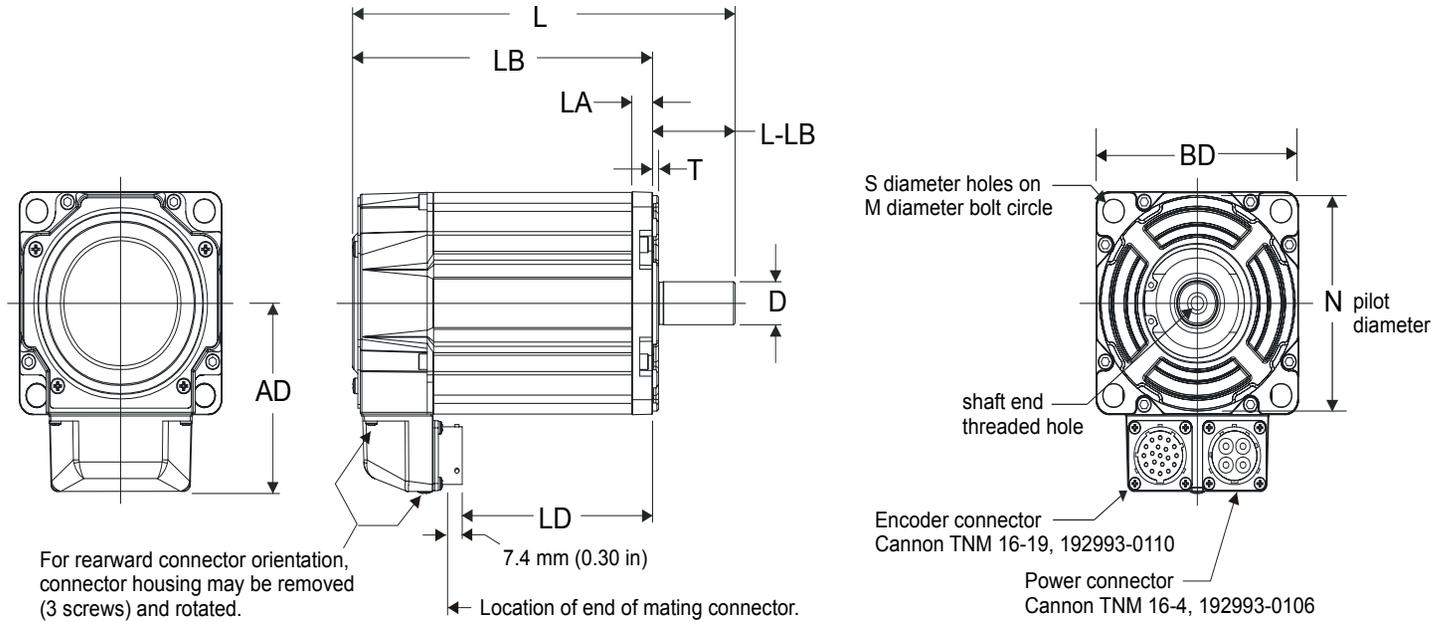
(2) 0 to peak value of volts, phase to phase

<b>STORAGE AND OPERATING CONDITIONS</b>	
Ambient Temperature:	0 to 40°C (32 to 104°F)
Storage Temperature:	-30 to 70°C (-22 to 158°F)
Relative Humidity:	5 to 95% non-condensing

Note: Engineering specification drawings are available from Giddings & Lewis for each motor model.

# Motor Dimensions

SHAFT END THREADED HOLE					
Motor	XSM100-14, XSM 100-27, XSM 100-37	XSM 115-42, XSM 115-53/55	XSM130-53, XSM130-72/74, XSM 130-90	XSM165-95, XSM 165-172	XSM215-325, XSM215-425, XSM215-531
Thread	M5 x 0.8 mm	M6 x 1.0 mm	M8 x 1.25 mm	M10 x 1.5-6 mm	M12 x 1.75 mm
Thread Depth	12.5 mm (0.49 in)	16 mm (0.63 in)	19 mm (0.75 in)	22 mm (0.87 in)	28.0 mm (1.10 in)
Key Supplied				8 x 7 x 40 mm	10 x 8 x 59 mm



## Dimensional Data

DIMENSIONS														
Motor Model	AD mm (in)	BD mm (in)	D mm (in)	F mm (in)	GE mm (in)	L mm (in)	LA mm (in)	LB mm (in)	L-LB mm (in)	M mm (in)	N mm (in)	S mm (in)	T mm (in)	TOLERANCES mm (in)
XSM100-14	80.9 (3.19)	89.4 (3.52)	16.0 (0.6299)	5.0 (0.197)	3.0 (0.118)	163.9 (6.46)	9.9 (0.39)	123.9 (4.88)	40.0 (1.575)	100 (3.937)	80 (3.1496)	7.0 (0.276)	2.87 (0.113)	D: +0.008/-0.003 (+0.0003/0.0001) L-LB: ±0.7 (±0.028) N: +0.012/-0.007 (+0.0005/-0.0003) S: +0.36/-0.0 (+0.014/-0.0)
XSM100-27						189.3 (7.46)		149.3 (5.88)						
XSM100-37						214.7 (8.46)		174.7 (6.88)						
XSM115-42	83.9 (3.30)	98.3 (3.87)	19.0 (0.7480)	3.5 (0.14)	6.0 (0.2)	185.7 (7.32)	10.2 (0.40)	145.7 (5.74)	40.0 (1.575)	115 (4.528)	95 (3.7402)	10.0 (0.394)	2.87 (0.113)	D: +0.009/-0.004 (+0.0004/-0.0002) L-LB: ±0.7 (±0.028) N: +0.013/-0.009 (+0.0005/-0.0004) S: +0.36/-0.0 (+0.014/-0.0)
XSM115-53/55						211.1 (8.32)		171.1 (6.74)						
XSM130-53	91.5 (3.60)	113.7 (4.48)	24.0 (0.9449)	8.0 (0.315)	4.0 (0.158)	199 (7.84)	12.2 (0.48)	149 (5.87)	50 (1.969)	130 (5.118)	110 (4.3307)	10.0 (0.394)	3.38 (0.133)	
XSM130-72/74						224.4 (8.84)		174.4 (6.87)						
XSM130-90						249.8 (9.84)		199.8 (7.87)						
XSM165-95, XSM 165-172	Non- Brake 106.2 (4.18) 24Vdc Brake 105.4 (4.15)	143.5 (5.65)	143.5 (5.65)	8.0 (0.3150)	4.10 (0.1615)	XSM165- 95 233 (9.173) XSM165- 172 283.8 (11.173)	13.97 (0.55)	XSM165- 95 173.0 (6.81) XSM165- 172 223.8 (8.81)	60.0 (2.362)	165.0 (6.496)	130.0 (5.1181)	12 (0.481)	3.38 (0.133)	D: +0.009/-0.004 (+0.0003/0.0002) F: -0.0036 (-0.0002) GE: ±0.10 (±0.0035) L-LB: ±0.7 (±0.028) N: +0.014/-0.009 (+0.0006/-0.0003) S: +0.43/-0.0 (±0.008)
XSM215-325, XSM215-425, XSM215-531	Non- Brake 142.9 (5.625) 24Vdc Brake 141.1 (5.56)	184.60 (7.27)	38.001 (1.4961)	10.00 (0.3937)	5.10 (0.201)	XSM215- 325 303.6 (11.95) XSM215- 425 354.4 (13.95) XSM215- 531 405.2 (15.95)	17.80 (0.70)	XSM215- 325 223.6 (8.8) XSM215- 425 274.4 (10.8) XSM215- 531 325.2 (12.8)	80.0 (3.150)	215.00 (8.465)	180.00 (7.0866)	14.715 (0.579)	3.86 (0.152)	D: +0.006/-0.0 (±0.0006/-0.0) F: +0.0/-0.036 (+0.0/-0.0014) GE: ±0.10 (±0.004) L-LB: ±0.7 (±0.028) N: +0.014/-0.009 (+0.0006/-0.0004) S: +0.215 (±0.008)

NOTE: Motors are manufactured to millimeter dimensions. Inch dimensions are approximate conversions from millimeters.

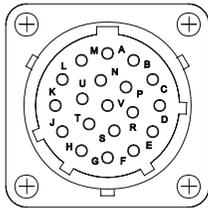
SUPPLEMENTAL DIMENSIONS								
Length, from motor mounting face to connectors (LD)								
Connector	XSM100-14	XSM100-27	XSM100-37	XSM115-42	XSM115-53/55	XSM130-53	XSM130-72/74	XSM130-90
Power mm (in)	70.7 (2.78)	96.1 (3.78)	121.5 (4.78)	92.5 (3.64)	117.9 (4.64)	95.8 (3.77)	121.2 (4.77)	146.6 (5.77)
Encoder mm (in)								

## Connector Data

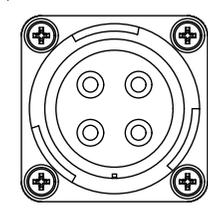
Feedback Connector			
Pin	2000 Line Encoder	High Resolution Encoder for XSM 230 VAC Motor	High Resolution Encoder for XSM 460 VAC Motor
A	A+	Sin+	Sin+
B	A-	Sin-	Sin-
C	B+	Cos+	Cos+
D	B-	Cos-	Cos-
E	I+	Data+	Data+
F	I-	Data-	Data-
G	GROUND	Reserved	Reserved
H	ABS		
J	Reserved		
K	+5 VDC	+5VDC	
L	Common	Common	
M	Reserved	Reserved	
N			Common
P			
R	TS+	TS+	TS+
S	TS -	TS-	TS-
T	S1	Reserved	Reserved
U	S2		
V	S3		

Power Connector	
Pin	Signal
A	PHASE R
B	PHASE S
C	PHASE T
D	GROUND

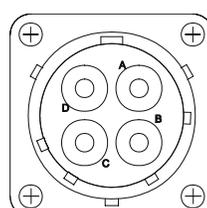
Brake Connector	
Pin	Signal
A	BR+
B	Reserved
C	BR-
D	Reserved



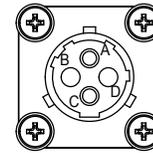
ITT CANNON  
TNM 16-19, 192993-0110



ITT CANNON  
CA-COM 24-22P



ITT CANNON  
TNM16-4, 192993-0106



ITT Cannon  
TNM 10-4

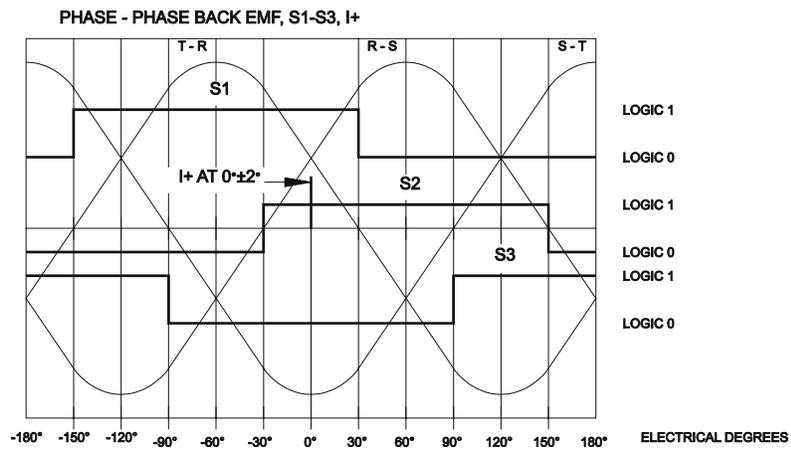
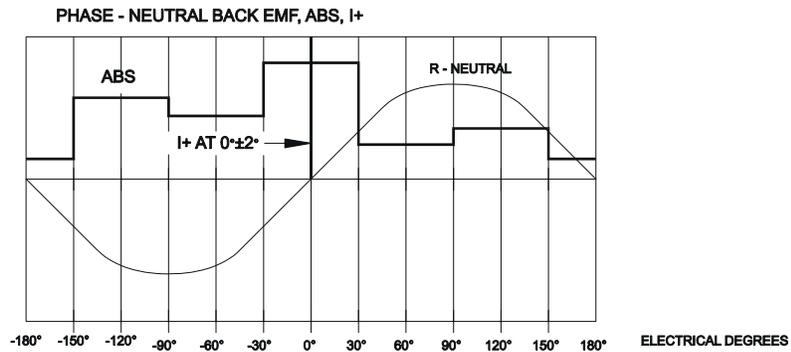
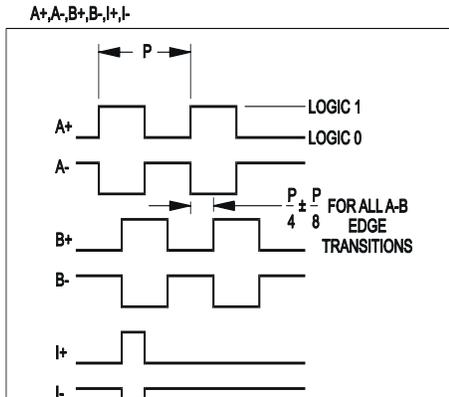
## Encoder Data

Encoders are factory aligned and must not be adjusted outside the factory.

- ◆ A+, A-, B+, B- Line Count; 2000 pulse/rev.
- ◆ S1, S2, S3 Commutation Line Count; 4 pulse/rev.
- ◆ I+, I- Index Pulse; 1 pulse/rev, gated with A+, B+.
- ◆ I+ Alignment (motors with keys); I+ occurs when the shaft keyway is oriented toward the connectors, ±10 degrees mechanical.
- ◆ +5VDC Voltage/Current Input; 4.75-5.25 VDC, 200 mA max.
- ◆ A+, A-, B+, B- Output; TTL line driver;
  - Logic 1 = 2.5 VDC min at 20 mADC source.
  - Logic 0 = 0.5 VDC max at 20 mADC sink.
- ◆ S1, S2, S3 Output;
  - Logic 1 = 3.5 VDC min at 1 mADC source
  - Logic 0 = 0.5 VDC max at 20 mADC sink.
- ◆ ABS Output; 1 mADC max source.
- ◆ TS+, TS- Thermostat Operating Voltage; 250 Volts max.
- ◆ TS+, TS- Thermostat Operating Current; 1.6/2.5 Amps max at 0.6/1.0 power factor.

# Encoder Outputs

The waveforms shown below are per clockwise (CW) shaft rotation while viewing the motor mounting face.



## Options: Shaft Seal and Connector Kits

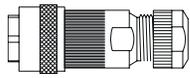
Factory manufactured power cables and encoder cables are available in standard cable lengths of 3, 7.6, 15, and 23 meters (10, 25, 50, and 75 feet). They can provide environmental sealing and shield termination.

### Shaft Seal Kits

SHAFT SEAL KITS				
Motor Series	Part Number	Inside Dia (mm)	Outside Dia (mm)	Width (mm)
XSM100-XX	M.1301.4031	17	47	7
XSM115-XX	M.1301.4032	20	52	7
XSM130-XX	M.1301.4033	25	62	7
XSM165-95, XSM165-172	M.1301.9161	30	72	8
XSM215-325, XSM215-425, XSM215-531	M.1301.9162	40	90	8

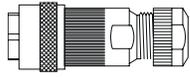
NOTE: Shaft seals require a lubricant to reduce wear. Lubricant is provided with kit.

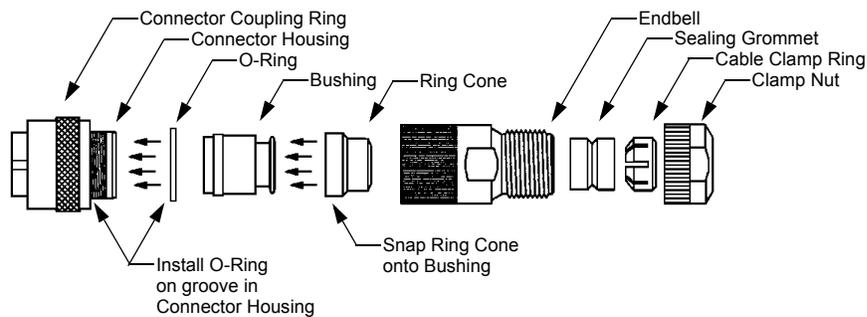
### Connector Kits

MOTOR MATING CONNECTORS FOR XSM100, 115, 130, 165 FRAMES				
	Part Number	Connector Type	Accepts Wire Gauge mm <sup>2</sup> (AWG)	Accepts Cable Diameter Gauge mm (in)
	M.1301.4036	Power - Solder	2.5-4.0 (14-12)	7.9-12.6 (0.31-0.49)
M.1301.4035	Encoder - Solder	0.08-2.5 (28-14)		
M.1301.9160	Power Straight	6 - 10 (10 - 8)	15.2 - 19.1 (0.60 - 0.75)	

These connectors provide environmental sealing and shield termination.

### Brake Connector Kits

CONNECTORS				
	Part Number	Connector Type	Accepts Wire Gauge mm <sup>2</sup> (AWG)	Accepts Cable Diameter Gauge mm (in)
	M.1301.4037	Brake-Solder	14)	



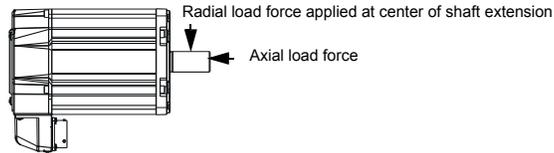
## Motor Load Force Ratings

Motors are capable of operating with the maximum radial or maximum axial shaft loads listed in the following tables. Radial loads listed are applied midway along the shaft extension. The table represents 20,000 hour L10 bearing fatigue life. This 20,000 hour life does not account for possible application-specific life reduction that may occur due to bearing grease contamination from external sources.

RADIAL LOAD FORCE RATINGS (Maximum Radial Load)							
MOTOR	500 rpm kg (lb)	1000 rpm kg (lb)	2000 rpm kg (lb)	3000 rpm kg (lb)	3500 rpm kg (lb)	4000 rpm kg (lb)	5000 rpm kg (lb)
XSM100-14	78 (171)	62 (136)	49 (108)	-	40 (89)	-	36 (79)
XSM100-27	87 (192)	69 (152)	55 (121)	-	45 (100)	-	40 (89)
XSM100-37	-	74 (163)	59 (129)	-	49 (107)	-	43 (95)
XSM115-42	-	78 (172)	62 (136)	-	51 (113)	-	45 (100)
XSM115-53/55	106 (234)	84 (186)	67 (148)	-	55 (122)	-	49 (109)
XSM130-53	-	97 (213)	77 (169)	67 (147)	64 (140)	61 (134)	56 (124)
XSM130-72/74	133 (292)	105 (232)	84 (184)	73 (161)	-	66 (146)	-
XSM130-90	140 (309)	111 (245)	89 (195)	77 (170)	-	-	-
XSM165-95	-	127 (280)	100 (222)	88 (194)	-	80 (176)	-
XSM165-172	-	143 (316)	114 (251)	99 (219)	-	90 (199)	-
XSM215-325	253 (557)	200 (442)	159 (351)	139 (307)	-	-	-
XSM215-425	275 (607)	219 (482)	173 (382)	151 (334)	-	-	-
XSM215-531	291 (641)	230 (508)	183 (404)	160 (353)	-	-	-

AXIAL LOAD FORCE RATINGS (Maximum Radial Load)							
MOTOR	500 rpm kg (lb)	1000 rpm kg (lb)	2000 rpm kg (lb)	3000 rpm kg (lb)	3500 rpm kg (lb)	4000 rpm kg (lb)	5000 rpm kg (lb)
XSM100-14	30 (66)	23 (50)	16 (36)	-	13 (29)	-	11 (24)
XSM100-27	34 (74)	25 (56)	19 (41)	-	15 (32)	-	13 (28)
XSM100-37	-	27 (59)	20 (44)	-	16 (35)	-	13 (29)
XSM115-42	-	36 (80)	27 (59)	-	21 (47)	-	18 (39)
XSM115-53/55	52 (115)	39 (86)	29 (63)	-	22 (49)	-	19 (42)
XSM130-53	-	31 (68)	23 (50)	19 (42)	18 (39)	17 (37)	15 (33)
XSM130-72/74	45 (100)	34 (74)	25 (55)	21 (46)	-	19 (41)	-
XSM130-90	49 (107)	36 (80)	27 (59)	22 (49)	-	-	-
XSM165-95	-	42 (94)	30 (68)	26 (58)	-	22 (50)	-
XSM165-172	-	48 (107)	35 (79)	30 (66)	-	26 (58)	-
XSM215-325	89 (197)	66 (146)	48 (107)	41 (90)	-	-	-
XSM215-425	98 (217)	72 (159)	53 (118)	45 (99)	-	-	-
XSM215-531	104 (230)	77 (169)	34 (125)	47 (104)	-	-	-

AXIAL LOAD FORCE RATINGS (Zero Radial Load)							
MOTOR	500 rpm kg (lb)	1000 rpm kg (lb)	2000 rpm kg (lb)	3000 rpm kg (lb)	3500 rpm kg (lb)	4000 rpm kg (lb)	5000 rpm kg (lb)
XSM100-14	49 (109)	36 (80)	27 (59)	-	21 (47)	-	18 (40)
XSM100-27	49 (109)	36 (80)	27 (59)	-	21 (47)	-	18 (40)
XSM100-37	-	36 (80)	27 (59)	-	21 (47)	-	18 (40)
XSM115-42	-	51 (112)	38 (83)	-	30 (65)	-	25 (55)
XSM115-53/55	69 (152)	51 (112)	38 (83)	-	30 (65)	-	25 (55)
XSM130-53	-	51 (112)	38 (83)	31 (69)	30 (65)	28 (61)	25 (55)
XSM130-72/74	69 (152)	51 (112)	38 (83)	31 (69)	-	28 (61)	-
XSM130-90	69 (152)	51 (112)	38 (83)	31 (69)	-	-	-
XSM165-95	-	67 (149)	49 (109)	41 (92)	-	26 (81)	-
XSM165-172	-	67 (149)	49 (109)	41 (92)	-	26 (81)	-
XSM215-325	136 (300)	99 (219)	74 (163)	62 (137)	-	-	-
XSM215-425	136 (300)	99 (219)	74 (163)	62 (137)	-	-	-
XSM215-531	136 (300)	99 (219)	74 (163)	62 (137)	-	-	-



## Motor Installation

Observe the following installation guidelines and those under the heading “Safety Notes”:

: Unmounted motors, disconnected mechanical couplings and/or disconnected cables are dangerous if power is applied.

Disassembled equipment should be appropriately identified (tagged-out) and access to electrical power restricted (locked-out).

Failure to observe these safety procedures could result in personal injury and damage to equipment.

1. Do not run motors that are not properly mounted. Attach all power and encoder cables after the motor is mounted.
2. Mount motors with connectors pointing downward and use a drip loop in the cable to keep liquids flowing away from the connectors.
3. The installer must comply with all local regulations and should use equipment and installation practices that promote electromagnetic compatibility and safety.

: Outer surfaces of motor can reach high temperatures, 125°C (275°F) during motor operation.

Take precautions to prevent accidental contact with hot surfaces.

Failure to observe these safety procedures could result in personal injury.

## Couplings and Pulleys

Mechanical connections to the motor shaft, such as couplings and pulleys, require a rigid coupling or a reinforced timing belt. The high dynamic performance of servo motors can cause couplings, pulleys or belts to loosen or slip over time. A loose or slipping connection will cause system instability and may damage the motor shaft and keyway. All connections between the system and the servo motor shaft must be rigid to achieve acceptable response from the system. Connections should be periodically inspected to verify the rigidity.

When mounting couplings or pulleys to the motor shaft, ensure that the connections are properly aligned and that axial and radial loads are within the specifications of the motor. The section “Load Force Ratings” provides guidelines to achieve 20,000 hours of bearing life. Additional information about load force ratings, including graphical depiction of varied load ratings and bearing life, is available for any motor from the Technical Support groups listed on the back cover.

## Preventing Electrical Noise

ElectroMagnetic Interference (EMI), commonly called “noise”, may adversely impact motor performance by inducing stray signals. Effective techniques to counter EMI include filtering the AC power, shielding and separating signal carrying lines, and practicing good grounding techniques. Effective AC power filtering can be achieved through the use of isolated AC power transformers or properly installed AC line filters. Physically separate signal lines from motor cabling and power wiring; do *not* parallel signal wires with motor or power wires or route signal wires over the vent openings of servo drives. Ground all equipment using a single-point parallel ground system that employs ground bus bars or straps. If necessary, use electrical noise remediation techniques to mitigate EMI in “noisy” environments.

Knowledgeable cable routing and careful cable construction improves system electromagnetic compatibility (EMC). General cable build and installation guidelines include:

1. Keep wire lengths as short as physically possible.
2. Route signal cables (encoder, serial, analog) away from motor and power wiring.
3. Separate cables by 1 foot minimum for every 30 feet of parallel run.
4. Ground both ends of the encoder cable and twist the signal wire pairs.
5. Use shielded motor cables when necessary to prevent electromagnetic interference (EMI) with other equipment

: High voltage can be present on the shield of a power cable, if the shield is not grounded

Ensure there is a connection to ground for any power cable shield.

Failure to observe these safety procedures could result in personal injury or damage to equipment.

## Motor Model Name Identification

Model	XSM
Frame	mm (bolt hole circle)
Torque	in-lb
Speed	2 digits *100=RPM
Voltage	1 digit *100=Voltage
Feedback	M, S, E [multiturn, SinCos, Incremental Encoder (linecount*1000)]
Brake Option	0, 2, 9 (0 no brake, 24 volt, 90 volt)
Other Option	AA (no other options) -- connectors, face plate, shaft modifications K* - with keyway

See examples below:

SAP Material Number	Model Number	Description
M.1300.6120	XSM100-14-502-E2-0AA	100 frame 14 in-lb, 5000 RPM, 230 volt, line encoder with no brake, no other options
M.1300.6121	XSM130-90-302-S-2AA	130 frame 90 in-lb, 3000 RPM, 230 volt, Single turn high resolution, 24 volt brake, no options

## NOTES