

#### 4.6.2 Allowable Radial Load and Thrust Load

Table 4.1 shows allowable loads according to AC SERVOMOTOR types.

Table 4.1 M Series Allowable Radial Load and Thrust Load

Motor Type USAMED-	Allowable Radial Load* N (lb)	Allowable Thrust Load N (lb)
03□□1	490 (110)	98 ( 22) †
06□□1	490 (110)	98 ( 22) †
09B□□2	686 (154)	343 ( 77)
12B□□2	1470 (330)	490 (110)
20B□□2	1470 (330)	490 (110)
30B□□2	1470 (330)	490 (110)
44B□□2	1764 (397)	588 (132)
USAMKD-60B□□2	1764 (397)	588 (132)

Table 4.2 F Series Allowable Radial Load and Thrust Load

Motor Type USAFED-	Allowable Radial Load* N (lb)	Allowable Thrust Load N (lb)
02□□1	147 ( 33)	49 ( 11) †
03□□1	147 ( 33)	49 ( 11) †
05□□1	490 (110)	98 ( 22) †
09□□1	490 (110)	98 ( 22) †
13C□□2	686 (154)	343 ( 77)
20C□□2	1470 (331)	490 (110)
30C□□2	1470 (331)	490 (110)
44C□□2	1470 (331)	490 (110)

Table 4.3 S Series Allowable Radial Load and Thrust Load

Motor Type USASEM-	Allowable Radial Load* N (lb)	Allowable Thrust Load N (lb)
02A□□2	78.4 ( 18)	39.2 ( 9)
03A□□2	245 ( 55)	98 (22)
05A□□2	245 ( 55)	98 (22)
08A□□1	392 ( 88)	147 (33)
15A□□1	490 (110)	147 (33)
30A□□1	686 (154)	196 (44)

Table 4.4 D Series Allowable Radial Load and Thrust Load

Motor Type USADED-	Allowable Radial Load* N (lb)	Allowable Thrust Load N (lb)
05E□□2	686 (154)	343 ( 77)
10E□□2	686 (154)	343 ( 77)
15E□□2	1176 (265)	490 (110)
22E□□2	1176 (265)	490 (110)
37E□□2	1176 (265)	490 (110)

\* Maximum values of the load applying to the shaft extension.  
† Do not apply the exceeding load because motor cannot be rotated.

#### 4.6.3 Mechanical Specifications (M, F, S and D Series)

Table 4.5 Mechanical Specifications in mm

Accuracy (T.I.R.)†		Reference Diagram
Flange surface perpendicular to shaft (A)	0.04 (0.06)*	
Flange diameter concentric to shaft (B)	0.04	
Shaft run out (C)	0.02 (0.04)†	

\* Accuracy for motor types USADED-15E, -22E, and -37E.  
† T.I.R (Total Indicator Reading)  
† Accuracy for motor types USAMED-44M□□2 and USAMKD-60M□□2.

#### 4.6.4 Direction of Rotation

AC SERVOMOTORS rotate counterclockwise (CCW) when viewed from the drive end when motor and detector leads are connected as shown below.

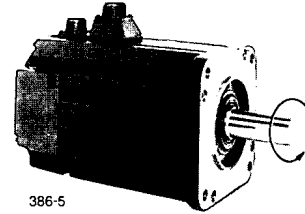
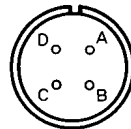


Fig. 4.9 AC SERVOMOTOR

#### (1) Connector Specifications for Standard SERVOMOTORS

##### (a) Motor receptacle

• M, F Series

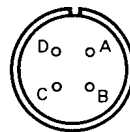


A	Phase U
B	Phase V
C	Phase W
D	Frame ground

• S Series  
(Type USASEM-02A)

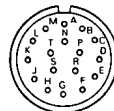
Color of Lead	Applicable
Red	Phase U
White	Phase V
Blue	Phase W

(Types USASEM-03A to 30A)



A	Phase U
B	Phase V
C	Phase W
D	Frame ground

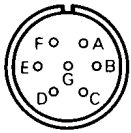
##### (b) Detector receptacle



A	Channel A output	K	Channel U output
B	Channel $\bar{A}$ output	L	Channel $\bar{U}$ output
C	Channel B output	M	Channel V output
D	Channel $\bar{B}$ output	N	Channel $\bar{V}$ output
E	Channel Z output	P	Channel W output
F	Channel $\bar{Z}$ output	R	Channel $\bar{W}$ output
G	0V	S	—
H	+5VDC	T	—
J	Frame ground	—	—

(2) Connector Specifications for SERVOMOTOR with Brake

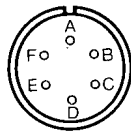
M, F\*, D Series (Brake is provided to all types of D series as standard.)



A	Phase U	E	Brake terminal
B	Phase V	F	
C	Phase W	G	—
D	Frame Ground	—	—

Types without brake of D series do not use E and F.

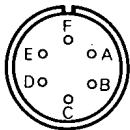
\*For USAFEM-02 and-03, see connector on the right.



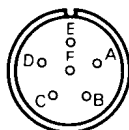
S Series (USASEM-02A)

Color of Lead	Applicable	Color of Lead	Applicable
Red	Phase U	Black	Brake
White	Phase V	Black	
Blue	Phase W	Green	Frame Ground

(USASEM-03A, -05A)



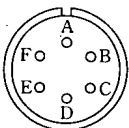
(USASEM-08A to -30A)



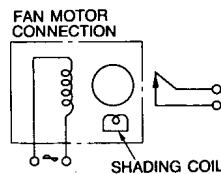
A	Phase U
B	Phase V
C	Phase W
D	Brake terminal
E	
F	Frame ground

A	Phase U
B	Phase V
C	Phase W
D	Brake terminal
E	
F	Frame ground

(3) Fan terminal connector specifications (Type USAMKD-60B□2)



A	Fan motor
B	Fan motor
C	—
D	Alarm terminal
E	Alarm terminal
F	—



Power Supply: Single-phase 200V, 50/60Hz, 38/35W  
 Alarm Contact: OFF when fan is running normally  
 ON when fan rotation is 1800 ± 200 r/min or less.  
 When cooling fan starts running, ON for 3 seconds.  
 Contact Capacity: Resistance load is 110V max, 0.3A

Fig. 4.10: Fan Terminal Connection

Arrange the main circuit sequence to stop the SERVOMOTOR and fan motor when cooling fan alarm occurs. (Alarm contact is ON at alarm occurrence).

After alarm occurrence, make sure to stop the SERVOMOTOR and fan motor within five minutes since SERVOMOTOR self-cooling protection is set to five minutes.

When cooling fan starts running, alarm detection signal turns ON for three seconds. Therefore, add a delay relay to the circuit for this time setting (three seconds).

4.6.5 Impact Resistance

When mounted horizontally and exposed to vertical shock impulses, the motor can withstand up to two impacts with impact acceleration of 490m/s<sup>2</sup> (50G) (Fig. 4.11).

NOTE

A precision detector is mounted on the opposite-drive end of AC SERVOMOTOR. Care should be taken to protect the shaft from impacts that could damage the detector.

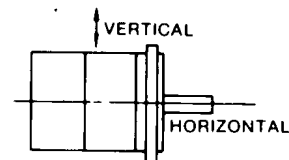


Fig. 4.11 Impact Resistance

4.6.6 Vibration Resistance

When mounted horizontally, the motor can withstand vibration (vertical, lateral, axial) of 24.5m/s<sup>2</sup> (2.5G) (Fig. 4.12).

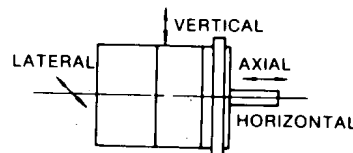


Fig. 4.12 Vibration Resistance

4.6.7 Vibration Class

Vibration of the motor running at rated speed is 15 μm or below (Fig. 4.13).

POSITION FOR CHECKING VIBRATION

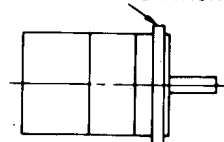


Fig. 4.13 Vibration Checking

4.6.8 Holding Brake

Turn ON/OFF according to Par. 6.9.3, "Application of SERVOMOTORS with Holding Magnetic Brake" since AC SERVOMOTORS with brake is used when the operation is held.