Technical Note

Mounting Procedures – Bolt Sizes and Torques

This technical note details the proper method for choosing and tightening the mounting bolts for SEW gear reducers, flanges, and torque arms.

Reducers with Feet

Foot-mounted reducers fasten in place by bolts slipped through the mounting holes in the mounting feet and secured with a nut beneath the mounting surface. To accommodate misalignment, SEW slightly oversizes mounting holes. Bolts should be long enough to protrude past the fastening nut a distance equal to the diameter of the bolt – refer to Figure 1. For additional information about proper mounting procedures for footed units, refer to SEW Technical Note **GM-019**.

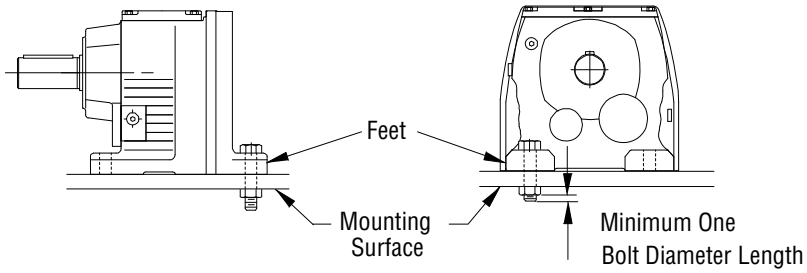


Figure 1: Minimum Bolt Length

Gear Unit				SAE (Inch)		ISO (mm)	
R	K	S	W	Hole Ø	Bolt Ø	Hole Ø	Bolt Ø
R07			W10, W20	0.26	1/4	6.6	M6
R17, R27, R37		S37	W30	0.35	5/16	9	M8
RX57	K37, K47	S47, S57		0.43	3/8	11	M10
RX67, R47, R57	K57, K67	S67		0.53	7/16	13.5	M12
R67				0.55	7/16	14	M12
R/RX77, R/RX87	K77	S77		0.69	5/8	17.5	M16
R/RX97, RX107	K87	S87		0.87	3/4	22	M20
R107	K97	S97		1.02	7/8	26	M24
R137	K107, K167			1.30	1-1/4	33	M30
R147, R167	K127, K157, K187			1.54	1-3/8	39	M36

Table 1: Mounting Hole and Bolt Diameters

NOTE: Minimum bolt property class is 8.8 (ISO) or grade 8 (SAE).

Reducers with Rail Holes (F Series)

Unlike foot-mounted reducers with through-holes, SEW F-series reducers have a rail mount consisting of tapped mounting holes on the sides of the reducer, as shown in Figure 2.

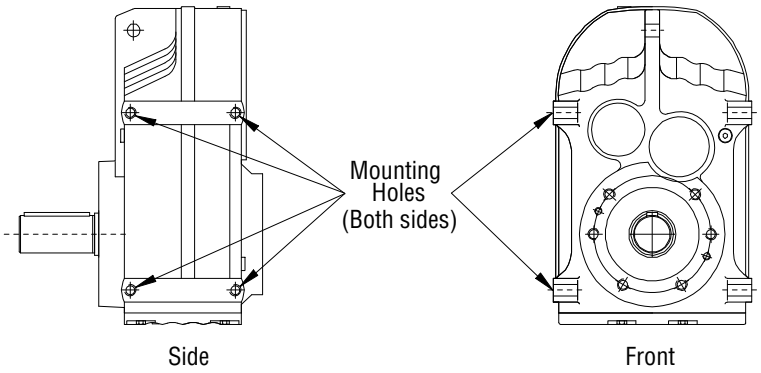


Figure 2: F-Series Mounting Holes

Table 2 shows the tap depths of F-Series reducers. The maximum bolt length to ensure that the bolt does not bottom out inside the mounting hole is equal to the thickness of the mounting surface through which the bolt must pass plus a distance that is slightly less than the tap depth. The minimum bolt length to ensure sufficient thread engagement is equal to the thickness of the mounting surface plus a distance equal to the bolt diameter. **Exception**: The F27 requires a minimum bolt engagement equal to 1.5 times the bolt diameter, due to its cast aluminum construction.

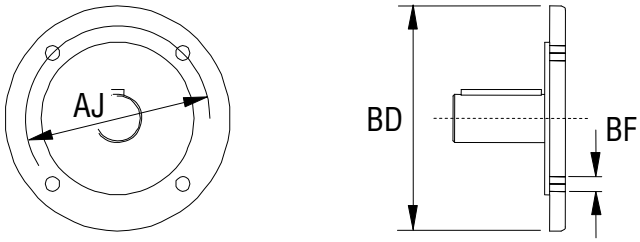
Gear Unit	Bolt Diameter	Tap depth	
		in	mm
F27*	M8	0.63	16
F37	M8	0.43	11
F47	M10	0.59	15
F57, F67	M12	0.67	17
F77, F87	M16	1.02	26
F97	M20	1.10	28
F107	M24	1.42	36
F127	M30	1.77	45
F157	M36	2.17	55

Table 2: F-Series Mounting Holes

NOTE: Minimum bolt property class is 8.8 (ISO) or grade 8 (SAE).

Reducers with Flange

Table 3 shows the recommended bolt diameters for each flange size. For more information about proper mounting procedures for flanged reducers, refer to SEW Technical Note **GM-020**.



Flange Size (BD Dimension)		Flange Dimensions				Bolt Diameter	
		in		mm			
in	mm	AJ	BF	AJ	BF	in	mm
3.15	80	2.56	0.26	65	6.6	1/4	6
4.33	110	3.43	0.35	87	9	5/16	8
4.72	120	3.94	0.26	100	6.6	1/4	6
5.51	140	4.53	0.35	115	9	5/16	8
6.30	160	5.12	0.35	130	9	5/16	8
6.30	160	5.12	0.33	130	8.5	5/16	8
7.87	200	6.50	0.43	165	11	3/8	10
9.84	250	8.46	0.53	215	13.5	7/16	12
11.81	300	10.43	0.53	265	13.5	7/16	12
13.78	350	11.81	0.69	300	17.5	5/8	16
17.72	450	15.75	0.69	400	17.5	5/8	16
21.65	550	19.69	0.69	500	17.5	5/8	16
25.98	660	23.62	0.87	600	22	3/4	20

= FF27 only

Table 3: Flange Bolt Diameters

NOTE: Minimum bolt property is class 8.8 (ISO) or grade 8 (SAE).

EXCEPTION: Bolts should be class 10.9 (ISO), grade 10 (SAE), or better for the following reducers: RF37F with 120mm flange; R47F with 140mm flange, R57F with 160mm flange.

Reducers with Torque Arms

Table 4 shows the recommended bolt sizes to mount an SEW torque arm onto a reducer. The torque arm mounts to the bottom of a K-series reducer and mounts to the side of an S or W-series reducer. For information regarding the proper design of torque arms brackets, refer to SEW Technical Note **GM-021.**

Gear Unit	Bolts			Torque
	Qty.	Dia. (mm)	Length (mm)	Nm
KA37	4	M10	25	48
KA47	4	M10	30	48
KA57	4	M12	35	86
KA67	4	M12	35	86
KA77	4	M12	40	86
KA87	4	M16	40	210
KA97	4	M20	50	410
KA107	4	M24	60	710
KA127	4	M36	130	2500
KA157	4	M36	130	2500
SA37	4	M6	16	11
SA47	4	M8	25	25
SA57	4	M8	25	25
SA67	4	M12	35	86
SA77	4	M12	35	86
SA87	4	M16	45	210
SA97	4	M16	50	210
WA10	4	M6	12	11
WA20	4	M6	12	11
WA30	4	M6	16	11

Table 4: Torque Arm Bolt Diameters

NOTE: All bolts should be of property class 8.8 (ISO).

Bolt Torque Requirements

Table 3 shows the torque limits for SAE and ISO bolts.

Bolt Size		Class ISO 8.8 and SAE 8 Bolts[1]				Class ISO 10.9 and SAE 10 Bolts[1]			
		lb-in		Nm		lb-in		Nm	
		T[2]	+10%	T[2]	+10%	T[2]	+10%	T[2]	+10%
M4	1/8	27	29	3	3.3	43	47	4.8	5.3
M5	3/16	53	58	6	6.6	84	93	9.5	10.5
M6	1/4	100	106	11	12	140	154	16	18
M8	5/16	240	270	27	30	350	390	40	44
M10	3/8	480	530	54	60	710	780	80	90
M12	7/16	820	900	93	100	1240	1360	140	150
M14	1/2	1310	1440	148	160	1950	2150	220	240
M16	5/8	2040	2240	230	250	2990	3290	338	370
M18	11/16	2910	3200	329	360	4150	4570	469	520
M20	3/4	4110	4510	464	510	5850	6440	661	730
M24	7/8	7060	7770	798	880	10050	11010	1136	1250
M27	1-1/8	10410	11450	1176	1300	14820	16300	1674	1840
M30	1-1/4	14130	15550	1597	1760	20130	22140	2274	2500
M36	1-3/8	24590	27040	2778	3060	35020	38520	3957	4350

Table 3: Bolt Tightening Torques

NOTE: [1] SAE bolt torques are based on standard UNC thread for that nominal bolt diameter; [2] T = tightening torque.

CAUTION: The +10% values indicate the upper torque limits; do not tighten bolts beyond this limit.