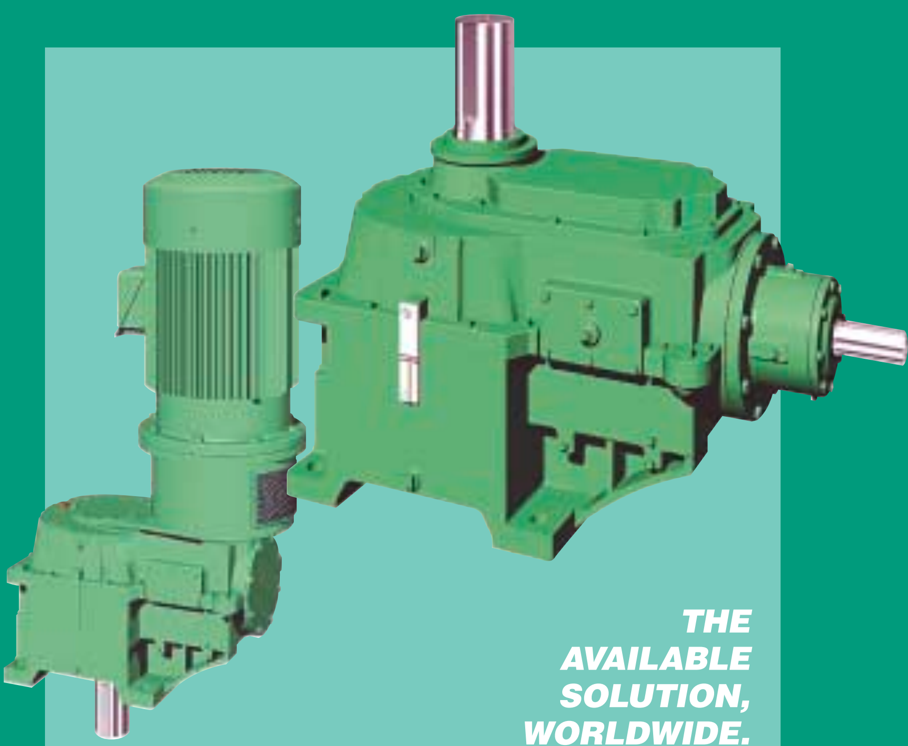
PARAMAX®
Cooling Tower Drives
Air Cooled Condenser Drives

New!

SFC SERIES



THE AVAILABLE SOLUTION, WORLDWIDE.

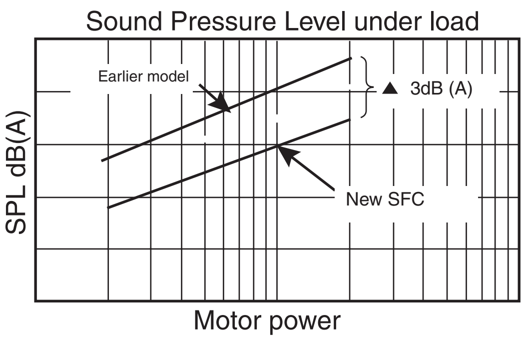
SUMITOMO
MACHINERY CORPORATION OF AMERICA

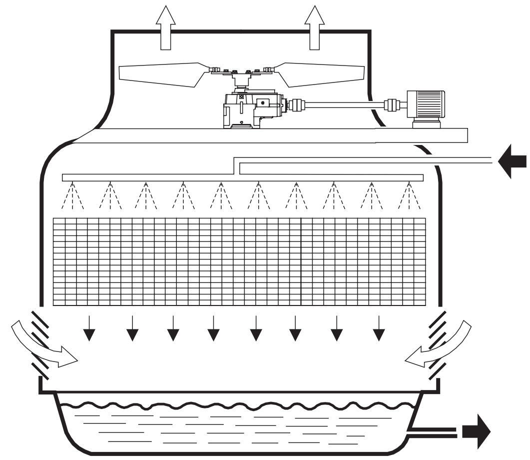
Catalog
07.51.50.001

SFC SERIES COOLING TOWER FAN DRIVES

Features

1. Extreme Low Noise Design
FEM design analysis of housing to minimize deflection under load and ensure best tooth mesh contact. This maximizes power capacity and reduces noise level by 3dB(A) compared with earlier designs.

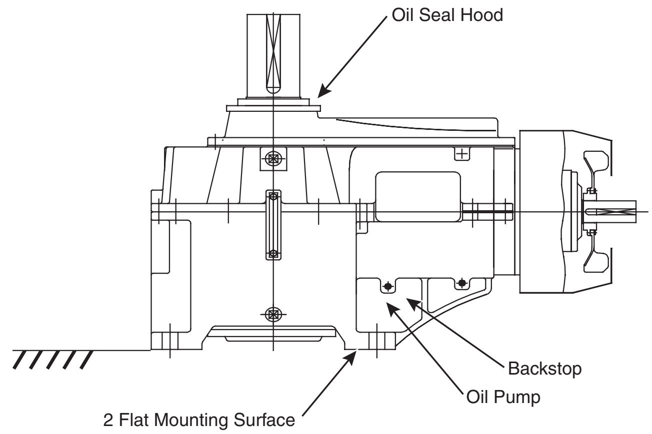




2. Designed Specifically for Cooling Towers

Standard
- Oil Seal Hood (output shaft)
- Oil Gauge
- Magnetic Drain Plug
- Oil Splash Lub.
- Epoxy Resin Paint Finish (DFT 70 micron m)

Options
- Cooling Fan
- Extended Output Shaft
- Backstop [1]
- Oil Pump [1]
- Oil Flow Switch
- Oil Level Switch
- Air Filter Breather [2]
- Immersion Heater
- High Build Epoxy Resin Paint Finish (DFT 180 micron m)



[1] Backstop and / or oil pump does not interfere with flat mounting surface.
[2] Breather must be located outside fan stack with extended piping.

3. Extended Oil Change Interval
Due to lower oil sump temperatures, intervals between oil changes can be extended. Even longer intervals are possible with the use of synthetic oils combined with regular oil sample analysis. (Recommend analysis every 3 months or 2500 hours operation.)

Quick Selection

Size	Output Torque[1] (in-lbs.)	Output Torque[1] (kNm)	Gear Ratio
SFC060	192,000	21.7	6.3 to 18
SFC065	243,000	27.5	
SFC070	314,000	35.5	
SFC075	389,000	44.0	

[1] Average torque

Cooling Tower Fan Drives: 1 kNm = 8850.7 in lbs.

- Four sizes to suit drives up to 225kW(300HP motor)
- Improved thermal rating
- Increased bearing span at output shaft
- Greater oil sump capacity

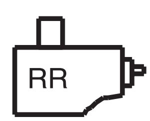
Gearbox Selection (Reference only) – use rating table page 4 for selection.

AGMA SF2.0

		Ratio	6.3	7.1	8	9	10	11.2	12.5	14	16	18
		Motor rpm	Fan rpm									
		1800 rpm	286	254	225	200	180	161	144	129	113	100
		1500 rpm	238	211	188	167	150	134	120	107	94	83
Motor	HP	kW										
	125	90										060
	150	110		available soon						060	065	065
	175	132						060	060	065	070	070
	200	160	060	060	060	060	060	060	065	065	075	075
	250	200	060	060	060	065	065	065	070	070	075	075
	300	225	060	060	060	065	065	070	075	075		

SFC Series Nomenclature - Cooling Towers

SFC | **065** | **R2** | **S** — **RR** | **F** — **14**

Series	Size	Approx. Torque kNm	Number of Gear Stages	Lubrication Method	Shaft Arrangement	Accessories	Nominal Ratio
SFC	060	21.7	R2 (Right Angle Double Reduction)	S Splash (standard) P shaft driven Pump		F with Fan cooling (standard)	6.3 7.1 8 9 10 11.2 12.5 14 16 18
	065	27.5				FB with Fan cooling and Backstop	
	070	35.5				N with No additional cooling	
	075	44.0				NB with Backstop	

VFD Operation

The use of variable speed drive controls may require the use of oil pump to ensure proper lubrication at reduced speeds. Check with factory.

SFC SERIES COOLING TOWER FAN DRIVES

Selection

HP

Right Angle Shaft   Double Reduction

Mechanical Power Rating (**HP** – AGMA SF1.0)

Nominal Reduction Ratio	Input Speed [rpm]	Output Speed [rpm]	Size			
			060	**065**	**070**	**075**
6.3	Exact Reduction Ratio		**6.188**	**6.426**	**6.188**	•
	1800	**286**	761	985	1070	
	1500	**238**	637	826	894	
	1200	**190**	511	664	717	
	1000	**159**	426	554	599	
7.1	Exact Reduction Ratio		**7.210**	**6.927**	**6.933**	
	1800	**254**	749	985	1070	
	1500	**211**	629	826	894	
	1200	**169**	505	664	717	
	1000	**141**	424	554	599	
8	Exact Reduction Ratio		**7.875**	**8.118**	**8.082**	
	1800	**225**	729	871	1086	
	1500	**188**	626	729	945	
	1200	**150**	501	587	761	
	1000	**125**	418	492	638	
9	Exact Reduction Ratio		**9.176**	**8.750**	**9.056**	**8.597**
	1800	**200**	594	800	944	1070
	1500	**167**	497	670	791	894
	1200	**133**	399	540	635	717
	1000	**111**	335	452	532	599
10	Exact Reduction Ratio		**9.995**	**10.028**	**10.125**	**10.007**
	1800	**180**	582	709	908	1086
	1500	**150**	485	594	760	956
	1200	**120**	387	479	611	773
	1000	**100**	323	399	512	646
11.2	Exact Reduction Ratio		**11.647**	**10.809**	**11.345**	**11.229**
	1800	**161**	471	649	757	1001
	1500	**134**	394	543	634	839
	1200	**107**	316	437	511	676
	1000	**89**	265	366	428	564
12.5	Exact Reduction Ratio		**12.469**	**12.756**	**12.797**	**12.536**
	1800	**144**	432	537	686	938
	1500	**120**	361	449	574	802
	1200	**96**	290	359	460	646
	1000	**80**	241	366	383	540
14	Exact Reduction Ratio		**14.529**	**13.750**	**14.338**	**14.067**
	1800	**129**	379	513	642	804
	1500	**107**	318	429	536	673
	1200	**86**	255	345	432	542
	1000	**71**	213	288	362	453
16	Exact Reduction Ratio		**15.392**	**16.235**	**15.750**	**15.844**
	1800	**113**	350	366	500	686
	1500	**94**	292	306	417	574
	1200	**75**	235	245	335	460
	1000	**63**	196	205	279	383
18	Exact Reduction Ratio		**17.936**	**17.500**	**17.647**	**17.779**
	1800	**100**	308	366	493	641
	1500	**83**	259	306	413	536
	1200	**67**	208	245	331	430
	1000	**56**	173	205	277	361

SF=2.0 or more is recommended for the motor ratings of P_M

$$SF = \frac{P}{P_M}$$

SF = Service Factor
P = Mechanical Power Rating
P_M = Motor Power

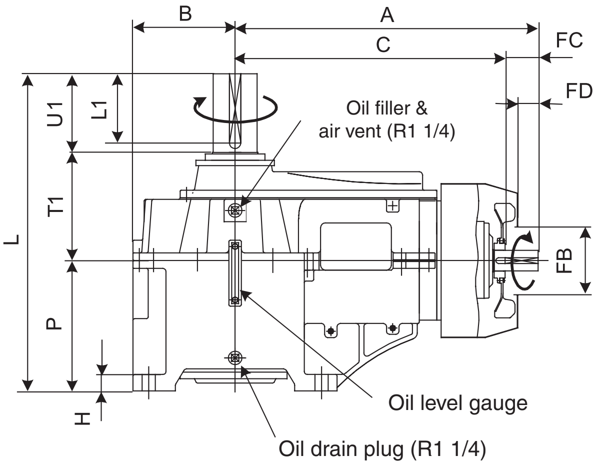
Thermal power rating has been considered in this table based on maximum ambient temperature of 40°C (104°F) degrees.

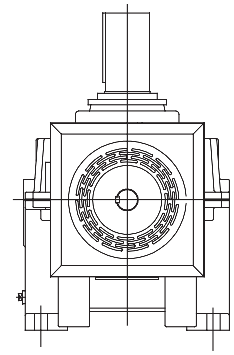
When ambient temperature is lower than -15°C (0°F) degrees or higher than 40°C (104°F) degrees, consult factory.

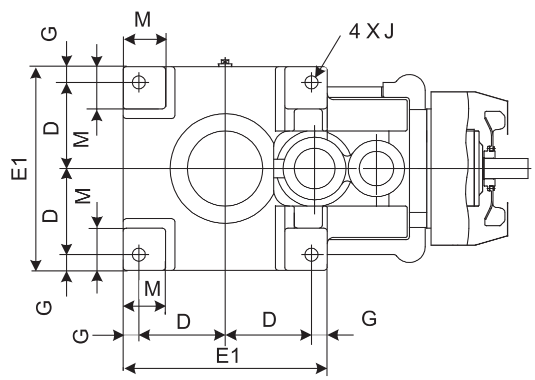
If starting ambient temperature is lower than 10°C (50°F) degrees, pump lubrication should be used instead of splash lubrication.

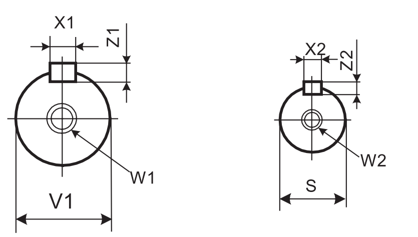
Dimensions

Inch









LOW SPEED SHAFT HIGH SPEED SHAFT

Inch

Size	A	B	C	D	E1	G	H	J	L	P	T1	M	Weight (lbs)	Oil Qty (US gal)
060R2	34.1	11.0	29.9	9.4	22.0	1.6	1.8	1.4	35.4	14.6	12.6	4.1	1452	9.25
065R2	37.2	11.8	33.1	10.2	23.6	1.6	1.8	1.4	38.0	15.6	12.6	4.1	1826	11.89
070R2	38.0	12.8	33.9	10.8	25.6	2.0	2.0	1.7	39.8	16.3	13.6	5.3	2112	15.85
075R2	40.1	13.6	35.9	11.6	27.2	2.0	2.0	1.7	41.1	17.7	13.6	5.3	2750	19.82

Inch

Size	LOW SPEED SHAFT						HIGH SPEED SHAFT					Fan	
	V1	U1	L1	X1	Z1	W1	S	FC	X2	Z2	W2	FB	FD
060R2	4.750	8.27	7.24	1.250	1.250	M24	2.375	4.13	0.625	0.625	M20	6.30	2.56
065R2	5.125	9.88	8.66	1.250	1.250	M24	2.500	4.13	0.625	0.625	M20	7.87	2.56
070R2	5.500	9.88	8.66	1.500	1.500	M30	2.500	4.13	0.625	0.625	M20	7.87	2.56
075R2	5.875	9.88	8.66	1.500	1.500	M30	2.500	4.13	0.625	0.625	M20	7.87	2.56

Notes

(1) Keys and keyways for both high-speed and low speed shafts conform to ANSI Standard.

(2) The oil quantity shown in this table is approximate. Use the oil level gauge to confirm oil level when unit is stopped.

(3) Air Vent or air breather must be located outside of fan stack with extended piping.

SFC SERIES COOLING TOWER FAN DRIVES

Selection

kW

Right Angle Shaft   Double Reduction

Mechanical Power Rating (**kW** – AGMA SF1.0)

Nominal Reduction Ratio	Input Speed [rpm]	Output Speed [rpm]	Size 060	065	070	075
6.3	Exact Reduction Ratio		**6.188**	**6.426**	**6.188**	
	1800	**286**	568	735	798	
	1500	**238**	475	616	667	
	1200	**190**	381	495	535	
	1000	**159**	318	413	447	
7.1	Exact Reduction Ratio		**7.210**	**6.927**	**6.933**	
	1800	**254**	559	735	798	
	1500	**211**	469	616	667	•
	1200	**169**	377	495	535	
	1000	**141**	316	413	447	
8	Exact Reduction Ratio		**7.875**	**8.118**	**8.082**	
	1800	**225**	544	650	810	
	1500	**188**	467	544	705	
	1200	**150**	374	438	568	
	1000	**125**	312	367	476	
9	Exact Reduction Ratio		**9.176**	**8.750**	**9.056**	**8.597**
	1800	**200**	443	597	704	798
	1500	**167**	371	500	590	667
	1200	**133**	298	403	474	535
	1000	**111**	250	337	397	447
10	Exact Reduction Ratio		**9.995**	**10.028**	**10.125**	**10.007**
	1800	**180**	434	529	677	810
	1500	**150**	362	443	567	713
	1200	**120**	289	357	456	577
	1000	**100**	241	298	382	482
11.2	Exact Reduction Ratio		**11.647**	**10.809**	**11.345**	**11.229**
	1800	**161**	351	484	565	747
	1500	**134**	294	405	473	626
	1200	**107**	236	326	381	504
	1000	**89**	198	273	319	421
12.5	Exact Reduction Ratio		**12.469**	**12.756**	**12.797**	**12.536**
	1800	**144**	322	401	512	700
	1500	**120**	269	335	428	598
	1200	**96**	216	268	343	482
	1000	**80**	180	273	286	403
14	Exact Reduction Ratio		**14.529**	**13.750**	**14.338**	**14.067**
	1800	**129**	283	383	479	600
	1500	**107**	237	320	400	502
	1200	**86**	190	257	322	404
	1000	**71**	159	215	270	338
16	Exact Reduction Ratio		**15.392**	**16.235**	**15.750**	**15.844**
	1800	**113**	261	273	373	512
	1500	**94**	218	228	311	428
	1200	**75**	175	183	250	343
	1000	**63**	146	153	208	286
18	Exact Reduction Ratio		**17.936**	**17.500**	**17.647**	**17.779**
	1800	**100**	230	273	368	478
	1500	**83**	193	228	308	400
	1200	**67**	155	183	247	321
	1000	**56**	129	153	207	269

SF=2.0 or more is recommended for the motor ratings of P_M

$$SF = \frac{P}{P_M}$$

SF = Service Factor
P = Mechanical Power Rating
P_M = Motor Power

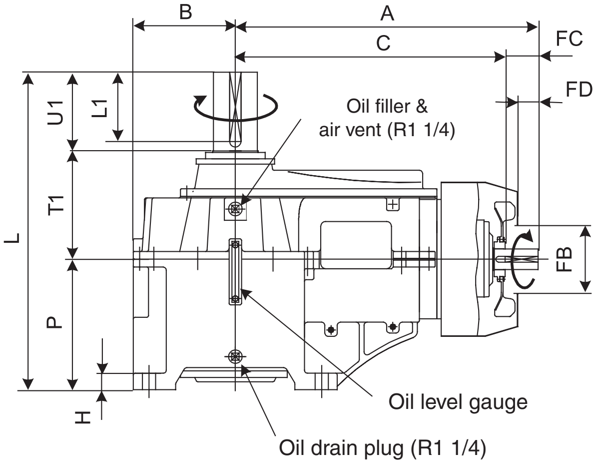
Thermal power rating has been considered in this table based on maximum ambient temperature of 40°C (104°F) degrees.

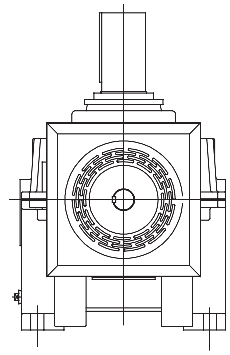
When ambient temperature is lower than -15°C (0°F) degrees or higher than 40°C (104°F) degrees, consult factory.

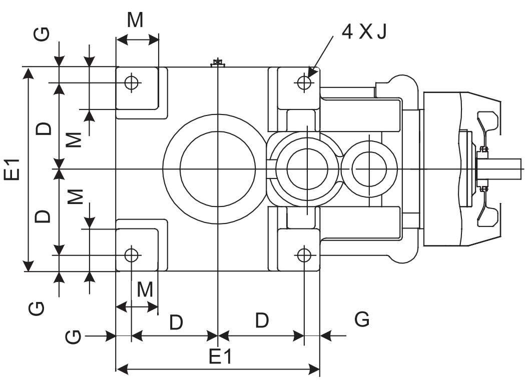
If starting ambient temperature is lower than 10°C (50°F) degrees, pump lubrication should be used instead of splash lubrication.

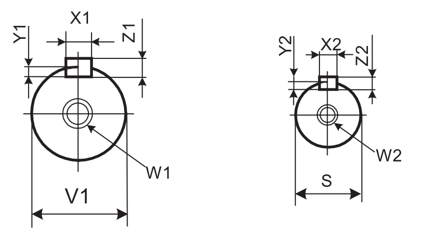
Dimensions

Metric









LOW SPEED SHAFT HIGH SPEED SHAFT

Millimeters

Size	A	B	C	D	E1	G	H	J	L	P	T1	M	Weight (Kg)	Oil Qty (Liters)
060R2	865	280	760	240	560	40	45	35	900	370	320	105	660	35
065R2	946	300	841	260	600	40	45	35	965	395	320	105	830	45
070R2	965	325	860	275	650	50	52	42	1010	415	345	135	960	60
075R2	1018	345	913	295	690	50	52	42	1045	450	345	135	1250	75

Millimeters

Size	LOW SPEED SHAFT							HIGH SPEED SHAFT						Fan	
	V1-m6	U1	L1	X1	Y1	Z1	W1	S-m6	FC	X2	Y2	Z2	W2	FB	FD
060R2	120	210	185	32	11	18	M24	60	105	18	7	11	M20	160	65
065R2	130	250	225	32	11	18	M24	65	105	18	7	11	M20	200	65
070R2	140	250	225	36	12	20	M30	65	105	18	7	11	M20	200	65
075R2	150	250	225	36	12	20	M30	65	105	18	7	11	M20	200	65

Notes

(1) Keys and keyways for both high-speed and low speed shafts conform to ISO/R773-1969 close key (JIS B 1301-1996 Parallel Key in Fastening Type).

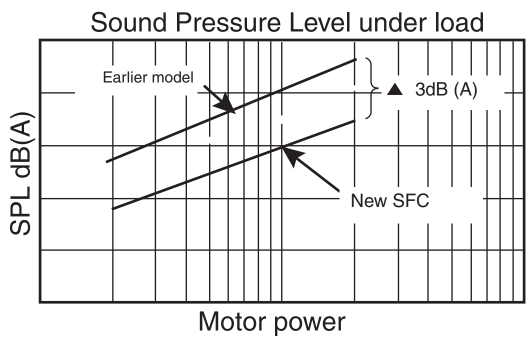
(2) The oil quantity shown in this table is approximate. Use the oil level gauge to confirm oil level when unit is stopped.

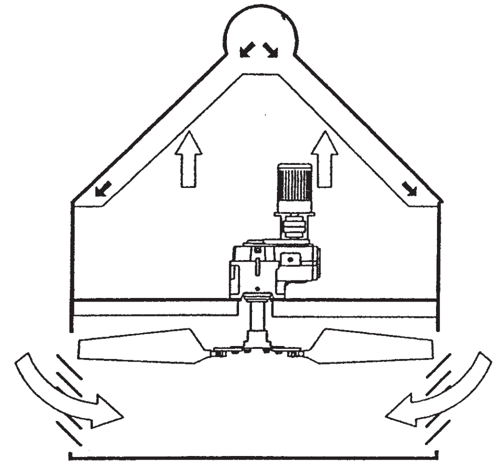
(3) Air Vent or air breather must be located outside of fan stack with extended piping.

SFC SERIES AIR COOLED CONDENSER DRIVES

Features

1. Extreme Low Noise Design
FEM design analysis of housing to minimize deflection under load and ensure best tooth mesh contact. This maximizes power capacity and reduces noise level by 3dB(A) compared with earlier designs.



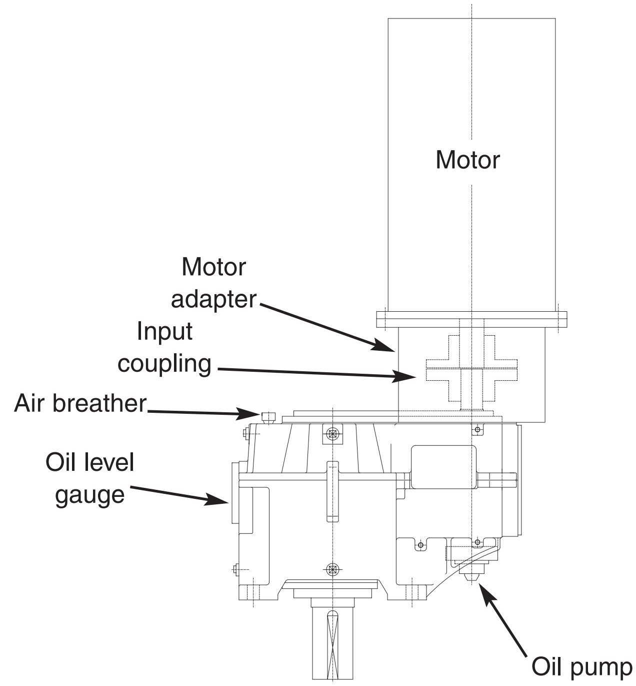


2. Designed Specifically for Air Cooled Condenser Drives

Standard
- Dual Low Speed Shaft Oil Seals
- Oil Gauge
- Magnetic Drain Plug
- Epoxy Resin Paint Finish (DFT 70 micron m)
- Oil Pump [1]
- Air Filter Breather

Options
- Cooling Fan
- Extended Output Shaft
- Backstop [1]
- Oil Flow Switch
- Oil Level Switch
- Immersion Heater
- High Build Epoxy Resin Paint Finish (DFT 180 micron m)
- Motor Adapter
- Input Coupling
- Dry Well
- Grease Purgeable Low Speed Shaft Seals

[1] Backstop and/or oil pump does not interfere with flat mounting surface.



3. Extended Oil Change Interval
Due to lower oil sump temperatures, intervals between oil changes can be extended. Even longer intervals are possible with the use of synthetic oils combined with regular oil sample analysis. (Recommend analysis every 3 months or 2500 hours operation.)

Quick Selection

Size	Output Torque[1] (in-lbs.)	Output Torque[1] (kNm)	Gear ratio
SFC060	197,000	22.3	10 to 22.4
SFC065	249,000	28.1	
SFC070	315,000	35.6	
SFC075	408,000	46.1	

[1] Average torque

- Four sizes to suit drives up to 200kW(250HP motor)
- Increased bearing span at output shaft
- Greater oil sump capacity

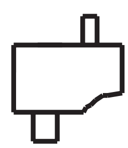
Gearbox Selection (Reference only) – use rating table page 10 for selection.

AGMA SF2.0

	Ratio		10	11.2	12.5	14	16	18	20	22.4
	Motor rpm		Fan rpm							
	1800 rpm		180	161	144	129	113	100		
	1500 rpm		150	134	120	107	94	83		
Motor	HP	kW								
	125	90	available soon					060	060	065
	150	110				060	060	065	065	065
	175	132		060	060	065	065	070	070	070
	200	160	060	065	065	065	070	075	075	075
	250	200	065	070	070	070	075	075		

SFC Series Nomenclature - Air Cooled Condenser Drives

SFC **065** **P2** — **RL** **NB** — **16**

Series	Size	Approx. Torque kNm	Number of Gear Stages	Shaft Arrangement	Accessories	Nominal Ratio
SFC	060	22.3	P (Parallel Double Reduction)		N with No additional cooling	10 11.2 12.5 14 16 18 20 22.4
	065	28.1			NB with Backstop	
	070	35.6			F with Fan cooling	
	075	46.1			FB with Fan cooling and Backstop	

SFC SERIES AIR COOLED CONDENSER DRIVES

Selection

HP

PARALLEL   DOUBLE REDUCTION

Mechanical Power Rating (**HP** – AGMA SF1.0)

Nominal Reduction Ratio	Input Speed [rpm]	Output Speed [rpm]	Size 060	065	070	075
10	Exact Reduction Ratio		**9.750**	**9.963**	**9.665**	**9.945**
	1800	**180**	606	717	924	1047
	1500	**150**	512	601	795	921
	1200	**120**	412	484	639	788
	1000	**100**	345	405	535	677
11.2	Exact Reduction Ratio		**11.361**	**10.739**	**10.829**	**11.160**
	1800	**161**	483	634	794	1007
	1500	**134**	403	531	664	843
	1200	**107**	324	428	535	680
	1000	**89**	271	358	448	568
12.5	Exact Reduction Ratio		**12.206**	**12.988**	**12.600**	**11.966**
	1800	**144**	491	555	733	924
	1500	**120**	412	464	614	814
	1200	**96**	330	373	493	676
	1000	**80**	276	312	413	566
14	Exact Reduction Ratio		**14.224**	**14.000**	**14.116**	**13.428**
	1800	**129**	387	491	613	842
	1500	**107**	324	410	513	705
	1200	**86**	260	330	413	567
	1000	**71**	217	276	345	475
16	Exact Reduction Ratio		**15.996**	**16.235**	**15.750**	**15.600**
	1800	**113**	377	446	590	757
	1500	**94**	315	373	493	649
	1200	**75**	253	300	397	521
	1000	**63**	212	251	332	436
18	Exact Reduction Ratio		**18.640**	**17.500**	**17.647**	**17.506**
	1800	**100**	298	394	493	650
	1500	**83**	248	330	413	544
	1200	**67**	200	265	331	437
	1000	**56**	166	221	277	366
20	Exact Reduction Ratio		**19.195**	**20.294**	**19.441**	**19.500**
	1800	**90**	255	358	480	623
	1500	**75**	212	300	399	521
	1200	**60**	169	241	319	420
	1000	**56**	141	201	265	350
22.4	Exact Reduction Ratio		**22.368**	**21.875**	**21.783**	**21.882**
	1800	**80**	248	316	401	523
	1500	**67**	206	265	334	437
	1200	**54**	165	213	267	351
	1000	**45**	137	178	223	294

SF=2.0 or more is recommended for the motor ratings of P_M

$$SF = \frac{P}{P_M}$$

SF = Service Factor
P = Mechanical Power Rating
P_M = Motor Power

THERMAL POWER RATING (HP @68°F)

Nominal Reduction Ratio	Input speed [r/m]	Number of Cooling Fans	Size 060	065	070	075
10 to 14	1800	-	182	212	244	295
		1	308	361	414	501
	1500	-	177	209	243	288
		1	302	355	412	491
	1200	-	172	205	237	286
		1	257	308	355	429
	1000	-	165	198	229	279
		1	248	298	345	418
16 to 22.4	1800	-	184	217	248	275
		1	311	369	422	466
	1500	-	181	214	247	272
		1	307	365	420	462
	1200	-	173	210	241	264
		1	260	316	362	395
	1000	-	168	202	232	255
		1	251	303	347	382

Table 1 Temperature correction factor

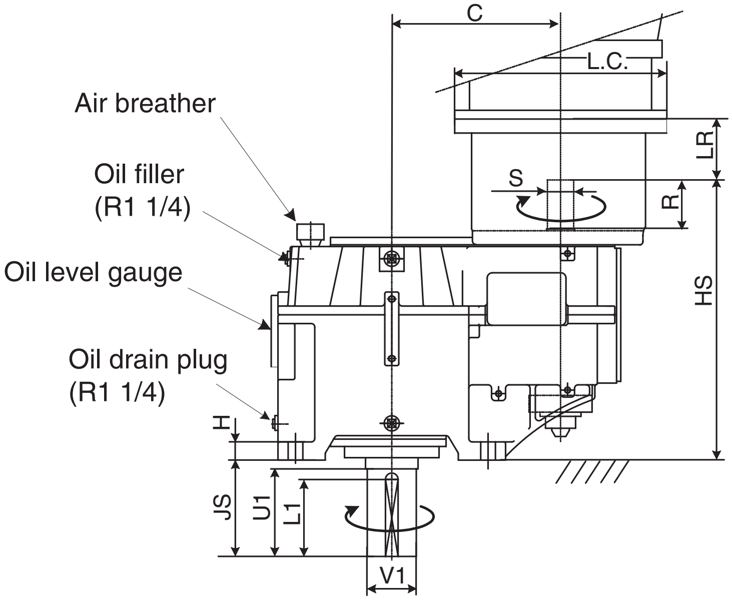
Ambient Temperature °F	Temperature Correction Factor Ta without fan	with fan
68	1.00	1.00
86	0.85	0.87
104	0.70	0.73
122	0.55	0.60

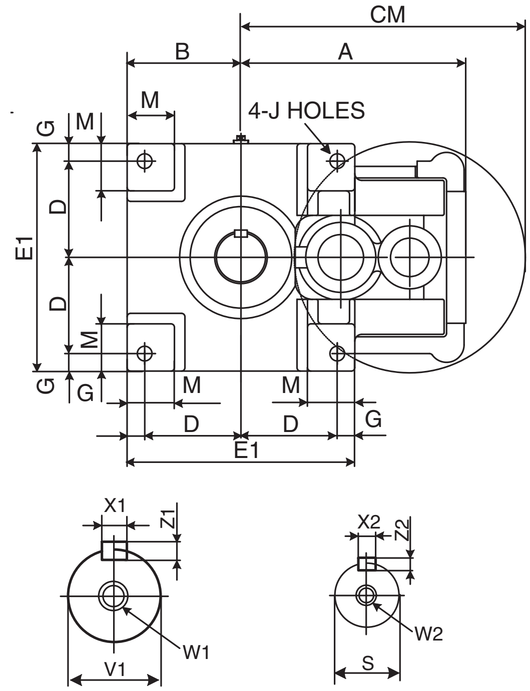
Thermal power rating should be checked by the following method. ex.) Specifications – Motor: 175HP, Input speed: 1200r/min, Size of Gearbox: SFC070, Reduction Ratio 16
Ambient temperature: 105°F

- **Temperature Correction factor without fan → Ta 0.7 (See Table 1)**
- **Temperature rating without fan → P_T 241 HP → P_T x Ta = 169 HP   Motor Power (175 HP) exceeds Thermal Capacity (169 HP)**
- **Temperature Correction factor with fan → Ta 0.73**
- **Thermal rating with fan → P_T 362 HP → → P_T x Ta = 264 HP   Motor Power (175 HP) is under Thermal Capacity (264 HP)**

Dimensions

Inch





LOW SPEED SHAFT HIGH SPEED SHAFT

Parallel Shaft (ACC)

Inch

Size	A	B	C	D	E1	G	H	J	M	HS	JS	Weight (lbs)	Oil Qty (US gal)
060	22.2	11.1	16.4	9.5	22.2	1.6	1.8	1.4	4.2	29.0	8.3	1430	11.4
065	23.1	11.9	18.4	10.3	23.8	1.6	1.8	1.4	4.2	31.0	9.9	1804	13.9
070	26.1	12.9	19.1	10.9	25.8	2.0	2.1	1.7	5.4	31.7	10.1	1980	17.7
075	28.2	13.7	21.2	11.7	27.4	2.0	2.1	1.7	5.4	33.1	10.1	2618	21.5

Size	LOW SPEED SHAFT (INCH)						HIGH SPEED SHAFT (MILLIMETERS)					
	V1	U1	L1	X1	Z1	W1	S	R	X2	Y2	Z2	W2/Depth
060R2	4.750	8.27	7.24	1.250	1.250	M24	65	140	18	7	11	M20/42
065R2	5.125	9.88	8.66	1.250	1.250	M24	75	140	20	7.5	12	M20/42
070R2	5.500	9.88	8.66	1.500	1.500	M30	75	140	20	7.5	12	M20/42
075R2	5.875	9.88	8.66	1.500	1.500	M30	75	140	20	7.5	12	M20/42

Inch

MOTOR		GEAR REDUCER							
		SFC060		SFC065		SFC070		SFC075	
Frame	LC	CM	LR	CM	LR	CM	LR	CM	LR
444 T	18.0	25.4	8.5	27.4	8.5	-	-	-	-
445 T	18.0	25.4	8.5	27.4	8.5	28.1	8.5	-	-
447 T	18.0	25.4	8.5	27.4	8.5	28.1	8.5	30.2	8.5
449 T	18.0	-	-	27.4	8.5	28.1	8.5	30.2	8.5

Notes

(1) Keys and keyways for low speed shafts conform to ANSI Standard. Keys and keyways for high-speed shafts conform to ISO/R773-1969 close key (JIS B 1301-1969 Parallel Key in Fastening Type).

(2) The oil quantity shown in this table is approximate. Use the oil level gauge to check the oil level.

(3) Standard input shaft metric dimensions. Input coupling can be supplied and mounted by Sumitomo.

SFC SERIES AIR COOLED CONDENSER DRIVES

Selection

kW

PARALLEL　　DOUBLE REDUCTION

Mechanical Power Rating (**kW** @AGMA SF1.0)

Nominal Reduction Ratio	Input Speed [r/m]	Output Speed [r/m]	Size 060	Size 065	Size 070	Size 075
10	Exact Reduction Ratio		**9.750**	**9.963**	**9.665**	**9.945**
	1800	**180**	452	535	689	781
	1500	**150**	382	448	593	687
	1200	**120**	307	361	477	588
	1000	**100**	257	302	399	505
11.2	Exact Reduction Ratio		**11.361**	**10.739**	**10.829**	**11.160**
	1800	**161**	360	473	592	751
	1500	**134**	301	396	495	629
	1200	**107**	242	319	399	507
	1000	**89**	202	267	334	424
12.5	Exact Reduction Ratio		**12.206**	**12.988**	**12.600**	**11.966**
	1800	**144**	366	414	547	689
	1500	**120**	307	346	458	607
	1200	**96**	246	278	368	504
	1000	**80**	206	233	308	422
14	Exact Reduction Ratio		**14.224**	**14.000**	**14.116**	**13.428**
	1800	**129**	289	366	457	628
	1500	**107**	242	306	383	526
	1200	**86**	194	246	308	423
	1000	**71**	162	206	257	354
16	Exact Reduction Ratio		**15.996**	**16.235**	**15.750**	**15.600**
	1800	**113**	281	333	440	565
	1500	**94**	235	278	368	484
	1200	**75**	189	224	296	389
	1000	**63**	158	187	248	325
18	Exact Reduction Ratio		**18.640**	**17.500**	**17.647**	**17.506**
	1800	**100**	222	294	368	485
	1500	**83**	185	246	308	406
	1200	**67**	149	198	247	326
	1000	**56**	124	165	207	273
20	Exact Reduction Ratio		**19.195**	**20.294**	**19.441**	**19.500**
	1800	**90**	190	267	358	465
	1500	**75**	158	224	298	389
	1200	**60**	126	180	238	313
	1000	**50**	105	150	198	261
22.4	Exact Reduction Ratio		**22.368**	**21.875**	**21.783**	**21.882**
	1800	**100**	185	236	299	390
	1500	**83**	154	198	249	326
	1200	**67**	123	159	199	262
	1000	**56**	102	133	166	219

SF=2.0 or more is recommended for the motor ratings of P_M

$$SF = \frac{P}{P_M}$$

SF = Service Factor
P = Mechanical Power Rating
P_M = Motor Power

THERMAL POWER RATING (kW @20°C)

Nominal Reduction Ratio	Input speed [r/m]	Number of Cooling Fans	Size 060	Size 065	Size 070	Size 075
10 to 14	1800	–	136	158	182	220
		1	230	269	309	374
	1500	–	132	156	181	215
		1	225	265	307	366
	1200	–	128	153	177	213
		1	192	230	265	320
	1000	–	123	148	171	208
		1	185	222	257	312
16 to 22.4	1800	–	137	162	185	205
		1	232	275	315	348
	1500	–	135	160	184	203
		1	299	272	313	345
	1200	–	129	157	180	197
		1	194	236	270	295
	1000	–	125	151	173	190
		1	187	226	259	285

Table 1 Temperature correction factor

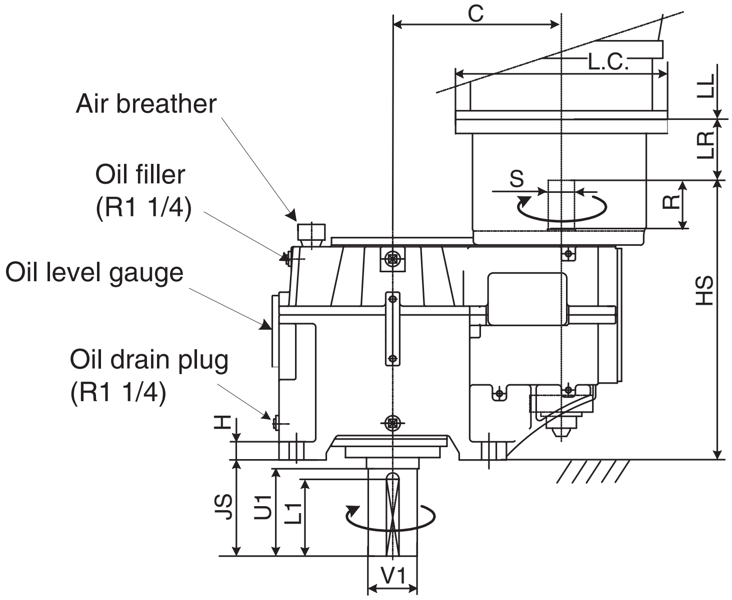
Ambient Temperature °C	Temperature Correction Factor Ta without fan	Temperature Correction Factor Ta with fan
20	1.00	1.00
30	0.85	0.87
40	0.70	0.73
50	0.55	0.60

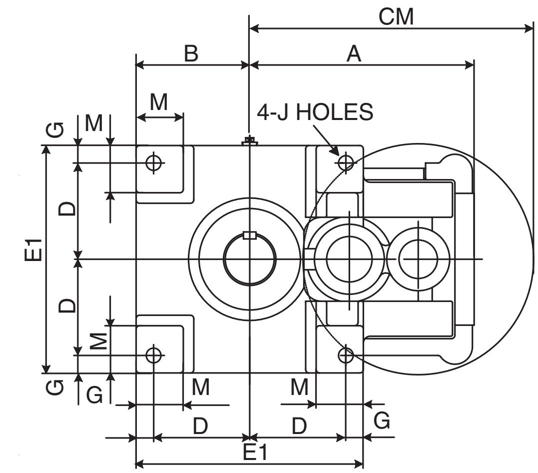
Thermal power rating should be checked by the following method. ex.) Specifications – Motor: 132kW, Input speed: 1200r/min, Size of Gearbox: SFC070, Reduction Ratio 16
Ambient temperature:40°C

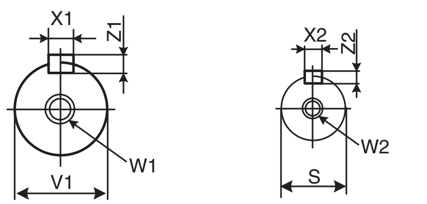
- **Temperature Correction factor without fan → Ta 0.7 (See Table 1)**
- **Temperature rating without fan → P_T 180kW　→ P_T x Ta = 126 kW < 132kW = P_M OUT**
- **Temperature Correction factor with fan → Ta 0.73**
- **Thermal rating with fan → P_T 270kW　→ P_T x Ta = 197kW > 132kW = P_M OK**

Dimensions

Metric







LOW SPEED SHAFT   HIGH SPEED SHAFT

Millimeters

Size	A	B	C	D	E1	G	H	J	M	HS	JS	Weight (Kg)	Oil Qty (Liters)
060	560	280	414	240	560	40	45	35	105	730	210	650	45
065	581	300	483	260	600	40	45	35	105	780	250	820	55
070	658	325	482	275	650	50	52	42	135	800	255	900	70
075	711	345	535	295	690	50	52	42	135	835	255	1190	85

Millimeters

Size	LOW SPEED SHAFT							HIGH SPEED SHAFT					
	V1	U1	L1	X1	Y1	Z1	W1/Depth	S	R	X2	Y2	Z2	W2/Depth
060	120	210	180	32	11	18	M24/50	65	140	18	7	11	M20/42
065	130	250	225	32	11	18	M24/50	75	140	20	7.5	12	M20/42
070	140	250	225	36	12	20	M30/60	75	140	20	7.5	12	M20/42
075	150	250	225	36	12	20	M30/60	75	140	20	7.5	12	M20/42

Millimeters

MOTOR			GEAR REDUCER							
			SFC060		SFC065		SFC070		SFC075	
Frame	LC	LL	CM	LR	CM	LR	CM	LR	CM	LR
225	550	920	689	145	–	–	–	–	–	–
250	550	980	689	145	738	145	757	145	–	–
280	660	1121	744	145	793	145	812	145	865	145
315	660	1393	–	–	793	175	812	175	865	175
355	800	1750	–	–	–	–	882	215	935	215

Notes

(1) Keys and keyways for both high-speed and low speed shafts conform to ISO/R773-1969 close key (JIS B 1301-1969 Parallel Key in Fastening Type).

(2) The oil quantity shown in this table is approximate. Use the oil level gauge to check the oil level.

(3) Standard input shaft metric dimensions. Input coupling can be supplied and mounted by Sumitomo.

Lubrication

Selection of lubricant

Refer to Table 2 to select appropriate viscosity.
Table 3 shows recommended lubricants.

Recommended Lubricant Grades - Table 2

Reducer Sizes	AGMA lubrication numbers ambient temperature C° (F°)	
	10 to 35 (50 to 95)	35 to 55 (95 to 131)
SFC060	6	6
SFC065	6	6
SFC070	6	6
SFC075	6	6

Note: Ambient temperature refers to temperature surrounding gearcase, i.e., cooling water return temperature. Oil grade selection assumes a cooling water return temperature of 95°F to 105°F.

Table 3 Typical Products

MANUFACTURER	AGMA GRADE 6EP	AGMA 6EP SYNTHETIC
AMOCO	Permagear EP LUB 320	Consult Manufacturer
MOBIL	Mobilgear 632	Mobilgear SHC 320
EXXON	Spartan EP320	Consult Manufacturer
CHEVRON	Gear Compound EP 320	Consult Manufacturer
SHELL	Omala 320	Consult Manufacturer
TEXACO	Meropa 320	Consult Manufacturer
SUNOCO	Sunep 320	Consult Manufacturer

Lubricants above are typical products ONLY and should not be construed as exclusive recommendations.

Caution

Cold Weather Starting

If the reducer is subject to non-continuous operation and is likely to be started when atmospheric ambient temperature is low (below 60°F), it is recommended to allow the return cooling water to flow through the tower for a period of 30 minutes prior to startup of the fan drive motor. This will reduce the viscosity of the Grade 6 oil.

Windmilling

Drives intended for intermittent operation may be subject to backdriving the reducer due to “windmilling” in one or both directions of rotation. Under certain circumstances this can cause damage to gears and/or bearings in the reducer. It is recommended that drives, which are operated intermittently, are prevented from windmilling by means of a brake. If this is considered impractical, contact Sumitomo Machinery Corporation of America for assistance with other means of protecting the reducer.

Anti-Condensation

Drives subject to frequent idle periods may be susceptible to the ingress of moisture through the breather as well as condensation inside the gearcase caused by temperature changes. To prevent damage to gears and bearings from water polluted oil, SMA can provide a special Hygroscopic Breather. Contact SMA for details.