

# Specifications / AFR Series

## Gearbox Performance

Model No.	Stage	Ratio <sup>A</sup>	AFR042	AFR060	AFR060A	AFR075	AFR075A	AFR100	AFR100A	AFR140	AFR140A	AFR180	AFR220	
Nominal Output Torque $T_{2N}$	1	3	9	36	-	90	-	195	-	342	-	588	1,140	
		4	12	48	-	120	-	260	-	520	-	1,040	1,680	
		5	15	60	-	150	-	325	-	650	-	1,200	2,000	
		6	18	55	-	150	-	310	-	600	-	1,100	1,900	
		7	19	50	-	140	-	300	-	550	-	1,100	1,800	
		8	17	45	-	120	-	260	-	500	-	1,000	1,600	
		9	14	40	-	100	-	230	-	450	-	900	1,500	
		10	14	60	-	150	-	325	-	650	-	1,200	2,000	
		12	-	55	-	150	-	310	-	600	-	1,100	1,900	
		14	-	42	-	140	-	300	-	550	-	1,100	1,800	
	16	-	45	-	120	-	260	-	500	-	1,000	1,600		
	20	-	40	-	100	-	230	-	450	-	900	1,500		
	2	12	12	-	-	-	-	-	-	-	-	-	-	-
		15	14	-	-	-	-	-	-	-	-	-	-	-
		16	15	-	-	-	-	-	-	-	-	-	-	-
		20	14	-	-	-	-	-	-	-	-	-	-	-
		25	15	60	60	150	150	325	325	650	650	1,200	2,000	
		28	19	50	50	140	140	300	300	550	550	1,100	1,800	
		30	20	55	55	150	150	310	310	600	600	1,100	1,900	
		32	17	45	45	120	120	260	260	500	500	1,000	1,600	
		35	19	50	50	140	140	300	300	550	550	1,100	1,800	
		40	17	45	45	120	120	260	260	500	500	1,000	1,600	
		45	14	40	40	100	100	230	230	450	450	900	1,500	
		48	-	-	55	150	150	310	310	600	600	1,100	1,900	
		50	14	60	60	100	100	230	230	650	650	1,200	2,000	
		60	20	55	55	150	150	310	310	600	600	1,100	1,900	
		64	-	-	45	120	120	260	260	500	500	1,000	1,600	
		70	19	50	50	140	140	300	300	550	550	1,100	1,800	
		80	17	45	45	120	120	260	260	500	500	1,000	1,600	
		90	14	40	40	100	100	230	230	450	450	900	1,500	
		100	14	40	60	150	150	325	325	650	650	1,200	2,000	
		120	-	-	55	150	150	310	310	600	600	1,100	1,900	
140	-	-	50	140	140	300	300	550	550	1,100	1,800			
160	-	-	45	120	120	260	260	500	500	1,000	1,600			
180	-	-	40	100	100	230	230	450	450	900	1,500			
200	-	-	40	100	100	230	230	450	450	900	1,500			
Emergency Stop Torque $T_{2NOT}$ <sup>B</sup>	Nm	1,2	3~200	3 times of Nominal Output Torque										
Nominal Input Speed $n_{1N}$	rpm	1,2	3~200	5,000	5,000	5,000	4,000	4,000	4,000	4,000	3,000	3,000	3,000	2,000
Max. Input Speed $n_{1B}$	rpm	1,2	3~200	10,000	10,000	10,000	8,000	8,000	8,000	8,000	6,000	6,000	6,000	4,000
Micro Backlash P0	arcmin	1	3~20	-	-	-	≤2	-	≤2	-	≤2	-	≤2	≤2
		2	12~200	-	-	-	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4
Reduced Backlash P1	arcmin	1	3~20	≤4	≤4	-	≤4	-	≤4	-	≤4	-	≤4	≤4
		2	12~200	≤7	≤7	≤7	≤7	≤7	≤7	≤7	≤7	≤7	≤7	≤7
Standard Backlash P2	arcmin	1	3~20	≤6	≤6	-	≤6	-	≤6	-	≤6	-	≤6	≤6
		2	12~200	≤9	≤9	≤9	≤9	≤9	≤9	≤9	≤9	≤9	≤9	≤9
Torsional Rigidity	Nm/arcmin	1,2	3~200	3	7	7	14	14	25	25	50	50	145	225
Max. Radial Load $F_{2RB}$ <sup>C</sup>	N	1,2	3~200	610	1,400	1,400	4,100	4,100	9,200	9,200	14,000	14,000	18,000	33,000
Max. Axial Load $F_{2aB}$ <sup>C</sup>	N	1,2	3~200	320	1,100	1,100	3,700	3,700	5,800	5,800	11,400	11,400	19,500	16,300
Service Life <sup>D</sup>	hr	1,2	3~200	30,000										
Efficiency $\eta$	%	1	3~20	≥95%										
		2	12~200	≥92%										
Weight	kg	1	3~20	0.9	2.1	-	6.4	-	13.9	-	23.7	-	50	83
		2	12~200	1.2	1.5	2.8	7.8	8	15.1	15.1	26.7	29.2	54	95
Operating Temp	°C	1,2	3~200	-10°C~+90°C										
Lubrication		1,2	3~200	Synthetic lubrication oils										
Degree of Gearbox Protection		1,2	3~200	IP65										
Mounting Position		1,2	3~200	all directions										
Noise ( $n_1=3000\text{rpm}, i=10, \text{No load}$ ) <sup>E</sup>	dB(A)	1,2	3~200	≤61	≤63	≤65	≤65	≤68	≤68	≤70	≤70	≤72	≤72	≤74

A. Ratio ( $i=N_{in}/N_{out}$ )B. Max. acceleration torque  $T_{2B} = 60\%$  of  $T_{2NOT}$ 

C. Applied to the output shaft center at 100 rpm

D. For continuous operation, the service life time is less than 15,000 hrs

E. These values are measured by gearbox with ratio = 10 (1-stage) or ratio = 100 (2-stage) at 3,000 rpm no loading.

By lower ratio and/or higher RPM, the noise level could be 3 to 5 dB higher

## Gearbox Inertia

Model No.		Stage	Ratio	AFR042	AFR060	AFR060A	AFR075	AFR075A	AFR100	AFR100A	AFR140	AFR140A	AFR180	AFR220	
Mass Moments of Inertia J <sub>1</sub>	kg · cm <sup>2</sup>	1	3~10	0.09	0.35	—	2.25	—	6.84	—	23.4	—	68.9	135.4	
			12~20	—	0.07	—	1.87	—	6.25	—	21.8	—	65.6	119.8	
		2	12~20	0.09	—	—	—	—	—	—	—	—	—	—	—
			25~90	0.09	0.09	0.35	0.35	2.25	2.25	6.84	6.84	23.4	23.4	68.9	—
			48, 64	—	—	0.07	0.31	1.87	1.87	6.25	6.25	21.8	21.8	65.6	—
			100~200	—	—	0.07	0.31	1.87	1.87	6.25	6.25	21.8	21.8	65.6	—
			—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—			