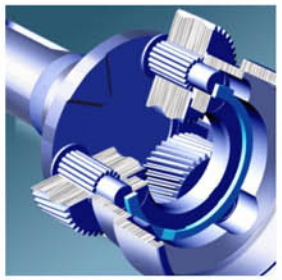
APEX DYNAMICS, INC.

AE Series

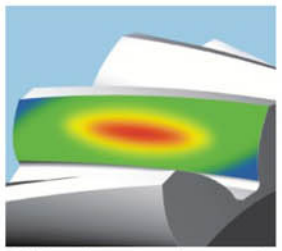
Planetary Gearboxes
High Precision
High Speed

Stainless

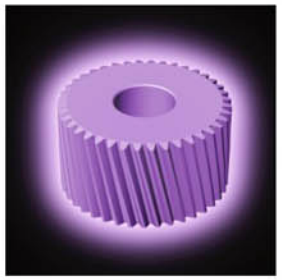
AE Series
Characteristic Highlights



Equipped with ***solid uncaged needle roller bearings,*** provides maximum contact points to increase stiffness and transmit high output torque.



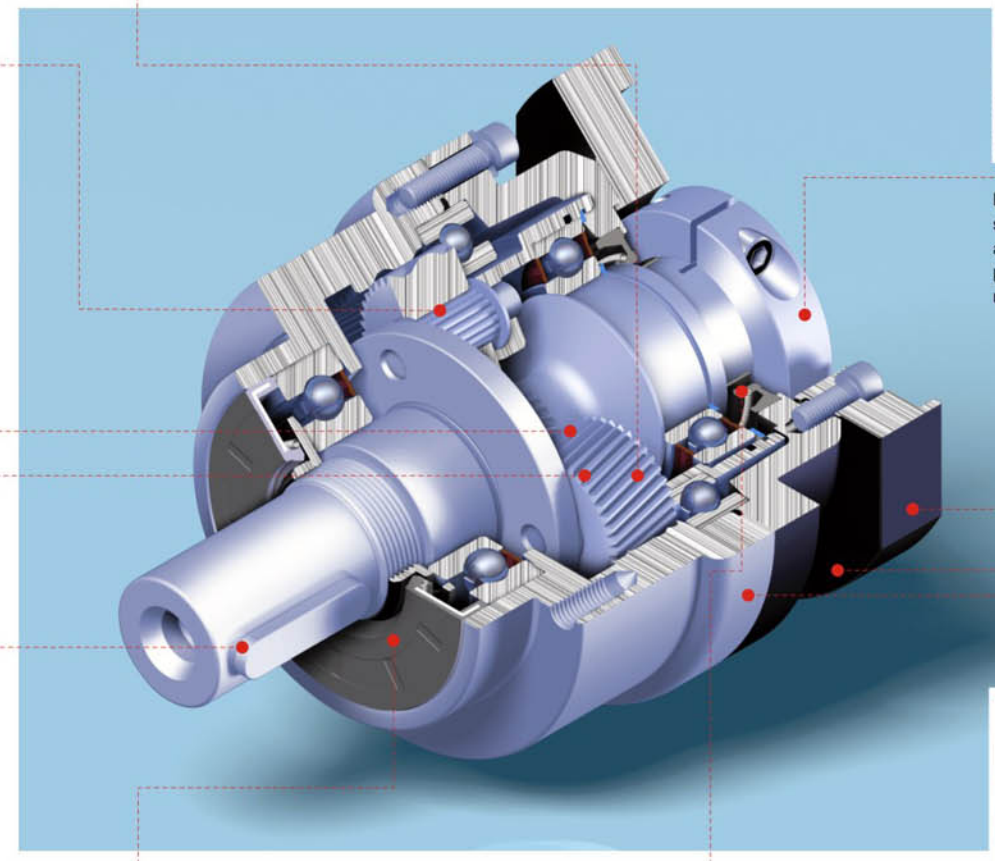
A high setting gear performance is achieved by using our ***HeliTopo technology.*** This ***eases off the tooth profile*** and ***crowns the lead of each tooth.*** This optimizes the gear mesh alignment and overlap to achieve maximum tooth surface contact.



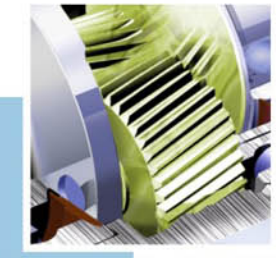
Our in-house plasma nitriding heat treatment process maintains the tooth surface hardness at ***840Hv*** for superior wear-resistance and a core hardness at ***30 HRc*** for toughness.

One piece planet carrier with extended bearing design provides maximum radial load capacity and increases system reliability and stiffness.

True Helical Gear Design
Precision helical gearing increases tooth to tooth contact ratio by over 33% vs spur gearing. The helix angle produces smooth and quiet operation with decreased backlash (less than 8 arc-minutes and ≦ 56dB).

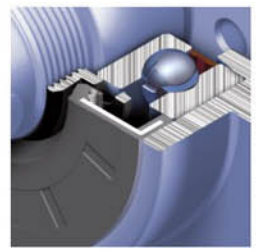


Patented planet carrier design puts the sun gear bearing directly into the planet carrier. It minimizes gear misalignment to gain higher accuracy.

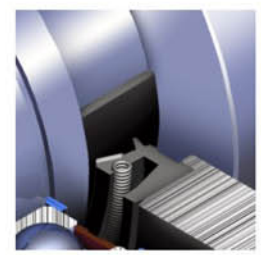


Lubricated with ***Nyogel 792D*** synthetic grease (smart grease) and sealed to ***IP65*** standards prevents leakage and is maintenance free.

Solid,Single piece sun gear construction obtains precise concentricity with increased strength and rigidity.



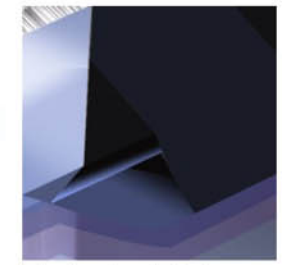
NEW - Patented output sealing systems design eliminates friction and heat generation which is accomplished by applying our hi-tech coating to all output contact surfaces. This coating reaches a hardness of ***3700 Hv*** and is ground to R_a 0.2 μm finish to ensure sealing.



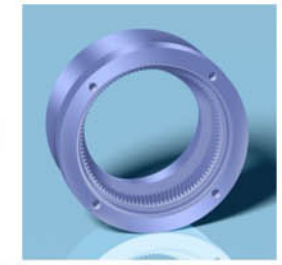
NEW - Patented input sealing system design eliminates break away torque and decreases friction/heat. The hi-tech coating bushing (***3700 Hv***, R_a 0.2 μm finish) interfaces with our proprietory seal which decreases wear and erosion of both sealing surfaces. This new patent prevents leakage and has a service life of over 20,000 hours.

Triple split collet with dynamic balanced set collar clamping system provides backlash free power transmission and eliminates slippage. 100% concentricity allows for smooth rotation and higher input speed capability.

The unique ***motor adapter*** and ***bushing module system design*** allows for quick and easy mounting of any motor.



Black anodized aluminum input adapter are provided for the most extreme environmental conditions.



Helical internal ring gear is machined directly into a single piece of steel. Maximized diameter and number of teeth to improve overall performance and torque capacity.

AE Series
Specifications

Gearbox Performance

Model No.		Stages	Ratio	AE050	AE070	AE090	AE120	AE155	AE205	AE235
Nominal output torque T_{2N}	Nm	1	3	20	55	130	208	342	588	1,140
			4	19	50	140	290	542	1,050	1,700
			5	22	60	160	330	650	1,200	2,000
			6	20	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	40	100	230	450	900	1,500
		2	15	20	55	130	208	342	588	1,140
			20	19	50	140	290	542	1,050	1,700
			25	22	60	160	330	650	1,200	2,000
			30	20	55	150	310	600	1,100	1,900
			35	19	50	140	300	550	1,100	1,800
			40	17	45	120	260	500	1,000	1,600
			45	14	40	100	230	450	900	1,500
			50	22	60	160	330	650	1,200	2,000
			60	20	55	150	310	600	1,100	1,900
			70	19	50	140	300	550	1,100	1,800
			80	17	45	120	260	500	1,000	1,600
			90	14	40	100	230	450	900	1,500
			100	14	40	100	230	450	900	1,500
Max. output torque T_{2B}	Nm	1,2	3~100	3 times of nominal output torque						
Nominal input speed n_{1N}	rpm	1,2	3~100	5,000	5,000	4,000	4,000	3,000	3,000	2,000
Max. input speed n_{1B}	rpm	1,2	3~100	10,000	10,000	8,000	8,000	6,000	6,000	4,000
Backlash	arcmin	1	3~10	≦8	≦8	≦8	≦8	≦8	≦8	≦8
		2	15~100	≦12	≦12	≦12	≦12	≦12	≦12	≦12
Torsional rigidity	Nm/arcmin	1,2	3~100	3	7	14	25	50	145	225
Max. radial load F_{2rB} [2]	N	1,2	3~100	702	1,377	2,985	6,100	8,460	13,050	8,700
Max. axial load F_{2aB} [2]	N	1,2	3~100	390	765	1,625	2,350	4,700	7,250	4,800
Service life	hr	1,2	3~100	20,000*						
Efficiency η	%	1	3~10	≧97%						
		2	15~100	≧94%						
Weight	kg	1	3~10	0.6	1.4	3.3	6.9	13	31	53
		2	15~100	0.9	1.6	4.7	8.7	17	35	66
Operating temp	°C	1,2	3~100	-10°C~+90°C						
Lubrication		1,2	3~100	synthetic gear grease (NYOGEL 792D)						
Degree of gearbox protection		1,2	3~100	IP65						
Mounting position		1,2	3~100	all directions						
Noise level (n_1=3000rpm)	dB	1,2	3~100	≦56	≦58	≦60	≦63	≦65	≦67	≦70

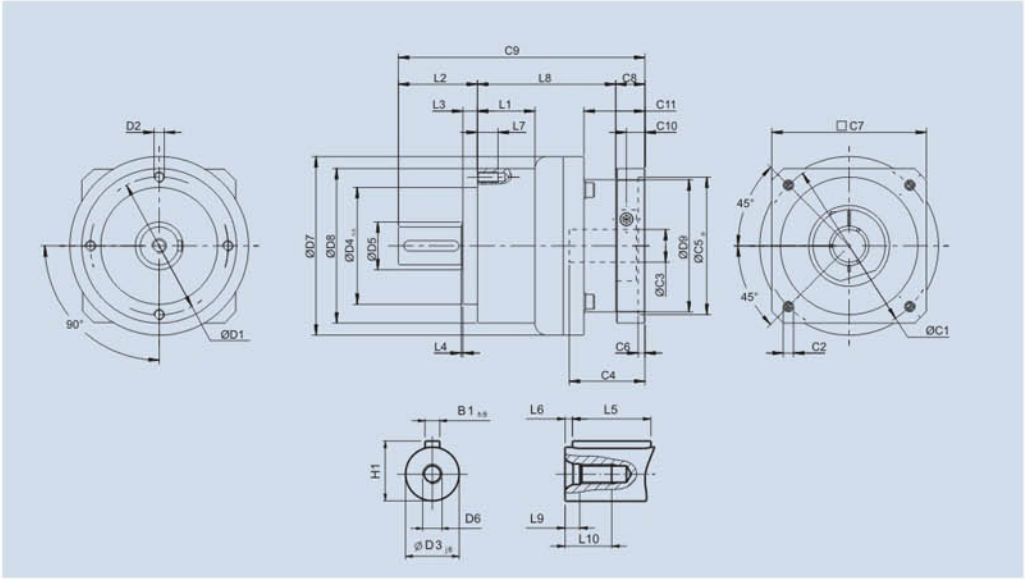
Gearbox Inertia

Model No.		Stages	Ratio	AE050	AE070	AE090	AE120	AE155	AE205	AE235
Mass moments of inertia J_1	kg · cm²	1	3	0.03	0.16	0.61	3.25	9.21	28.98	69.61
			4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			6	0.03	0.13	0.45	2.65	7.25	22.75	51.72
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			8	0.03	0.13	0.44	2.58	7.07	22.59	50.84
			9	0.03	0.13	0.44	2.57	7.04	22.53	50.63
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
		2	15	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			20	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			25	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			30	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			35	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			40	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			45	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			50	0.03	0.03	0.13	0.44	2.57	7.03	22.51
			60	0.03	0.03	0.13	0.44	2.57	7.03	22.51
			70	0.03	0.03	0.13	0.44	2.57	7.03	22.51
			80	0.03	0.03	0.13	0.44	2.57	7.03	22.51
			90	0.03	0.03	0.13	0.44	2.57	7.03	22.51
			100	0.03	0.03	0.13	0.44	2.57	7.03	22.51

1. Ratio ($i=N_m / N_{out}$)
*S1 service life 10,000 hrs

2. F_{2rB} 、 F_{2aB} applied to the output shaft center @ 100 rpm

Dimensions (1-stage, ratio i=3~10)

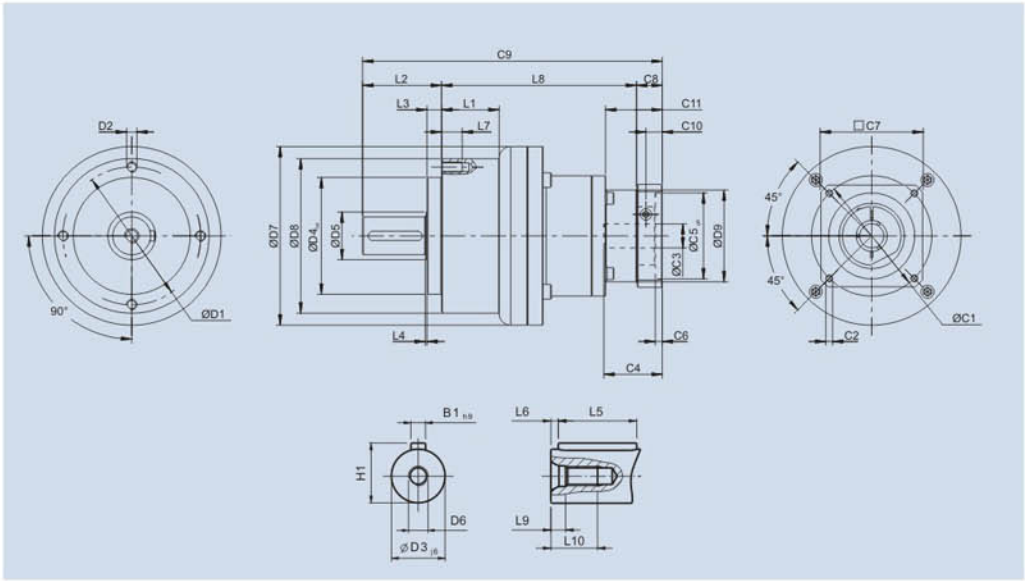


[unit: mm]

Dimension	AE050	AE070	AE090	AE120	AE155	AE205	AE235
D1	44	62	80	108	140	184	210
D2	M4 x 0.7P	M5 x 0.8P	M6 x 1P	M8 x 1.25P	M10 x 1.5P	M12 x 1.75P	M16 x 2P
D3 j6	12	16	22	32	40	55	75
D4 h6	35	52	68	90	120	160	180
D5	22	22	30	40	75	95	115
D6	M4 x 0.7P	M5 x 0.8P	M8 x 1.25P	M12 x 1.75P	M16 x 2P	M20 x 2.5P	M20 x 2.5P
D7	53	70	104	130	162	205	260
D8	50	70	90	120	155	205	235
D9	45.5	53.4	77	102	125	160	205
L1	34.5	--	33.5	38	50	--	70
L2	24.5	36	46	70	97	100	126
L3	4	6.5	8.5	17.5	15	15	18
L4	1	1	1	1.5	3	3	3
L5	14	25	32	40	63	70	90
L6	2	2	3	5	5	6	7
L7	8	10	12	16	20	22	28
L8	47	62	80.5	97	119.5	159	175.5
L9	3.2	4	6	9.5	12	15	15
L10	10	12.5	19	28	36	42	42
C1[3]	46	70	100	130	165	200	235
C2[3]	M4 x 0.7P	M4 x 0.7P	M6 x 1P	M8 x 1.25P	M10 x 1.5P	M12 x 1.75P	M12 x 1.75P
C3[3]	≦11	* ≦14 / ≦16	≦19 / ≦24	≦32	≦38	≦48	≦55
C4[3]	30	30	40	50	60	113	116
C5[3] G6	30	50	80	110	130	114.3	200
C6[3]	3.5	4	4	5	6	6	6
C7[3]	48	60	90	115	142	180	220
C8[3]	19.5	15	17	19.5	22.5	57	63
C9[3]	91	113	143.5	186.5	239	316	364.5
C10[3]	13.25	9.5	10.75	13	15.5	48.75	53.5
C11[3]	19.5	33	35.5	46	53.5	107.5	106.5
B1 h9	4	5	6	10	12	16	20
H1	14	18	24.5	35	43	59	79.5

3. C1~C10 are motor specific dimensions (metric std shown). Refer to apexdyna.com and design tool to view your specific motor mounting system.
* AE070 ratio 5,10 provides C3 ≦ 16 option.

Dimensions (2-stage, ratio i=15~100)

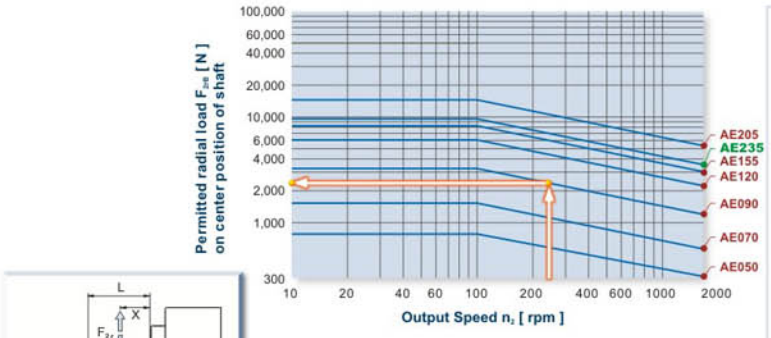


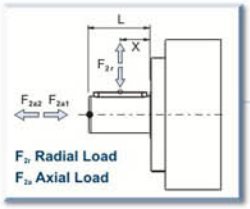
[unit: mm]

Dimension	AE050	AE070	AE090	AE120	AE155	AE205	AE235
D1	44	62	80	108	140	184	210
D2	M4 x 0.7P	M5 x 0.8P	M6 x 1P	M8 x 1.25P	M10 x 1.5P	M12 x 1.75P	M16 x 2P
D3 j6	12	16	22	32	40	55	75
D4 h6	35	52	68	90	120	160	180
D5	22	22	30	40	75	95	115
D6	M4 x 0.7P	M5 x 0.8P	M8 x 1.25P	M12 x 1.75P	M16 x 2P	M20 x 2.5P	M20 x 2.5P
D7	53	70	104	130	162	205	260
D8	50	70	90	120	155	205	235
D9	45.5	45.5	53.4	77	102	125	160
L1	61.5	--	33.5	38	50	--	70
L2	24.5	36	46	70	97	100	126
L3	4	6.5	8.5	17.5	15	15	18
L4	1	1	1	1.5	3	3	3
L5	14	25	32	40	63	70	90
L6	2	2	3	5	5	6	7
L7	8	10	12	16	20	22	28
L8	74	87.5	113.5	138.5	176	214.5	260
L9	3.2	4	6	9.5	12	15	15
L10	10	12.5	19	28	36	42	42
C1[4]	46	46	70	100	130	165	200
C2[4]	M4 x 0.7P	M4 x 0.7P	M4 x 0.7P	M6 x 1P	M8 x 1.25P	M10 x 1.5P	M12 x 1.75P
C3[4]	≦11	＊ ≦11 / ≦12	＊≦14 / ≦15.875 / ≦16	≦19 / ≦24	≦32	≦38	≦48
C4[4]	30	30	30	40	50	60	113
C5[4] G6	30	30	50	80	110	130	114.3
C6[4]	3.5	3.5	4	4	5	6	6
C7[4]	48	48	60	90	115	142	180
C8[4]	19.5	19.5	15	17	19.5	22.5	57
C9[4]	118	143	174.5	225.5	292.5	337	443
C10[4]	13.25	13.25	9.5	10.75	13	15.5	48.75
C11[4]	19.5	19.5	33	35.5	46	53.5	107.5
B1 h9	4	5	6	10	12	16	20
H1	14	18	24.5	35	43	59	79.5

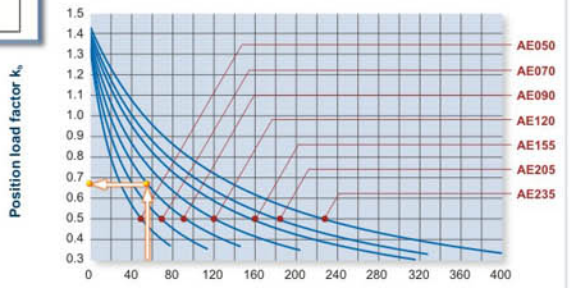
4. C1~C10 are motor specific dimensions (metric std shown). Refer to apexdyna.com and design tool to view your specific motor mounting system.
＊AE070 ratio 15~50 provides C3≦12 option. ＊AE090 ratio 15~50 provides C3≦15.875 / ≦16 option.

Permitted Radial and Axial Loads on Gearbox Output Shaft





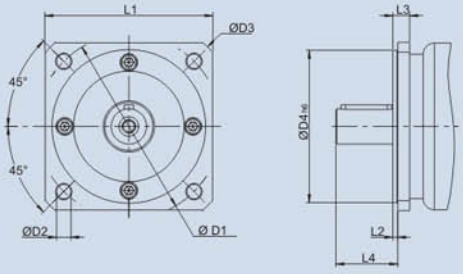
If radial force F_{2r} exert on the center of the output shaft X=1/2 x L.
Under various operating condition the lifetime is over 20,000 hours. *
The permitted radial load is given on left diagram.
The permitted axial load can be calculated by using the formula:
$F_{2a1B}=0.2 \times F_{2rB}$
$F_{2a2B}=0.1 \times F_{2rB}$



If radial force F_{2r} not exert on the center of the output shaft X<1/2 x L or X>1/2 x L
The permitted radial and axial load can be calculated by the position load factor K_b on the left diagram.
Radial load:
$F'_{2rB}=k_b \times F_{2rB}$
Axial load:
$F'_{2a1B}=0.2 \times F'_{2rB}$
$F'_{2a2B}=0.1 \times F'_{2rB}$

*Continuous running reduces service life by 50%

Front plate option



[unit: mm]

Dimension	D1	D2	D3	D4h6	L1	L2	L3	L4
AE050-NEMA 23	66.675	6	77	38.15	57.2	2	8	18.5
AE050-PX60	70	5.6	80.5	50	60	2.5	8.5	18.5
AE070-Metric	90	6.6	106	50	80	3	11	28
AE070-NEMA 34	98.425	5.6	115	73.08	86	2.5	8	30.5
AE070-DT90/PX90	100	6.6	120	80	90	3	8	31
AE090-IEC 63D5 B5	115	9	140	95	105	3	10.5	38.5
AE090-NEMA 42	125.73	7	144	55.58	107	4	14.5	35.5
AE120-NEMA 56	149.225	6.6	170	114.3	127	3	17.5	55.5
AE155-B5	175	11	196	130	160	5	20	82
AE205-B5	230	13	277	180	210	5	23	82
AE235-B5	275	17	317	235	240	5	23	108

Ordering Code

Ordering Example: AE090-010 / SIEMENS 1FT6 041-4AF71

AE090 – **010** – **MOTOR**

Gearbox Size:
AE050, AE070, AE090
AE120, AE155, AE205, AE235

Motor Designation:
Manufacturer, type
and model

Ratio:
1 Stage: 3, 4, 5, 6, 7, 8, 9, 10
2 Stages: 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100

AE-SERIES

www.apexdyna.com

APEX DYNAMICS, INC.
No. 6, 20th Rd., Taichung Industrial Park, Taichung, Taiwan, R.O.C.
Tel: 886 4 23550219 / Fax: 886 4 23550218
E-mail: sales@apexdyna.com
Website: www.apexdyna.com

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