

Product Specification Document

Product Name : **Dual/Single Axis Brushless Motor**
(with Built-in Driver)

Model : **Dual Axis FCU102/103-12311**

Single Axis FCU102/103-60311

Customer Name :



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Product Specifications

- Application :

This product integrates a driver and a DC brushless motor, suitable for DC motor applications.

- Input Specifications :

(1) Dual Axis

Model : FCU102/103-12311

Power : 120W / 220V

(2) Single Axis

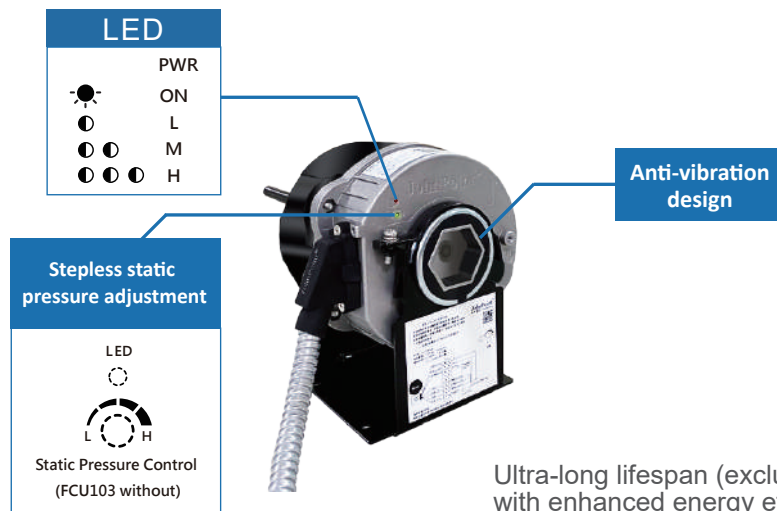
Model : FCU102/103-60311

Power : 60W / 220V

- Motor Shaft Height : 105mm
- Sensorless Motor Design : Equipped with overcurrent protection and Class B insulation.
- Motor Drive Technology : Sine wave control with a drive frequency of 20kHz.

Item	Minimum	Nominal	Maximum	Unit
Input Voltage	110	220	277	VAC
Input Frequency	50/60			Hz
Input Current	Dual Axis <2 Single Axis <1			A
Input Power	Dual Axis <160 Single Axis <90			W
Speed Range	350~1050			r.p.m
Operating Temperature	-20~50			°C
Dielectric Strength	DC500V/100MΩ↑			MΩ

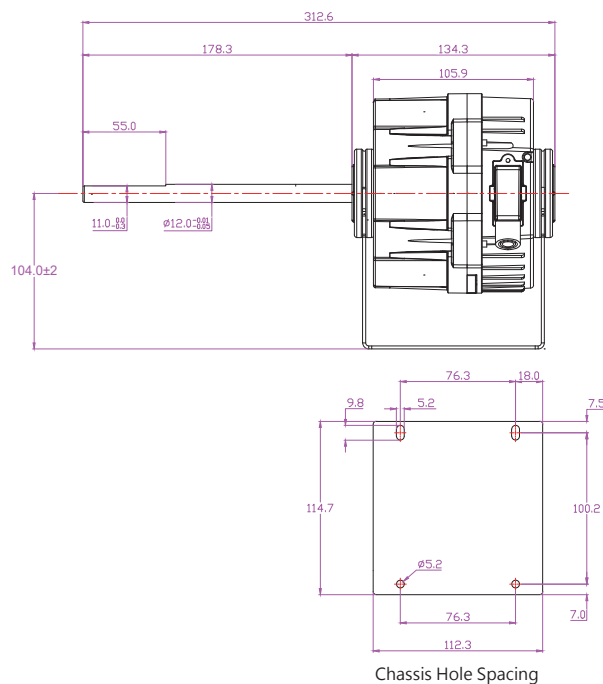
Model : FCU102/103-60311



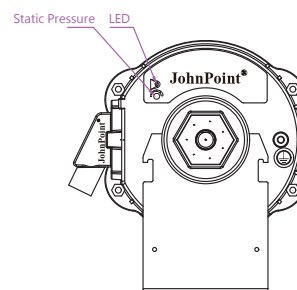
Ultra-long lifespan (excluding bearing life) with enhanced energy efficiency.

- Motor Height 105mm

FCU102/103-60311

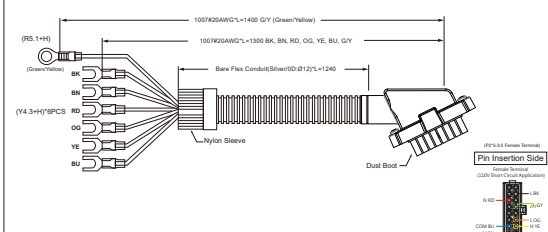


Note : To reduce fan vibration noise, use "6x6mm headless hex socket screws" for impeller fixation.



Wiring Diagram

Housing: H41400M-16P-A(Dust Boot*1PCS)
Nylon Sleeve*7PCS
Sleeve*1PCS
Bare Metal Flexible Conduit (Silver/OD: Ø12)x1240mm*1PCS
(Bare Metal Flexible Conduit Pressure Rating Must Exceed 15Kg)



Control Method

- Control Method

Stepped Speed Selection : Three-speed switching control available.

Signal Input Pins :

(1) H_SPEED to COM

(2) M_SPEED to COM

(3) L_SPEED to COM

- Input Signal Format : AC 110V or 220V

- Input Signal Frequency Range : 50/60 Hz

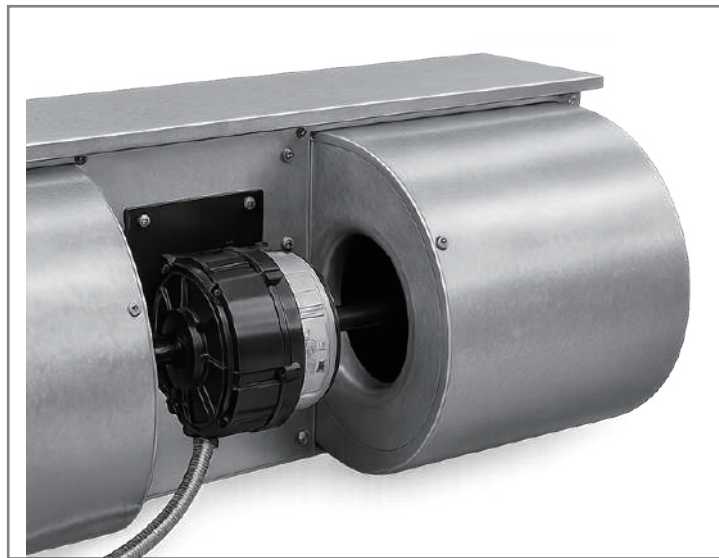
Three-Speed RPM Table			
Static Pressure Mode for Speed Selection	H	M	L
RPM	1050 (800~1150)	800 (600~950)	420 (300~700)

- Speed Adjustment Method for Each Range :

Using the programming panel developed by Rishou Energy Saving Technology, speed parameters within the driver can be adjusted when the motor is in non-operational mode.

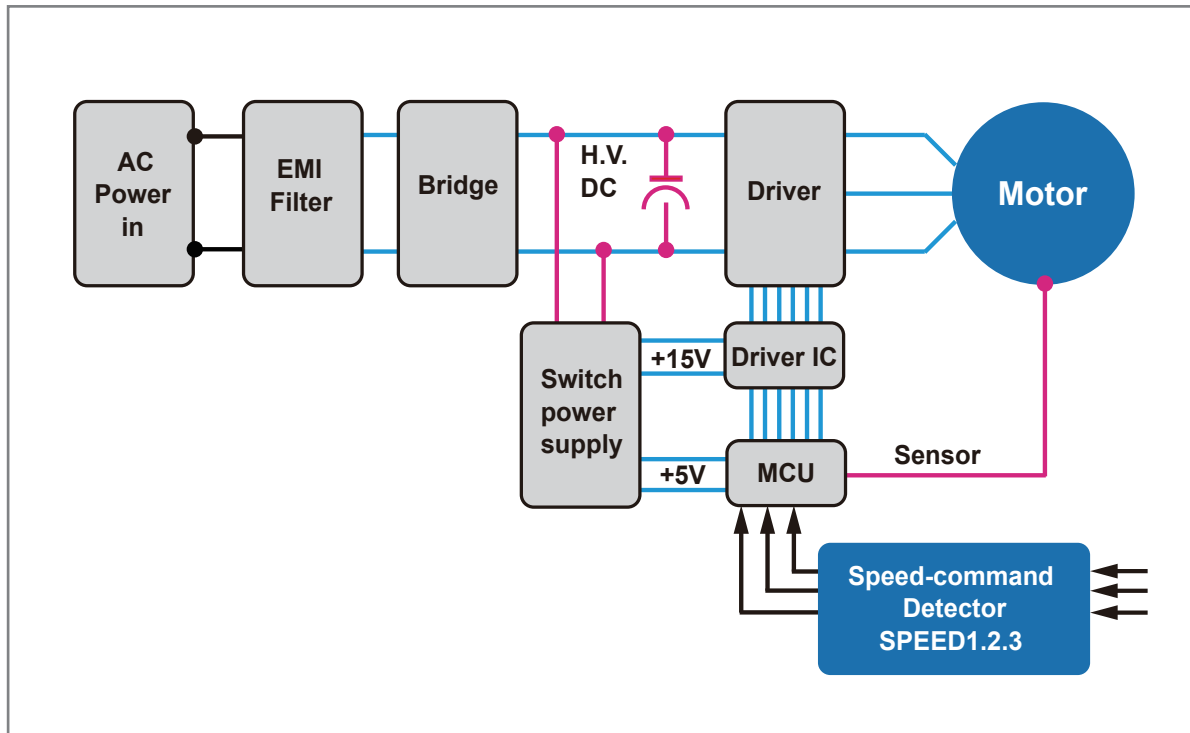
Protection Features

- Motor Current Limit Protection : The driver incorporates motor current limiting functionality. When the motor experiences overload or stall conditions with a peak current reaching $2.4A \pm 15\%$, the internal protection mechanism will activate.

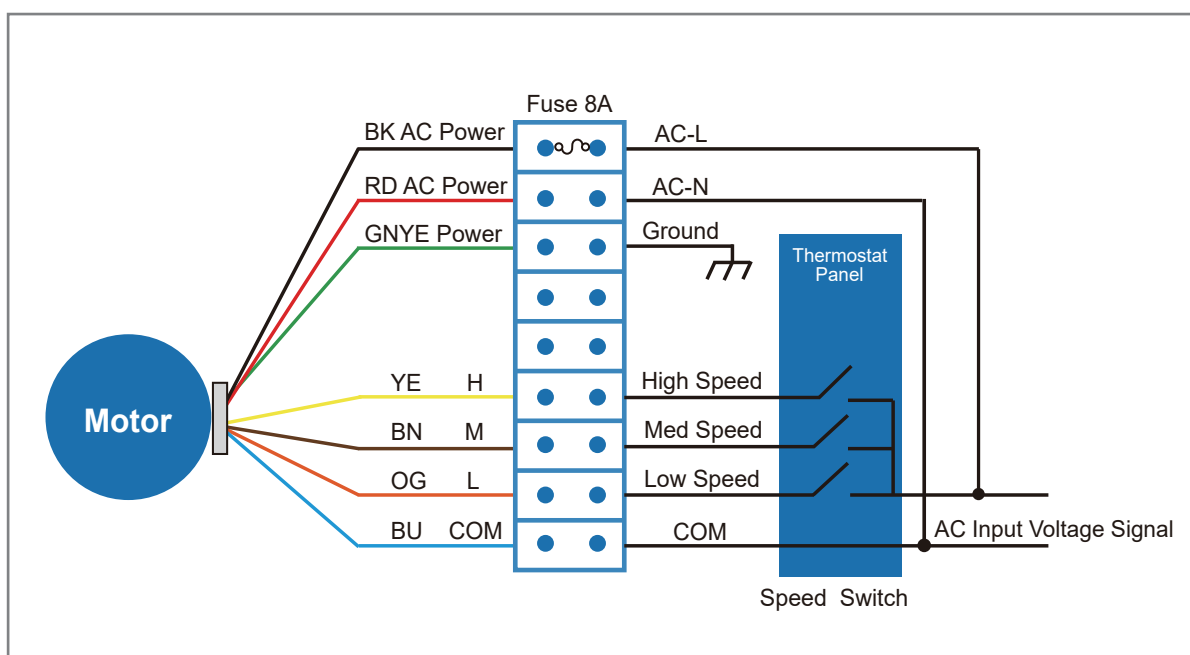


- FCU Fan Impeller Diameter Relative to Motor Shaft Height (H) :
 - φ160mm=H105mm (Standard Taiwan Specification)
 - φ150mm=H100mm
 - φ140mm=H95mm
 - φ130mm=H90mm

System Block Diagram

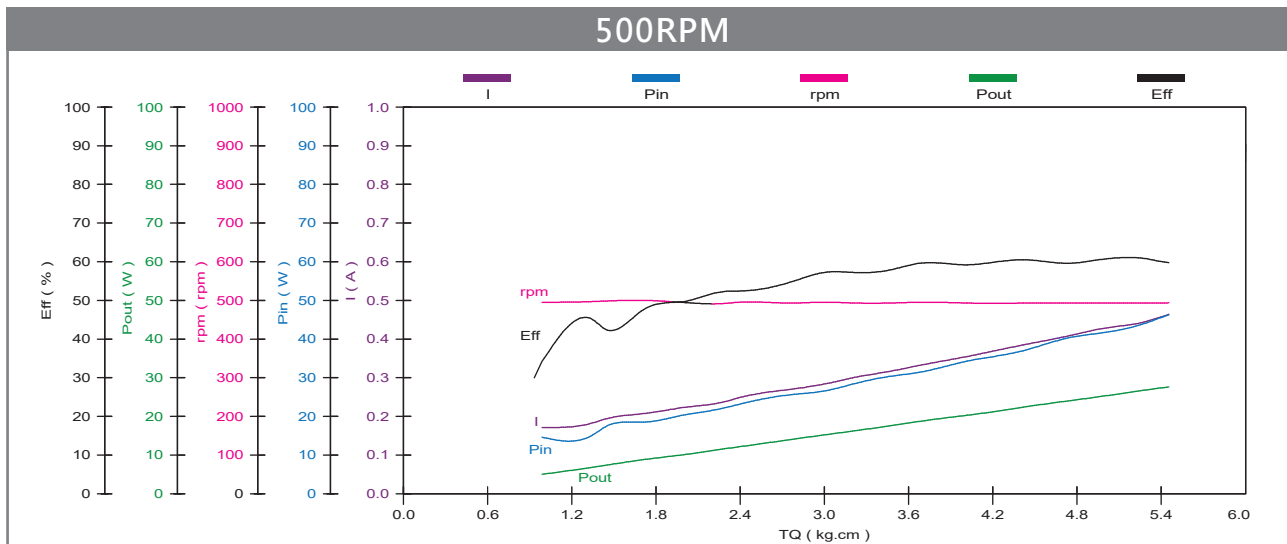


Product Wiring Diagram



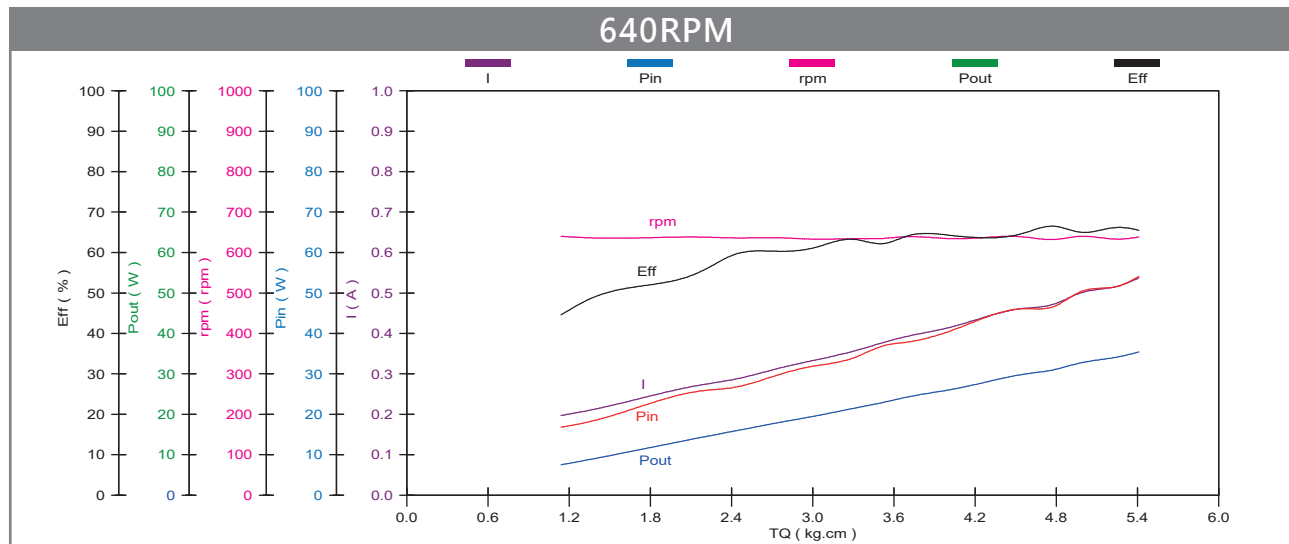
Electrical Characteristics - Motor Efficiency Diagram

Dual-Axis Motor Drive Unit 500RPM



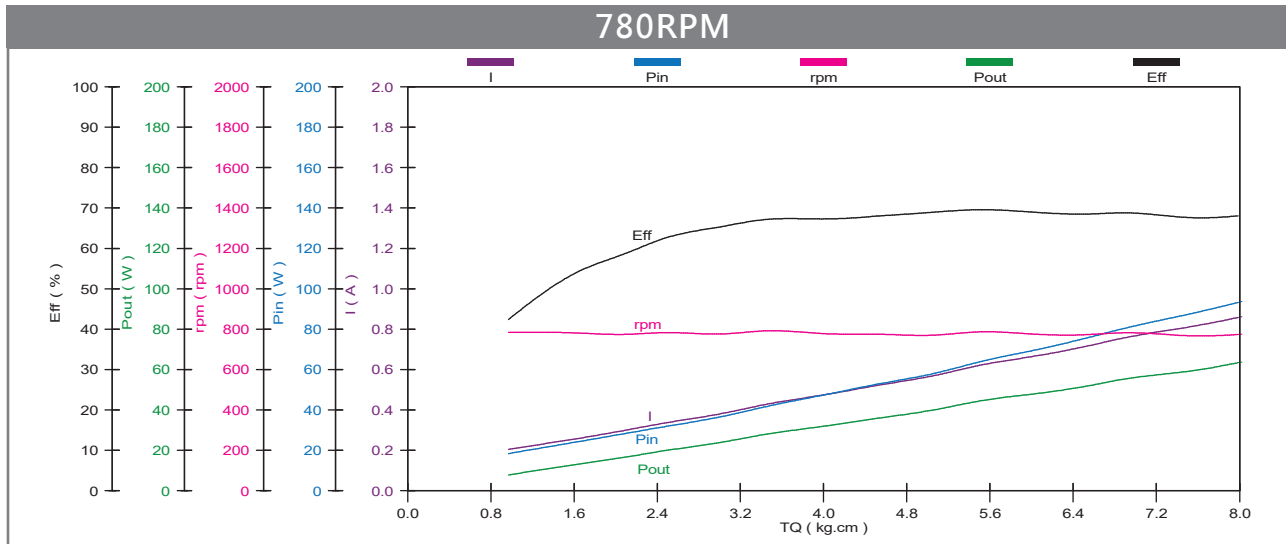
Item	Voltage	Current	Input	Torque	R.P.M	Output	Eff_T
Set Value	V(V)	I(A)	Pi(W)	kg/cm	rpm	po(W)	η(%)
67	220.0	0.171	14.7	0.99	495.0	5.0	34.0
68	220.0	0.184	15.3	1.36	497.0	6.9	45.0
69	220.0	0.192	17.2	1.43	498.0	7.3	42.4
70	220.0	0.207	18.6	1.71	500.0	8.8	47.3
71	220.0	0.224	20.7	2.02	494.0	10.2	49.2
72	220.0	0.238	22.3	2.29	492.0	11.6	52.0
73	220.0	0.248	23.2	2.39	495.0	12.1	52.1
74	220.0	0.269	25.7	2.74	493.0	13.9	54.0
75	220.0	0.285	26.8	3.02	495.0	15.3	57.0
76	220.0	0.301	28.6	3.22	493.0	16.3	56.9
77	220.0	0.316	30.4	3.46	493.0	17.5	57.5
78	220.0	0.332	31.5	3.68	495.0	18.7	59.3
79	220.0	0.355	34.4	4.02	493.0	20.3	59.0
80	220.0	0.373	35.7	4.26	492.0	21.5	60.2
81	220.0	0.385	37.1	4.42	493.0	22.4	60.3
82	220.0	0.408	40.4	4.74	493.0	24.0	59.4
83	220.0	0.427	41.7	4.98	493.0	25.2	60.4
84	219.7	0.445	44.2	5.29	493.0	26.8	60.6
85	219.7	0.468	46.8	5.50	494.0	27.9	59.6
86	220.0	0.483	48.1	5.78	497.0	29.5	61.3
87	219.7	0.500	50.2	5.95	493.0	30.1	59.9

Dual-Axis Motor Drive Unit 640RPM



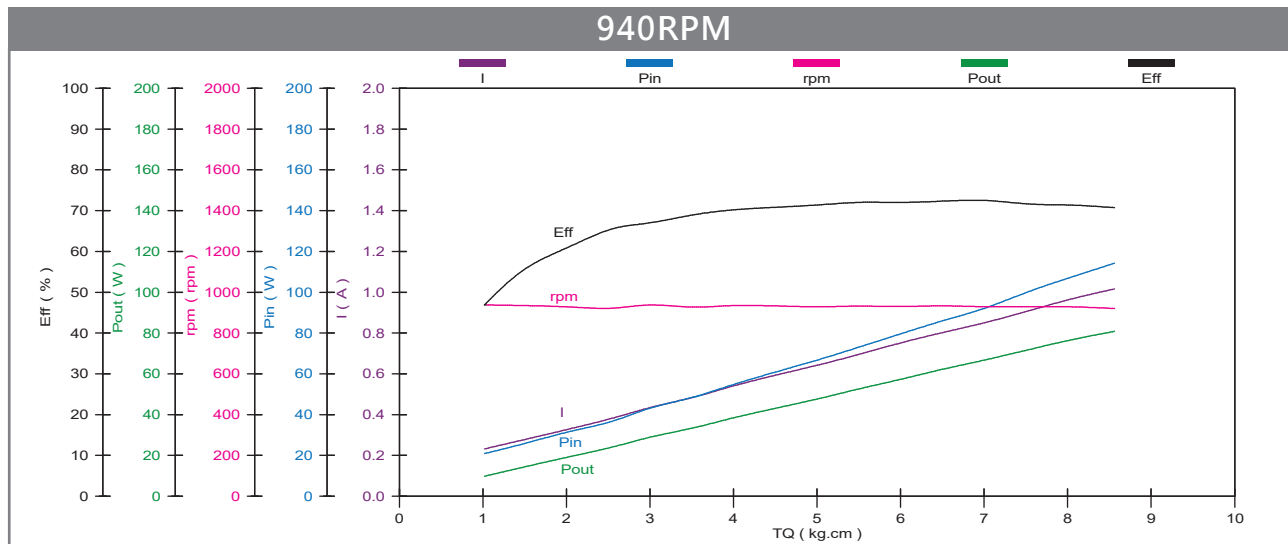
Item	Voltage	Current	Input	Torque	R.P.M	Output	Eff_T
Set Value	V(V)	I(A)	Pi(W)	kg/cm	rpm	po(W)	η(%)
51	220.0	0.197	16.7	1.14	640.0	7.5	44.9
52	220.0	0.212	18.5	1.38	636.0	9.0	48.6
53	220.0	0.273	25.9	2.18	638.0	14.3	55.2
54	220.0	0.287	26.8	2.43	636.0	15.9	59.3
55	220.0	0.317	30.1	2.79	636.0	18.2	60.4
56	220.0	0.332	31.9	2.99	633.0	19.4	60.8
57	220.0	0.355	33.9	3.29	634.0	21.4	63.1
58	220.0	0.378	37.2	3.53	635.0	23.0	61.8
59	220.0	0.392	37.7	3.69	639.0	24.2	64.1
60	220.0	0.418	41.1	4.05	634.0	26.3	63.9
61	220.0	0.435	43.3	4.22	636.0	27.5	63.5
62	219.7	0.461	46.0	4.54	639.0	29.8	64.7
63	220.0	0.472	46.7	4.78	632.0	31.0	66.3
64	220.0	0.500	50.4	4.98	640.0	32.7	64.8
65	219.7	0.517	51.6	5.26	633.0	34.2	66.2
66	219.7	0.539	54.4	5.42	639.0	35.5	65.2

Dual-Axis Motor Drive Unit 780RPM



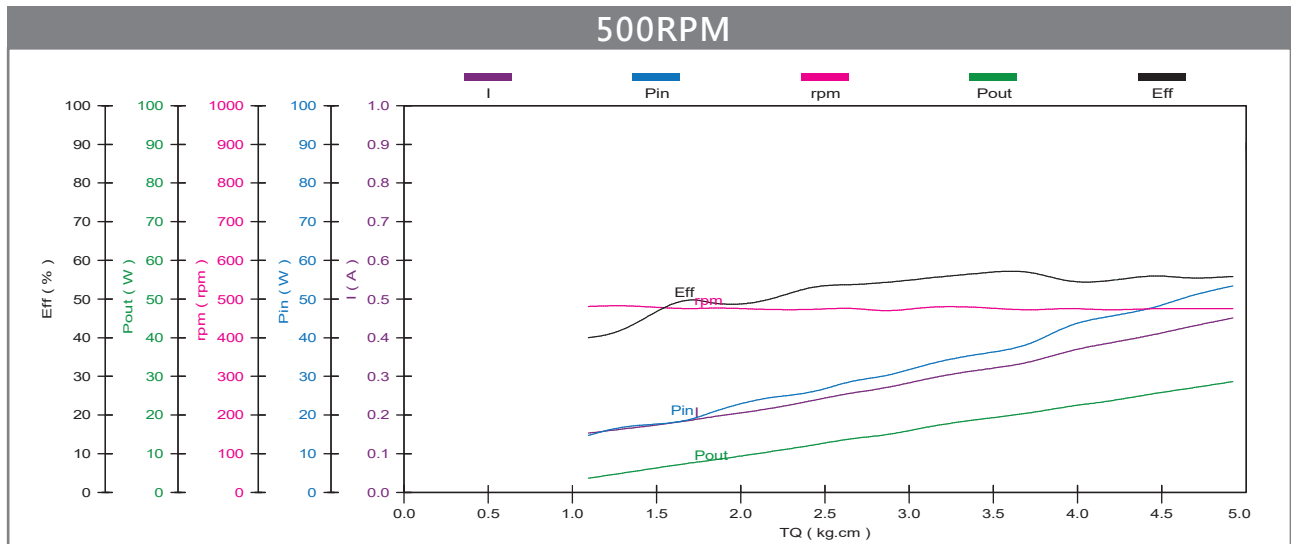
Item	Voltage	Current	Input	Torque	R.P.M	Output	Eff_T
Set Value	V(V)	I(A)	Pi(W)	kg/cm	rpm	po(W)	η (%)
36	220.0	0.205	18.5	0.97	784.0	7.8	42.1
37	220.0	0.258	24.1	1.63	781.0	13.1	54.3
38	219.7	0.299	28.4	2.09	774.0	16.6	58.4
39	219.7	0.335	31.8	2.47	783.0	19.8	62.2
40	219.7	0.382	36.6	3.02	776.0	24.0	65.5
41	219.7	0.429	41.9	3.46	792.0	28.1	67.0
42	220.0	0.477	47.5	4.03	777.0	32.1	67.5
43	219.7	0.522	52.6	4.52	775.0	35.9	68.2
44	219.7	0.572	58.1	5.08	771.0	40.2	69.1
45	219.7	0.624	64.1	5.53	787.0	44.7	69.7
46	219.7	0.664	69.4	6.00	776.0	47.8	68.8
47	219.7	0.717	75.9	6.54	773.0	51.9	68.3
48	219.7	0.757	80.5	6.89	782.0	55.3	68.6
49	219.7	0.815	88.2	7.56	767.0	59.5	67.4
50	219.7	0.866	94.3	8.06	776.0	64.2	68.0

Dual-Axis Motor Drive Unit 940RPM



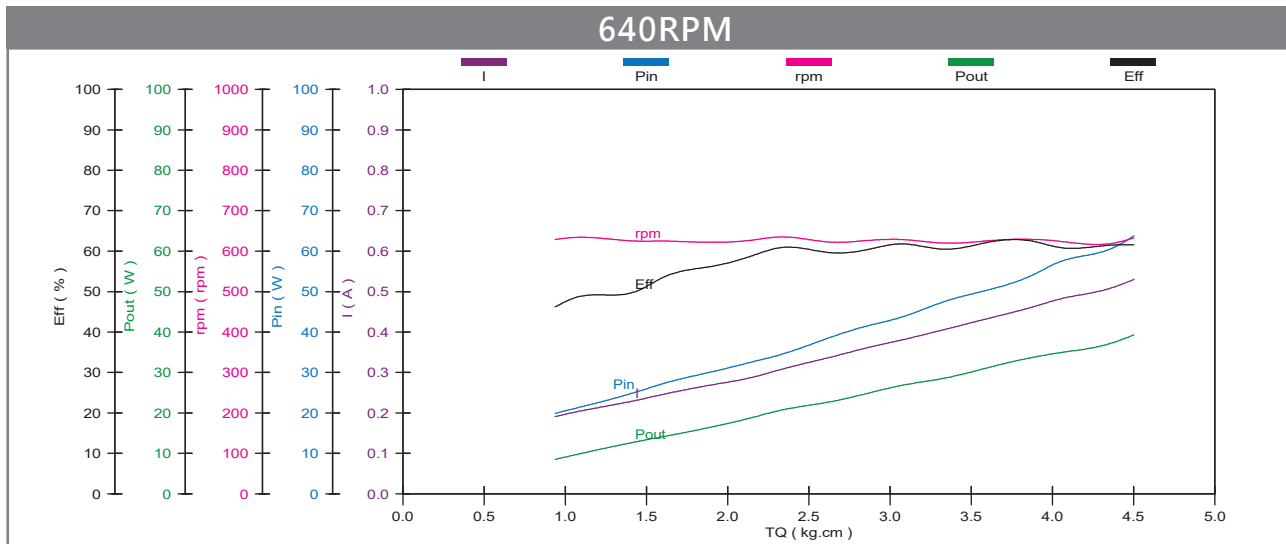
Item	Voltage	Current	Input	Torque	R.P.M	Output	Eff_T
Set Value	V(V)	I(A)	Pi(W)	kg/cm	rpm	po(W)	η(%)
20	220.0	0.232	20.8	1.02	938.0	9.8	47.1
21	220.0	0.237	25.2	1.45	935.0	13.9	55.1
22	220.0	0.328	31.6	2.02	928.0	19.2	60.7
23	219.7	0.388	37.3	2.60	923.0	24.6	65.9
24	219.7	0.430	42.7	2.96	937.0	28.5	66.7
25	219.7	0.486	48.6	3.53	927.0	33.6	69.1
26	219.7	0.535	54.0	3.95	934.0	37.9	70.1
27	219.7	0.591	60.7	4.48	933.0	42.9	70.6
28	219.7	0.651	67.9	5.09	929.0	48.5	71.4
29	219.7	0.693	72.9	5.48	932.0	52.4	71.8
30	219.7	0.748	79.1	5.97	930.0	57.0	72.0
31	219.7	0.800	85.8	6.48	933.0	62.0	72.2
32	219.7	0.851	92.3	7.01	929.0	66.8	72.3
33	219.7	0.912	100.8	7.56	929.0	72.1	71.5
34	219.7	0.959	106.6	7.97	929.0	76.0	71.2
35	219.7	1.017	114.5	8.57	920.0	80.9	70.6

Single-Axis Motor Drive Unit 500RPM



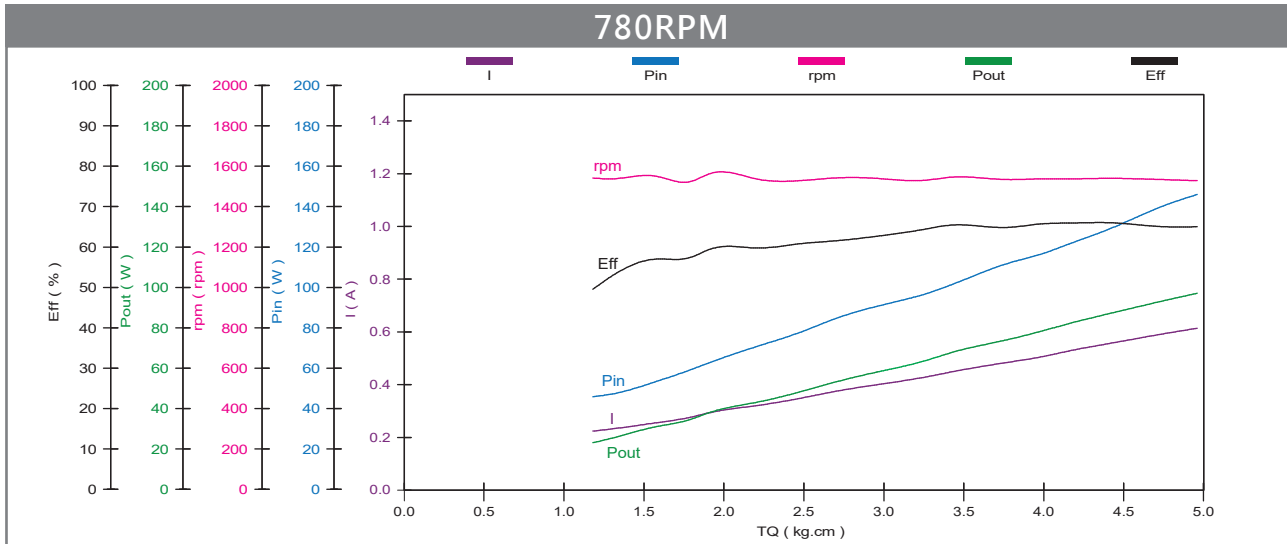
Item	Voltage	Current	Input	Torque	R.P.M	Output	Eff_T
Set Value	V(V)	I(A)	Pi(W)	kg/cm	rpm	po(W)	$\eta(\%)$
78	220.0	0.187	14.6	1.19	498.0	6.1	41.7
79	220.0	0.196	16.1	1.37	500.0	7.0	43.4
80	220.0	0.220	17.8	1.81	493.0	9.2	51.6
81	220.0	0.226	18.8	1.90	494.0	9.6	51.0
82	219.7	0.246	21.9	2.23	491.0	11.2	51.1
83	219.7	0.267	23.2	2.50	491.0	12.6	54.3
84	220.0	0.286	25.1	2.74	493.0	13.9	55.3
85	220.0	0.298	26.3	2.92	488.0	14.6	55.5
86	220.0	0.321	28.6	3.18	496.0	16.2	56.6
87	220.0	0.341	30.5	3.46	496.0	17.6	57.7
88	220.0	0.363	32.6	3.78	490.0	19.0	58.2
89	220.0	0.388	36.1	4.00	493.0	20.2	55.9
90	220.0	0.407	37.9	4.22	490.0	21.2	55.9
91	220.0	0.432	40.1	4.53	493.0	22.9	57.1
92	220.0	0.445	41.6	4.67	493.0	23.6	56.7
93	220.0	0.470	43.8	4.96	493.0	25.1	57.3

Single-Axis Motor Drive Unit 640RPM



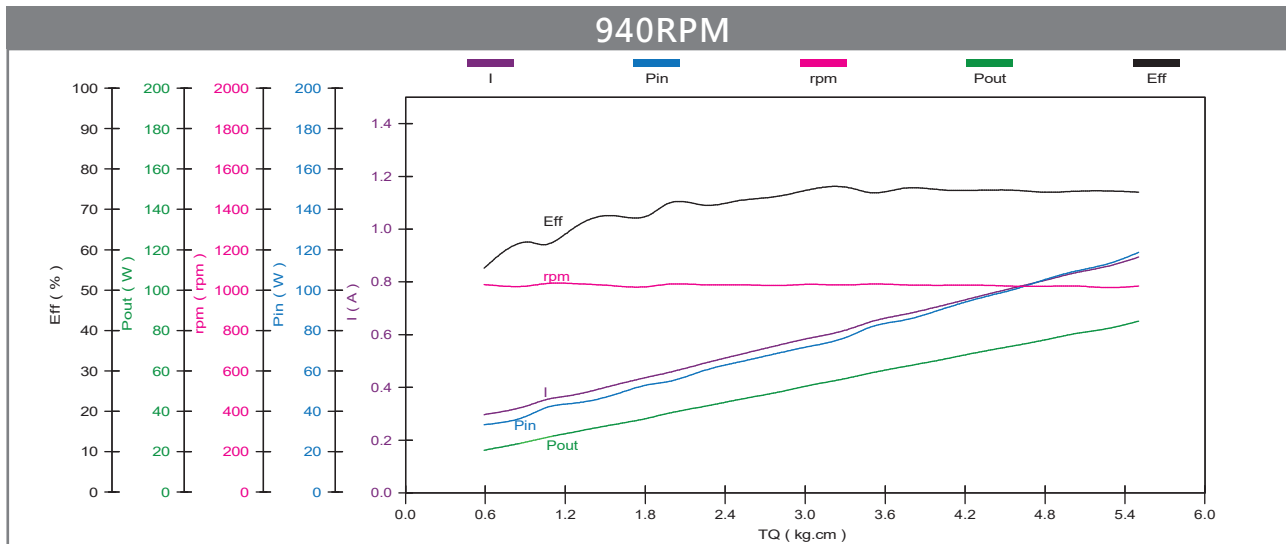
Item	Voltage	Current	Input	Torque	R.P.M	Output	Eff_T
Set Value	V(V)	I(A)	Pi(W)	kg/cm	rpm	po(W)	η (%)
62	220.0	0.206	17.2	1.23	639.0	8.1	47.0
63	220.0	0.217	18.2	1.36	644.0	9.0	49.4
64	220.0	0.245	21.3	1.74	635.0	11.5	53.9
65	220.0	0.261	23.1	1.93	635.0	12.6	54.5
66	220.0	0.286	25.6	2.27	632.0	14.7	57.4
67	220.0	0.301	27.2	2.48	637.0	16.2	59.5
68	220.0	0.321	28.5	2.67	645.0	17.7	62.1
69	220.0	0.353	32.1	3.01	632.0	19.5	60.7
70	220.0	0.373	34.2	3.21	636.0	20.9	61.1
71	220.0	0.392	35.7	3.43	639.0	22.5	63.0
72	219.7	0.419	39.1	3.72	630.0	24.0	61.3
73	220.0	0.450	41.7	4.04	637.0	26.4	63.3
74	220.0	0.475	44.2	4.29	639.0	28.1	63.5
75	219.7	0.492	46.7	4.44	635.0	28.9	61.8
76	219.7	0.520	49.4	4.78	629.0	30.5	61.7
77	219.7	0.542	51.8	4.93	643.0	32.5	62.7

Single-Axis Motor Drive Unit 780RPM



Item	Voltage	Current	Input	Torque	R.P.M	Output	Eff_T
Set Value	V(V)	I(A)	Pi(W)	kg/cm	rpm	po(W)	η(%)
45	220.0	0.224	19.0	1.18	789.0	9.6	50.5
46	220.0	0.233	19.6	1.31	787.0	10.6	54.0
47	220.0	0.255	21.8	1.57	794.0	12.8	58.7
48	220.0	0.275	24.3	1.78	779.0	14.2	58.4
49	220.0	0.295	26.0	1.92	801.0	15.8	60.7
50	220.0	0.321	29.2	2.21	786.0	17.8	60.9
51	220.0	0.351	32.3	2.50	783.0	20.1	62.2
52	220.0	0.374	34.7	2.69	789.0	21.8	62.8
53	220.0	0.400	37.3	2.96	788.0	23.9	64.0
54	220.0	0.428	39.5	3.25	783.0	26.1	66.0
55	220.0	0.448	41.6	3.42	791.0	27.8	66.8
56	219.7	0.484	45.9	3.77	785.0	30.4	66.2
57	219.7	0.505	47.6	3.98	787.0	32.1	67.4
58	219.7	0.528	49.7	4.16	787.0	33.7	67.8
59	219.7	0.556	52.9	4.41	788.0	35.7	67.4
60	219.7	0.593	57.7	4.75	785.0	38.3	66.3
61	219.7	0.615	59.8	4.97	782.0	39.9	66.7

Single-Axis Motor Drive Unit 940RPM



Item	Voltage	Current	Input	Torque	R.P.M	Output	Eff_T
Set Value	V(V)	I(A)	Pi(W)	kg/cm	rpm	po(W)	η(%)
24	220.0	0.226	18.9	1.00	936.0	9.6	50.7
25	220.0	0.262	22.7	1.35	930.0	12.9	56.8
26	219.7	0.278	24.7	1.45	939.0	14.0	56.6
27	220.0	0.299	26.9	1.69	940.0	16.3	60.5
28	220.0	0.327	29.2	1.93	932.0	18.5	63.3
29	219.7	0.364	33.7	2.25	926.0	21.4	63.5
30	220.0	0.379	34.7	2.39	937.0	23.0	66.2
31	219.7	0.415	39.0	2.68	934.0	25.7	65.8
32	219.7	0.446	41.8	2.94	935.0	28.2	67.4
33	219.7	0.483	45.5	3.26	931.0	31.1	68.3
34	220.0	0.501	47.2	3.42	936.0	32.8	69.4
35	219.7	0.539	51.4	3.77	934.0	36.1	70.2
36	219.7	0.565	54.5	3.93	938.0	37.8	69.3
37	219.7	0.593	57.3	4.19	934.0	40.2	70.1
38	219.7	0.628	61.7	4.50	932.0	43.0	69.6
39	219.7	0.662	65.6	4.78	932.0	45.7	69.6
40	219.7	0.689	68.4	5.01	928.0	47.7	69.7
41	219.7	0.718	72.2	5.26	927.0	50.0	69.2
42	219.7	0.742	74.9	5.46	929.0	52.0	69.4
43	219.7	0.770	77.8	5.74	921.0	54.2	69.6
44	219.7	0.805	82.2	5.98	929.0	57.0	69.3

AC vs. DC Comparison Table

Single-Axis Motor Drive Unit (400 Series)

AC Fan - Competitor Model					DC Model - AKR				
Name	Static Press	Airflow	Power (W)	Speed	Name	Static Press	Airflow	Power (W)	Speed
0Static Press	400-0 Low	220	65	530	0Static Press	0 Static Pressure 500	201	13	500
	400-0 Medium	275	72	630		0 Static Pressure 600	256	18	600
	400-0 High	324	80	720		0 Static Pressure 700	309	24	700
	400-0 High Press	414	97	890		0 Static Pressure 800	364	32	800
						0 Static Pressure 900	416	43	900
						0 Static Pressure 1000	467	57	1000
3Static Press	400-3 Low	153	60	755	3Static Press	3 Static Pressure 800	206	21	800
	400-3 Medium	222	69	835		3 Static Pressure 900	289	31	900
	400-3 High	280	78	900		3 Static Pressure 1000	361	43	1000
	400-3 High Press	372	94	1032		3 Static Pressure 1100	424	59	1100
5Static Press	400-5 Low				5Static Press				
	400-5 Medium	189	69	1003		5 Static Pressure 900	73	16	900
	400-5 High	250	76	1021		5 Static Pressure 1000	178	26	1000
	400-5 High Press	341	91	1112		5 Static Pressure 1100	338	47	1100

Dual-axis Motor Drive Unit (600 Series)

AC Fan - Competitor Model					DC Model - AKR				
Name	Static Press	Airflow	Power (W)	Speed	Name	Static Press	Airflow	Power (W)	Speed
0Static Press	600-0 Low	379	85	503	0Static Press	600-0 Static Pressure 500	366	16	500
	600-0 Medium	473	98	606		600-0 Static Pressure 600	464	24	600
	600-0 High	558	109	693		600-0 Static Pressure 700	563	35	700
	600-0 High Press	664	125	801		600-0 Static Pressure 800	666	49	800
						600-0 Static Pressure 900	757	67	900
3Static Press	600-3 Low	276	81	782	3Static Press	600-3 Static Pressure 800	393	32	800
	600-3 Medium	366	93	848		600-3 Static Pressure 900	557	49	900
	600-3 High	465	104	904		600-3 Static Pressure 1000	680	70	1000
	600-3 High Press	585	118	958		600-3 Static Pressure 1100	785	97	1100
5Static Press	600-5 Low	242	82	923	5Static Press	600-5 Static Pressure 900	266	29	900
	600-5 Medium	317	90	968		600-5 Static Pressure 1000	474	50	1000
	600-5 High	405	102	1027		600-5 Static Pressure 1100	631	75	1100
	600-5 High Press	519	116	1066					

Dual-axis Motor Drive Unit (800 Series)

AC Fan - Competitor Model					DC Model - AKR				
Name	Static Press	Airflow	Power (W)	Speed	Name	Static Press	Airflow	Power (W)	Speed
0Static Press	800-0 Low	457	92	506	0Static Press	800-0 Static Pressure 500	460	22	507
	800-0 Medium	583	115	630		800-0 Static Pressure 600	554	31	597
	800-0 High	680	127	744		800-0 Static Pressure 700	662	44	698
	800-0 High Press	771	148	823		800-0 Static Pressure 800	768	62	796
						800-0 Static Pressure 900	876	87	901
						800-0 Static Pressure 1000	984	118	1003
						800-0 Static Pressure 1100	1087	158	1098
3Static Press	800-3 Low	361	88	793					
	800-3 Medium	487	106	850	3Static Press	800-3 Static Pressure 800	423	35	800
	800-3 High	605	126	900		800-3 Static Pressure 900	633	57	894
	800-3 High Press	692	146	960		800-3 Static Pressure 1000	775	85	996
						800-3 Static Pressure 1100	914	122	1101
5Static Press	800-5 Low	307	86	915					
	800-5 Medium	411	103	990	5Static Press	800-5 Static Pressure1000	503	54	999
	800-5 High	534	118	1040		800-5 Static Pressure1100	748	93	1101
	800-5 High Press	634	144	1070					

Dual-axis Motor Drive Unit (1000 Series)

AC Fan - Competitor Model					DC Model - AKR				
Name	Static Press	Airflow	Power (W)	Speed	Name	Static Press	Airflow	Power (W)	Speed
0Static Press	1000-0 Low	587	155	515	0Static Press	1000-0 Static Pressure 500	588	27	500
	1000-0 Medium	724	175	610		1000-0 Static Pressure 600	711	37	600
	1000-0 High	851	190	711		1000-0 Static Pressure 700	848	52	702
	1000-0 High Press	1043	226	861		1000-0 Static Pressure 800	1002	75	800
						1000-0 Static Pressure 900	1137	102	899
						1000-0 Static Pressure 1000	1278	138	1001
3Static Press	1000-3 Low	438	139	762					
	1000-3 Medium	590	159	820		1000-3 Static Pressure 800	529	44	800
	1000-3 High	738	180	882	3Static Press	1000-3 Static Pressure 900	801	70	899
	1000-3 High Press	924	209	982		1000-3 Static Pressure 1000	989	103	998
						1000-3 Static Pressure 1100	1166	144	1101
5Static Press	1000-5 Low	366	134	897					
	1000-5 Medium	499	154	958	5Static Press	1000-5 Static Pressure1000	647	71	1004
	1000-5 High	652	175	999		1000-5 Static Pressure1100	946	114	1101
	1000-5 High Press	845	202	1070					

Wiring Diagram

Housing : H41400M-16P-A(Dust Boot*1PCS)
Nylon Sleeve*7PCS
Sleeve*1PCS
Bare Metal Flexible Conduit (Silver/OD : Ø12)x1240mm*1PCS
(Bare Metal Flexible Conduit Pressure Rating Must Exceed 15Kg)

