ภาคผนวก ฉ.

Minertia Motor F Series B Type

Yaskawa Electric

KAE-C249-30

SMALL SIZE DC SERVOMOTORS

Minertia® Motor

F Series B TYPE

Type FB5□20E 6.2 TO 17.4W
Type FB9□20E 9.9 TO 30.8W

589-64

YASKAWA

FB9 20E

■RATINGS AND SPECIFICATIONS

Specifications	Type	FB9T20E	FB9S20E	FB9E20E	FB9M20E	FB9L20E
Peak Rated Torque	oz. in	38.9	61.1	77.8	128	156
Rated Torque	oz. in	11.1	16.7	22.2	29.2	34.7
Torque Constant	oz. in/amp	7.0	10.8	14.5	15.3	16.5
Armature Winding Resistance	Ω	4.1	5.3	6.4	4.2	3.9
Armature Inductance	mH	1.9	2.8	3.6	2.6	2.6
Peak Current	A	5.7	5.7	5.7	8.5	9.5
Induced Voltage Constant	V/1000r/min	5.2	8.0	10.7	11.3	12.2
Viscous Damping Coefficient	oz. in/1000r/min	0.43	0.50	0.58	1.86	0.85
Friction Torque	oz. in	1.10	1.31	1.53	2.22	2.36
Inertia (With Encoder)	oz. in sec^2 ×10^{-3}	1.94	2.64	3.13	4.61	5.69
Mechanical Time Constant	millisec	22.8	16.9	14.0	11.7	11.5
Electrical Time Constant	millisec	0.46	0.53	0.56	0.62	0.67
Power Rate	KW/sec	0.45	0.74	1.10	1.30	1.50
Torque Inertia Ratio	rad/sec^2	5710	6320	7110	6330	6100
Rated Speed	r/min	1200	1200	1200	1200	1200
Max. Safety Operating speed	r/min	3500	3500	3500	3500	3500
Rated Voltage	V	18.1	23.7	30.0	27.0	28.1
Rated Current	A	2.0	1.90	1.95	2.33	2.54
Constant Output	W	9.9	14.8	19.7	25.9	30.8

- ●Time Rating: Continuous
- ●Dielectric Strength: 500VAC/1 min
- ●Applicable Environment
  - Applicable Location: Indoor
  - Ambient Temperature: −10 to +40°C
  - Humidity: 80% Max.

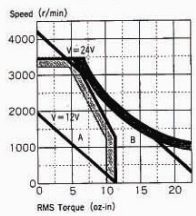
●Direction of Rotation: When (+) current is supplied to the red lead it rotates counterclockwise viewed from drive end.

The values described above are those with HA type encoder.
With HS type encoder (200, 240 pulses), some values differ since the inertia is larger.

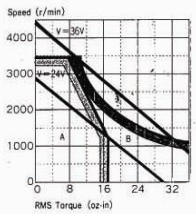
Inertia 200 pulses + 0.11×10^{-3} oz. in. sec^2
240 pulses + 0.24×10^{-3} oz. in. sec^2

■SPEED-TORQUE CURRENT CHARACTERISTICS

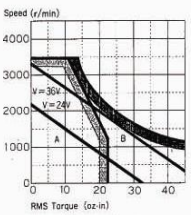
●FB9T20E



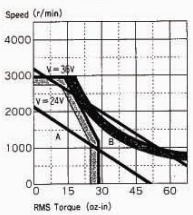
●FB9S20E



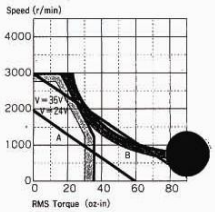
●FB9E20E



●FB9M20E



●FB9L20E



A: Area of safe continuous duty without air cooling.
B: Area of intermittent duty.

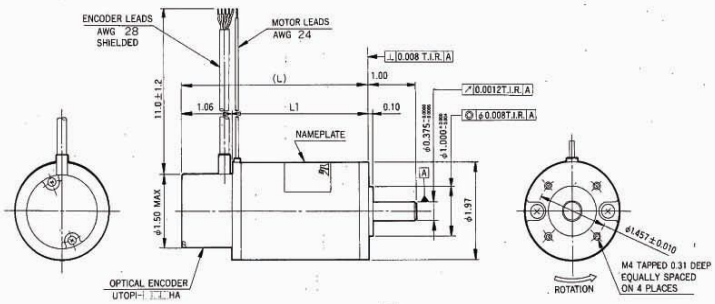
Environmental conditions:
Temperature 25°C Humidity 80% max.

Note : Motor mounted on 10 in × 10 in ×1/4 in heat sink. Curve data for an armature temp. of 125°C

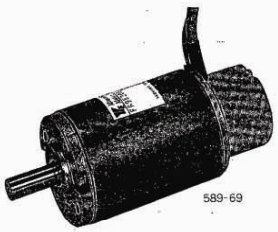
WITH HIGH ACCURACY ENCODER "HA" TYPE

200 to 1000 pulses/rev

■DIMENSIONS in inches



TYPE	L1	L
FB9T20E	2.11	3.17
FB9S20E	2.50	3.56
FB9E20E	2.90	3.96
FB9M20E	3.69	4.75
FB9L20E	4.28	5.34

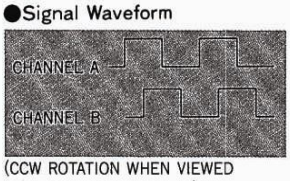


■OPTICAL ENCODER CHARACTERISTIC TABLES

TYPE	P/rev.
UTOPI-020HA	200
UTOPI-025HA	250
UTOPI-02BHA	288
UTOPI-040HA	400
UTOPI-050HA	500
UTOPI-060HA	600
UTOPI-080HA	800
UTOPI-100HA	1000

Input Power Requirement	+5VDC±5% 100mA Max.
Waveform	Square Wave
Output Circuit	TTL Compatible
Flutter	360°±18°(10%p-p Max.)
Pulse Duty Cycle	180°±36°(50±10%)
Phase Offset	90°±40°(25±11%)
Frequency Range	50kHz

●Signal Waveform



(CCW ROTATION WHEN VIEWED FROM SHAFT DRIVE END)

●Encoder Lead

INPUT	RED	+5VDC
	BLACK	0V
OUTPUT	WHITE	CHANNEL A
	GREEN	CHANNEL B
	SHIELD	—

NOTE

- The relation of A and B channels to the motor rotating direction must correctly be set. If not so, overtravel may occur.
- Avoid vibration or shock on the encoder or its output shaft.
- Do not perform the insulation test or measure the insulation resistance.