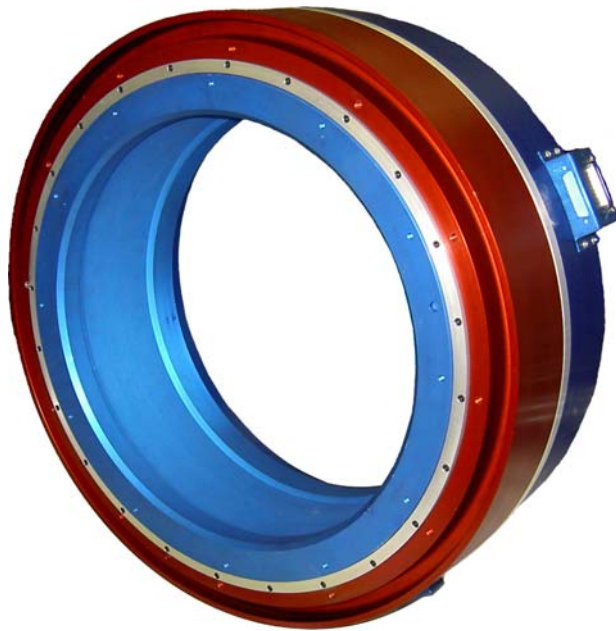


Hollow shaft servomotor/encoder

CM-21000 series, 21" brushless DC , 15" ID through shaft

1



Description:

The CM-21000 "Megaflex" hollow shaft motor/encoder is characterized by a very high torque to inertia ratio, providing excellent servo stiffness. A large selection of size and winding constants is available in a similar mechanical configuration.

Feedback is provided by an optical encoder, incremental up to 512,000 c/r (2,048,000 measuring steps) or 16 bit absolute, SSI interface standard.

Various options such as custom linecount, absolute resolution, output formats, redundancy, winding constants and water cooling are available, please contact the factory.

mechanical:

ID shaft: 15"
shaft loading: 400 lbs radial and axial
shaft runout: 0.002" T.I.R.
max speed: 1,000 rpm (mechanical)
bearings: ABEC 5
shaft material: aluminum

housing material: aluminum
bearing life: manufacturer's specs
moment of inertia: see motor data
weight: see motor data
temperature: operating: -20°C to +85°C
shock: 50 G's @ 11 ms
vibration: 5-2,000 Hz @ 20 G's
humidity: 98% without condensation
protection: IP 64

encoder:

incremental low count:

power supply: 5 Vdc @ 100 mA max
code: incremental, square wave
standard linecounts: 1,000; 1,024; 2,048; 4,096 c/r
+ commutation
output format: RS 422, linedriver
frequency response: 150 kHz

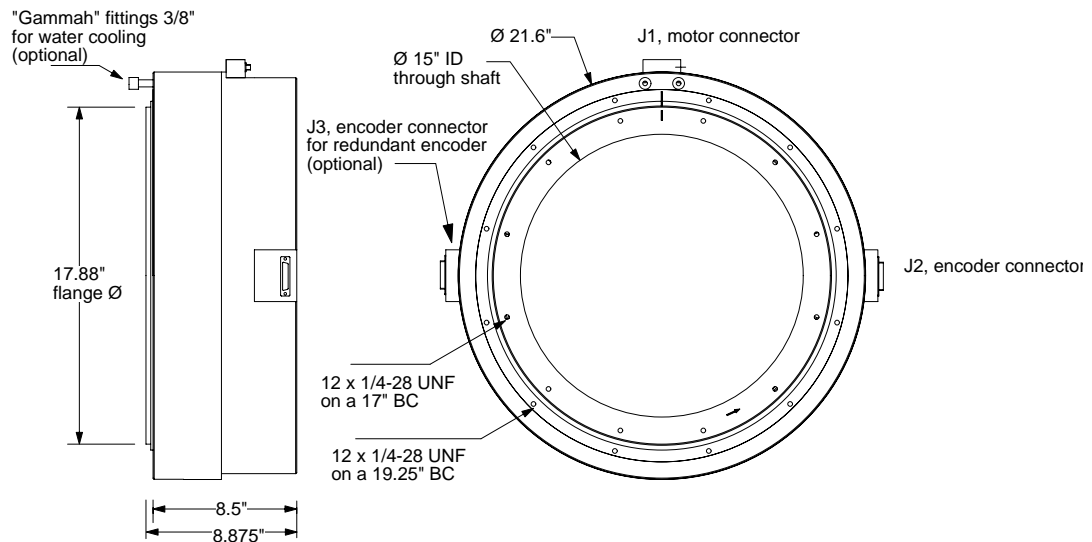
incremental high count:

power supply: 5 Vdc @ 250 mA max
code: incremental, square wave
standard linecounts: up to 512,000 c/r + commutation
output format: RS 422, linedriver
frequency response: 2 MHz

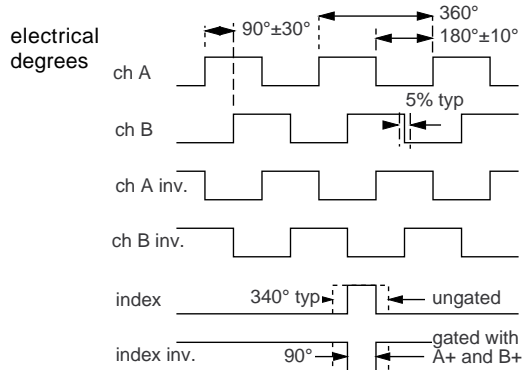
absolute:

power supply: 5 Vdc @ 250 mA max
code: absolute, 16 bit
output format: SSI

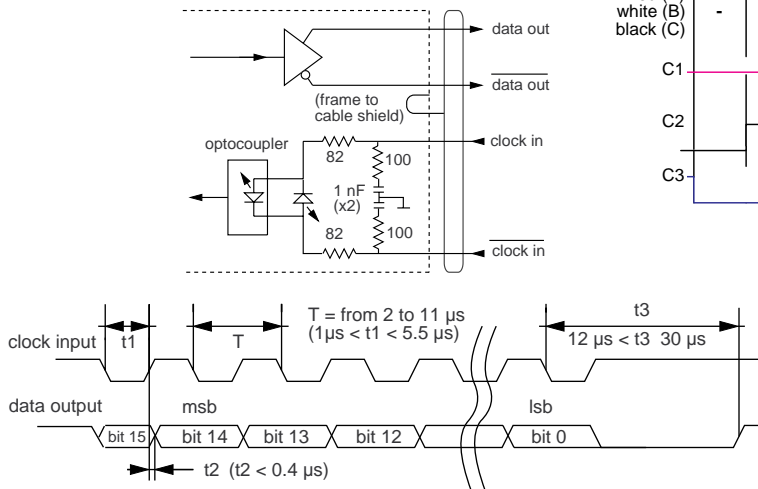
Outline:



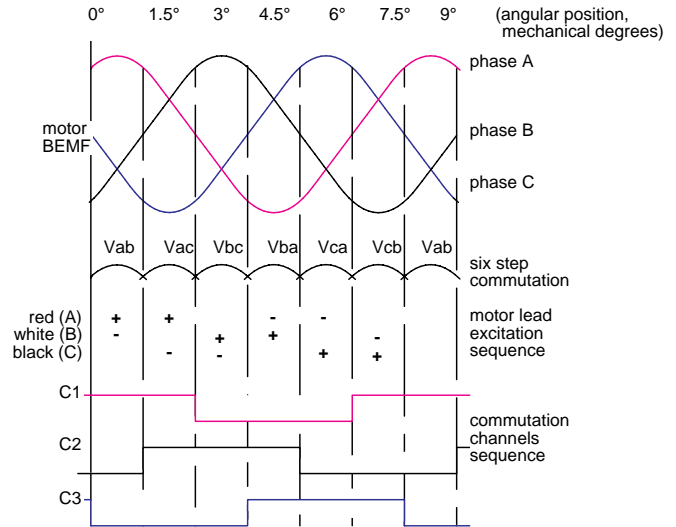
A & B signals, high & low count versions



SSI interface & timing



motor BEMF & commutation signals



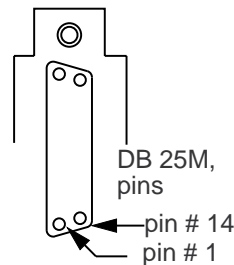
pinouts (J2, J3 if applicable) increments:

- pin 1 + 5Vdc
- pin2 + 5Vdc
- pin3 thermistor front bearing
- pin4 thermistor front bearing
- pin5 thermistor rear bearing
- pin6 thermistor rear bearing
- pin7 channel A
- pin8 channel A inverse
- pin9 channel B
- pin10 channel B inverse
- pin11 Index channel
- pin12 Index channel inverse
- pin13 C1 commutation channel
- pin14 C1 commutation channel inverse
- pin15 C2 commutation channel
- pin16 C2 commutation channel inverse
- pin17 C3 commutation channel
- pin18 C3 commutation channel inverse
- pin23 encoder ground
- pin24 encoder ground
- pin25 chassis ground

pinouts (J2, J3 if applicable) absolute:

- pin 1 + 5Vdc
- pin2 + 5Vdc
- pin3 thermistor front bearing
- pin4 thermistor front bearing
- pin5 thermistor rear bearing
- pin6 thermistor rear bearing
- pin7 data channel out
- pin8 data channel out inverse
- pin9 clock channel
- pin10 clock channel inverse
- pin23 encoder ground
- pin24 encoder ground
- pin25 chassis ground

J 1 motor connector & pin designations TBD



Motor specifications

size constants @ 20°C ambient:

parameter	symbol	unit	value
maximum rated torque	Tr	lb.ft	1760
		Nm	2386
maximum continuous stall torque @ temperature rise of 110°C	Tc	lb.ft	250
		Nm	339
motor constant	Km	lb.ft/W	12
		Nm/W	16
electrical time constant	Te	ms	11.9
mechanical time constant	Tm	ms	4.7
angular acceleration (theoretical)		rad/sec ²	1880
thermal resistance*	TPR	°C/Watt	0.18
maximum cogging torque	Tf	lb.ft	1.2
		Nm	1.6
viscous damping (infinite source)	Fi	lb.ft/rpm	0.066
		Nm/rpm	0.09
hysteresis drag torque	Th	lb.ft	2.94
		Nm	4
number of poles		P	80
rotor inertia	Jm	lb.ft-sec ²	0.935
		kg.m ²	1.27
motor weight		lb	123
		kg	55

(*) TPR assumes motor mounted to an aluminum heatsink of 30" x 30" x 1" in still air.

winding constants @ 20°C ambient*:

design voltage	Vp	Volt	300
peak torque, ± 25%	Tp	lb.ft	1760
		Nm	2386
peak current, ± 25%	Ip	Ampere (limit)	76.8
torque sensitivity, ±10%	Kt	lb.ft/A	23
		Nm/A	31
no-load speed	Snl	rpm	88
		rad/s	9.2
voltage constant	Kb	V/krpm	3253
		V/rad/s	31
terminal resistance, ± 12%	Rm	Ohm	3.6
terminal inductance, ± 30%	Lm	mH	42.4

(*) performance @ 20°C

Peak torque performance:

Continuous power output @ -temperature rise of 110°C, -still air cooling -ambient temperature of 20°C	power	Watt	1155
		horsepower	1.55
	torque	lb.ft	813
		Nm	1103
	speed	rpm	10
	I phase	Ampere	40.1
	I dc-link	Ampere	28.9
	efficiency %		13.3