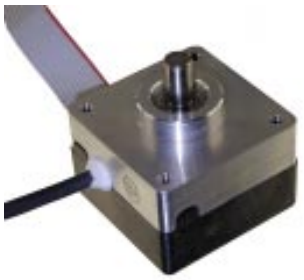
CM-300 series, Brushless DC Motor



Description:

The CM-300 is a high-performance brushless DC motor with integral optical encoder characterized by a very high torque to inertia ratio. Both a two phase and three phase version are available.

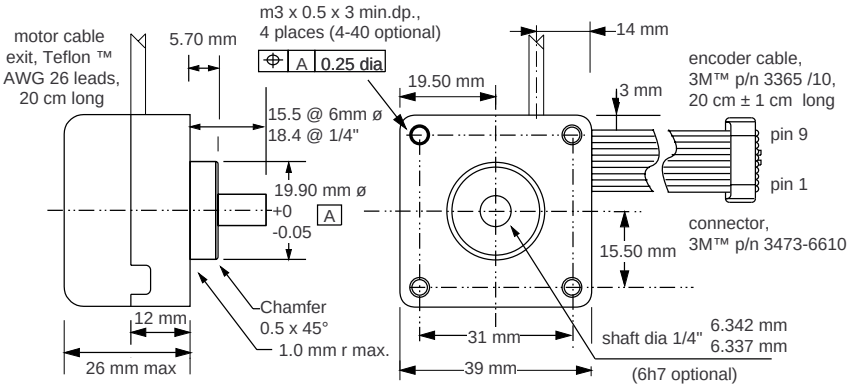
The motor was specifically designed for high speed/high resolution scanning and positioning applications and accepts all CP-300/350/500/550 encoder configurations: up to 10 bits absolute and up to 4096 (sine/cosine or square wave) incremental.

Standard linecounts:

with commutation signal: 360, 512, 1000, 1024, 2048, 4096 c/r .

without commutation signals, see CP-300/350/500/550 datasheets for linecounts, output waveforms (incremental & absolute)

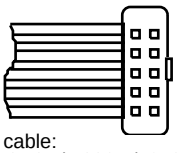
Mechanical Data:



radial play: < 0.0001" @ 1 lb sideload
axial play: 0.0003" max @ 2 lbs in direction of encoder, less than 0.0001" @ 2 lbs in the direction of the load

Encoder Pinout:

pin 1:	Vcc	pin 6:	A+
pin 2:	ground	pin 7:	index
pin 3:	C3	pin 8:	C1
pin 4:	C2	pin 9:	B+
pin 5:	A-	pin 10:	B-

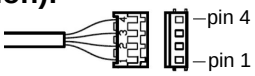


connector:
3M[a] p/n 3473-6610

cable:
3M[a] p/n 3365 /10, 20 cm ± 1 cm long

Motor Pinout (3 phase version):

pin 1:	phase A	red
pin 2:	phase B	white
pin 3:	phase C	black
pin 4:	case/shield	green

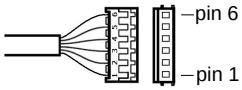


connector:
AMP 4 pin single, AMP p/n 102241-2 w/ selective gold plated terminals

cable:
three phase motor wires, no termination:

Motor Pinout (2 phase version):

pin 1:	phase 1, +	yellow
pin 2:	phase 1, -	white
pin 3:	phase 2, +	red
pin 4:	phase 2, -	blue (green)
pin 5:		n/c
pin 6:	ground	shield



connector:
AMP 6 pin single, AMP p/n 102241-4 w/ selective gold plated terminals

cable:
grounded to motor frame, AWG 26 leads.

Size Constants @ 20°C ambient:

PARAMETER	symbol	UNITS	3 phase	2 phase
maximum rated torque	Tr	in.oz mNm	33 232	17 120
max. continuous stall torque	Tc	in-oz mNm	4.4 31	3.7 26
maximum continuous output power	Pout Smpo	watts RPM	19.9 8,600	15.8 7,904
motor constant	Km	oz.in/√W mNm/√W	1.7 12	1.5 10
electrical time constant	Te	msec.	0.26	.22
mechanical time constant	Tm	msec.	4.46	5.81
thermal resistance*	TPR	°C/W	7	7
maximum cogging torque	Tf	oz.in mNm	0.14 .99	0.14 .99
viscous damping		in-oz/rpm Nm/rpm	5.1×10^{-5} 3.6×10^{-7}	5.2×10^{-5} 3.7×10^{-7}
hysteresis drag torque		in-oz mNm	0.15 1.1	.15 1.1
rotor inertia		in-oz-sec^2 Kg.m^2	8.9×10^{-5} 6.3×10^{-7}	8.9×10^{-5} 6.3×10^{-7}
motor weight		oz Kg	7.6 0.2148	7.6 0.2148
number of poles		P	6	6

24V Winding Constants @ 20°C ambient:

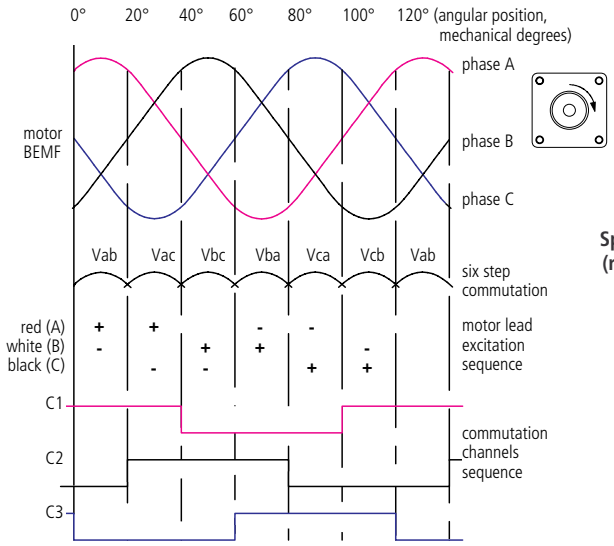
parameter	symbol	units	3 phase	2 phase
peak torque, ± 25%	Vp	in-oz mNm	18 130	12 80
peak current, ± 15%	Tp	Amps	5.1	2.7
torque sensitivity, ± 10%	Kt	in/oz/Amp mNm/Amp	3.65 26	4.37 31
no load speed, ± 15%	Snl	rpm rad/sec	8,600 901	7,099 743
voltage constant, ± 10%	Kb	v/Krpm v/rad/sec	2.70 0.026	3.23 0.031
terminal resistance, ± 12%	Rm	Ohms	4.73	8.9
terminal inductance, ± 30%	Lm	mH	1.23	1.95
continuous power output @ 75°C temperature rise	power	Watt mHP	17.2 23	10.9 15
	torque	in-oz mNm	3.5 25	3.2 23
	speed	rpm	6,600	4,553
	current	Amperes	1.16	0.88
	efficiency	percent	61.6	51.6

**motor mounted to aluminum heat sink 3.2" x 3.2" x 0.25" thick*

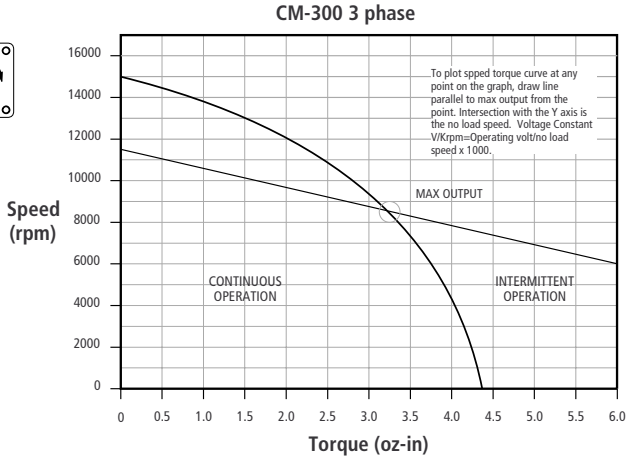
Other voltage windings are available

CM-300, Brushless DC Motor

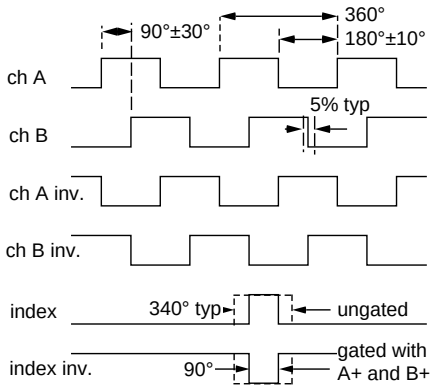
Commutation Sequence (3 phase):



Continuous Performance with 75°C Temp. Rise (3 phase version):



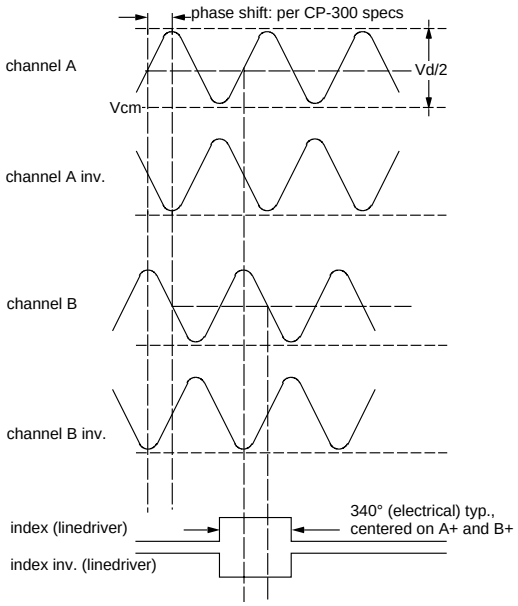
digital output:



Commutation Sequence (2 phase):

angle (CCW)	0°	30°	60°	90°	120°
phase 1 +	+	-	-	+	+
phase 1 -	-	+	+	-	-
phase 2 +	+	+	-	-	+
phase 2 -	-	-	+	+	-

sine/cosine output:



Ordering information:

CM-320-(linecount): three phase motor, no commutation signals, incremental, differential sine/cosine, Vd/2 = 0.5V pp*.
Linecounts available: 512, 1024, 2048 & 4096 (others on request).

CM-350-(linecount): two phase motor, no commutation signals, incremental, digital complementary linedriver outputs.
Linecounts available: 512, 1024, 2048 & 4096 (others on request).

CM-335-(linecount): three phase motor, commutation signals, incremental, differential sine/cosine, Vd/2 = 0.5V pp*.
Linecounts available: 512, 1024, 2048 & 4096 (others on request).

CM-360-(linecount): three phase motor, no commutation signals, incremental, digital complementary linedriver outputs.
Linecounts available: 512, 1024, 2048 & 4096 (others on request).

CM-365-(linecount): three phase motor, commutation signals, incremental, digital complementary linedriver outputs.
Linecounts available: 512, 1024, 2048 & 4096 (others on request).

CM-325-08GC: two phase motor, 8 bit absolute encoder. Encoder output specs and cable pinouts per CP-350-08GC datasheet.

CM-335-08GC: three phase motor, 8 bit absolute encoder. Encoder output specs and cable pinouts per CP-350-08GC datasheet.

(*) single ended outputs also avalable, please contact the factory for available configurations.