Allied Motion (Emoteq)
10002 E 43rd St
Tulsa, OK 74146-3638
USA
(918) 627-1845

rev. 4/5/2012
in red text

This document is a purchase request for thirteen units of Emoteq MF0150010 frameless motors, each with the following specifications.

- Custom windings (see included spec sheet from 05-Mar-2012)
- Windings are to be electrically split in half, so we can use one amplifier to power half of the windings, and another amplifier to power the other half. This is to overcome peak current limitations in COTS amplifiers, and increase the peak torque available from our motor.
- Thermistors (one on each winding for each electrically isolated set of coils, for a total of six on each motor)
    - Datasheet URL: http://www.epcos.com/inf/50/db/ntc_09/MiniSensors__B57861__S861.pdf
    - Series #:B57861S
    - MFG part number: B57861S0103F040
    - Digikey Part Number: 495-2142-ND
- Hall effect sensors
- ~~The Stators are to be modified according to included drawing ATRIAS 2.1 - 071~~
    - Note: this modification is no longer requested. We understand that this will have minimal effect on total price.
- The Rotors are to be modified according to included drawing ATRAIS 2.1 - 072

This document consists of 6 total pages: This cover sheet, Emoteq quote CR-6683-040312, three pages of the SPEED simulation winding specification, ~~one page for stator modification detail drawing,~~ and one page for the rotor modification detail drawing.

Please feel free to contact us at any time via Email (jonathan.hurst@oregonstate.edu) or phone (541-791-7171).

Our shipping address is as follows.

Attn: Jonathan Hurst
Dynamic Robotics Laboratory
Oregon State University
204 Rogers Hall
Corvallis, OR 97330

Thank you –
Jonathan Hurst
Jesse Grimes

Allied Motion

Motion Solutions that Change the Game

Quote No.: CR-6683-040312
Date: 4/3/2012

Name:	Jonathan W Hurst	Phone:	541-737-7010
Company:	OREGON STATE UNIVERSITY	E-mail:	jonathan.hurst@oregonstate.edu
Address:	MECHANICAL ENGINEERING		
Address:	204 ROGERS HALL	FOA:	EE
City, State, Zip:	CORVALLIS, OR 97331	NAICS:	
Country:	USA		

Currency: USD

Item	Part Number	Cust. P/N	Description	Qty	Price	Total
1	MF0150010-X0X		Emoteq Megaflux Frameless Torque Motor	1	$ 1,614.00	$ 1,614.00
		ATRIAS	With Halls , Thermistors, & Custom Rotor ID	3	$ 1,614.00	$ 4,842.00
			DESIGN DATE:03/5/12	5	$ 1,546.00	$ 7,730.00
				13	$ 1,473.00	$ 19,149.00
2	NRE		Non Recurring Expense	1	$ 230.00	$ 230.00

Payment terms:	Net 30 Days
INCOTERMS:	Ex-Works Tulsa, Oklahoma, USA
Delivery:	14 to 16 weeks after receipt of Purchase Order or customer-supplied parts if applicable. Please contact Emoteq for expedited delivery requests.
Validity:	This quotation is valid for 30 days. All items quoted and ordered must be scheduled for delivery within 12 months from date on Purchase Order.
Acceptance:	Purchase Orders for items on this quotation are subject to Contract and Design Review prior to acceptance.
Surcharges:	Material and / or energy surcharges may be applied at time of product shipment.
ITAR:	Emoteq Corporation is registered with, and complies with, the United States of America's Export Compliance Regulations under International Trade in Arms Regulations (ITAR).

Iris Fernandez
Customer Service Representative
Phone: (918) 627-1845
E-mail: am-tul-csr@alliedmotion.com

MF0150010-X0X (3800 RPM) OREGON STATE UNIVERSITY

SIZE CONSTANTS **

Parameter	Symbol	Unit	VALUE
Maximum Rated Torque	Tr	lbft	17.171
		Nm	23.281
Maximum Continuous Stall Torque	Tc	lbft	3.059
@Temperature Rise 110.000 °C		Nm	4.147
Motor Constant	Km	lbft/sqrt.w	0.390
[Sqw. drive]		Nm/sqrt.w	0.529
Electrical Time Constant	Te	msec	1.966
Mechanical Time Constant	Tm	msec	5.064
Angular Acceleration (theoretical)		rad/sec²	16425.275
Thermal Resistance *	TPR	°C/watts	1.250
Maximum Cogging Torque	Tf	lbft	0.245
		Nm	0.332
Viscous Damping	Fi	lbft/rpm	7.173E-05
(Infinite Source Impedance)		Nm/rpm	9.725E-05
Hysteresis Drag Torque	Th	lbft	0.029
		Nm	0.039
Rotor Inertia Frameless	Jm	lbfts²	1.045E-03
		kg.m2	1.417E-03
Motor Weight Frameless	Wt	lb	2.578
		kg	1.169
No. of Poles		P	24

* TPR Assumes motor mounted to aluminium heat sink
10.000 10.000 0.250 inches (Still air)
** @ Ambient Temperature , 20.000°C

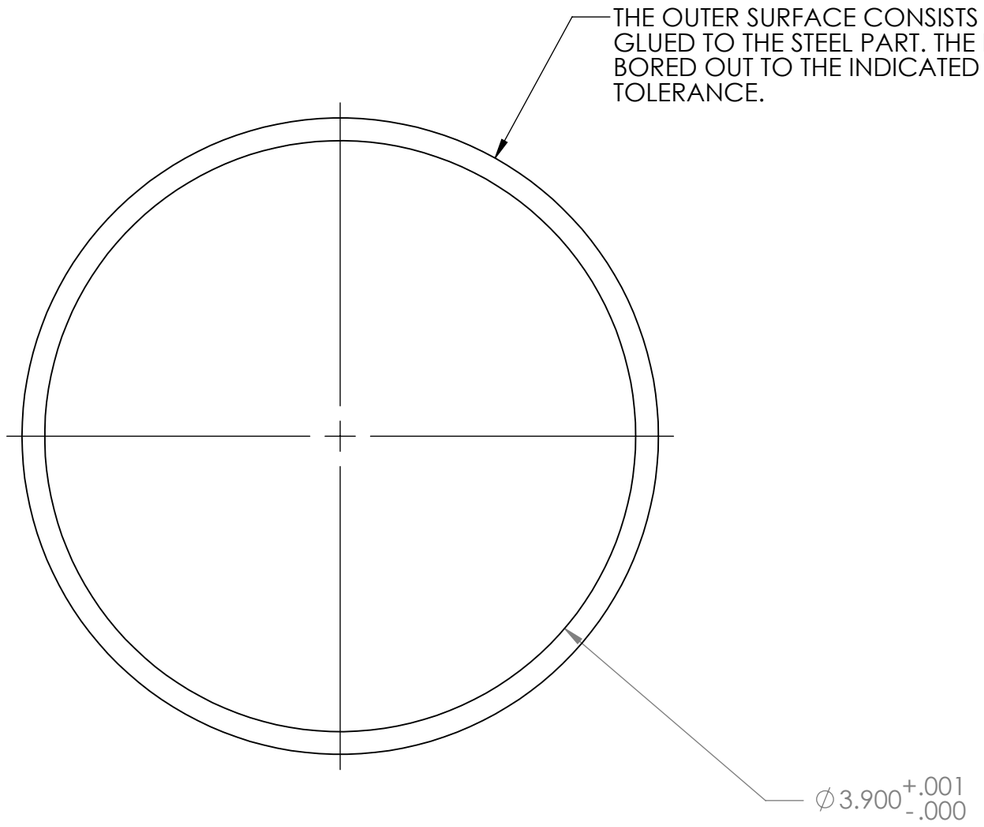
Winding Constants *

Parameter	Symbol	Unit	VALUE
Design Voltage	Vp	volt	50.000
Peak Torque,+/-25%	Tp	lbft	17.171
		Nm	23.281
Peak Current,+/-15%	Ip	amps LIMIT	193.166
Torque Sensitivity +/-10%	Kt	lbft/amp	0.089
		Nm/Amp	0.121
No Load Speed	Snl	rpm	3760.086
		rad/sec	393.755
Voltage Constant +/-10%	Kb	v/Krpm	12.621
		v/rad/sec	0.121
Terminal Resistance +/-12%	Rm	ohms	0.052
Terminal Inductance +/-30%	Lm	mH	0.102

* Performance @ 20.000°C
RMS TORQUE PERFORMANCE

Design Voltage		Vp	volt	50.000
Continuous Power Output @		Power	watt	532.105
			Horsepower	0.714
Temperature Rise:	110.568°C	Torque	lbft	1.874
COOLING :			Nm	2.541
{ Still air}		Speed	rpm	2000.000
Ambient temperature	20.000°C	Iphase	A [peak]	25.400
		I(dc-link)	amperes	12.411
		Efficiency	%	85.746

UNHOUSED	MECHANICAL	
Stator Stack OD	6.693 inch	170.002 mm
Stator Stack Length (UNmachined)	0.390 inch	9.906 mm
Stator ID	4.366	
No. Of Phases	3	
Phase Connection	WYE	
Length Over Coil (Maximum)	1.240 inch	31.496 mm
End Turns OD (Maximum)	5.750 inch	146.050 mm
End Turns ID (Maximum)	4.440 inch	112.776 mm
Lead Wire Gage	20 AWG	
Lead Wire Length	12.000 inch	304.800 mm
ROTOR OD	4.326 inch	109.880 mm
Rotor ID	3.701 inch	94.000 mm
Rotor Axial Length "B"	0.515 inch	13.081 mm
No. Of Poles	24	



NOTE: PART CONSISTS OF FRAGILE CERAMIC MAGNETS

UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16" ANGULAR: MACH ±0.5 DECIMAL: TWO PLACE: ±0.010" THREE PLACE: ±0.005" MIN: +0.010" MAX: -0.010"	DRAWN	DRAWN BY	DRAW DATE
	CHECKED	CHECKED BY	CHECK DATE
	ENG APPR.		
	MFG APPR.		
	Q.A.		
	COMMENTS:		

Dynamic Robotics Laboratory

File Name: MF150_Rotor_MODIFIED

Material: STEEL AND CERAMIC MAGNETS

Finish: Machined

SIZE	DWG. NO.	REV
B	ATRIAS 2.1 - 072	A

SCALE: 1:1 | WEIGHT: | SHEET 1 OF 1