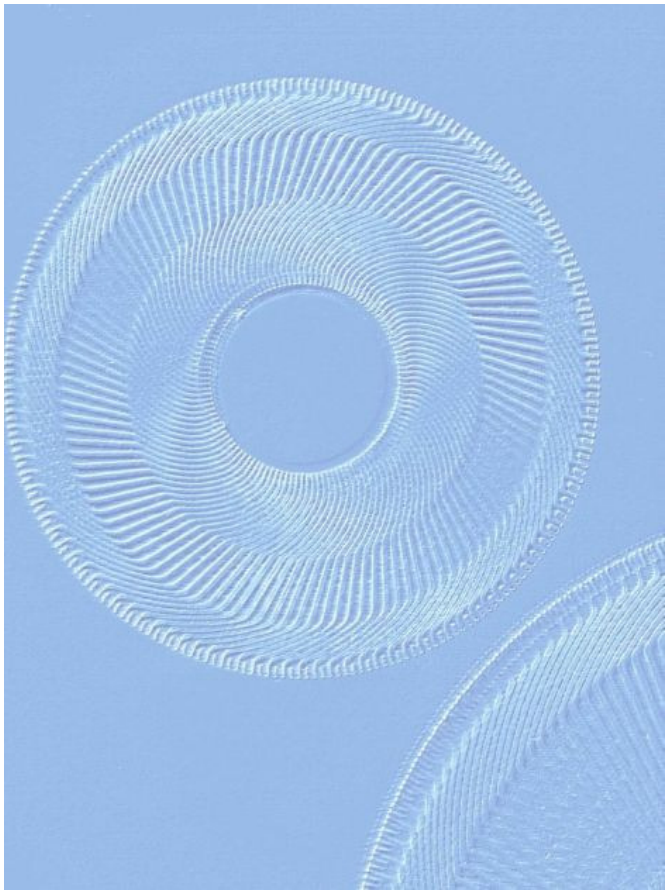
Performance Data

U…D-… Series

with printed armature

ServoDisk® Motors



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Printed Motors

Platinum Series ServoDisc

PERFORMANCE DATA

Platinum U9D Series Pancake Servomotors
Motor Torque Frame Size U9D-A to U9D-F

Motor Diameter	D	4.4/111	Inches/mm
Motor Length	LG	1.8/46.7	Inches/mm
Weight	W	3.8/1.7	Lbs/kg

Performance Specifications	Symbol	Units	Standard Torque Frames—Series Windings U9D-A	U9D-B	U9D-C	U9D-D	U9D-E	U9D-F
Peak Torque	T_p	oz-in	453	545	581	727	773	691
		N-cm	319.9	384.9	410.3	513.4	545.9	488.0
Rated Speed	N	RPM	3000	3000	3000	3000	3000	3000
Rated Continuous Torque @25°C	T_{25}	oz-in	50	60	65	80	85	75
		N-cm	35.3	42.4	45.9	56.5	60.0	53.0
Rated Continuous Torque @40°C	T_{40}	oz-in	45	54	59	72	77	68
		N-cm	32.0	38.3	41.5	51.1	54.3	47.9
Rated Power Output	P	Watts	109	133	142	179	190	170
Maximum Recommended Speed	Nmax	RPM	6000	6000	6000	6000	6000	6000
Continuous Stall Torque	T_s	oz-in	39	48	51	65	69	62
		N-cm	27.5	33.9	36.0	45.9	48.7	43.8
Cogging Torque	T_c	oz-in	0.0	0.0	0.0	0.0	0.0	0.0
		N-cm	0.0	0.0	0.0	0.0	0.0	0.0
Electrical Specifications								
Rated Terminal Voltage	E	Volts	23	26	27	32	33	30
Rated Continuous Current	I	Amps	8.67	8.64	8.63	8.57	8.55	8.59
Peak Current	I_p	Amps	72	72	72	72	72	72
Continuous Stall Current	I_s	Amps	6.8	6.8	6.8	6.8	6.8	6.8
Winding Specifications								
Terminal Resistance +/- 10%	R_t	Ohms	0.85	0.85	0.85	0.85	0.85	0.85
Armature Resistance +/- 10%	R_a	Ohms	0.66	0.66	0.66	0.66	0.66	0.66
Back EMF Constant +/- 10%	K_e	V/kRPM	5	6	6.4	8	8.5	7.6
Torque Constant +/- 10%	K_t	oz-in/Amp	6.8	8.1	8.7	10.8	11.5	10.3
		N-cm/Amp	4.8	5.7	6.1	7.6	8.1	7.3
Viscous Damping Constant	K_d	oz-in/kRPM	0.8	0.9	1	1.2	1.3	1.2
		N-cm/kRPM	0.6	0.6	0.7	0.8	0.9	0.8
Armature Inductance	L	µH	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Temperature Coeff. of Ke	C	%/°C Rise	-0.093	-0.093	-0.093	-.093	-0.093	-0.093
Mechanical Specifications								
Moment of Inertia	J_m	oz-in-sec2	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056
		kg-cm2	0.395	0.395	0.395	0.395	0.395	0.395
Static Friction Torque	T_f	oz-in	4	4	4	4	4	4
		N-cm	2.8	2.8	2.8	2.8	2.8	2.8
Number of Commutator Bars	Z		117	117	117	117	117	117
Figures of Merit								
Peak Acceleration	A_p	kRad/s2	80.9	97.2	103.8	129.9	138.1	123.4
Mechanical Time Constant	T_m	ms	11.27	7.85	6.9	4.43	3.92	4.9
Electrical Time Constant	T_e	ms	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Continuous Power Rate	P_c	kW/sec	3.06	4.52	5.17	8.19	9.25	7.38
Thermal Specifications								
Thermal Resistance at Rated Speed	RAAR	°C/Watt	1.3	1.3	1.3	1.3	1.3	1.3
Thermal Resistance at Stall	RAAS	°C/Watt	2.4	2.4	2.4	2.4	2.4	2.4
Forced Air Thermal Resistance:								
- w/ 2.0 Lbs/Min Forced Air	RAA3	°C/Watt	0.32	0.32	0.32	0.32	0.32	0.32

Notes:
1) All values are based upon a 150°C armature temperature limit and with the motor mounted on a 8" x 16" x 3/8" aluminum heatsink with no forced air cooling. Other voltages, speeds, and torques, and duty cycles are achievable as long as the max. armature temp. of 150°C is not exceeded.
2) Mass air flow (lbs/min) = air volume (CFM) x air density (lbs/Cu. Ft.)
3) Terminal Resistance is measured at 4.0 Amps. R_t varies as a function of applied current
4) Unless otherwise noted, all specifications above apply at 25°C.
5) Peak torque and current is calculated based on max. pulse duration of 50 milliseconds and a 1% duty cycle.

Platinum Series ServoDisc

PERFORMANCE DATA

Platinum U9D Series Pancake Servomotors With Integral Tachometer Motor Torque Frame Size U9DT-A to U9DT-F

Motor Diameter	D	4.4/111	Inches/mm
Motor Length	LG	1.8/46.7	Inches/mm
Weight	W	3.8/1.7	Lbs/kg

Performance Specifications	Symbol	Units	Standard Torque Frames—Series Windings U9DT-A	U9DT-B	U9DT-C	U9DT-D	U9DT-E	U9DT-F
Peak Torque	T_p	oz-in	412	528	547	699	795	680
		N-cm	290.9	372.8	386.3	493.6	561.4	480.2
Rated Speed	N	RPM	3000	3000	3000	3000	3000	3000
Rated Continuous Torque @25°C	T_{25}	oz-in	45	55	60	75	85	72
		N-cm	31.8	38.8	42.4	53.0	60.0	50.8
Rated Continuous Torque @40°C	T_{40}	oz-in	40.5	49.5	54	67.5	76.5	64.8
		N-cm	28.6	35.0	38.1	47.7	54.0	45.8
Rated Power Output	P	Watts	94	123	128	165	187	160
Maximum Recommended Speed	Nmax	RPM	6000	6000	6000	6000	6000	6000
Continuous Stall Torque	T_s	oz-in	34	44	46	60	69	58
		N-cm	24.0	31.1	32.5	42.4	48.7	41.0
Cogging Torque	T_c	oz-in	0.0	0.0	0.0	0.0	0.0	0.0
		N-cm	0.0	0.0	0.0	0.0	0.0	0.0
Electrical Specifications								
Rated Terminal Voltage	E	Volts	22	25.1	25.7	30.1	32.9	29.6
Rated Continuous Current	I	Amps	8.32	8.72	8.71	8.65	8.6	8.66
Peak Current	I_p	Amps	71	71	71	71	71	71
Continuous Stall Current	I_s	Amps	6.5	6.5	6.5	6.5	6.5	6.5
Winding Specifications								
Terminal Resistance +/- 10%	R_t	Ohms	0.85	0.85	0.85	0.85	0.85	0.85
Armature Resistance +/- 10%	R_a	Ohms	0.66	0.66	0.66	0.66	0.66	0.66
Back EMF Constant +/- 10%	K_e	V/kRPM	4.6	5.6	5.8	7.4	8.4	7.2
Torque Constant +/- 10%	K_t	oz-in/Amp	6.2	7.6	7.8	10.0	11.4	9.7
		N-cm/Amp	4.4	5.3	5.5	7.1	8.0	6.9
Viscous Damping Constant	K_d	oz-in/kRPM	0.7	0.9	0.9	1.2	1.4	1.1
		N-cm/kRPM	0.5	0.6	0.6	0.8	1.0	0.8
Armature Inductance	L	µH	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Temperature Coeff. of Ke	C	%/°C Rise	-0.093	-0.093	-0.093	-0.093	-0.093	-0.093
Mechanical Specifications								
Moment of Inertia	J_m	oz-in-sec^2	0.0083	0.0083	0.0083	0.0083	0.0083	0.0083
		kg-cm^2	0.586	0.586	0.586	0.586	0.586	0.586
Static Friction Torque	T_f	oz-in	4.5	4.5	4.5	4.5	4.5	4.5
		N-cm	3.2	3.2	3.2	3.2	3.2	3.2
Number of Commutator Bars	Z		117	117	117	117	117	117
Figures of Merit								
Peak Acceleration	A_p	kRad/s^2	73.6	94.3	97.7	124.9	141.9	121.5
Mechanical Time Constant	T_m	ms	13.29	8.19	7.64	4.7	3.65	4.97
Electrical Time Constant	T_e	ms	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Continuous Power Rate	P_c	kW/sec	2.26	3.89	4.19	6.97	9.01	8.47
Thermal Specifications								
Thermal Resistance at Rated Speed	RAAR	° C/Watt	1.3	1.3	1.3	1.3	1.3	1.3
Thermal Resistance at Stall	RAAS	° C/Watt	2.4	2.4	2.4	2.4	2.4	2.4
Forced Air Thermal Resistance:								
- w/ 2.0 lbs/min Forced Air	RAA3	° C/Watt	0.23	0.23	0.23	0.23	0.23	0.23
Tachometer Specifications								
Output Voltage	V	Volts/kRPM	2.30	2.80	2.90	3.70	4.20	3.60
MaxRipple peak to peak(@1000RPM)	Vrh	%	3.0	3.0	3.0	3.0	3.0	3.0
Linearity of Output Voltage(@3600RPM)	LIN	%	0.06	0.06	0.06	0.06	0.06	0.06

Notes:

1) All values are based upon a 150°C armature temperature limit and with the motor mounted on a 8" x 16" x 3/8" aluminum heatsink with no forced air cooling. Other voltages, speeds, and torques, and duty cycles are achievable as long as the max. armature temp. of 150°C is not exceeded.
2) Mass air flow (lbs/min) = air volume (CFM) x air density (lbs/Cu. Ft.)
3) Terminal Resistance is measured at 4.0 Amps. R_t varies as a function of applied current
4) Unless otherwise noted, all specifications above apply at 25°C.
5) Peak torque and current is calculated based on max. pulse duration of 50 milliseconds and a 1% duty cycle.

Platinum Series ServoDisc

PERFORMANCE DATA

Platinum U12D Series Pancake Servomotors
Motor Torque Frame Size U12D-A to U12D-F

Motor Diameter	D	5.5/ 139.7	Inches/mm
Motor Length	LG	2.1/ 53.3	Inches/mm
Weight	W	6.8/ 3.1	Lbs/kg

			Standard Torque Frames—Series Windings					
Performance Specifications	**Symbol**	**Units**	**U12D-A**	**U12D-B**	**U12D-C**	**U12D-D**	**U12D-E**	**U12D-F**
Peak Torque	T_p	oz-in	1285	1403	1541	1744	1893	1935
		N-cm	907.4	990.7	1088.2	1231.5	1336.8	1366.4
Rated Speed	N	RPM	3000	3000	3000	3000	3000	3000
Rated Continuous Torque @25°C	T_{25}	oz-in	130	135	150	160	175	175
		N-cm	91.8	95.3	105.9	113.0	123.6	123.6
Rated Continuous Torque @40°C	T_{40}	oz-in	116	120	134	142	156	156
		N-cm	81.7	84.8	94.3	100.6	110.0	110.0
Rated Power Output	P	Watts	275	298	325	362	387	380
Maximum Recommended Speed	Nmax	RPM	6000	6000	6000	6000	6000	6000
Continuous Stall Torque	T_s	oz-in	116	127	140	159	173	175
		N-cm	81.9	89.7	98.9	112.3	122.2	123.6
Cogging Torque	T_c	oz-in	0.0	0.0	0.0	0.0	0.0	0.0
		N-cm	0.0	0.0	0.0	0.0	0.0	0.0
Electrical Specifications								
Rated Terminal Voltage	E	Volts	43.3	46	49	55	59	59
Rated Continuous Current	I	Amps	8.65	8.59	8.51	8.37	8.26	8.01
Peak Current	I_p	Amps	84	84	84	84	84	84
Continuous Stall Current	I_s	Amps	7.9	7.9	7.9	7.9	7.9	7.9
Winding Specifications								
Terminal Resistance +/- 10%	R_t	Ohms	0.75	0.75	0.75	0.75	0.75	0.75
Armature Resistance +/- 10%	R_a	Ohms	0.61	0.61	0.61	0.61	0.61	0.61
Back EMF Constant +/- 10%	K_e	V/kRPM	12.1	13.2	14.5	16.4	17.8	18.2
Torque Constant +/- 10%	K_t	oz-in/Amp	16.4	17.9	19.6	22.2	24.1	24.6
		N-cm/Amp	11.6	12.6	13.8	15.7	17.0	17.4
Viscous Damping Constant	K_d	oz-in/kRPM	1.9	2.2	2.6	3.1	3.6	3.8
		N-cm/kRPM	1.3	1.6	1.8	2.2	2.5	2.7
Armature Inductance	L	µH	<.045	<.045	<.045	<.045	<.045	<.045
Temperature Coeff. Of Ke	C	%/°C Rise	-0.093	-0.093	-0.093	-0.093	-0.093	-.093
Mechanical Specifications								
Moment of Inertia	J_m	oz-in-sec^2	0.019	0.019	0.019	0.019	0.019	0.019
		kg-cm^2	1.342	1.342	1.342	1.342	1.342	1.342
Static Friction Torque	T_f	oz-in	5.5	5.5	5.5	5.5	5.5	7
		N-cm	3.9	3.9	3.9	3.9	3.9	4.9
Number of Commutator Bars	Z		141	141	141	141	141	141
Figures of Merit								
Peak Acceleration	A_p	kRad/s$_2$	67.6	73.8	81.1	91.8	99.7	101.8
Mechanical Time Constant	T_m	ms	6.09	5.12	4.24	3.32	2.82	2.69
Electrical Time Constant	T_e	ms	0.07	0.07	0.07	0.07	0.07	0.07
Continuous Power Rate	P_c	kW/sec	5.71	6.72	7.98	9.9	11.35	10.94
Thermal Specifications								
Thermal Resistance at Rated Speed	RAAR	°C/Watt	1.25	1.25	1.25	1.25	1.25	1.25
Thermal Resistance at Stall	RAAS	°C/Watt	1.9	1.9	1.9	1.9	1.9	1.9
Forced Air Thermal Resistance:								
- w/ 2.0 lbs/min Forced Air	RAA3	°C/Watt	0.23	0.23	0.23	0.23	0.23	0.23

Notes:

1) All values are based upon a 150°C armature temperature limit and with the motor mounted on a 8" x 16" x 3/8" aluminum heatsink with no forced air cooling. Other voltages, speeds, and torques, and duty cycles are achievable as long as the max. armature temp. of 150°C is not exceeded.
2) Mass air flow (lbs/min) = air volume (CFM) x air density (lbs/Cu. Ft.)
3) Terminal Resistance is measured at 4.0 Amps. R_t varies as a function of applied current
4) Unless otherwise noted, all specifications above apply at 25°C.
5) Peak torque and current is calculated based on max. pulse duration of 50 millisecond and a 1% duty cycle

Platinum Series ServoDisc

PERFORMANCE DATA

Platinum U12D Series Pancake Servomotors With Integral Tachometer Motor Torque Frame Size U12DT-A to U12DT-F

Motor Diameter	D	5.5/ 139.7	Inches/mm
Motor Length	LG	2.1/ 53.3	Inches/mm
Weight	W	6.8/ 3.1	Lbs/kg

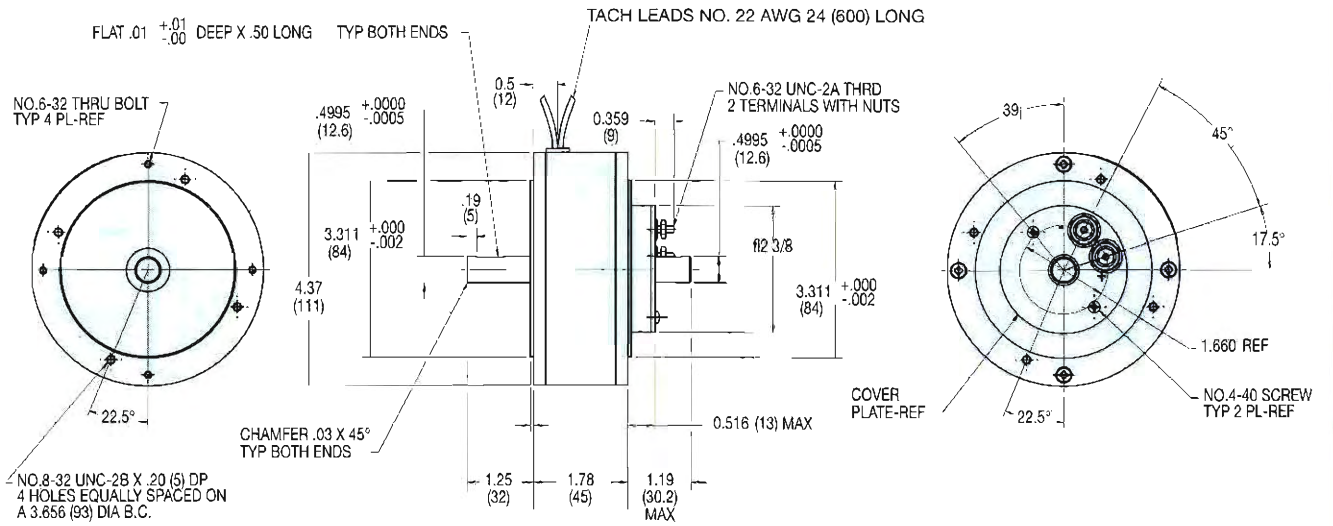
			Standard Torque Frames—Series Windings					
Performance Specifications	**Symbol**	**Units**	**U12DT-A**	**U12DT-B**	**U12DT-C**	**U12DT-DT**	**U12DT-E**	**U12DT-F**
Peak Torque	T_p	oz-in	1178	1307	1435	1648	1829	1936
		N-cm	831.9	922.9	1013.3	1163.7	1291.6	1367.1
Rated Speed	N	RPM	3000	3000	3000	3000	3000	3000
Rated Continuous Torque @25°C	T_{25}	oz-in	115	125	135	155	165	175
		N-cm	81.2	88.3	95.3	109.5	116.5	123.6
Rated Continuous Torque @40°C	T_{40}	oz-in	104.65	113.75	122.85	141.05	150.15	159.25
		N-cm	73.9	80.3	86.8	99.6	106.0	112.5
Rated Power Output	P	Watts	250	276	301	341	373	390
Maximum Recommended Speed	Nmax	RPM	6000	6000	6000	6000	6000	6000
Continuous Stall Torque	T_s	oz-in	105	117	129	149	166	176
		N-cm	74.1	82.6	91.1	105.2	117.2	124.3
Cogging Torque	T_c	oz-in	0.0	0.0	0.0	0.0	0.0	0.0
Electrical Specifications								
Rated Terminal Voltage	E	Volts	40	43	47	52	57	60
Rated Continuous Current	I	Amps	8.65	8.59	8.52	8.38	8.25	8.16
Peak Current	I_p	Amps	84	84	84	84	84	84
Continuous Stall Current	I_s	Amps	7.9	7.9	7.9	7.9	7.9	7.9
Winding Specifications								
Terminal Resistance +/- 10%	R_t	Ohms	0.75	0.75	0.75	0.75	0.75	0.75
Armature Resistance +/- 10%	R_a	Ohms	0.61	0.61	0.61	0.61	0.61	0.61
Back EMF Constant +/- 10%	K_e	V/kRPM	11.1	12.3	13.5	15.5	17.2	18.2
Torque Constant +/- 10%	K_t	oz-in/Amp	15.0	16.6	18.3	21.0	23.3	24.6
		N-cm/Amp	10.6	11.7	12.9	14.8	16.4	17.4
Viscous Damping Constant	K_d	oz-in/kRPM	1.7	2	2.3	2.9	3.4	3.8
		N-cm/kRPM	1.2	1.4	1.6	2.0	2.4	2.7
Armature Inductance	L	µH	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Temperature Coeff. of Ke	C	%°/C Rise	-0.093	-0.093	-0.093	-0.093	-0.093	-0.093
Mechanical Specifications								
Moment of Inertia	J_m	oz-in-sec^2	0.026	0.026	0.026	0.026	0.026	0.026
		kg-cm^2	1.836	1.836	1.836	1.836	1.836	1.836
Static Friction Torque	T_f	oz-in-sec^2	6.0	6.0	6.0	6.0	6.0	6.0
		N-cm	4.2	4.2	4.2	4.2	4.2	4.2
Number of Commutator Bars	Z		141	141	141	141	141	141
Figures of Merit								
Peak Acceleration	A_p	Krad/s^2	62	68.8	75.5	86.7	96.3	101.9
Mechanical Time Constant	T_m	ms	7.23	5.89	4.89	3.71	3.02	2.69
Electrical Time Constant	T_e	ms	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Continuous Power Rate	P_c	kW/sec	4.72	5.76	6.86	8.8	10.5	11.52
Thermal Specifications								
Thermal Resistance at Rated Speed	RAAR	°C/Watt	1.25	1.27	1.27	1.27	1.27	1.27
Thermal Resistance at Stall	RAAS	°C/Watt	1.9	1.9	1.9	1.9	1.9	1.9
Forced Air Thermal Resistance:								
- w/ 2.0 lbs/min Forced Air	RAA3	°C/Watt	0.23	0.23	0.23	0.23	0.23	0.23
Tachometer Specifications								
Output Voltage	V	Volts/kRPM	5.40	6.00	6.50	7.50	8.30	8.80
Max Ripple peak to peak (@1000RPM)	Vrh	%	3.0	3.0	3.0	3.0	3.0	3.0
Linearity of Output Voltage (@3600RPM)	LIN	%	0.11	0.11	0.11	0.11	0.11	0.11

Notes:

1) All values are based upon a 150°C armature temperature limit and with the motor mounted on a 8" x 16" x 3/8" aluminum heatsink with no forced air cooling. Other voltages, speeds, and torques, and duty cycles are achievable as long as the max. armature temp. of 150°C is not exceeded.
2) Mass air flow (lbs/min) = air volume (CFM) x air density (lbs/Cu. Ft.)
3) Terminal Resistance is measured at 4.0 Amps. R_t varies as a function of applied current
4) Unless otherwise noted, all specifications above apply at 25°C.
5) Peak torque and current is calculated based on max. pulse duration of 50 milliseconds and a 1% duty cycle.

DIMENSIONS

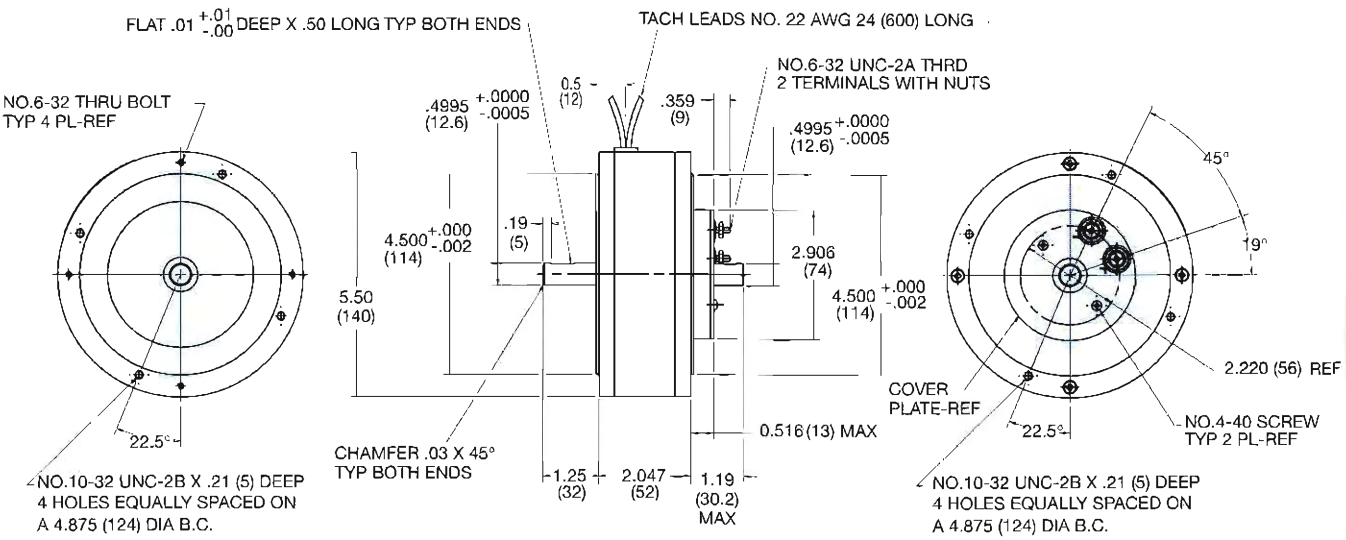
U9D-A to U9D-F



Note:
1) True metric designs available.

Dimensions in inches (mm)

U12D-A to U12D-F



Note:
1) True metric designs available.

Dimensions in inches (mm)