

## M4-295X DC Servomotors

Direct Replacement of SEM MT30 \* motors



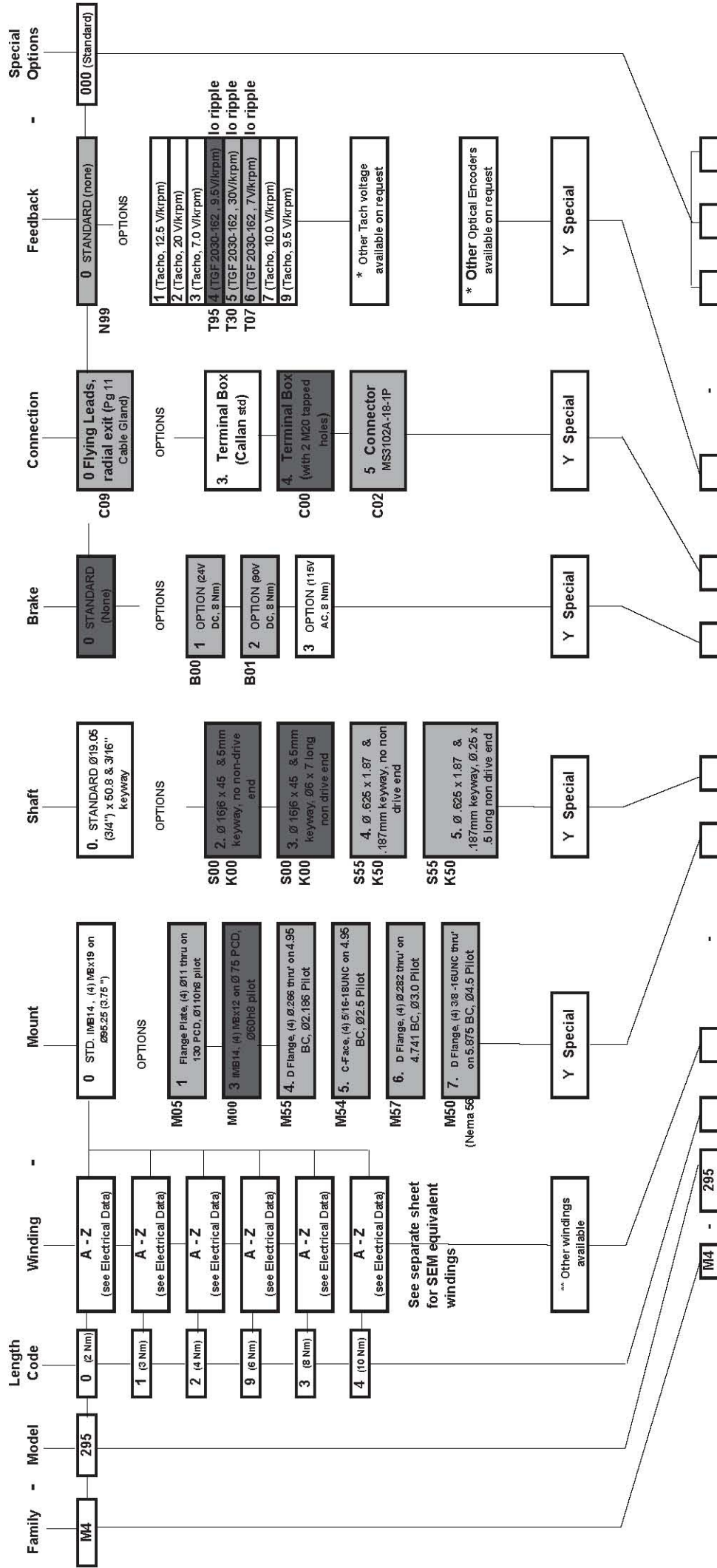
- Identical motor shaft and mount dimensions (IEC & NEMA options)
- Matched motor windings
- Compatible torque/speed performance
- Matched connection options
- 24/90 V DC or 115V AC brake options
- Matched tachogenerator output
- Encoder options available
- Matched non drive end interface options
- Rare Earth magnets
- Rugged mechanical design

\* MT is a tradename of SEM Ltd, UK, brush DC servomotors



Original Part Number	Our Equivalent
MT30E4-52	M4-2950 M
MT30E4-32	M4-2950 Q
MT30E4-25	M4-2950 S
MT30E4-20	M4-2950 A
MT30F4-52	M4-2950 M
MT30F4-45	M4-2950 F (updated 11/9/11)
MT30F4-39	M4-2950 U
MT30F4-25	M4-2950 S
MT30H4-65	M4-2951 L
MT30H4-44	M4-2951 I
MT30H4-33	M4-2951 C
MT30H4-22	M4-2951 E
MT30M4-59	M4-2951 K
MT30M4-48	M4-2951 J
MT30M4-38	M4-2951 H
MT30M4-24	M4-2951 G
MT30R4-58	M4-2952 I
MT30R4-46	M4-2952 B (updated 3/12/12)
MT30R4-37	M4-2952 A
MT30R4-25	M4-2952 F
MT30U4-57	M4-2959 E
MT30U4-48	M4-2959 F
MT30U4-36	M4-2959 A
MT30U4-26	M4-2959 G
MT30Z4-85	M4-2959 H
MT30Z4-61	M4-2959 B
MT30Z4-37	M4-2959 A

# M4-295X Code Table (Replacements for SEM MT30)

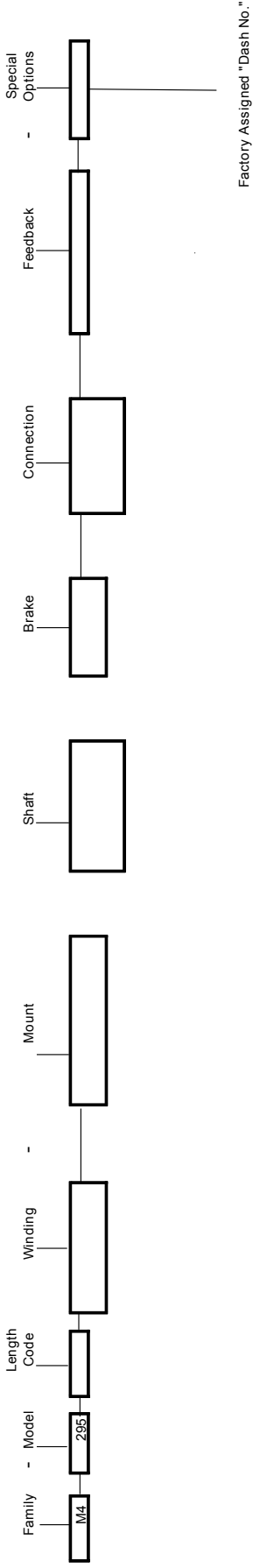


[Grey Box] = SEM Standard for MT30  
 [White Box] = SEM Standard Option for MT30

For encoders, encoder adapters, rear shaft, thermostats, shaft seals etc please contact factory

Example : M4 - 295 3 A - 0 0 0 1 1 - 0 0 0 0

M4-295X Code Table (Replacements for SEM MT30)



Dash No. List (as of 5/12/12)

- 000 Standard motor as specified by order code, no thermostat, no rear shaft ext (plain endcover)
- 124 Motor as specified by order code, no thermostat, rear shaft ext provided Ø6mm (motor rear compatible with SEM MT30)
- 140 Motor as specified by order code, with thermostat, no rear shaft ext (plain endcover)
- 142 Motor as specified by order code, with thermostat, rear shaft ext provided Ø6mm (motor rear compatible with SEM MT30)

Accessories (must be specified and ordered separately)

- M75701-567 Encoder Adapter (BEC 260 or 755) .... Suitable for motors -124 or -142 (replaces SEM A04)
- M35701-100 Encoder Cover (BEC 260 or 755) .... Suitable for motors -124 or -142 Adapts to item M75701-567 above (replaces SEM G01/G02)

Motor	M4-2950						M4-2950							
	Winding		Q		S		A		M		F		U	
	(MT30E4-52)		(MTE4-32)		(MT30E4-25)		(MT30E4-20)		(MT30E4-52)		(MT30F4-45)		(MT30F4-39)	
Power, P (W) (Brush cont. Limit)	0.5	0.7	0.75	0.75	0.75	0.75	0.75	0.75	0.5	0.5	0.52	0.52	0.75	
Max Speed, Nmax (rpm)	2,700	4,000	4,000	4,000	4,000	4,000	4,000	4,000	2,700	3,000	3,600	3,600	4,000	
Cont. Torque Mo (Nm)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Current @ Cont. Torque, Io (A)	4.3	6.9	9.2	9.2	9.2	11.7	11.7	11.7	4.3	4.8	5.7	5.7	9.2	
Peak Torque, Mmax (Nm)	13	17.2	15.5	15.5	15.5	12.9	12.9	12.9	13	14.7	16.5	16.5	15.5	
Current @ Peak Torque, Ip (A)	32	79	90	90	90	90	90	90	32	42	60	60	90	
Max Terminal Voltage, Vt (V)	140	130	100	100	100	80	80	80	140	140	140	140	100	
Back EMF Const. Ke (V/krpm)	51	31	23.8	23.8	23.8	18.2	18.2	18.2	51	45.5	38.2	38.2	23.8	
Torque Const., Kt (Nm/A)	0.482	0.293	0.225	0.225	0.225	0.172	0.172	0.172	0.482	0.43	0.361	0.361	0.225	
DC Resistance, R ( )	2.9	1.1	0.55	0.55	0.55	0.32	0.32	0.32	2.9	2.2	1.55	1.55	0.55	
Inductance, L (mH)	7.2	2.7	1.55	1.55	1.55	0.92	0.92	0.92	7.2	5.7	4	4	1.55	
Weight, M (kg)	7.5													
Inertia, J (kgm <sup>2</sup> )	9.4x10 <sup>4</sup>													
Static Friction, Tf (Nm)	0.145													
Viscous Damping, F1 (Nm/krpm)	0.03													

Tachogenerator Option	
Tachogenerator Model	TGF 2030
Voltage, Kg (V/krpm)	7.0 / 9.5 / 19.0/30.0
Ripple (pk-pk/avg)	2%

Encoder Option- Flexmount Encoder with internal bearing	
Encoder Type	Incremental (A quad B with index Z & complements)
Power Supply	5V DC +5%, 200mA max
Output	Line Driver, 20mA max source/sink
Resolution (ppr)	1024 / 2048 / 4096
Frequency Response	120 kHz max

Brake Option			
Brake Voltage	24 (DC)	90 (DC)	115 (AC)
Power (Watts)	16	16	16
Brake Static Torque (Nm)	12	12	12
Weight (brake + housing) Kg	2.5	2.5	2.5

Motor	M4-2951					M4-2951				
	L (MT30H4-65)	I (MT30H4-44)	C (MT30H4-33)	E (MT30H4-22)		K (MT30M4-59)	J (MT30M4-48)	H (MT30M4-38)	G (MT30M4-24)	
Winding replaces :-										
Power, P (W) (Brush cont. Limit)	0.6	0.65	0.8	0.82		0.6	0.65	0.7	0.8	
Max Speed, Nmax (rpm)	2,100	3,100	4,000	4,000		2,400	3,000	3,700	4,000	
Cont. Torque Mo (Nm)	2.9	2.9	2.9	2.9		2.9	2.9	2.9	2.9	
Current @ Cont. Torque, Io (A)	4.9	7.4	10	14.6		5.6	6.8	8.3	12.7	
Peak Torque, Mmax (Nm)	18.5	26	22	16.1		21.8	24.2	25	18	
Current @ Peak Torque, Ip (A)	35	84	90	90		49	70	90	90	
Max Terminal Voltage, Vf (V)	140	140	130	90		140	140	140	100	
Back EMF Const. Ke (V/krpm)	65.5	43.7	32.6	21.8		57.4	46.5	38.2	24.6	
Torque Const., Kt (Nm/A)	0.62	0.413	0.308	0.206		0.543	0.44	0.361	0.233	
DC Resistance, R ( )	2.65	1.1	0.6	0.27		1.88	1.32	0.85	0.37	
Inductance, L (mH)	8	3.55	2	0.89		6.1	4	2.7	1.1	
Weight, M (kg)	8.75					8.75				
Inertia, JM (kgm <sup>2</sup> )	11.7x10 <sup>4</sup>					11.7x10 <sup>4</sup>				
Static Friction, Tf (Nm)	0.222					0.222				
Viscous Damping, F1 (Nm/krpm)	0.052					0.052				

Tachogenerator Option	
Tachogenerator Model	TGF 2030
Voltage, K <sub>G</sub> (V/krpm)	7.0 / 9.5 / 19.0/30.0
Ripple (pk-pk/avg)	2%

Encoder Option- Flexmount Encoder with internal bearing	
Encoder Type	Incremental (A quad B with index Z & complements)
Power Supply	5V DC +5%, 200mA max
Output	Line Driver, 20mA max source/sink
Resolution (ppr)	1024 / 2048 / 4096
Frequency Response	120 kHz max

Brake Option			
Brake Voltage	24 (DC)	90 (DC)	115 (AC)
Power (Watts)	16	16	16
Brake Static Torque (Nm)	12	12	12
Weight (brake + housing) Kg	2.5	2.5	2.5

Motor		M4-2952			
Winding		I	B	A	F
replaces :-		(MT30R4-58)	(MT30R4-46)	(MT30R4-37)	(MT30R4-25)
Power, P (W) (Brush cont. Limit)		0.8	0.9	0.9	1.0
Max Speed, Nmax (rpm)		2,400	3,000	3,700	3,800
Cont. Torque Mo (Nm)		4.1	4.1	4.1	4.1
Current @ Cont. Torque, Io (A)		7.4	9.5	11.8	17
Peak Torque, Mmax (Nm)		32.5	30	27.1	20.3
Current @ Peak Torque, Ip (A)		73	90	90	90
Max Terminal Voltage, Vt (V)		140	140	140	100
Back EMF Const. Ke (V/krpm)		60	45.4	37.8	26.4
Torque Const., Kt (Nm/A)		0.567	0.434	0.357	0.25
DC Resistance, R ( )		1.26	0.68	0.452	0.25
Inductance, L (mH)		4.2	2.5	1.6	0.78
Weight, M (kg)		10			
Inertia, J (kgm <sup>2</sup> )		14x10 <sup>4</sup>			
Static Friction, Tf (Nm)		0.3			
Viscous Damping, F1 (Nm/krpm)		0.075			

#### Tachogenerator Option

Tachogenerator Model	TGF 2030
Voltage, Kg (V/krpm)	7.0 / 9.5 / 19.0/30.0
Ripple (pk-pk/avg)	2%

#### Encoder Option- Flexmount Encoder with internal bearing

Encoder Type	Incremental (A quad B with index Z & complements)
Power Supply	5V DC +5%, 200mA max
Output	Line Driver, 20mA max source/sink
Resolution (ppr)	1024 / 2048 / 4096
Frequency Response	120 kHz max

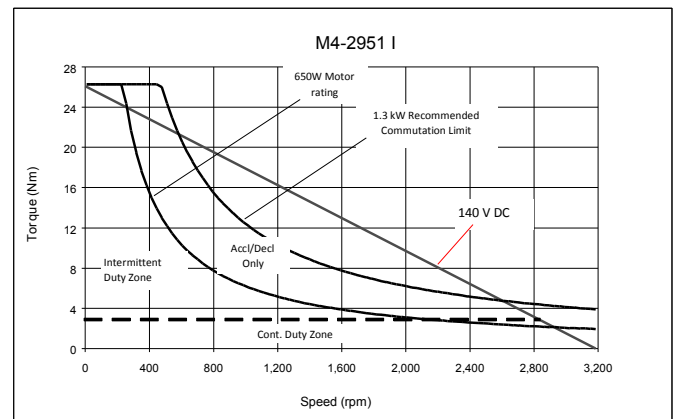
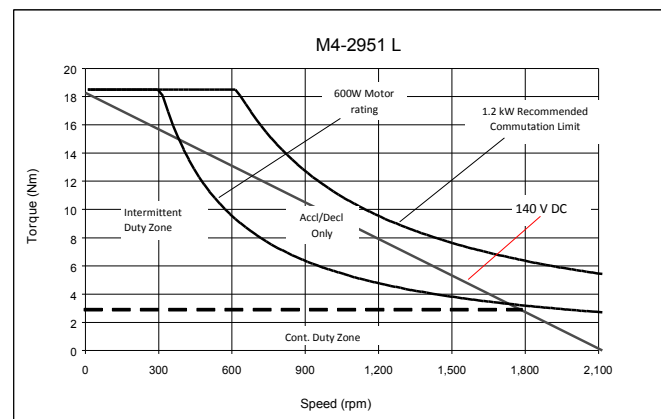
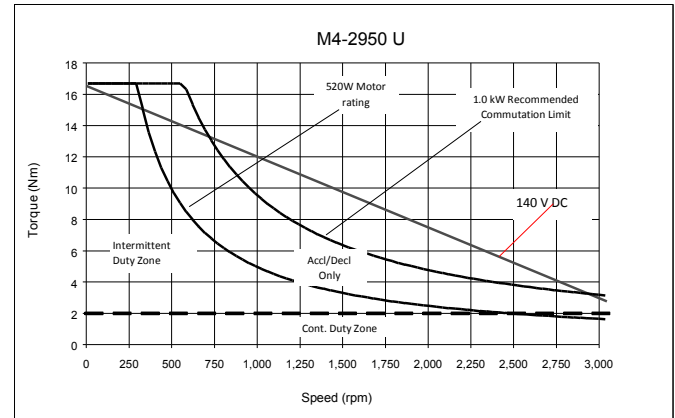
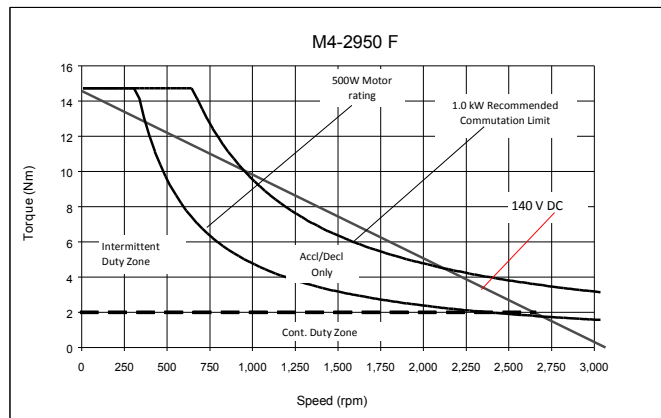
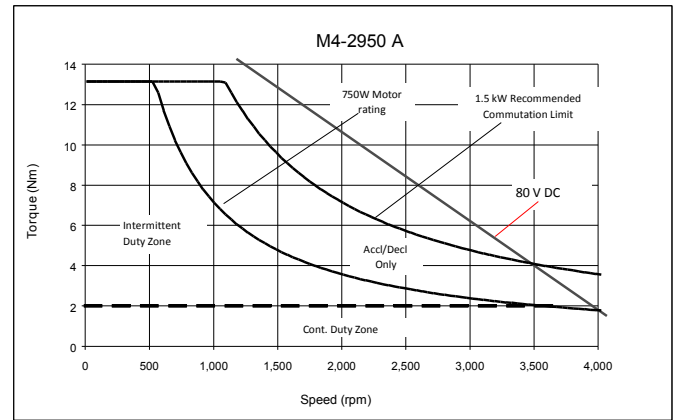
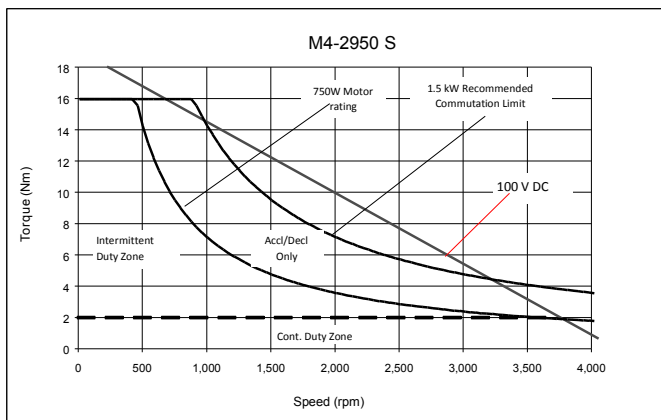
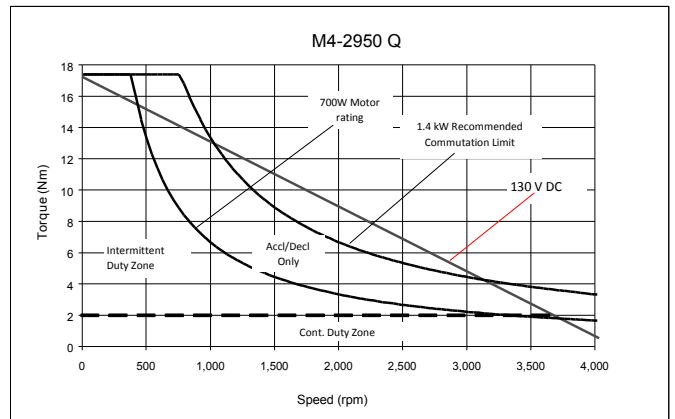
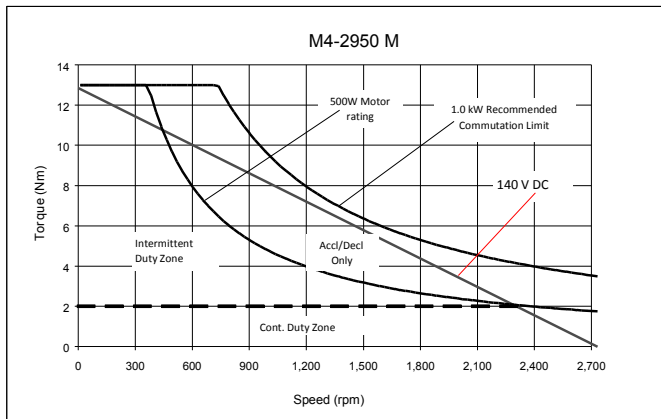
#### Brake Option

Brake Voltage	24 (DC)	90 (DC)	115 (AC)
Power (Watts)	16	16	16
Brake Static Torque (Nm)	12	12	12
Weight (brake + housing) Kg	2.5	2.5	2.5

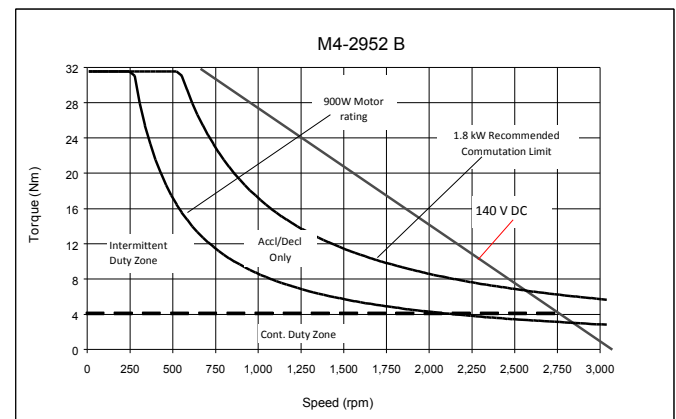
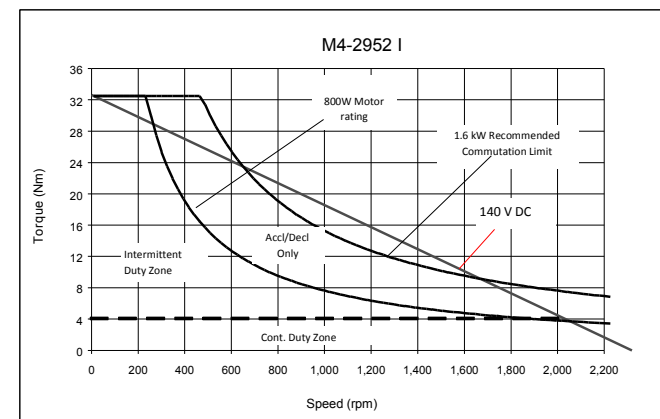
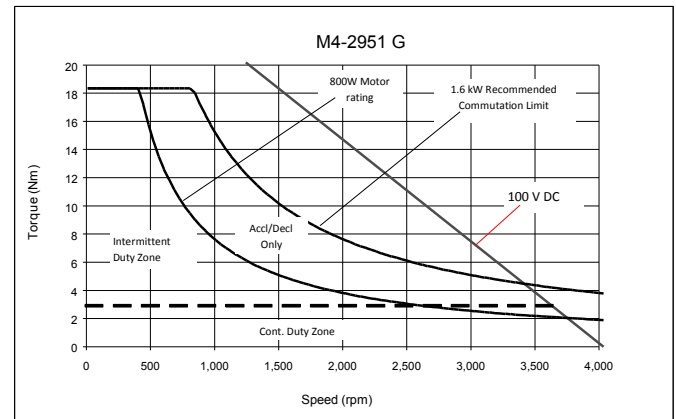
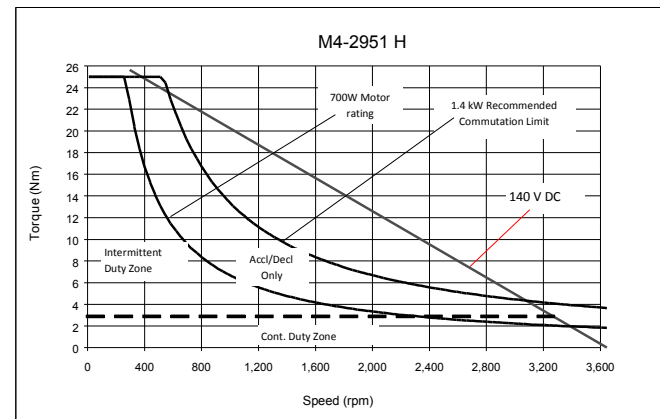
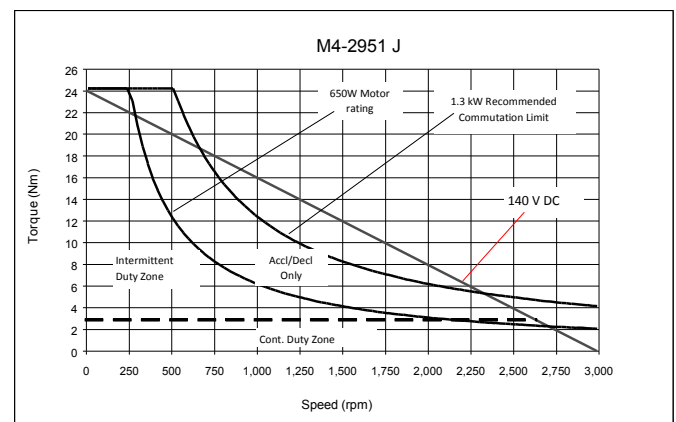
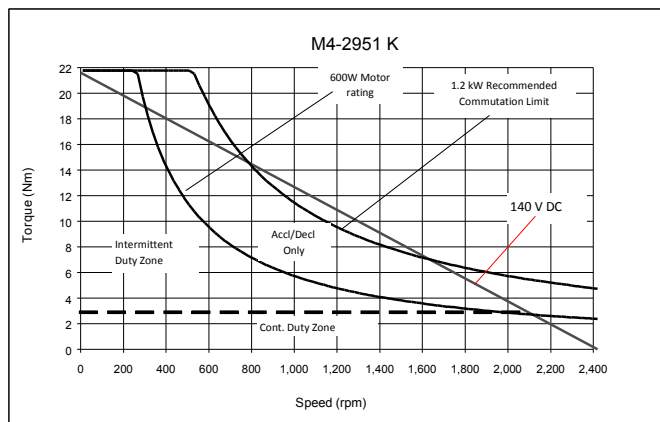
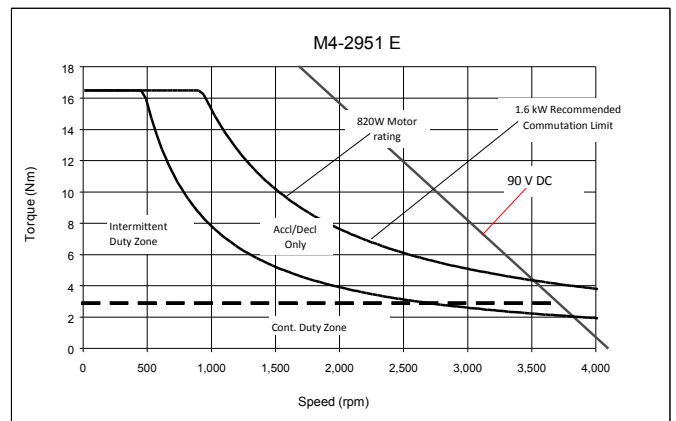
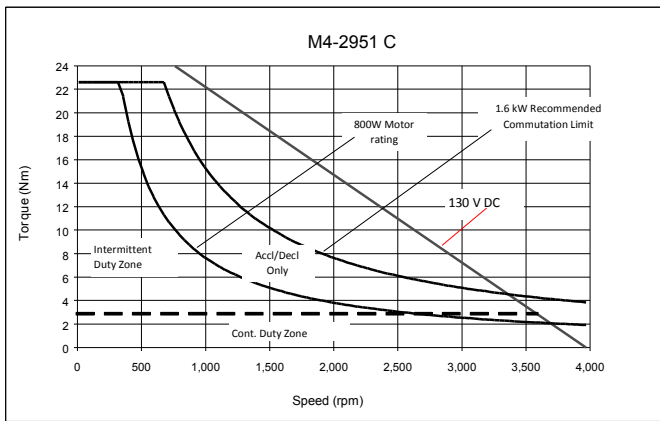
Motor	M4-2959				M4-2959			
Winding	E	F	A	G	H	B	A	
replaces :-	(MT30U4-57)	(MT30U4-48)	(MT30U4-36)	(MT30U4-26)	(MT30Z4-85)	(MT30Z4-61)	(MT30Z4-37)	
Power, P (W) (Brush cont. Limit)	1.0	1.1	1.2	1.2	0.9	1.0	1.2	
Max Speed, Nmax (rpm)	2,500	3,000	3,700	3,700	1,600	2,300	3,700	
Cont. Torque Mo (Nm)	6.0	5.9	5.9	5.8	6.0	6.0	5.9	
Current @ Cont. Torque, Io (A)	11.6	14.4	16	23	7.5	11	16	
Peak Torque, Mmax (Nm)	40	32.5	29.6	22	39.3	42	29.6	
Current @ Peak Torque, Ip (A)	90	90	90	90	56	90	90	
Max Terminal Voltage, Vf (V)	140	140	140	100	140	140	140	
Back EMF Const. Ke (V/krpm)	56	44.4	38.8	27.7	88.8	61	38.8	
Torque Const., Kt (Nm/A)	0.53	0.42	0.37	0.262	0.84	0.58	0.37	
DC Resistance, R ( )	0.64	0.4	0.32	0.16	1.65	0.8	0.32	
Inductance, L (mH)	2.4	1.54	1.2	0.6	6.1	2.9	1.2	
Weight, M (kg)	12.5							
Inertia, Jm (kgm <sup>2</sup> )	20.7x10 <sup>4</sup>							
Static Friction, Tf (Nm)	0.365							
Viscous Damping, F1 (Nm/krpm)	0.113							
Tachogenerator Option								
Tachogenerator Model	TGF 2030							
Voltage, Kg (V/krpm)	7.0 / 9.5 / 19.0/30.0							
Ripple (pk-pk/avg)	2%							
Encoder Option- Flexmount Encoder with internal bearing								
Encoder Type	Incremental (A quad B with index Z & complements)							
Power Supply	5V DC +5%, 200mA max							
Output	Line Driver, 20mA max source/sink							
Resolution (ppr)	1024 / 2048 / 4096							
Frequency Response	120 kHz max							
Brake Option								
Brake Voltage	24 (DC)	90 (DC)	115 (AC)					
Power (Watts)	16	16	16					
Brake Static Torque (Nm)	12	12	12					
Weight (brake + housing) Kg	2.5	2.5	2.5					



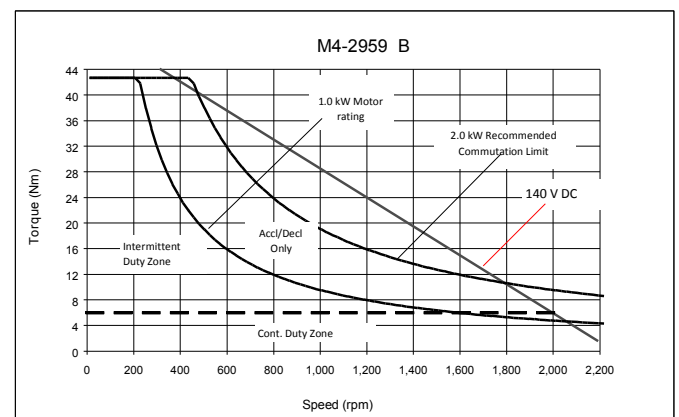
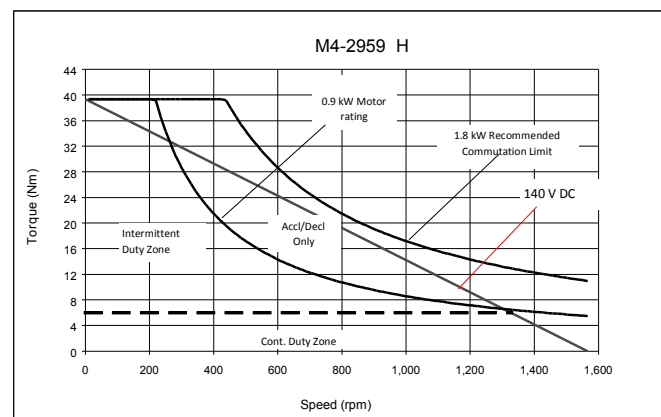
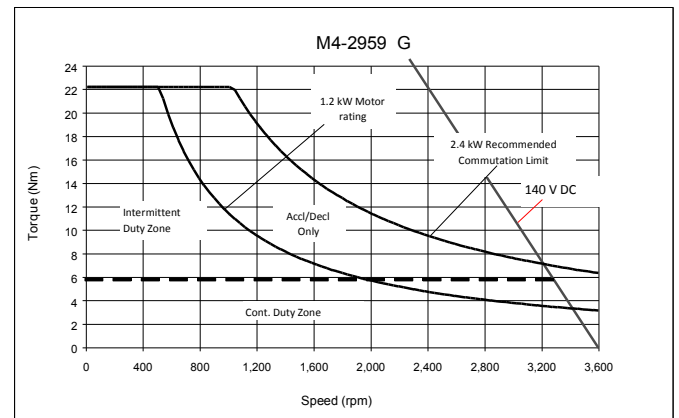
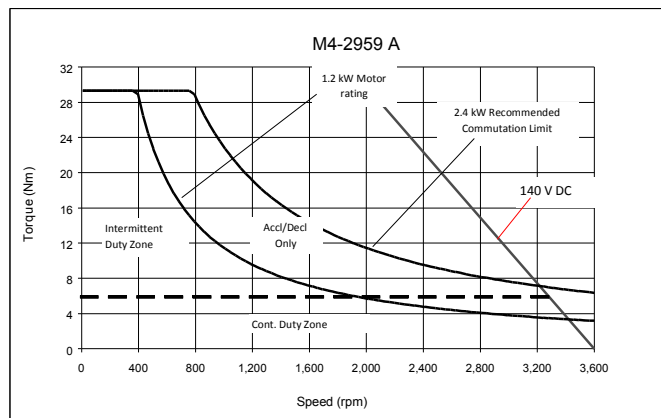
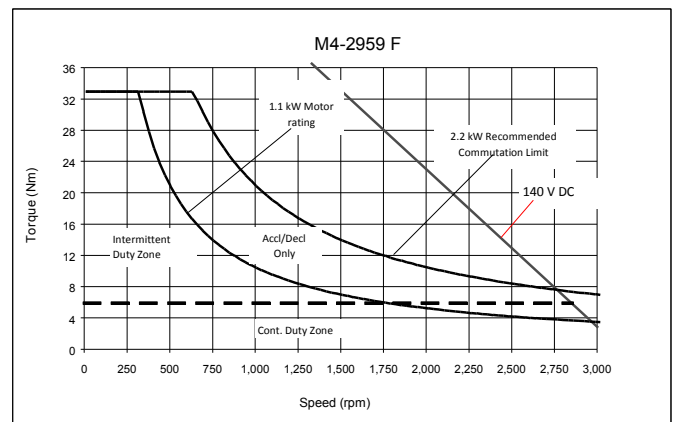
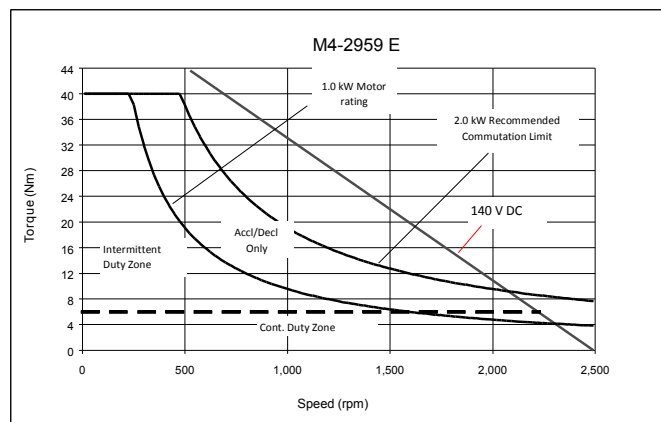
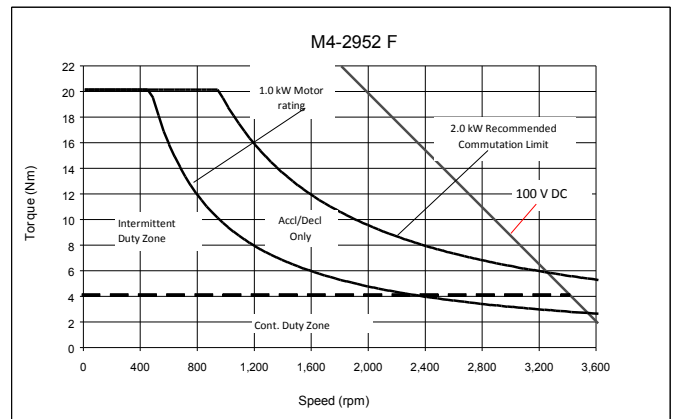
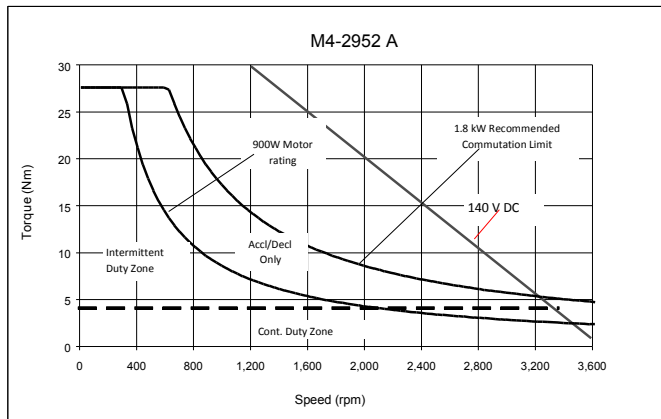
# Performance Curves

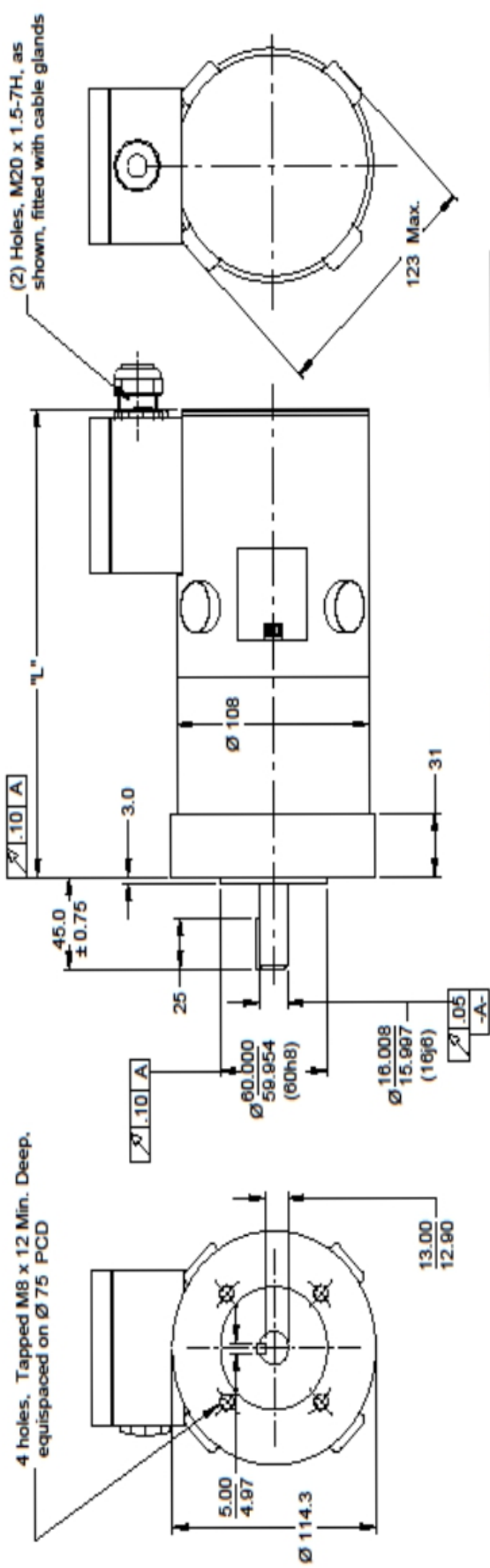


# Performance Curves



# Performance Curves



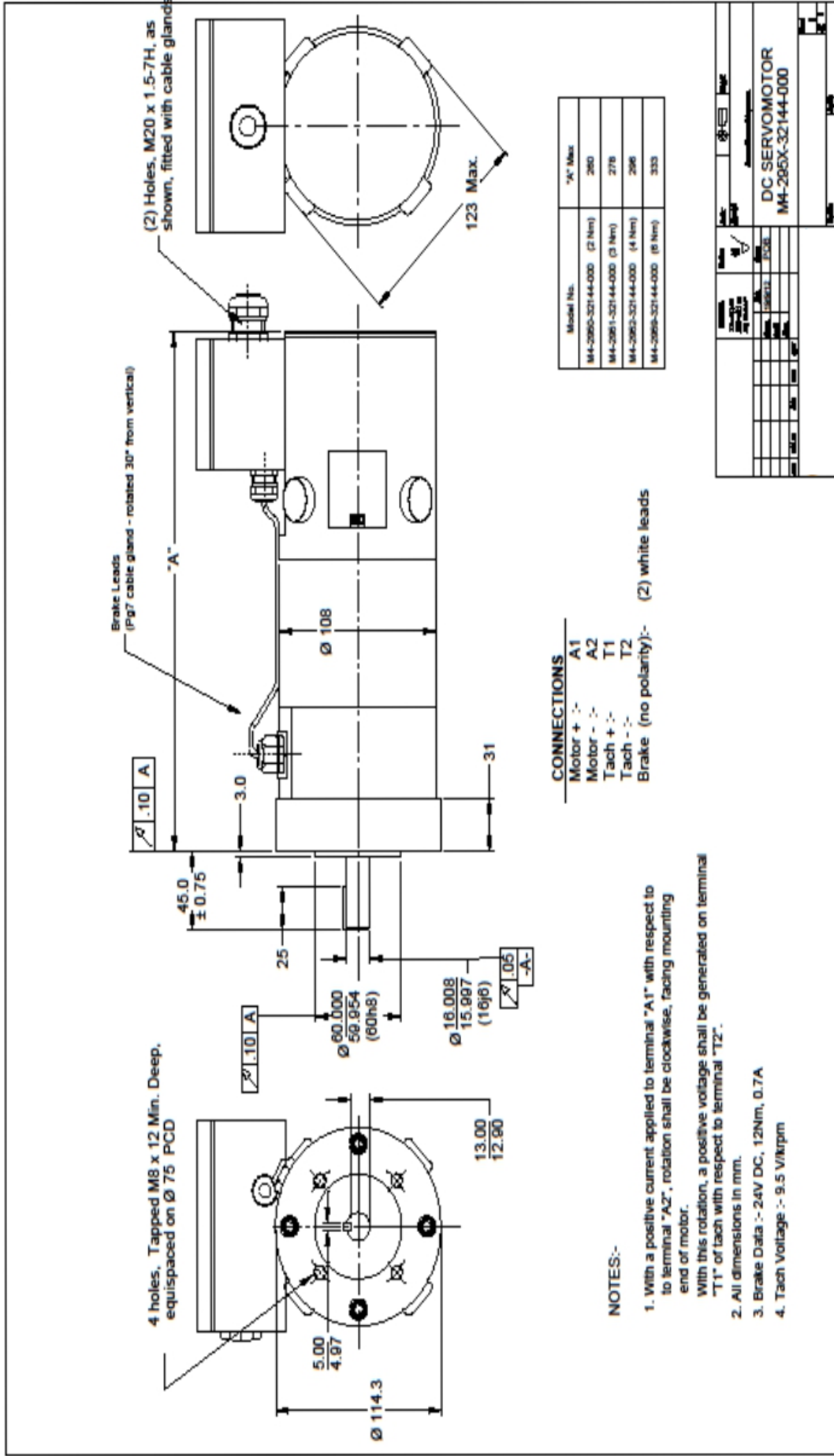


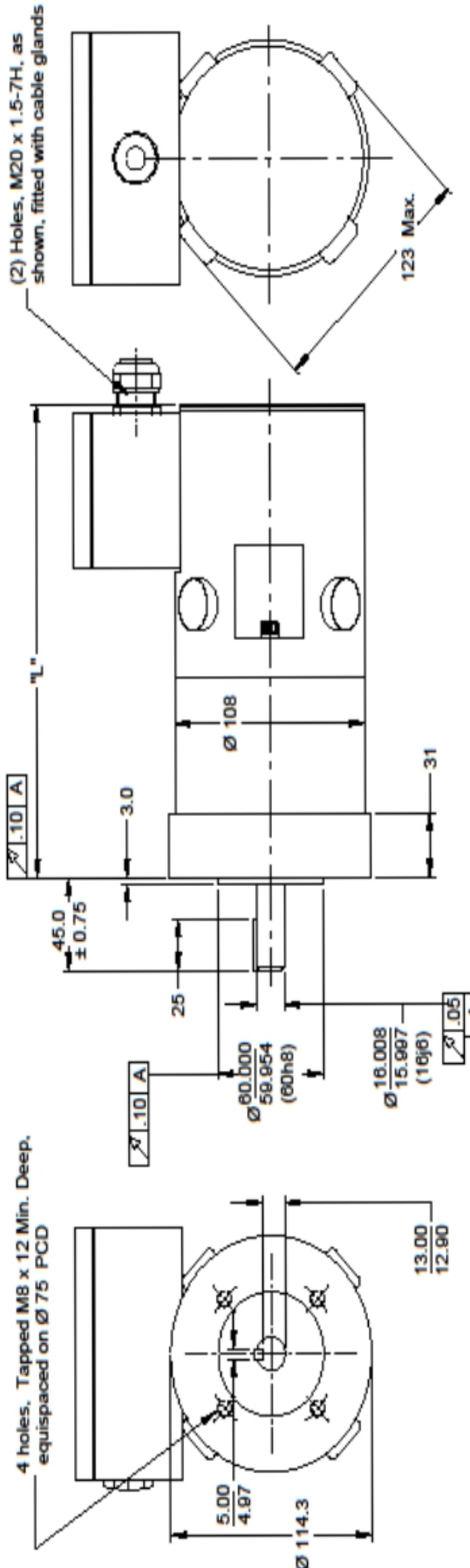
Motor Type	Length "L" mm
M4-2950	210
M4-2951	228
M4-2952	246
M4-2959	283

Notes:-

1. With a positive current applied to motor terminal A1 with respect to terminal A2, rotation shall be positive facing mounting end of motor. With this rotation, a positive voltage shall be generated on terminal T1 of tach with respect to terminal T2.
2. Tach Voltage :- 9.5 V/Krpm
3. All dimensions in mm.

Rev	By	App'd	Chg'd	NTS	Scale	Sheet
1						
RARE EARTH DC SERVOMOTOR						
M4-295X-32044-000						Page
						1
						R 1

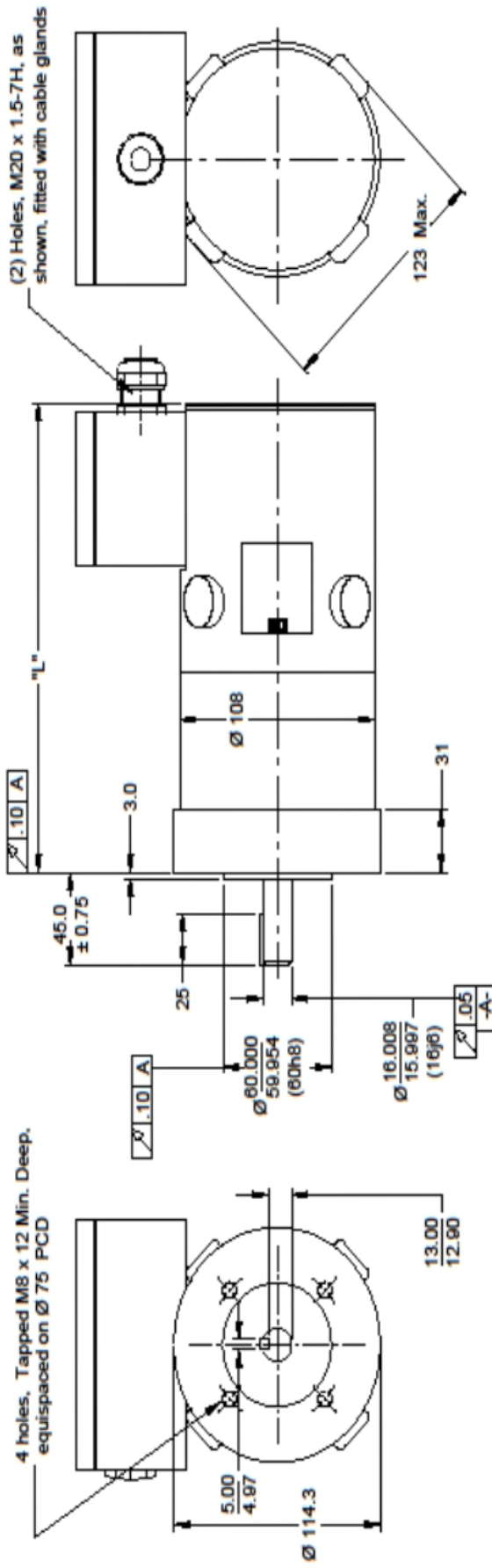




Motor Type	Length "L" mm
M4-2950	210
M4-2951	228
M4-2952	246
M4-2959	283

- Notes:-
1. With a positive current applied to motor terminal A1 with respect to terminal A2, rotation shall be positive facing mounting end of motor. With this rotation, a positive voltage shall be generated on terminal T1 of tach with respect to terminal T2.
  2. Thermostat set to open at 112°C±0% & close at 92°C±6% falling, normally open contacts, rated 3A, 120V AC, (yellow leads)
  3. Tach Voltage :- 9.5 V/krpm
  4. All dimensions in mm.

Material	NTS	Finish	Black
Quantity		Lot Size	
Part No.	RARE EARTH DC SERVOMOTOR		
Part No.	M4-295X-32044-140		
Rev.	1		

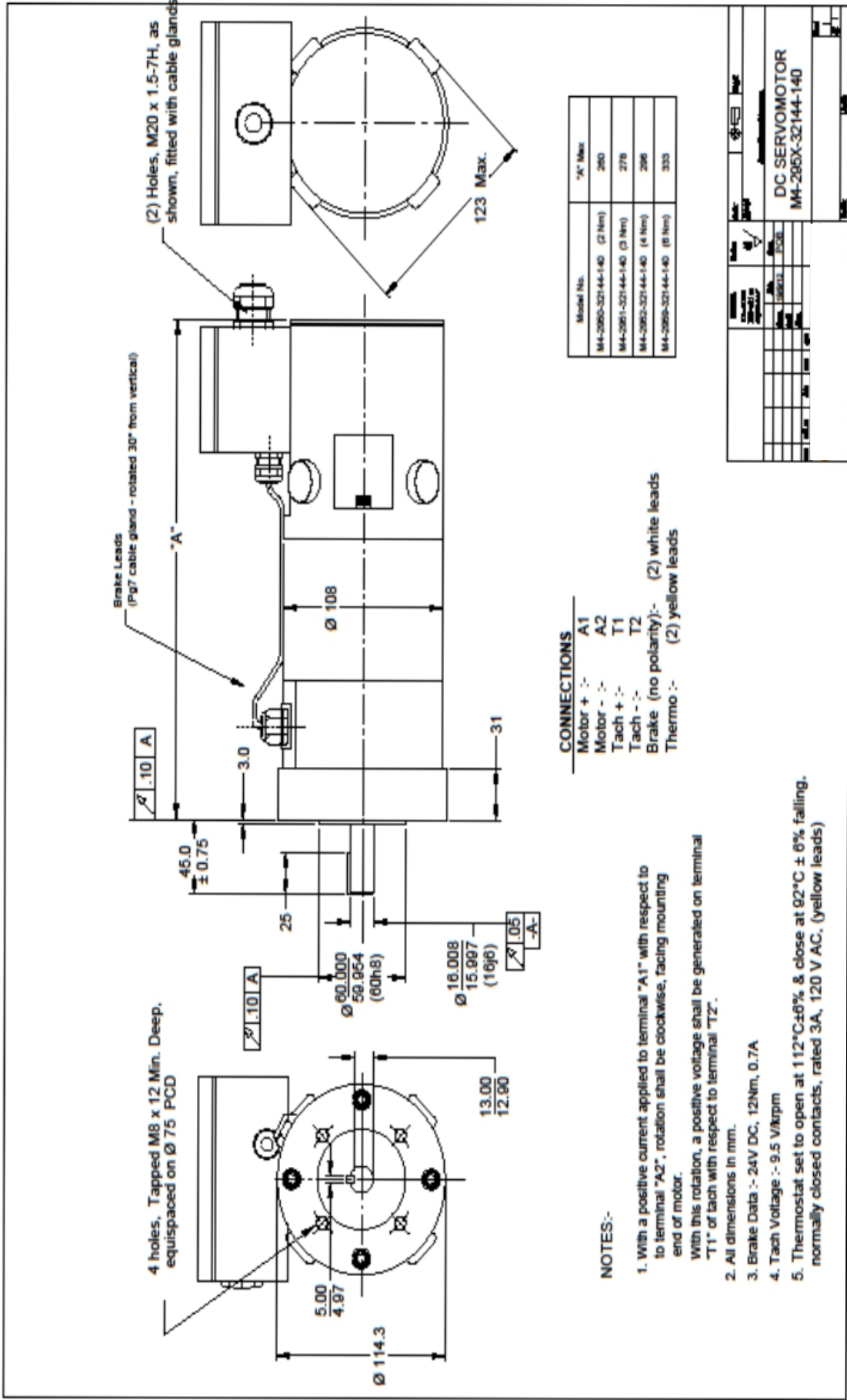


Motor Type	Length "L" mm
M4-2950	210
M4-2951	228
M4-2952	246
M4-2959	283

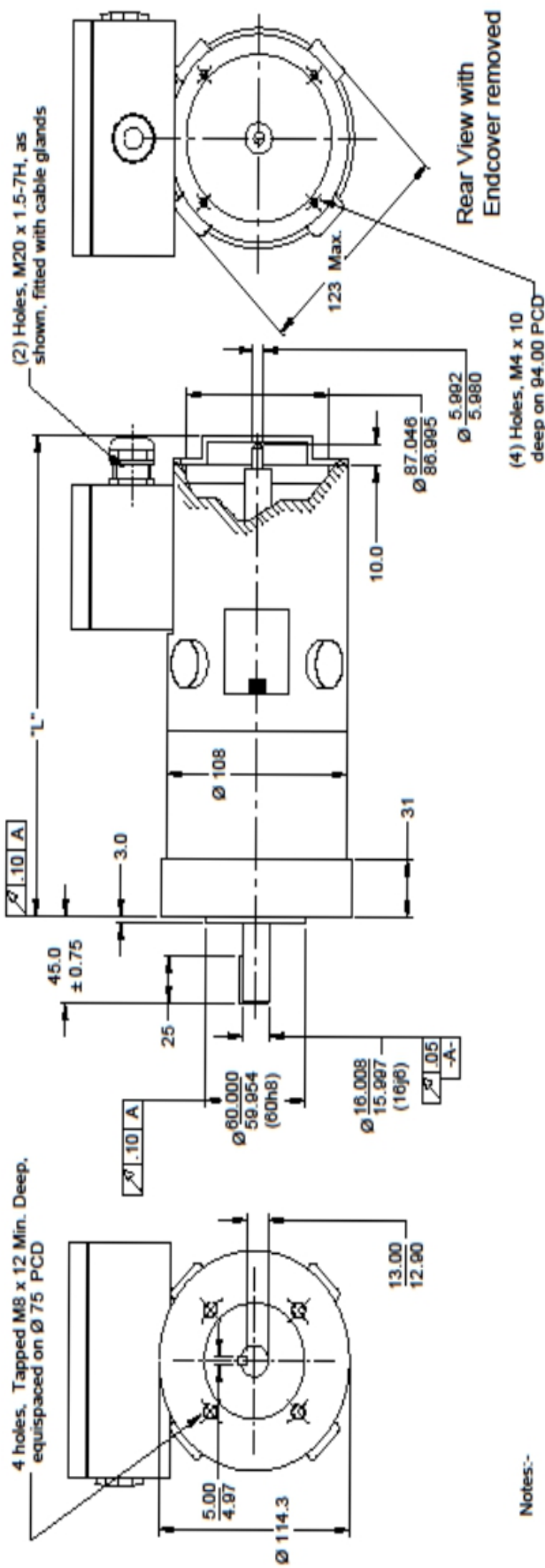
Notes:-

1. With a positive current applied to motor terminal A1 with respect to terminal A2, rotation shall be positive facing mounting end of motor. With this rotation, a positive voltage shall be generated on terminal T1 of tach with respect to terminal T2.
2. Thermostat set to open at 112°C±6% & close at 92°C±6% falling. normally open contacts, rated 3A, 120V AC, (yellow leads)
3. Tach Voltage :- 30 V/krpm
4. All dimensions in mm.

Material	Finish	Mark	NTS	Scale	Page
DC Motor	IP 54	IP 54			
DC Motor	IP 54	IP 54			
<b>RARE EARTH DC SERVO MOTOR</b>					
M4-295X-32045-140					
Page 1 of 1					







Motor Type	Length "L" mm
M4-2950	230
M4-2951	248
M4-2952	266
M4-2959	303

Notes:-

- With a positive current applied to motor terminal A1 with respect to terminal A2, rotation shall be positive facing mounting end of motor. With this rotation, a positive voltage shall be generated on terminal T1 of tach with respect to terminal T2.
- Thermostat set to open at  $112^{\circ}\text{C} \pm 6\%$  & close at  $92^{\circ}\text{C} \pm 6\%$  falling, normally open contacts, rated 3A, 120V AC, (yellow leads)
- Tach Voltage :- 9.5 V/krpm
- Rear shaft extension provided with (2) flats at  $60^{\circ}$
- All dimensions in mm.

Part No.	NTS	Scale	Rev.
M4-2950	1:1	1:1	1
<b>RARE EARTH DC SERVO MOTOR</b>			
M4-295X-32044-142			