APPLICATION FLOWCHART

1 Calculate Duty Cycle for Application DC (%)

$$DC = \frac{(t_1 + t_2 + t_3)}{(t_1 + t_2 + t_3 + t_4)} * 100\%$$

2 DC < 50% use T_{Peak}
DC > 50% use T_{Cont}
See Below (11)

3 Determine Gearhead Type
Determine Mean Output Speed (RPM) for the Motor
Determine Mean Output Speed (RPM) for the Gearhead

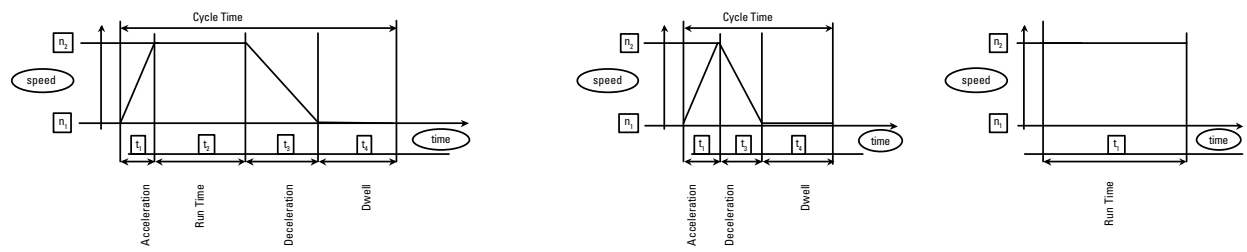
Inline
Right Angle Single Shaft
Right Angle Dual Shaft

4 Calculate Gear Ratio
See Figure 1 for Standard Ratios

Figure 1	Ratios
1 Stage	3, 4, 5, 5.5, 7, 10
2 Stage	15, 16, 20, 22, 25, 28, 30, 40, 49, 50, 55, 70, 100
3 Stage	160, 280, 400, 550, 700

$m = (n_{\text{Mean Output Speed Motor}} / n_{\text{Mean Output Speed Gearhead}})$

5 Determine Acceleration Time
Determine Run Time
Determine Deceleration Time
Determine Dwell Time



6 Determine Motor Peak Torque
Determine Motor Continuous Torque
Determine Load Inertia
Determine Motor Rotor Inertia

7 Determine Direction, Motion Profile, Maximum Speed, Cycles per Hour, Hours per Day, and Shock Load

S.F. = A + B + C + D + E + F

Direction (A):	Cycles per Hour (D):
Motion Profile (B):	Hours per Day (E):
Max Speed (C):	Shock Load (F):

Cycles per Hour (D) = $\frac{3600 \text{ (sec/hr)}}{\text{Cycle Time (sec)}}$

Direction (A):	
Unidirectional:	0.3
Reversing:	0.4

Cycles per Hour (D):	
0-999:	0.1
1000-2999:	0.2
3000-4999:	0.3
5000 +:	0.4

Motion Profile (B):	
Continuous:	0.3
Trapezoidal:	0.4
Triangular:	0.5

Hours per Day (E):	
0 - 4.0:	0.1
4.1 - 8.0:	0.2
8.1 - 16.0	0.3
16.1 +:	0.4

Max Speed (C):	
0-999:	0.1
1000-2999	0.2
3000-4999	0.3
5000 +:	0.4

Shock Load (F):	
None:	0.1
Light:	0.3
Moderate:	0.5
Heavy:	0.7

8 Calculate Service Factor (SF)

9 Is Current being limited to the Motor?
NO
YES

10 Limit Factor (LF) = % of Motor Peak
Limit Factor (LF) = 1.0

11 Calculate Peak Output Torque
or
Calculate Required Mean Continuous Output Torque

$T_{Peak} = (T_{\text{Motor Peak}} * L.F. * m * S.F. * h)$

$T_{Cont} = (T_{\text{Mean}} * S.F.)$

$$T_{\text{Mean}} = \sqrt[3]{\frac{n_1 t_1 T_1^3 + \ldots n_n t_n T_n^3}{n_1 t_1 + \ldots n_n t_n}}$$

Inline	Efficiency h
1 Stage	>90%
2 Stage	>85%
3 Stage	>80%

Right Angle	Efficiency h
1 Stage	>85%
2 Stage	>80%
3 Stage	>75%

12 Select Gearhead Size

NEMA	METRIC
017	040
023	060
034	075
042	100
056	140
075	180

PLX	RCX	DCX
PMX	RNX	DNX
PNX	RSX	DSX
PTX	RBD	DBD
SIX		

13 Desired Inertia Match

14 Calculate System Inertia

System Inertia = Gearhead Inertia + Input Pinion Inertia + (Load Inertia / (Gear Ratio)^2)

15 Determine System Inertia Match

System Inertia Match = System Inertia / Motor Rotor Inertia

16 Determine Radial and Axial Loads

17 Determine Drive Type

Pulley with Belt
Lead / Ball Screw
Direct Drive
Gearhead Input
Sprocket with Chain

18 Gear Head Mount

19 **Select Part Number**