

## Winding sheet

## 嵌线参数

### Motor Type Document

Winding pitch	跨槽距
Stator stack	叠厚
Poles number	极数
Slot number	槽数
Turns/coil each section	匝数
Winding section	
Number of // wires each section	并头数
Wire diameter (copper)	铜线直径
Winding resistance	电阻
Winding inductance	电感
Rated current	额定电流
Max. head dimension	线包高度
Power leads side	引出线端
Max. head dimension	线包高度
power leads opposite side	非引出线端
Power leads size	引出线
Center star (0 = N, 1 = Y)	
Winding section connection (0 = N, 1 = Y)	
Power lead length	引出线长度
Lamination thickness	单层冲片厚
Magnetic wedge (0 = N, 1 = Y)	磁性槽楔
Rotor laminated (0 = N, 1 = Y)	
Magnets sliced (0 = N, 1 = Y)	
Magnets skew 6th harmonic (0 = N, 1 = Y)	

### Thermal sensor

Insert in winding 3 x PTC130 + 1 x KTY84  
 线包中埋入3 x PTC130 + 1 x KTY84

## Name plate data

Rated speed	额定转速	[wn]	$wknee1 = 488.68 \cdot \text{rad} \cdot \text{sec}^{-1}$
Rated torque	额定转矩	[Tn]	$Mtor(wknee1) = 2.227 \cdot \text{N} \cdot \text{m}$
Rated current	额定电流	[In]	$Currentlim(wknee1) = 3.72 \cdot \text{amp}$
Rated power	额定功率	[Pn]	$Mpower(wknee1) = 1.09 \cdot \text{kW}$
Rated voltage	额定电压	[Vn]	$Vnom = 161 \cdot \text{volt}$
Motor type	电机型号	[Code]	$MotorCode = "UL-T4-40-0.06A"$
Current at locked rotor	堵转电流	[Io]	$Id0 = 3.5 \cdot \text{amp}$
Torque at locked rotor	堵转转矩	[To]	$Md0 = 3 \cdot \text{N} \cdot \text{m}$
Torque constant	转矩系数	[Kt]	$Kt = 0.65 \cdot \text{N} \cdot \text{m} \cdot \text{amp}^{-1}$
Peak torque	峰值转矩	[Tpk]	$Cul = 11.71 \cdot \text{N} \cdot \text{m}$

MotorCode = "UL-T4-40-0.06A"

DocNum = "55464n-0-c-m"

Wpitch := "1 : 4"

Stk = 40·mm

(Magnets lenght ONLY!  
Stator stack as drawing!)

Pn = 8

Sn = 9

Spm = 66

section = 1

Winding = "66turn x 1// coil, 0.63G2"

Nfil = 1

Diacu = 0.64·mm

Rw = 2.7161·ohm

Lc = 8.8083·mH

Currentlim(wknee1) = 3.72·amp

Tax1 = 25·mm

Tax = 20·mm

PowerLeads = "3 x AWG16"

cs = 0 CenterStar = "none"

paral = 0

CableLength := "as mech design"

LamSteel<sub>n,0</sub> = "M270-35A"

zeppe = 0

Rotorlam = 0

Slice = 0 Mthslice = "none"·mm

Skew = 1  $\alpha_{skw} = 15 \cdot \text{deg}$

## Winding Scheme

**Motor Type**  
**Document**

MotorCode = "UL-T4-40-0.06A"

DocNum = "55464n-0-c-m"

## Summarization mechanical design

### Motor Type Document

Lamination type	MotorCode = "UL-T4-40-0.06A"	
Stator outer diameter	DocNum = "55464n-0-c-m"	
Stator bore	Lam <sub>type,0</sub> = "T4"	
Stator lenght	Dstin = 74·mm	
	Dag = 45.5·mm	
	Stk = 40·mm	
Magnets outer diameter	Dmag = 43.9·mm	Rout = 21.95·mm
Magnet inner diameter	Dcrot = 39.5·mm	Rin = 19.75·mm
Maximum rotor bore	Daxis = 29.2247·mm	
Rotor lenght	Rstk = 42·mm	
Magnet type	MagType = "N38UH"	
Magnet thickness	Mth = 2.2·mm	
Poles number	Pn = 8	
Magnetic airgap	Agth = 0.8·mm	
Airgap meccanico	Agap = 0·mm	
Magnetic skew	Skew = 1	
Thickness carbon tube	Th_CarbonFibre = 0.8mm	
Magnetic wedge (0 = N, 1 = Y)	zeppe = 0	
Lamination thickness (stator/rotor)	LamSteel <sub>n,0</sub> = "M270-35A"	
Resin	resin = 1	
Copper mass	Ma = 0.22 kg	
Stack mass (only lamination)	Mst = 0.55 kg	
Stator mass (winding + lamination)	Msta = 0.77 kg	
Minimum rotor mass	Mrot = 0.27 kg	
Magnets mass	Mmag = 0.0827 kg	
Motor mass	Mmot = 1 kg	
Minimum Inertia	Jm = 0 kg·m <sup>2</sup>	
Cooling version	Cooling <sub>na,0</sub> = "Flanged"	
Minimum Flow	Fl = "na" · L·min <sup>-1</sup>	
Max winding head opposite power lead	Tax = 20·mm	
Max winding head power lead	Tax1 = 25·mm	
Overall stator length	Overstk = 85·mm	
Power cable gauge (U V W)	PowerLeads = "3 x AWG16"	

Short circuit current Icc and braking torque

**Motor Type**  
**Document**

MotorCode = "UL-T4-40-0.06A"  
DocNum = "55464n-0-c-m"

$K_e = 0.3733 \cdot V \cdot s$

$R_w = 2.7161 \cdot \text{ohm}$

$R_{ext} := 0 \cdot \text{ohm}$

$R_{tot} := R_w + R_{ext}$

$L_c = 8.8083 \cdot \text{mH}$

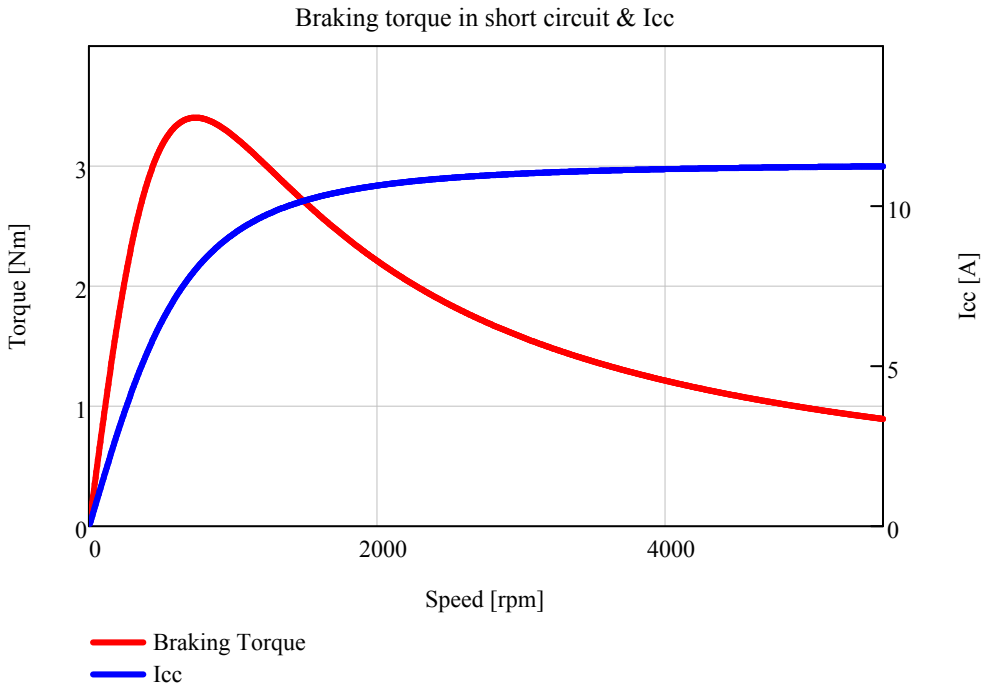
$P_n = 8$

Motor backEMF  
Motor resistance (phase-phase)  
Additional external resistance  
Total resistance  
Motor inductance (phase-phase)  
Motor poles number

$$I(w) := \frac{E \cdot w}{\frac{R_{tot}}{2} + \frac{L_c}{2} \cdot j \cdot w \cdot \frac{P_n}{2}}$$
Short circuit current

$$P_{diss}(w) := 3 \cdot E \cdot w \cdot \text{Re}(I(w))$$
Power dissipated

$$\text{Torque}(w) := \frac{P_{diss}(w)}{w}$$
Braking torque



$|I(\omega_1)| = 11 \cdot A$

$\text{Torque}(\omega_1) = 0.9 \cdot N \cdot m$

$\text{Torque}(w_x) = -0 \cdot N \cdot m$

$P_{diss}(\omega_1) = 0.5 \cdot kW$

$w_x = -0 \cdot rpm$

$7200rpm \cdot E = 151 \cdot V$