PROVEN PERFORMANCE

Our customers span over 70 countries and cover diverse markets and industries.

FMC

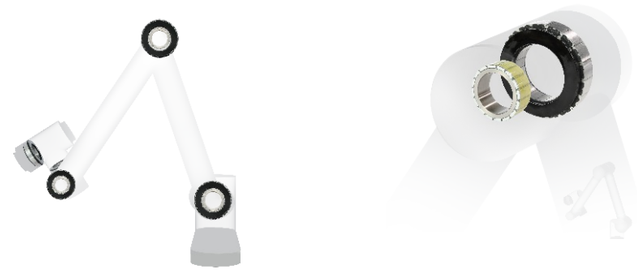
High-Performance Frameless Torque Motor

Advantages and Features

Advantages and Features of FMC Frameless Torque Motors:

- Higher torque density achieved through optimization of electromagnetic solutions, with smaller cogging torque thanks to increased pole pairs.
- Easy replacement of mainstream foreign products thanks to compatiable product dimensions, also wide compatibility to common harmonic reducers in the market.
- Various frame sizes, larger hollow inner diameter to meet diverse threading requirements, covering loads of 3～25Kg.
- Customizable options: optional Hall sensors, temperature sensors, etc., with noticeable cost advantages.

Collaborative Robots



Kinco® Automation

en.kinco.cn Email: sales@kinco.cn

K4E54-2605

FMC High-Performance Frameless Torque Motor

Kinco

■ Naming rules

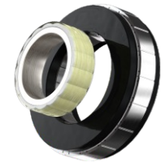
FMC 085 18 - 0062 - 30 42 N - 8 D S X X - X X XX

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

①-Series name:	FMC：High-Performance Frameless Torque Motor
②-Stator outer diameter:	085：85mm .....
③-Stator lamination stack height:	18：18mm .....
④-Rated power：	0062：62x10(W) .....
⑤-Rated speed:	30：30x100(rpm) .....
⑥-Rotor inner diameter:	42：42mm .....
⑦-Sensor options: (with or without Hall)	H：(Hall)With Hall N：Without Hall
⑧-No. of pole pairs:	8：8 pairs
⑨-Supply voltage:	D：DC48V
⑩- Design version: (including magnetic steel grade, certification)	P：P version
⑪- Motor body outlet	0：Wire length 100mm, no terminals 2：Wire length 200mm, no terminals X：Custom cable length with terminals .....
⑫- Temperature sensor	0：No temperature sensor 1：PT1000 temperature sensor，Wire length100mm 2：NTC
⑬-Reducer option	N：No reducer
⑭-Restructuring code	M：Only motor body part is modified C：Only connection part is modified T：Both motor body and connection part are modified
⑮-Restructuring transaction code	01：The first edition of the restructuring .....

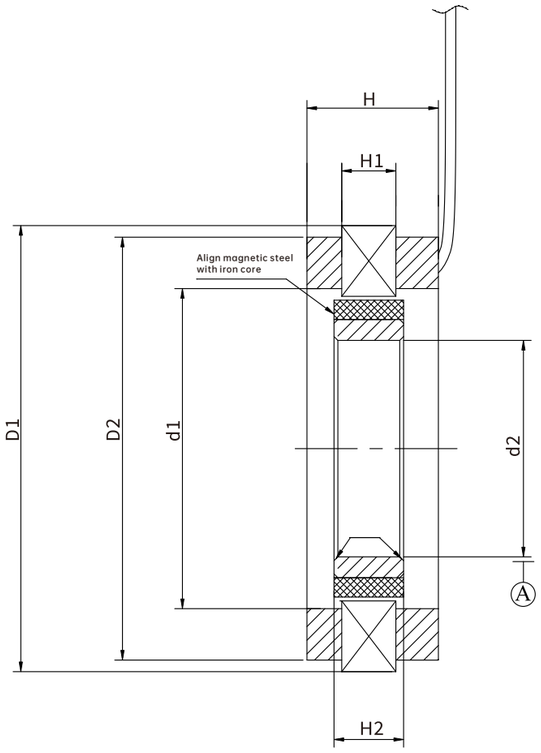
Note: Design version S stands for the 3rd generation electromagnetic design with high power density, design version K is the 2nd generation electromagnetic design.

■ Specifications parameters



Model	Rated voltage (VDC)	Rated power Pn(W)	Rated torque Tn(Nm)	Max torque Tm(Nm)	Rated current In(A)	Max current Im(A)	Rated speed nN(rpm)	Max speed nM(rpm)	Torque constant Kt(Nm/A)	Mechanical time constant τm(ms)
FMC05705-0007-3028N-8DS00	48	75	0.24	0.72	1.91	5.9	3000	3800	0.12	2.75
FMC05707-0011-3528N-8DS00	48	117	0.32	0.96	3.2	10.5	3500	4300	0.107	1.93
FMC05714-0020-3027N-8DS00	48	200	0.64	1.92	5.1	15.6	3000	4000	0.137	1.44
FMC06012-0014-3128N-8DK00	48	146	0.45	1.25	3.4	10.88	3100	3400	0.124	1.06
FMC06805-0010-3034N-8DS00	48	101	0.32	0.96	2.8	8.4	3000	3900	0.127	0.99
FMC06808-0015-3034N-8DS00	48	157	0.5	1.5	4.5	13.5	3000	3900	0.127	0.77
FMC06813-0025-3034N-8DS00	48	251	0.8	2.4	7	21	3000	3900	0.129	0.52
FMC07605-0012-3038N-8DS00	48	117	0.32	0.96	3.2	10.5	3000	4300	0.126	1.7
FMC07712-0031-3033N-8DS00	48	314	1	3	7.65	24	3000	4000	0.1	1.45
FMC07730-0075-3035N-8DS00	48	750	2.39	7.17	18.6	61	3000	3800	0.131	1.21
FMC08505-0015-3042N-8DS00	48	157	0.5	1.5	5	16.3	3000	3900	0.126(ref)	1.51(ref)
FMC08508-0031-3042N-8DS00	48	314	1	3	8.8	26.4	3000	4100	0.123	1.25
FMC08518-0062-3042N-8DS00	48	628	2	6	21.3	63.9	3000	5000	0.105	0.76
FMC09114-0063-3046N-8DS01	48	630	2	5	16.2	43.5	3000	4000	0.13	1.39
FMC10414-0072-3055N-8DS01	48	723	2.3	6.9	18.9	56.7	3000	3900	0.134	1.01
FMC10422-0100-3047N-8DS00	48	1000	3.18	9.54	27	89	3000	3800	0.13	1.44
FMC10429-0100-2543N-8DS00	48	1050	4	12	22.5	74.1	2500	2650	0.196	1.09
FMC12330-0100-2060N-5DS00	48	1000	4.78	14.3	22	71	2000	2290	0.22	0.045
FMC12718-0090-2465N-8DS00	48	904	3.6	10.8	24	72	2400	3250	0.161	1.46
FMC12730-0160-2457N-8DS00	48	1600	6.37	19.11	35.3	110	2400	2600	0.2	1.14
FMC13224-0118-3243N-8DK00	48	1180	3.5	8.4	29.2	70	3220	3800	0.132	0.801

■ Drawing (Parameter) (unit:mm)



Model (mm)	Stator		Coil		Rotor		Total height H(mm)
	Outside diameter D1(mm)	Iron core height H1(mm)	Iron core height D2(mm)	Inside diameter d1(mm)	Inside diameter d2(mm)	Iron core height H2(mm)	
FMC05705-0007-3028N-8DS00	57.8	5	56	39.4	28	5.55	14.5
FMC05707-0011-3528N-8DS00	57.8	7	56	39.4	28	7.55	16.5
FMC05714-0020-3027N-8DS00	57.8	14	56.5	39.4	27	16	25
FMC06012-0014-3128N-8DK00	60	13.5	58.5	40.5	28.7	13.55	22.7
FMC06805-0010-3034N-8DS00	68	5	64	46	34	6	17
FMC06808-0015-3034N-8DS00	68	8	64	46	34	10	20.5
FMC06813-0025-3034N-8DS00	68	13	64	46	34	14	26
FMC07605-0012-3038N-8DS00	76	5	72.5	52	38	6	15
FMC07712-0031-3033N-8DS00	77	12	75	53	33	14	26
FMC07730-0075-3035N-8DS00	77	30	75	53	35	31	44
FMC08505-0015-3042N-8DS00	85	5	80	57	42.5	6	17.5
FMC08508-0031-3042N-8DS00	85	8	80	57	42.5	9	19
FMC08518-0062-3042N-8DS00	85	18	80	57	42.5	20	33
FMC09114-0063-3046N-8DS01	91.5	14	89	61.7	46.7	16	28.5
FMC10414-0072-3055N-8DS01	104	14	100.5	72	55	16	28
FMC10422-0100-3047N-8DS00	104	22	100.5	71	47	24	38.8
FMC10429-0100-2543N-8DS00	104	29	100.5	72	43	30	44.1
FMC12330-0100-2060N-5DS00	122.5	30	119	80	60	32	51
FMC12718-0090-2465N-8DS00	127	18	123	87	65	20	36
FMC12730-0160-2457N-8DS00	127	30	123	87	57	32	48
FMC13224-0118-3243N-8DK00	132	24.5	129	82	57	29	41.1

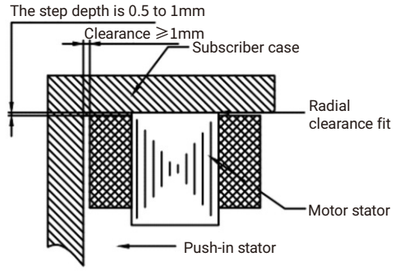
Mounting and installation guide

Kinco suggests the following options for installation of the frameless motors to realize the high performance, small space comsumption, high efficiency and serviceability desired by the user.

Stator Mounting Practices

Stator bonding

In most cases, motors may have the stator bonded in place using anaerobic, such as Loctite 638/648 or other similar adhesives. Adhesive bonding is a preferred and convenient installation technique for all stators, the user should consult the adhesive manufacturer for proper curing instructions (depends on the adhesive applied).
Following options for stator housing design and installaiton of the motor stator should be repected:
1. The stator enclosure housing should be designed as a cylindrial cup.
2. A small shoulder with radial depth of 0.5mm-1mm for axial positioning at one end of the stator housing should be designed.
3. The shoulder serves as a axial stop point for the stator bo bank against when inserted from the open end of the stator housing and should not use the stator winding lead-out end.
4. The clearance fit is adopted between stator outer diameter and the housing inner diameter. The user should consult the adhesive manufacturer's guidelines for proper housing inner diameter clearance design recommendations.
5. It is recommended to place additional adhesive grroves in the inner diameter of the housing to provide torsional strength for more reliable bonding.
6. Stator and housing surfaces should be cleaned thoroughly prior to bonding to ensure good adhesion.
7. Adhesive cure temperatures should not exceed 155°C to avoid damaging the motor stator.

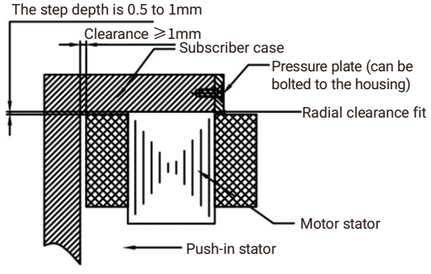


Stator shink Fit

In case adhesive is not preferred, a thermal shink fit technique for motor stator installation is recommended. Cold pressing should be avoid during installation. Extreme pressures will result in damage to the structure of stator laminations stack.
If desired, following options for stator housing design and installaiton of the motor stator should be repected:
1. The stator enclosure housing should be designed as a cylindrial cup.
2. The clearance fit is adopted between stator outer diameter and the housing inner diameter. The user should consider required pulling-out force with respect to appliations for proper housing inner diameter clearance design. Dissimilar thermal expansion coefficients (e.g. steel laminations vs. aluminum housing) should also be considered to ensure reliable holding strength across a board temperature range.

Stator clamping

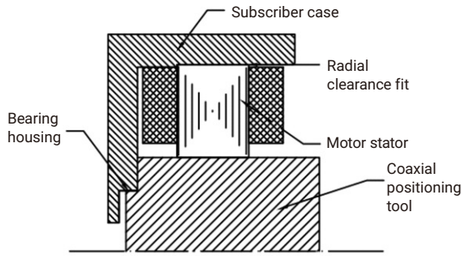
For applications where the torque range is small or the stator may need to be repeatedly installed and removed from the system, axial clamping may also be an acceptable option. Kinco does not recommend this technique in mass production where shock or vibration from motor operation is high and the clamping methods may fail.
If desired, following options for stator housing design and installaiton of the motor stator should be repected:
1. The stator enclosure housing should be designed as a cylindrial cup.
2. A small shoulder with radial depth of 0.5mm-1mm for axial positioning at one end of the stator housing should be designed.
3. The shoulder serves as a axial stop point for the stator bo bank against when inserted from the open end of the stator housing and should not use the stator winding lead-out end.
4. A clamping ring is needed is needed at the opposite end of the stator and bolted to the housing. The clamping ring should contact the stator with pressures designed according to the clamping forces needed in the applications.
5. The sliding fit between stator outer diameter and the housing inner diameter.



Mounting and installation guide

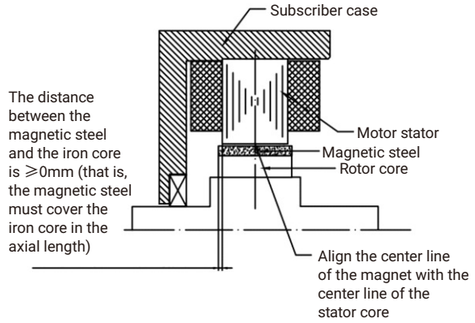
Important

All these three installation options are clearance fit between stator outer diameter and housing inner diameter during stator insertion and the radial running out tolearance in between will be presented as a result and therefore further create the running out tolerance between motor stator and rotor.
The axial alignment between stator inner diameter and rotor outer diameter must be maintained to ensure proper motor performance. It is recommended to have a common and stable axial basis when mounting the stator and rotor:
1. Set the stator housing case stop point or bearing chamber as the positioning basis.
2. Insert the rotor into the stator by using a custom installation fixture.



Rotor Mounting Practices

The rotor of a frameless motor generally consists of a ring shaped metal yoke with magnets equally placed around its outer surface with adhersive bonding technique. The user can install the rotor to a shaft by the inner bore of the metal ring for most applications. Generally the rotors can be installed by means of adhesive bonding or cold pressing techniques. Consider proper fit tolerance with repect to different installation option taken or applicaiton requirements.
To ensure proper motor performance, following specified mounting dimension principles must be respected:
1. Axial alignment must be maintained between rotor magnets and stator.
2. Or the dimension tolerance design should at least guarantee that the axial length of the rotor magnets can envelop the axial length of the stator lamination stack.



Important

Kinco FMC freamessless motors utilize high-performance rare earth magnets, the attracive forces between magnetized rotors and nearby stator steel lamination can be extremely powerful. Improper handling can result in unexpected impacts and can potentially damage the rotor fiber band layer.Following assembly process can be followed:
1. Insert the rotor into the position inside the stator by using a custom installation fixture to avoid rotor from sticking to the inner bore of the stator.
2. In case no custom fixture is available, user can install a thin layer of shim material (such as insulation film) in the inner bore of the stator, prior to inserting the rotor into the stator. Remove the shim material from the airgap between the rotor and stator after the installation.