

HPB HPB MOTION CONTROL CO.,LTD

EASY SERVOMOTOR

HIGH PERFORMANCE
ESM SERIES AC SERVOMOTOR



YOUR BEST CHOICE OF AC SERVO MOTOR



The ESM series brushless servomotor with permanent magnet is designed and manufactured for most of industrial applications, which will require high performance, fast dynamic response, good reliability, and free maintenance.

The ESM servomotor is made use of new advanced material such as Neodymium Iron, Boron Magnet, low loss Silicon Steel Sheet, to ensure excellent performances as including of :

- HIGH POWER DENSITY WITH LOW OVERALL DIMENSIONS
- HIGH OVERLOAD CAPABILITY
- LOW MOMENT OF ROTOR INERTIA, PERFORM VERY HIGH DYNAMIC RESPONSE
- LOW WEIGHT
- SINUSOIDAL B.E.M.F.
- LOW COGGING TORQUE
- HIGH ACCURACY

GENERAL SPECIFICATION :

- INSULATION CLASS OF STATOR WINDING : F
- INSULATION VOLTAGE : 1500Vrms/MIN
- INSULATION RESISTANCE : ABOVE 500VDC 10M Ω
- PROTECTION LEVEL : IP55
- OPERATING AMBIENT ENVIRONMENT : 0~40°C · 90%RH · NON-CONDENSING
- STORAGE AMBIENT ENVIRONMENT : -20°C ~ 60°C · 90%RH · NON-CONDENSING
- VIBRATION CLASS : BELOW 1.8mm/S
- MOUNTING : B5 (FLANGE MOUNTING)
- FEEDBACK SYSTEM : ENCODER
+5V · LINE DRIVER · 2500PPR WITH U.V.W COMMUTATION SIGNALS
- CONNECTOR & CABLE :
FRAME 60 · 85 : FLYING LEADS
FRAME 125 / 145 : CONNECTOR
FRAME 190/ 230 : MOTOR (TERMINAL BOX)
ENCODER (CONNECTOR)
- OVER TEMPERATURE PROTECTION : THERMO-SWITCH

OPTIONS :

- BRAKE
- RESOLVER
- IP65 PROTECTION
- OIL SEAL
- SPECIAL K θ · K t
- SPECIAL FLANGE, SHAFT
- CABLE FOR MOTOR · ENCODER.....ETC
- CONNECTOR FOR FRAME 60 · 85
- GEARBOX

TECHNICAL - DATA I

FRAME NO:	ESM60 A	ESM85 A	ESM85 B	ESM85 C	ESM85 D	ESM125 A	ESM125 B	ESM125 C	ESM125 D	ESM125 E	ESM125 F	ESM145 A	ESM145 B	ESM145 C
RATED POWER (KW)	0.4	0.4	0.6	0.75	1.0	0.75	1	1.5	2.2	3	4	3	4	5.6
RATED TORQUE (NM)	1.274	1.9	2.84	3.53	4.8	3.6	4.8	7.2	10.5	14.3	19	14.3	19	26.7
PEAK TORQUE (NM)	3.822	5.7	8.52	10.6	14.4	10.8	14.4	21.6	31.5	42.9	57	42.9	57	80.1
RATED SPEED (RPM)	3000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
MAX SPEED (RPM)	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
RATED CURRENT (A)	2	2.5	3.2	4	5.2	3.2	5	7.2	10.6	14.5	19.5	15	19.5	25.6
PEAK CURRENT (A)	6	7.5	9	12	15.6	9.6	15	21.6	31.5	43.5	58.5	45	58.5	80.1
K _t (NM/A)	0.62	0.76	0.89	0.88	0.92	1.13	0.96	1	0.99	0.986	0.974	0.953	0.97	1.04
K _e V _{rms} /1000RPM	38.2	45	44	48	48	60	60	60	60	60	60	60	60	60
WINDING RESISTANT (Ω)	5.28	5.4	3.58	2.5	1.8	6.6	3.5	2	1.2	0.9	0.73	0.5	0.3	0.26
WINDING INDUCTANCE (mH)	11.8	10	7.6	5.8	4.3	18.5	11.2	6.8	4.8	4.3	2.6	2.9	2.1	1.4
POLE	8	8	8	8	8	8	8	8	8	8	8	8	8	8
ROTOR INERTIA J (Kg-cm ²)	0.414	2.44	3.34	4.2	5.1	6.66	10.1	14.4	20.35	27.25	35.9	51.06	66.48	91.15
INSULATION	F	F	F	F	F	F	F	F	F	F	F	F	F	F
COOLING	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041
PROTECTION	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55
FEEDBACK SYSTEM ENCODER	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR
OVER TEMPERATURE PROTECTION	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW
WEIGHT (Kg)	2	3	4	5	6	5.3	6.36	8.7	12	15	19	17.7	22	28.5

TECHNICAL - DATA I**TECHNICAL - DATA II**

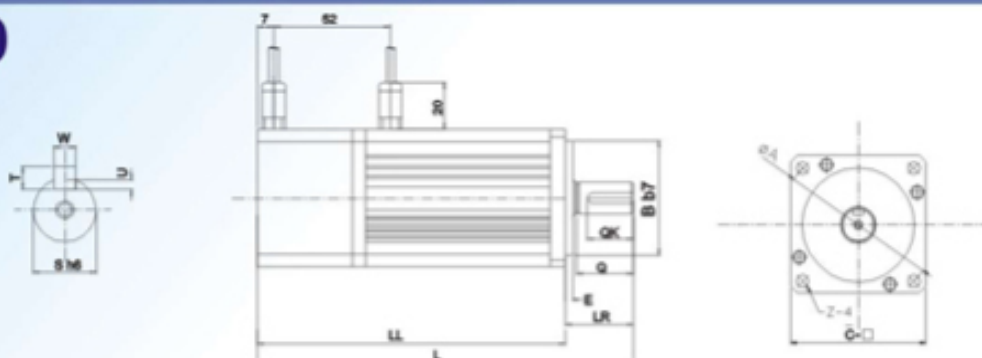
FRAME NO:	ESM145 D	ESM190 A	ESM190 B	ESM190 C	ESM190 D	ESM190 E	ESM125 B	ESM125 C	ESM125 D	ESM125 E	ESM125 F	ESM145 A	ESM145 B	ESM145 C
RATED POWER (KW)	7.5	4.5	6	7.5	11	15	1	1.5	2.2	3	4	3	4	5.6
RATED TORQUE (NM)	35.8	29	39	48	71.5	95	4.8	7.2	10.5	14.3	19	14.3	19	26.7
PEAK TORQUE (NM)	103.2	87	117	144	214.5	285	14.4	21.6	31.5	42.9	57	42.9	57	80.1
RATED SPEED (RPM)	2000	1500	1500	1500	1500	1500	2000	2000	2000	2000	2000	2000	2000	2000
MAX SPEED (RPM)	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
RATED CURRENT (A)	34.4	29.5	35	48	66	80	2.3	3.4	4.9	6.7	8.7	6.6	8.8	12.3
PEAK CURRENT (A)	107.4	88.2	105	144	198	240	6.9	10.2	14.7	20.1	26.1	19.8	26.4	36.9
K _t (NM/A)	1.04	0.98	1.11	1.0	1.08	1.19	2.08	2.12	2.14	2.13	2.18	2.17	2.16	2.17
K _e V _{rms} /1000RPM	60	62	61	60	60	57	125	125	125	125	125	125	125	125
WINDING RESISTANT (Ω)	0.2	0.2	0.13	0.5	0.09	0.1	13.2	8.5	5.1	3.7	3.1	2.4	1.6	1.03
WINDING INDUCTANCE (mH)	1.1	0.96	0.66	0.1	0.46	0.58	40.5	28.4	19.5	17.4	11.5	11.2	8.1	5.5
POLE	8	8	8	8	8	8	8	8	8	8	8	8	8	8
ROTOR INERTIA J (Kg-cm ²)	120.45	87	102.7	139.8	177.4	214.5	10.1	14.4	20.35	27.25	35.9	51.06	66.48	91.15
INSULATION	F	F	F	F	F	F	F	F	F	F	F	F	F	F
COOLING	IC 0041	IC 416	IC 416	IC 416	IC 416	IC 416	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041
PROTECTION	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55
FEEDBACK SYSTEM ENCODER	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR
OVER TEMPERATURE PROTECTION	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW
WEIGHT (Kg)	36.7	28	33	42	50	65	6.36	8.7	12	15	19	17.7	22	28.5

TECHNICAL - DATA II

FRAME NO:	ESM145 D	ESM190 A	ESM190 B	ESM190 C	ESM190 D	ESM190 E	ESM230 A	ESM230 B	ESM230 C	ESM230 D	ESM230 E	ESM230 F	ESM230 G
RATED POWER (KW)	7.5	4.5	6	7.5	11	15	6	7.5	11	15	22	30	37
RATED TORQUE (NM)	35.8	29	39	48	71.5	95	38.2	48	71	95.1	139.2	191.1	235.2
PEAK TORQUE (NM)	103.2	87	117	144	214.5	285	115	144.1	212	285.2	418	573.3	706
RATED SPEED (RPM)	2000	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
MAX SPEED (RPM)	4000	4000	4000	4000	4000	4000	1800	1800	1800	1800	1800	1800	1800
RATED CURRENT (A)	16.3	17	20	24	38	57	14	17	25	34	50	68	84
PEAK CURRENT (A)	48.9	51	60	72	114	171	42	51	75	102	150	204	252
K _t (NM/A)	2.2	1.7	1.95	2.0	1.88	1.67	2.728	2.82	2.84	2.8	2.78	2.81	2.8
K _e V _{rms} /1000RPM	125	109	108	119	104	98	160	160	160	160	160	160	160
WINDING RESISTANT (Ω)	0.19	0.59	0.43	0.41	0.28	0.18	1.05	0.77	0.37	0.6	0.225	0.16	0.175
WINDING INDUCTANCE (mH)	0.98	3.4	2.1	2.2	1.6	0.99	7.4	5.6	3.6	3.4	2.1	1.6	1.8
POLE	8	8	8	8	8	8	8	8	8	8	8	8	8
ROTOR INERTIA J (Kg-cm ²)	120.45	87	102.7	139.8	177.4	214.5	118	139	187	229	326	409	506
INSULATION	F	F	F	F	F	F	F	F	F	F	F	F	F
COOLING	IC 0041	IC 416	IC 416	IC 416	IC 416	IC 416	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041	IC 0041
PROTECTION	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55	IP55
FEEDBACK SYSTEM ENCODER	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR	2500 PPR
OVER TEMPERATURE PROTECTION	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW	TH-SW
WEIGHT (Kg)	36.7	28	33	42	50	65	30	40	50	60	80	95	103

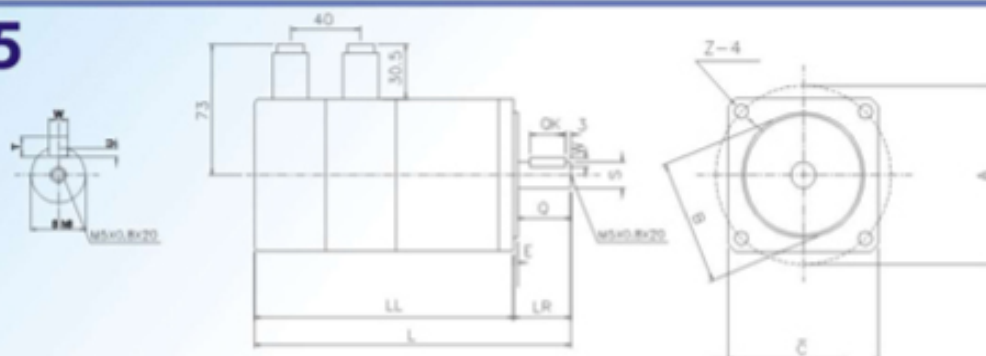
DIMENSION DRAWING

ESM 60



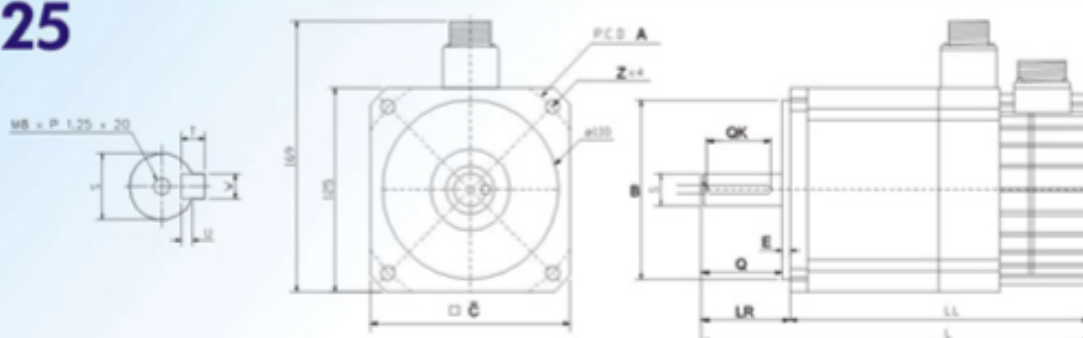
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ESM60A	161	131	3	30	70	61	50	27	20	14	5	2.5	5	5.5

ESM85



FRAME	L	LL	E	LR	B	A	C	Q	QK	S	W	U	T	Z
ESM85A	172.5	145	2.5	33.5	70	100	85	30	20	14	5	2.5	5	7
ESM85B	192.5	165	2.5	33.5	70	100	85	30	20	16	5	2.5	5	7
ESM85C	212.5	185	2.5	33.5	70	100	85	30	20	16	5	2.5	5	7
ESM85D	232.5	205	2.5	33.5	70	100	85	30	20	16	5	2.5	5	7

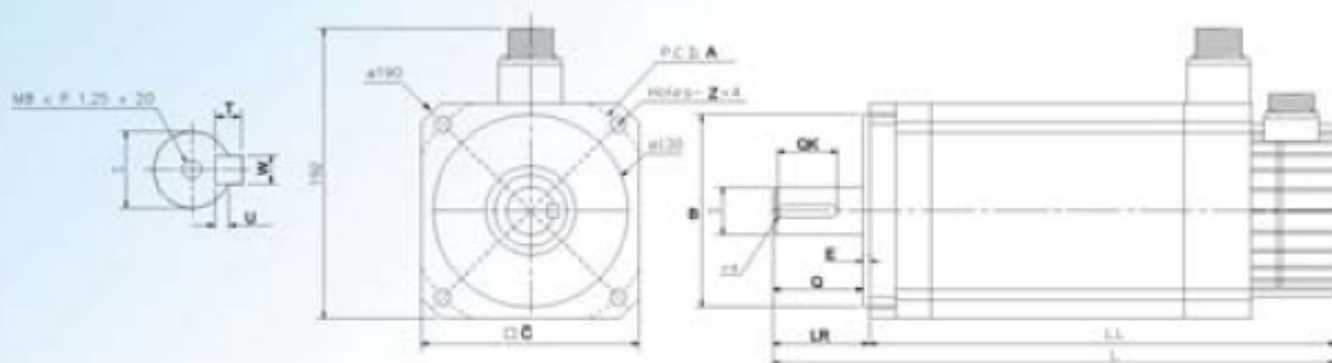
ESM125



FRAME	L	LL	E	LR	B	A	C	Q	QK	S	W	U	T	Z
ESM125A	209	153	5	56	110	145	125	51	40	19	5	3	5	9
ESM125B	229	173	5	56	110	145	125	51	40	22	7	4	7	9
ESM125C	254	198	5	56	110	145	125	51	40	24	7	4	7	9
ESM125D	289	233	5	56	110	145	125	51	40	24	7	4	7	9
ESM125E	329	273	5	56	110	145	125	51	40	28	8	5	8	9
ESM125F	379	323	5	56	110	145	125	51	40	28	8	5	8	9

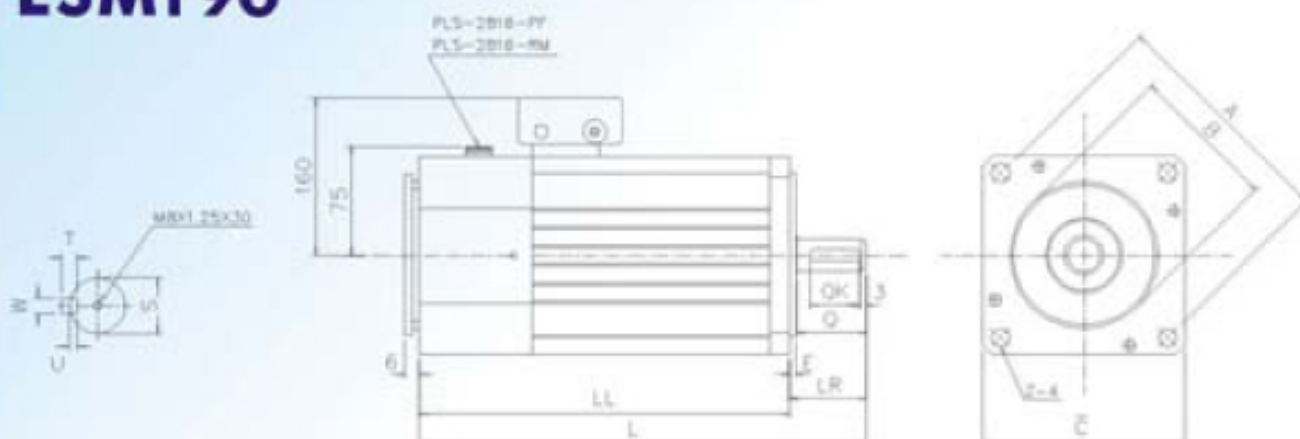
DIMENSION DRAWING

ESM145



FRAME	L	LL	E	LR	B	A	C	Q	QK	S	W	U	T	Z
ESM145A	320	256	3.5	65	130	165	145	61	40	32	8	5	8	11
ESM145B	360	296	3.5	65	130	165	145	61	40	32	8	5	8	11
ESM145C	425	360	3.5	65	130	165	145	61	40	32	8	5	8	11
ESM145D	500	436	3.5	65	130	165	145	61	40	32	8	5	8	11

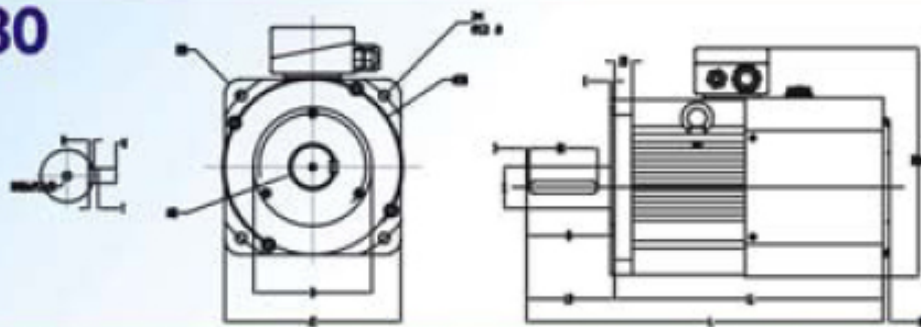
ESM190



FRAME	L	LL	E	LR	B	A	C	Q	QK	S	W	U	T	Z
ESM190A	459	380	5	79	180	215	190	76	60	28	8	4	8	13
ESM190B	479	400	5	79	180	215	190	76	60	38	10	4	8	13
ESM190C	529	450	5	79	180	215	190	76	60	38	10	4	8	13
ESM190D	579	500	5	79	180	215	190	76	60	42	12	5	10	13
ESM190E	629	550	5	79	180	215	190	76	60	42	12	5	10	13

DIMENSION DRAWING

ESM 230



FRAME	L	LL	E	LR	B	A	$\bar{C}$	Q	QK	S	W	U	T	Z
ESM230A	466	351	5	115	155	265	230	110	90	55	16	5	10	13.5
ESM230B	481	366	5	115	155	265	230	110	90	55	16	5	10	13.5
ESM230C	516	401	5	115	155	265	230	110	90	55	16	5	10	13.5
ESM230D	546	431	5	115	155	265	230	110	90	55	16	5	10	13.5
ESM230E	624	501	5	115	155	265	230	110	90	55	16	5	10	13.5
ESM230F	676	561	5	115	155	265	230	110	90	55	16	5	10	13.5
ESM230G	746	631	5	115	155	265	230	110	90	55	16	5	10	13.5

CONNECTION

ESM60 ESM85

WITH FLYING LEADS

	MOTOR			THERMO-SWITCH		BRAKE	
Cable Color	RED	WHITE	BLACK	YELLOW	YELLOW	BLACK	BLACK
Description	U	V	W	H1	H2	B1	B2

	ESM60 , ESM85 ENCODER													
Cable Color	Green	Green Black	Blue	Blue Black	Yellow	Yellow Black	Brown Black	Brown	Grey Black	Grey	White Black	White	Red	Black
Description	A	$\bar{A}$	B	$\bar{B}$	Z	$\bar{Z}$	U	$\bar{U}$	V	$\bar{V}$	W	$\bar{W}$	+5V	0V

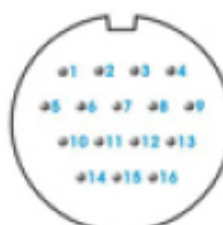
ESM 85 / 125 / 145

WITH CONNECTOR

POWER CONNECTION

CONNECTOR PIN	FUNCTION
A	MOTOR U PHASE
B	MOTOR V PHASE
C	MOTOR W PHASE
D	GROUND
E	THERMO-SWITCH
F	THERMO-SWITCH

ENCODER CONNECTION



- | | |
|---------------|----------------|
| 1 → A | 9 → V |
| 2 → $\bar{A}$ | 10 → $\bar{V}$ |
| 3 → B | 11 → W |
| 4 → $\bar{B}$ | 12 → $\bar{W}$ |
| 5 → Z | 13 → +VCC |
| 6 → $\bar{Z}$ | 14 → OV |
| 7 → U | 15 → Shield |
| 8 → $\bar{U}$ | |

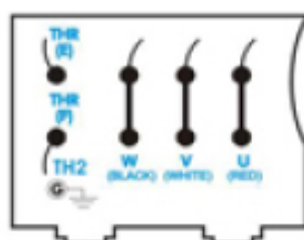
BRAKE CONNECTION



ESM 190 / 230

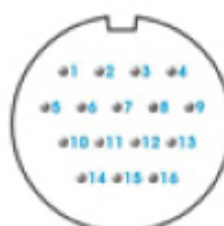
WITH TERMINAL BOX AND CONNECTOR

POWER CONNECTION



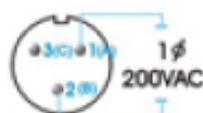
THR(E) , THR(F)
FOR THERMO - SWITCH

ENCODER CONNECTION



- | |
|----------------|
| 6 → $\bar{Z}$ |
| 7 → U |
| 8 → $\bar{U}$ |
| 9 → V |
| 10 → $\bar{V}$ |
| 11 → W |
| 12 → $\bar{W}$ |
| 13 → +VCC |
| 14 → OV |
| 15 → Shield |
| 1 → A |
| 2 → $\bar{A}$ |
| 3 → B |
| 4 → $\bar{B}$ |
| 5 → Z |

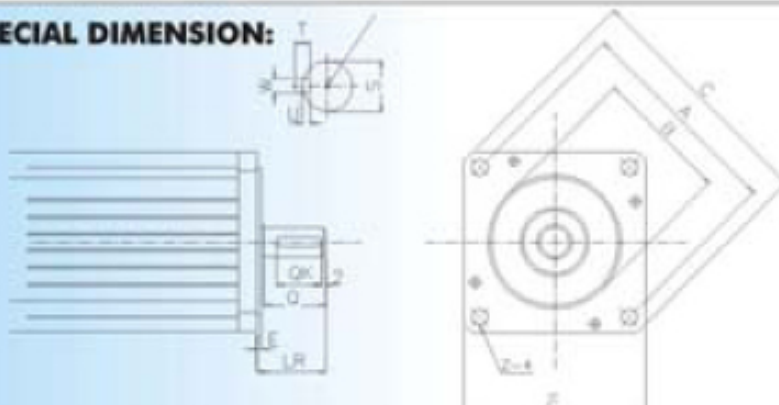
FAN CONNECTION



BRAKE CONNECTION



INQUIRY-FORM

RATED TORQUE	NM	PEAK TORQUE	NM
RATED SPEED	RPM	MAX SPEED	RPM
RATED OUTPUT POWER	KW	PEAK OUTPUT POWER	KW
Ke:	Vrms/1000RPM	Kt:	NM/A
Protection: IP _____			
FEEDBACK SYSTEM	☐ WITHOUT ☐ ENCODER ☐ RESOLVER		
Descriptions of Encoder or Resolver:			
BRAKE	☐ WITH ☐ WITHOUT	VOLTAGE OF BRAKE: _____ V, ☐ AC ☐ DC	
ENCODER CONNECTION	☐ FLYING LEADS, ☐ CONNECTOR, LENGTH OF CABLE _____mm		
MOTOR CONNECTION	☐ FLYING LEADS ☐ CONNECTOR ☐ TERMINAL BOX LENGTH OF CABLE _____mm		
BRAKE CONNECTOR	☐ FLYING LEADS, ☐ CONNECTOR, LENGTH OF CABLE _____mm		
GEARBOX	RATIO: _____ , BACKLASH: _____		
COOLING: ☐ SELF-COOLED, ☐ FORCED AIR COOLING; VOLTAGE OF FAN MOTOR: _____			
SPECIAL DIMENSION:  A: _____ S: _____ B: _____ T: _____ Z: _____ U: _____ Q: _____ W: _____ QK: _____ E: _____ LR: _____			

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