Torishima Pump Global Network



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End-Suction Volute Pump







PT TORISHIMA GUNA INDONESIA

The Torishima "Eco Pumps" lead the World!

End-Suction Volute Pump (10 bar type)

CAL is of Cast Iron construction. CAR is of Stainless Steel construction.

CA series pumps are eco-friendly high-efficiency pumps based on technology from our engineered pumps.

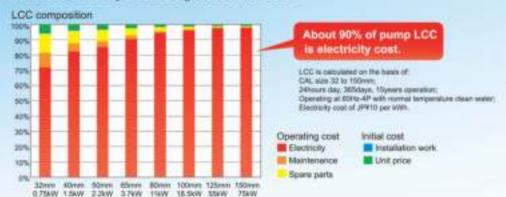


Energy Saving & Cost Reduction

Eco pumps significantly reduce the life cycle costs of pumps and CO₂ emissions because of their design (3D impeller,casing), motor (Torishima ultra high efficiency motor) and optimized specification (impeller cut).

Reduction of LCC (Life Cycle Cost)

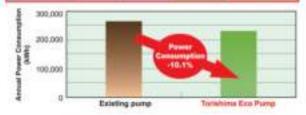
About 90% of the pump LCC is generated from electricity cost. Increased efficiency leads to big reduction of LCC.



Energy Saving with Eco Pumps

Cooling water pump Annual operating hours: 8,760hours

	Emirga	MANUFACTORS	CALIDS-250	- Manager -
	Moner cope	iny 2000	30kW	G/ference
	Perfet land	Cowning part	Operation parel	
Cepatyternes	4.7	4.7	47	0%
Headyd	265	27.7	265	Hilani
Parti officeros/OU.		.76	0.000	100%
That press(M)		27.2	263	-6.190
More efferencially		19130	945	10.0%
Power consumption (CM)		20.0	200.0	-9 DWH (-50.1%)
Aresal Power Consumption(KMo)		269,296	830,016	-29,290kWh



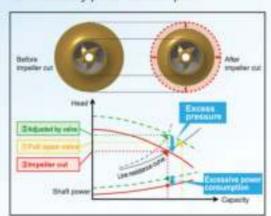




Convenier factor of COs emissions 0.00045 (s-COs/With) referred from Tokyo Electric Power Co., Inc. 2011

Meeting Customer's Specification (Impeller cut)

The impeller diameter can be cut to meet the customer's specification to reduce unnecessary power consumption.



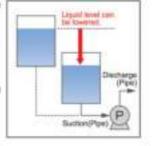
■ High Speed and Simplified Design

CAL/CAR are simplified with high speed and compact design, which enable to reduce the installation space.

Low NPSH and a Wide Application Range

Low NPSH performance enables lower suction level which reduces plant construction cost.

CAL/CAR can handle liquid temperatures from -40 to +350°C (heat medium) and various liquid types.



Y Ma

Maintenance & Operation

Mechanical Seal as Standard Part

Maintenance free.

No leakage from seal parts allows cleanliness around pumps.

Standard mechanical seal (rubber bellows seal) is easy to install and does not damage shaft, thus does not require shaft sleeve.

	Mechanical seal	Gland packing
Leakage	0 comen	15 comin
5-year leavings	0.0	39,420 8
Cost amount	USDS 0	USOS 1381

- " ht case of veing tag water
- Industry Water 1/80% (7.74 (USDS 0,45H2) - Top Hoser 1/60% 1/6 (USDS 3,5H2)
- Plane Weeker LORDIE SIRT, DESCRIPTION TO SIR

39,4200 leakage from using gland packing for 5 years equals to about 197 bathtubs (2000 home bathtub)



Safe Operation with Precision Bearing Design

Stable Operation

The stable pump performance facilitates valve control and parallel operation.

Coupling Guard

CAL/CAR are covered with and enclosed type coupling guard as an optional

An enclosed coupling guard improves safety and maintenance compared to an existing coupling guard due to the wide area of coverage



Standard Coupling Guard

Enclosed Coupling Guard (as optional) TU Motor: 2P-55kW or less, 4P-110kW or less Coupling Dismeter: 280 mm or less Motors have different size and frame by manufacturers

Downsizing to 2P Design

Increasing the pump speed by using a 2 pole motor reduces the pump size and weight.

Conditions: total head of 50m, capacity of 1m3/min, and 60Hz

Pole number: 4P

Pump size: CAL80-400 Motor output: 18.5kW

Weight: 400kg

Pole number: 2P Pump size: CAL50-200 Motor output: 15kW Weight: 209kg

Weight reduced by 47% compared to 4P = (400-208) +400+100

The above diagram describes characteristics of 2P. We can provide the design for 4P as well. Weight includes pure, base plats, motor and coupling. Mutor weight differs responding on manufacturers:

Applications

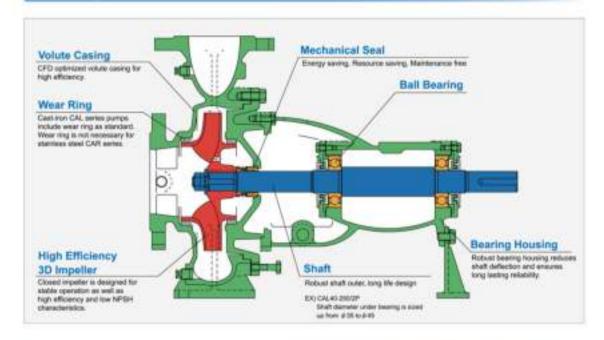
	Co-generation	Cooling water pump, Hot water (circulation) pump	CAL
Utility	Air conditioning	Cold water pump, Cooling water pump. Hot water pump	UMI
dunty	Dramage treatment	Raw water pump, Filtrate pump, Back wash pump, Transfer pump	CAI
	Pure water facility	Raw water pump, RO wash pump. Recovering back wash pump. Filtrate water pump	-
	Power generation	Deserator feed water pump	
	Hot railing	Transfer pump, Hot water pump, Water pumping pump, Filtrate pump, Back wash pump.	CA
Iron & Metal	Flue gas desulfutzation	Cooling water pump, Industrial water pump	
	Roll cootant	Spray pump	CA
	Plating	Wash pump (Rinse pump)	10000
	Manufacturing process	Cold water pump, Cooling water pump (Circulation / Boool), Racycle water pump, Filtrate pump, Sprinking pump	
Food & Beverage	Refrigerator	Chilled pump, Defrost pump	CA
	CIP system	CIP supply / return pump	CA
SHEWAR	Degressing process	Degrassing pump, Hot / Cold water wash pump, Spray pump	
Automobile (Painting Plant)	Transformation process:	Chemical pump, Hot / Cold water wash pump, Pure water pump	CA
(ranning round)	Electrodegration process	Electrodeposition liquid circulation pump, Wash pump, Pure water pump	
Contract	Power generation	Deaerstor feed water pump, Condensate pump,	
Garbage Incinerating Plant	Heat decrease tower	Heat decrease pump, Spray pump for heat decrease tower	CA
memerating ream	Drainage	Reuse water pump (pumping, transferring, feeding)	
Other Liquid Handled		m chloride, Kallum chloride, Alkaline solution, Ethylene glycol, Agua fortis, Sulfate, intonia liquor, Caustic soda, etc.	CA

Please ask about special fluid.

Specification

		CAL(Cast Iron)	CAR(Stainless Steel)
Handled	Kinds	Cheon water, Warm water, Oil, Chemical medicine, Absolve solution, Brine, Heat trensfer media, Absolve skirty liquid Linder Jieffs, etc.	Pure water, that water, See water, Salted water, Rofrigorom, Electrodoposition paint, Alexance stury figure under Set'lls, etc.
liquid	Temperature	Danklard: -10°C = T = 100°C Option: 100°C = T = 250°C	Standard -10°C to +80°C Option: -40°C to +140°C
Max. disc	harge pressure	Standard: 1MPs (10kg/lon/G) Option: 1.4MPs (14kg/lon/G)	MPs (10kgfor/0)
Max. suct	ion pressure	0.8MPa.8Ng/cm/G)	G BMP's (BligStory'G)
	Impoller	Closed	Closed
	Shaft seals	Standard: Single mechanical seal (Rubber believes) Option: Double mechanical seal, Gland padong	Standard: Single mechanical seal (Rubber bellows) Option: Double mechanical seal, Gland packing
Design	Water injection for shaft seei	Standard, Internal Injection Option: Quenching, Flushing	Standard Internal injection Option: Quenching: Funhing
	Lubricated bearing	Standard: Greate Advication Option: Oil Advication	Standard: Greate lubrication Option: Oil lubrication
Flange star Suction / D	idard, scharge direction	JIS YOKKIF Shalt direction suction / Vertical Inguillecharge	JIS YOURF Shaft direction suction / Vertical top discharge
	Casing	Standard: FC250 Option: FCD400	Standard (ICS1) Option: SCS14
Pump	Impeller	Standard FC295 Ceter: 5C313,5C514,6C6	Standard: SCS13 Option: SCS14
material	Shat	Standard SUS425U2 Option: SUSSINAT-SUS304	Standard: 5U5304 Option: 5U5316.5U5325U1
	Case wear ring	Standard FC200	=

Design Features



Parts Interchangeability

■2P type Serie color and rearries in the serie parts indicate intensharquebility

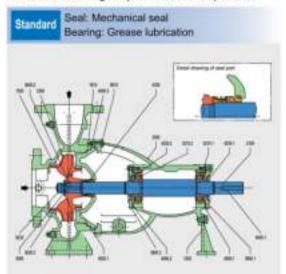
	Caring	G.	Seaton Healthing	Bult	Memorical Steal
32-125	10				
40 tits	2	*			
88-726	*				
13 400	*				
40-100		2	18	19	(8
50-160	4:				
32-200	7				
45-300		- 3			
00-206	*:				
00 NG	10	*	-2	×2	
90-250	n	- 6			
22.250	12				2
MI-250	12		3	. 3	
NI-250	16				
00 251	15	7.			

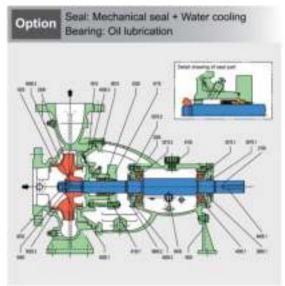
	CARLO CONTROL AND AND AND THE CONTROL OF THE CONTRO	
#4P type	Same color and number in the same parts indicate it	Hierdrangeabilit

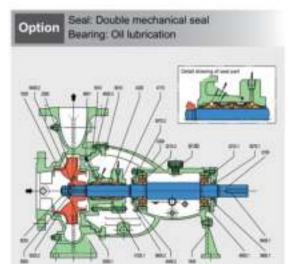
Plants	Canne	Cower Cower	Bearing Health	Sheft	Mechanical Soul
33-120 40-120 66-120	2 3	11.			
50 160 50 160 60 160	6 8 7	#1		ě	Ni.
60-128 05-128 12-160 60-160 06-160 06-160 06-160 06-160 80 80-160 80 80-160 80 80 80 80 80 80 80 80 80 80 80 80 80	# 10 11	1			
100,100	12	97.			
BG-1180	18	8			
100000	15				
40.250	16	9.1			
50.000	15				
7750	19		7.	- 2	3.
1000384	20	7)			
B1250B	21				
100 CO 100 CO	22 23				
0.000	24	8.3			
1005H00	25				
60-2-6 100-144 90-2-15 66-3-16 86-3-9 100-140 120-2-6 120-2-6 120-2-6 120-2-6	26	*	3	3	3
125720	27	100			
	28	15	4		
105-110 105-110 60-400	29	12		25	
50-600	30	13	_1		
155-400	31	14:	90	4	
125:4(0)	32	165	40	- 100	
155-450 125-400 103-310 165-315 150-365 181-410	33	16			10
B1-0	-34	-16	18	- 6	25
THE RESERVE AND ADDRESS OF THE PERSON NAMED IN					

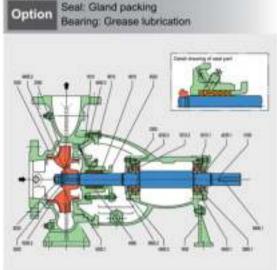
Pump Sectional Drawing

The basic structure is same between CAL and CAR for parts interchangeability. CAR, which is made from stainless, does not require case wear ring. Due to adopting build to order method, various combination with pump material, seal and bearing is available according to liquids kinds and temperature.









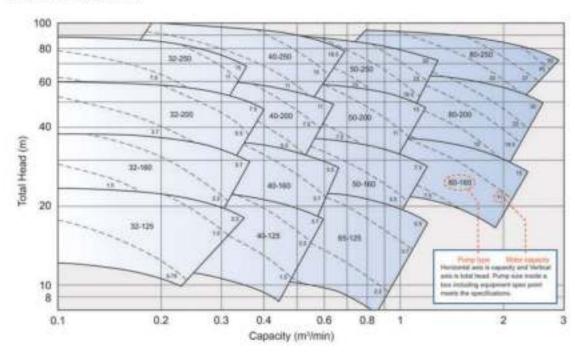
Parts number	Parts name	Parts number	Paris name	Parts number	Parts name	Parts number	Parts name
1020	Volute casing	3800.2	Bearing cover	4580	Lantern ring:	9010	Hex. bolt
1610	Casing cover	4000.1	Flat gasket	4610	Gland packing	9041	Nock
1830	Support foot	4000.Z	Flot gasket	4710	Seal cover	9130	Plug
2100	Shuft	4000.3	Flat gasket	6020.1	Casing wear ring	9233	Lock nut
2300	Impoler	4120.1	O-mg	5020.2	Casing wear ring	9400.1	Key
3210.1	Deep groove but bearing	4230.1	Labyrinth ring	5070.1	Defector	9400.2	Key
3210.2	Deep groove ball bearing	4230.2	Mechanical seal	5070.2	Defector		
3300	Bearing housing	4330	Shaft box gland	5500	Washer		
3600.1	Bearing cover	4520		6430	Oligauge		

5

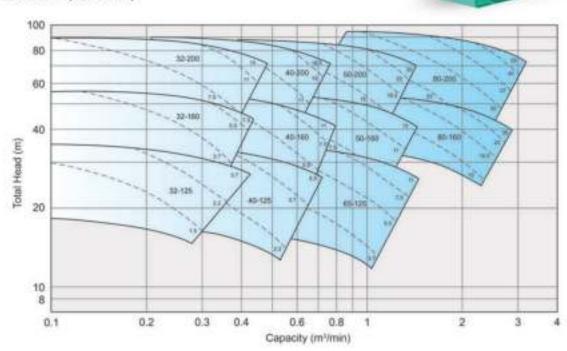
CAL (Cast Iron) Selection Range Charts

fiP is also available. Please ask our sales representative for details.

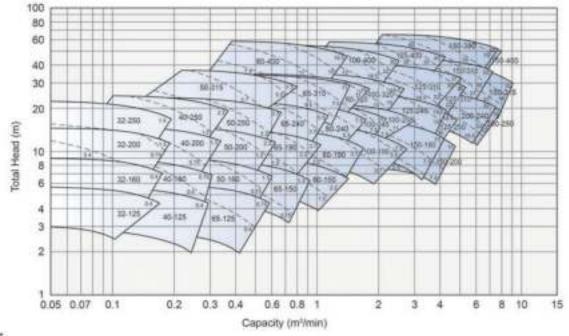
■50Hz-2P (3000min⁻¹)



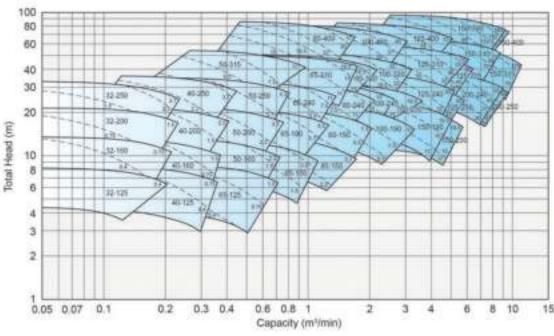
■60Hz-2P (3600min⁻¹)



■50Hz-4P (1500min⁻¹)



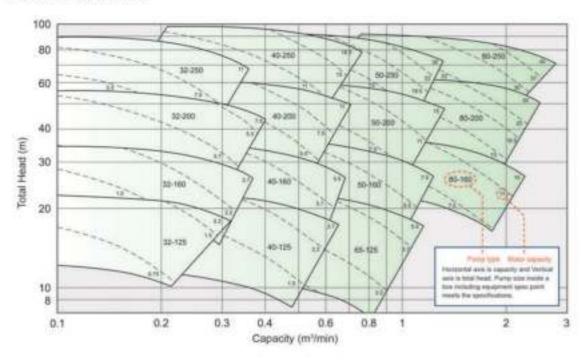
■60Hz-4P (1800min⁻¹)



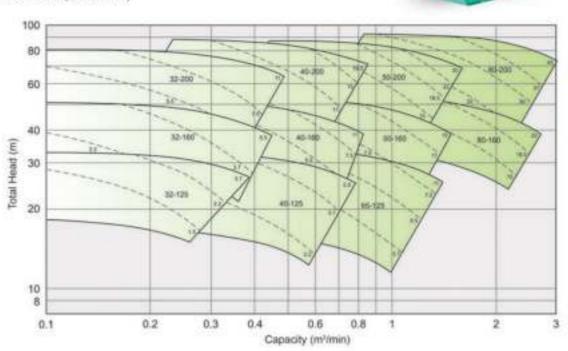
CAR (Stainless Steel) Selection Range Charts

fiP is also available. Please ask our sales representative for details.

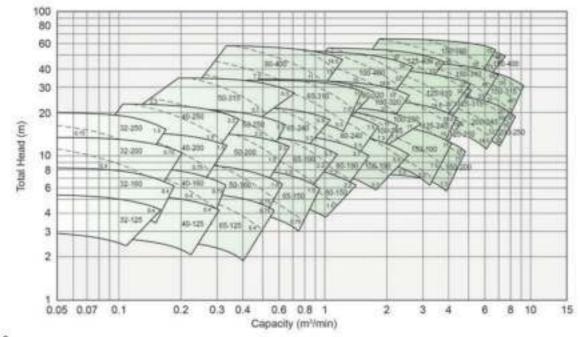
■ 50Hz-2P (3000min⁻¹)



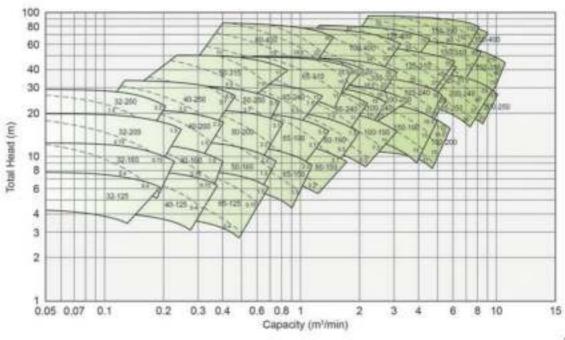
#60Hz-2P (3600min⁻¹)



■ 50Hz-4P (1500min⁻¹)



■60Hz-4P (1800min⁻¹)

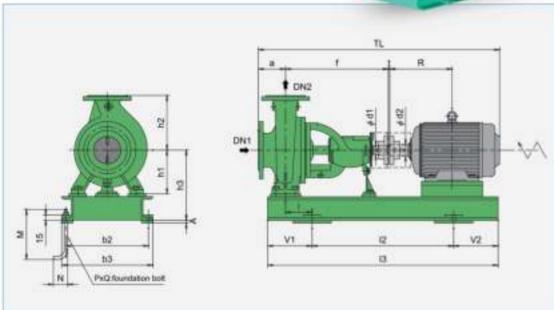


10

Dimension Chart

- Flange standard CAL: JIS10K RF / CAR: JIS10K RF
- Below dimension is based on totally enclosed fan-cooled motor.
- Motors have different size and frame depending on manufacturers.





Dimension Chart for 2P Motor Drive

					P	AND .					Motor			Tare !						Pin m	DED NA	_		_			100	-	
	P	-	J.,	Dire	-		Ann	100	ight		Diene	-		Service of the last	(mail					Mari		100		1			Lin		100
None:	CHI	DMI		T	M	10	en	Charle 1.	Diagn.	Yearn	*	6	10	п	A	m.	93	¥	11		м	14	+	4	91	V2	Ť	W.	71
	1900	m	100	file	mm	(8)	PERM	No	100		200	801	AND:	200	=	Ag.	200	THE	300	WW.	piet	mn				m		14	-
									1	-TUM-	130	-14	320:	£70:	:0:	47.	.002	41.	210	4.00	300	50	4	MIZ	185	345	1	1.1	-68
											130	39	18291	670	10.	TT.	392	All:	28	420	300	50	4	MIZ	100	345	1	1.13	175
	1		15.			100	- 55			WS#	340	:10	330	670	0.	.27	300	49	390	4200	300	10	4.	MII	195	145	1.1	11	700
12-125		32	30.	300	113	140	28	(37)	25	9001	.156	24	370	750	0	36.	2017	346	210	480	200	50	4.	387	135	335	8	TE	150.
48-125	555	40	361	360	312	146	24	28	229	98L	168.5	24	120	750	:10	-35	202	58	250	481	300	50	4	382	115	135	13	1.1	175
	-		153			1722	E19.5	501		1005	161	29	170	730	0.	28	202	86	280	480	200	50	4	3412	133	135	1	1.6	89
										711256	200	-29-	320	750.	0.	.27	202	33-	200	480.	300	50.	4	BBI	115	335	3	1.4	834
									12	1305	.779	3.8	350	870	8.	31	215	50	370	600	300	50.	4	MIZ	150.	130	#	1.1	20
										(80)	130	.19	320	479	0.	- 21	222	42	200	120	200	50	4./	MIZ	180	1404	1	1.1	745
									1 3	96M	140	.19	170	670.	0.	29	222	13	250	420	300	10	4	107	100	345	1	1.1	7,0
									-	981	116	24	320	73st.	0.	30	227	58	210	461	200	50	4	MIL2	115	335	3	TE	154
-					100	000	100	12	100	BOL	168.7t	24	120	750	0.	30	111	21	290	400	300	00.	4	MIZ	115	355	1	1.1	790
80-160	30.	巫	30		120		35	70	30	- 10tt.	191	29	(120)	730	00	29	222	194	240	4.00	300	.00	4.	MIZ.	110	335	T	1.0	1921
65133	55 80	465	30 100		ICITY ICITY			311	31 30	11291	299	29	320	730	0	21	222	20	200	487	300	100	4	367	133	355	1	1.6	101
90,000	1	95			Ann	-	100	- 94	.40	1125	234	.10	350	170	0.	36	222	98	370	600	300	80	4	567	150	130	1	1.1	917
									3	10000	321	4.2	430	1000	0.	41	250	110	400	660	200	30.	4	MII	179	170	3	6.7	107
									1	16001"	103	12	430	1009	0	11	250	1,00	400	640	300	50	4	507		170	E	6.7.	766
										1605.	345	42	630	1000	n	41	250	110	900	663	200	50	4	DELT	120	170	2	6.7	1111

"Motor frome is the same but shaft aide diameter (d2) is different.

						ery.		-	-		Minu			Marrie P	-	Q 1				Paper	640	D-		ě.			0	and the last	nu
Pump		**		Dies			Aute	Ye		Frence	Dirte	men			-									-					-
Sizes	1361	100		1	91	NZ.	(1)	SET S	Grante	4	. A:	(42	10	(1)	*	W	149	1	NI.	10	4	B	7.	0:	Vi	V2	.0	WI	*
	200	HINE:	7800	7888	ren	men		Nr.	No.	001	168.1	28	224	750	-	禁	714	35	2001	400	200	00	78	MI	1115	met 155	H	11	796
										1000	(30)	28	288	756		11	758	35	290	400	390	50	in.	M42	Atta	in	0.	1.0	(A)
						183	***			11286	200	28	286	100		11	29	55	290.	450	290	30.	A.	Mi	111	123	3.	1.6	854
0.200	65	40	80	30		183 183		37.	29	1125	239	35	230	ACT D	+	24	28	30	320	600	390	30	4	MI	130	128	3.	12	- 14
6.000	30.		100			180		32	23	160W.	333	42	(31	1900	9	.29	_	-	-	19061	290	30	4.0	M2	1000	£70	3	4.7	.38
		1		25	M		154		100	160A)**	323	42	430	1900	*	20	_	130		900	290	50	110	Max	178	176 178	1	8.7	11
										-180M	111 1	-	(0)	1000	0	42	-	110	4 minus	1658	350	700	H.V	MI	in	120	10	9.0	11
	П									TIZM	200	28	231	138		32	230	35	290	450	250	00	4.	Mia	111	139	1	1.0	45
									1 3	1125	239	38	398	STR	*	-34	298	30	120	100	350	50	4	MI	_	120	1	1.1	9
									1	160M°	333	17	430	1000	*	29	700	130	-	900	200	200	E	MEX	170	170	13.	6.7	T
										3600.4	345	日日	430	1900	÷	-	쯨	110	وتنتته	960	200	50	+	借	170	170	1	17	11
									1	1000-	345	46	430	1900		38	10001	110	d-coord	HIAD -	390	30	4.	Mil	110	170	1	9.0	iii
0.000	100	30	186	361	160	200	24	37	39	1800£A	301, 5	.00	130	1000		42	25)	110	200	960	200	00	4	NE:	170	1,76	11	9.0	11
					m	m	m		3	180M°	451.5	-	436	1000	+	42		114		906	300	100	1	MI	170	1.76	0.	9.0	11
										18045	301.5	محاكمه	(30	1000		42	District of	130	40000	SEE.	330	76	4	Mi.	ATRI	176	3	13.9	11
									1	280LA	270, 3- 285, 5-	56	400	1120	+	13	-	1000	440	740	220	50	4	M2 M2	176	150	3	11.9	11
										2900	195.5	55		1130		10			440	730	200	50	i.	342		150	0	12.9	tin
	-								-	2255	402	56	130	1250	10	TT	312	145	4800	640	290	10	10	MA	205	716	3	12.9	13
										132%	229	28	350	1000	9	31	250		4000m	000	200	30	160	MIZ	179	B OOK IN	3.	33	30
									1	1900%	201	42	430	11200	0	38	2307	130		748	200	28	4	ALC: N	1100	150	3	6.7	17
									1	1900.	303	41	430	1139	0	36	120		400	748	200	58	1	MII	100	190	2	67	17
										1600."	343	46	430	1129	0	38	250	(30		748	300	58	_	MI	H	110	3	9.6	110
COMP.	100			1000		200		-	W.	180353	251.3	48	430	2129	0	44	270	-	400	748	200	59	4	MIZ	盲	190	3	9.8	12
0.100	100	-	100	400	-	part.	**	201	N.	DEST	251. 9	48:	430	1129	0	44	170	130	400	748	200	64	4	MIZ.	190	190	2	9.8	17
										(MORT)	351.5	-	430	1130	-0	- (1)			400	740	200	-	1	MIZ	190	190	3	11.0	33
										200LA	30.3	36	430 470	1120	13	44	357	185	430	240	200	80	10	306	200	280	3	11.9	13
										300L	200.5	100	470	1200	10	63	SUT.		430	040	250	61	13	306	705	250	5	11.9	134
									1	226	407	W	-	1997		65	147	-	100	848	200	63		Mil	100	700	1	11.9	13
										11250	300	28	180	870	0	38	270	73-	250	000	200	36	4	nar	156	133	3	1.1	1885
										3325	229	58	430	1000	0.1	42	270	-	400	000	200	50	4	MIZ	120	179	3.	3.7	30
									1	10000	333	42	470	1129	0.	45	CONT.	-	140	748	200	16		Brazzin	139	199	3	6.7	32
									3	1606T.,	343	42	470	1139	0	45	-		440	748	200	24	-	MII MII	-	190	5	6.7	112
									1 3	1600,"	345	16	-	1126	_	45			400	746	200	58	-	MIZ	100	110	3	9.4	iii
										TREVES	201.5	-00	\$10000H	1129		43	STATE OF		4.00	740	200	59	-	BOOM	110	190	3	9.9	12
0.250	80	20. 40.		470	180	225 225	12	55	56	18001,	351.5	10		1129	-	43			440	740	200	58	4	707	1310	199	3.	9.4	U
0250	10	50				255		37	59	7900L	251.5	4	670	1130	_	41	-	-	400	748	300	58	4	MI.	110	196	3.	13.0	31
0.200	100	80.	125	479	380	250	32	100	42	200 LA	270.3	105	100	1139 1256	10	67	357	-	460	246	200	61	-	M12 M16	265	120	3	11.0	12
		100	m		m				-	2001	200.3	量	Brancon and	1250	10	47			400	840	250	EL	1	2016 2016	100	765	÷	11.0	m
										125	407	16		1256	10	60	141		490	840	250	61		M34	385	205	3	11.0	Ü
										3233414	111.5	25	100	1274	10	100	142	(30	400.	P40	250	61	1	MD4	mi	200	2	iI 0	11
									1	ZEM	01.5	03		1256	10	.00	141	130	بدننم	310	250	EI	4:	MII	385	201	2	11.9	180
										2904 2904	452.3	100	\$10000F	1200 1200	10	7A	and the second	130	490	841	Z30 Z30	EI .	4	MIE	200	200	1	23. 0 11. 0	18
										1600C	101	10	_	1120	_	100			400	746	200	200	_	MIL	180	-	i i	WE	10
									3	10004	303	42	-	1130	-	11	-	-	+	240	200	-	_		110	-	3	0.7	B
										1600,"	345	42	470	1120	10	11	357	190	440	748	200		4	MI	110	110	3	6.7	17
										100C1	343	48		1120		32			440	748	MODEL	_			139		1	A. B.	11/8
										THEAP	351.5	100		1130		53			400	740	200	_			199		-	0.0	12
										19005	201.5			1130		13			400	740	200	_	_		100	-	2	11.0	111
0.054	110	80.	125	470	225	200	11	67	70	3900	200. S	88		1120	0	11			460	748	300	_			H		3	11.9	11
MODEL IN		100		1000	1700	100			1000	2001A	186.3			126		H			400	848		61			2000		2	11.9	13
									1	2006	866.4			374		7.4			490	848	250			-	2005	_	1	11.9	•
										2358	602	14	_	1,550	-	65			490	840	250		_		2005	-	-	11.9	-
										225563	414.3			1200	10	41			400	940 940	250	-	-	304	_	200	-	11 B	140
									1	225AI 2005A	414.5			器		34			BOOM !	940	250	61			205			13. N 25. O	
										23261	452.5		530	100	199	11	120			940		61	_	MILE	_	-	1 1	- F	12.00

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"Motor frome is the same but shaft asks diameter (d2) to different.

Dimension Chart

Dimension Chart for 4P Motor Drive

				100	- 7	m	mer.		(Open	- 2	Union*	med		franc)	nin'	-77			- (faire	intim	Simi	-	0.0			D	e in a	Helte
Party:	D	-		Die	mylo	100	Aprile	. 1/w	2.	ALC: Y	Line	meter	Ь.	7710		-	1		_	1	200				-				1,000
Sides .	0441	ONE			86	12	41	Grade	A	Flate	-	140	- 10	-19	A	W	10		12	42:	10	A.	1	-0	W	72		100	TL.
	-	881	plant.	886	em:	man	-	390	16	400	794	THE .	Days.	THE .	res	14	gran.	-	000	1860	840	181			**	mes	Ħ	49.	Non
30125	50	33	80	-	100	140	-11	77	-	71M	130	1.0	320	679	.0	JE.	100	45.	250	431	200	38	4.	502	HIS.	145	3	3.3.	481
W122	63	40	80			140			20	81	3.63	19	320	628		25.	Dist	43	250	420	300	31	4.	bna:	100	145	3.	10.10	724
ANCE					133	000			1	BIM	3.80	18	320	601		17.	200	43	250	400	200	13	+	hnz	100	143	ы	11	765
72.160	50	32	80	300	132	160	24	-28	30	7 DM	130	110	320	628	1	29	137	40	290	420	200	10	1	3417	100	143	3	1.1	726
40-100	60	40	80.			160		30	31	9000	100	19	320	629		28	223	45	284	420	300	-	-	502	100-	145		LI	765
62133	10	463	100	361	132	180	21	21	.00	900.	1055	24	320	736	-	30	100	35	190	400	300	36	1	MIZ	體	益	낡	11	374
										7130	130	111	320	678	-	36	254	10	290	420.	300	31	1	bri2	100	145	3	E	711
32.00	50	33	88	30	160	160	21	36	8	30	140	19	320	678	1	28	250	40	391	420	200	36	4	302	100	145	3	1.1	246
40-200	61	40	90	364	100	380	26	32	30	9000	140	19	320	1079		.30	258	45	250	420	200	34		MIS.	100	319	3	1.1	125
99-198	60.	90	100			180 180		# H	33 36	900.	100.2	134	220	JTM.	8	12	258	50	翘	400	200	М	4.	pus.	115	,155	2	1.1	.794
-	173	33	飅		M	100	(5)		20	100C	141	185	120	.734	-	33	88	20	200	490	300	크	1	503	111	105	131	1.6	808
-	-		-				-	_		HINE	390	0.28	320	100		14	256	45	236	470	200	38	-	502	100.	1105	31	1.0	740
									- 3	8034	140	10	120	629	w	36	250	45	290	420	200	56	+	5012	100	145	5	7.4	725
9020	60	50	100	300	160	286	24	70	70	905.	.2963	24	120	756		31	750	55	290	480	300	100	1	302	111	185	3	11	796
45-290	85	65				266		40	42	1001.	193	28	330	714		32	254	55	290	480	300	20	4	hri2	113	155	3	1.6	838
		100	100	35		(22)	100		1	THIN	200	28	:320	739	4:	32	258	55	290	480	200	24	4	2012	112	125	3	1.9	835
							1.17			1325	229	28	250	870		34	259	90	229	000	200	10	4	5112	100	128	3	3.2	907
									- 23	900.	3665	24	320	859		30	250	90	290	900	300	.94	4	5112	150	128	3	3.2	1909
80 CW.	1000	30	100	di	100	500	32	12	40	LUCK	183	28	330	808		36	229	100	296	600	200	38	4	5017	156	H	3	1.2	948
				-						11158	281	135	320	874	8	.29	276	90	290	990	300	분	4	M13	158	Hit.	н	3.5	962
_	-	-	-		-	Н	н			1305	239	128	350	625	-	33	770	75	330	600	200	52	+	502	120	128	3	3.2	MIX
							Ш			80M	340	19	380	621	-	38	276	75	250 250	800	200	34		3412	138-	129	3	3.2	860
30-2W	99	32	100	270	166	225	32	49	51	900.	100.5	114	380	624		- 34	338	75	350	600	200	H	1	MIZ	150	128	3	1.2	991
69-258	65	10	100		180	225	30	38	- 55	1001	161	28	380	879	0	38	270	75	330	630	300	H	4	Miz	156	128	3	37	603
55-249	90	65	100	100 100		223		14 14	36 58	11258	230	.28	280	826	0	.38	270	75	300	630	200	38	4.	5012	154	128	3	3.2	190
90-196	100	80	100			225		12	36	1325	239	39	430	3930	.0	12	276	95	400	000	300	54	4	MIZ	128	178	3	3.7	1000
	177	100	/110	///	633	177.1	m		000	130M	138	29	430	1900	1	42	279	90	460.	860	200	36	4	3412	150.	178	3	5.4	1000
_	-	_	_	_	_	_	-	_		10050	325	42	470	3120	0	45	259	115	443	740	200	34	4.	MIE	190.	156	3.	5.7	1206
										10fL	.193	12	290	879	11	42	270	80	300	600	200	50	4	302	150	126	2	3.2	503
22107		20	1	400		-		7225	100	11134	200	12	.290	575	-	41.	200	-90. -80.	.200 460	990	200	쓨	-	MUZ. MUZ	176	176	B	22	999
305 200	盟					250 280		12	139	DIM	230	25	430	2800 3000	-	40.	29G	30	400	000	300	ii	1	bna:	176	LTE	Si	3.4	1090
										16856	113	12	170	1120	-	12	290	100	440	240	200	04	1	bn2	100	IDE	3	8.7	1206
									- 33	10%	263	12	470	1126	-	12	290	100	110	740	200	10	4	502	190-	100	3	8.T	1250
										100L	.291	29	280	879	0	38	335	300	390	900	200	34	9	50.2	JUNE	320	3	3.7	.945
										LUM	290	26	380	679	0	42	JHE	75	398	-800	200	34	4	503	Jok	125	3	17	1962
50.00	an .	30	155	de	225	280	22	20	TI	1385	239	39	430	3900	_	44.	315		100	660	200	30	4.	MIL	176	176	3	12	1000
	177	III.	780	77.5		-	1	111		13051	138	38	430	3900	0	46.	7315	35	MIC	890.	300	39	8	bn2	170	176	3	3.4	1005
		Н								16651	323	42	470	3120	-	31,	213	-	8.83	740	200	30	8	002	180	100	3	4.7.	1181
	\vdash	_	-		-	_	н	_		106L	241	12	420	878	0.	0	311 317	111	447 493	740	200	36	÷	5617. 5612.	136 136	126	4	4.7	1225
										1385	291	28. 39	430	3100	1	#	1117	BX.	400	690	300	100	1	bna:	170	179	ы	32	3000
									- 4	DIM	238	24	430	3300	1	40	317	800	480	600	300	H	-	hna	178	176	3	3.6	1000
									3	16851	121	42	470	1120	-	14	317	100	110	101	200	=	4	5012	110	1300	3	4.T	1206
										1607	161	42	470	1120	11	14	m	100	110	240	200	34	4	0412	190	1300	3	A.T.	129
100-215	123		123		223		200	m	79	1601."	30.	10.	179	1120		H.	337	100	111	230	200	31	.1	30.2	196	JMI	3	2.0	33000
100-250	122		127			280 280		H	n	FROME	361.7	10	C01	1125	1	EM.	301	100	333	240	300	H.	1	201	199.	JW.	3	9.0	LETTO
65-310 86-330	100	A5 30				290		5	38	DMM	301.5	-	470	1120	0	10	100	100	480	740	300	36	1	bna:	190.	196	3	3.0	1342
	100		Will	000	555	10	0			IMM"	361.3	135	670	3130	0	14	312	100	880	7/80	200	36	8	MIZ	190	Title	31	12.0	2000
									33	19002	37E.3	10	470	-	_	14.	-	100	_	740	200	_	1	DD2	-	-	8	-	1306
									- 5	200LC	370: ñ 390: ñ		130	1120	-	74	347	133	480	2.00	200	93	-	ME	200		E.	10.9	
									1	3000	390.7		130	1250	_	79		113		9.00	130	-		M16	500	possini,	3	12.9	
					1					300L"	405.7		130	1250		74		111	_	0.00	_	61	4	nne	200	-	1	21.9	-
										1325	.138	38	430	3300	$\overline{}$.51	_	300.	400	000	300		6.	302	170	LTE	3	1.7	1000
									- 3	13031	258	.10	430	3300	_	34		80.	400	660	200		4	Mi2		_	3	3.4	
										16850	321	42	470	3120		16		300		740	200		4	302	190	poon.	3	6.7	1,206
100.220	125	100	125	473	250	315	22	81	91	1667	345	-CI	450			16.	Broom!	100	Proposition of the Proposition o	740		种	4	\$1000 PM	100	pot entre	3	6.7	1850
										lest."	245	-13		3120		IA.		166		740	300	20	6	M13		100	•	9.0	1169
									- 3	THING	301.0		-	3120	_	34	342	-	440	740	300	30	6	M12	-	100	•	1.0	
												48	1470												190	1330		0.0	

1	-			_		yrse.	000 m		and the		Vicer.		l x	(Swiss)	heri				- 2	Year	istivi	Cim	-				d	i principal	Thefai
Free.		-			THE STATE OF		Acre	Drade.		form		nuntr																	-
See	100	CAG		5.0	115	10	97	10	1			49	8.0	0.00	0	W	30	1	M	*	M	*	-	4	44	1/2	1		Th.
	798	m	1004	m	9691	em	**	(Ng	NA	- Andrews	1910	rere	chere		=	100	***	無	men.	-	***	-			=	-	H	30.	-
										188E.	200 A	-35	CT0.	1128	0	M .	342	190	440	740	200	50	4	MIZ	150	190	-	12.0	1300
									- 5	1801."	400.7	10	m	1128	18	84	367	115	430	540	230	63	4	ND+	265	190 286	Ť	23.0	1272
									3	2000	395.7	35	330	1254	18	73.	367	110	190	542	230	63	4	MILE	201	204	fi	12.9	1366
10028	125	100	123	479	250	10	22	- 60	90	20012	395,7	33.	330	1294	18	73.	367	.110	690	545	200	63	4	Mile	261	209	17	12.9	139
									1	20837	555. N	10	330	1254	35.	23.	367	310	400	545	被	43	4	MH	285	284	A.	23,35	.138
									1	J398C	437	10	330	1294	38.	3	M2.	115	490	SH	100	100	4	MH	25	1000	4	乱进	340
									1 3	8855°	437	65	530	1204	30	n	367	113	490	545 345	156	63	1	MI6 MI6	283. 365.	289	÷	22.8	1977
				-		-	-			11211	250	28	438	ATO-	100	81	367	10	400	600	300	50	4	Mil	130	雷	Ė	5.4	130€
					П					1325	139	39	GE	1000	B	11	342	źΕ	400	603	200	50	4	Mil	170	170	\$	5.1	1063
										13211	258	38	CIE	T00H	0	-31	342	ήű	400	663	200	30	4.	MII	179	170	1	5.4	1.000
									3	16650	323	47	m	1129	8	36	147	100	340	740	200	30	4	+	199	199	1	6.7	1223
									- 3	Hear	343	47	ETE	1139	0.7	36	347	100	840	740	208	50	4	MI	190	130	13	6.5	1000
										TROMC	30 0	0	m	1120	B	36	317	200	AID AID	781	708	50	1	MII	190	190 790	10	9.4	1386
130-286	100	100	150	in		ini	12	10	303	18881	301.0		m	1330	0	-50	365	100	410	781	200	50	4	Mil	790	790	i	100	1357
136300		im						100	3001	Intel-	301.0	-	m	1320	0	-34	107	100	4.00	788	208	30	4	Mil	199	190	3	13.9	1100
125.000		133				355 355		1003	313	18000	376.5	4 min	m	1320	0	-30	107	100	4.00	181	200	50	4.	Mil	110	190	3	9.4	1307
125/200	1177	347	177	117	177	100	100	2008	313	Her.	318.2	متنتمه	an.	1320	0	-34	36	100	440	183	200	50	4	MII	190	330	3	17.0	1390
										Her.	400.7	-	47E	1220	900	80	悪	热	40	140	器	41.4	1	器	3	=	1	23. B	126
										300T;	296	100	200	1230	000	품	馬雷	110 110	etion.	740 740	뜷	합	1	Mil		票	÷	12.0	1406
									- 3	206L**	425.3	100	338	1200	100	Th	雷	iii	610	543	1	41	4	Mil	381	雷	4	11.0	1296
										115%	(32	10	300	1230	100	Th	SHT	ith	600	543	200	41	4	Stre	381	節	馆	21.0	1400
										1285	432	100	100	1230	00	Th	NT.	1115	400	543	256	41	4	MH	381	205	4	11.0	3104
				⊨		⊨				2887	432	85	100	1230	to:	Th	MT	115	490	543	254	0	4	bbs	391	205	4	21.0	303
										1325	139	36	310	1000	.0.	80.	312	M	480	660	200	50	4	MO	120	3,70	2	5.4	1000
									- 3	13258	334	42	310	1290	10.	77	307	115	490	840	350 354	63	4	M12 M16	170	285	ê	6.7	1206
										TOUR.	345	42	538	1290	50.	77	397	115	490	840	254	63	4	M14	200	285	6	6.7	129
										1005."	345	48	7,000	1250	10.	TT	397	115	490	640	258	63.	4	MH	285	235	13	0.0	1168.
										180VC	360, 6	45	208	1350	900	TF	397	1115	400	640.	359	43	4	M14	365	395	1	9.31	1000
										18040	351, 5		538	1350	000	77	397	115	490	843	154	63.	+	M16	385	299	X.	9.3	136
				_	_		ш			18841"	353.5		729	1550	00.	TT	387	HIS	490	840	259	63	+	MH	355	235	3	13.9	1161
80 400	1100	99	163	100	100	1777	150	120	100	18002	370 A	سنتسو	728	1350	10	Щ.	397	HA	400	840 840	258 258	61	4	MH	380	285 280	ŀ÷.	13.9	1306
										1881."	400.7	grania in	328	1250	20	픞	100	IIIA	400	840	258	급	4	Mit	200	55	÷	23.0	1277
										39000	305. 7	بمتتمحه	206	1400	30	89	307	140	330	D43	258	63	4	Mil	130	230	1	13.9	1368
										3000	305. Y	.15	390	1400	DO.	.89	397	100	550	040	258	63	4	Mil	230	230	1	13.9	1393
										. 20HL**	405.75	60	596	1400	10	80	307	3.00	450	040	258	63	4	Mis	230	230	4	21.8	1379.
										1258C	432	0	590	1400	00-	102	307	140	550	040	258	63	4	MH	230	230	4.	21.8	3411
									1 1	2006	432	10	500	1400	30	92	307	340	500	040	258	63	4	MH	230	230	+	71.8	1411
										2255	345	42	500	1290	100	82	300	140	700	040 840	224	40	4	Mis	560	200	4	6.7	130
									-	1601,***	345	10	538	1290	1000	61	400	16	600	640	254	41	4	MDS	399	285	F	9.4	1261.
										180040	361.5	48	7000	1290	10.	80	000	96	400	540	258	41	1	Mis	396	285	1	9.8	06
										180301	361.5	48	7000	1299	10.	30	400	14	490	540	259	40	1	Miss	395	989	2	9.9	(01)
										HADAL.	301.5	15	208	1290	10	80	400	96	490	540	254	49	4	Mis	385	285	2	13.6	1254
										SWEE	370.5	18	330	1220	10	80	400	96	400	840	258	43	4	MA	200	285	13	0.0	1363
									- 3	1800."	370. E	15	339	1220	20	30	400	99	490	640	農	43	1	MOS MOS	200	200	怜	21. D	130
		7,711	17/21	1			1/12		0.00	200M	406.1	65	389	1400	10	91		1000	550	Account to the	部	A rction	1	40.00	130	4000	garden.	21, 0	BAGGION.
125-010								140		2000010	285.1	15	500	1400	201	91	400		500	049	250	67	4		230	231	2	13.6	1017
125-315								110		2001.	201.1	3.5	390	1400	20	91	400	130	300	040	250	43	4	Stat	230	230	1	11.9	
3-07-900	1	100	3.44	000		233	74		-	2001."	425.3	RS.	399	1430	20	91		170	200	040	29		4	MH	*****	233		21.0	-
										THK.	437	100	396	1400	10	HT.		120	-	940	258		4	Mis				21.0	
										3335	431	65	390	1400	10	RT.		120		943	254 254	-	4	50A 50A	-	230		21.0	
									-	THINK	444 5	100	1846	1400	50.	87	400	$\overline{}$		943	154		4	Mis		_		21.0	
									- 5	225M	441 5	1 60	396	1400	100	87		130		943	158		1	MD4		_	-	21.0	
									-	EMBC:	663.3	79	1840	1400	D0X	87	400	_	-	943	151	43.	1	M04		230		11.0	
										124M.	482.3	65	7516	1400	000	87	400	120	550	943	358	43	4	MDS	130	ZBI	4	21.0	1917
		4114	1000	1-	L.				-11/	256M	482.3	75	2546	1403	100	87	E40D	120	922	941	254	43	4.	Mis	230	231	14	31.6	1672

"Moder frame is the same but shaft aste diameter (42) is different.

Dimension Chart

Dimension Chart for 4P Motor Drive (continuation)

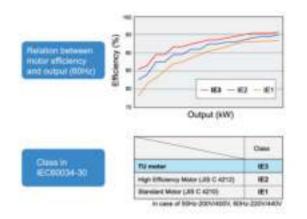
Furty Steen	Row Oleman Asia Weight							Mutor Devension		Basic Plate				Fooreletton Directories										Coupling		Rw			
	DATE	DALD			M	10	6		Chrade	France	N at		90	-10	10 A W		10	1 10		42.	MH			-0	45	Va		W:	11.
	1000	reco	100	-	1000	200	17//2				200	-	0001	200	-	AND .	-	1000	-	100	-	-		100	700	1000		to	-
										100.	340	AE	190	1250	10	10	435	95	100	10	250	63	4)UE	200	20.0	3	9.0	121
										1805AC	331.3	4.6	100	1230	10	Je:	135	95	234	160	250	63	4	ME	200	205	3	9.0	13
									COCCONTRACTOR	18002	351.7	-	790	1250		90	435	4	334	300	250	63	-	M36	206	205	3	9.0	13
										18004	331. 9		190	1250		70	435		330	840	350	63		Mie	306	205	3	IE9	11
										1800.0	370.1	35	190	1250	10	10	435	25	390	840	200	63	1	MD6	200	200	2	11.9	L
										1000.	400.1		190	1230	Elocori	10	635	-	100	810	200	63		Mie	200	205	6	21.0	î
										390M	495.7		200	1100	10	100	435	40.60	290	940	370	63	i	MIE	236	238	6	21.0	14
										30002	395, 5	35	180	1400	10	10	435		580	981	350	63	4	M16-	230	238	3	13.9	1
										3900,1	395. 5	55	580	1400	16	50	435	129	588	940	150	63	4	MIE	236	238	3	13:9	14
	201								- 19	2005,"	425.5	60.	580	1830	18	59.	433	150	550	340	250	63	4	Mie	236	230	4	21.0	14
				530 530 530		375	40	163 158 158	1807 1774 174	2225K	422	60	250	1030	10	90	433	2000	556	140	250	63	4	MIE	230	220	6	27.0	1
25-400		290	160		115					2255	432	60	580	1000	10	90	433		004	940	250	60	4	MIE	230	730	ŧ.	31.0	4
90.200					315					1255"	432	60	190	1400		90	435	•	550	940	230	63	-	MIE	236	7,38	4.	23.0	13
200.250					315					2255*** 22556C	432	78	190	1400	10	96	425 425	129	380	940	250	63	1	MI6	230	728	4	31.0 21.0	1
										225M	446.3	6E	190	1800	10	95	435	\$100 EH	330	940	250	63	÷	Mis	Z36 Z36	738 738	÷	21.0	iŝ
										125M	884.3	15	289	1800	10	100	435	P ORTO	330	940	250	63	1	MIE	20	228	÷	21.0	fi
										25050	463.3	-	641	1800	10	160	435		620	900	250	63	4	MIE	70	238	6	20.0	4.0
										2506	463.3	15	641	1400	10	10	435		600	940	250	60	4	3416	230	210	6	31.0	1
										2505K	482.5	70	643	1400	10	.10	435	120	600	910	250	63	4	M16	110	220	4	31.0	16
										290M*	482.5	65	640	1400	10	10	435	120	699	940	230	63	4	MIE	230	239	4.	21.0	þĖ
										250M"	482.3	70	643	1400	10	96	435	120	40000	940	230	63		MIE	230	220	٤	IL 0	13
										260531	564	300	T30	1600	10	100	435	4	670	1000	250	63		MIE	276	52.6	1	45, 0	113
										2805	511	175	788	3600	10	309	435	-			350	63		Mie	376	279	1	30.0	12
										18004	539.3	75	THE	1900	10	109	435	1	679	1060	250	63		MI6	丑	279	8	31.0	13
		-			-					1809E	369.1 311.3	16	188	1236	18 18	109	435 406	95	500	340	200	163	1	Mile	270	205	4	9.6	i
100-030 100-030 100-000									786 785 787 727	18006	351 1	18	188	1250	gata ia	100-	635	95	200	340	350	83	0	Mie	300	265	-	9.6	H
										180M=	351 3	10	580	1250		16	105	95	700	100	350	63	4	Me	50	205	3	11.9	fi
										100LC	270 B	46	180	1250	10.	100	425	95	700	840	250	63	4	Mis	200	205	3	9.0.	1
										1000,1	370.3	16	100	1250	10	10	400	95	//90	840	200	63	4	MIE	200	205	33	11:9	1
										1805,"	#00.3	160	299	1230	10	36	130	90.	550	300	200	63	4	Mis	200	200	ŧ.	23.0	1
										- 390M	405.3	100	199	1400	10	79	423	130	100	940	230	63	4	pare	276	THE	0	20.0	1.4
										3000	395.2	30	200	1800	10	26.	434	120	130	340	250	63	1	ptte	216	229	3	11:9	3
										3905,"	395.9	.36	199	1800	10	99	435	138		340	350	63	1	MIE	跳	238	1	11.9	14
										2000,"	425.3	165	199	1100	(III)	100	GQ.	****	594	340	259	60	1	M06	218	238	1.	21.0	14
										1256K	133	16	299	1100	18	Ph.	400	133	304	90	270	63	4	Me	思	725	-	23.0	13
										138. 139.	cm cm	60	201	1800	10	10	65	139 139	1000	940	220	62	1	MIL	700 700	735 736	-	21.0	1
										235"	CII	15	191	1800	10	10	425		4000	980	220	63	Ť	Bile	700	238	÷	31.0	13
		150								BSSAC.	446.5	-68:	294	1400	IB	16	425	-		9481	250	63	À	M16	238	238	ï	71.0	1
		120								225M*	444.3	100	190	1400	10	16	425		-	740	250	63	4	Mis	210	238	ī	21.0	118
										225M"	444.3	19.3	220	1400	10	36	400	\$1000E	xid	940	250	63	4)ne	238	225	4.	20.0	Ti
										25000	463.5	18	640	1400	10	16	433	130	600	9(0)	350	63	4	MIE	236	235	4	30.0	13
										1905	143.3	78	640	1400	10	10	404	138	690	910	350	63	4	Mie	326	738	4	10.0	3
										1905"	483.3	16	640	1400	10	.10	455	129	600	940	250	163	4	M16	236	238	4	45.0	13
										2500AC	482.3	.TE	540	1100	10	26	420	129	600	940	234	10	9	Me	236	238	4	30.0	•
										INOT.	482.5	discount of	680	1100		76		129	1000	901	290	40000	1	ME	20	200	÷	23.0	
										25014	462.3	_	•	1100		190	•	•		901	230	-		MIE				31.0 45.0	
										290021	344	50	738			103				1060			-				-	45.0	
										2805	514	75	198			589				1000				-		_	-	31.0	-
										2500	544	80	139		_	339				1000								42.0	•
										290081	588.3		T38	1800						1000								43.0	
										280M	338.3	-	T33	1900	Book Co.	339	· compris	-	44cm	1000	250	4-0-614	4000	4 Com	EC-MO	and the Con-		31.0	
										2804"	269.3	35	730	1400		309				1000	250		4	MIE	276	279	t	43.0	T
										31588	188	AG.	738	1600	10	306	441	160	659	1000	298	93		Mis	276	279	1	61.9	l i

[&]quot;Motor frame is the same but shaft axie diameter (d2) is different.

TU Motor (Torishima Ultra High Efficiency Motor)

■ Torishima pursues high efficiency for not only pump but motor.

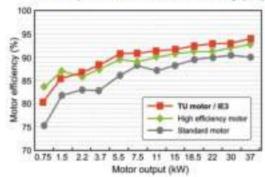
IEC (International Electronical Commission) classifies IE1 (standard), IE2 (high efficiency), IE3 (premium efficiency) by motor efficiency. TU motor is equivalent to IE3.

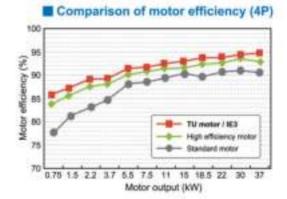




TU Motor Efficiency (Ex. 50Hz, 400V)

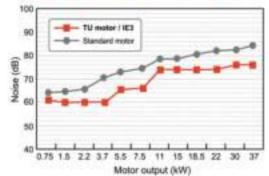
■ Comparison of motor efficiency (2P)

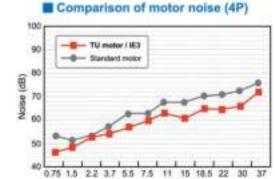




TU Motor Noise (Ex. 50Hz, 400V)

■ Comparison of motor noise (2P)





Motor output (kW)

15