MITSUBISHI ELECTRIC

Changes for the Better

THREE PHASE INDUCTION MOTOR WITH HELICAL GEAR

SUPER LINE Q SERIES

The high performance and wide variations meet all needs

SF-QRGH 10HP 4P

SF-QRGH 1/2HP 4P

- Motor efficiency class IE1 conformed with IEC 60034-30-1
- Same installation base on GM-D geared motor
- Compatible with distribution control devices
- High corrosion resistance
- Degrees of protection IP55
- Thermal class 155(F)
- Developed & made in Thailand, Gear set by Mitsubishi Electric FA Industrial Products Corp., Japan

ENERGY SAVING FOR A GREEN WORLD

MITSUBISHI ELECTRIC AUTOMATION (THAILAND) CO., LTD.

What's New

Advance efficiency for energy saving

Efficiency is higher than non IE1 motor, Advanced energy saving is possible with three phase Q-Series.

MITSUBISHI ELECTRIC THREE PHASE INDUCTION MOTOR

3 HP	(**2.2** kW)	**4** POLE		TYPE	**SF-QRGH**
Hz	50	50	50	RATIO	1:15
V	220	380	415		
A	8.7	5.0	4.9		
min^{-1}	97	97	98	RATING	S1
P.F.	0.84	0.84	0.78	TH. CLASS	155 (F)
RATED EFF.	79.7%	79.7%	79.7%	AMB TEMP	40°C
EFF. CLASS.	IE1	IE1	IE1	IP55	IC411
STD.	IEC 60034-1	IEC 60034-30-1		SERIAL	

MITSUBISHI ELECTRIC AUTOMATION (THAILAND) CO.,LTD.

NM54N704-34

Sample name plate model : SF-QRGH 3HP(2.2kW) 4P IP55

*The efficiency values and IE code are specified on nameplate.

Corrosion resistance

Steel part of motor Q-series have been change under coat painting by electric process EDP (Electro Deposited Paint). Which renowned for its superior corrosion resistance, rust protection, uniformed coating film and long life used.

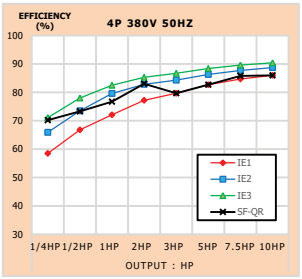
Old : under coat by dipping

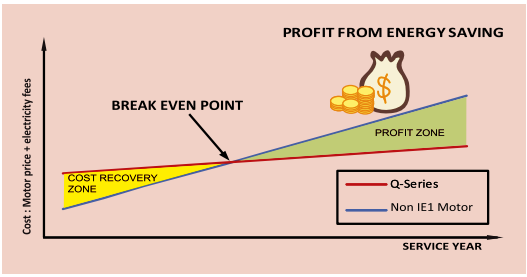
New : under coat by EDP

By salt spray test 192Hr

Hidden profit from energy saving

The investment cost of motor doesn't refer to only price, but including the variable electricity fees. Three phase Q-Series can be helped to reach a break even point sooner by advance energy saving performance, to consume less electricity fees.

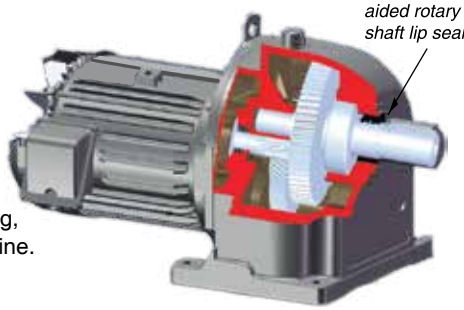




Features and benefits

Sealing

Hydrodynamic aided rotary shaft lip seals are provided for high-frequency driving to improve sealing quality up to 100 times in comparison with before.



Compact and lightweight

High performance cooling structure of steel motor frame integrated with RGC. (Round-bar Gear cutting : gear cutting after heat treatment) technology and precision cutting, make the product to be compact and lightweight, suitable for install with limited space machine.

Low noise

From RGC technology and the precision cutting to pinion gear (1st gear) and 2nd gear grinding, realized to low noise operation.

Installation

Q-series models can be installed instead of the J-series.

Hydrodynamic aided rotary shaft lip seal

Compatibility with distribution control devices

Since the motors are designed for combined use with Mitsubishi's distribution control devices. Devices with equivalent specifications to those used for conventional motors can be used.

Significance of type designation and ordering

Model name	Output	Gear ratio (or speed)	Voltage	Frequency
EX. **S F - Q R G H**	**5HP (3.7kW)**	**1:30 or 50 min^{-1} ***	**220V or 380V**	**50Hz**

- **S F - Q R G H**
  - **G H** — Gear type: GH = MITSUBISHI's Helical gear, D-Series
  - **R** — Frame material: R = Steel frame
  - **F** — Enclosure: F = Totally enclosed fan-cooled
  - **S F - Q** — Super Line Q-Series: Q = Quality

Table 1 - Load condition

Service factor	Load condition		
	3 hrs./day Discontinuous operation	3 ~ 10 hrs./day Continuous operation	Over 10 hrs./day Continuous operation
1.4	Heavy shock load	Moderate shock load	Constant or low shock

Remark : min^{-1} = r/min or rpm (Revolutions per minute)

Stock & delivery

Table 2 - Gear size and stock & delivery

Gear ratio		1:3	1:5	1:10	1:15	1:20	1:25	1:30	1:40	1:50	1:60
Output HP(kW)	1/2(0.4)	○ D	● D	● D	● D	● D	● D	● D	● D	● D	○ G
	1(0.75)	○ F	● F	● F	● F	● F	● F	● F	● G	● G	○ J
	2(1.5)	○ H	● H	● H	● H	● H	● H	● H	● J	● J	○ L
	3(2.2)	○ J	● J	● J	● J	● J	● J	● J	● L	● L	○ M
	5(3.7)	○ L	● L	● L	● L	● L	○ L	● L	● M	○ M	○ N
	7.5(5.5)	○ M	● M	● M	● M	● M	○ M	● M	● N	○ N	
	10(7.5)	○ M	● M	● M	● M	● M	○ N	● N			

● In stock
○ Upon request and delivery within 30 days

Grease lubricant type
Oil lubricant type
Gear size

Remark : For gear ratio no identify in Table 2, please consult us before order

Output shaft rotation direction

Output shaft rotation direction is as show in table 3 (When power supply is connected as show in table 12)

Table 3 - Output shaft rotation direction

Output HP(kW)	Gear ratio	Step No. of gear	Rotation direction
1/2(0.4)	1:3 - 1:50	2	Counterclockwise
	1:60	3	Clockwise
1(0.75)	1:3 - 1:30	2	Counterclockwise
	1:40 - 1:60	3	Clockwise
2(1.5)	1:3 - 1:30	2	Counterclockwise
	1:40 - 1:60	3	Clockwise
3(2.2)	1:3 - 1:30	2	Counterclockwise
	1:40 - 1:60	3	Clockwise
5(3.7)	1:3	3	Clockwise
	1:5 - 1:30	2	Counterclockwise
	1:40 - 1:60	3	Clockwise
7.5(5.5)	1:3 - 1:30	2	Counterclockwise
	1:40, 1:50	3	Clockwise
10(7.5)	1:3 -1:30	2	Counterclockwise

Lubrication detail

(1) For grease lubrication type, grease is filled from factory. For ambient temperature between -15°C to +40°C, lithium soap grease (extreme pressure) NLGI No.000 is applicable. Grease lubrication type can be installed in universal direction.
(2) For the oil lubrication type, no filled oil from factory shipment. Select appropriate oil type and quantity by refer to table 4-5. Before operation, Oil level must be above red line on oil level gauge. Do not overfill, doing so can cause to leak or overheat. Allowable inclination for horizontal installation is as show in table 6.

Table 4 - Oil lubricant type

Ambient temp.	-15 ~ 0 ℃	0 ~ 40 ℃	40 ~ 70 ℃
JIS	Class 2 ISO VG150	Class 2 ISO VG220	Class 2 ISO VG320
Nippon oil	Bonnoc M 150	Bonnoc M 220	Bonnoc M 320
Showa shell oil	Shell omala oil 150	Shell omala oil 220	Shell omala oil 320
General oil	General SP gearroll 150	General SP gearroll 220	General SP gearroll 320
Mobil oil	Mobil gear 629	Mobil gear 630	Mobil gear 632
Cosmo oil	Cosmogear SE-150	Cosmogear SE-220	Cosmogear SE-320

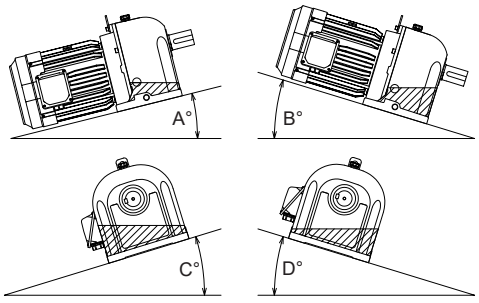
Table 5 - Lubricant quantity

Gear ratio		1:3	1:5	1:10	1:15	1:20	1:25	1:30	1:40	1:50	1:60
Output HP(kw)	1/2(0.4)	0.52							0.42		1.0
	1(0.75)	0.9							1.0		2.1
	2(1.5)	1.5							2.1		2.7
	3(2.2)	2.1							2.7		2.0
	5(3.7)	3.2							2.0		3.3
	7.5(5.5)	2.0							3.2		
	10(7.5)	2.0					3.3				

Grease Quantity(kg)
Oil Quantity(litre)

Note : For oil lubrication type, “Shell omala oil 320” will be supported from our factory by 4 litre.

Table 6 - Allowable installation on inclined area



Gear size	A°	B°	C°	D°
M	14	17	17	17
N	13	17	16	16

Characteristic and performance

Table 7 - Motor characteristic for 1/2 ~ 10HP (0.4 ~ 7.5kW) LT : 220/380/415 50Hz

Output HP(kW)	Output Speed (min^{-1}) 50Hz			Reduction ratio	Actual gear ratio	Output Torque (N·m) 50Hz			Allowable Radial load (N)	Allowable Trust load (N)	Motor specification		
	220	380	415			220	380	415			V	Hz	A
1/2(0.4)	465	465	470	1:3	1:3.00	8.2	8.2	8.1	686	50	↑ 220 380 415 ↓	↑ 50 50 50 ↓	↑ 2.00 1.14 1.18 ↓
	280	280	285	1:5	1:4.95	14	14	13	784	83			
	140	140	143	1:10	1:9.94	27	27	27	1180	167			
	94	94	96	1:15	1:14.80	41	41	40	1370	250			
	73	73	74	1:20	1:19.10	52	52	52	1570	333			
	55	55	55.5	1:25	1:25.54	69	69	69	1670	417			
	46.5	46.5	47	1:30	1:30.15	82	82	81	1810	500			
	35	35	35	1:40	1:40.20	109	109	109	1960	500			
	27.5	27.5	28	1:50	1:50.62	139	139	136	2450	500			
	23.5	23.5	23.5	1:60	1:60.06	163	163	163	3230	700			
1(0.75)	460	460	460	1:3	1:3.04	16	16	16	980	70	↑ 220 380 415 ↓	↑ 50 50 50 ↓	↑ 3.20 1.85 1.80 ↓
	290	290	290	1:5	1:4.80	25	25	25	1180	117			
	140	140	143	1:10	1:9.94	51	51	50	1760	233			
	96	96	97	1:15	1:14.58	75	75	74	1960	350			
	71.5	71.5	72.5	1:20	1:19.59	100	100	99	2650	467			
	55	55	56	1:25	1:25.38	130	130	128	2790	583			
	50	50	50.5	1:30	1:27.96	143	143	142	2990	700			
	37	37	37.5	1:40	1:37.93	194	194	191	3040	700			
	29.5	29.5	30	1:50	1:47.39	243	243	239	4020	700			
	23	23	23.5	1:60	1:60.20	311	311	305	4310	1200			
2(1.5)	490	490	490	1:3	1:2.93	29	29	29	1320	70	↑ 220 380 415 ↓	↑ 50 50 50 ↓	↑ 6.1 3.5 3.5 ↓
	290	290	290	1:5	1:4.91	49	49	49	1570	117			
	144	144	145	1:10	1:9.78	99	99	99	2450	233			
	96	96	97	1:15	1:14.57	149	149	148	2940	350			
	71.5	71.5	72	1:20	1:19.76	200	200	199	3920	467			
	60	60	60.5	1:25	1:23.47	239	239	237	4460	583			
	49.5	49.5	50	1:30	1:28.42	289	289	287	5000	700			
	34.5	34.5	35	1:40	1:40.67	415	415	409	5190	1200			
	31	31	31.5	1:50	1:45.19	462	462	455	6370	1200			
	25	25	25	1:60	1:56.45	573	573	573	8820	1300			
3(2.2)	465	465	470	1:3	1:3.04	45	45	45	1910	120	↑ 220 380 415 ↓	↑ 50 50 50 ↓	↑ 8.7 5.0 4.9 ↓
	285	285	290	1:5	1:5.00	74	74	72	2250	200			
	142	142	143	1:10	1:9.98	148	148	147	3430	400			
	97	97	98	1:15	1:14.52	217	217	214	3920	600			
	75	75	75.5	1:20	1:18.92	280	280	278	5100	800			
	61	61	61.5	1:25	1:23.19	344	344	342	5640	1000			
	48	48	48.5	1:30	1:29.36	438	438	433	6220	1200			
	36	36	36.5	1:40	1:39.16	584	584	576	6370	1300			
	31.5	31.5	31.5	1:50	1:44.95	667	667	667	7840	1300			
	24	24	24	1:60	1:59.51	875	875	875	14700	1400			
5(3.7)	485	485	490	1:3	1:2.95	73	73	72	2700	130	↑ 220 380 415 ↓	↑ 50 50 50 ↓	↑ 14.0 8.1 8.0 ↓
	300	300	305	1:5	1:4.75	118	118	116	3190	217			
	142	142	143	1:10	1:9.97	249	249	247	4900	433			
	99	99	99	1:15	1:14.35	357	357	357	5590	650			
	70	70	70.5	1:20	1:20.22	505	505	501	6960	867			
	56.5	56.5	57	1:25	1:25.13	625	625	620	8870	1083			
	50	50	50	1:30	1:28.41	707	707	707	10780	1300			
	34.5	34.5	34.5	1:40	1:41.13	1024	1024	1024	10190	1400			
	30	30	30	1:50	1:47.26	1178	1178	1178	13430	1400			
	23	23	23	1:60	1:62.12	1536	1536	1536	18330	2200			
7.5(5.5)	500	500	500	1:3	1:2.91	105	105	105	3480	140	↑ 220 380 415 ↓	↑ 50 50 50 ↓	↑ 20.2 11.7 11.6 ↓
	295	295	300	1:5	1:4.89	178	178	175	4120	233			
	150	150	151	1:10	1:9.51	350	350	346	6370	467			
	101	101	102	1:15	1:14.05	520	520	515	8620	700			
	76.5	76.5	77	1:20	1:18.63	687	687	682	9800	933			
	61.5	61.5	62	1:25	1:23.22	854	854	847	11270	1167			
	47.5	47.5	47.5	1:30	1:30.10	1106	1106	1106	12740	1400			
	37.5	37.5	37.5	1:40	1:38.12	1401	1401	1401	14110	2200			
	29	29	29.5	1:50	1:48.78	1811	1811	1781	15580	2200			
10(7.5)	505	505	510	1:3	1:2.87	142	142	140	3920	210	↑ 220 380 415 ↓	↑ 50 50 50 ↓	↑ 26.8 15.5 15.0 ↓
	290	290	290	1:5	1:4.99	247	247	247	4610	350			
	145	145	146	1:10	1:9.86	494	494	491	7150	700			
	100	100	101	1:15	1:14.22	716	716	709	10190	1050			
	72	72	72.5	1:20	1:19.78	995	995	988	11560	1400			
	59	59	59.5	1:25	1:24.20	1214	1214	1204	13720	1833			
	52	52	52.5	1:30	1:27.38	1377	1377	1364	15970	2200			

Characteristic and performance

Table 8 - Motor characteristic for 5 ~ 10HP (3.7 ~ 7.5kW) HT : 380/415 50Hz

Output HP(kW)	Output Speed (min^{-1}) 50Hz 380	Output Speed (min^{-1}) 50Hz 415	Reduction ratio	Actual gear ratio	Output Torque (N·m) 50Hz 380	Output Torque (N·m) 50Hz 415	Allowable Radial load (N)	Allowable Trust load (N)	Motor specification V	Motor specification Hz	Motor specification A
5(3.7)	485	490	1:3	1:2.95	73	72	2700	130	380 ↓ 415 ↓	50 ↑ 50 ↑	8.1 ↑ 8.0 ↑
	300	305	1:5	1:4.75	118	116	3190	217			
	142	143	1:10	1:9.97	249	247	4900	433			
	99	99	1:15	1:14.35	357	357	5590	650			
	70	70.5	1:20	1:20.22	505	501	6960	867			
	56.5	57	1:25	1:25.13	625	620	8870	1083			
	50	50	1:30	1:28.41	707	707	10780	1300			
	34.5	34.5	1:40	1:41.13	1024	1024	10190	1400			
	30	30	1:50	1:47.26	1178	1178	13430	1400			
	23	23	1:60	1:62.12	1536	1536	18330	2200			
7.5(5.5)	500	500	1:3	1:2.91	105	105	3480	140	380 ↓ 415 ↓	50 ↑ 50 ↑	11.7 ↑ 11.7 ↑
	295	300	1:5	1:4.89	178	175	4120	233			
	150	151	1:10	1:9.51	350	348	6370	467			
	101	102	1:15	1:14.05	520	515	8620	700			
	76.5	77	1:20	1:18.63	687	682	9800	933			
	61.5	62	1:25	1:23.22	854	847	11270	1167			
	47.5	47.5	1:30	1:30.10	1106	1106	12740	1400			
	37.5	37.5	1:40	1:38.12	1401	1401	14110	2200			
	29	29.5	1:50	1:48.78	1811	1781	15580	2200			
10(7.5)	505	510	1:3	1:2.87	142	140	3920	210	380 ↓ 415 ↓	50 ↑ 50 ↑	15.4 ↑ 14.7 ↑
	290	290	1:5	1:4.99	247	247	4610	350			
	145	146	1:10	1:9.86	494	491	7150	700			
	100	101	1:15	1:14.22	716	709	10190	1050			
	72	72.5	1:20	1:19.78	995	988	11560	1400			
	59	59.5	1:25	1:24.20	1214	1204	13720	1833			
	52	52.5	1:30	1:27.38	1377	1364	15970	2200			

Outline dimensions

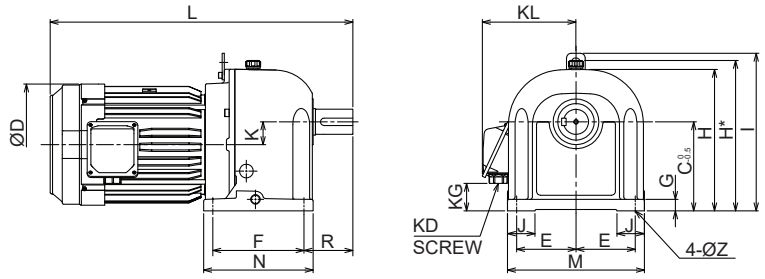
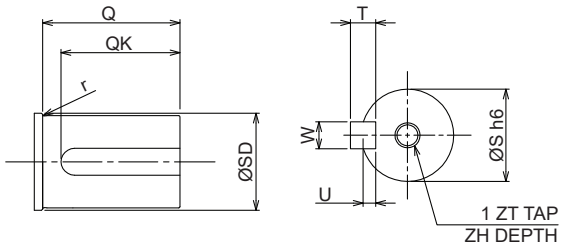


Table 9 - Outline dimensions

Output HP(kW)	Gear ratio	Gear size	Dimensions (mm) L	ØD	K	F	R	N	KD	KL	KG	J	E	M	G	C	H	I	ØZ	Weight (kg)
1/2(0.4)	1:3 - 1:50	D	379	148	20	85	50	109	PF1/2	140	49	25	75	170	15	100	160	-	10	12
	1:60	G	433	148	30	135	65	161	PF1/2	140	64	30	87.5	200	18	125	195	230	12	26
1(0.75)	1:3 - 1:30	F	430	162	30	120	65	146	PF3/4	145	48	30	87.5	200	18	120	195	230	12	28
	1:40, 1:50	G	448.5	162	30	135	65	161	PF3/4	145	53	30	87.5	200	18	125	195	230	12	33
	1:60	J	481.5	162	32	150	80	187	PF3/4	145	71	45	107.5	250	22	145	230	265	15	44
2(1.5)	1:3 - 1:30	H	478	184	30	115	65	141	PF3/4	158	78.4	35	102.5	230	18	140	227	262	12	41
	1:40, 1:50	J	517.5	184	32	150	80	187	PF3/4	158	81.4	45	107.5	250	22	145	230	265	15	53
	1:60	L	544	184	40	170	95	206	PF3/4	158	98.4	50	125	285	22	170	275	310	15	67
3(2.2)	1:3 - 1:30	J	559	207	32	150	80	187	PF3/4	170	90	45	107.5	250	22	145	230	265	15	55
	1:40, 1:50	L	585	207	40	170	95	206	PF3/4	170	107	50	125	285	22	170	275	310	15	73
	1:60	M	627.5	207	50	200	107	240	PF3/4	170	122	60	130	300	25	195	330*	345	19	90
5(3.7)	1:3 - 1:30	L	568	228	40	170	95	206	PF3/4	178	78	50	125	285	22	170	275	310	15	81
	1:40, 1:50	M	609	228	50	200	107	240	PF3/4	178	93	60	130	300	25	195	330*	345	19	98
	1:60	N	642.5	228	60	230	120	280	PF3/4	178	118	70	150	350	30	230	380*	395	24	125
7.5(5.5)	1:3 - 1:30	M	663.5	266	50	200	107	240	PF1	205	77	60	130	300	25	195	330*	345	19	109
	1:40, 1:50	N	697	266	60	230	120	280	PF1	205	102	70	150	350	30	230	380*	395	24	143
10(7.5)	1:3 -1:20	M	701.5	266	50	200	107	240	PF1	205	77	60	130	300	25	195	330*	345	19	123
	1:25, 1:30	N	720	266	60	230	120	280	PF1	205	102	70	150	350	30	230	380*	395	24	144

Table 10 - Shaft end dimensions

Gear size	Dimensions (mm) Q	QK	ØS h6	W(key) h9	T(key) h9	U	ZT	ZH	r	ØSD
D	36	32	22 $^{0}_{-0.013}$	6 $^{0}_{-0.030}$	6 $^{0}_{-0.030}$	3.5	M8	12	0.4	24
F	50	45	32 $^{0}_{-0.016}$	10 $^{0}_{-0.036}$	8 $^{0}_{-0.036}$	5			0.8	34
G										
H										
J	60	55	40	12 $^{0}_{-0.043}$	8 $^{0}_{-0.043}$	5			1.6	45
L	75	70	48	14	9	5.5			0.8	50
M	82	71	55	16	10	6	M10	18		58
N	90	72	60	18	11	7				63



Standard Specification

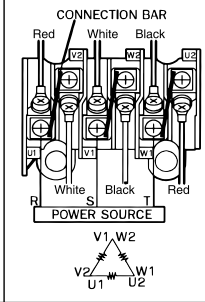
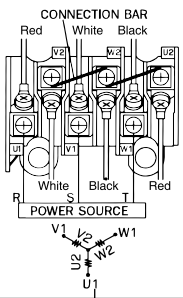
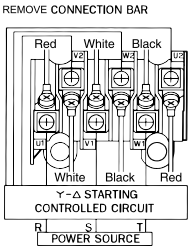
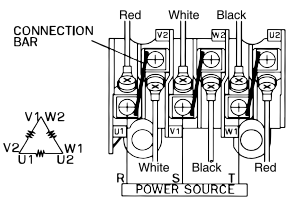
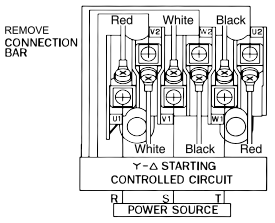
Table 11 - Standard specification

Item	Specification
Output	1/2HP (0.4kW) ~ 10HP (7.5kW)
Pole	4
Phase	3 Phase
Voltage and frequency	LT : 220/380/415V 50Hz (1/2 ~ 10HP) HT : 380/415V 50Hz (5 ~ 10HP)
Gear ratio	1:3 ~ 1:60 (7.5HP => 1:3 ~ 1:50, 10HP => 1:3 ~ 1:30)
Method of cooling	IC411
Rating	S1 (Continuous)
Thermal class	155(F)
Starting	Direct, Y- Δ
Enclosure condition	Totally-enclosed fan-cooled
Degree of protection	Outdoor (IP55)
Mounting	Foot mount
Frame material	Steel plate
Mounting direction	Grease lubrication type : Universal direction / Oil lubrication type : Limited (see page 3)
Lubrication	5HP (1:3~1:30) : Grease lubrication (Pyronock Universal#000) 5HP(1:40~1:60), 7.5,10HP : Oil lubrication (no filled oil from factory)
Vibration	4.9 m/s^2 or less constantly, 9.8 m/s^2 or less instantaneously
Service of factor	1.4 (Reduction gear)
Ambient temperature	-15°C ~ +40°C
Ambient humudity	95% RH or less
Altitude	1,000m above sea level or less
Coating color	Munsell N1.5 (Black)
Conformed standard	IEC 60034-1, IEC 60031-30-1
Accessories	Shaft end key (JIS B 1301-1996)

Connection

Connect power supply to terminal as shown in Table 12. To rotate in opposite direction, swap any pair of wire (from R, S, and T).

Table 12 - Standard wiring

<table>
<tr><td rowspan="3">OUTPUT (HP)</td><td colspan="3">TERMINAL CONNECTION & WIRE CONNECTION METHOD</td></tr>
<tr><td colspan="2">DIRECT START</td><td>Y- Δ START</td></tr>
<tr><td>220V (Δ)</td><td>380/415V (Y)</td><td>220V</td></tr>
<tr><td>LT
1/2 ~ 10HP</td><td> 
</td><td> 
</td><td> 
</td></tr>
<tr><td rowspan="2">HT
5 ~ 10HP</td><td colspan="2">DIRECT START
380/415V (Δ)</td><td>Y- Δ START
380/415V</td></tr>
<tr><td colspan="2"> 
</td><td> 
</td></tr>
</table>

MITSUBISHI ELECTRIC AUTOMATION (THAILAND) CO., LTD.