

# FUJI LOW-VOLTAGE INDUCTION MOTORS

- » 3 Phase Premium Efficiency Motor [IE3 class] **OUTPUT** 0.75-375kW
- » 3 Phase Standard Efficiency Motor [IE1 class] **OUTPUT** 0.1-0.4kW



Challenge to Tomorrow



**MLW1**  
SERIES

PREMIUM EFFICIENCY MOTOR





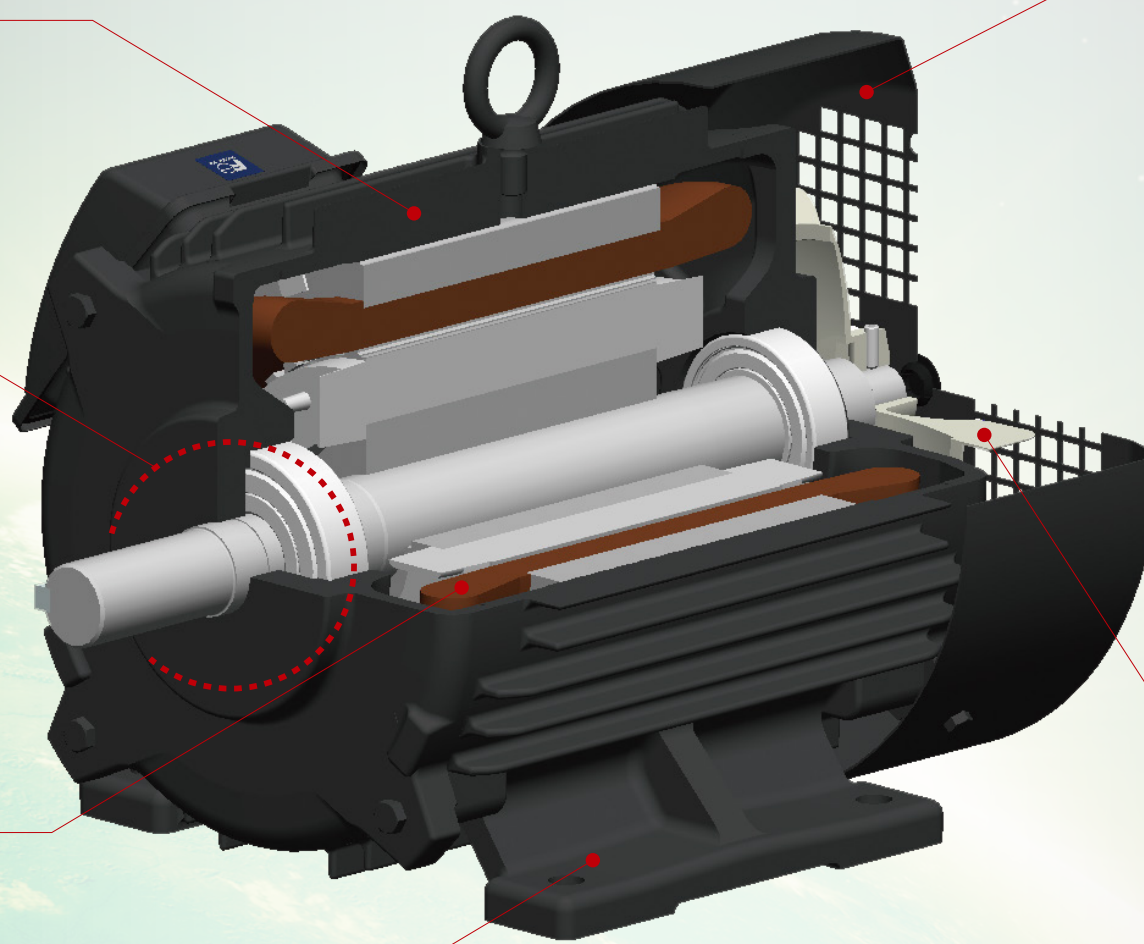
# ACCELERATES TO THE NEXT GENERATION

FUJI LOW-VOLTAGE THREE - PHASE INDUCTION MOTOR

## FEATURES

[PREMIUM EFFICIENCY MOTOR]

## ALL PREMIUM



### High efficiency

#### Efficiency class IE3!

\*Efficiency class according to IEC60034-30

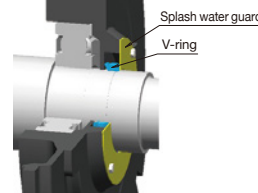
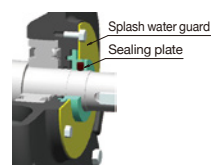
Significant reduction of the overall loss successfully achieved by using high-quality materials featuring reduced iron loss, adopting a slot shape with the optimized distribution of primary and secondary copper loss, and reviewing the mechanical loss.

### Outdoor type

#### Global standard protection rating: IP55

[Frame size 200L or smaller]

[Frame size 225S or larger]



### Inverter driving

#### Constant torque operation possible at 0.5 to 60 Hz (1:120)

100% constant torque operation is possible at 0.5 to 60 Hz with vector control. (with 4P, output 45 kW or less)

### Long service life

#### Longer service life of insulation system

\*Comparison with conventional products of Fuji Electric

Longer service life realized with an ultimate design featuring a lower loss to reduce any temperature rise and Fuji Electric's independent thermal class 155 (F) adopted as a standard feature.

### Easy replacement

#### Same frame sizes and connecting dimensions as standard motors

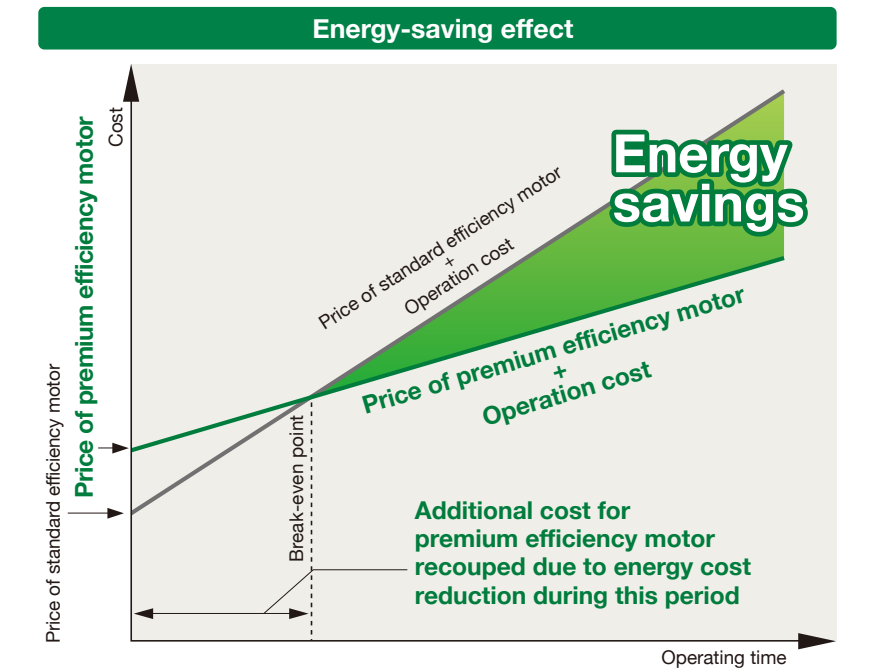
\*Comparison with conventional products of Fuji Electric

Existing motors can be easily replaced because the new products have the same motor frame sizes and connecting dimensions as those of existing standard efficiency motors.

### Energy saving

#### Running cost greatly decreased

Premium efficiency motors have higher efficiency than standard efficiency motors and offer a higher energy-saving effect with longer-hour applications, improving economic efficiency.



### Low noise

#### Average noise reduction of 5 dB (A)

\*Comparison with conventional products of Fuji Electric

Noise reduction achieved by improving and optimizing the cooling fan and revising the fan cover shape, not to mention reducing the motor electromagnetic force-induced noise.

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**Totally-enclosed fan-cooled type Indoor 200 V class**

For products with stock indication, please provide the part number code when placing orders.

MLK1005   In stock (200/200-220 V)  
Part number code Stock indication

\*Those without a stock indication are made to order.

**Premium efficiency**

Leg mounting type					Thermal class
Frame size	Type	Output [kW]			
		2P	4P	6P	
80M	MLK1085M	0.75 <input type="checkbox"/> MLK1002 <input checked="" type="checkbox"/>	0.75 <input type="checkbox"/> MLK1005 <input checked="" type="checkbox"/>	-	155 (F)
90L	MLK1096M	1.5 <input type="checkbox"/> MLK1003 <input checked="" type="checkbox"/>	-	-	
	MLK1097M	2.2 <input type="checkbox"/> MLK1004 <input checked="" type="checkbox"/>	1.5 <input type="checkbox"/> MLK1006 <input checked="" type="checkbox"/>	0.75 <input type="checkbox"/> MLK1023 <input checked="" type="checkbox"/>	
100L	MLU1107A	-	2.2 <input type="checkbox"/> MLU1007 <input checked="" type="checkbox"/>	1.5 <input type="checkbox"/> MLU1082 <input checked="" type="checkbox"/>	
112M	MLU1115A	3.7 <input type="checkbox"/> MLU1004 <input checked="" type="checkbox"/>	3.7 <input type="checkbox"/> MLU1008 <input checked="" type="checkbox"/>	2.2 <input type="checkbox"/> MLU1063 <input checked="" type="checkbox"/>	
132S	MLU1132A	5.5 <input type="checkbox"/> MLU1005 <input checked="" type="checkbox"/>	-	-	
	MLU1133A	7.5 <input type="checkbox"/> MLU1006 <input checked="" type="checkbox"/>	5.5 <input type="checkbox"/> MLU1009 <input checked="" type="checkbox"/>	3.7 <input type="checkbox"/> MLU1064 <input checked="" type="checkbox"/>	
132M	MLU1135A	-	7.5 <input type="checkbox"/> MLU1010 <input checked="" type="checkbox"/>	5.5 <input type="checkbox"/> MLU1065 <input checked="" type="checkbox"/>	
160M	MLU1164A	11 <input type="checkbox"/> MLU1033 <input checked="" type="checkbox"/>	-	-	
	MLU1165A	15 <input type="checkbox"/> MLU1034 <input checked="" type="checkbox"/>	11 <input type="checkbox"/> MLU1036 <input checked="" type="checkbox"/>	7.5 <input type="checkbox"/> MLU1068 <input checked="" type="checkbox"/>	
160L	MLU1167A	18.5 <input type="checkbox"/> MLU1035 <input checked="" type="checkbox"/>	15 <input type="checkbox"/> MLU1037 <input checked="" type="checkbox"/>	11 <input type="checkbox"/> MLU1067 <input checked="" type="checkbox"/>	
180M	MLU1184A	-	18.5 <input type="checkbox"/> MLU1089 <input checked="" type="checkbox"/>	-	
	MLU1185A	22 <input type="checkbox"/> MLU1085 <input checked="" type="checkbox"/>	22 <input type="checkbox"/> MLU1090 <input checked="" type="checkbox"/>	15 <input type="checkbox"/> MLU1094 <input checked="" type="checkbox"/>	
180L	MLU1186A	-	-	18.5 <input type="checkbox"/> MLU1095 <input checked="" type="checkbox"/>	
	MLU1187A	30 <input type="checkbox"/> MLU1086 <input checked="" type="checkbox"/>	30 <input type="checkbox"/> MLU1091 <input checked="" type="checkbox"/>	22 <input type="checkbox"/> MLU1096 <input checked="" type="checkbox"/>	
200L	MLU1206A	37 <input type="checkbox"/> MLU1087 <input checked="" type="checkbox"/>	37 <input type="checkbox"/> MLU1092 <input checked="" type="checkbox"/>	30 <input type="checkbox"/> MLU1097 <input checked="" type="checkbox"/>	
	MLU1207A	45 <input type="checkbox"/> MLU1088 <input checked="" type="checkbox"/>	45 <input type="checkbox"/> MLU1093 <input checked="" type="checkbox"/>	37 <input type="checkbox"/> MLU1098 <input checked="" type="checkbox"/>	
225S	MLU1220A	55 <input type="checkbox"/> MLU7003 <input checked="" type="checkbox"/>	-	-	
	MLU1221A	-	55 <input type="checkbox"/> MLU7004 <input checked="" type="checkbox"/>	45 <input type="checkbox"/> MLU7005 <input checked="" type="checkbox"/>	
250S	MLU1250A	75	75	55	
250M	MLU1252A	90	90	75	
280S	MLU1280A	110	110	90	
280M	MLU1282A	132	132	110	

Flange mounting type					Thermal class
Frame size	Type	Output [kW]			
		2P	4P	6P	
80M	MLK1085P	0.75 <input type="checkbox"/> MLK1011 <input checked="" type="checkbox"/>	0.75 <input type="checkbox"/> MLK1014 <input checked="" type="checkbox"/>	-	155 (F)
90L	MLK1096P	1.5 <input type="checkbox"/> MLK1012 <input checked="" type="checkbox"/>	-	-	
	MLK1097P	2.2 <input type="checkbox"/> MLK1013 <input checked="" type="checkbox"/>	1.5 <input type="checkbox"/> MLK1015 <input checked="" type="checkbox"/>	0.75 <input type="checkbox"/> MLK1024 <input checked="" type="checkbox"/>	
100L	MLU1107C	-	2.2 <input type="checkbox"/> MLU1020 <input checked="" type="checkbox"/>	1.5 <input type="checkbox"/> MLU1088 <input checked="" type="checkbox"/>	
112M	MLU1115C	3.7 <input type="checkbox"/> MLU1017 <input checked="" type="checkbox"/>	3.7 <input type="checkbox"/> MLU1021 <input checked="" type="checkbox"/>	2.2 <input type="checkbox"/> MLU1069 <input checked="" type="checkbox"/>	
132S	MLU1132C	5.5 <input type="checkbox"/> MLU1018 <input checked="" type="checkbox"/>	-	-	
	MLU1133C	7.5 <input type="checkbox"/> MLU1019 <input checked="" type="checkbox"/>	5.5 <input type="checkbox"/> MLU1022 <input checked="" type="checkbox"/>	3.7 <input type="checkbox"/> MLU1070 <input checked="" type="checkbox"/>	
132M	MLU1135C	-	7.5 <input type="checkbox"/> MLU1023 <input checked="" type="checkbox"/>	5.5 <input type="checkbox"/> MLU1071 <input checked="" type="checkbox"/>	
160M	MLU1164C	11 <input type="checkbox"/> MLU1040 <input checked="" type="checkbox"/>	-	-	
	MLU1165C	15 <input type="checkbox"/> MLU1041 <input checked="" type="checkbox"/>	11 <input type="checkbox"/> MLU1042 <input checked="" type="checkbox"/>	7.5 <input type="checkbox"/> MLU1072 <input checked="" type="checkbox"/>	
160L	MLU1167C	18.5	15 <input type="checkbox"/> MLU1043 <input checked="" type="checkbox"/>	11 <input type="checkbox"/> MLU1073 <input checked="" type="checkbox"/>	
180M	MLU1184C	-	18.5 <input type="checkbox"/> MLU1099 <input checked="" type="checkbox"/>	-	
	MLU1185C	22	22 <input type="checkbox"/> MLU1100 <input checked="" type="checkbox"/>	15	
180L	MLU1186C	-	-	18.5	
	MLU1187C	30	30 <input type="checkbox"/> MLU1101 <input checked="" type="checkbox"/>	22	
200L	MLU1206C	37	37 <input type="checkbox"/> MLU1102 <input checked="" type="checkbox"/>	30	
	MLU1207C	45	45	37	
225S	MLU1220C	55	-	-	
	MLU1221C	-	55	45	
250S	MLU1250C	75	75	55	
250M	MLU1252C	90	90	75	

**Totally-enclosed fan-cooled type Indoor 400 V class**

For products with stock indication, please provide the part number code when placing orders.

MLK1009   In stock (400/400-440 V)  
Part number code Stock indication

\*Those without a stock indication are made to order.

**Premium efficiency**

Leg mounting type					Thermal class
Frame size	Type	Output [kW]			
		2P	4P	6P	
80M	MLK1085M	0.75	0.75 <input type="checkbox"/> MLK1009 <input checked="" type="checkbox"/>	-	155 (F)
90L	MLK1096M	1.5	-	-	
	MLK1097M	2.2	1.5 <input type="checkbox"/> MLK1010 <input checked="" type="checkbox"/>	0.75	
100L	MLU1107A	-	2.2 <input type="checkbox"/> MLU1013 <input checked="" type="checkbox"/>	1.5	
112M	MLU1115A	3.7	3.7 <input type="checkbox"/> MLU1014 <input checked="" type="checkbox"/>	2.2	
132S	MLU1132A	5.5	-	-	
	MLU1133A	7.5	5.5 <input type="checkbox"/> MLU1015 <input checked="" type="checkbox"/>	3.7	
132M	MLU1135A	-	7.5 <input type="checkbox"/> MLU1016 <input checked="" type="checkbox"/>	5.5	
160M	MLU1164A	11	-	-	
	MLU1165A	15	11 <input type="checkbox"/> MLU1038 <input checked="" type="checkbox"/>	7.5	
160L	MLU1167A	18.5	15 <input type="checkbox"/> MLU1039 <input checked="" type="checkbox"/>	11	
180M	MLU1184A	-	18.5 <input type="checkbox"/> MLU1103 <input checked="" type="checkbox"/>	-	
	MLU1185A	22	22 <input type="checkbox"/> MLU1104 <input checked="" type="checkbox"/>	15	
180L	MLU1186A	-	-	18.5	
	MLU1187A	30	30 <input type="checkbox"/> MLU1105 <input checked="" type="checkbox"/>	22	
200L	MLU1206A	37	37 <input type="checkbox"/> MLU1106 <input checked="" type="checkbox"/>	30	
	MLU1207A	45	45 <input type="checkbox"/> MLU1107 <input checked="" type="checkbox"/>	37	
225S	MLU1220A	55	-	-	
	MLU1221A	-	55 <input type="checkbox"/> MLU7006 <input checked="" type="checkbox"/>	45	
250S	MLU1250A	75	75	55	
250M	MLU1252A	90	90	75	
280S	MLU1280A	110	110	90	
280M	MLU1282A	132	132	110	
280L	MLU1284A	160	160	132	
	MLU1286A	200	200	160	
315L	MLU1314A	220, 250	220, 250	200, 220	
	MLU1316A	300	300	250	
355K	MLU1350A	315	315	-	
	MLU1352A	355	355, 375	-	
	MLU1354A	375	-	300, 315	
	MLU1356A	-	-	355, 375	

Flange mounting type					Thermal class
Frame size	Type	Output [kW]			
		2P	4P	6P	
80M	MLK1085P	0.75	0.75 <input type="checkbox"/> MLK1016 <input checked="" type="checkbox"/>	-	155 (F)
90L	MLK1096P	1.5	-	-	
	MLK1097P	2.2	1.5 <input type="checkbox"/> MLK1017 <input checked="" type="checkbox"/>	0.75	
100L	MLU1107C	-	2.2 <input type="checkbox"/> MLU1024 <input checked="" type="checkbox"/>	1.5	
112M	MLU1115C	3.7	3.7 <input type="checkbox"/> MLU1025 <input checked="" type="checkbox"/>	2.2	
132S	MLU1132C	5.5	-	-	
	MLU1133C	7.5	5.5 <input type="checkbox"/> MLU1108 <input checked="" type="checkbox"/>	3.7	
132M	MLU1135C	-	7.5 <input type="checkbox"/> MLU1109 <input checked="" type="checkbox"/>	5.5	
160M	MLU1164C	11	-	-	
	MLU1165C	15	11 <input type="checkbox"/> MLU1110 <input checked="" type="checkbox"/>	7.5	
160L	MLU1167C	18.5	15 <input type="checkbox"/> MLU1111 <input checked="" type="checkbox"/>	11	
180M	MLU1184C	-	18.5 <input type="checkbox"/> MLU1112 <input checked="" type="checkbox"/>	-	
	MLU1185C	22	22 <input type="checkbox"/> MLU1113 <input checked="" type="checkbox"/>	15	
180L	MLU1186C	-	-	18.5	
	MLU1187C	30	30 <input type="checkbox"/> MLU1114 <input checked="" type="checkbox"/>	22	
200L	MLU1206C	37	37 <input type="checkbox"/> MLU1115 <input checked="" type="checkbox"/>	30	
	MLU1207C	45	45	37	
225S	MLU1220C	55	-	-	
	MLU1221C	-	55	45	
250S	MLU1250C	75	75	55	
250M	MLU1252C	90	90	75	

**Standard efficiency**

Leg mounting type					Thermal class
Frame size	Type	Output [kW]			
		2P	4P	6P	
63M	MLH8062A	-	0.1 <input type="checkbox"/> MLP1001 <input checked="" type="checkbox"/>	-	120 (E)
	MLH8065M	0.2 <input type="checkbox"/> MLH1165 <input checked="" type="checkbox"/>	0.2 <input type="checkbox"/> MLH1170 <input checked="" type="checkbox"/>	-	
71M	MLH8075M	0.4 <input type="checkbox"/> MLH1166 <input checked="" type="checkbox"/>	0.4 <input type="checkbox"/> MLH1171 <input checked="" type="checkbox"/>	0.2 <input type="checkbox"/> MLH1229 <input checked="" type="checkbox"/>	
	MLH8085M	-	-	0.4 <input type="checkbox"/> MLH1175 <input checked="" type="checkbox"/>	

Flange mounting type					Thermal class
Frame size	Type	Output [kW]			
		2P	4P	6P	
63M	MLH8065P	0.2 <input type="checkbox"/> MLH1194 <input checked="" type="checkbox"/>	0.2 <input type="checkbox"/> MLH1199 <input checked="" type="checkbox"/>	-	120 (E)
	MLH8075P	0.4 <input type="checkbox"/> MLH1195 <input checked="" type="checkbox"/>	0.4 <input type="checkbox"/> MLH1200 <input checked="" type="checkbox"/>	0.2 <input type="checkbox"/> MLH1231 <input checked="" type="checkbox"/>	
80M	MLH8085P	-	-	0.4 <input type="checkbox"/> MLH1204 <input checked="" type="checkbox"/>	

Note) Type MLH8062A (part number code: MLP1001) is a totally-enclosed self-cooled type.

**Standard efficiency**

Leg mounting type					Thermal class
Frame size	Type	Output [kW]			
		2P	4P	6P	
63M	MLH8065M	0.2	0.2 <input type="checkbox"/> MLH1186 <input checked="" type="checkbox"/>	-	120 (E)
71M	MLH8075M	0.4	0.4 <input type="checkbox"/> MLH1187 <input checked="" type="checkbox"/>	0.2	
80M	MLH8085M	-	-	0.4	

Flange mounting type					Thermal class
Frame size	Type	Output [kW]			
		2P	4P	6P	
63M	MLH8065P	0.2	0.2	-	120 (E)
71M	MLH8075P	0.4	0.4 <input type="checkbox"/> MLH1206 <input checked="" type="checkbox"/>	0.2	
80M	MLH8085P	-	-	0.4	



# MODEL LIST

## Totally-enclosed fan-cooled type

**Outdoor 200 V class / 400 V class**

### Premium efficiency

Leg mounting type					
Frame size	Type	Output [kW]			Thermal class
		2P	4P	6P	
80M	MLK1085B	0.75 MLK1018	0.75 MLK1021	-	155 (F)
		1.5 MLK1019	-	-	
90L	MLK1096B	2.2 MLK1020	1.5 MLK1022	0.75 MLK1025	
		-	2.2 MLU1029	1.5 MLU1074	
100L	MLU1107B	-	2.2 MLU1029	1.5 MLU1074	
112M	MLU1115B	3.7 MLU1026	3.7 MLU1030	2.2 MLU1075	
		5.5 MLU1027	-	-	
132S	MLU1132B	7.5 MLU1028	5.5 MLU1031	3.7 MLU1076	
		-	7.5 MLU1032	5.5 MLU1077	
132M	MLU1135B	-	7.5 MLU1032	5.5 MLU1077	
		11 MLU1044	-	-	
160M	MLU1164B	15 MLU1045	11 MLU1051	7.5 MLU1078	
		18.5 MLU1046	15 MLU1052	11 MLU1079	
160L	MLU1167B	18.5 MLU1046	15 MLU1052	11 MLU1079	
		-	18.5 MLU1053	-	
180M	MLU1184B	-	18.5 MLU1053	-	
		22 MLU1047	22 MLU1054	15 MLU1080	
180L	MLU1186B	-	-	18.5 MLU1081	
		30 MLU1048	30 MLU1055	22 MLU1082	
200L	MLU1206B	37 MLU1049	37 MLU1056	30 MLU1083	
		45 MLU1050	45 MLU1057	37 MLU1084	
225S	MLU1220B	55 MLU7000	-	-	
		-	55 MLU7001	45 MLU7002	
250S	MLU1250B	75	75	55	
250M	MLU1252B	90	90	75	
280S	MLU1280B	110	110	90	
280M	MLU1282B	132	132	110	
280L	MLU1284B	160	160	132	
		200	200	160	
315L	MLU1314B	220, 250	220, 250	200, 220	
		300	300	250	
355K	MLU1350B	315	315	-	
		355	355, 375	-	
		375	-	300, 315	
	MLU1356B	-	-	355, 375	

### Standard efficiency

Leg mounting type					
Frame size	Type	Output [kW]			Thermal class
		2P	4P	6P	
63M	MLH8065B	0.2 MLH1209	0.2 MLH1214 MLH1225	-	120 (E)
		0.4 MLH1210	0.4 MLH1215 MLH1226	0.2	
80M	MLH8085B	-	-	0.4	

For products with stock indication, please provide the part number code when placing orders.

MLK1021  
Part number code      Stock indication

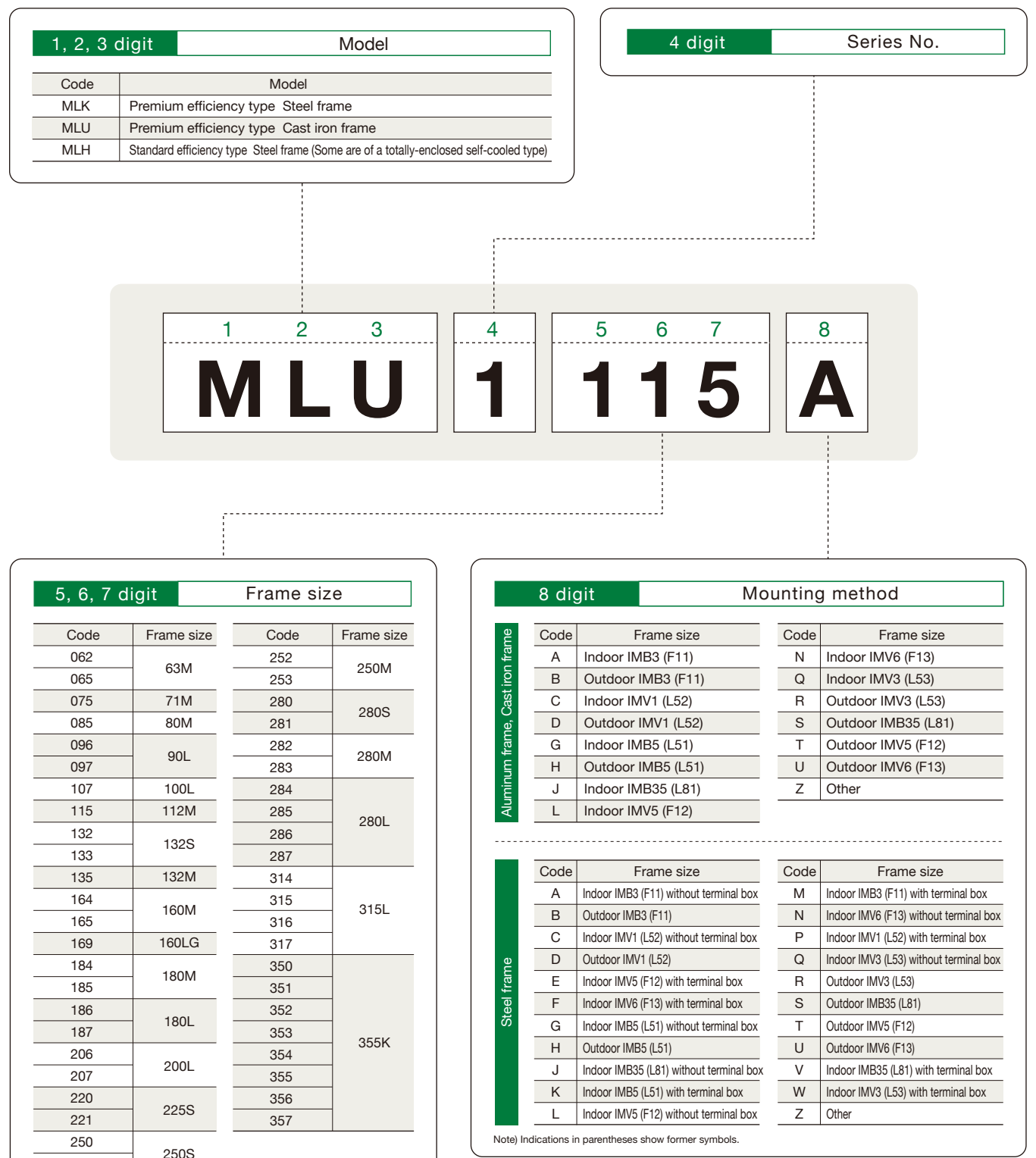
⊙ In stock (200-400/200-400, 220-440 V)  
⊙ In stock (200/200-220 V)  
⊙ In stock (380-400-415/400-440-460 V)

\*Those without a stock indication are made to order.

Flange mounting type					
Frame size	Type	Output [kW]			Thermal class
		2P	4P	6P	
80M	MLK1085D	0.75	0.75	-	155 (F)
90L	MLK1096D	1.5	-	-	
		2.2	1.5	0.75	
100L	MLU1107D	-	2.2	1.5	
112M	MLU1115D	3.7	3.7	2.2	
132S	MLU1132D	5.5	-	-	
		7.5	5.5	3.7	
132M	MLU1135D	-	7.5	5.5	
		11	-	-	
160M	MLU1164D	15	11	7.5	
		18.5	15	11	
160L	MLU1167D	18.5	15	11	
		-	18.5	-	
180M	MLU1184D	-	18.5	-	
		22	22	15	
180L	MLU1186D	-	-	18.5	
		30	30	22	
200L	MLU1206D	37	37	30	
		45	45	37	
225S	MLU1220D	55	-	-	
		-	55	45	
250S	MLU1250D	75	75	55	
250M	MLU1252D	90	90	75	

Flange mounting type					
Frame size	Type	Output [kW]			Thermal class
		2P	4P	6P	
63M	MLH8065D	0.2	0.2	-	120 (E)
71M	MLH8075D	0.4	0.4	0.2	
80M	MLH8085D	-	-	0.4	

# TYPE NUMBER NOMENCLATURE



Indoor

		Premium efficiency	Standard efficiency		
Housing structure		Totally-enclosed fan-cooled	Totally-enclosed self-cooled type · Totally-enclosed fan-cooled type		
Type	Steel frame	MLK	MLP·MLH		
	Cast iron frame	MLU	—		
Output		0.75 to 375 kW	0.1 to 0.4 kW		
Frame size		80M to 355K	63M to 80M		
Rated voltage and rated frequency		200 / 200 V and 400 / 400 V·50/60Hz	200 / 200 V and 380 / 400 V·50/60Hz 415 / 460		
Time rating		S1 (continuous)	S1 (continuous)		
Protection rating		IP44	IP40·IP44		
<sup>1</sup> Starting method		3.7 kW or smaller: direct-on-line starting 5.5 to 55 kW: Δ-starting 75 kW or larger: Direct-on-line starting	Direct-on-line starting		
<sup>2</sup> Thermal class		155 (F)	120 (E)		
Direction of rotation		CCW (counterclockwise as seen from load)	CCW (counterclockwise as seen from load)		
Ambient conditions	Temperature	-30°C to <sup>3</sup> +40°C	-20°C to +40°C		
	Humidity	100%RH max. (no condensation)	100%RH max. (no condensation)		
	Altitude	1,000 m max.	1,000 m max.		
	Other	No corrosive or explosive gas or vapor	No corrosive or explosive gas or vapor		
Terminal box	Mounting position (Leg mounting type)	200L or smaller	225S or larger	63M·71M	80M
		Left side as seen from load	Top side	Left side as seen from load	
	Port orientation (Leg mounting type)	200L or smaller	225S or larger	—	
		Downward	Leftward as seen from load	Downward	
		Orientation changeable at intervals of 90 degrees		Upward/downward selectable	Orientation changeable at intervals of 90 degrees
Material	Steel plate		Plastic	Steel plate	
Lead wire	System	160L or smaller: Terminal strip system	180M or larger: Lug system	Terminal strip system	
	<sup>4</sup> No. of wires	3.7 kW or smaller: 3 5.5 to 55 kW: 6 75 kW or larger: 3		3	
Color of coating		Munsell N1.2 (black matte)		Munsell N5 (gray)	
Standard	Applicable	JIS C 4213		JIS C 4210	
	Efficiency	JIS C 4034-30:2011 (IE3-equivalent)		—	

Note 1) The manufacturable range is up to 600 V.  
 Note 2) The starting method (\*1) is based on 4P.  
 Note 3) Temperature rise for insulation class (\*2): frame size 112M or smaller: "E" rise, frame size 132S to 225S: "B" rise  
 Note 4) An atmospheric temperature (\*3) of up to +50°C is acceptable only with frame sizes of 200L or smaller during commercial power supply operation.  
 Note 5) No. of lead wires (\*4) applies to models in stock. For made-to-order products, specify the starting method and no. of lead wires.  
 Note 6) If you wish to export (motors as they are or installed in machines, equipment, etc.) to foreign countries, please contact us separately to obtain information about the high-efficiency regulations enforced and implemented in the respective countries.

Outdoor

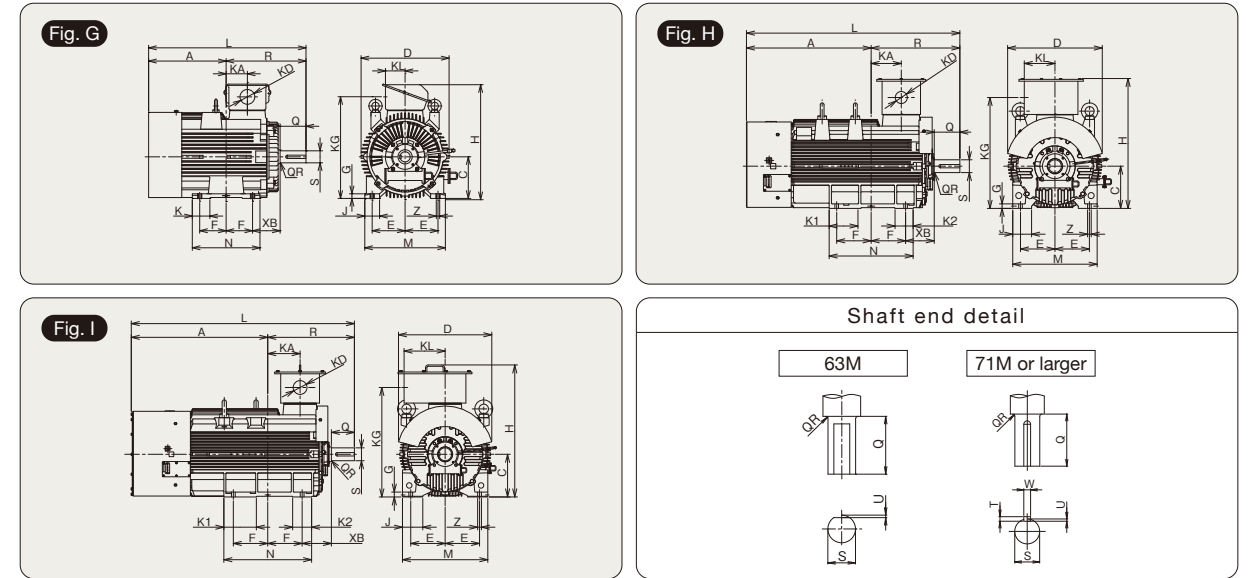
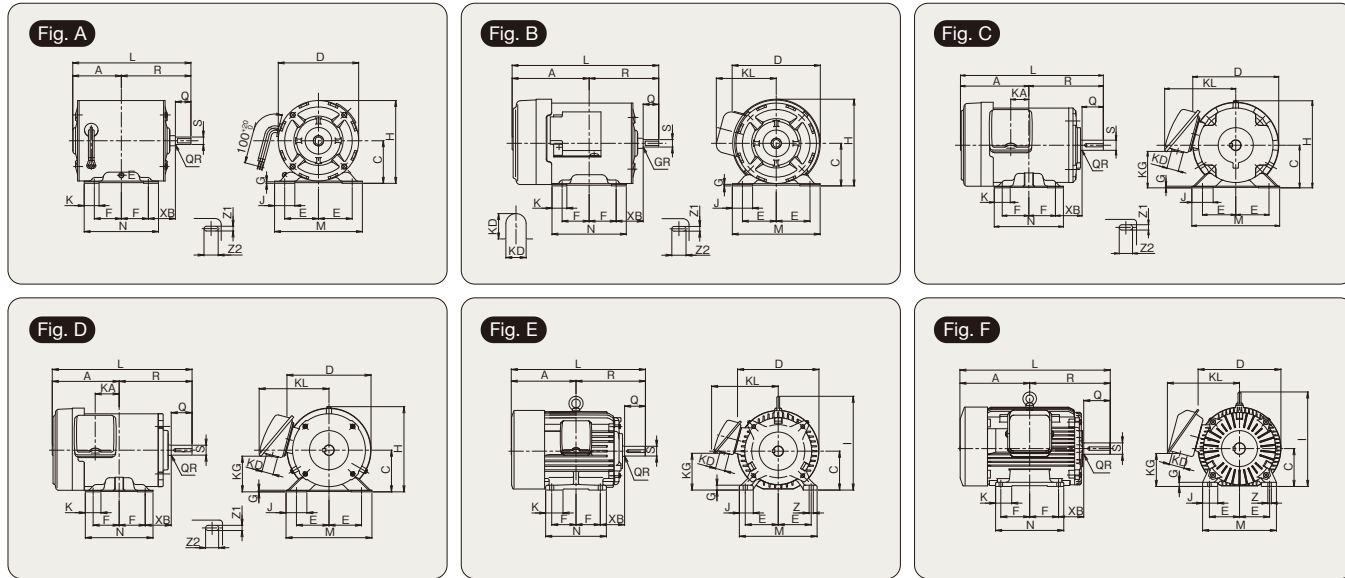
		Premium efficiency	Standard efficiency		
Housing structure		Totally-enclosed fan-cooled	Totally-enclosed fan-cooled		
Type	Steel frame	MLK	MLH		
	Cast iron frame	MLU	—		
Output		0.75 to 375 kW	0.2 to 0.4 kW		
Frame size		80M to 355K	63M to 80M		
<sup>1</sup> Rated voltage and rated frequency		200-400 / 200-400 V, 50/60 Hz	200-400 / 200-400 V, 50/60 Hz		
Time rating		S1 (continuous)	S1 (continuous)		
Protection rating		IP55	IP44		
<sup>2</sup> Starting method		3.7 kW or smaller: direct-on-line starting 5.5 to 55 kW: Δ-starting 75 kW or larger: direct-on-line starting	Direct-on-line starting		
<sup>3</sup> Thermal class		155 (F)	120 (E)		
Direction of rotation		CCW (counterclockwise as seen from load)	CCW (counterclockwise as seen from load)		
Ambient conditions	Temperature	-30°C to <sup>4</sup> +50°C	-20°C to +40°C		
	Humidity	100%RH max. (no condensation)	100%RH max. (no condensation)		
	Altitude	1,000m max.	1,000m max.		
	Other	No corrosive or explosive gas or vapor	No corrosive or explosive gas or vapor		
Terminal box	Mounting position (Leg mounting type)	200L or smaller	225S or larger	—	
		Left side as seen from load	Top side	Left side as seen from load	
	Port orientation (Leg mounting type)	200L or smaller	225S or larger	—	
		Toward opposite operation side	Leftward as seen from load	Toward opposite operation side	
		Orientation changeable at intervals of 90 degrees		Orientation changeable at intervals of 90 degrees	
Material	Steel plate		Steel plate		
Lead wire	System	Lug system		Terminal strip system	
	<sup>5</sup> No. of wires	3.7 kW or smaller: 9 5.5 to 55 kW: 12 75 to 132 kW: 9 160 kW or larger: 3		3	
Color of coating		Munsell N1.2 (black matte)		Munsell N5 (gray)	
Standard	Applicable	JIS C 4213		JIS C 4210	
	Efficiency	JIS C 4034-30:2011 (IE3-equivalent)		—	

Note 1) The manufacturable range is up to 600 V.  
 Note 2) Rated voltage and rated frequency (\*1): output 132 kW or less: dual voltage, output over 132 kW: single voltage (with 4P)  
 Note 3) The starting method (\*2) is based on 4P.  
 Note 4) Temperature rise for insulation class (\*3): frame size 112M or smaller: "E" rise, frame size 132S to 225S: "B" rise  
 Note 5) An atmospheric temperature (\*4) of up to +50°C is acceptable only with frame sizes of 200L or smaller during commercial power supply operation.  
 Note 6) No. of lead wires (\*5) applies to models in stock. For made-to-order products, specify the starting method and no. of lead wires.  
 Note 7) If you wish to export products (motors as they are or installed in machines, equipment, etc.) to foreign countries, please contact us separately to obtain information about the high-efficiency regulations enforced and implemented in the respective countries.

**DIMENSIONAL OUTLINE DRAWINGS**

Indoor

Leg mounting type



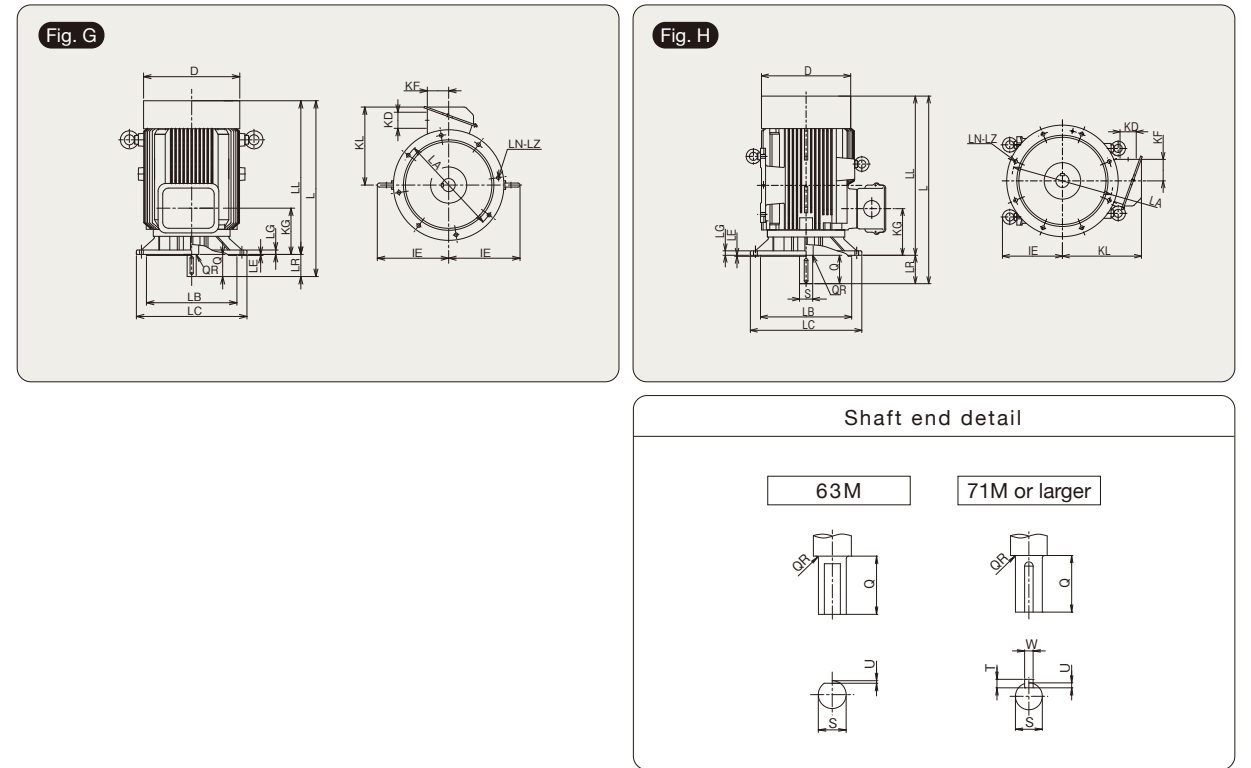
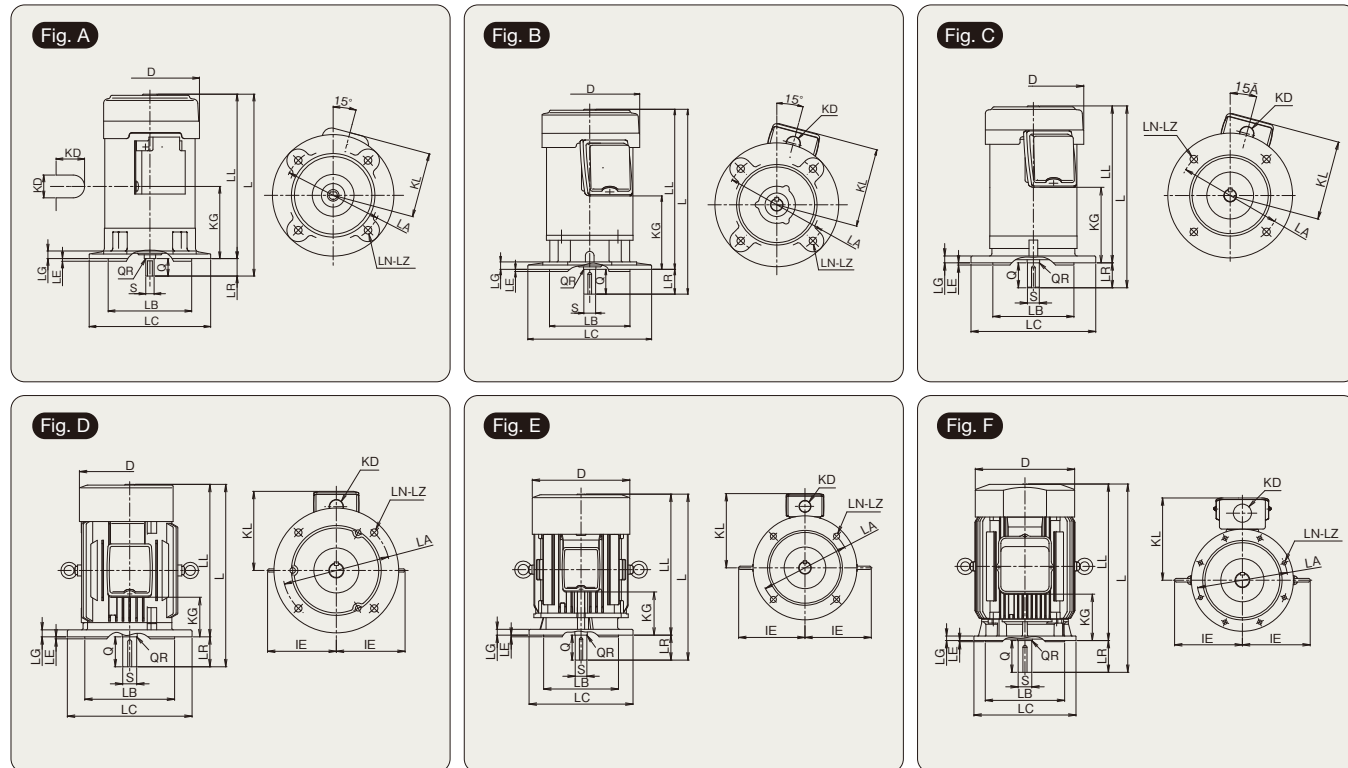
**Premium efficiency**

Frame size	Type	Output [kW]			Drawing No.	A	C	D	E	F	G	H	I	J	K	K1	K2	KA	KD	KG	KL	L	M	N	R	XB	Z (Z1 x Z2)	Shaft end						Bearing				Approximate mass [kg]	
		2P	4P	6P																								Q	QR	S	T	U	W	Operation side		Opposite operation side			
80M	MLK	1085M	0.75	0.75	—	129	80	162	62.5	50	3.1	164	—	40	30	—	—	46	22	68.5	134	269	165	130	140	50	10X25	40	0.5	19j6	6	3.5	6	6204ZZ	6204ZZ	6203ZZ	6203ZZ	14	
90L		1096M	1.5	—	—	—	149.5	90	187	70	62.5	4.2	187	—	40	30	—	—	49	22	82	146	318	180	155	168.5	56	10X25	50	0.5	24j6	7	4	8	6205ZZ	6205ZZ	6205ZZ	6205ZZ	19
100L		1097M	2.2	1.5	0.75	—	173	100	202	80	70	12.5	—	238	40	40	—	—	—	27	82.5	159	366	195	170	193	63	12	60	0.5	28j6	7	4	8	6206ZZ	6206ZZ	6206ZZ	6206ZZ	22
112M		1115A	3.7	3.7	2.2	—	187	112	235	95	70	14	—	270	40	50	—	—	—	27	105	185	387	224	175	200	70	12	60	0.5	28j6	7	4	8	6306ZZ	6306ZZ	6206ZZ	6206ZZ	36
132S		1132A	5.5	—	—	—	204	132	272	108	70	17	—	311	45	50	—	—	—	34	110	212	443	250	180	239	89	12	80	0.5	38k6	8	5	10	6308ZZ	6308ZZ	6207ZZ	6207ZZ	48
132M		1133A	7.5	5.5	3.7	—	223	132	272	108	89	17	—	311	45	50	—	—	—	34	110	212	481	250	212	258	89	12	80	0.5	38k6	8	5	10	6308ZZ	6308ZZ	6207ZZ	6207ZZ	63
160M		1135A	—	7.5	5.5	—	270	160	319	127	105	18	—	376	50	63	—	—	—	48	144	272	593	300	250	323	108	14.5	110	1	42k6	8	5	12	6310ZZC3	6310ZZ	6308ZZ	6308ZZ	70
160L		1164A	11	—	—	—	292	160	319	127	127	18	—	376	50	63	—	—	—	48	144	272	637	300	300	345	108	14.5	110	1	42k6	8	5	12	6310ZZC3	6310ZZ	6308ZZ	6308ZZ	82
160M		1165A	15	11	7.5	—	314.5	180	410	139.5	120.5	18	—	438	75	75	—	—	—	48	178	318	666	350	292	351.5	121	14.5	110	1.5	48k6	9	5.5	14	6312ZZC3	6312ZZ	6310ZZ	6310ZZ	116
180M		1184A	—	18.5	—	—	333.5	180	410	139.5	139.5	18	—	438	75	75	—	—	—	60	178	318	704	350	330	370.5	121	14.5	110	1.5	55m6	10	6	16	6312ZZC3	6312ZZC3	6310ZZC3	6310ZZC3	130
180L		1185A	22	22	15	—	368.5	180	410	139.5	152.5	22	—	499	80	85	—	—	—	80	174	381	764	390	360	395.5	133	18.5	110	2	55m6	10	6	16	6312ZZC3	6312ZZC3	6311ZZC3	6311ZZC3	158
200L		1206A	—	37	—	—	429	225	476	178	143	25	617	—	80	95	—	—	115	80	548	106	831	436	366	402	149	18.5	110	1	55m6	10	6	16	6312ZZC3	6315ZZC3	6312ZZC3	6312ZZC3	205
225S	1220A	55	—	—	—	579.5	250	519	203	155.5	30	658	—	100	—	158	120	143.5	80	589	106	1013	506	449	433.5	168	24	110	1	55m6	10	6	16	6314C3	6318	6314C3	6314	228	
250S	1250A	—	75	—	—	578.5	250	519	203	174.5	30	658	—	100	—	158	120	162.5	80	589	106	1042	506	449	463.5	168	24	140	2	75m6	12	7.5	20	6314C3	6318	6314C3	6314	218	
250M	1252A	—	90	—	—	579.5	250	519	203	174.5	30	658	—	100	—	158	120	162.5	80	589	106	1013	506	449	452.5	168	24	110	1	55m6	10	6	16	6314C3	6318	6314C3	6314	228	
280S	1280A	110	—	—	—	658	280	628	228.5	184	45	861	—	160	225	—	—	—	80	735	203	1142	630	570	484	190	24	110	1	55m6	10	6	16	6314C3	6320	*2	NU314	280	
280M	1282A	—	110	90	—	657	280	628	228.5	184	30	861	—	125	—	172	120	—	80	735	203	1201	560	519	544	190	24	170	2	85m6	14	9	22	6314C3	6320	*2	NU314	280	
280L	1284A	—	132	—	—	632.5	280	628	228.5	209.5	45	861	—	160	225	—	—	181	80	735	203	1142	630	570	509.5	190	24	110	1	55m6	10	6	16	6314C3	6320	*2	NU314	280	
315L	1286A	—	200	160	—	631.5	280	628	228.5	209.5	30	861	—	125	—	172	120	—	80	735	203	1201	560	519	569.5	190	24	170	2	85m6	14	9	22	6314C3	6320	*2	NU314	280	
355K	1314A	—	220	—	—	843.5	315	689	254	254	45	975	—	160	—	450	225	—	102	808	303	1372	630	800	528.5	190	24	110	1	55m6	10	6	16	6314C3	6222	*2	NU314	280	
	1316A	—	250	—	—	842.5	315	689	254	254	36	975	—	150	—	240	140	—	102	808	303	1431	560	557	588.5	190	24	170	1	95m6	14	9	25	6314C3	6222	*2	NU314	280	
	1350A	—	300	—	—	843.5	315	689	254	254	36	975	—	150	—	240	140	—	102	808	303	1431	560	557	588.5	190	24	170	1	95m6	14	9	25	6314C3	6222	*2	NU314	280	
	1352A	—	355	—	—	842.5	315	689	254	254	36	975	—	150	—	240	140	—	102	808	303	1618	730	900	610	216	28	140	1	65m6	11	7	18	6316C3	6222	*2	NU314	280	
	1354A	—	375	—	—	842.5	315	689	254	254	36	975	—	150	—	240	140	—	102	808	303	1618	730	900	610	216	28	140	1	65m6	11	7	18	6316C3	6222	*2	NU314	280	
	1356A	—	—	—	355,375	987	355	778	305	355	55	1059	—	190	—	360	250	—	102	893	413	1736	810	950	749	254	28	140	1	65m6	11	7	18	6316C3	6222	*2	NU314	280	

**Standard efficiency**

Frame size	Type	Output [kW]	Efficiency [%]	Drawing No.	A	C	D	E	F	G	H	I	J	K	K1	K2	KA	KD	KG	KL	L	M	N	R	XB	Z (Z1 x Z2)	Q	QR	S	T	U	W	Bearing	Approximate mass [kg]					
63M	MLH	8062A	—	0.1	—	72	63	120	50	40	2.3	123	—	30	22	—	—	—	—	—	—	175	130	110	103	40	7 x 21	23	1	11h6	—	1	—	6202ZZ	6202ZZ	6202ZZ	6202ZZ	4.5	
		8065M	0.2	0.2	—	115	63	131	50	40	2.3	129	—	30	22	—	—	—	12 x 15	—	—	89	218	130	110	103	40	7 x 21	23	1	11h6	—	1	—	6202ZZ	6202ZZ	6202ZZ	6202ZZ	6
		8075M	0.4	0.4	0.2	—	122	71	131	56	45	2.3	137	—	33	22	—	—	12 x 15	—	—	89	242	142	115	120	45	7 x 21	30	0.5	14j6	5	3	5	6202ZZ	6202ZZ	6202ZZ	6202ZZ	8
80M		8085M	—	—	0.4	—	129	80	162	62.5	50	3.1	164	—	40	30	—	—	34	22	68.5	134	269	165	130	140	50	10 x 25	40	0.5	19j6	6	3.5	6	6204ZZ	6204ZZ	6203ZZ	6203ZZ	10.5

Note 1) Steel frames are used for frame sizes 63M to 90L and cast iron frames for 100 L or larger.  
 Note 2) Only those with 100 W output are of the totally-enclosed self-cooled type.  
 Note 3) The standard mounting method is IMB3 (F11: frame mounting). Please contact us for other mounting methods.  
 Note 4) Dimensional tolerance: height of rotating shaft C ≤ 250 mm: 0.5 mm, C > 250 mm: 1 mm, shaft end key groove (W) dimensional tolerance: average class (N9).  
 Note 5) The 2-pole models are for direct connection only.  
 Note 6) Bearing nos. beginning with "63" represent a single row deep groove ball bearing, "NU" a cylindrical roller bearing, "ZZ" a grease-filled shielded ball bearing and "C3" a bearing with the radial gap of C3.  
 Note 7) \*: Please contact us for the individual dimensions. \*: NU314MCCG50  
 Note 8) The dimensions are subject to change. Please request dimensional outline drawings for designing.



Premium efficiency

Flange No.	Frame size	Type	Output [kW]			Drawing No.	Shaft end																	Bearing				Approximate mass [kg]							
			2P	4P	6P		D	L	IE	LL	LR	KL	KD	KF	KG	LA	LB	LC	LE	LG	LN	LZ	Q	QR	S	T	U		W	Operation side		Opposite operation side			
			2P		4P		2P		4P-6P		2P		4P-6P																						
FF165	80M	MLK	1085P	0.75	0.75	—	C	162	292	—	252	40	127	22	—	129	165	130j6	200	3.5	11	4	12	40	0.5	19j6	6	3.5	6	6204ZZ	6204ZZ	6203ZZ	6203ZZ	17	
			1096P	1.5	—	—		187	345	—	295	50	140	22	—	154	165	130j6	200	3.5	11	4	12	50	0.5	24j6	7	4	8	6205ZZ	—	6205ZZ	—	21	
			1097P	2.2	1.5	0.75		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24
FF215	100L	MLK	1107C	—	2.2	1.5	D	202	366	138	306	60	159	27	—	85	215	180j6	250	4	14	4	14.5	60	0.5	28j6	7	4	8	—	6206ZZ	—	6205ZZ	—	37
			1115C	3.7	3.7	2.2		235	399	160	339	60	179	27	—	109	215	180j6	250	4	14	4	14.5	60	0.5	28j6	7	4	8	6306ZZ	6306ZZ	6206ZZ	6206ZZ	50	
FF265	132S	MLK	1132C	5.5	—	—	E	272	450	179	370	80	200	34	—	112	265	230j6	300	4	17	4	14.5	80	0.5	38k6	8	5	10	6308ZZ	—	6207ZZ	—	65	
			1133C	7.5	5.5	3.7		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	72	
			1135C	—	7.5	5.5		272	488	179	408	80	200	34	—	131	265	230j6	300	4	17	4	14.5	80	0.5	38k6	8	5	10	—	6308ZZ	—	6207ZZ	—	84
FF300	160M	MLU	1164C	11	—	—	E	319	614	216	504	110	261	48	—	178	300	250j6	350	5	20	4	18.5	110	1	42k6	8	5	12	6310ZZC3	—	6308ZZ	—	121	
			1165C	15	11	7.5		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	135	
			1167C	18.5	15	11		319	644	216	534	110	261	48	—	193	300	250j6	350	5	20	4	18.5	110	1	42k6	8	5	12	6310ZZC3	6310ZZ	6308ZZ	6308ZZ	163	
FF350	180M	MLU	1184C	—	18.5	—	E	410	678	258	568	110	310	48	—	207	350	300j6	400	5	20	4	18.5	110	1.5	48k6	9	5.5	14	—	6312ZZ	—	6310ZZ	—	215
			1185C	22	22	15		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	238	
			1186C	—	—	18.5		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	228
FF400	200L	MLU	1187C	30	30	22	F	410	718	258	608	110	310	60	—	227	350	300j6	400	5	20	4	18.5	110	1.5	55m6	10	6	16	6312ZZC3	6312ZZC3	6310ZZC3	6310ZZC3	270	
			1206C	37	—	—		800	—	690	110	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	360
			1207C	45	—	—		830	299	690	140	363	80	—	220	400	350j6	450	5	20	8	18.5	110	2	60m6	11	7	18	—	6313ZZC3	—	6311ZZC3	—	385	
FF500	225S	MLH	1220C	55	—	—	G	479	884	355	774	110	392	80	106	230	500	450	550	5	22	8	18.5	110	1	55m6	10	6	16	6312C3	6315	6312C3	6312	440	
			1221C	—	55	45		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	500	
			1250C	75	—	—		110	—	110	140	408	G2 1/2	106	230	500	450	550	5	22	8	18.5	110	1	55m6	10	6	16	6312C3	6318	6212C3	6314	630		
FF500	250S	MLH	1250C	—	75	55	H	509	1062	340	952	140	408	G2 1/2	106	230	500	450	550	5	22	8	18.5	140	2	75m6	12	7.5	20	6312C3	6318	6212C3	6314	680	
			1252C	90	—	—		110	—	110	140	408	G2 1/2	106	230	500	450	550	5	22	8	18.5	110	1	55m6	10	6	16	6312C3	6318	6212C3	6314	660		
			—	—	90	75		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	720	

Standard efficiency

FF130	63M	MLH	8065C	0.2	0.2	—	A	131	240	—	217	23	86	12 x 15	—	95	130	110j6	160	3.5	10	4	10	23	1	11h6	—	1	—	6202ZZ	6202ZZ	6202ZZ	6202ZZ	7
	71M		8075C	0.4	0.4	0.2		131	262	—	232	30	86	12 x 15	—	110	130	110j6	160	3.5	10	4	10	30	0.5	14j6	5	3	5	6202ZZ	6202ZZ	6202ZZ	6202ZZ	9
FF165	80M	MLH	8085P	—	—	0.4	B	162	299	—	259	40	127	22	—	124	165	130j6	200	3.5	12	4	12	40	0.5	19j6	6	3.5	6	6204ZZ	6204ZZ	6203ZZ	6203ZZ	14

Note 1) Steel frames are used for frame sizes 63M to 90L and cast iron frames for 100 L or larger.  
 Note 2) The standard mounting method is IMV1 (L52: vertical shaft end bottom). Please contact us for details of other mounting methods.  
 Note 3) The allowable dimensional tolerance of the shaft end key groove (W) is coarse (N9).  
 Note 4) Use with non-direct connection requires consideration of the bearing lifespan. Please contact us for details.

Note 5) Bearing nos. beginning with "63" represent a single row deep groove ball bearing, "NU" a cylindrical roller bearing, "ZZ" a grease-filled shielded ball bearing and "C3" a bearing with the radial gap of C3.  
 Note 6) The dimensions are subject to change. Please request dimensional outline drawings for designing.



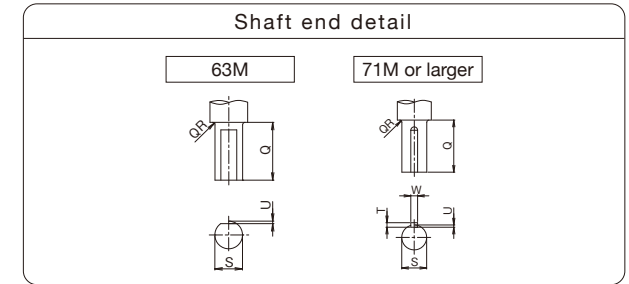
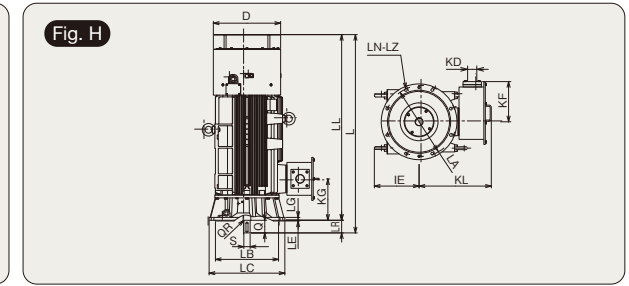
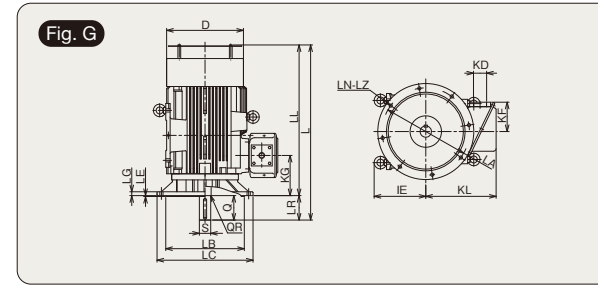
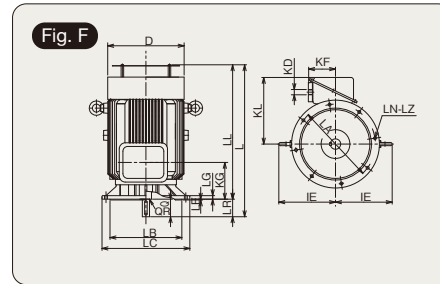
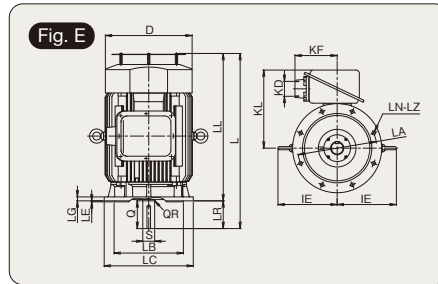
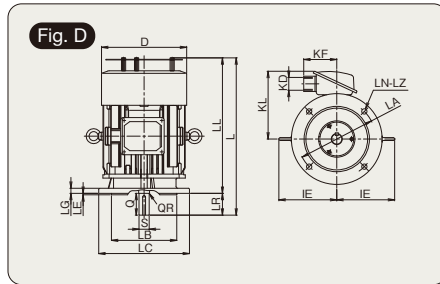
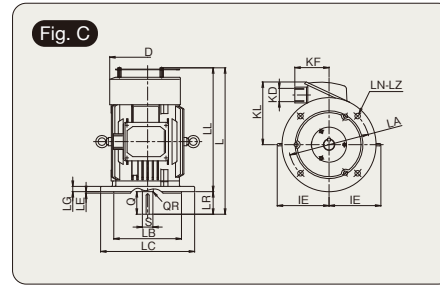
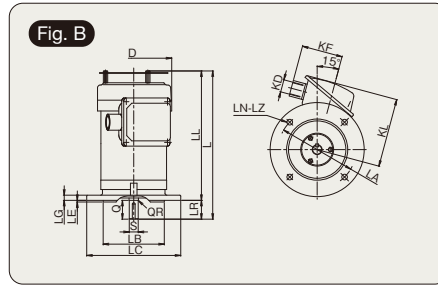
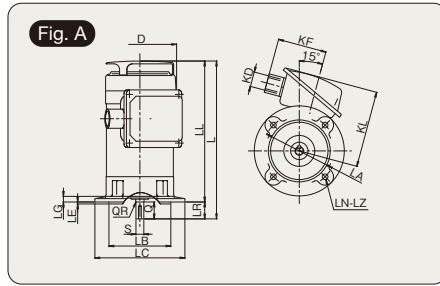




**DIMENSIONAL OUTLINE DRAWINGS**

**Outdoor**

**Flange mounting type**



**Premium efficiency**

Flange No.	Frame size	Type	Output [kW]			Drawing No.	D	L	IE	LL	LR	KL	KD	KF	KG	LA	LB	LC	LE	LG	LN	LZ	Shaft end						Bearing				Approximate mass [kg]		
			2P	4P	6P																		Q	QR	S	T	U	W	Operation side		Opposite operation side				
FF165	80M	MLK	1085D	0.75	0.75	—	B	162	316	—	276	40	147	G3/4	87	—	165	130j6	200	3.5	11	4	12	40	0.5	19j6	6	3.5	6	6204ZZ	6204ZZ	6203ZZ	6203ZZ	17	
			1096D	1.5	—	—		187	369	—	319	50	159	G3/4	87	—	165	130j6	200	3.5	11	4	12	50	0.5	24j6	7	4	8	6205ZZ	—	6205ZZ	—	21	
			1097D	2.2	1.5	0.75		235	433	160	373	60	187	G1	91	—	215	180j6	250	4	14	4	14.5	60	0.5	28j6	7	4	8	—	6206ZZ	—	6205ZZ	—	24
FF215	100L	—	1107D	—	2.2	1.5	C	202	390	138	330	60	167	G1	91	—	215	180j6	250	4	14	4	14.5	60	0.5	28j6	7	4	8	6306ZZ	6306ZZ	6206ZZ	6206ZZ	37	
			1122M	3.7	3.7	2.2		235	433	160	373	60	187	G1	91	—	215	180j6	250	4	14	4	14.5	60	0.5	28j6	7	4	8	—	6206ZZ	—	6205ZZ	—	37
FF265	132S	—	1132D	5.5	—	—	D	272	484	179	404	80	239	G1 1/4	121	—	265	230j6	300	4	17	4	14.5	80	0.5	38k6	8	5	10	6308ZZ	—	6207ZZ	—	65	
			1133D	7.5	5.5	3.7		272	523	179	443	80	239	G1 1/4	121	—	265	230j6	300	4	17	4	14.5	80	0.5	38k6	8	5	10	—	6308ZZ	—	6207ZZ	—	72
			1135D	—	7.5	5.5		319	648	216	538	110	263	G1 1/2	123	—	300	250j6	350	5	20	4	18.5	110	1	42k6	8	5	12	6310ZZC3	—	6308ZZ	—	121	
FF300	160M	—	1165D	15	11	7.5	D	319	678	216	568	110	263	G1 1/2	123	—	300	250j6	350	5	20	4	18.5	110	1	42k6	8	5	12	6310ZZC3	6310ZZ	6308ZZ	6308ZZ	135	
			1167D	18.5	15	11		319	678	216	568	110	263	G1 1/2	123	—	300	250j6	350	5	20	4	18.5	110	1	42k6	8	5	12	6310ZZC3	6310ZZ	6308ZZ	6308ZZ	163	
FF350	180M	—	1184D	—	18.5	—	D	410	732	258	622	110	311	G1 1/2	122	—	350	300j6	400	5	20	4	18.5	110	1.5	48k6	9	5.5	14	—	6312ZZC3	—	6310ZZ	—	215
			1185D	22	22	15		410	772	258	662	110	377	G2	214	—	350	300j6	400	5	20	4	18.5	110	1.5	55m6	10	6	16	6312ZZC3	6312ZZ	6310ZZC3	6310ZZ	238	
			1186D	—	—	18.5		410	772	258	662	110	377	G2	214	—	350	300j6	400	5	20	4	18.5	110	1.5	55m6	10	6	16	—	6312ZZC3	—	6310ZZC3	—	228
FF400	200L	—	1206D	37	—	—	E	439	855	—	745	110	395	G2 1/2	214	—	400	350j6	450	5	20	8	18.5	110	2	55m6	10	6	16	6312ZZC3	—	6311ZZC3	—	360	
			885	299	745	140			140	60m6	11	7												18		—	6313ZZC3	—	6311ZZC3	—					
			855	—	745	110			110	55m6	10	6												16		6312ZZC3	—	6311ZZC3	—						
FF500	225S	—	1220D	55	—	—	F	479	961	355	851	110	417	G2 1/2	170	230	500	450	550	5	22	8	18.5	110	1	55m6	10	6	16	6312C3	6315	6312C3	6312	440	
			1221D	—	55	45			140	60m6	11	7												18		—	6313ZZC3	—	6311ZZC3	—					
			991	—	—	140			140	55m6	10	6												16		6312C3	6315	6312C3	6312						
FF500	250S	—	1250D	75	—	—	G	509	1144	340	1034	110	433	G2 1/2	170	230	500	450	550	5	22	8	18.5	140	1	55m6	10	6	16	6314C3	6318	6214C3	6314	630	
			1174	—	—	140			140	75m6	12	7.5												20		—	6314C3	6318	6214C3	6314					
			1144	—	—	110			110	55m6	10	6												16		6314C3	6318	6214C3	6314						
FF600	250M	—	1252D	90	—	—	G	509	1144	340	1034	110	433	G2 1/2	170	230	500	450	550	5	22	8	18.5	140	1	55m6	10	6	16	6314C3	6318	6214C3	6314	680	
			1174	—	—	140			140	75m6	12	7.5												20		—	6314C3	6318	6214C3	6314					
			1144	—	—	110			110	55m6	10	6												16		6314C3	6318	6214C3	6314						
FF600	280L	MLU	1280B	110	—	—	H	586	1727	—	170	110	629	G2 1/2	350	360	600	550	660	6	25	8	24	110	0.5	55m6	10	6	16	6316C3	6322C3	*2	NU216	1200	
			1282B	132	—	—			1787	—	170	110												95m6		14	9	25	1250						
			1284B	160	—	—			1727	—	110	110												55m6		10	6	16	1250						
			1286B	200	—	—			1787	—	170	110												95m6		14	9	25	1350						
			1288B	—	132	110			1727	—	110	110												55m6		10	6	16	1500						
			1290B	—	—	—			1787	—	170	110												95m6		14	9	25	1400						
			1292B	—	—	—			1727	—	110	110												55m6		10	6	16	1550						
			1294B	—	—	—			1787	—	170	110												95m6		14	9	25	1500						
			1296B	—	—	—			1727	—	110	110												55m6		10	6	16	1550						
			1298B	—	—	—			1787	—	170	110												95m6		14	9	25	1500						
			1300B	—	—	—			1727	—	110	110												55m6		10	6	16	1850						
			1302B	—	—	—			1787	—	170	110												95m6		14	9	25	1900						
FF740	315L	—	1314B	250	—	—	H	634	1898	—	140	140	658	*1	460	360	740	680	800	6	25	8	24	140	0.5	65m6	11	7	18	*3	6322C3	*2	NU216	1850	
			1316B	300	—	—			1928	—	170	110												95m6		14	9	25	1900						
			1318B	—	250	200			1898	—	140	140												65m6		11	7	18	1850						
			1320B	—	—	220			1928	—	170	110												95m6		11	7	18	1900						
			1322B	—	—	—			1898	—	140	140												65m6		11	7	18	1900						
			1324B	—	—	—			1928	—	170	110												95m6		11	7	18	1950						
FF740	355K	—	1350B	315	—	—	H	720	2013	—	140	140	703	*1	460	360	740	680	800	6	30	8	24	140	0.5	65m6	11	7	18	*3	6324C3	*2	NU216	2350	
			1352B	355	—	—			2083	—	210	210												100m6		16	10	28	2300						
			1354B	—	—	—			2013	—	140	140												65m6		11	7	18	2450						
			1356B	—	—	—			2083	—	210	210												100m6		16	10	28	2400						
			1358B	—	—	—			2013	—	140	140												65m6		11	7	18	2500						
			1360B	—	—	—			2083	—	210	210												100m6		16	10	28	2600						

**Standard efficiency**

FF130	63M	MLH	8065D	0.2	0.2	—	A	131	259	—	236	23	137	G3/4	87	—	130	110j6	160	3.5	10	4	10	23	1	11h6	—	1	—	6202ZZ	6202ZZ	6202ZZ	6202ZZ	7
	71M		8075D	0.4	0.4	0.2		131	281	—	251	30	137	G3/4	87	—	130	110j6	160	3.5	10	4	10	30	0.5	14j6	5	3	5	6202ZZ	6202ZZ	6202ZZ	6202ZZ	9
FF165	80M	—	8085D	—	—	0.4	—	162	316	—	276	40	147	G3/4	87	—	165	130j6	200	3.5	12	4	12	40	0.5	19j6	6	3.5	6	6204ZZ	6204ZZ	6203ZZ	6203	

# CHARACTERISTIC SPECIFICATION

## Premium efficiency

### 200 V class 2P

Type	Output [kW]	Voltage [V]	Frequency [Hz]	Rated current [A]	Rated speed [min <sup>-1</sup> ]	Load characteristic									Efficiency class	Starting current [A]	Starting torque [%]	Maximum torque [%]	Input difference from standard motor [kW] (with 100% load)
						50% load			75% load			100% load							
						Current [A]	Efficiency [%]	Power factor [%]	Current [A]	Efficiency [%]	Power factor [%]	Current [A]	Efficiency [%]	Power factor [%]					
MLK1085	0.75	200	50	3.1	2850	1.89	81.0	70.7	2.42	82.4	81.5	3.07	81.5	86.7	IE3	21.5	288	284	0.060
		200	60	3	3420	1.73	80.9	77.5	2.31	82.1	85.7	3.00	81.1	89.1	IE3	19.5	254	254	0.053
		220	60	2.8	3455	1.71	79.9	71.9	2.19	82.2	82.1	2.76	82.5	86.6	IE3	21.5	323	316	0.061
MLK1096	1.5	200	50	5.6	2865	3.15	86.9	79.0	4.27	87.2	87.2	5.58	85.8	90.4	IE3	43	294	322	0.139
		200	60	5.6	3435	3.03	85.4	83.8	4.22	85.8	89.6	5.58	85.6	90.6	IE3	39	256	293	0.132
		220	60	5.1	3470	2.91	84.8	79.8	3.93	86.3	87.1	5.06	86.0	90.5	IE3	43	310	355	0.109
MLK1097	2.2	200	50	8.3	2890	4.87	85.7	76.1	6.46	86.6	85.2	8.25	86.0	89.5	IE3	76	384	355	0.128
		200	60	8.1	3465	4.50	85.8	82.3	6.20	86.6	88.7	8.07	86.8	90.7	IE3	67	306	314	0.135
		220	60	7.4	3490	4.38	85.4	77.2	5.81	87.0	85.6	7.40	86.9	89.8	IE3	73	374	377	0.094
MLU1107	2.2	200	50	13	2930	7.35	88.6	82.0	10.1	89.3	88.5	13.2	88.8	91.2	IE3	139	325	263	0.279
		200	60	13	3510	7.06	86.4	87.6	9.90	88.4	91.3	13.0	88.5	92.6	IE3	111	288	310	0.256
		220	60	12	3530	6.68	87.2	83.3	9.20	89.1	89.4	11.9	89.3	91.6	IE3	124	348	375	0.221
MLU1115	3.7	200	50	20	2935	11.5	88.8	77.8	15.5	89.9	85.7	19.9	89.7	89.1	IE3	194	353	345	0.270
		200	60	19.5	3525	10.8	88.5	82.7	15.0	89.6	88.4	19.6	89.5	90.5	IE3	169	288	299	0.310
		220	60	18	3540	10.5	88.0	78.0	14.0	89.7	85.9	18.0	90.0	89.2	IE3	187	355	366	0.300
MLU1132	5.5	200	50	26.5	2940	14.7	89.9	82.1	20.3	90.6	88.3	26.4	90.3	90.7	IE3	252	334	334	0.236
		200	60	26.5	3525	14.1	89.2	86.0	20.0	90.0	90.3	26.3	90.2	91.3	IE3	220	269	291	0.306
		220	60	24	3540	13.5	88.9	82.2	18.5	90.3	88.6	24.0	90.4	90.9	IE3	243	339	355	0.249
MLU1133	7.5	200	50	38	2950	20.5	90.7	85.3	28.9	91.6	90.1	37.9	91.3	91.7	IE3	373	271	317	0.512
		200	60	38	3540	19.9	90.1	88.5	28.5	91.1	91.7	37.9	91.1	92.0	IE3	319	211	270	0.598
		220	60	34	3550	18.7	89.8	85.8	26.2	91.3	90.6	34.3	91.4	92.0	IE3	355	262	331	0.536
MLU1164	11	200	50	51	2955	26.8	92.2	87.6	38.2	92.8	91.6	50.6	92.0	93.0	IE3	524	264	327	0.512
		200	60	51	3545	26.4	91.3	90.0	38.1	92.1	92.6	50.8	91.8	93.0	IE3	453	213	282	0.627
		220	60	46	3555	24.6	91.1	87.9	34.8	92.4	91.9	45.8	92.5	92.9	IE3	513	276	352	0.713
MLU1165	15	200	50	62	2950	32.4	92.7	88.8	46.7	93.1	92.2	62.0	92.5	93.1	IE3	594	307	327	0.717
		200	60	62	3540	31.8	92.7	90.6	46.6	92.6	93.0	62.7	91.7	92.9	IE3	464	243	276	0.706
		220	60	56	3550	29.7	91.9	88.9	42.5	92.6	92.5	56.4	92.3	93.3	IE3	510	294	334	0.734
MLU1167	18.5	200	50	74	2960	39.1	93.2	87.1	55.7	93.6	91.4	73.6	93.3	92.5	IE3	658	201	324	0.992
		200	60	74	3550	38.8	91.2	89.6	55.8	92.3	92.5	74.2	92.4	92.6	IE3	564	159	275	0.993
		220	60	67	3560	36.2	91.3	87.4	51.0	92.7	91.7	67.1	93.0	92.5	IE3	623	196	336	1.091
MLU1185	22	200	50	100	2960	52.6	94.6	87.1	75.1	94.7	91.4	99.5	94.2	92.5	IE3	922	212	347	1.216
		200	60	100	3550	51.9	93.2	89.5	74.9	93.8	92.4	99.8	93.6	92.8	IE3	789	171	282	1.346
		220	60	90	3560	47.9	93.0	88.5	68.2	93.8	92.3	90.3	93.7	93.1	IE3	850	207	341	1.247
MLU1187	30	200	50	123	2970	66.2	93.5	86.3	93.5	94.2	91.0	123	94.0	92.2	IE3	1190	197	338	1.224
		200	60	124	3565	65.4	91.7	89.0	93.5	92.9	92.3	124	93.0	92.6	IE3	1020	153	287	1.372
		220	60	112	3570	61.1	91.6	86.8	86.1	93.1	90.9	112	93.6	92.5	IE3	1130	186	349	1.434
MLU1206	37	200	50	149	2975	79.3	93.8	87.3	113	94.4	91.5	149	94.3	92.5	IE3	1410	203	321	1.844
		200	60	150	3565	78.4	92.8	89.3	113	93.6	92.3	150	93.6	92.5	IE3	1210	153	263	1.483
		220	60	135	3575	73.3	92.7	87.0	104	93.8	91.0	136	94.0	92.5	IE3	1340	185	318	1.555
MLU1207	45	200	50	184	2965	101	93.8	83.8	141	94.4	89.5	184	94.3	91.5	IE3	1710	156	342	2.315
		200	60	180	3560	97.0	91.9	89.1	140	92.2	92.3	180	93.0	94.9	IE2	1330	102	271	1.366
		220	60	166	3565	91.0	92.0	86.2	129	93.3	89.9	166	93.6	92.9	IE3	1520	133	338	1.613
MLU1220	55	200	50	244	2970	136	93.9	84.7	192	94.8	89.3	244	94.8	93.6	IE3	2140	129	281	1.792
		200	60	244	3565	132	92.5	88.7	190	93.5	91.4	244	93.7	94.7	IE2	1748	93	231	1.657
		220	60	222	3570	124	92.6	85.7	174	93.9	90.3	222	94.2	94.1	IE3	1942	115	282	1.904
MLU1250	75	200	50	292	2970	162	94.3	85.1	228	95.0	90.0	292	95.1	93.6	IE3	2580	135	281	2.346
		200	60	290	3565	156	93.7	88.9	224	94.4	92.2	290	94.5	94.8	IE2	2100	97	230	2.694
		220	60	264	3570	146	93.8	86.3	206	94.8	90.8	264	95.0	94.2	IE3	2320	120	281	3.089
MLU1252	90	200	50	364	2970	208	94.7	80.7	288	95.3	86.8	364	95.4	91.4	IE3	2920	122	259	3.230
		200	60	358	3570	194	94.1	87.0	278	94.7	90.4	358	94.7	93.7	IE2	2340	86	210	2.763
		220	60	328	3575	186	94.1	82.5	258	95.0	88.3	328	95.2	92.5	IE3	2620	107	257	3.244
MLU1280	110	200	50	446	2975	260	94.8	77.3	354	95.5	84.6	446	95.4	89.6	IE3	3800	142	278	3.114
		200	60	428	3570	234	94.5	86.1	334	95.1	90.0	428	95.1	93.6	IE2	2980	94	222	3.440
		220	60	396	3575	226	94.5	81.1	312	95.4	87.3	396	95.5	91.6	IE3	3360	120	274	3.716

Note 1) These characteristic values are based on the dynamometer method (actual load method).  
Note 2) These characteristic values are typical ones. They are not guaranteed.

## Standard efficiency

### 2P

#### 200 V class

Type	Output [kW]	Rated current [A]			Rated speed [min <sup>-1</sup> ]		
		50Hz		60Hz	50Hz		60Hz
		200V	200V	220V	200V	200V	220V
MLH8065	0.2	1.1	1.0	1.0	2900	3475	3500
MLH8075	0.4	1.9	1.7	1.7	2900	3475	3500

#### 400 V class

Type	Output [kW]	Rated current [A]						Rated speed [min <sup>-1</sup> ]					
		50Hz			60Hz			50Hz			60Hz		
		380V	400V	415V	400V	440V	460V	380V	400V	415V	400V	440V	460V
MLH8065	0.2	-	0.55	0.56	0.5	0.5	0.51	-	2900	2905	3475	3500	3510
MLH8075	0.4	-	0.95	0.95	0.85	0.85	0.85	-	2900	2905	3475	3500	3510

## Premium efficiency

### 200 V class 4P

Type	Output [kW]	Voltage [V]	Frequency [Hz]	Rated current [A]	Rated speed [min <sup>-1</sup> ]	Load characteristic									Efficiency class	Starting current [A]	Starting torque [%]	Maximum torque [%]	Input difference from standard motor [kW] (with 100% load)
						50% load			75% load			100% load							
						Current [A]	Efficiency [%]	Power factor [%]	Current [A]	Efficiency [%]	Power factor [%]	Current [A]	Efficiency [%]	Power factor [%]					
MLK1085	0.75	200	50	3.5	1440	2.32	80.4	58.0	2.75	83.0	71.1	3.28	83.2	79.2	IE3	23	317	315	0.075
		200	60	3.2	1725	1.98	83.8	65.2	2.49	85.1	76.7	3.07	85.5	82.5	IE3	20	263	272	0.072
		220	60	3.1	1740	2.06	83.0	57.5	2.46	85.4	70.4	2.94	85.8	78.1	IE3	22	335	339	0.068
MLK1097	1.5	200	50	6.9	1450	4.83	83.6	53.7	5.66	85.7	67.0	6.68	85.8	75.6	IE3	56	243	323	0.180
		200	60	6.1	1740	3.74	87.1	66.4	4.78	87.7	77.5	6.00	86.9	83.1	IE3	44	193	263	0.135
		220	60	5.9	1755	4.07	85.8	56.3	4.86	87.7	69.3	5.82	87.8	77.1	IE3	51	264	337	0.134
MLU1107	2.2	200	50	9.5	1450	6.74	85.6	55.0	7.97	87.5	68.3	9.49	88.5	75.6	IE3	77	253	340	0.274
		200	60	8.5	1740	5.26	88.7	68.0	6.78	89.4									

# CHARACTERISTIC SPECIFICATION

## Premium efficiency

### 200 V class 6P

Type	Output [kW]	Voltage [V]	Frequency [Hz]	Rated current [A]	Rated speed [min <sup>-1</sup> ]	Load characteristic									Efficiency class	Starting current [A]	Starting torque [%]	Maximum torque [%]	Input difference from standard motor [kW] (with 100% load)	
						50% load			75% load			100% load								
						Current [A]	Efficiency [%]	Power factor [%]	Current [A]	Efficiency [%]	Power factor [%]	Current [A]	Efficiency [%]	Power factor [%]						
MLK1097	0.75	200	50	4.2	965	3.48	76.7	40.5	3.79	79.8	53.7	4.20	80.1	64.4	IE3	27	313	320	0.044	
		200	60	3.8	1155	2.91	79.9	46.6	3.30	82.2	60.0	3.80	82.5	69.1		24	250	264	0.069	
		220	60	3.7	1165	3.05	79.1	40.8	3.36	82.3	53.4	3.70	83.1	64.0		27	312	332	0.068	
MLU1107	1.5	200	50	7.5	970	5.72	85.4	44.3	6.54	87.1	57.0	7.50	86.7	66.6	IE3	46	245	249	0.157	
		200	60	6.6	1160	4.44	88.0	55.4	5.41	88.7	67.7	6.60	88.5	74.1		36	164	198	0.190	
		220	60	6.5	1170	4.79	86.8	47.3	5.46	88.5	61.1	6.50	88.7	68.3		41	213	249	0.163	
MLU1115	2.2	200	50	11	975	8.49	86.0	43.5	9.64	88.1	56.0	11.0	88.4	65.3	IE3	77	273	350	0.198	
		200	60	9.6	1170	6.47	89.1	55.2	7.92	90.0	66.9	9.60	89.6	73.8		63	207	293	0.215	
		220	60	9.5	1175	6.99	86.5	47.7	8.20	88.9	59.4	9.50	90.1	67.5		69	250	354	0.184	
MLU1133	3.7	200	50	18	975	13.2	84.9	47.8	15.4	86.5	60.0	18.0	86.5	68.6	IE3	120	256	333	0.170	
		200	60	15.5	1170	9.90	89.5	60.2	12.5	90.2	71.0	15.5	89.5	77.0		95	200	268	0.302	
		220	60	15	1175	10.6	87.9	52.3	12.7	89.5	64.1	15.0	89.6	72.3		109	267	340	0.234	
MLU1135	5.5	200	50	25.5	975	18.6	87.1	49.1	21.8	88.7	61.6	25.5	88.8	70.1	IE3	181	281	361	0.209	
		200	60	22.5	1170	14.4	90.5	61.1	18.1	91.3	72.0	22.5	91.0	77.5		145	213	290	0.411	
		220	60	22	1175	15.4	89.2	52.5	18.6	90.8	64.0	22.0	91.1	72.0		176	258	351	0.373	
MLU1165	7.5	200	50	33	980	23.5	88.7	51.8	28.0	90.2	64.4	33.0	90.3	72.7	IE3	238	288	303	0.236	
		200	60	30	1175	19.1	90.5	62.5	24.3	91.3	73.3	30.0	91.0	79.3		189	236	246	0.379	
		220	60	29.5	1180	20.4	89.6	54.0	24.8	91.2	65.3	29.5	91.4	73.0		212	299	305	0.336	
MLU1167	11	200	50	45	980	30.8	90.3	57.2	37.6	91.0	69.6	45.0	90.5	78.0	IE3	327	293	294	0.417	
		200	60	43	1175	26.4	90.9	66.2	34.1	91.2	76.5	43.0	90.9	81.2		IE2	270	236	244	0.300
		220	60	40	1180	26.6	90.7	59.7	33.2	91.8	71.1	40.0	91.7	78.7		IE3	298	286	296	0.322
MLU1185	15	200	50	60	980	40.8	91.4	58.0	50.1	92.1	70.4	60.0	91.8	78.6	IE3	457	312	288	0.552	
		200	60	57	1175	34.9	92.3	67.3	45.4	92.5	77.3	57.0	91.9	82.7		365	218	230	0.570	
		220	60	53	1180	35.3	91.9	60.6	44.1	92.9	72.1	53.0	92.9	79.9		414	280	286	0.689	
MLU1186	18.5	200	50	76	985	51.4	92.1	56.4	63.2	92.7	68.3	76.0	92.5	76.0	IE3	568	315	292	0.787	
		200	60	71	1180	43.0	93.5	66.3	56.1	93.7	76.2	71.0	93.0	80.9		490	221	233	0.663	
		220	60	67	1185	44.1	92.7	59.4	55.2	93.6	70.5	67.0	93.5	77.5		552	282	290	0.701	
MLU1187	22	200	50	89	985	60.6	92.4	56.7	74.4	93.1	68.7	89.0	92.7	77.0	IE3	673	327	303	0.849	
		200	60	83	1180	50.4	93.5	67.4	65.8	93.7	77.2	83.0	93.1	82.2		544	258	237	0.679	
		220	60	78	1185	51.1	93.2	60.6	64.0	93.9	72.1	78.0	93.7	79.0		598	312	287	0.697	
MLU1206	30	200	50	124	985	87.7	92.2	53.6	105	93.0	66.5	124	93.0	75.1	IE3	930	194	291	1.001	
		200	60	116	1185	74.0	93.1	62.9	93.4	93.6	74.3	116	93.3	80.0		IE2	745	135	235	0.633
		220	60	111	1190	76.3	92.8	55.6	92.9	93.8	67.7	111	94.1	75.4		IE3	845	174	292	0.834
MLU1207	37	200	50	155	985	108	92.8	53.3	130	93.5	65.9	155	93.4	73.8	IE3	1100	190	241	1.090	
		200	60	144	1185	89.7	93.6	63.6	115	93.8	74.3	144	93.3	79.5		IE2	870	130	191	0.869
		220	60	137	1190	93.1	93.4	55.9	114	94.1	67.8	137	94.2	75.2		IE3	1000	173	231	1.071
MLU1221	45	200	50	190	980	144	92.1	49.0	168	93.4	62.0	190	93.7	73.0	IE3	1400	219	311	1.787	
		200	60	170	1180	110	94.3	62.5	139	94.4	74.0	170	95.1	80.4		IE2	1080	142	243	2.355
		220	60	164	1180	120	94.0	52.3	143	94.9	65.4	164	95.0	75.8		IE3	1250	191	306	2.157
MLU1250	55	200	50	218	985	150	94.0	56.3	184	94.8	68.3	218	94.3	77.2	IE3	1614	172	263	1.851	
		200	60	204	1180	126	93.9	67.1	164	94.6	76.8	204	94.3	82.5		IE2	1262	115	208	1.588
		220	60	194	1185	130	93.7	59.3	162	94.7	70.5	194	94.7	78.6		IE3	1442	150	259	1.770
MLU1252	75	200	50	284	980	182	94.4	63.0	232	94.8	73.8	283	94.6	80.6	IE3	1828	144	219	2.686	
		200	60	272	1180	158	94.4	72.6	214	94.7	80.1	272	94.3	84.4		IE2	1436	97	174	1.988
		220	60	254	1180	158	94.4	66.0	206	95.0	75.4	254	95.0	81.6		IE3	1636	126	216	2.486
MLU1280	90	200	50	344	990	228	94.5	60.3	286	95.2	71.6	343	95.1	79.4	IE3	2500	138	234	3.189	
		200	60	322	1185	190	94.6	72.3	256	95.2	80.0	322	94.9	85.0		IE2	1866	84	180	2.356
		220	60	304	1190	194	94.4	64.5	248	95.3	75.0	304	95.4	81.4		IE3	2160	115	227	3.063
MLU1282	110	200	50	410	990	264	94.9	63.4	336	95.6	74.2	410	95.3	81.3	IE3	2960	134	229	2.474	
		200	60	388	1185	226	94.9	74.0	308	95.5	81.0	387	95.3	85.9		IE2	2220	83	176	2.348
		220	60	364	1190	228	94.7	66.8	296	95.6	76.5	364	95.8	82.8		IE3	2600	113	223	2.825

Note 1) These characteristic values are based on the dynamometer method (actual load method).  
 Note 2) These characteristic values are typical ones. They are not guaranteed.

## Standard efficiency

### 6P

#### 200 V class

Type	Output [kW]	Rated current [A]			Rated speed [min <sup>-1</sup> ]		
		50Hz		60Hz	50Hz		60Hz
		200V	200V	220V	200V	200V	220V
MLH8075	0.2	1.3	1.2	1.2	920	1100	1125
MLH8085	0.4	2.5	2.2	2.2	930	1120	1135

#### 400 V class

Type	Output [kW]	Rated current [A]						Rated speed [min <sup>-1</sup> ]					
		50Hz		60Hz		50Hz		50Hz		60Hz		60Hz	
		380V	400V	415V	400V	440V	460V	380V	400V	415V	400V	440V	460V
MLH8075	0.2	0.65	0.65	0.68	0.6	0.6	0.62	910	920	925	1100	1125	1130
MLH8085	0.4	1.2	1.3	1.4	1.1	1.1	1.2	920	930	935	1120	1135	1140

## Premium efficiency

### 400 V class 2P

Type	Output [kW]	Voltage [V]	Frequency [Hz]	Rated current [A]	Rated speed [min <sup>-1</sup> ]	Load characteristic									Efficiency class	Starting current [A]	Starting torque [%]	Maximum torque [%]	Input difference from standard motor [kW] (with 100% load)
						50% load			75% load			100% load							
						Current [A]	Efficiency [%]	Power factor [%]	Current [A]	Efficiency [%]	Power factor [%]	Current [A]	Efficiency [%]	Power factor [%]					
MLK1085	0.75	400	50	1.6	2850	0.95	81.0	70.7	1.21	82.4	81.5	1.53	81.5	86.7	IE3	10.5	288	284	0.060
		400	60	1.5	3420	0.86	80.9	77.5	1.15	82.1	85.7	1.50	81.1	89.1		9.8	254	254	0.053
		440	60	1.4	3455	0.86	79.9	71.9	1.09	82.2	82.1	1.38	82.5	86.6		10.5	323	316	0.061
MLK1096	1.5	400	50	2.8	2865	1.58	86.9	79.0	2.14	87.2	87.2	2.79	85.8	90.4	IE3	21.5	294	322	0.139
		400	60	2.8	3435	1.51	85.4	83.8	2.11	85.8	89.6	2.79	85.6	90.6		19.5	256	293	0.132
		440	60	2.6	3470	1.45	84.8	79.8	1.97	86.3	87.1	2.53	86.0	90.5		21.5	310	355	0.109
MLK1097	2.2	400	50	4.2	2890	2.43	85.7	76.1	3.23	86.6	85.2	4.12	86.0	89.5	IE3	38	384	355	0.128
		400	60	4.1	3465	2.25	85.8	82.3	3.10	86.6	88.7	4.03	86.8	90.7		34	306	314	0.135
		440	60	3.7	3490	2.19	85.4	77.3	2.91	87.0	85.6	3.70	86.9	89.8		37	374	377	0.094
MLU1115	3.7	400	50	6.5	2930	3.67	88.6	82.0	5.10	89.3	88.5	6.70	88.8	91.2	IE3	70	325	263	0.279
		400	60	6.5	3510	3.53	86.4	87.6	5.00	88.4	91.3	6.50	88.5	92.6		56	288	310	0.256
		440	60	6	3530	3.34	87.2	83.3	4.6										



# CHARACTERISTIC SPECIFICATION

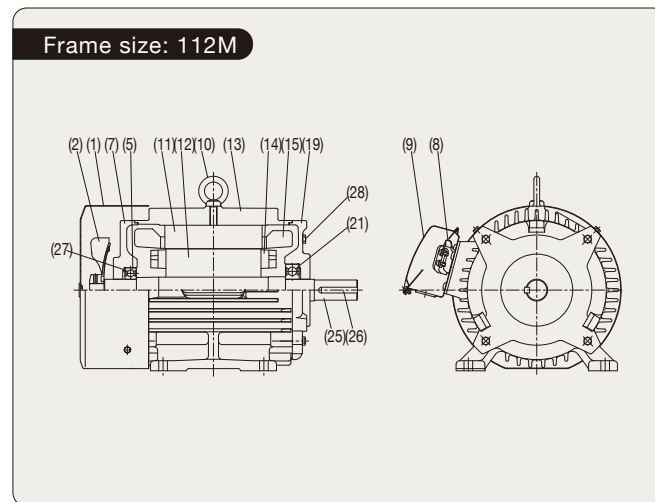
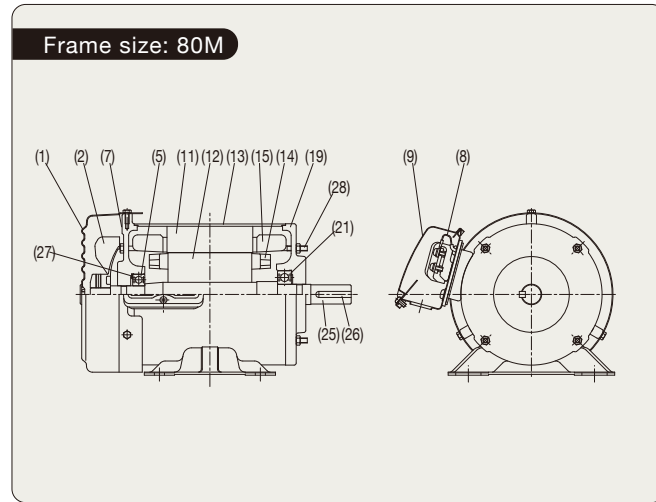
Premium efficiency

400 V class 4P

Type	Output [kW]	Voltage [V]	Frequency [Hz]	Rated current [A]	Rated speed [min <sup>-1</sup> ]	Load characteristic									Efficiency class	Starting current [A]	Starting torque [%]	Maximum torque [%]	Input difference from standard motor [kW] (with 100% load)
						50% load			75% load			100% load							
						Current [A]	Efficiency [%]	Power factor [%]	Current [A]	Efficiency [%]	Power factor [%]	Current [A]	Efficiency [%]	Power factor [%]					
MLK1085	0.75	400	50	1.8	1440	1.16	80.4	58.0	1.38	83.0	71.1	1.64	83.2	79.2	IE3	11.5	317	315	0.075
		400	60	1.6	1725	0.99	83.8	65.2	1.24	85.1	76.7	1.54	85.5	82.5		10	263	272	0.072
		440	60	1.6	1740	1.03	83.0	57.5	1.23	85.4	70.4	1.47	85.8	78.1		11	335	339	0.068
MLK1097	1.5	400	50	3.5	1450	2.41	83.6	53.7	2.83	85.7	67.0	3.34	85.8	75.6	IE3	28	243	323	0.180
		400	60	3.1	1740	1.87	87.1	66.4	2.39	87.7	77.5	3.00	86.9	83.1		22	193	263	0.135
		440	60	3	1755	2.04	85.8	56.3	2.43	87.7	69.3	2.91	87.8	77.1		25.5	264	337	0.134
MLU1107	2.2	400	50	4.8	1450	3.37	85.6	55.0	3.99	87.5	68.3	4.75	88.5	75.6	IE3	39	253	340	0.274
		400	60	4.3	1740	2.63	88.7	68.0	3.39	89.4	78.6	4.27	89.5	83.1		29.5	195	271	0.222
		440	60	4.2	1755	2.85	87.3	58.0	3.43	89.2	70.8	4.13	89.9	77.7		35	270	344	0.197
MLU1115	3.7	400	50	7.8	1465	5.37	86.7	57.4	6.40	88.4	70.4	7.70	88.5	78.0	IE3	70	256	328	0.348
		400	60	7	1755	4.35	88.9	69.0	5.60	89.6	79.3	7.10	89.5	83.9		58	205	262	0.297
		440	60	6.8	1765	4.58	87.8	60.3	5.80	89.5	72.7	6.80	90.0	79.3		35	248	336	0.273
MLU1133	5.5	400	50	10.5	1470	7.00	90.0	62.7	8.70	91.0	75.0	10.7	90.8	81.5	IE3	102	286	376	0.375
		400	60	10	1760	5.90	91.6	73.7	7.80	92.0	82.7	10.0	91.7	86.5		89	222	325	0.274
		440	60	9.3	1770	6.00	90.7	66.0	7.60	91.8	77.4	9.50	92.0	83.0		98	269	393	0.293
MLU1135	7.5	400	50	13.5	1470	8.60	90.7	69.3	11.1	91.3	80.0	14.0	90.7	85.1	IE3	129	242	327	0.364
		400	60	13	1760	7.60	91.7	77.8	10.4	91.8	85.4	13.5	91.8	87.6		105	197	267	0.314
		440	60	12	1765	7.50	91.3	71.7	9.80	92.0	81.6	12.5	92.2	85.6		118	238	332	0.292
MLU1165	11	400	50	20	1470	11.9	92.2	72.2	15.8	92.7	81.3	20.2	92.0	85.4	IE3	190	293	347	0.445
		400	60	19.5	1765	10.7	92.6	79.9	15.0	92.9	85.8	19.6	92.4	87.6		152	207	279	0.525
		440	60	18	1775	10.5	92.5	74.4	14.0	93.3	82.9	18.0	92.8	86.6		171	262	346	0.492
MLU1167	15	400	50	27	1475	15.6	93.7	74.0	21.0	93.9	82.4	27.1	93.0	86.0	IE3	258	284	350	0.744
		400	60	26.5	1770	14.4	93.4	80.7	20.1	93.6	86.2	26.5	93.1	87.8		211	210	287	0.704
		440	60	24	1775	13.9	93.4	75.6	18.7	94.0	83.8	24.2	93.7	86.9		236	263	354	0.751
MLU1184	18.5	400	50	34	1480	20.9	94.1	68.0	27.0	94.5	78.5	34.1	93.8	83.4	IE3	274	253	317	0.879
		400	60	33	1775	18.8	94.6	74.9	25.6	94.8	82.7	33.1	93.9	85.8		224	194	259	1.085
		440	60	31	1780	18.5	94.1	69.6	24.1	94.7	79.7	30.6	94.2	84.3		251	244	319	0.916
MLU1185	22	400	50	42	1475	25.7	94.4	65.4	33.1	94.8	75.9	41.7	94.0	81.0	IE3	335	266	326	0.956
		400	60	39	1770	22.4	94.3	75.1	30.4	94.5	83.0	39.4	94.0	85.8		271	200	263	0.841
		440	60	36	1775	22.2	94.3	69.1	28.8	94.9	79.3	36.4	94.6	83.8		306	255	327	0.821
MLU1187	30	400	50	58	1475	35.4	94.4	64.9	46.0	94.7	75.3	58.0	94.1	80.0	IE3	461	280	340	1.122
		400	60	53	1770	30.1	94.7	76.1	40.9	94.8	83.7	53.2	94.2	86.7		360	209	266	1.048
		440	60	51	1775	30.8	94.6	67.6	40.1	95.1	77.4	51.0	94.7	81.5		396	253	322	1.025
MLU1206	37	400	50	69	1480	43.3	93.0	66.3	55.0	94.1	77.0	68.0	94.2	83.8	IE3	585	220	294	1.235
		400	60	67	1775	38.2	93.3	74.9	51.0	94.0	83.1	66.0	94.0	85.9		480	170	240	1.253
		440	60	62	1780	37.6	93.0	69.4	48.5	94.2	79.7	61.0	94.6	84.1		535	212	295	1.105
MLU1207	45	400	50	83	1480	52.0	94.0	66.8	66.0	94.6	77.4	82.0	94.5	84.1	IE3	690	204	290	1.797
		400	60	81	1775	45.5	93.8	76.2	62.0	94.3	83.8	80.0	94.0	86.4		560	157	229	0.957
		440	60	75	1780	44.5	93.9	70.7	58.0	94.8	80.5	73.0	95.0	84.6		630	190	277	1.017
MLU1221	55	400	50	100	1475	69.0	94.2	61.0	86.0	94.8	73.3	100	94.6	83.9	IE3	835	167	336	1.821
		400	60	94	1770	54.5	95.8	76.1	74.0	95.9	84.2	94.0	95.4	88.5		645	110	263	2.176
		440	60	88	1775	57.7	95.3	65.6	73.0	95.6	77.0	88.0	95.4	86.0		740	147	330	2.090
MLU1250	75	400	50	136	1480	86.0	94.7	66.4	111	95.4	76.7	136	95.4	83.5	IE3	1040	132	262	2.277
		400	60	129	1775	74.0	94.8	77.2	101	95.3	84.4	129	95.2	88.2		811	88	208	2.348
		440	60	121	1780	74.0	94.6	70.3	97.0	95.3	79.8	121	95.6	85.1		929	115	259	2.541
MLU1252	90	400	50	166	1480	107	95.0	63.9	136	95.4	75.1	166	95.4	82.1	IE3	1300	143	271	2.185
		400	60	155	1775	89.0	95.0	76.8	122	95.4	83.7	155	95.3	88.0		1000	93	213	2.208
		440	60	146	1780	91.0	94.8	68.4	118	95.5	78.6	146	95.7	84.6		1150	123	267	2.376
MLU1280	110	400	50	190	1485	114	95.6	72.9	152	96.0	81.6	190	95.9	87.1	IE3	1490	121	252	3.219
		400	60	186	1780	104	95.0	80.4	145	95.5	86.0	186	95.4	89.5		1190	84	203	3.307
		440	60	171	1785	102	94.9	74.5	137	95.7	82.6	171	95.9	88.1		1340	107	250	3.264
MLU1282	132	400	50	225	1485	132	95.8	75.3	178	96.2	83.5	225	96.1	88.1	IE3	1730	119	245	3.225
		400	60	221	1780	122	95.5	81.8	172	95.9	86.7	221	95.8	90.0		1390	84	199	3.355
		440	60	203	1785	118	95.4	76.9	161	96.0	84.0	203	96.2	88.7		1560	106	244	3.458
MLU1284	160	400	50	273	1480	161	95.8	74.9	217	96.2	83.0	273	96.1	88.0	IE3	2170	124	261	3.549
		400	60	267	1780	149	95.5	81.1	208	95.9	86.8	267	95.8	90.3		1750	88	211	3.942
		440	60	246	1780	144	95.5	76.4	195	96.1	84.0	246	96.2	88.7		1960	111	259	4.205
MLU1286	200	400	50	342	1480	204	95.9	73.8	273	96.3	82.4	342	96.1	87.8	IE3	2810	136	268	3.573
		400	60	332	1780	185	95.7	81.6	259	96.0	87.1	332	95.8	90.8		2230	94	214	4.000
		440	60	307	1780	180	95.6	76.2	244	96.2	83.8	307	96.3	88.8		2520	120	265	4.521
MLU1314	220	400	50	376	1480	230	95.8	72.1	305	96.3	81.1	376	96.2	87.8	IE3	3140	136	275	3.944
		400	60	365	1780	209	95.7	79.4	289	96.2	85.7	365	96.0	90.6		2530	96	221	4.732
		440	60	338	1780	204	95.6	74.0	273	96.3	82.3	338	96.3	88.7		2830	121	272	4.894
MLU1316	300	400	50	429	1480	262	95.9	71.8	348	96.4	80.7	429	96.2	87.4	IE3	3380	129	259	4.204
		400	60	414	1780	235	95.9	80.0	327	96.3	86.0	414	96.1	90.7		3020	88	206	5.314
		440	60	384	1780	230	95.8	74.4	309	96.4	82.6	384	96.4	88.6		3020	112	255	5.814
MLU1350	315	400	50	509	1480	304	96.2	74.0	409	96.4	82.4	509	96.2	88.5	IE3	3700	119	237	4.554
		400	60	495	1775	275	96.1	81.9	388	96.3	86.9	495	96.1	91.1		3290	80	188	5.825
		440	60	456	1780	267	96.1	76.7	364	96.5	84.0	456	96.4	89.5		3300	103	232	6.650
MLU1352	355	400	50	531	1485	316	95.8	75.1	426	96.3	83.1	531	96.2	89.0	IE3	4010	100	248	4.271
		400	60	517	1780	288	95.8	82.4	406	96.3	87.2	517	96.2	91.4		3190	69	198	5.848
		440	60	476	1785	278	95.8	77.6	380	96.4	84.6	476	96.4	90.1		3580	87	243	5.956
MLU1352	375	400	50	596	1485	351	95.8	76.2	476	96.4	83.8	596	96.2	89.3	IE3	4660	108	254	4.035
		400	60	579	1780	322													

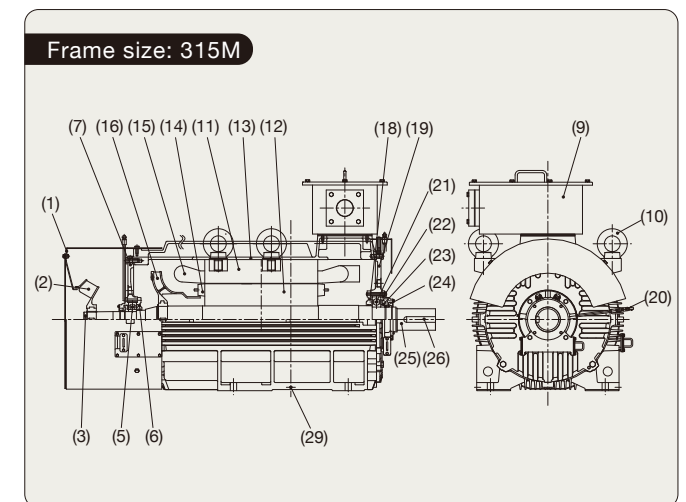
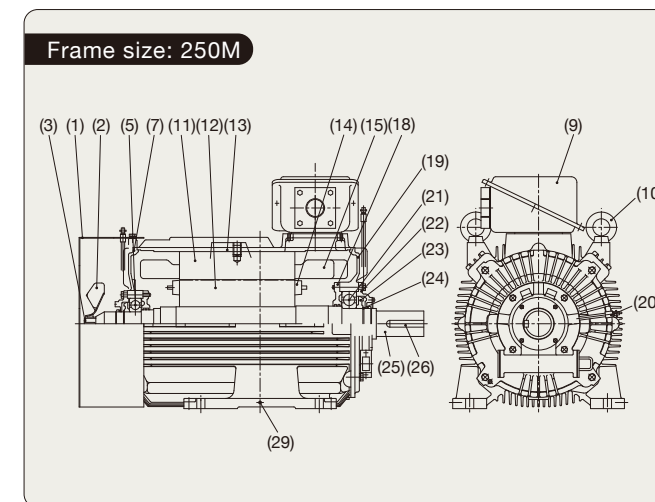
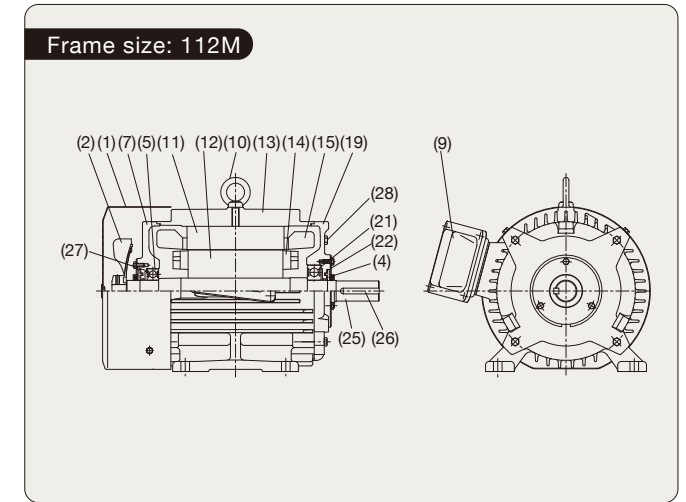
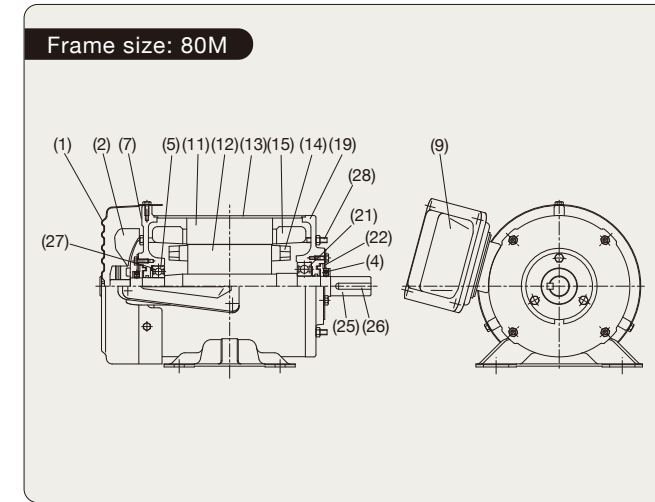
# TYPICAL STRUCTURAL DRAWINGS (LEG MOUNTING TYPE)

## Totally-enclosed fan-cooled type (indoor)



No.	Part name	No.	Part name
(1)	Fan cover	(16)	Internal fan
(2)	External fan	(17)	Air guide
(3)	C-shaped retaining ring for securing external fan	(18)	Inner end cover on operation side
(4)	—	(19)	Bracket on operation side
(5)	Bearing opposite operation side	(20)	Grease inlet
(6)	Inner end cover opposite operation side	(21)	Bearing on operation side
(7)	Bracket opposite operation side	(22)	Outer end cover on operation side
(8)	Lead wire	(23)	Rotating disk
(9)	Terminal box	(24)	C-shaped retaining ring for shaft
(10)	Hanger bolt	(25)	Shaft
(11)	Stator iron core	(26)	Shaft end key
(12)	Rotor iron core	(27)	Wave washer
(13)	Stator frame	(28)	Tightening bolt
(14)	Rotor conductor	(29)	Grounding screw
(15)	Stator winding		

## Totally-enclosed fan-cooled type (outdoor)



No.	Part name	No.	Part name
(1)	Fan cover	(16)	Internal fan
(2)	External fan	(17)	Air guide
(3)	C-shaped retaining ring for securing external fan	(18)	Inner end cover on operation side
(4)	Watertight collar	(19)	Bracket on operation side
(5)	Bearing opposite operation side	(20)	Grease inlet
(6)	Inner end cover opposite operation side	(21)	Bearing on operation side
(7)	Bracket opposite operation side	(22)	Outer end cover on operation side
(8)	Lead wire	(23)	Rotating disk
(9)	Terminal box	(24)	C-shaped retaining ring for shaft
(10)	Hanger bolt	(25)	Shaft
(11)	Stator iron core	(26)	Shaft end key
(12)	Rotor iron core	(27)	Wave washer
(13)	Stator frame	(28)	Tightening bolt
(14)	Rotor conductor	(29)	Grounding screw
(15)	Stator winding		

# MOMENT OF INERTIA (SI UNIT)

## Premium efficiency

[Unit: kg·m²]

Output [kW]	Rotor moment of inertia	2P			Rotor moment of inertia	4P			Rotor moment of inertia	6P		
		Allowable load moment of inertia				Allowable load moment of inertia				Allowable load moment of inertia		
		200 V, 400 V	220 V, 440 V	60 Hz		200 V, 400 V	220 V, 440 V	60 Hz		200 V, 400 V	220 V, 440 V	60 Hz
0.75	0.0019	0.30	0.20	0.21	0.0039	2.7	1.8	1.9	0.010	4.3	2.9	3.0
1.5	0.0033	0.57	0.39	0.40	0.0104	2.8	1.9	2.0	0.016	13	8.4	9.0
2.2	0.0039	0.63	0.43	0.46	0.0142	4.0	2.8	2.9	0.029	14	10	10
3.7	0.0121	1.1	0.75	0.77	0.0230	4.0	2.7	2.9	0.047	19	13	14
5.5	0.0213	1.7	1.2	1.2	0.042	6.4	4.5	4.7	0.073	22	16	16
7.5	0.0272	2.0	1.4	1.4	0.055	8.1	5.7	5.9	0.15	35	25	26
11	0.067	4.0	2.7	2.9	0.12	17	12	13	0.21	45	33	34
15	0.10	4.9	3.5	3.6	0.17	23	16	17	0.32	82	56	59
18.5	0.12	5.6	3.9	4.0	0.24	38	27	28	0.40	98	68	71
22	0.14	8.6	6.0	6.2	0.27	42	30	31	0.45	110	88	92
30	0.17	11	7.7	8.0	0.33	50	35	36	0.79	107	74	78
37	0.42	15	10	11	0.62	61	43	45	0.79	114	78	79
45	0.45	16	11	11	0.66	67	46	48	1.1	195	124	133
55	0.48	14	9.3	10	0.68	75	48	51	1.1	255	164	178
75	0.53	24	15	16	0.85	100	63	68	1.3	246	163	179
90	0.58	25	16	18	0.92	109	69	74	3.1	343	223	246
110	0.84	34	22	23	1.7	148	93	100	3.7	433	281	314
132	0.89	37	23	25	2.0	173	108	118	4.1	449	286	324
160	1.3	46	29	31	2.4	170	108	116	4.5	505	321	363
200	1.5	50	32	34	2.6	185	116	125	-	-	-	-

Conditions: full voltage starting, starting load torque of 100% with square reduction characteristic, started in cold condition twice and hot condition once

## Standard efficiency

[Unit: kg·m²]

Output [kW]	Rotor moment of inertia	2P			Rotor moment of inertia	4P			Rotor moment of inertia	6P		
		Allowable load moment of inertia				Allowable load moment of inertia				Allowable load moment of inertia		
		200 V, 400 V	220 V, 440 V	60 Hz		200 V, 400 V	220 V, 440 V	60 Hz		200 V, 400 V	220 V, 440 V	60 Hz
0.1	-	-	-	-	0.00088	0.50	0.35	0.35	-	-	-	-
0.2	0.00035	0.20	0.14	0.14	0.00088	0.90	0.55	0.57	0.0019	2.1	1.4	1.5
0.4	0.00053	0.25	0.17	0.18	0.0014	1.2	0.87	0.90	0.0025	4.5	3.0	3.2

Conditions: full voltage starting, starting load torque of 100% with square reduction characteristic, started in cold condition twice and hot condition once

# FLYWHEEL EFFECT (GD<sup>2</sup>) \*For calculation with the "conventional" flywheel effect\* (GD<sup>2</sup>), see the table below.

## Premium efficiency

[Unit: kg·m²]

Output [kW]	Motor rotor GD <sup>2</sup>	2P			Motor rotor GD <sup>2</sup>	4P			Motor rotor GD <sup>2</sup>	6P		
		Allowable load: GD <sup>2</sup>				Allowable load: GD <sup>2</sup>				Allowable load: GD <sup>2</sup>		
		200 V, 400 V	220 V, 440 V	60 Hz		200 V, 400 V	220 V, 440 V	60 Hz		200 V, 400 V	220 V, 440 V	60 Hz
0.75	0.0074	1.2	0.80	0.85	0.0157	11	7.3	7.6	0.039	17	11	12
1.5	0.0130	2.3	1.5	1.6	0.0417	11	7.6	8.0	0.064	50	34	36
2.2	0.0155	2.5	1.7	1.8	0.0569	16	11	12	0.12	57	40	42
3.7	0.0484	4.3	3.0	3.1	0.0919	16	11	11	0.19	74	52	54
5.5	0.0850	6.8	4.8	4.9	0.17	26	18	19	0.29	88	62	64
7.5	0.1090	7.9	5.4	5.8	0.22	32	23	24	0.59	138	100	104
11	0.27	16	11	11	0.46	70	49	51	0.84	180	130	135
15	0.40	20	14	14	0.66	90	64	66	1.3	326	226	237
18.5	0.47	22	16	16	0.97	152	107	112	1.6	392	272	285
22	0.58	34	24	25	1.1	168	119	124	1.8	440	352	369
30	0.69	44	31	32	1.3	198	141	146	3.2	429	294	312
37	1.7	59	40	42	2.5	245	170	178	3.2	455	311	314
45	1.8	64	43	45	2.6	268	184	193	4.2	780	495	530
55	1.9	56	37	40	2.7	300	190	205	4.5	1020	655	710
75	2.1	94	60	65	3.4	400	250	272	5.1	985	650	715
90	2.3	101	65	70	3.7	435	274	295	12	1370	890	985
110	3.4	136	86	92	6.7	590	370	400	15	1730	1125	1255
132	3.6	148	93	100	8.1	690	432	470	16	1795	1145	1295
160	5.3	184	116	124	9.8	680	430	465	18	2020	1285	1450
200	5.8	200	126	135	10	740	465	500	-	-	-	-

Conditions: full voltage starting, starting load torque of 100% with square reduction characteristic, started in cold condition twice and hot condition once

## Standard efficiency

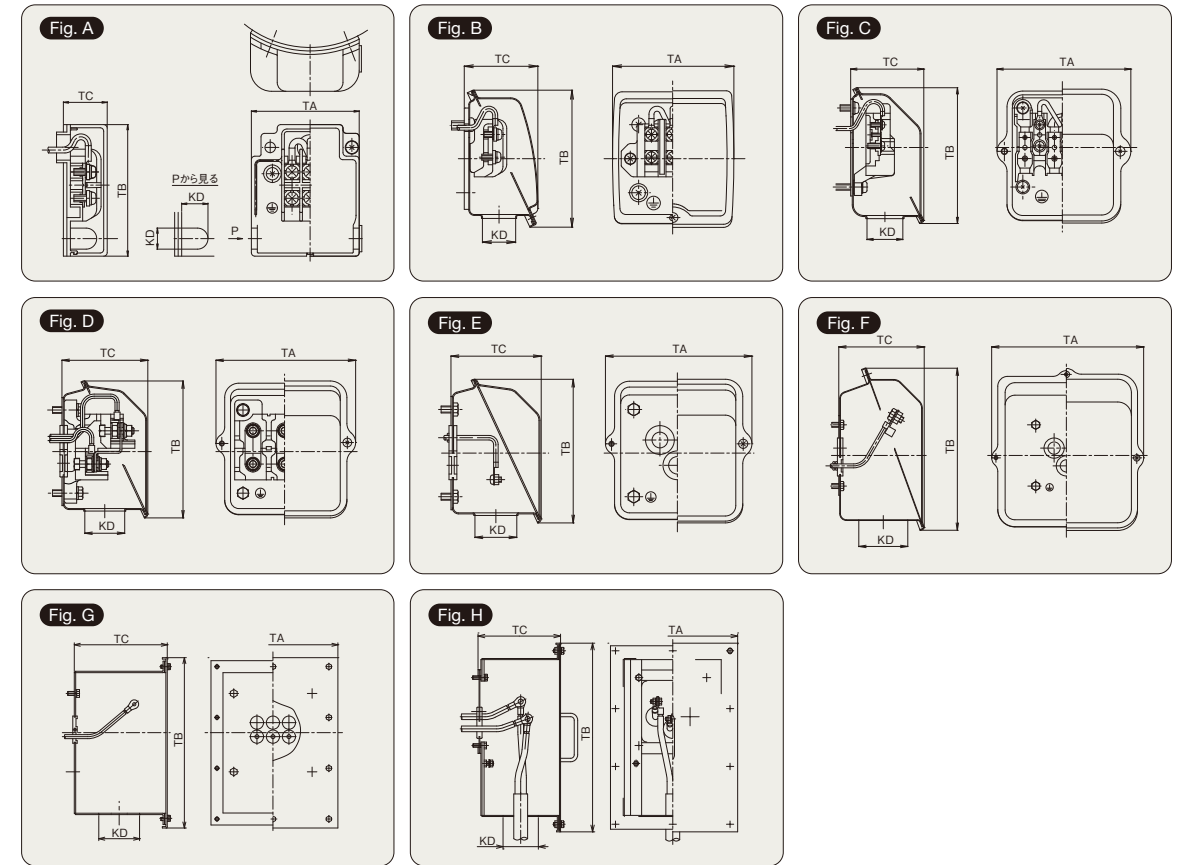
[Unit: kg·m²]

Output [kW]	Motor rotor GD <sup>2</sup>	2P			Motor rotor GD <sup>2</sup>	4P			Motor rotor GD <sup>2</sup>	6P		
		Allowable load: GD <sup>2</sup>				Allowable load: GD <sup>2</sup>				Allowable load: GD <sup>2</sup>		
		200 V, 400 V	220 V, 440 V	60 Hz		200 V, 400 V	220 V, 440 V	60 Hz		200 V, 400 V	220 V, 440 V	60 Hz
0.1	-	-	-	-	0.0035	2.0	1.4	1.4	-	-	-	-
0.2	0.0014	0.82	0.56	0.57	0.0035	3.6	2.2	2.3	0.0074	8.6	5.8	6.2
0.4	0.0021	1.0	0.71	0.75	0.0056	5.0	3.5	3.6	0.010	18	12	13

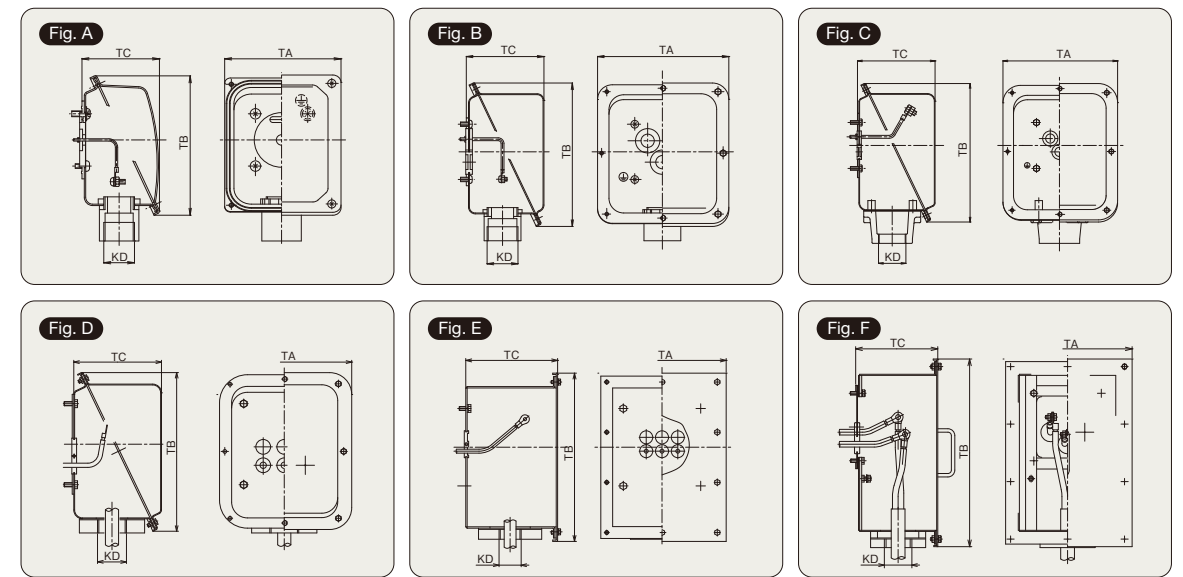
Conditions: full voltage starting, starting load torque of 100% with square reduction characteristic, started in cold condition twice and hot condition once

# STANDARD PRODUCT TERMINAL BOX AND DIMENSIONS

## Totally-enclosed fan-cooled type (indoor)



## Totally-enclosed fan-cooled type (outdoor)



### [Indoor dimensions]

[Unit: mm]

Applicable frame size	Drawing No.	Major dimensions			
		TA	TB	TC	KD
63M-71M	A	61.5	75	25	12×15
80M-90L	B	81	91	49	22
100L-112M		91	107	60	27
132S-132M	C	130	129	69.5	34
160M-160L	D	171	165	103.5	48
180M					60
180L	E	375	545	238.5	80
200L to 250M					253
280S to 280L	G	325	426	230	80
315L	H	375	545	238.5	*1
355K					655

Note) Please contact us for \*1 above for each case.

### [Outdoor dimensions]

[Unit: mm]

Applicable frame size	Drawing No.	Major dimensions			
		TA	TB	TC	KD
80M-90L	A	103	120	67	G3/4
100L-112M					G1
132S-132M					G1 1/4
160M to 180M	B	181	195	106	G1 1/2
180L					G2
200L	C	254	302	169	G2 1/2
225S to 250M					
280S to 280L	D	325	426	230	
315L	E	375	545	238.5	*1
355K					

Note) Please contact us for \*1 above for each case.



# MOTOR STANDARD CONNECTIONS

Voltage	Single voltage		200-400 V (1:2 voltage)				
Motor output	3.7 kW or smaller	5.5 kW or larger	3.7 kW or smaller		5.5 kW or larger		
No. of lead wires	3	6	9		12		
Connection method		Direct-on-line starting	200 V		Direct-on-line starting		
			3.7 kW or smaller (Except for 3.7 kW-6P)	3.7 kW-6P	200V	400V	
	Star-delta starting	400V		Star-delta starting			
			200V	400V			

Note) Products of frame sizes 132S to 160L are factory-connected for direct-on-line starting.  
 To enable star-delta starting for frame sizes 132S and M, change the connections (star-delta starting is not available for 3.7 kW 6P).  
 To enable star-delta starting for the terminal strip system of frame sizes 160M and L, remove the shoring bar.  
 These connection diagrams are examples. For wiring, use the connection diagram pasted on the product.

# MOTOR WIRING AND GROUNDING

- For motor wiring, use high-grade wiring materials and follow the Electrical Equipment Technical Standards, Interior Wiring Code and rules of the respective utility companies.
- Longer wiring distances cause larger voltage drops, leading to motor accidents. Ensure that the voltage drop does not exceed 2% of the standard voltage.
- Be sure to provide grounding wiring. Grounding terminals are in the terminal box or at the bottom of the frame.

Note) Wiring distance calculation (3-phase 3-wire)

$$L = \frac{1000 \times A \times e}{30.8 \times I}$$

L: Wiring distance (m)  
 A: Cross-sectional area of one wire (mm<sup>2</sup>)  
 e: Voltage drop between respective wires (V)  
 I: Current (A)

## •Wiring thickness (reference)

Output [kW]	Voltage [V]	Minimum wiring thickness (copper wires)		Minimum ground plane thickness (copper wires)
		Direct-on-line starting	λ-Δ starting	
0.2	200	1.6 mm (2.0 mm <sup>2</sup> )	-	1.6 mm (2.0 mm <sup>2</sup> )
0.4	200	1.6 mm (2.0 mm <sup>2</sup> )	-	1.6 mm (2.0 mm <sup>2</sup> )
0.75	200	1.6 mm (2.0 mm <sup>2</sup> )	-	1.6 mm (2.0 mm <sup>2</sup> )
1.5	200	1.6 mm (2.0 mm <sup>2</sup> )	-	1.6 mm (2.0 mm <sup>2</sup> )
2.2	200	1.6 mm (2.0 mm <sup>2</sup> )	-	1.6 mm (2.0 mm <sup>2</sup> )
3.7	200	2.0 mm (3.5 mm <sup>2</sup> )	-	2.0 mm (3.5 mm <sup>2</sup> )
5.5	200	2.6 mm (5.5 mm <sup>2</sup> )	2.0 mm (3.5 mm <sup>2</sup> )	2.6 mm (5.5 mm <sup>2</sup> )
7.5	200	3.2 mm (8.0 mm <sup>2</sup> )	2.6 mm (5.5 mm <sup>2</sup> )	2.6 mm (5.5 mm <sup>2</sup> )
11	200	14 mm <sup>2</sup>	3.2 mm (8.0 mm <sup>2</sup> )	3.2 mm (8.0 mm <sup>2</sup> )
15	200	22 mm <sup>2</sup>	14 mm <sup>2</sup>	3.2 mm (8.0 mm <sup>2</sup> )
18.5	200	38 mm <sup>2</sup>	22 mm <sup>2</sup>	3.2 mm (8.0 mm <sup>2</sup> )
22	200	38 mm <sup>2</sup>	22 mm <sup>2</sup>	3.2 mm (8.0 mm <sup>2</sup> )
30	200	60 mm <sup>2</sup>	38 mm <sup>2</sup>	14 mm <sup>2</sup>
37	200	100 mm <sup>2</sup>	60 mm <sup>2</sup>	22 mm <sup>2</sup>
45	200	100 mm <sup>2</sup>	60 mm <sup>2</sup>	38 mm <sup>2</sup>
55	200	125 mm <sup>2</sup>	100 mm <sup>2</sup>	38 mm <sup>2</sup>
75	400	80 mm <sup>2</sup>	38 mm <sup>2</sup>	38 mm <sup>2</sup>
90	400	100 mm <sup>2</sup>	60 mm <sup>2</sup>	38 mm <sup>2</sup>
110	400	125 mm <sup>2</sup>	80 mm <sup>2</sup>	38 mm <sup>2</sup>
132	400	150 mm <sup>2</sup>	100 mm <sup>2</sup>	38 mm <sup>2</sup>
160	400	200 mm <sup>2</sup>	125 mm <sup>2</sup>	38 mm <sup>2</sup>
200	400	250 mm <sup>2</sup>	150 mm <sup>2</sup>	38 mm <sup>2</sup>

Note 1) Thicknesses shown in parentheses are when twisted wires are used.  
 Note 2) For λ-Δ starting, the thicknesses are for wiring between the λ-Δ starter and motor.  
 Note 3) The minimum wiring thicknesses are given for metal conduit wiring.

# INVERTER DRIVING OF PREMIUM EFFICIENCY MOTORS

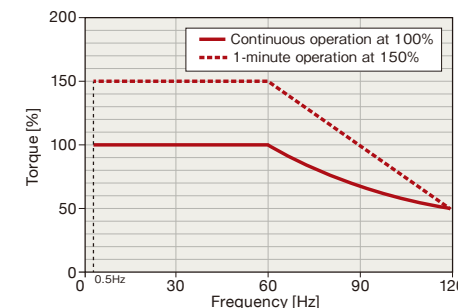
## Consider the following points for speed control by using an inverter to drive a premium efficiency motor.

- Increase of the generated loss and starting characteristics
- Decrease of the cooling capacity in a low-speed region
- Bearing service life and mechanical strength in a high-speed region of 60 Hz or higher
- Generation of surge voltage

## 1. Allowable torque characteristics

The output voltage of an inverter contains a harmonic component. This causes a higher generated loss of the motor than when it is driven by a sine wave as in a commercial power supply, leading to a temperature rise of the motor. Meanwhile, the motor is cooled by its own fan mounted on the shaft. However, the air volume of the fan decreases when the rotational speed is reduced, which causes a decrease in the cooling capacity of the motor. Accordingly, pay attention to the motor temperature when using the product at a low rotational speed.

Fig. 1 Representative 4P models (frame size 132M or smaller)



- 2P (frame size 200L or smaller)  
Constant torque characteristic: 3 to 60 Hz Constant output characteristic: 60 to 90 Hz
- 4P (frame size 160M to 200L)  
Constant torque characteristic: 0.5 to 60 Hz Constant output characteristic: 60 to 90 Hz
- 6P (frame size 200L or smaller)  
Constant torque characteristic: 0.5 to 60 Hz Constant output characteristic: 60 to 90 Hz

Note 1) The torque characteristics shown above are available in vector control operation of Fuji inverters.  
 Note 2) 100% torque is the allowable torque [N·m] of each output at 60 Hz.  
 Note 3) 1-minute operation at 150% torque is allowed in the range of constant torque characteristic.

## 2. Starting characteristics

Unlike when using a commercial power supply, inverter driving is restricted by the inverter current. Generally, the starting torque is lower than when driven by a commercial power supply. This torque can be increased to some extent by adjusting the amount of torque boost in the V/F pattern. When an even higher starting torque is required, it is necessary to increase the capacity of the inverter and motor.

## 3. Noise

- Generally, inverter driving involves higher electromagnetic noise than when using a commercial power supply because of the effect of the inverter. When used at a frequency higher than the commercial frequency, the ventilation sound increases as the rotational speed increases.
- Please contact us for details of noise reduction measures, which include use of a low-noise inverter and provision of a noise-reduction reactor between the inverter and the motor.

## 4. Vibration

- When the operation frequency for inverter driving is different from the commercial power frequency, resonance with the enclosure is generated at a certain rotational speed band, and this may result in a larger vibration. If this happens, measures such as improving the foundation of the motor installation or of the coupling may be required.
- When used at a frequency higher than the commercial power frequency, vibration increases as the speed increases.

## 5. High-speed operation

When a motor is driven in a high-speed region of over 60 Hz, the bearing service life may be reduced for reasons such as increased vibration, which limits the maximum speed. In addition, noise, strength, service life, etc. may pose problems with power transmission mechanisms such as the coupling, belt, chain and gear. Please contact their respective manufacturers for details.

## 6. Surge voltage

When a 400-V-class motor is driven by a PWM inverter that uses a high-speed switching device such as an IGBT, surge voltage may be generated depending on the power voltage, cable length and installation condition. This surge voltage may cause the motor insulation to deteriorate. The maximum value for the motor terminal voltage is 1300 V line voltage. If a surge voltage exceeding this value is generated, reduce the surge voltage by fitting an AC reactor, surge suppression filter, etc. on the inverter output side.

## 7. Electrolytic corrosion of bearings

When an inverter is used to drive the motor, electrolytic corrosion may be developed on rare occasions depending on the bearing grease, wiring, load and operation conditions. If any measure to deal with electrolytic corrosion is required, please consult us in advance.

[Reference] JEM-TR 169  
 "Supplement to the application guide for low-voltage three-phase squirrel-cage induction motors for general purposes driven by inverters"

To achieve an energy-saving effect by improving the efficiency, which is the biggest feature of premium efficiency motors, it is necessary to study products from various perspectives including their selection, operation and maintenance.

- Motor characteristics (starting current, rotational speed, load factor)
- Motor installation environment (dimensions, mount)
- Peripheral devices (magnetic switch, thermal overload relay)

**1. Starting current**

Losses of various parts have been reduced as much as possible in order to improve the motor efficiency. For that purpose, the resistance of various parts (winding, rotor) has been reduced, which makes the starting current inclined to be higher than that of conventional standard efficiency motors.

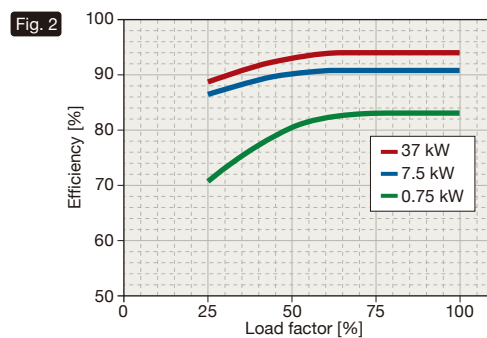
**2. Rotational speed**

The generated loss of the motor is reduced as compared with conventional standard efficiency motors and the rotational speed is inclined to be slightly higher (slip is inclined to be smaller). For square reduction loads such as pumps and fans, attention must be paid because the power requirement may be increased in proportion to the increase of the rotational speed, leading to increased power consumption.

(\*Square reduction load: load that varies in proportion to the square of the rotational speed)

**3. Load factor and efficiency**

As shown in Fig. 2, motor efficiency reaches its maximum at a load factor of approximately 75 to 100% The energy-saving effect can be maximized by selecting so that the motor load factor is between 75 and 100%. If the load factor is extremely low, the motor capacity must be reconsidered. If there is any load variation or rotational speed variation, you are recommended to fit an inverter for optimized control according to the rotational speed and load.



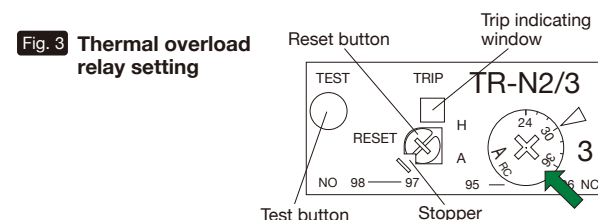
Note) Generally, a larger motor capacity offers higher motor efficiency.

**4. Motor peripheral devices**

1) Arranging the peripheral devices may require reconsideration due to an increase of the magnetic switch, starter or motor starting current. When using devices from other manufacturers for replacement, please contact the respective manufacturers.

**2) Thermal overload relay**

As with Item 1, the setting of the thermal overload relay shown in Fig. 3 may require reconsideration due to an increase of the starting current.



**5. Other**

**1) Motor mounting dimensions**

The installation dimensions are the same as those of standard efficiency motors, except for some models whose motors have a longer entire length, entire width, etc. If the installation dimensions are very small, check the dimensions of the individual motors.

**2) Motor mass**

To improve efficiency, premium efficiency motors are inclined to be heavier than conventional standard efficiency motors. In particular, when using a motor installed on a moving object or with a mount that is not robust, take appropriate measures separately.

**3) Notes on use**

The descriptions in this catalog are intended to help the user select a model. In actual use, please read the "Instruction Manual" that comes with the motor carefully to ensure correct use.

**4) Star-delta starting**

For star-delta starting, use a model with a magnetic switch (3-contact type) on the primary side.

**5) Outdoor type structure**

The outdoor horizontal and vertical types have different waterproof structures. Please order a type that is appropriate for the mounting method. For use in an environment subject to explosive gas or dust, choose an explosion-proof type.

**1. To place an order, please provide the following information.**

For motors of other than the Fuji standard types, you will need to provide details of your requirements.

- (1) Application: name of the machine to be connected
- (2) Output:
- (3) Time rating: continuous, short-time, intermittent-service, etc.
- (4) Voltage:
- (5) Frequency:
- (6) No. of poles: load characteristics for pole change (square reduction torque, constant torque, constant output)
- (7) Rotational speed (synchronous speed):
- (8) Protection rating and Fuji's type:
- (9) Mounting method, terminal box position, shaft end
- (10) Applicable standards:
- (11) Installation location: indoor or outdoor
- (12) Environment (location) of use: presence of water, oil, chemical, dust, etc. and their degrees
- (13) Ambient temperature and altitude
- (14) Insulation class and maximum allowable temperature
- (15) Starting method: For anything other than full-voltage starting, the starting method and frequency (no. of switchings SW/h) (duty cycle %), moment of inertia (converted to motor shaft) of the machine to be connected and braking method
- (16) Connection with load: belt, gear connection, direct coupling
- (17) Direction of rotation: standard direction is counterclockwise as seen from operation side
- (18) Specification of terminal symbols, no. of terminals, terminal box structure, etc.
- (19) Accessories such as slide base, rail and pulley
- (20) Coating: Specification of coating color and material
- (21) Other: characteristics, noise, vibration, accuracy, nameplate indication (English, Japanese, etc.)


**2. When using the product for any of the following applications, please contact us in advance.**

- (1) Use on vital equipment<sup>\*1</sup> or equipment that may affect human safety and have a serious impact on the maintenance of public functions<sup>\*2</sup> requires special consideration.<sup>\*3</sup> Be sure to contact us in advance. Using the product without giving special consideration may lead to serious accidents.
- (2) Notify us in advance when using the product for clean rooms, food processing machines, etc. Use of a standard product as it is without subjecting it to special treatment may result in a leakage of grease or oil through the joint between a bearing shield and frame or shaft penetration. Special consideration is required for use in an environment where oil should be avoided.
- (3) Bearings are not subjected to treatment against electrolytic corrosion. If directly connected with the load, electrolytic corrosion may occur due to the shaft voltage. For use in applications that may involve electrolytic corrosion, measures such as use of isolation coupling are required.

\*1: Operating room devices, life-support systems (artificial dialysis, incubators, etc.), toxic and other gas and smoke extraction systems, equipment made compulsory by various laws and regulations such as the Fire Service Act and Building Standards Act, various safety systems and other equivalent systems

\*2: Systems for air, train, maritime and other traffic control and equipment to control such systems, systems for controlling nuclear power stations, communication control equipment and other equivalent systems

\*3: Have adequate discussions with device designers on the installation, operation and management of the product and construction in advance with regards to a backup system available for use in the event of product failure

 Notes on safety

[1] The descriptions in this catalog are intended for assisting with model selection. Before actual use, read the "Instruction Manual" carefully to ensure correct use.

[2] These products are not designed or manufactured for use in vital devices or systems.

When considering products mentioned in this material for special applications such as nuclear power control, aerospace, medical care or traffic devices or systems for these purposes, inquire our sales representative. For use in any equipment where failure of the products may lead to life-threatening consequences or serious damage, be sure to provide a safety system.

 Notes on adoption of premium efficiency motors

Premium efficiency motors feature lower generated loss and generally have slightly higher rotational speeds than standard efficiency motors. If the load is a pump or blower and a standard efficiency motor is replaced with a premium efficiency motor, the rotational speed is increased, resulting in increased motor output. Despite the high motor efficiency, increased output may cause increased power consumption. The resistance (primary and secondary) has been lowered for reducing copper loss and the starting current is inclined to increase, which may require changing of the breaker.