Table of Contents

60Hz

1. Mechanical Seals, Lubrication & Bearings

2. Motor Protection

3. Cable Specifications

4. Motor Data for Model DKE

Mechanical Seals, Lubrication & Bearings 60Hz

■ **Applicable Models – DKE**

Output	Mechanical		Bearings	
kW	Seal Type	Lubricant oil	Bottom	Top
1.5	A-25	Turbine Oil SAE 10W (Turbine Oil 32)	6306ZZ	6204ZZ
2.2	A-30		6307ZZ	6205ZZ
3.7			6308ZZ	6205ZZ
5.5	P-40A		6309ZZ	6306ZZ
7.5			6309ZZ	6306ZZ
11			6313ZZ	6308ZZ
15	P-45A		6315ZZ	6308ZZ
18.5			6315ZZ	6309ZZ
22			6315ZZ	6309ZZ
30			6314ZZDR	6309ZZ
37	A-60		6315ZZDR	6310ZZ
45			6315ZZDR	6310ZZ

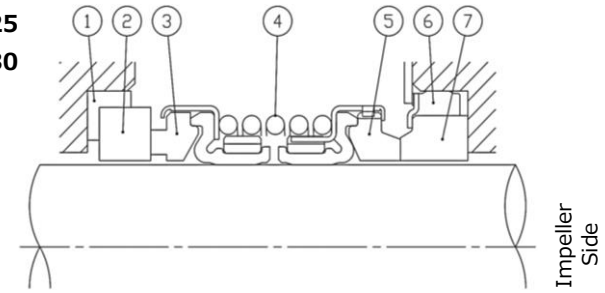
■ **Applicable Models – DKE－IE3**

Output	Mechanical		Bearings	
kW	Seal Type	Lubricant oil	Bottom	Top
1.5	A-25	Turbine Oil SAE 10W (Turbine Oil 32)	6306ZZ	6204ZZ
2.2	A-30		6307ZZ	6205ZZ
3.7			5307ZZ	6205ZZ
5.5	EAN-40		5309ZZ	6306ZZ
7.5			5309ZZ	6306ZZ
11	EAN-45		6310ZZDR	6308ZZ
15			6310ZZDR	6308ZZ
18.5			6312ZZDR	6309ZZ
22			6312ZZDR	6309ZZ
30	A-60		6314ZZDR	6309ZZ
37			6315ZZDR	6310ZZ
45			6315ZZDR	6310ZZ

Mechanical Seal

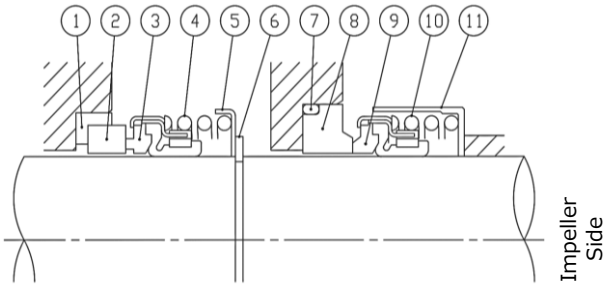
No.	Part Name	Material	No.per Set
1	Cup Gasket	N.B.Rubber	1
2	Mating Ring	Ceramic	1
3	Seal Ring	Carbon Graphite	1
4	Spring	304 SS	1
5	Seal Ring	Silicon Carbide	1
6	Mating Ring	Silicon Carbide	1
7	Cup Gasket	N.B.Rubber	1

Type
A-25
A-30



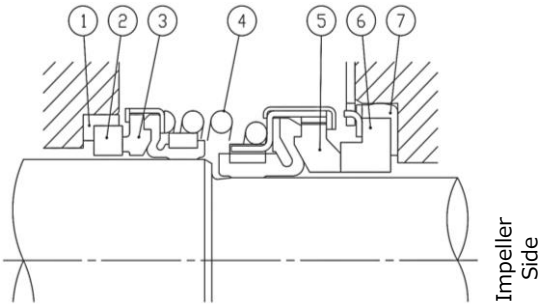
No.	Part Name	Material	No.per Set
1	Cup Gasket	N.B.Rubber	1
2	Mating Ring	Ceramic	1
3	Seal Ring	Carbon Graphite	1
4	Coll Spring	304 SS	1
5	Spring Holder	304 SS	1
6	Snap Ring	Spring Steel	1
7	O-ring	N.B.Rubber	1
8	Mating Ring	Silicon Carbide	1
9	Seal Ring	Silicon Carbide	1
10	Coll Spring	304 SS	1
11	Spring Holder	304 SS	1

Type
P-40A
P-45A
A-60



No.	Part Name	Material	No.per Set
1	Cup Gasket	N.B.Rubber	1
2	Mating Ring	Ceramic	1
3	Seal Ring	Carbon Graphite	1
4	Spring	304 SS	1
5	Seal Ring	Silicon Carbide	1
6	Mating Ring	Silicon Carbide	1
7	Cup Gasket	N.B.Rubber	1

Type
EAN-40
EAN-45



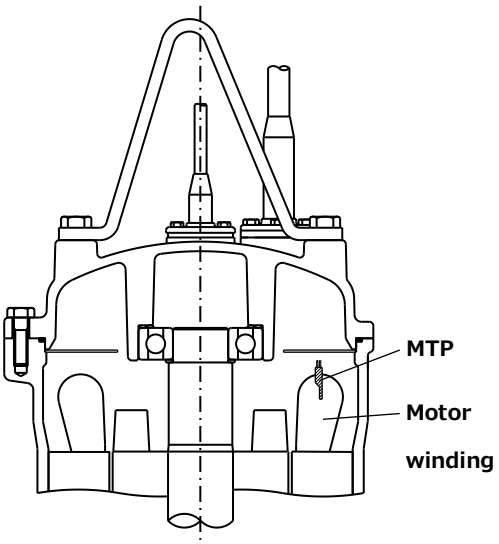
(A-1) Miniature Thermal Protector

A Miniature Thermal Protector (MTP) is embedded in each winding of the motor as illustrated below, and provides automatic cut off with manual reset. When the temperature of the windings increases and reaches the MTP acting point, an external motor protection circuit (not supplied) is activated.

P1 & P2 (wiring in Blue and Brown), in normally closed contact type, once temperature high, the contact will open, and thus circuit not complete leading to trip and pump stop.

1. Applicable model

Motor Model ZDKE3 1.5～45kW
ZDKE 11～45kW
ZDKESD 3.7～7.5kW



2. Specifications

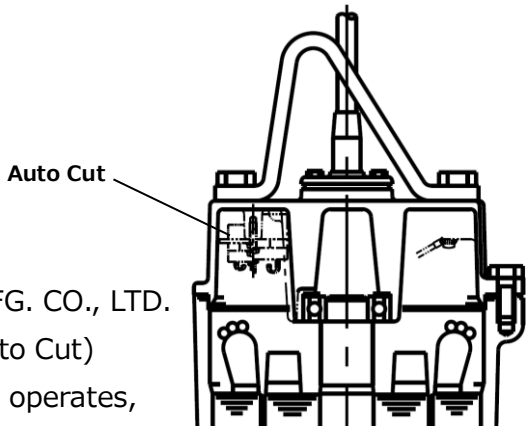
Type of contact	: b (Normally-Closed)
Acting temperature	: 150±5 ℃
Re-setting temperature	: Approx. 100 ℃
Contact rating(Max.)	: AC 115V-18A
	AC 230V-13A

(A-2) Automatic Reset Type Thermal Protector

A automatic reset type thermal protector (Auto Cut) is built-in motor inside as illustrated below. Auto Cut is connected in series to motor circuit, when the temperature of the windings increase, the Auto Cut detects it and cuts off the motor circuit directly, the pump operation is stopped. The winding temperature cools down, the Auto Cut will reset automatically and the pump operation restarts.

1. Applicable model

Motor Model ZDKE 1.5～7.5kW



2. Specifications

(1) Manufacturer : YAMADA ELECTRIC MFG. CO., LTD.
(2) Name of product article : Thermal protector (Auto Cut)
(3) Contact type : Normally Close. When operates, becomes open.

(B) Leakage detector

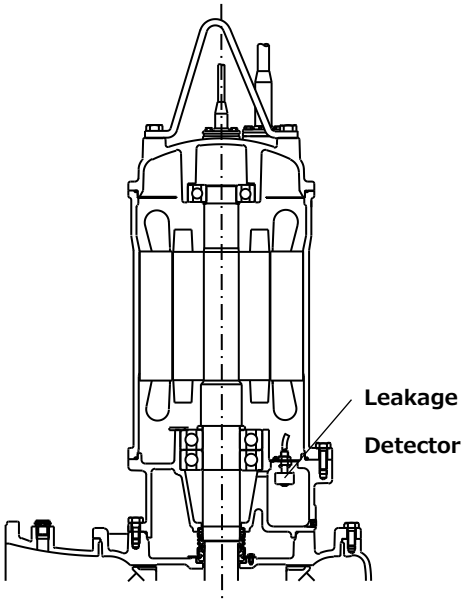
A built-in float type leakage detector with an encapsulated dry reed switch within the stem is fitted to sense leaking of pumping water and/or seal oil into the motor as a result of failure of the mechanical seal.

1. Applicable model

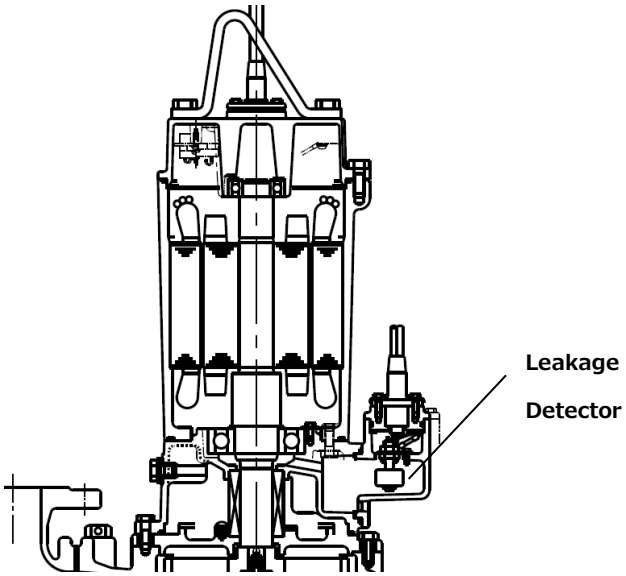
Motor Model ZDKE3 with Leakage Detector (Option)
ZDKE with Leakage Detector (Option)
ZDKESD with Leakage Detector (Option)

2. Specifications

Type of contact	: b (Normally-Closed)
Breaking capacity	: AC 50VA / DC 50W
Max. breaking current	: AC 0.5A / DC 0.5A
Max. operating voltage	: AC 300V / DC 300V



ZDKE3

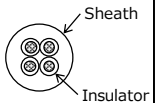


ZDKE, ZDKESD

Cable Specifications 60Hz

■ Applicable Motor Models - ZDKE3, ZDKE, ZDKESD

Motor		Applicable Motor Models	Starting method	Length of cable	Power Cable Type	Number & size of conductor(s)	
						Power Cable(s)	Protector Cable
	kW						Thermal protector & Leakage detector
Three Phase	1.5	ZDKE3	DOL	10 m	H07RN-F	4c x 1.5mm^2	Standard model 2c x 1mm^2 for Thermal protector Option model (with Leakage detector) 4c x 1mm2 for Thermal protector & Leakage detector
	2.2		DOL	10 m	H07RN-F	4c x 1.5mm^2	
	3.7		DOL	10 m	H07RN-F	4c x 1.5mm^2	
	5.5		DOL	10 m	H07RN-F	4c x 1.5mm^2	
	7.5		DOL	10 m	H07RN-F	4c x 2.5mm^2	
	11		Y-Δ	10 m	H07RN-F	4c x 4mm^2 x 2cables	
	15		Y-Δ	10 m	H07RN-F	4c x 4mm^2 x 2cables	
	18.5		Y-Δ	10 m	H07RN-F	4c x 4mm^2 x 2cables	
	22		Y-Δ	10 m	H07RN-F	4c x 6mm^2 x 2cables	
	30		Y-Δ	10 m	H07RN-F	4c x 10mm^2 x 2cables	
	37		Y-Δ	10 m	H07RN-F	4c x 10mm^2 x 2cables	
	45		Y-Δ	10 m	H07RN-F	4c x 16mm^2 x 2cables	
Three Phase	1.5	ZDKE	DOL	10 m	H07RN-F	4c x 1.5mm^2	Standard model N/A Option model (with Leakage detector) 2c x 1mm2 for Leakage detector
	2.2		DOL	10 m	H07RN-F	4c x 1.5mm^2	
	3.7		DOL	10 m	H07RN-F	4c x 1.5mm^2	
	5.5		DOL	10 m	H07RN-F	4c x 1.5mm^2	
	7.5		DOL	10 m	H07RN-F	4c x 2.5mm^2	
	11		Y-Δ	10 m	H07RN-F	4c x 4mm^2 x 2cables	Standard model 2c x 1mm2 for Thermal protector Option model (with Leakage detector) 2c x 1mm2 X 2cables for Thermal protector & Leakage detector
	15		Y-Δ	10 m	H07RN-F	4c x 4mm^2 x 2cables	
	18.5		Y-Δ	10 m	H07RN-F	4c x 4mm^2 x 2cables	
	22		Y-Δ	10 m	H07RN-F	4c x 6mm^2 x 2cables	
	30		Y-Δ	10 m	H07RN-F	4c x 10mm^2 x 2cables	
	37		Y-Δ	10 m	H07RN-F	4c x 10mm^2 x 2cables	
	45		Y-Δ	10 m	H07RN-F	4c x 16mm^2 x 2cables	
Three Phase	3.7	ZDKESD	Y-Δ	10 m	H07RN-F	4c x 1.5mm^2 x 2cables	
	5.5		Y-Δ	10 m	H07RN-F	4c x 1.5mm^2 x 2cables	
	7.5		Y-Δ	10 m	H07RN-F	4c x 2.5mm^2 x 2cables	

Applicable to	Cross sectional area of conductors	No. of conductors	Cable Type	Sheath Material	Insulation Material	Sheath Thickness mm	Insulation Thickness mm	Overall Diameter mm	
Three Phase For Power Cable DOL start motors use 1x4 core, Y-Δ start motors use 2x4 core.	1.5mm^2	4 core	H07RN-F	Chlorinated Polyethylene Rubber	Ethylene Propylene Rubber	1.7	0.8	11.2	
	2.5mm^2					1.9	0.9	13.2	
	4mm^2					2.0	1.0	15.3	
	6mm^2					2.3	1.0	18.0	
	10mm^2					3.4	1.2	23.7	
	16mm^2					3.6	1.2	28.0	
Three Phase For Protector Cable	1mm^2	2 core				1.3	0.8	8.6	
		4 core				1.5	0.8	10.3	

Motor Data for Model DKE 60Hz

■ **Applicable Motor Model - ZDKE3 60Hz 380V**

Applicable Motor Model	Phase	Poles	Voltage	Hz	Service Factor	VFD
ZDKE3	3	4	380 V	60	1.0	Available

Name-Plate Rating	Output	kW	1.5	2.2	3.7	5.5	7.5
	Phase		3	3	3	3	3
	Pole		4	4	4	4	4
	Voltage	V	380	380	380	380	380
	Current	A	3.7	5.3	8.3	12.3	16.8
	Frequency	Hz	60	60	60	60	60
	Insulation Class		F	F	F	F	F
Speed		min-1	1755	1780	1770	1780	1775
Locked Rotor Torque		%	436	154	122	108	101
Start Current		A	33.6	38.4	51.8	90.3	115.5
No.starts per hour			10	10	10	10	10
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%

Name-Plate Rating	Output	kW	11	15	18.5	22	30	37	45
	Phase		3	3	3	3	3	3	3
	Pole		4	4	4	4	4	4	4
	Voltage	V	380	380	380	380	380	380	380
	Current	A	23.9	31.4	37.6	45.1	63.3	76.7	92.0
	Frequency	Hz	60	60	60	60	60	60	60
	Insulation Class		F	F	F	F	F	F	F
Speed		min-1	1780	1785	1775	1775	1780	1780	1780
Locked Rotor Torque		%	170	177	194	205	235	147	146
Start Current		A	168.2	241.4	324.1	408.3	630.6	621.8	743.2
No.starts per hour			6	6	6	6	6	6	6
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%	±5%	±5%

Motor Data for Model DKE 60Hz

■ **Applicable Model – ZDKE3 60Hz 400V**

Applicable Motor Model	Phase	Poles	Voltage	Hz	Service Factor	VFD
ZDKE3	3	4	400 V	60	1.0	Available

Name-Plate Rating	Output	kW	1.5	2.2	3.7	5.5	7.5
	Phase		3	3	3	3	3
	Pole		4	4	4	4	4
	Voltage	V	400	400	400	400	400
	Current	A	3.2	4.6	7.5	10.8	14.7
	Frequency	Hz	60	60	60	60	60
	Insulation Class		F	F	F	F	F
Speed		min-1	1740	1780	1760	1775	1770
Locked Rotor Torque		%	300	119	89	97	93
Start Current		A	22.9	27.0	35.1	63.0	82.6
No.starts per hour			10	10	10	10	10
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%

Name-Plate Rating	Output	kW	11	15	18.5	22	30	37	45
	Phase		3	3	3	3	3	3	3
	Pole		4	4	4	4	4	4	4
	Voltage	V	400	400	400	400	400	400	400
	Current	A	21.2	27.8	33.6	40.0	54.0	66.8	80.0
	Frequency	Hz	60	60	60	60	60	60	60
	Insulation Class		F	F	F	F	F	F	F
Speed		min-1	1770	1775	1770	1770	1775	1780	1780
Locked Rotor Torque		%	141	141	167	177	195	112	116
Start Current		A	124.6	171.4	240.4	302.8	449.0	444.6	553.8
No.starts per hour			6	6	6	6	6	6	6
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%	±5%	±5%

Motor Data for Model DKE 60Hz

■ **Applicable Model - ZDKE3 60Hz 440V**

Applicable Motor Model	Phase	Poles	Voltage	Hz	Service Factor	VFD
ZDKE3	3	4	440 V	60	1.0	Available

Name-Plate Rating	Output	kW	1.5	2.2	3.7	5.5	7.5
	Phase		3	3	3	3	3
	Pole		4	4	4	4	4
	Voltage	V	440	440	440	440	440
	Current	A	3.1	4.5	7.0	10.2	14.0
	Frequency	Hz	60	60	60	60	60
	Insulation Class		F	F	F	F	F
Speed		min^{-1}	1750	1780	1765	1780	1775
Locked Rotor Torque		%	382	141	107	97	95
Start Current		A	25.4	30.0	39.0	69.8	92.2
No.starts per hour			10	10	10	10	10
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%

Name-Plate Rating	Output	kW	11	15	18.5	22	30	37	45
	Phase		3	3	3	3	3	3	3
	Pole		4	4	4	4	4	4	4
	Voltage	V	440	440	440	440	440	440	440
	Current	A	20.0	26.0	31.6	37.8	52.8	63.2	76.0
	Frequency	Hz	60	60	60	60	60	60	60
	Insulation Class		F	F	F	F	F	F	F
Speed		min^{-1}	1780	1780	1770	1775	1770	1780	1780
Locked Rotor Torque		%	166	166	192	204	198	138	143
Start Current		A	137.8	189.8	266.8	336.9	470.2	489.1	609.6
No.starts per hour			6	6	6	6	6	6	6
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%	±5%	±5%

Motor Data for Model DKE 60Hz

■ **Applicable Model - ZDKE3 60Hz 460V**

Applicable Motor Model	Phase	Poles	Voltage	Hz	Service Factor	VFD
ZDKE3	3	4	460 V	60	1.0	Available

Name-Plate Rating	Output	kW	1.5	2.2	3.7	5.5	7.5
	Phase		3	3	3	3	3
	Pole		4	4	4	4	4
	Voltage	V	460	460	460	460	460
	Current	A	3.1	4.5	6.9	10.1	14.0
	Frequency	Hz	60	60	60	60	60
	Insulation Class		F	F	F	F	F
Speed		min^{-1}	1755	1780	1770	1780	1775
Locked Rotor Torque		%	419	154	117	106	104
Start Current		A	26.6	31.7	41.2	73.5	97.3
No.starts per hour			10	10	10	10	10
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%

Name-Plate Rating	Output	kW	11	15	18.5	22	30	37	45
	Phase		3	3	3	3	3	3	3
	Pole		4	4	4	4	4	4	4
	Voltage	V	460	460	460	460	460	460	460
	Current	A	19.9	25.8	31.2	37.5	52.0	62.4	75.0
	Frequency	Hz	60	60	60	60	60	60	60
	Insulation Class		F	F	F	F	F	F	F
Speed		min^{-1}	1780	1780	1775	1775	1775	1780	1780
Locked Rotor Torque		%	181	181	209	223	250	151	156
Start Current		A	144.8	199.6	280.3	354.5	530.5	513.5	640.1
No.starts per hour			6	6	6	6	6	6	6
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%	±5%	±5%

Motor Data for Model DKE 60Hz

■ **Applicable Motor Model - ZDKE 60Hz 380V**

Applicable Motor Model	Phase	Poles	Voltage	Hz	Service Factor
ZDKE	3	4	380 V	60	1.0

Name-Plate Rating	Output	kW	1.5	2.2	3.7	5.5	7.5
	Phase		3	3	3	3	3
	Pole		4	4	4	4	4
	Voltage	V	380	380	380	380	380
	Current	A	3.6	4.9	7.8	11.2	15.1
	Frequency	Hz	60	60	60	60	60
	Insulation Class		F	F	F	F	F
Speed		min^{-1}	1705	1710	1710	1735	1740
Locked Rotor Torque		%	271	185	189	225	234
Start Current		A	21.7	25.9	43.8	71.0	106.0
No.starts per hour			20	20	20	20	20
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%

Name-Plate Rating	Output	kW	11	15	18.5	22	30	37	45
	Phase		3	3	3	3	3	3	3
	Pole		4	4	4	4	4	4	4
	Voltage	V	380	380	380	380	380	380	380
	Current	A	21.5	28.7	35.5	41.5	57.5	73.0	89.0
	Frequency	Hz	60	60	60	60	60	60	60
	Insulation Class		F	F	F	F	F	F	F
Speed		min^{-1}	1745	1740	1750	1750	1765	1770	1775
Locked Rotor Torque		%	139	145	136	134	177	149	145
Start Current		A	124.0	156.0	214.0	248.0	500.6	516.8	668.7
No.starts per hour			20	20	20	20	20	20	20
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%	±5%	±5%

Motor Data for Model DKE 60Hz

■ **Applicable Motor Model - ZDKE 60Hz 400V**

Applicable Motor Model	Phase	Poles	Voltage	Hz	Service Factor
ZDKE	3	4	400 V	60	1.0

Name-Plate Rating	Output	kW	1.5	2.2	3.7	5.5	7.5
	Phase		3	3	3	3	3
	Pole		4	4	4	4	4
	Voltage	V	400	400	400	400	400
	Current	A	3.5	4.7	7.4	10.6	14.4
	Frequency	Hz	60	60	60	60	60
	Insulation Class		F	F	F	F	F
Speed		min^{-1}	1710	1715	1720	1735	1735
Locked Rotor Torque		%	299	234	224	208	219
Start Current		A	22.5	27.0	43.0	63.0	92.0
No.starts per hour			20	20	20	20	20
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%

Name-Plate Rating	Output	kW	11	15	18.5	22	30	37	45
	Phase		3	3	3	3	3	3	3
	Pole		4	4	4	4	4	4	4
	Voltage	V	400	400	400	400	400	400	400
	Current	A	20.1	27.5	34.0	39.5	53.0	66.0	79.0
	Frequency	Hz	60	60	60	60	60	60	60
	Insulation Class		F	F	F	F	F	F	F
Speed		min^{-1}	1745	1730	1750	1745	1745	1745	1755
Locked Rotor Torque		%	138	135	136	120	197	161	169
Start Current		A	107.0	138.0	202.5	225.0	350.0	361.8	464.1
No.starts per hour			20	20	20	20	20	20	20
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%	±5%	±5%

Motor Data for Model DKE 60Hz

■ **Applicable Motor Model - ZDKE 60Hz 440V**

Applicable Motor Model	Phase	Poles	Voltage	Hz	Service Factor
ZDKE	3	4	440 V	60	1.0

Name-Plate Rating	Output	kW	1.5	2.2	3.7	5.5	7.5
	Phase		3	3	3	3	3
	Pole		4	4	4	4	4
	Voltage	V	440	440	440	440	440
	Current	A	3.4	4.5	6.9	9.7	13.4
	Frequency	Hz	60	60	60	60	60
	Insulation Class		F	F	F	F	F
Speed		min^{-1}	1725	1735	1735	1745	1750
Locked Rotor Torque		%	370	286	274	246	267
Start Current		A	25.0	30.0	47.5	70.0	99.0
No.starts per hour			20	20	20	20	20
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%

Name-Plate Rating	Output	kW	11	15	18.5	22	30	37	45
	Phase		3	3	3	3	3	3	3
	Pole		4	4	4	4	4	4	4
	Voltage	V	440	440	440	440	440	440	440
	Current	A	18.7	25.0	31.0	36.5	49.0	61.0	75.0
	Frequency	Hz	60	60	60	60	60	60	60
	Insulation Class		F	F	F	F	F	F	F
Speed		min^{-1}	1750	1745	1765	1755	1765	1770	1770
Locked Rotor Torque		%	161	167	166	144	163	136	132
Start Current		A	118.0	150.0	226.0	248.0	394.3	408.8	525.8
No.starts per hour			20	20	20	20	20	20	20
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%	±5%	±5%

Motor Data for Model DKE 60Hz

■ **Applicable Motor Model - ZDKE 60Hz 460V**

Applicable Motor Model	Phase	Poles	Voltage	Hz	Service Factor
ZDKE	3	4	460 V	60	1.0

Name-Plate Rating	Output	kW	1.5	2.2	3.7	5.5	7.5
	Phase		3	3	3	3	3
	Pole		4	4	4	4	4
	Voltage	V	460	460	460	460	460
	Current	A	3.4	4.4	6.7	9.6	13.0
	Frequency	Hz	60	60	60	60	60
	Insulation Class		F	F	F	F	F
Speed		min^{-1}	1735	1745	1740	1745	1750
Locked Rotor Torque		%	406	314	296	274	304
Start Current		A	23.7	31.5	49.0	72.5	105.0
No.starts per hour			20	20	20	20	20
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%

Name-Plate Rating	Output	kW	11	15	18.5	22	30	37	45
	Phase		3	3	3	3	3	3	3
	Pole		4	4	4	4	4	4	4
	Voltage	V	460	460	460	460	460	460	460
	Current	A	18.2	24.0	30.0	34.5	47.5	59.5	74.0
	Frequency	Hz	60	60	60	60	60	60	60
	Insulation Class		F	F	F	F	F	F	F
Speed		min^{-1}	1755	1745	1770	1760	1765	1770	1775
Locked Rotor Torque		%	162	180	181	162	177	149	145
Start Current		A	127.0	159.0	238.0	254.0	413.5	426.9	552.4
No.starts per hour			20	20	20	20	20	20	20
Voltage Tolerance			±10%	±10%	±10%	±10%	±10%	±10%	±10%
Frequency Tolerance			±5%	±5%	±5%	±5%	±5%	±5%	±5%