# **General Information**

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General Information

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# **Safety Standards**

The safety of the component parts is an important consideration in equipment design. However, a part-by-part analysis of component quality and design is too time consuming for design and quality personnel. To get around this problem, safety standards have been designed to assure component safety. The following section describes the safety standards with which Oriental Motor is concerned.

# Safety Standards UL Standards (United States)



UL, or Underwriters Laboratories Inc., is a non-profit testing organization that was founded in 1894 by a group of American fire insurance companies. Their aim was to prevent loss of human life and damage to property from fires and other hazards by ensuring that machinery, tools and materials were safe. To this end, UL developed a

variety of tests and research methods for machinery, tools and materials, which resulted in the compilation of the UL standards. These standards are used for common items such as electronic equipment, motor-powered devices and electronic parts. The most important aspect to the UL standards for a manufacturer is that legal provisions in many American states require that such products must have passed the relevant UL safety tests and be listed in the UL Directory before being offered for sale. Although some states do not explicitly require UL-listing by law, there are cases where insurers refuse to cover the risk of fire or damage caused by a product that is not UL-listed. This is almost equivalent to the legal sales restrictions in the other states, and under such circumstances the customer will obviously only purchase items that are UL-listed. For a product that is to be sold in the United States, recognition or listing by UL is recommended.

Also, UL has been accredited as a verification agency by the Standards Council of Canada (SCC) and is recognized by all Canadian provinces. Therefore, it is possible to have testing for Canadian safety standards performed at UL. Products that are recognized as conforming with Canadian safety standards can display the c-UL mark, and their sale and use is permitted in Canada.

### • CSA Standards (Canada)



CSA stands for "Canadian Standards Association", a private, non-profit testing organization established after an inquiry by the Canadian government. To

protect human life and property from fire hazard and accidents, provincial laws in Canada forbid the sale and use

of any electrical machinery, electrical parts, and so on, unless its safety has been confirmed by CSA. For this purpose, CSA has established standards detailing mandatory tests and requirements to ascertain component safety.

Also, the CSA has been accredited by the United States Occupational Safety and Health Administration (OSHA) as a national research and testing laboratory (NRTL) and is now able to undertake testing under American safety standards. Products that are recognized as conforming with American safety standards may display the CSA mark with NRTL added, and their sale and use is permitted in the United States.

#### • EN Standards (EU member states)



The European Union continues to coordinate the industrial and safety standards of individual member states under the aegis of the Council of European Standardization (CEN) and the Council of European Electrical Standardization (CENELEC). The unified standards for all of Europe are called the Harmonized Standards. The numbers for Harmonized Standards all begin with an "EN". EN standards apply

to the design and manufacture of products exported to the EU area. (IEC and VDE standards apply when an EN standard has not yet been enacted.)

Certification is given by private inspection organizations such as TÜV Rheinland, VDE and DEMKO. Qualifying products may display the various safety marks.

### • Electrical Appliance and Material Safety Law



Effective April 1, 2002, Japan's Electrical Appliance and Material Control Law was revised and renamed the "Electrical Appliance and Material Safety Law". The purpose of the new law is to prevent the occurrence of danger and trouble resulting from electrical appliances and materials by

regulating the manufacture, sale and other activities involving electrical appliances and materials, while promoting the voluntary efforts of private businesses in order to ensure their safety. Accordingly, the authorizations (tests) and other safety checks, which under the old law were conducted directly by the government, have become the responsibility of the manufacturers, etc., which must now ensure the safety of their own products through the introduction of a third-party certification system. The Electrical Appliance and Material Safety Law applies to the electrical appliances and materials generally used in homes, offices, etc. They are classified into two categories– "special electrical appliances and materials" and "products other than special electrical appliances and materials" –according to the level of danger they present. Special electrical appliances and materials are subject to compliance tests and the retention of compliance certificates performed/issued by the Japan Electrical Safety & Environment Technology Laboratories (JET) or other test laboratory certified (or approved) by the Ministry of Economy, Trade and Industry, and must also bear the diamond-shape PSE mark. Products other than special electrical appliances and materials must comply with the relevant technical standards and bear the circular PSE mark.

#### Standards for Motors and Fans

The following is a listing of the standards pertaining to electrical motors and fans.

- UL Standards
- ♦ UL1004: Electric Motors

Establishes general requirements for all types of electrical motors.

UL2111: Overheating Protection for Motors

Establishes requirements for overheating protection for motors. Previously, requirements for impedance protected motors were established under UL519 while requirements for thermal protectors for motors were established under UL547. UL2111 was published on March 28, 1997, combining UL519 and UL547, and partially harmonizing C22.2 No. 77 (Motors with Inherent Overheating Protection) under the CSA standards.

#### UL507: Electric Fans

Establishes general requirements for electrical fans and blowers that have an input voltage of 600V or lower. Note that motor parts of fans and blowers must also comply with requirements of UL2111 and UL1004.

#### ◆ UL60950-1 (=IEC60950-1):

**Safety of Information Technology Equipment** This standard covers information technology equipment, including electrical business equipment.s

#### CSA Standards

- C22.2 No.100: Motors and Generators
   Establishes general requirements for motors.
- C22.2 No.77: Motors with Inherent Overheating Protection

Establishes special requirements for motors with inherent overheating protection that supplement those of C22.2 No.100.

C22.2 No.60950-1:

#### Safety of Information Technology Equipment This standard covers information technology equipment,

including electrical business equipment.

C22.2 No.113: Fans and Ventilators
 Establishes general requirements for fans.

#### EN Standards

VDE, TÜV and DEMKO approved motors and fans are evaluated in accordance with the items required for motors under the following standards. Forty-eight hour humidity experiments are conducted in addition to experiments with motor and fan characteristics.

- EN60034 (= IEC60034, DIN VDE0530)
   Rotating Electrical Machines
   Stipulates general requirements for motors.
- EN60950-1 (= IEC60950-1) Safety of Information Technology Equipment This standard covers information technology equipment, including electrical business equipment.

#### IEC Standards

Shown below are two standards for motors and fans under the IEC standards.

♦ IEC60034 (=DIN VDE0530) Rotating Electrical Machines

Establishes general requirements for motors. There are over 20 parts, and IEC60034 covers some parts which are not yet published by EN60034.

 IEC60664 (=DIN VDE0110) Insulation Coordination for Equipment within Low-Voltage-Systems

Stipulates insulation distances for motors.

# Standards for Control Circuits UL Standards

#### UL Standards

#### UL508: Industrial Control Equipment This standard covers industrial control devices used to start, stop, regulate, control, or protect motors. This standard covers speed control packs.

#### ♦ UL508C: Power Conversion Equipment This standard covers equipment used to supply power to control motors activated by a frequency or voltage which is different than the input supply voltage. This standard covers drivers.

# UL1917: Solid-State Fan Speed Controls These are standards for control of single-phase 300V max variable speed fans.

◆ UL60950-1 (=IEC60950-1)

### Safety of Information Technology Equipment

This standard covers information technology equipment, including electrical business equipment.

#### CSA Standards

C22.2 No.14: Industrial Control Equipment

This standard covers industrial control equipment used to start, stop, regulate, control or protect motors. This standard covers speed control packs and drivers.

C22.2 No.113: Fans and Ventilators
 Establishes general requirements for fans.

#### EN and Other Standards

The speed control packs and drivers approved by VDE, TÜV and DEMKO conform to the following standards.

# EN60950-1 (=IEC60950-1) Safety of Information Technology Equipment This standard covers information technology equipment, including electrical business equipment.

- EN50178 (Overvoltage test, EMC excluded)
   Electric equipment for use in power installations
   General regulation of electronic equipment that can be used in power facilities.
- DIN VDE0160 (Overvoltage test, EMC excluded)
   Electric equipment use in electrical power
   installations and assembly into electrical power
   installations

This standard covers electric equipment use in electrical power installations and assembly into electrical power installations.

- JIS: Japanese Industrial Standards National standards for Japanese mining and manufacturing industries.
- IEC: International Electrotechnical Commission The IEC promotes unification and coordination of international standards on electrical and electronic equipment. IEC standards are issued with the ultimate goal of having individual countries reflect international standards within their own standards.
- DIN: Deutsches Institute für Normung e. V. The German standards association. It's standards range from basic to wide-ranging standards that cover all industrial fields.
- VDE: Verband Deutscher Elektrotechniker e. V. This German association of electrical engineers enacts safety standards for electricity that are issued as DIN-VDE standards.

# Safety Considerations and Tests

A comparison of the items evaluated by various testing agency reveals that there are a few points of particular concern for motors and fans.

# Construction

#### Devices to Prevent Overheating

UL, CSA, EN and IEC standards require that any equipment using a motor also possess a device to protect the motor from overheating which can be caused by overload, intentional or unintentional locking of the rotor, etc. All Oriental Motor approved products include impedance protection or thermal protectors in the motor (brushless DC motors excluded).

#### Insulation Materials

Oriental Motor's motors and fans have class E insulation (World **K** Series, **V** Series, and **BH** Series have class B insulation). The insulation class indicates the division of heat-resistant grades, and is specified as shown in the table below by JIS C4003 (IEC60085).

Also, the insulation is certified as class E by EN/IEC standards (World **K** Series, **V** Series, and **BH** Series are class B) but recognized as class A by UL and CSA standards (World **K** Series, **V** Series, and **BH** Series are class B).

Table 1: Insulation Class and Temperature

Insulation Class	Maximum Temperature
Class Y	194°F (90°C)
Class A	221°F (105°C)
Class E	248°F (120°C)
Class B	266°F (130°C)
Class F	311°F (155°C)
Class H	356°F (180°C)

Table 2: Insulation Materials

Safety Standard	Insulation Materials
Japanese Safety Standards for Electrical Equipment (Fans)	Insulation materials that are registered or temporarily registered with the Japan Electrical Equipment Laboratory, the material experiment organization for the Japanese Safety Standard for Electrical Equipment, and have been assigned a heat resistance grade of class E [248°F (120°C)] are used.
UL Standards (Motors) CSA Standards (Fans)	All grommets, lead wires and some slot insulations are approved products while all other insulation materials satisfy UL and CSA standard requirements.
EN Standards IEC Standards (Motors) Fans	The insulation materials satisfy EN and IEC standard requirements.

### Minimum Spacing Between Live Materials

To prevent accidents caused by short circuits between live materials or between live materials and user-accessible materials (normally not live materials), minimum spacing distances between such materials have been defined. All Oriental Motor products comply with the relevant requirements.

# General Information

#### Degree of Protection

IEC60529 and EN60034-5 (=IEC60034-5) classify the dust-resistance and waterproofing into grades. The test methods are shown below. A third-party certification body has certified that Oriental Motor's watertight motor **FPW** Series confirms to IP67.

Example IP67

 Second number: Degree of protection against ingress of water
 First number: Degree of protection against access to hazardous parts and solid foreign objects

An "X" is used when one of the two protection classes is not specified in the name (e.g., IPX5 or IP4X).

#### Table 3: Meanings of Markings and Testing Conditions

IP Code	Degree of protection against access to hazardous parts and against solid foreign objects					
First Number	Description	Definition and Test Conditions				
IP0X	None	None				
IP1X	Protection against approach by hands	Cannot be penetrated by a solid object 1.97 in. (50 mm) or more in diameter.				
IP2X	Protection against approach by fingers	Cannot be penetrated by a solid object 0.79 in. (12 mm) or more in diameter.				
IP3X	Protection against tips of tools, etc.	Cannot be penetrated by a solid object 0.09 in. (2.5 mm) or more in diameter.				
IP4X	Protection against wire, etc.	Cannot be penetrated by a solid object 0.04 in. (1.0 mm) or more in diameter.				
IP5X	Protection against dust	Cannot be penetrated by dust that could interfere with normal operation.				
IP6X	Completely dust-proof design	Cannot be penetrated by dust				

IP Code	Degree of protection against ingress of water						
Second Number	Description	Definition and Test Conditions					
IPX0	None	None					
IPX1	Protection against water drops falling vertically.	Water drops falling at a rate of 3 to 5 mm/min. from a height of 7.87 in. (200 mm) for 10 minutes.					
IPX2	Protection against water drops falling vertically over a 15° range.	Water drops falling over a 15° range at a rate of 3 to 5 mm/min.from a height of 7.87 in. (200 mm) for 10 minutes.					
IPX3	Protection against water drops falling vertically over a 60° range.	Water drops falling over a 60° range at a rate of 10 $\ell$ /min. from a height of 7.87 in. (200 mm) for 10 minutes.					
IPX4	Protection from spray of water from all directions.	Water sprayed from all directions from a distance of 11.81 in. (300 mm) to 11.69 in. (500 mm) at a rate of 10 $\ell$ /min. for 10 minutes.					
IPX5	Protection against jets of water from all directions.	Jets of water sprayed from a distance of 9.84 ft. (3 m) from all directions at a rate of 12.5 $\dot{\ell}$ /min. at a pressure of 30 kPa for 3 minutes.					
IPX6	Protection against strong wave-like jets of water.	Jets of water sprayed from a distance of 9.84 ft. (3 m) from all directions at a rate of 100 $\ell$ /min. at a pressure of 100 kPa for 3 minutes.					
IPX7	Usable after immersion in water under fixed conditions.	Immersion to a depth of 3.3 ft. (1 m) for 30 minutes.					
IPX8	Usable under water	Determined through cooperation between user and manufacturer.					

#### Capacitor

Capacitors, supplied with single-phase AC motors and fans, are approved separately from the motor or fan.

#### Motor Fan Protective Gear (Finger Guards)

When a fan is used in a device, measures must be taken to protect people from harm.

Oriental Motor finger guards are designed to pass all tests stipulated under the UL Standards, CSA Standards and Japanese Safety Standards for Electrical Equipment when used on a compatible product.

(Protective gear cannot be certified as stand-alone equipment, since it is used when installed on another product as an accessory.)

#### Plug Cord for Connecting Power Supply

The optional plug cord that can be used with the **MU** Series of fans is recognized by UL (unlisted component) and certified by CSA. Also **PCA2B** is certified by JET.

# Performance Temperature Test

Standard Test Item	UL2111, CSA C22.2 No.77 (Class A/Class B)
Overload operation test for thermal-protected motor	Winding temperature is 284°F (140°C) /329°F (165°C) or less when temperature is stabilized and the thermal protector does not work with applying maximum load.
Locked-rotor temperature rise test for impedance- protected motor	Winding temperature is 302°F (150°C) /347°F (175°C) or less when a 72-hour locked-rotor test is performed at a test voltage of 120 V or 240 V (when rated voltages are 115 V or 230 V) with rated capacitor connected, rotor locked or capacitor short-circuited. No deterioration on insulation material of the windings after above test.
Locked-rotor temperature rise test for thermally- protected motor	<ul> <li>Winding temperature is in the following range when 72-hour locked-rotor test is performed at a test voltage of 115 V or 240 V (when rated voltages are 115 V or 230 V) with rated capacitor connected.</li> <li>Maximum temperature in first hour is 392°F (200°C) /437°F (225°C) or less.</li> <li>Maximum temperature after one hour is 347°F (175°C) /392°F (200°C) or less.</li> <li>Calculated average value of maximum temperature and minimum temperature after one hour is 302°F (150°C) /347° (175°C) or less.</li> </ul>

• For winding temperature rise, Oriental Motor products are designed to meet the UL standard and CSA standard for Class A insulation. The insulation material is also a Class E heat-resistant grade under the Electrical Appliance and Material Safety Law (World K Series, V Series and BH Series are Class B).

 The following are tested by the Electrical Appliance and Material Safety Law: Rated operation: The constant winding temperature reached for rated operation must be no greater than 239°F (115°C). Rotor constraint protection performance: When the test piece is placed on a wooden table at least 10 mm thick and covered with gauze, and the constraint test is run at rated frequency and rated voltage until the temperature stabilizes, the test piece, wooden table and gauze must not burn and the insulation resistance at 500 V must be 0.1 MΩ min.

• Temperature tests are stipulated in the EN and IEC standards (Class E insulation. World K Series, V Series and BH Series are Class B). Oriental Motor products have all been certified to perform normally in these tests.

#### Endurance Test

Standard Test Item	UL2111, CSA C22.2 No.77
Endurance test for impedance-protected motor	No deterioration on insulation material of windings when continuing the locked-rotor test for another 15 days after the aforementioned 72-hour locked-rotor test for a total of 18 days. (UL60950 required another 12 days, total 15 days locked-rotor test) a) No deterioration on insulation material of windings. b) The fuse in the grounding conductor shall not open. c) The motor shall still electrically operate.
Endurance test for thermal- protected motor	No deterioration on insulation material of windings when continuing the locked-rotor test for another 15 days after the aforementioned 72-hour locked-rotor test for a total of 18 days. a) No deterioration on insulation material of windings. b) The fuse in the grounding conductor shall not open. c) The motor shall still electrically operate.

The UL and CSA standards cover the endurance tests as noted above. These rules were established to prevent motors and fans from burn-out when they are locked.
 All Oriental Motor approved products passed these tests. Our approved fans employ high-grade (V-0) non-flammable resins for the fan blades.

• Temperature tests are stipulated in the EN and IEC standards (Grade E insulation). Oriental Motor products have all been certified to perform normally in these tests.

#### Dielectric Voltage - Withstand Test

All motors and fans are sufficient to withstand this test, which is carried out by applying the voltage listed in the table below between the motor case and lead wires, without insulation breakdown.

Standard Test Item	Electrical Appliance and Material Safety Law	UL Standard	CSA Standard
Less than 150 V	1000 V 1 minute	60Hz, 1000 V, 1minute	60Hz, 1000 V, 1minute
Over 150 V	1500 V 1 minute	Common to impedance-protected and thermally-protected motors	Common to impedance-protected and thermally-protected motors

• The EN and IEC standards stipulate 1500 V for 1 minute.

# ISO9001/ ISO14001 al Power / Voltages Product Line Updates Produc Index

#### Evidence of Product Approval Approved Mark

The following marks are indicated on the nameplates of approved products.

- Japanese Safety Standards for Electrical Equipment Certified by Japan Electrical Safety & Environment Technology Laboratories .....
- UL recognized component ······
- Recognized to Canadian safety requirements under the component Recognition Program of Underwriters Laboratories Inc. ....



Recognized to Canadian Safety requirements and UL under the component Recognition Program of Underwriters Laboratories Inc...... C. TLL IIS



- CSA certified component ······
- EN and IEC certified component (indicates that VDE, TÜV Rheinland or DEMKO has certified that the product meets EN or IEC standards.) ······





#### Factory Inspection

Even after a product has been recognized or certified, UL and CSA inspectors verify continued compliance of products and manufacturing process with the relevant standards by regular visits to the factory.

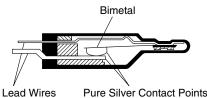
UL:	Four times a year	VDE:	Once a year
CSA:	Twice a year	DEMKO	:Once a year
TÜV:	Once a year	JET:	Once a year

# Overheating Protection Devices

Overheating may be caused by overload, no load or extremely small load, intentional or unintentional locking of the rotor, or use in very high ambient temperatures. This results in a drastic shortening of the life of the insulation system or, in extreme cases, fire. To prevent degeneration of the insulation materials and burning out the windings as a result of overheating or rotor locking, Oriental Motor products approved by UL, CSA, EN and IEC standards are equipped with the following overheat protection devices.

### Thermally Protected Motors

AC motors with a frame size of 2.76 in. sq. (70 mm sq.), 3.15 in. sq. (80 mm sq.), and 3.54 in. sq. (90 mm sq.), and AC fans **MRS** Series, **MB** Series [impeller dia. 3.15 in. ( $\phi$ 80 mm) or larger], and **MF** Series contain a built-in automatic reset thermal protector. The construction of a thermal protector is shown in the following figure.



The thermal protectors employ a bimetal contact, using pure silver. Pure silver has the lowest electrical resistance of all materials and has thermal conductivity second only to copper.

Operating temperature of thermal protector Open: 248°F±9°F (120°C±5°C) or 266°F±9°F (130°C±5°C)

Close: 170.6°F±59°F (77°C±15°C) or 179.6°F±59°F (82°C±15°C)

Motor winding temperature where the thermal protector is working is slightly higher than the operating temperature listed above.

#### Impedance Protected Motors and Fans

Impedance protection is used in AC motors with frame sizes smaller than 2.36 in. sq. (60 mm sq), and AC fans MU Series, **MB** Series [impeller  $\phi$ 2.36 in. ( $\phi$ 60 mm) or smaller], and the SMK Series. Impedance protected motors are designed with higher impedance in the motor windings so that even if the motor locks, the increase in current (input) is reduced and temperature does not rise beyond a certain constant level.

### Brushless DC Motors

The motor and driver are equipped with overloading and overheating protection features to control temperature rises by cutting off the input current from the driver to the motor when a malfunction occurs.

### Stepping Motors

Stepping motors are designed with impedance protection in case they are stopped with five-phase excitation (with the rated current flowing).

#### DC Fans

These fans include solid state control circuitry that incorporates a limiting, current shut-down circuit, which controls the fan during locked rotor conditions.

# CE Marking

To distribute equipment within the European Union, the CE marking is mandatory for certifying that the equipment complies with EC Directives (safety).

To obtain a ruling that the equipment satisfies the required items of each directive, the manufacturer must usually verify that the equipment complies with the EN standards

applicable to the EC Directives or, if not available, with the IEC standards. The manufacturer then composes a

declaration stating compliance with the directives and applies the CE marking.

(However, depending on the risk of danger, formal testing by an approving authority may be required and the selfcomposed declaration is then issued after receiving proof of formal testing.)

Products with a declaration of voluntary compliance have the following mark either on the nameplate or on the package label.

# 

The major scope of compliance and period of obligation are as follows:

#### Machinery directives: 98/37/EC

Applicable to equipment with moving parts that could cause human injury. (Mandatory as of 1 January 1995) 89/392/EEC, 91/368/EEC, 93/44/EEC have been newly issued as 98/37/EC.

#### EMC directives: 89/336/EEC, 92/31/EEC

Applicable to equipment that could cause electromagnetic interference (EMI) and equipment that could be affected by electromagnetic interference (EMS). (Mandatory as of 1 January 1996)

#### Low voltage directive: 73/23/EEC

Applicable to equipment used with 50-1000 VAC or 75-1500 VDC. (Mandatory as of 1 January 1997)

#### • The Advantages of Approved Components

Under EC Directives, not all components in a device or piece of equipment have to be approved. However, when nonapproved components are used, the manufacturer of the equipment must evaluate and verify the safety of the component itself. If approved components are used, the manufacturer has the advantage of the benefits listed below:

- 1) Simplified component safety evaluation
- Simplified documentation and testing when lodging equipment standards applications with an approving authority

### Oriental Motor's Approach to CE Marking

To ensure that the company's products comply with the low voltage directives, we have issued a declaration of voluntary compliance with the standards imposed by the approving authorities within the EU (or a declaration of voluntary compliance based on EN standard).

Our view is that the EMC Directives do not directly pertain to our products themselves since all of Oriental Motor sales are to equipment manufacturers. The controllers used in the company's products and equipment, as well as equipment as a whole, including electrical components, are subject to the EMC Directives. Additionally, since the properties of equipment in relation to EMC Directives will vary depending upon the controller, electrical component configuration, wiring, general configuration and level of danger, clients should verify compliance with EMC Directives themselves. When a client is using our products in other equipment, Oriental Motor will provide methods such as adequately efficient filters and ferrite cores required by EMC measures. AC motors and AC fans are outside the range of applicability of EMC Directives because it has been judged both theoretically and experimentally that there is no influence on emissions or immunity. Also, DC fans that function alone conform to EMC Directives.

#### • Compliance ①

Oriental Motor's products have received the following VDE, TÜV Rheinland and DEMKO approval.

For the recognized or certified model name, see the list starting on page G-10.

\* Refer to page G-2 for the details of applicable standards of Oriental Motor's recognized or certified products. Clients should inquire at their local Oriental Motor sales office when a copy of the company's product approval or declaration of voluntary compliance with the low voltage directives is required for lodging an application with approving authorities.

#### Installation Conditions ②

The following installation conditions must be rigidly adhered to in order to ensure that products are used with greater safety.

Over voltage: Category  $\mathbb{I}$  (For AC input products)\* Pollution Degree: Class 2 (Products with the protection class of IP54 can be used in pollution degree of class 3.) Protective Structure: It depends upon the models. See the following pages for details.

\* For **BH** Series (with terminal box, single-phase 110 V/115 V, single-phase 220 V/230 V type) and **AXU** Series , Over voltage category:  $\mathbbm{I}$ 

# Protection Against Electrocution ③

Oriental Motor products are designed with Class  $\,\rm I$  Equipment basic insulation. When being used, the following must always be observed:

- Install products inside protective grounded enclosures so that they are out of the direct reach of users. or
- Always ground any product housing that is within the direct reach of users. Be sure to ground any product using the Protective Earth terminal.

Equipment with DC input is designed with Class  $\mathbb{I}$ Equipment structure. The power should be supplied from the primary winding and a safety power supply with reinforced insulation.

1)

 Generally, EN60204 applies to electricity in industrial equipment and EN60950 applies to electrical business equipment and information technology equipment. EN60204 satisfies the requirements of EN60034-1 (IEC60034-1) but, for the incorporation of equipment, EN60950-conforming motors can be handled likewise.

#### 2

Overvoltage Category\*

- This signifies the size of the shock produced at an input power terminal to which the equipment is directly connected.
- Category I : Circuits, secondary circuits on transformers in industrial machinery, home appliances powered by commercial electrical power, office equipment and other power sources where major overvoltage is not produced.
- Category II: Power supplies from primary circuits on transformers, general plant control panels and other power sources where major overvoltage is anticipated.
- \* The term "Installation Category" has been replaced with "Overvoltage Category".
- Pollution Degree

This signifies the level of pollution in the environment where the equipment can be used

Degree 1: No possibility of machine contamination through pollution because the environment is normally clean, dry and completely free of pollutant particles (inside packed with plastic, etc.)

Degree 2: Possible machine contamination through pollution due to the presence of charged particles with moderate pollutant forming tendencies (homes, offices, research laboratories).

Degree 3: Charged particles will contaminate machinery (boiler rooms and general plants).

In the event that the construction of the equipment creates internal pollution in equipment in a Degree 2 environment, that equipment must be designed to comply with a lower degree.

• Degree of protection (Degree of protection: signified by IP Code) This refers to the grade of dust-resistance and waterproofing of equipment (IEC60529). Equipment can be given a higher IP grade by providing protection with an appropriate enclosure.

• Oriental Motor's motors have been assessed under EN60034-5 (IEC60034-5, IEC60529).

#### 3

• Methods of protection against electrocution by equipment are divided into the following protection classes (Protection Class).

Class I Equipment:

Equipment with basic insulation and protective grounding for protection against electrocution; at sections where electrocution is a possible danger, protection against electrocution should be provided through protective grounding in case the basic installation is damaged.

Class I Equipment:

Equipment for which reinforced insulation or double insulation, consisting of the basic insulation plus extra insulation, is used as an added precaution. Therefore, there is no protective grounding as in Class I equipment.

Class II Equipment:

Equipment for which all the power is fed from a SELV circuit. Therefore, no danger of electrocution exists.

# List of Safety Standard Approved Products The file No. in the table indicates the registration number of the product. Last updated May 2005

# World K Series Induction Motors

Model		Overheating Protection	UL File	Degree of	EN/IEC Standard		Page
Pinion Shaft	Round Shaft	Device	No.	Protection	Certification Body	Licence No. or Certificate No.	Faye
2IK6GN-AW	2IK6A-AW	Impedance Protection	E64199	IP20	VDE	114919	A-20
2IK6GN-AWT	2IK6A-AWT	Impedance Protection	E64199	IP54 *1	VDE	114919	A-20
2IK6GN-CW	2IK6A-CW	Impedance Protection	E64199	IP20	VDE	114919	A-20
2IK6GN-CWT	2IK6A-CWT	Impedance Protection	E64199	IP54 *1	VDE	114919	A-20
2IK6GN-SW	2IK6A-SW	Impedance Protection	E64199	IP20	VDE	114919	A-20
2IK6GN-SWT	2IK6A-SWT	Impedance Protection	E64199	IP54 *1	VDE	114919	A-20
3IK15GN-AW	3IK15A-AW	Thermal Protector	E64197	IP20	VDE	6751	A-24
3IK15GN-CW	3IK15A-CW	Thermal Protector	E64197	IP20	VDE	6751	A-24
4IK25GN-AW	4IK25A-AW	Thermal Protector	E64197	IP20	VDE	6751	A-28
4IK25GN-AWT	4IK25A-AWT	Thermal Protector	E64197	IP54(IP40*2)	VDE	6751	A-28
4IK25GN-CW	4IK25A-CW	Thermal Protector	E64197	IP20	VDE	6751	A-28
4IK25GN-CWT	4IK25A-CWT	Thermal Protector	E64197	IP54(IP40*2)	VDE	6751	A-28
4IK25GN-SW	4IK25A-SW	Thermal Protector	E64197	IP20	VDE	6751	A-28
4IK25GN-SWT	4IK25A-SWT	Thermal Protector	E64197	IP54(IP40*2)	VDE	6751	A-28
5IK40GN-AW	5IK40A-AW	Thermal Protector	E64197	IP20	VDE	6751	A-34
5IK40GN-AWT	5IK40A-AWT	Thermal Protector	E64197	IP54(IP40*2)	VDE	6751	A-34
5IK40GN-CW	5IK40A-CW	Thermal Protector	E64197	IP20	VDE	6751	A-34
5IK40GN-CWT	5IK40A-CWT	Thermal Protector	E64197	IP54(IP40*2)	VDE	6751	A-34
5IK40GN-SW	5IK40A-SW	Thermal Protector	E64197	IP20	VDE	6751	A-34
5IK40GN-SWT	5IK40A-SWT	Thermal Protector	E64197	IP54(IP40*2)	VDE	6751	A-34
5IK60GU-AW	5IK60A-AW	Thermal Protector	E64197	IP20	VDE	6751	A-40
5IK60GU-AWT	5IK60A-AWT	Thermal Protector	E64197	IP44(IP40*2)	VDE	6751	A-40
5IK60GU-CW	5IK60A-CW	Thermal Protector	E64197	IP20	VDE	6751	A-40
5IK60GU-CWT	5IK60A-CWT	Thermal Protector	E64197	IP44(IP40*2)	VDE	6751	A-40
5IK60GU-SW	5IK60A-SW	Thermal Protector	E64197	IP20	VDE	6751	A-40
5IK60GU-SWT	5IK60A-SWT	Thermal Protector	E64197	IP44(IP40*2)	VDE	6751	A-40
5IK90GU-AW	5IK90A-AW	Thermal Protector	E64197	IP20	VDE	6751	A-47
5IK90GU-AWT	5IK90A-AWT	Thermal Protector	E64197	IP44(IP40*2)	VDE	6751	A-47
5IK90GU-CW	5IK90A-CW	Thermal Protector	E64197	IP20	VDE	6751	A-47
5IK90GU-CWT	5IK90A-CWT	Thermal Protector	E64197	IP44(IP40*2)	VDE	6751	A-47
5IK90GU-SW	5IK90A-SW	Thermal Protector	E64197	IP20	DEMKO	138642	A-47
5IK90GU-SWT	5IK90A-SWT	Thermal Protector	E64197	IP44(IP40 *2)	DEMKO	138642	A-47

\*1 When using  $\phi$ 0.33 in. ( $\phi$ 8.5 mm) cables, IP grade is 54; otherwise, IP40 is applied, except for the mounting surface of the round shaft motor. \*2 Round shaft type.

# World K Series Reversible Motors

Мо	del	Overheating Protection	UL File	Degree of	EN/IEC	Standard	Daga
Pinion Shaft	Round Shaft	Device	No.	Protection	Certification Body	Licence No. or Certificate No.	Page
2RK6GN-AW	2RK6A-AW	Impedance Protection	E64199	IP20	VDE	114919	A-74
2RK6GN-AWT	2RK6A-AWT	Impedance Protection	E64199	IP40	VDE	114919	A-74
2RK6GN-CW	2RK6A-CW	Impedance Protection	E64199	IP20	VDE	114919	A-74
2RK6GN-CWT	2RK6A-CWT	Impedance Protection	E64199	IP40	VDE	114919	A-74
3RK15GN-AW	3RK15A-AW	Thermal Protector	E64197	IP20	VDE	6751	A-78
3RK15GN-CW	3RK15A-CW	Thermal Protector	E64197	IP20	VDE	6751	A-78
4RK25GN-AW	4RK25A-AW	Thermal Protector	E64197	IP20	VDE	6751	A-82
4RK25GN-AWT	4RK25A-AWT	Thermal Protector	E64197	IP40	VDE	6751	A-82
4RK25GN-CW	4RK25A-CW	Thermal Protector	E64197	IP20	VDE	6751	A-82
4RK25GN-CWT	4RK25A-CWT	Thermal Protector	E64197	IP40	VDE	6751	A-82
5RK40GN-AW	5RK40A-AW	Thermal Protector	E64197	IP20	VDE	6751	A-87
5RK40GN-AWT	5RK40A-AWT	Thermal Protector	E64197	IP40	VDE	6751	A-87
5RK40GN-CW	5RK40A-CW	Thermal Protector	E64197	IP20	VDE	6751	A-87
5RK40GN-CWT	5RK40A-CWT	Thermal Protector	E64197	IP40	VDE	6751	A-87
5RK60GU-AW	5RK60A-AW	Thermal Protector	E64197	IP20	VDE	6751	A-92
5RK60GU-AWT	5RK60A-AWT	Thermal Protector	E64197	IP40	VDE	6751	A-92
5RK60GU-CW	5RK60A-CW	Thermal Protector	E64197	IP20	VDE	6751	A-92
5RK60GU-CWT	5RK60A-CWT	Thermal Protector	E64197	IP40	VDE	6751	A-92
5RK90GU-AW	5RK90A-AW	Thermal Protector	E64197	IP20	VDE	6751	A-97
5RK90GU-AWT	5RK90A-AWT	Thermal Protector	E64197	IP40	VDE	6751	A-97
5RK90GU-CW	5RK90A-CW	Thermal Protector	E64197	IP20	VDE	6751	A-97
5RK90GU-CWT	5RK90A-CWT	Thermal Protector	E64197	IP40	VDE	6751	A-97

# **General Information**

Safety Standards

Mo	del	Overheating Protection	UL File	Degree of	EN/IEC Standard		Dogo
Pinion Shaft	Round Shaft	Device	No.	Protection	Certification Body	Licence No. or Certificate No.	Page
2RK6GN-AWM	2RK6A-AWM	Impedance Protection	E64199	IP20	VDE	114919	A-132
2RK6GN-CWM	2RK6A-CWM	Impedance Protection	E64199	IP20	VDE	114919	A-132
2IK6GN-SWM	2IK6A-SWM	Impedance Protection	E64199	IP20	VDE	114919	A-132
3RK15GN-AWM	3RK15A-AWM	Thermal Protector	E64197	IP20	VDE	6751	A-137
3RK15GN-CWM	3RK15A-CWM	Thermal Protector	E64197	IP20	VDE	6751	A-137
4RK25GN-AWM	4RK25A-AWM	Thermal Protector	E64197	IP20	VDE	6751	A-142
4RK25GN-CWM	4RK25A-CWM	Thermal Protector	E64197	IP20	VDE	6751	A-142
4IK25GN-SWM	4IK25A-SWM	Thermal Protector	E64197	IP20	VDE	6751	A-142
5RK40GN-AWM	5RK40A-AWM	Thermal Protector	E64197	IP20	VDE	6751	A-147
5RK40GN-CWM	5RK40A-CWM	Thermal Protector	E64197	IP20	VDE	6751	A-147
5IK40GN-SWM	5IK40A-SWM	Thermal Protector	E64197	IP20	VDE	6751	A-147
5RK60GU-AWM	5RK60A-AWM	Thermal Protector	E64197	IP40	VDE	6751	A-152
5RK60GU-CWM	5RK60A-CWM	Thermal Protector	E64197	IP40	VDE	6751	A-152
5IK60GU-SWM	5IK60A-SWM	Thermal Protector	E64197	IP40	VDE	6751	A-152
5RK90GU-AWM	5RK90A-AWM	Thermal Protector	E64197	IP40	VDE	6751	A-157
5RK90GU-CWM	5RK90A-CWM	Thermal Protector	E64197	IP40	VDE	6751	A-157
5IK90GU-SWM	5IK90A-SWM	Thermal Protector	E64197	IP40	DEMKO	138642	A-157

# V Series Induction Motors

Model	Motor Model	Overheating Protection	UL File	Degree of	EN/IEC S	Standard	Page
WOUEI		Device	No.	Protection	Certification Body	Licence No.	Faye
VHI206A-□U	VHI206A-GV	Impedance Protection	E64199	IP20	VDE	114919	A-20
VHI206C-	VHI206C-GV	Impedance Protection	E64199	IP20	VDE	114919	A-20
VHI315A-DU	VHI315A-GV	Thermal Protector	E64197	IP20	VDE	6751	A-24
VHI315C-DE	VHI315C-GV	Thermal Protector	E64197	IP20	VDE	6751	A-24
VHI425A-🗆 U	VHI425A-GV	Thermal Protector	E64197	IP20	VDE	6751	A-28
VHI425C-□E	VHI425C-GV	Thermal Protector	E64197	IP20	VDE	6751	A-28
VHI425S-	VHI425S-GV	Thermal Protector	E64197	IP20	VDE	6751	A-28
VHI425AT-□U	VHI425AT-GV	Thermal Protector	E64197	IP54	VDE	6751	A-28
VHI425CT-□E	VHI425CT-GV	Thermal Protector	E64197	IP54	VDE	6751	A-28
VHI425ST-	VHI425ST-GV	Thermal Protector	E64197	IP54	VDE	6751	A-28
VHI540A-🗆 U	VHI540A-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-34
VHI540C-	VHI540C-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-34
VHI540S-	VHI540S-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-34
VHI540AT-	VHI540AT-GVH	Thermal Protector	E64197	IP54	VDE	6751	A-34
VHI540CT-	VHI540CT-GVH	Thermal Protector	E64197	IP54	VDE	6751	A-34
VHI540ST-	VHI540ST-GVH	Thermal Protector	E64197	IP54	VDE	6751	A-34
VHI560A-🗆 U	VHI560A-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-40
VHI560C-	VHI560C-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-40
VHI560S-	VHI560S-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-40
VHI560AT-	VHI560AT-GVH	Thermal Protector	E64197	IP44	VDE	6751	A-40
VHI560CT-	VHI560CT-GVH	Thermal Protector	E64197	IP44	VDE	6751	A-40
VHI560ST-	VHI560ST-GVH	Thermal Protector	E64197	IP44	VDE	6751	A-40
VHI590A-🗆U	VHI590A-GVR	Thermal Protector	E64197	IP20	—	—	A-47
VHI590C-	VHI590C-GVR	Thermal Protector	E64197	IP20	—	—	A-47
VHI590S-	VHI590S-GVR	Thermal Protector	E64197	IP20	—	—	A-47
VHI590AT-	VHI590AT-GVR	Thermal Protector	E64197	IP44	—	—	A-47
VHI590CT-	VHI590CT-GVR	Thermal Protector	E64197	IP44	—	—	A-47
VHI590ST-	VHI590ST-GVR	Thermal Protector	E64197	IP44	—	—	A-47

Enter the gear ratio in the box (
) within the model name.
VHI590 type conforms to EN Standards.

# **V** Series Reversible Motors

Model	Motor Model	Overheating Protection	UL File	Degree of	EN/IEC S	Standard	Daga
IVIOUEI		Device	No.	Protection	Certification Body	Licence No.	Page
VHR206A-□U	VHR206A-GV	Impedance Protection	E64199	IP20	VDE	114919	A-74
VHR206C-□E	VHR206C-GV	Impedance Protection	E64199	IP20	VDE	114919	A-74
VHR315A-DU	VHR315A-GV	Thermal Protector	E64197	IP20	VDE	6751	A-78
VHR315C-DE	VHR315C-GV	Thermal Protector	E64197	IP20	VDE	6751	A-78
VHR425A-□U	VHR425A-GV	Thermal Protector	E64197	IP20	VDE	6751	A-82
VHR425C-□E	VHR425C-GV	Thermal Protector	E64197	IP20	VDE	6751	A-82
VHR425AT-□U	VHR425AT-GV	Thermal Protector	E64197	IP40	VDE	6751	A-82
VHR425CT-□E	VHR425CT-GV	Thermal Protector	E64197	IP40	VDE	6751	A-82
VHR540A-□U	VHR540A-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-87
VHR540C-□E	VHR540C-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-87
VHR540AT-□U	VHR540AT-GVH	Thermal Protector	E64197	IP40	VDE	6751	A-87
VHR540CT-□E	VHR540CT-GVH	Thermal Protector	E64197	IP40	VDE	6751	A-87
VHR560A-□U	VHR560A-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-92
VHR560C-□E	VHR560C-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-92
VHR560AT-□U	VHR560AT-GVH	Thermal Protector	E64197	IP40	VDE	6751	A-92
VHR560CT-□E	VHR560CT-GVH	Thermal Protector	E64197	IP40	VDE	6751	A-92
VHR590A-🗆 U	VHR590A-GVR	Thermal Protector	E64197	IP20	—	_	A-97
VHR590C-	VHR590C-GVR	Thermal Protector	E64197	IP20	—	—	A-97
VHR590AT-□U	VHR590AT-GVR	Thermal Protector	E64197	IP40	—	_	A-97
VHR590CT-	VHR590CT-GVR	Thermal Protector	E64197	IP40	—		A-97

Enter the gear ratio in the box (
) within the model name.
VHR590 type conforms to EN Standards.

# V Series Electromagnetic Brake Motors

Madal	Motor Model	Overheating Protection	UL File	Degree of	EN/IEC S	Standard	Daga
Model	wotor woder	Device	No.	Protection	Certification Body	Licence No.	- Page
VHR206AM-□U	VHR206AM-GV	Impedance Protection	E64199	IP20	VDE	114919	A-132
VHR206CM-	VHR206CM-GV	Impedance Protection	E64199	IP20	VDE	114919	A-132
VHR315AM-	VHR315AM-GV	Thermal Protector	E64197	IP20	VDE	6751	A-137
VHR315CM-	VHR315CM-GV	Thermal Protector	E64197	IP20	VDE	6751	A-137
VHR425AM- U	VHR425AM-GV	Thermal Protector	E64197	IP20	VDE	6751	A-142
VHR425CM-	VHR425CM-GV	Thermal Protector	E64197	IP20	VDE	6751	A-142
VHI425SM-	VHI425SM-GV	Thermal Protector	E64197	IP20	VDE	6751	A-142
VHR540AM-	VHR540AM-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-147
VHR540CM-	VHR540CM-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-147
VHI540SM-	VHI540SM-GVH	Thermal Protector	E64197	IP20	VDE	6751	A-147
VHR560AM-	VHR560AM-GVH	Thermal Protector	E64197	IP40	VDE	6751	A-152
VHR560CM-	VHR560CM-GVH	Thermal Protector	E64197	IP40	VDE	6751	A-152
VHI560SM-	VHI560SM-GVH	Thermal Protector	E64197	IP40	VDE	6751	A-152
VHR590AM-	VHR590AM-GVR	Thermal Protector	E64197	IP40	—	—	A-157
VHR590CM-	VHR590CM-GVR	Thermal Protector	E64197	IP40	—	_	A-157
VHI590SM-	VHI590SM-GVR	Thermal Protector	E64197	IP40	—	_	A-157

Enter the gear ratio in the box (
) within the model name.
VHR590 type conforms to EN Standards.

# **BH** Series Induction Motors

Mo	Model		Degree of	Daga
Model	Motor Model	Motor	Protection	Page
BHI62F-	BHI62F-G2	E64197	IP40	A-54
BHI62FT-	BHI62FT-G2	E64197	IP54	A-54
BHI62FT-A	—	E64197	IP54 *	A-54
BHI62F-A		E64197	IP40	A-54
BHI62E-	BHI62E-G2	E64197	IP40	A-54
BHI62ET-	BHI62ET-G2	E64197	IP54	A-54
BHI62ET-A	—	E64197	IP54 *	A-54
BHI62E-A	_	E64197	IP40	A-54
BHI62ST-	BHI62ST-G2	E64197	IP54	A-54
BHI62ST-A	_	E64197	IP54 *	A-54

\* Except for the mounting surface.

Enter the gear ratio in the box (□) within the model name.
Enter the shaft type "RH" or "RA" in the box (■) within the model name. (Right-Angle Shaft Type Only)

Мо	Model		Degree of	Page	
Model	Motor Model	Motor	Protection	Taye	
BHI62FMT-	BHI62FMT-G2	E64197	IP54	A-163	
BHI62FMT-A	—	E64197	IP54 *	A-163	
BHI62EMT-	BHI62EMT-G2	E64197	IP54	A-163	
BHI62EMT-A	_	E64197	IP54 *	A-163	
BHI62SMT-	BHI62SMT-G2	E64197	IP54	A-163	
BHI62SMT-A	_	E64197	IP54 *	A-163	

\* Except for the mounting surface.

Enter the gear ratio in the box (
) within the model name.
Enter the shaft type "RH" or "RA" in the box (
) within the model name. (Right-Angle Shaft Type Only)

# Clutch and Brake Motors

Model	Motor Model	Overheating Protection Device	UL File No. Motor	Degree of Protection	Page
CBI540-701WU	5IK40GN-AW-CB1	Thermal Protector	E64197	IP20	A-171
CBI560-801WU	5IK60GU-AW-CB1	Thermal Protector	E64197	IP20	A-171
CBI590-801WU	5IK90GU-AW-CB1	Thermal Protector	E64197	IP20	A-171

• The clutch and brake unit is not UL recognized.

# K Series Conduit Box Type

Mo Pinion Shaft	odel Round Shaft	Overheating Protection Device	UL File No.	Degree of * Protection	Page
4IK25GN-FCH	4IK25AA-FCH	Thermal Protector	E64197	IP54	A-28
4IK25GN-ECH	4IK25AA-ECH	Thermal Protector	E64197	IP54	A-28
4IK25GN-SH	4IK25AA-SH	Thermal Protector	E64197	IP54	A-28
5IK40GN-FCH	5IK40AA-FCH	Thermal Protector	E64197	IP54	A-34
5IK40GN-ECH	5IK40AA-ECH	Thermal Protector	E64197	IP54	A-34
5IK40GN-SH	5IK40AA-SH	Thermal Protector	E64197	IP54	A-34
5IK60GU-FCH	5IK60A-FCH	Thermal Protector	E64197	IP54	A-40
5IK60GU-ECH	5IK60A-ECH	Thermal Protector	E64197	IP54	A-40
5IK60GU-SH	5IK60A-SH	Thermal Protector	E64197	IP54	A-40
5IK90GU-FCH	5IK90A-FCH	Thermal Protector	E64197	IP54	A-47
5IK90GU-ECH	5IK90A-ECH	Thermal Protector	E64197	IP54	A-47
5IK90GU-SH	5IK90A-SH	Thermal Protector	E64197	IP54	A-47

\* Except for the mounting surface of the round shaft motor and conduit opening.

# **K** Series Induction Motors

Model		Overheating Protection UL File		CSA Degree of		EN/IEC S	Page	
Pinion Shaft	Round Shaft	Device	No.	Certificate No.	Protection	Certification Body	Licence No.	Faye
0IK1GN-AUL	OIK1A-AUL	Impedance Protection	E64199	LR47296	IP20	VDE	5876ÜG	A-18
	4IK40A-BA	Thermal Protector	E64197	—	IP20		_	A-65
	5IK60A-BA	Thermal Protector	E64197		IP20			A-65
	5IK90A-BFUL	Thermal Protector	E64197	_	IP20	VDE	5877ÜG	A-65

# **K** Series Reversible Motors

Mo	odel	Overheating Protection	UL File	CSA	Degree of	EN/IEC S	Standard	Page
Pinion Shaft	Round Shaft	Device	No.	Certificate No.	Protection	Certification Body	Licence No.	Page
ORK1GN-AUL	ORK1A-AUL	Impedance Protection	E64199	LR47296	IP20	VDE	5876ÜG	A-72

# Synchronous Motors

Model		Overheating Protection UL File		CSA	Degree of EN/IEC Sta		Standard	Pago
Pinion Shaft	Round Shaft	Device	No.	Certificate No.	Protection	Certification Body	Licence No.	Page
2SK4GN-AUL	2SK4A-AULA	Impedance Protection	E64199	LR47296	IP20	VDE	5876ÜG	A-103
3SK10GN-AUL	3SK10A-AULA	Thermal Protector	E64197	LR47296	IP20	VDE	5877ÜG	A-103
4SK15GN-AUL	4SK15A-AULA	Thermal Protector	E64197	LR47296	IP20	VDE	5877ÜG	A-103
5SK25GN-AUL	5SK25A-AULA	Thermal Protector	E64197	LR47296	IP20	VDE	5877ÜG	A-103

Safety Standards

# Torque Motors

101015						
el	Overheating Protection	UL File	CSA	Degree of	EN/IEC Standard	
Round Shaft	Device	No.	Certificate No.	Protection	Certification Body	Licence No.
3TK6A-AULA	Thermal Protector	E64197	LR47296	IP20	VDE	5877ÜG
4TK10A-AULA	Thermal Protector	E64197	LR47296	IP20	VDE	5877ÜG
5TK20A-AULA	Thermal Protector	E64197	LR47296	IP20	VDE	5877ÜG
(	Round Shaft BTK6A-AULA BTK10A-AULA	Overheating Protection       Round Shaft     Device       BTK6A-AULA     Thermal Protector       ITK10A-AULA     Thermal Protector	Overheating Protection Round ShaftOverheating Protection DeviceUL File No.BTK6A-AULAThermal ProtectorE64197BTK10A-AULAThermal ProtectorE64197	elOverheating Protection DeviceUL File No.CSA Certificate No.BTK6A-AULAThermal ProtectorE64197LR47296BTK10A-AULAThermal ProtectorE64197LR47296	elOverheating Protection DeviceUL File No.CSA Certificate No.Degree of ProtectionBTK6A-AULAThermal ProtectorE64197LR47296IP20BTK10A-AULAThermal ProtectorE64197LR47296IP20	elOverheating Protection DeviceUL File No.CSA Certificate No.Degree of ProtectionEN/IEC SBTK6A-AULAThermal ProtectorE64197LR47296IP20VDEBTK10A-AULAThermal ProtectorE64197LR47296IP20VDE

Page A-111 A-111 A-111

# Brake Pack

Model	UL File No.	Degree of Protection	Page
SB50	E91291	IP10*	A-179

\* When attached to a flush mounting socket.

# Watertight Motors **FPW** Series

Model	Overheating Protection Device	UL File No.	Degree of Protection	Page
FPW425A-	Thermal Protector	E64197	IP67	A-119
FPW425C-	Thermal Protector	E64197	IP67	A-119
FPW425S-	Thermal Protector	E64197	IP67	A-119
FPW540A-	Thermal Protector	E64197	IP67	A-119
FPW540C-	Thermal Protector	E64197	IP67	A-119
FPW540S-	Thermal Protector	E64197	IP67	A-119
FPW560A-	Thermal Protector	E64197	IP67	A-119
FPW560C-	Thermal Protector	E64197	IP67	A-119
FPW560S-	Thermal Protector	E64197	IP67	A-119
FPW690A-	Thermal Protector	E64197	IP67	A-119
FPW690C-	Thermal Protector	E64197	IP67	A-119
FPW690S-	<b>/6905-</b> Thermal Protector		IP67	A-119

• Enter the gear ratio in the box  $(\Box)$  within the model name.

# Brushless DC Motor Systems BX Series

Model	Motor Model	Driver Model	UL Fi	le No.	Daga
Model		Driver would	Motor	Driver	Page
BX230A-A	BXM230-A2	BXD30A-A	E208200	E171462	B-10
BX230A-	BXM230-GFH2	BXD30A-A	E208200	E171462	B-10
BX230C-A	BXM230-A2	BXD30A-C	E208200	E171462	B-10
BX230C-	BXM230-GFH2	BXD30A-C	E208200	E171462	B-10
BX460A-A	BXM460-A2	BXD60A-A	E208200	E171462	B-10
BX460A-	BXM460-GFH2	BXD60A-A	E208200	E171462	B-10
BX460C-A	BXM460-A2	BXD60A-C	E208200	E171462	B-10
BX460C-	BXM460-GFH2	BXD60A-C	E208200	E171462	B-10
BX5120A-A	BXM5120-A2	BXD120A-A	E208200	E171462	B-10
BX5120A-	BXM5120-GFH2	BXD120A-A	E208200	E171462	B-10
BX5120C-A	BXM5120-A2	BXD120A-C	E208200	E171462	B-10
BX5120C-	BXM5120-GFH2	BXD120A-C	E208200	E171462	B-10
BX6200A-A	BXM6200-A	BXD200A-A	E62327	E171462	B-10
BX6200A-	BXM6200-GH	BXD200A-A	E62327	E171462	B-10
BX6200C-A	BXM6200-A	BXD200A-C	E62327	E171462	B-10
BX6200C-	BXM6200-GH	BXD200A-C	E62327	E171462	B-10
BX6400S-A	BXM6400-A	BXD400A-S	E62327	E171462	B-10
BX6400S-	BXM6400-GH	BXD400B-S	E62327	E171462	B-10

• Enter the gear ratio in the box  $(\Box)$  within the model name.

# Brushless DC Motor Systems BX Series with Electromagnetic Brake

Model	Motor Model	Driver Model	UL Fi	le No.	Daga
WOder	wotor woder	Driver Model	Motor	Driver	Page
BX230AM-A	BXM230M-A2	BXD30A-A	E208200	E171462	B-10
BX230AM-	BXM230M-GFH2	BXD30A-A	E208200	E171462	B-10
BX230CM-A	BXM230M-A2	BXD30A-C	E208200	E171462	B-10
BX230CM-	BXM230M-GFH2	BXD30A-C	E208200	E171462	B-10
BX460AM-A	BXM460M-A2	BXD60A-A	E208200	E171462	B-10
BX460AM-	BXM460M-GFH2	BXD60A-A	E208200	E171462	B-10
BX460CM-A	BXM460M-A2	BXD60A-C	E208200	E171462	B-10
BX460CM-	BXM460M-GFH2	BXD60A-C	E208200	E171462	B-10
BX5120AM-A	BXM5120M-A2	BXD120A-A	E208200	E171462	B-10
BX5120AM-	BXM5120M-GFH2	BXD120A-A	E208200	E171462	B-10
BX5120CM-A	BXM5120M-A2	BXD120A-C	E208200	E171462	B-10
BX5120CM-	BXM5120M-GFH2	BXD120A-C	E208200	E171462	B-10
BX6200AM-A	BXM6200M-A	BXD200A-A	E62327	E171462	B-10
BX6200AM-	BXM6200M-GH	BXD200A-A	E62327	E171462	B-10
BX6200CM-A	BXM6200M-A	BXD200A-C	E62327	E171462	B-10
BX6200CM-	BXM6200M-GH	BXD200A-C	E62327	E171462	B-10
BX6400SM-A	BXM6400M-A	BXD400A-S	E62327	E171462	B-10
BX6400SM-	BXM6400M-GH	BXD400B-S	E62327	E171462	B-10

• Enter the gear ratio in the box  $(\Box)$  within the model name.

# Brushless DC Motor Systems FBLII Series

Model	Motor Model	Driver Model	UL Fi	le No.	DEMKO Ce	rtificate No.	Degree of	Protection	Daga
MOUEI		Driver would	Motor	Driver	Motor	Driver	Motor	Driver	Page
FBL575AW-	FBLM575W-GFB	FBLD75AW	E62327	E171462	124888	131974	IP40	IP10	B-34
FBL575AW-A	FBLM575W-A	FBLD75AW	E62327	E171462	124888	131974	IP40	IP10	B-34
FBL575CW-	FBLM575W-GFB	FBLD75CW	E62327	E171462	124888	131974	IP40	IP10	B-34
FBL575CW-A	FBLM575W-A	FBLD75CW	E62327	E171462	124888	131974	IP40	IP10	B-34
FBL575SW-	FBLM575W-GFB	FBLD75SW	E62327	E171462	124888	_	IP40	IP10	B-34
FBL575SW-A	FBLM575W-A	FBLD75SW	E62327	E171462	124888	_	IP40	IP10	B-34
FBL5120AW-	FBLM5120W-GFB	FBLD120AW	E62327	E171462	124888	131974	IP40	IP10	B-34
FBL5120AW-A	FBLM5120W-A	FBLD120AW	E62327	E171462	124888	131974	IP40	IP10	B-34
FBL5120CW-	FBLM5120W-GFB	FBLD120CW	E62327	E171462	124888	131974	IP40	IP10	B-34
FBL5120CW-A	FBLM5120W-A	FBLD120CW	E62327	E171462	124888	131974	IP40	IP10	B-34
FBL5120SW-	FBLM5120W-GFB	FBLD120SW	E62327	E171462	124888	—	IP40	IP10	B-34
FBL5120SW-A	FBLM5120W-A	FBLD120SW	E62327	E171462	124888	_	IP40	IP10	B-34

• Enter the gear ratio in the box  $(\Box)$  within the model name.

• FBL575SW, FBL5120SW types conform to EN Standards.

Safety Standards

# Brushless DC Motor Systems AXU Series

Model	Motor Model	Control Unit	UL	File No.	Degree	of Protection	Dogo
wouer		Model	Motor	Control Unit	Motor	Control Unit	Page
AXU210A-GN	AXUM210-GN	AXUD10A	E208200	E171462	IP65	IP10	B-46
AXU210A-A	AXUM210-A	AXUD10A	E208200	E171462	IP65*	IP10	B-46
AXU210C-GN	AXUM210-GN	AXUD10C	E208200	E171462	IP65	IP10	B-46
AXU210C-A	AXUM210-A	AXUD10C	E208200	E171462	IP65*	IP10	B-46
AXU210S-GN	AXUM210-GN	AXUD10S	E208200	E171462	IP65	IP10	B-46
AXU210S-A	AXUM210-A	AXUD10S	E208200	E171462	IP65*	IP10	B-46
AXU425A-GN	AXUM425-GN	AXUD25A	E208200	E171462	IP65	IP10	B-46
AXU425A-A	AXUM425-A	AXUD25A	E208200	E171462	IP65*	IP10	B-46
AXU425C-GN	AXUM425-GN	AXUD25C	E208200	E171462	IP65	IP10	B-46
AXU425C-A	AXUM425-A	AXUD25C	E208200	E171462	IP65*	IP10	B-46
AXU425S-GN	AXUM425-GN	AXUD25S	E208200	E171462	IP65	IP10	B-46
AXU425S-A	AXUM425-A	AXUD25S	E208200	E171462	IP65*	IP10	B-46
AXU540A-GN	AXUM540-GN	AXUD40A	E208200	E171462	IP65	IP10	B-46
AXU540A-A	AXUM540-A	AXUD40A	E208200	E171462	IP65*	IP10	B-46
AXU540C-GN	AXUM540-GN	AXUD40C	E208200	E171462	IP65	IP10	B-46
AXU540C-A	AXUM540-A	AXUD40C	E208200	E171462	IP65*	IP10	B-46
AXU540S-GN	AXUM540-GN	AXUD40S	E208200	E171462	IP65	IP10	B-46
AXU540S-A	AXUM540-A	AXUD40S	E208200	E171462	IP65*	IP10	B-46
AXU590A-GU	AXUM590-GU	AXUD90A	E208200	E171462	IP65	IP10	B-46
AXU590A-A	AXUM590-A	AXUD90A	E208200	E171462	IP65*	IP10	B-46
AXU590C-GU	AXUM590-GU	AXUD90C	E208200	E171462	IP65	IP10	B-46
AXU590C-A	AXUM590-A	AXUD90C	E208200	E171462	IP65*	IP10	B-46
AXU590S-GU	AXUM590-GU	AXUD90S	E208200	E171462	IP65	IP10	B-46
AXU590S-A	AXUM590-A	AXUD90S	E208200	E171462	IP65*	IP10	B-46

\* Except for the mounting surface.

# Brushless DC Motor Systems AXH Series

Model	Motor Model	Driver Model	UL Fi	le No.	Degree of	Protection	Page
			Motor	Driver	Motor	Driver	Faye
AXH015K-	AXHM015K-	AXHD15K	E208200	E208200	IP40	IP00	B-58
AXH015K-A	AXHM015K-A	AXHD15K	E208200	E208200	IP40	IP00	B-58
AXH230KC-	AXHM230KC-GFH	AXHD30K	E208200	E208200	IP65	IP00	B-58
AXH230KC-A	AXHM230KC-A	AXHD30K	E208200	E208200	IP65 *	IP00	B-58
AXH450KC-	AXHM450KC-GFH	AXHD50K	E208200	E208200	IP65	IP00	B-58
AXH450KC-A	AXHM450KC-A	AXHD50K	E208200	E208200	IP65 *	IP00	B-58
AXH5100KC-	AXHM5100KC-GFH	AXHD100K	E208200	E208200	IP65	IP00	B-58
AXH5100KC-A	AXHM5100KC-A	AXHD100K	E208200	E208200	IP65 *	IP00	B-58

★ Except for the mounting surface.
● Enter the gear ratio in the box (□) within the model name.

# AC Motor Systems **BHF** Series Speed Control Motor Unit

Model	Motor Model	Speed Control Pack Model	UL	UL File No.		Degree of Protection		
INIOUEI		Speed Control Pack Model	Motor	Speed Control Pack	Motor	Speed Control Pack	Page	
BHF62AT-	BHM62T-G2	FSP200-1	E64197	E171462	IP54	IP10	B-70	
BHF62AT-A	BHM62T-A	FSP200-1	E64197	E171462	IP54*	IP10	B-70	
BHF62CT-	BHM62T-G2	FSP200-2	E64197	E171462	IP54	IP10	B-70	
BHF62CT-A	BHM62T-A	FSP200-2	E64197	E171462	IP54*	IP10	B-70	
BHF62ST-	BHM62T-G2	FSP200-3	E64197	E171462	IP54	IP10	B-70	
BHF62ST-A	BHM62T-A	FSP200-3	E64197	E171462	IP54 *	IP10	B-70	

\* Except for the mounting surface.

• Enter the gear ratio in the box ( $\Box$ ) within the model name.

• Enter the shaft type "RH" or "RA" in the box() within the model name. (Right-Angle Shaft Type Only)

# AC Motor Systems BHF Series Speed Control Motor Unit with Electromagnetic Brake

Model	Motor Model	or Model Speed Control Pack Model		UL File No.		Degree of Protection		
INIOUEI	Motor Model	Speed Control Pack Model	Motor	Speed Control Pack	Motor	Speed Control Pack	Page	
BHF62AMT-	BHM62MT-G2	FSP200-1	E64197	E171462	IP54	IP10	B-70	
BHF62AMT-A	BHM62MT-A	FSP200-1	E64197	E171462	IP54 *	IP10	B-70	
BHF62CMT-	BHM62MT-G2	FSP200-2	E64197	E171462	IP54	IP10	B-70	
BHF62CMT-A	BHM62MT-A	FSP200-2	E64197	E171462	IP54 *	IP10	B-70	
BHF62SMT-	BHM62MT-G2	FSP200-3	E64197	E171462	IP54	IP10	B-70	
BHF62SMT-A	BHM62MT-A	FSP200-3	E64197	E171462	IP54*	IP10	B-70	

\* Except for the mounting surface.

• Enter the gear ratio in the box  $(\Box)$  within the model name.

• Enter the shaft type "RH" or "RA" in the box() within the model name. (Right-Angle Shaft Type Only)

# AC Motor Systems Speed Controllers

Model	UL File No.	Degree of Protection	Page
ESO1	E91291	IP20	B-86
ESO2	E91291	IP20	B-86

## World K Series Speed Control Motors Induction Motors

Mod	el	Overheating Protection	UL File	Degree of	Page
Pinion Shaft	Round Shaft	Device	No.	Protection	i aye
2IK6RGN-AW	2IK6RA-AW	Impedance Protection	E64199	IP20	B-86
2IK6RGN-CW	2IK6RA-CW	Impedance Protection	E64199	IP20	B-86
3IK15RGN-AW	3IK15RA-AW	Thermal Protector	E64197	IP20	B-86
3IK15RGN-CW	3IK15RA-CW	Thermal Protector	E64197	IP20	B-86
4IK25RGN-AW	4IK25RA-AW	Thermal Protector	E64197	IP20	B-86
4IK25RGN-CW	4IK25RA-CW	Thermal Protector	E64197	IP20	B-86
5IK40RGN-AW	5IK40RA-AW	Thermal Protector	E64197	IP20	B-86
5IK40RGN-CW	5IK40RA-CW	Thermal Protector	E64197	IP20	B-86
5IK60RGU-AW	5IK60RA-AW	Thermal Protector	E64197	IP40	B-86
5IK60RGU-CW	5IK60RA-CW	Thermal Protector	E64197	IP40	B-86

### World K Series Speed Control Motors Reversible Motors

Mode	1	Overheating Protection	UL File	Degree of	Page
Pinion Shaft	Round Shaft	Device	No.	Protection	. ugo
2RK6RGN-AW	2RK6RA-AW	Impedance Protection	E64199	IP20	B-86
2RK6RGN-CW	2RK6RA-CW	Impedance Protection	E64199	IP20	B-86
3RK15RGN-AW	3RK15RA-AW	Thermal Protector	E64197	IP20	B-86
3RK15RGN-CW	3RK15RA-CW	Thermal Protector	E64197	IP20	B-86
4RK25RGN-AW	4RK25RA-AW	Thermal Protector	E64197	IP20	B-86
4RK25RGN-CW	4RK25RA-CW	Thermal Protector	E64197	IP20	B-86
5RK40RGN-AW	5RK40RA-AW	Thermal Protector	E64197	IP20	B-86
5RK40RGN-CW	5RK40RA-CW	Thermal Protector	E64197	IP20	B-86
5RK60RGU-AW	5RK60RA-AW	Thermal Protector	E64197	IP40	B-86
5RK60RGU-CW	5RK60RA-CW	Thermal Protector	E64197	IP40	B-86

Safety Standards

# V Series Speed Control Motors Induction Motors

Mode	)	Overheating Protection	UL File	Degree of	Page
Model	Motor Model	Device	No.	Protection	Tago
VSI206A-🗆 U	VSI206A-GV	Impedance Protection	E64199	IP20	B-86
VSI206C-□E	VSI206C-GV	Impedance Protection	E64199	IP20	B-86
VSI315A-🗆U	VSI315A-GV	Thermal Protector	E64197	IP20	B-86
VSI315C-	VSI315C-GV	Thermal Protector	E64197	IP20	B-86
VSI425A-□U	VSI425A-GV	Thermal Protector	E64197	IP20	B-86
VSI425C-□E	VSI425C-GV	Thermal Protector	E64197	IP20	B-86
VSI540A-🗆U	VSI540A-GVH	Thermal Protector	E64197	IP20	B-86
VSI540C-	VSI540C-GVH	Thermal Protector	E64197	IP20	B-86
VSI560A-🗆U	VSI560A-GVH	Thermal Protector	E64197	IP20	B-86
VSI560C-	VSI560C-GVH	Thermal Protector	E64197	IP20	B-86
VSI590A-🗆U	VSI590A-GVR	Thermal Protector	E64197	IP20	B-86
VSI590C-	VSI590C-GVR	Thermal Protector	E64197	IP20	B-86

 $\bullet$  Enter the gear ratio in the box ( ) within the model name.

# **V** Series Speed Control Motors Reversible Motors

Mode	9]	Overheating Protection	UL File	Degree of	Page
Model	Motor Model	Device	No.	Protection	Faye
VSR206A-🗆 U	VSR206A-GV	Impedance Protection	E64199	IP20	B-86
VSR206C-	VSR206C-GV	Impedance Protection	E64199	IP20	B-86
VSR315A-	VSR315A-GV	Thermal Protector	E64197	IP20	B-86
VSR315C-	VSR315C-GV	Thermal Protector	E64197	IP20	B-86
VSR425A-🗆 U	VSR425A-GV	Thermal Protector	E64197	IP20	B-86
VSR425C-	VSR425C-GV	Thermal Protector	E64197	IP20	B-86
VSR540A-🗆 U	VSR540A-GVH	Thermal Protector	E64197	IP20	B-86
VSR540C-	VSR540C-GVH	Thermal Protector	E64197	IP20	B-86
VSR560A-🗆 U	VSR560A-GVH	Thermal Protector	E64197	IP20	B-86
VSR560C-	VSR560C-GVH	Thermal Protector	E64197	IP20	B-86
VSR590A-🗆 U	VSR590A-GVR	Thermal Protector	E64197	IP20	B-86
VSR590C-	VSR590C-GVR	Thermal Protector	E64197	IP20	B-86

 $\bullet$  Enter the gear ratio in the box ( ) within the model name.

# AC Motor Systems US Series

Model	Motor	Control Unit	Overheating Protection	UL F	ile No.	Degree of	Protection	Daga
INIOUEI	IVIOLOI	Control Unit	Device	Motor	Control Unit	Motor	Control Unit	Page
US206-401U	USM206-401W	USP206-1U	Impedance Protection	E64199	E91291	IP20	IP10	B-116
US206-001U	USM206-001W	USP206-1U	Impedance Protection	E64199	E91291	IP20	IP10	B-116
US315-401U	USM315-401W	USP315-1U	Thermal Protector	E64197	E91291	IP20	IP10	B-116
US315-001U	USM315-001W	USP315-1U	Thermal Protector	E64197	E91291	IP20	IP10	B-116
US425-401U	USM425-401W	USP425-1U	Thermal Protector	E64197	E91291	IP20	IP10	B-116
US425-001U	USM425-001W	USP425-1U	Thermal Protector	E64197	E91291	IP20	IP10	B-116
US540-401U	USM540-401W	USP540-1U	Thermal Protector	E64197	E91291	IP20	IP10	B-116
US540-001U	USM540-001W	USP540-1U	Thermal Protector	E64197	E91291	IP20	IP10	B-116
US560-501U	USM560-501W	USP560-1U	Thermal Protector	E64197	E91291	IP40	IP10	B-116
US560-001U	USM560-001W	USP560-1U	Thermal Protector	E64197	E91291	IP40	IP10	B-116
US590-501U	USM590-501W	USP590-1U	Thermal Protector	E64197	E91291	IP40	IP10	B-116
US590-001U	USM590-001W	USP590-1U	Thermal Protector	E64197	E91291	IP40	IP10	B-116
US206-402E	USM206-402W	USP206-2E	Impedance Protection	E64199	E91291	IP20	IP10	B-116
US206-002E	USM206-002W	USP206-2E	Impedance Protection	E64199	E91291	IP20	IP10	B-116
US315-402E	USM315-402W	USP315-2E	Thermal Protector	E64197	E91291	IP20	IP10	B-116
US315-002E	USM315-002W	USP315-2E	Thermal Protector	E64197	E91291	IP20	IP10	B-116
US425-402E	USM425-402W	USP425-2E	Thermal Protector	E64197	E91291	IP20	IP10	B-116
US425-002E	USM425-002W	USP425-2E	Thermal Protector	E64197	E91291	IP20	IP10	B-116
US540-402E	USM540-402W	USP540-2E	Thermal Protector	E64197	E91291	IP20	IP10	B-116
US540-002E	USM540-002W	USP540-2E	Thermal Protector	E64197	E91291	IP20	IP10	B-116
US560-502E	USM560-502W	USP560-2E	Thermal Protector	E64197	E91291	IP40	IP10	B-116
US560-002E	USM560-002W	USP560-2E	Thermal Protector	E64197	E91291	IP40	IP10	B-116
US590-502E	USM590-502W	USP590-2E	Thermal Protector	E64197	E91291	IP40	IP10	B-116
US590-002E	USM590-002W	USP590-2E	Thermal Protector	E64197	E91291	IP40	IP10	B-116

General

# ■ *QSTEP* AS Series/AS PLUS Series

Tuna		AS			AS PLUS			Daga	l n
Туре	Model	Motor Model	Driver Model	Model	Motor Model	Driver Model	UL File No.	Page	al Information
	AS66 A	ASM66_A	ASD24A-A	AS66 AP	ASM66⊡A	ASD24A-AP			ma
itandard	AS69 A	ASM69_A	ASD30D-A	AS69 AP	ASM69_A	ASD30D-AP			tio
ingle-Phase 100-115 VAC	AS98 A	ASM98_A	ASD30A-A	AS98 AP	ASM98_A	ASD30A-AP			ä
	AS911AA	ASM911AA	ASD30E-A	AS911AAP	ASM911AA	ASD30E-AP			
	AS66 C	ASM66_C	ASD12A-C	AS66 CP	ASM66□C	ASD12A-CP			St
tandard	AS69 C	ASM69_C	ASD16D-C	AS69 CP	ASM69_C	ASD16D-CP		0.04	Standards
ingle-Phase 200-230 VAC	AS98 C	ASM98_C	ASD16A-C	AS98 CP	ASM98_C	ASD16A-CP		C-21	ards
	AS911AC	ASM911AC	ASD20A-C	AS911ACP	ASM911AC	ASD20A-CP			
	AS66_S	ASM66 C	ASD12A-S	AS66 SP	ASM66□C	ASD12A-SP			Products
itandard	AS69_S	ASM69_C	ASD16D-S	AS69_SP	ASM69 C	ASD16D-SP			ldts
hree-Phase 200-230 VAC	AS98_S	ASM98_C	ASD16A-S	AS98_SP	ASM98□C	ASD16A-SP			
	AS911AS	ASM911AC	ASD20A-S	AS911ASP	ASM911AC	ASD20A-SP			SO1
	AS66 A-T3.6	ASM66□A-T3.6		AS66 AP-T3.6	ASM66_A-T3.6		1 1		ISO14001
	AS66 A-T7.2	ASM66_A-T7.2	ASD24B-A	AS66 AP-T7.2	ASM66_A-T7.2	ASD24B-AP			
	AS66_A-T10	ASM66_A-T10		AS66 AP-T10	ASM66_A-T10			0.00	Supply Voltages
	AS66 A-T20	ASM66 A-T20		AS66 AP-T20	ASM66_A-T20		1	C-23	Volta
<b>FH</b> Geared Single-Phase 100-115 VAC	AS66 A-T30	ASM66⊡A-T30	ASD24C-A	AS66 AP-T30		ASD24C-AP			ges
	AS98 A-T3.6	ASM98_A-T3.6		AS98_AP-T3.6	ASM98_A-T3.6				Updates
	AS98_A-T7.2	ASM98_A-T7.2	ASD30A-A	AS98 AP-T7.2	ASM98_A-T7.2	ASD30A-AP	Motor — E64199 — Driver -		date
	AS98 A-T10	ASM98_A-T10		AS98 AP-T10	ASM98_A-T10			C-24	S
	AS98□A-T20	ASM98 A-T20	ASD30C-A	AS98_AP-T20	ASM98 A-T20	ASD30C-AP			=
	AS98_A-T30	ASM98_A-T30		AS98_AP-T30	ASM98 A-T30				Index
	AS66_C-T3.6	ASM66C-T3.6		AS66 CP-T3.6	ASM66 C-T3.6				
	AS66_C-T7.2	ASM66C-T7.2	ASD12B-C	AS66 CP-T7.2	ASM66 C-T7.2	ASD12B-CP	E171462		0
	AS66 C-T10	ASM66 C-T10		AS66 CP-T10	ASM66 C-T10			C-23	vervi
	AS66 C-T20	ASM66 C-T20	100100.0	AS66 CP-T20	ASM66 C-T20		-		Overview
<b>H</b> Geared	AS66_C-T30	ASM66 C-T30	ASD12C-C	AS66_CP-T30		ASD12C-CP			Network
Single-Phase 200-230 VAC	AS98_C-T3.6	ASM98C-T3.6		AS98 CP-T3.6	ASM98_C-T3.6		-		Vetwo
·	AS98_C-T7.2	ASM98C-T7.2	ASD16A-C	AS98 CP-T7.2	ASM98_C-T7.2	ASD16A-CP			ork
	AS98_C-T10	ASM98_C-T10		AS98 CP-T10				C-24	Info
	A598_C-T20	ASM98 C-T20		AS98_CP-T20			1		rmatio
	A598_C-T30	ASM98 C-T30	ASD16C-C	AS98_CP-T30		ASD16C-CP			Information Sheets
	AS66_S-T3.6	ASM66C-T3.6		AS66 SP-T3.6	ASM66 C-T3.6		1		
	AS66_S-T7.2	ASM66_C-T7.2	ASD12B-S		ASM66_C-T7.2	ASD12B-SP			Charts
	AS66 S-T10	ASM66 C-T10		AS66 SP-T10				C-23	arts
	AS66_S-T20	ASM66 C-T20		AS66 SP-T20			1		
H Geared	AS66_S-T30	ASM66C-T30	ASD12C-S	AS66_SP-T30		ASD12C-SP			
Three-Phase 200-230 VAC	AS98_S-T3.6	ASM98_C-T3.6			ASM98_C-T3.6				-
	AS98_S-T7.2	ASM98_C-T7.2	ASD16A-S		ASM98_C-T7.2	ASD16A-SP			
	AS98_S-T10	ASM98_C-T10		AS98 SP-T10				C-24	
	AS98_S-T20	ASM98 C-T20		AS98_SP-T20				-	
-	AS98_S-T30	ASM98 C-T30	ASD16C-S	AS98 SP-T30		ASD16C-SP			

• Enter **A** (Standard) or **M** (electromagnetic brake) in the box ( $\Box$ ) within the model names.

Type		AS			AS PLUS			Deer
Туре	Model	Motor Model	Driver Model	Model	Motor Model	Driver Model	UL File No.	Page
	AS66 A-N5	ASM66_A-N5		AS66 AP-N5	ASM66_A-N5			
	AS66 A-N7.2	ASM66_A-N7.2	ASD24A-A	AS66 AP-N7.2	ASM66 A-N7.2	ASD24A-AP		
	AS66 A-N10	ASM66_A-N10		AS66 AP-N10	ASM66_A-N10			0.00
	AS66 A-N25	ASM66_A-N25	ASD24B-A	AS66 AP-N25	ASM66 A-N25	ASD24B-AP		C-26
	AS66 A-N36	ASM66_A-N36		AS66 AP-N36	ASM66_A-N36			
PN Geared	AS66 A-N50	ASM66_A-N50	ASD24C-A	AS66 AP-N50	ASM66_A-N50	ASD24C-AP		
Single-Phase 100-115 VAC	AS98 A-N5	ASM98_A-N5		AS98 AP-N5	ASM98□A-N5			
Ū.	AS98_A-N7.2	ASM98_A-N7.2		AS98_AP-N7.2	ASM98_A-N7.2			
	AS98 A-N10	ASM98_A-N10	ASD30A-A	AS98_AP-N10	ASM98_A-N10	ASD30A-AP		
				AS98_AP-N25	ASM98 A-N25			C-27
		ASM98_A-N36		AS98 AP-N36	ASM98_A-N36			
		ASM98_A-N50	ASD30B-A	AS98_AP-N50	ASM98□A-N50	ASD30B-AP	-	
	AS66_C-N5	ASM66 C-N5		AS66 CP-N5				
		ASM66_C-N7.2	ASD12A-C	AS66_CP-N7.2	ASM66_C-N7.2	ASD12A-CP		
	AS66 C-N10	ASM66_C-N10		AS66 CP-N10				
<b>PN</b> Geared Single-Phase 200-230 VAC	AS66_C-N25	ASM66_C-N25	ASD12B-C	AS66 CP-N25	ASM66 C-N25	ASD12B-CP		C-26
	AS66_C-N36	ASM66_C-N36		AS66_CP-N36		<u>.</u>	-	
		ASM66_C-N50	ASD12C-C		ASM66 C-N50	ASD12C-CP		
	AS98 C-N5	ASM98 C-N5		AS98 CP-N5				
		ASM98_C-N7.2		AS98 CP-N7.2	ASM98_C-N7.2			
	AS98 C-N10	ASM98_C-N10	ASD16A-C	AS98_CP-N10	ASM98_C-N10	-		
	AS98 C-N25	ASM98_C-N25	AJDTOA-C	AS98 CP-N25	ASM98_C-N25			C-27
	A576_C-N25	ASM98_C-N36		AS98 CP-N36	ASM98_C-N36		Motor	
	A598_C-N50	ASM98_C-N50	ASD16B-C	AS98_CP-N50	ASM98_C-N50	ASD16B-CP	E64199	
	AS66_S-N5	ASM66_C-N5	ASD10B-C	AS66_SP-N5	ASM66 C-N5	ASDTOD-CI		
		ASM66_C-N7.2	ASD12A-S		ASM66_C-N7.2	ASD12A-SP	Driver	
	AS66_S-N10	ASM66_C-N10	AJD12A-J	AS66_SP-N10	ASM66_C-N10	AJD12A-JF	E171462	
			ASD12B-S			ASD12B-SP	-	C-26
	AS66 S-N25	ASM66 C-N25	AJD12D-J		ASM66C-N25	AJD12D-JF	-	
	AS66 S-N36	ASM66C-N36	ASD12C-S		ASM66C-N36	ASD12C-SP		
PN Geared		ASM66C-N50			ASM66C-N50			
Three-Phase 200-230 VAC		ASM98C-N5						
		ASM98C-N7.2			ASM98 C-N7.2			
	AS98 S-N10	ASM98C-N10	ASD16A-S		ASM98C-N10	ASD16A-SP		C-27
	AS98 S-N25	ASM98C-N25			ASM98C-N25			
	AS98 S-N36	ASM98C-N36			ASM98C-N36		- 1	
			ASD16B-S			ASD16B-SP		
		ASM66 A2-H50	ASD24B-A		ASM66 A2-H50	ASD24B-AP		
HG Geared		ASM66 A2-H100	ASD24C-A		ASM66 A2-H100	ASD24C-AP		
Single-Phase 100-115 VAC		ASM98 A-H50	ASD30B-A		ASM98 A-H50	ASD30B-AP		
		ASM98 A-H100	ACD100 C		ASM98 A-H100			
		ASM66C2-H50	ASD12B-C		ASM66C2-H50	ASD12B-CP		
HG Geared		ASM66 C2-H100	ASD12C-C		ASM66 C2-H100	ASD12C-CP		C-28
Single-Phase 200-230 VAC	AS98_C-H50		ASD16B-C		ASM98C-H50	ASD16B-CP		
		ASM98 C-H100			ASM98 C-H100			
		ASM66 C2-H50	ASD12B-S		ASM66C2-H50	ASD12B-SP		
HG Geared		ASM66 C2-H100	ASD12C-S		ASM66 C2-H100	ASD12C-SP		
Three-Phase 200-230 VAC	AS98_S-H50	ASM98 C-H50	ASD16B-S	AS98 SP-H50	ASM98□C-H50	ASD16B-SP		
	AS98 S-H100	ASM98 C-H100		AS98 SP-H100	ASM98 C-H100			

• Enter **A** (Standard) or **M** (electromagnetic brake) in the box ( $\Box$ ) within the model names.

$\alpha_{step}$	ASC	Series
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Туре	Model	Motor Model	Driver Model	UL File No.	Page	
	ASC34AK	ASM34AK	ASD10A-K			
Standard	ASC36AK	ASM36AK	ASD10B-K		C-59	
Sidiludiu	ASC46 K	ASM46_K	ASD18A-K		0-39	
	ASC66 K	ASM66⊡K	ASD36A-K			
	ASC46_K-T3.6	ASM46_K-T3.6				
	ASC46_K-T7.2	ASM46_K-T7.2				
	ASC46 K-T10	ASM46_K-T10	ASD18B-K		C-60	
	ASC46 K-T20	ASM46 K-T20				
<b>TH</b> Geared	ASC46 K-T30	ASM46_K-T30				
	ASC66 K-T3.6	ASM66_K-T3.6		Motor	C-61	
	ASC66 K-T7.2	ASM66_K-T7.2				
	ASC66 K-T10	ASM66_K-T10	ASD36B-K			
	ASC66 K-T20	ASM66 K-T20		E208200		
	ASC66 K-T30	ASM66 K-T30				
	ASC46_K-N7.2	ASM46_K-N7.2	ASD18A-K	Driver E171462 E208200	C-62	
	ASC46 K-N10	ASM46_K-N10	AJDTOA-K		0-02	
	ASC66 K-N5	ASM66_K-N5				
PN Geared	ASC66 K-N7.2	ASM66_K-N7.2	ASD36A-K			
FIN Gealeu	ASC66 K-N10	ASM66□K-N10			C-63	
	ASC66 K-N25	ASM66_K-N25			0-00	
	ASC66 K-N36	ASM66□K-N36	ASD36B-K			
	ASC66 K-N50	ASM66⊡K-N50				
	ASC34AK-H50	ASM34AK-H50	ASD10C-K			
	ASC34AK-H100	ASM34AK-H100	ASD IUC-K		C-64	
<b>HG</b> Geared	ASC46 K-H50	ASM46 K-H50	ASD18A-K		0-04	
ng Gealeu	ASC46 K-H100	ASM46□K-H100	AJUTOA-K			
	ASC66 K-H50	ASM66 K-H50	ASD36B-K		C-65	
	ASC66 K-H100	ASM66_K-H100	AJUJOD-N		0-00	

• Enter **A** (Standard) or **M** (electromagnetic brake) in the box ( $\Box$ ) within the model names.

# Stepping Motors RK Series

In addition to the products listed on pages G-21 and G-22, we also offer products conforming to various safety standards. Refer to page C-79 for details.

Turo	Model	Motor Model	Driver Model	UL File No.	EN/IEC Star	ndards	Page
Туре	IVIOUEI	WOLDT WOUEI	Driver would	OL FILE NO.	Motor	Driver	Faye
	RK564□A	PK564⊡W	RKD514L-A	Motor			
	RK566 🗆 A	PK566⊡W	RKD514L-A		Certification Body		
Standard	RK569_A	PK569⊡W	RKD514L-A	E64199	VDE		
Single-Phase 100-115 VAC	RK596_A	PK596⊡W	RKD514H-A	Driver	Licence No.		
	RK599_A	PK599⊡W	RKD514H-A	E171462	114293		
	RK5913_A	PK5913⊡W	RKD514H-A	E171402			C-82
	RK564_C	PK564⊡W	RKD514L-C	Motor			6-02
	RK566 C	PK566⊡W	RKD514L-C	E64199	Certification Body	у	
Standard	RK569_C	PK569⊡W	RKD514L-C	E04199	VDE		
Single-Phase 200-230 VAC	RK596_C	PK596⊡W	RKD514H-C	Driver	Licence No.		
	RK599_C	PK599⊡W	RKD514H-C	-	114293		
	RK5913_C	PK5913⊡W	RKD514H-C	E171462			
	RK564_A-T3.6	PK564⊡W-T3.6	RKD514L-A				
	RK564_A-T7.2	PK564□W-T7.2	RKD514L-A				
	RK564 A-T10	PK564□W-T10	RKD514L-A	Motor			C-84
	RK564□A-T20	PK564□W-T20	RKD514L-A	Motor	Certification Body		
TH Geared	RK564□A-T30	PK564□W-T30	RKD514L-A	E64199	VDE		
Single-Phase 100-115 VAC	RK596 A-T3.6	PK596□W-T3.6	RKD514H-A	Driver	Licence No.		
	RK596_A-T7.2	PK596□W-T7.2	RKD514H-A		114293		
	RK596 A-T10	PK596□W1-T10	RKD514H-A	E171462			C-85
	RK596 A-T20	PK596□W1-T20	RKD514H-A				
	RK596 A-T30	PK596□W1-T30	RKD514H-A				

• Enter **A** (single shaft) or **B** (double shaft) in the box  $(\Box)$  within the model names.

Turce	Model	Motor Model	Driver Model	UL File No.	EN/IEC Stand	lards	Dage
Туре	woder				Motor	Driver	Page
	RK564_C-T3.6	PK564⊡W-T3.6	RKD514L-C				
	RK564_C-T7.2	PK564 W-T7.2	RKD514L-C				
	RK564 C-T10	PK564□W-T10	RKD514L-C	Motor			C-84
	RK564_C-T20	PK564 W-T20	RKD514L-C	Motor	Certification Body		
TH Geared	RK564_C-T30	PK564⊡W-T30	RKD514L-C	E64199	VDE		
Single-Phase 200-230 VAC	RK596_C-T3.6	PK596 W-T3.6	RKD514H-C	Duissen	Licence No.		
	RK596_C-T7.2	PK596 W-T7.2	RKD514H-C	Driver	114293		
	RK596_C-T10	PK596 W1-T10	RKD514H-C	E171462			C-85
	RK596□C-T20	PK596 W1-T20	RKD514H-C				
	RK596□C-T30	PK596 W1-T30	RKD514H-C				
	RK566□A-N5	PK566□W-N5	RKD514L-A				
	RK566 A-N7.2	PK566 W-N7.2	RKD514L-A				
	RK566 A-N10	PK566□W-N10	RKD514L-A				o o=
	RK564_A-N25	PK564_W-N25	RKD514L-A				C-87
	RK564□A-N36	PK564□W-N36	RKD514L-A	Motor	Certification Body		
PN Geared	RK564_A-N50	PK564□W-N50	RKD514L-A	E64199	VDE		
Single-Phase 100-115 VAC	RK599□A-N5	PK599□W-N5	RKD514H-A	_	Licence No.	-	
	RK599□A-N7.2	PK599□W-N7.2	RKD514H-A	Driver	114293		
	RK599□A-N10	PK599□W-N10	RKD514H-A	E171462			_
	RK596 A-N25	PK596□W-N25	RKD514H-A				C-88
	RK596 A-N36	PK596□W-N36	RKD514H-A	-			
	RK596 A-N50	PK596□W-N50	RKD514H-A				
	RK566 C-N5	PK566 W-N5	RKD514L-C				
	RK566_C-N7.2	PK566 W-N7.2	RKD514L-C		Certification Body		
	RK566_C-N10	PK566 W-N10	RKD514L-C				
	RK564_C-N25	PK564□W-N25	RKD514L-C				C-87
	RK564_C-N36	PK564□W-N36	RKD514L-C	Motor			
PN Geared	RK564_C-N50	PK564□W-N50	RKD514L-C	E64199	VDE		
Single-Phase 200-230 VAC	RK599_C-N5	PK599⊡W-N5	RKD514H-C		Licence No.	-	
511910 1 11200 200 200 VAU	RK599 C-N7.2	PK599⊡W-N7.2	RKD514H-C	Driver	114293		
	RK599 C-N10	PK599 W-N10	RKD514H-C	E171462	117250		
	RK596_C-N25	PK596_W-N25	RKD514H-C				C-88
	RK596_C-N36	PK596_W-N36	RKD514H-C				
	RK596_C-N50	PK596_W-N50	RKD514H-C				
	RK564_A-H50	PK564 W-H50S	RKD514H-C RKD514L-A	Motor			
<b>HG</b> Geared	RK564_A-H100	PK564 W-H100S	RKD514L-A RKD514L-A		-		
	RK596_A-H50	PK596_W1-H50	RKD514L-A RKD514H-A		E64199 Certification Body	_	
Single-Phase 100-115 VAC				Driver	VDE Licence No.		
	RK596 A-H100	PK596 W1-H100	RKD514H-A	E171462	114293		C-89
LC Coored	RK564 C-H50	PK564 W-H50S	RKD514L-C	Motor			
HG Geared	RK564_C-H100	PK564 W-H100S	RKD514L-C	E64199	Certification Body	_	
Single-Phase 200-230 VAC	RK596_C-H50	PK596 W1-H50	RKD514H-C	Driver	VDE Licence No.		
	<b>RK596C-H100</b> PK596 <b>W</b> 1-H100	RKD514H-C	E171462	114293			

• Enter **A** (single shaft) or **B** (double shaft) in the box (
) within the model names.

# Stepping Motors 5-Phase CSK Series

Туре	Model	Motor Model	Driver Model	UL File No.	Page
	CSK543-N□TA	PK543N⊡WA	CSD5807N-T		
	CSK544-N□TA	PK544N⊡WA	CSD5807N-T		
Standard	CSK545-N□TA	PK545N⊡WA	CSD5807N-T		C-122
Statiuaru	CSK564-N□TA	PK564N⊡WA	CSD5814N-T		6-122
	CSK566-N_TA	PK566N□WA	CSD5814N-T		
	CSK569-N□TA	PK569N□WA	CSD5814N-T	Motor	
	CSK543 A-TG3.6	PK543N□WA-T3.6	CSD5807N-T	E64199	
	CSK543 A-TG7.2	PK543N□WA-T7.2	CSD5807N-T		
	CSK543 A-TG10	PK543N_WA-T10	CSD5807N-T	Driver	C-124
	CSK543 A-TG20	PK543N□WA-T20	CSD5807N-T	E171462	
<b>TH</b> Geared	CSK543 A-TG30	PK543N□WA-T30	CSD5807N-T	E208200	
Gealeu	CSK564 A-TG3.6	PK564N□WA-T3.6	CSD5814N-T		
	CSK564_A-TG7.2	PK564N_WA-T7.2	CSD5814N-T		
	CSK564 A-TG10	PK564N_WA-T10	CSD5814N-T		C-125
	CSK564 A-TG20	PK564N□WA-T20	CSD5814N-T		
	CSK564 A-TG30	PK564N□WA-T30	CSD5814N-T		

 $\bullet$  Enter  ${\bf A}$  (single shaft) or  ${\bf B}$  (double shaft) in the box ( ) within the model names.

# Low-Speed Synchronous Motors

Model	Overheating Protection Device	UL File No.	Page
SMK237A-A	Impedance Protection	E64199	C-273
SMK216A-GN	Impedance Protection	E64199	C-273
SMK5100A-AA	Impedance Protection	E64199	C-273
SMK5160A-AA	Impedance Protection	E64199	C-273
SMK550A-GN	Impedance Protection	E64199	C-273

# AC Axial Flow Fans **MRS** Series

Model	Overheating Protection	UL File	CSA *	Degree of	EN/IEC S	Standard	Daga	
	Device	No.	Certificate No.	Protection	Certification Body	Licence No.or Certificate No.	Page	
MRS25-B								
MRS25-D								
MRS25-T								
MRS25-BM								
MRS25-DM		E58377	*	IP00		—	E-24	
MRS25-TM								
MRS25-BB								
MRS25-DB								
MRS25-TB								
MRS20-BUL								
MRS20-BM								
MRS20-DUL		E58377	LR62524	IP00	VDE	5867	E-26	
MRS20-DM		200011	LITOLOLA		VDL	0007	2 20	
MRS20-TUL								
MRS20-TM								
MRS18-BUL								Overview
MRS18-BTM	Thermal Protector							
MRS18-DUL		E58377	LR62524	IP00	VDE	5868	E-28	
MRS18-DTM		200011	LINGLOLI		VDE 500	0000	2 20	
MRS18-TUL								
MRS18-TTM								
MRS16-BUL								
MRS16-BTM								
MRS16-BTA								
MRS16-DUL								
MRS16-DTM		E58377	LR62524	IP00	VDE	5869	E-30	
MRS16-DTA								
MRS16-TUL								
MRS16-TTM								
MRS16-TTA	_							
MRS14-TUL		E58377	LR62524	IP00	VDE	5866	E-32	
MRS14-TTM	-							
MRS18V2-B		E58377	*	IP00	DEMKO	138655	E-34	
MRS18V2-D								

\* The MR\$25 and MR\$18V2 types are recognized to Canadian safety requirements under the Component Recognition Program of Underwriters Laboratories Inc.

Safety Standards

# DC Axial Flow Fans MDS-MD Series

	UL File	Degree of	EN/IEC S	Deve	
Model	No.	Protection	Certification Body	Certificate No.	Page
MDS1751-24	E58377	IP00	DEMKO	135713	
MDS1751-24B					E-46
MDS1751-24S	E58377	IP00	_		
MDE1225-12L					
MDE1225-24L					E-44
MDS1225-12					
MDS1225-12M	E58377	IP00	DEMKO	135713	<b>F</b> 40
MDS1225-24					E-48
MDS1225-24M					
MD1225-12	550077	1500	DENIKO	105710	
MD1225-24	E58377	IP00	DEMKO	135713	E-50
MD925A-12					
MD925A-12L					
MD925A-24					
MD925A-24L			5511/0		
MD925AM-12	E58377	IP00	DEMKO	135713	E-52
MD925AM-24					
MD925AL-12					
MD925AL-24					
MD925A-12S	550077	1000			F 50
MD925A-24S	E58377	IP00	_		E-52
MD825B-12					
MD825B-12L					
MD825B-24					
MD825B-24L	E58377	IP00	DEMKO	135713	E-54
MD825BM-12					
MD825BM-24					
MD825BL-12					
MD825B-12S	550077	1000			E 54
MD825B-24S	E58377	IP00	_		E-54
MD625B-12					
MD625B-12L					
MD625B-24	FF0077	1000	DEMICO	105710	E EC
MD625B-24L	E58377	IP00	DEMKO	135713	E-56
MD625BM-12					
MD625BM-24					
MD625B-12S	E58377	IP00			E-56
MD625B-24S	LJ03//	IFUU			E-00
MDS510-12					
MD\$510-12L					
MDS510-24					
MDS510-24L	E58377	IP00	DEMKO	135713	E-58
MDS510M-5					
MDS510M-12					
MDS510M-24					
MDS410-12					
MDS410-12L					
MDS410-24	E58377	IP00	DEMKO	135713	E-60
MDS410-24L					
MDS410M-5					

General Information

# AC Axial Flow Fans **MU** Series

Model	Overheating Protection	UL File	CSA	Degree of	EN/IEC S	tandard	JET	Page
wouel	Device	No.	Certificate No.	Protection	Certification Body	Licence No.	Certificate No.	Faye
MU1238A-21B								
MU1238B-21B		E58377	LR62524	IP00	VDE	5870	0018-91002-001	E-36
MU1238L-21B								
MU1238A-51B								
MU1238B-51B		E58377	LR62524	IP00	VDE	5870	0018-91002-002	E-36
MU1238L-51B								
MU1225S-21		E58377	LR62524	IP00	VDE	5870	0018-91002-001	E-38
MU1225M-21	Impedance Protection		L1102324	11 00	VDL	0070	0010-91002-001	L-30
MU1225S-51	Impedance i rotection	E58377	LR62524	IP00	VDE	5870	0018-91002-002	E-38
MU1225M-51		L30377	LN02324	IF UU	VDL	5070	0018-91002-003	L-30
MU925S-21		E58377	LR62524	IP00	VDE	5870	0018-91002-001	E-40
MU925M-21		20077	LIIUZJZH	11 00	VDL	5070	0010-01002-001	L-40
MU925S-51		E58377	LR62524	IP00	VDE	5870	0018-91002-002	E-40
MU925M-51		L30377	L1102324	11 00	VDL	0070	0018-91002-003	L-40
MU825S-23		E58377	LR62524	IP00	VDE	5870		E-42
MU825S-53		L303/1	LIIUZJZ4	11 00	VDL	5070		L-42

# Centrifugal Blowers **MB** Series

Model	Overheating Protection	UL File	Degree of	EN/IEC S	Standard	Daga
wouer	Device	No.	Protection	Certification Body	Licence No.or Certificate No.	Page
MB1665-B						
MB1665-D	Thermal Protector	E58377	IP00	VDE	6755	E-66
MB1665-T						
MB1255-B	Thermal Drotester	FE0077	1000	VDE	6755	F 60
MB1255-D	Thermal Protector	E58377	IP00	VDE	6755	E-68
MB1255-T	Thermal Protector	E58377	IP00			E-68
MB1040-B	Thermal Drotester	FE0077	1000	VDE	6765	F 70
MB1040-D	Thermal Protector	E58377	IP00	VDE	6755	E-70
MB840-B	Thermal Protector	E58377	IP00	DEMKO	135714	E-72
MB840-D	Inermal Protector	E303//	IPUU	DEIVIKU	133714	E-72
MB840-T	Thermal Protector	E58377	IP00	_	—	E-72
МВ630-В	Impedance Drotaction	FE0077	1000	VDE	6755	E 74
MB630-D	Impedance Protection	E58377	IP00	VDE	6755	E-74
MB520-B	Impedance Drotaction	FF0077	1000	VDE	0755	F 70
MB520-D	Impedance Protection	E58377	IP00	VDE	6755	E-76

# Cross Flow Fans **MF** Series

Model	Overheating Protection	UL File	Degree of	EN/IEC S	Standard	Page
WOUEI	Device	No.	Protection	Certification Body	Licence No.	Faye
MF930-BC MF930B-BC MF930-DC MF930B-DC	Thermal Protector	E58377	IP00	VDE	5854	E-88
MF915-BC MF915B-BC MF915-DC MF915B-DC	Thermal Protector	E58377	IP00	VDE	5854	E-90

# Thermostats

Model	UL File No.	CSA Certificate No.	Degree of Protection	Page
AM1-WA1 AM1-XA1	E164102	E164102	IP00	E-98

Quality is vital for a company operating on a worldwide scale. The quality assurance system at Oriental Motor meets all global requirements.

# ISO9000 Series

Oriental Motor has put in place a quality assurance system to ensure our products satisfy the quality needs of all customers. Our quality assurance system consists of four components: a forward-thinking product development system for creating new products that meet the anticipated needs of our customers in the future; an immediate delivery system that can flexibly address the demands for multi-product, small-lot production; a responsive sales system for answering all customer inquiries in a timely manner; and a comprehensive after-sales service system. We at Oriental Motor are continually improving these key components of our quality assurance system.

#### Plants that have acquired Certification for ISO9001 and ISO14001

Plants				
Tsuruoka Plants (Chuo, Nishi, Higashi)				
Tsuchiura Plant				
Takamatsu Plants (Tarumi, Kozai)				
Soma Plant				
Kashiwa Plant				
U.S.A. Plant (ISO9001 Only)				

Products AC Motors Brushless DC Motors Stepping Motors Servo Motors Fan Motors Drive Circuits Electric actuators Accessories

# ISO14000 Series

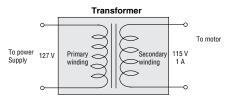
Oriental Motor plays a positive role in preserving the global environment. Protecting the global environment is a major task for all humankind. Companies in the manufacturing sector must contribute to this effort. Oriental Motor is fully aware of its environmental responsibilities. We strive to create environmentally friendly products and reduce the output of waste. We believe that acquisition of the ISO14001 standard, which is related to the environment, is an important step to promote activities of environmental preservation.

Global	Power	Supply	Voltages
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Country	Frequency	Voltage
Canada	60 Hz	Single-Phase 120/347 VAC, Three-Phase 208/240/600 VAC
U.S.A.	60 Hz	Single-Phase 115/230 VAC, Three-Phase 230 VAC
Austria	50 Hz	Single-Phase 230 VAC, Three-Phase 400 VAC
Belgium	50 Hz	Single-Phase 230 VAC, Three-Phase 400 VAC
Bulgaria	50 Hz	Single-Phase 220 VAC, Three-Phase 380 VAC
Czech Republic	50 Hz	Single-Phase 220 VAC, Three-Phase 380 VAC
Denmark	50 Hz	Single-Phase 230 VAC, Three-Phase 400 VAC
Finland	50 Hz	Single-Phase 230 VAC, Three-Phase 400 VAC
France	50 Hz	Single-Phase 230 VAC, Three-Phase 400 VAC
Germany	50 Hz	Single-Phase 230 VAC, Three-Phase 400 VAC
Greece	50 Hz	Single-Phase 230 VAC, Three-Phase 400 VAC
Hungary	50 Hz	Single-Phase 220 VAC, Three-Phase 380 VAC
Italy	50 Hz	Single-Phase 220 VAC, Three-Phase 380 VAC
Luxembourg	50 Hz	Single-Phase 230 VAC, Three-Phase 400 VAC
Netherlands	50 Hz	Single-Phase 230 VAC, Three-Phase 400 VAC
Norway	50 Hz	Single-Phase 220/230 VAC, Three-Phase 380 VAC
Poland	50 Hz	Single-Phase 220 VAC, Three-Phase 380 VAC
Portugal	50 Hz	Single-Phase 230 VAC, Three-Phase 400/480 VAC
Romania	50 Hz	Single-Phase 220 VAC, Three-Phase 380 VAC
Spain	50 Hz	Single-Phase 127/220 VAC, Three-Phase 220/380 VAC
Sweden	50 Hz	Single-Phase 230/400 VAC, Three-Phase 400/690 VAC
Switzerland	50 Hz	Single-Phase 230 VAC, Three-Phase 400 VAC
United Kingdom	50 Hz	Single-Phase 240 VAC, Three-Phase 415VAC
China	50 Hz	Single-Phase 220 VAC, Three-Phase 220 VAC
Japan	50/60 Hz	Single-Phase 100/200 VAC, Three-Phase 200 VAC
Korea	60 Hz	Single-Phase 110/220 VAC, Three-Phase 200/220/380 VAC
Malaysia	50 Hz	Single-Phase 240 VAC, Three-Phase 415 VAC
Thailand	50 Hz	Single-Phase 220 VAC, Three-Phase 380 VAC
India	50 Hz	Single-Phase 230/240 VAC, Three-Phase 400/415 VAC
Singapore	50 Hz	Single-Phase 230 VAC, Three-Phase 400 VAC
Taiwan	60 Hz	Single-Phase 110/220 VAC, Three-Phase 220/380 VAC

### Power Supply Voltage and Motor Rated Voltage

Line voltage varies from country to country and, in some places, from city to city. The line voltages and frequencies of many countries are shown in the table above. Oriental Motor offers motors and fans for worldwide use. Our wide range of products includes those that meet North American voltage specifications, as well as Asian and European voltage specifications. If a motor is to be used with a different power supply voltage than specified, a transformer must be connected between the power supply and the motor. The primary winding of the transformer should be of the same voltage as the power source, and the secondary winding voltage should be the same as the voltage rating of the motor or fan.



The transformer should be rated for a current of at least twice the rated motor current to allow for the current peak at motor start. The transformer should also possess stable transforming characteristics.

# **Product Line Updates**

Some products published in previous versions of this catalog may not be included in the current version. If you cannot find an Oriental Motor product in this catalog, refer to the list below. If it is listed under Previously Published Products, the equivalent Recommended Substitution is listed in the next column. If you have any questions regarding any product line updates, contact your local sales office.

#### Note:

• The specifications and/or drawings for the Recommended Substitution and the Previously Published Products may not be exactly the same. Please check them carefully before deciding which product to use.

# **Standard AC Motors**

Previously Published Products (not included in this catalog)	Recommended Substitution	Page		
2GB10XK 2GB3KA 2GB3KA 2GB3.6KA 2GB5KA 2GB7.5KA 2GB12.5KA 2GB12.5KA 2GB18KA 2GB25KA 2GB30KA 2GB30KA 2GB30KA 2GB50KA 2GB50KA 2GB90KA 2GB100KA 2GB120KA 2GB150KA 2GB150KA	<b>2GNKA</b> Type Motor and gearhead need to be replaced together. Motor and gearhead can not be replaced separately.	A-20		
2GB250KA 2GB300KA 2GB360KA				
4GB10XK 4GB3KA 4GB3KA 4GB3KA 4GB5KA 4GB5KA 4GB7.5KA 4GB12.5KA 4GB15KA 4GB15KA 4GB25KA 4GB30KA 4GB30KA 4GB50KA 4GB50KA 4GB75KA 4GB90KA 4GB100KA 4GB120KA 4GB150KA 4GB150KA	<b>4GNKA</b> Type Motor and gearhead need to be replaced together. Motor and gearhead can not be replaced separately.	A-28		
4GB250KA 4GB300KA 4GB360KA				
2IJ3A-AULA 2IJ3GB-AUL 4IJ15A-AULA 4IJ15GB-AUL 2RJ4A-AULA 2RJ4GB-AUL 4RJ20A-AULA 4RJ20GB-AUL 2IK6A-AULA 2IK6GN-AUL 3IK15A-AULA 3IK15GN-AUL 4IK25A-AULA 4IK25GN-AUL	2IK6A-AWU 2IK6GN-AWU 4IK25A-AWU 2RK6A-AWU 2RK6GN-AWU 2RK6GN-AWU 4RK25A-AWU 2IK6A-AWU 2IK6A-AWU 2IK6A-AWU 3IK15A-AWU 3IK15GN-AWU 4IK25A-AWU 4IK25GN-AWU	A-20 A-20 A-28 A-74 A-74 A-74 A-82 A-82 A-82 A-20 A-20 A-20 A-24 A-24 A-28 A-28 A-28		

Previously Published Products (not included in this catalog)	Recommended Substitution	Page
5IK40A-AULA	5IK40A-AWU	A-34
5IK40GN-AUL	5IK40GN-AWU	A-34
5IK60A-AFUL	5IK60A-AWU	A-40
5IK60GU-AFUL	5IK60GU-AWU	A-40
5IK90A-AFUL	5IK90A-AWU	A-47
5IK90GU-AFUL	5IK90GU-AWU	A-47
2RK6A-AULA	2RK6A-AWU	A-74
2RK6GN-AUL	2RK6GN-AWU	A-74
2RK6A-AMULA	2RK6A-AWMU	A-132
2RK6GN-AMUL	2RK6GN-AWMU	A-132
3RK15A-AULA	3RK15A-AWU	A-78
3RK15GN-AUL	3RK15GN-AWU	A-78
3RK15A-AMULA	3RK15A-AWMU	A-137
3RK15GN-AMUL	3RK15GN-AWMU	A-137
4RK25A-AULA	4RK25A-AWU	A-82
4RK25GN-AUL	4RK25GN-AWU	A-82
4RK25A-AMULA	4RK25A-AWMU	A-142
4RK25GN-AMUL	4RK25GN-AWMU	A-142
5RK40A-AULA	5RK40A-AWU	A-87
5RK40GN-AUL	5RK40GN-AWU	A-87
5RK40A-AMULA	5RK40A-AWMU	A-147
5RK40GN-AMUL	5RK40GN-AWMU	A-147
5RK60A-AMUL	5RK60A-AWMU	A-152
5RK60GU-AFUL	5RK60GU-AWU	A-92
5RK60GU-AMUL	5RK60GU-AWMU	A-152
5RK90A-AMUL	5RK90A-AWMU	A-157
5RK90GU-AFUL	5RK90GU-AWU	A-97
5RK90GU-AMUL	5RK90GU-AWMU	A-157

# Speed Control Systems

Previously Published Products (not included in this catalog)	Recommended Substitution	Page
2IK6RA-AULA	2IK6RA-AWU	B-86
2IK6RGN-AUL	2IK6RGN-AWU	B-86
3IK15RA-AULA	3IK15RA-AWU	B-86
3IK15RGN-AUL	3IK15RGN-AWU	B-86
4IK22RA-AULA	4IK22RA-AWU	B-86
4IK22RGN-AUL	4IK22RGN-AWU	B-86
5IK40RA-AULA	5IK40RA-AWU	B-86
5IK40RGN-AUL	5IK40RGN-AWU	B-86
HBL210K-AA	AXH230KC-A	B-58
HBL210K-GN/2GN□KA	AXH230KC-	B-58
HBL425K-AA	AXH450KC-A	B-58
HBL425K-GN/4GN□KA	AXH450KC-	B-58
HBL540K-AA	AXH5100KC-A	B-58
HBL540K-GN/5GN□KA	AXH5100KC-	B-58
PAVR-20KY	PAVR-20KZ	A-216
SC206-001WU	2IK6RA-AWU/ES01	B-86
SC206-002WE	2IK6RA-CWE/ES02	B-86
SC206-011WU	2RK6RA-AWU/ES01	B-86
SC206-012WE	2RK6RA-CWE/ES02	B-86
SC206-401WU	2IK6RGN-AWU/ES01	B-86
SC206-402WE	2IK6RGN-CWE/ES02	B-86
SC206-411WU	2RK6RGN-AWU/ES01	B-86
SC206-412WE	2RK6RGN-CWE/ES02	B-86
SC315-001WU	3IK15RA-AWU/ES01	B-86
SC315-002WE	3IK15RA-CWE/ES02	B-86

Previously Published Products (not included in this catalog)	Recommended Substitution	Page
(not included in this catalog) SC315-011WU SC315-012WE SC315-401WU SC315-402WE SC315-411WU SC315-412WE SC425-001WU SC425-002WE SC425-011WU SC425-012WE SC425-401WU SC425-402WE SC540-001WU SC540-002WE SC540-011WU SC540-402WE SC540-401WU SC540-402WE SC540-401WU SC540-402WE SC540-412WE SC560-001WU SC560-001WU SC560-001WU SC560-012WE SC560-011WU SC560-502WE SC560-501WU	Substitution 3RK15RA-AWU/ES01 3RK15RA-CWE/ES02 3IK15RGN-AWU/ES01 3IK15RGN-AWU/ES01 3RK15RGN-CWE/ES02 3RK15RGN-CWE/ES02 4IK25RA-AWU/ES01 4IK25RA-CWE/ES02 4IK25RGN-AWU/ES01 4IK25RGN-CWE/ES02 4IK25RGN-CWE/ES02 4IK25RGN-CWE/ES02 5IK40RA-AWU/ES01 5IK40RA-CWE/ES02 5IK40RGN-AWU/ES01 5IK40RGN-AWU/ES01 5IK40RGN-AWU/ES01 5IK40RGN-CWE/ES02 5IK40RGN-AWU/ES01 5IK40RGN-CWE/ES02 5IK60RA-AWU/ES01 5IK60RA-AWU/ES01 5IK60RA-AWU/ES01 5IK60RA-AWU/ES01 5IK60RA-AWU/ES01 5IK60RA-AWU/ES01 5IK60RGU-AWU/ES01 5IK60RGU-AWU/ES01 5IK60RGU-AWU/ES01 5IK60RGU-AWU/ES01 5IK60RGU-AWU/ES01 5IK60RGU-AWU/ES01 5IK60RGU-AWU/ES01 5IK60RGU-AWU/ES01 5IK60RGU-AWU/ES01 5IK60RGU-AWU/ES01 5IK60RGU-AWU/ES01	B-86 B-86 B-86 B-86 B-86 B-86 B-86 B-86
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# **Stepping Motors**

Previously Published Products (not included in this catalog)	Recommended Substitution	Page
D4CL-5.0 D6CL-6.3 D6CL-6.3 D6CL-8.0 D9CL-12.7 D9CL-12.7 D9CL-14 PMU33AH3 PMU35AH3 PMU35AH3 PMU35AH3 PMU35AH3 PMU33AH1-MG3.6* <sup>2</sup> PMU33AH1-MG3.6* <sup>2</sup> PMU33AH1-MG7.2* <sup>2</sup> PMU33AH1-MG7.2* <sup>2</sup> PMU33AH1-MG10* <sup>2</sup> PMU33AH1-MG20* <sup>2</sup> PMU33AH1-MG20* <sup>2</sup> PMU33AH1-MG20* <sup>2</sup> PMU33AH1-MG20* <sup>2</sup> PMU33AH1-MG20* <sup>2</sup> PMU33AH1-MG20* <sup>2</sup> PMU33AH1-MG20* <sup>2</sup> PMU33AH1-MG30* <sup>2</sup> PMU33AH1-MG30* <sup>2</sup> PMU33AH1-MG30* <sup>2</sup> PMU33AH1-MG30* <sup>2</sup> RFK543AA RFK543AA RFK544BA RFK564AA RFK566BA RFK566BA RFK569BA SMK014K-AA UFK564BW* <sup>1</sup>	D4CL-5.0F D6CL-6.3F D6CL-8.0F D9CL-12.7F D9CL-14F PMC33A3 PMC35B3 PMC35B3 PMC35B3 PMC33A1-MG3.6 PMC33B1-MG3.6 PMC33B1-MG3.6 PMC33B1-MG7.2 PMC34A1-MG7.2 PMC34A1-MG7.2 PMC34A1-MG7.2 PMC34A1-MG7.2 PMC34A1-MG7.2 PMC34A1-MG7.2 PMC34A1-MG7.2 PMC34A1-MG7.2 PMC3	C-293 C-293 C-293 C-293 C-293 C-138 C-138 C-138 C-138 C-138 C-139 C-139 C-139 C-139 C-139 C-139 C-139 C-139 C-139 C-139 C-139 C-139 C-139 C-139 C-109 C-109 C-109 C-109 C-109 C-109 C-109 C-109 C-109 C-109 C-109 C-109 C-109 C-109 C-109 C-109 C-109 C-109 C-274 C-82 C-82
UFK566AW*1 UFK566BW*1 UFK569AW*1	RK566AA RK566BA RK569AA	C-82 C-82 C-82

\*1 AS Series is also available to replace UPK·W, UFK·W, UPK Series. \*2 ASC Series is available to replace PMU Series.

 $\bullet$  AS Series model names apply to single shaft types. If double shaft models are required, please contact our sales office.

Previously Published Products (not included in this catalog)	Recommended Substitution	Page
UFK569BW*1	RK569BA	C-82
UFK596AW*1	RK596AA	C-82
UFK596BW*1 UFK599AW*1	RK596BA RK599AA	C-82 C-82
UFK599BW*1	RK599BA	C-82
UFK5913AW*1	RK5913AA	C-82
UFK5913BW*1 UFK564AW-T3.6*1	RK5913BA RK564AA-T3.6	C-82 C-84
UFK564BW-T3.6*1	RK564BA-T3.6	C-84
UFK564AW-T7.2*1	RK564AA-T7.2	C-84
UFK564BW-T7.2*1 UFK564AW-T10*1	RK564BA-T7.2 RK564AA-T10	C-84 C-84
UFK564BW-T10*1	RK564BA-T10	C-84
UFK564AW-T20*1	RK564AA-T20	C-84
UFK564BW-T20*1 UFK564AW-T30*1	RK564BA-T20 RK564AA-T30	C-84 C-84
UFK564BW-T30*1	RK564BA-T30	C-84
UFK596AW-T3.6*1	RK596AA-T3.6	C-85
UFK596BW-T3.6*1 UFK596AW-T7.2*1	RK596BA-T3.6 RK596AA-T7.2	C-85 C-85
UFK596BW-T7.2*1	RK596BA-T7.2	C-85
UFK596AW-T10*1	RK596AA-T10	C-85
UFK596BW-T10*1 UFK596AW-T20*1	RK596BA-T10 RK596AA-T20	C-85 C-85
UFK596BW-T20*1	RK596BA-T20	C-85
UFK596AW-T30*1	RK596AA-T30	C-85
UFK596BW-T30*1 UFK566AW-N5*1	RK596BA-T30 RK566AA-N5	C-85 C-87
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UFK566BW-N10*1	RK566BA-N10	C-87
UFK564AW-N25*1	RK564AA-N25	C-87
UFK564BW-N25*1 UFK564AW-N36*1	RK564BA-N25 RK564AA-N36	C-87 C-87
UFK564BW-N36*1	RK564BA-N36	C-87
UFK564AW-N50*1 UFK564BW-N50*1	RK564AA-N50 RK564BA-N50	C-87 C-87
UPK543AA*1	RK543AA	C-81
UPK543BA*1	RK543BA	C-81
UPK544AA*1 UPK544BA*1	RK544AA RK544BA	C-81 C-81
UPK545AA*1	RK545AA	C-81
UPK545BA*1 UPK564AA*1	RK545BA RK564AA	C-81 C-82
UPK564BA*1	RK564BA	C-82
UPK566AA*1	RK566AA	C-82
UPK566BA*1 UPK569AA*1	RK566BA RK569AA	C-82 C-82
UPK569BA*1	RK569BA	C-82
	AS69AA	C-21
UPK569BHA UPK596AA*1	AS69AA RK596AA	C-21 C-82
UPK596BA*1	RK596BA	C-82
UPK599AA*1 UPK599BA*1	RK599AA RK599BA	C-82 C-82
UPK599BA*1	RK599BA RK5913AA	C-82 C-82
UPK5913BA*1	RK5913BA	C-82
UPK596AHA UPK596BHA	AS98AA AS98AA	C-21 C-21
UPK599AHA	AS911AA	C-21
	AS911AA	C-21
UPK5913AHA UPK5913BHA	AS911AA AS911AA	C-21 C-21
UPK543AW*1	RK564AA	C-82
UPK543BW*1 UPK544AW*1	RK564BA RK564AA	C-82 C-82
UPK544BW*1	RK564BA	C-82
UPK545AW*1	RK564AA	C-82
UPK545BW *1 UPK564AW2 *1	RK564BA RK564AA	C-82 C-82
UPK564BW2*1	RK564BA	C-82
UPK566AW2*1	RK566AA	C-82
UPK566BW2*1 UPK569AW2*1	RK566BA RK569AA	C-82 C-82
UPK569BW2*1	RK569BA	C-82

\*1 AS Series is also available to replace UPK·W, UFK·W, UPK Series.

• AS Series model names apply to single shaft types. If double shaft models are required, please contact our sales office.

Safety Standards

List of Safety Standard Approved Products

ISO9001/ Global Power ISO14001 Supply Voltages

Product Line Updates

Product Oriental Motor Oriental Motor Index Overview Network

Product Recommendation Information Sheets Charts

Previously Published Products	Recommended	
(not included in this catalog)	Substitution	Page
UPK596AW2*1	RK596AA	C-82
UPK596BW2*1 UPK599AW2*1	RK596BA RK599AA	C-82 C-82
UPK599BW2*1	RK599BA	C-82
UPK5913AW2*1 UPK5913BW2*1	RK5913AA RK5913BA	C-82 C-82
UPK564AJW*1	RK564AC	C-82
	RK564BC	C-82
UPK566AJW*1 UPK566BJW*1	RK566AC RK566BC	C-82 C-82
UPK569AJW*1	RK569AC	C-82
UPK569BJW*1 UPK596AJW*1	RK569BC RK596AC	C-82 C-82
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	RK599AC	C-82
UPK599BJW*1 UPK5913AJW*1	RK599BC RK5913AC	C-82 C-82
UPK5913BJW*1	RK5913BC	C-82
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UPK596AHW2	AS98AA	C-21
UPK596BHW2	AS98AA	C-21
UPK599AHW2 UPK599BHW2	AS911AA AS911AA	C-21 C-21
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UPK543BW-T7.2*1 UPK543AW-T10*1	RK543BA-T7.2 RK543AA-T10	C-83 C-83
UPK543BW-T10*1	RK543BA-T10	C-83
UPK543AW-T20*1	RK543AA-T20	C-83
UPK543BW-T20*1 UPK543AW-T30*1	RK543BA-T20 RK543AA-T30	C-83 C-83
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\*1 AS Series is also available to replace UPK-W, UFK-W, UPK Series.
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\*1 AS Series is also available to replace UPK·W, UFK·W, UPK Series.

• AS Series model names apply to single shaft types. If double shaft models are required, please contact our sales office.

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• Enter the number which indicates the stroke length in the box  $(\Box)$  within the model name.

• Motor and linear head need to be replaced together.

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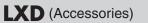
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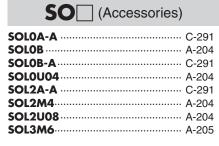
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• Products in regular font represent component parts of package or
combination type models (motors, drivers, gearheads, etc.).

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## **Oriental Motor Corporate Overview**

Oriental Motor Co., Ltd. Founded: 1885 Incorporated: 1950 President: Yoshio Kuraishi Capital: 4,000 Million Yen Sales for 2003 (March, 2004): 39,480 Million Yen Number of Employees (March, 2004): 1,920 Company Activities: Manufacture and sale of small electric motors, motion control systems and fans Major Banks: The Sumitomo Mitsui Banking Corporation The Chiba Bank, Ltd. The Mizuho Bank, Ltd. The Hyakujushi Bank, Ltd. The Shonai Bank, Ltd. The Toho Bank, Ltd. The Akita Bank, Ltd. Head Office: 6-16-17, Ueno, Taito-ku, Tokyo, Japan

- Technical Centers: R & D Center Kofu R & D Center Manufacturing Technology Center
- Plants: Tsuruoka-Chuo Plant Tsuruoka-Nishi Plant Tsuruoka-Higashi Plant Soma Plant Tsuchiura Plant Kashiwa Plant Takamatsu Plant Takamatsu Kozai Plant



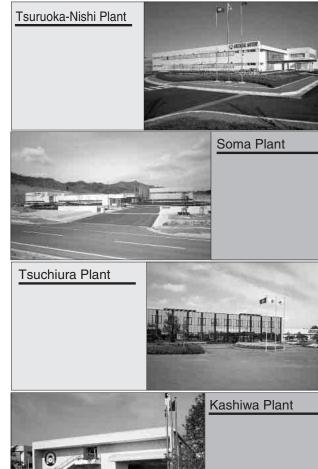








Standard



Takamatsu Plant

## **Oriental Motor Global Sales Network**

Oriental Motor has a direct sales network with subsidiaries in North America, Europe, and Asia, offering a wide variety of products. The establishment of plants globally enables Oriental Motor to meet local demand, service its products, and upgrade customer equipment. Oriental Motor customers can always find local support.



Safety Standards

ISO9001/ ISO14001

. Power Voltage

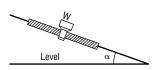
uct Line

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# **Product Recommendation Information Sheet**

## Lead Screw Application Information



#### Move & Distance Within t Time

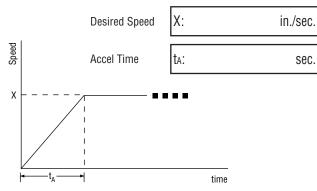
① Move Distance	<b>l</b> :	in.
② Time to Make Move	<i>t</i> :	Sec.
(3) Maximum Linear Speed	ν:	in./sec.
Push/Pull Force Push Opposes, Pull Helps	F:	lb.
(5) Stopping Accuracy	<u>+</u> :	in.
(6) Work+Table Weight	W:	lb.
⑦ Screw Angle	α:	deg

Eead Screw	
W	
Motor	

Bistance per Pulse (Step Motor)	$\Delta l$ : in.
(9) Stop Time	t': sec.
⑦ Screw Diameter	D <sub>B</sub> : in.
<ol> <li>Screw Length</li> </ol>	L <sub>B</sub> : in.
⑦ Screw Pitch	P <sub>B</sub> : in./rev
(3) Screw Efficiency	η: %
(4) Gear Ratio (If Applicable)	N::1

### Alternate Motion Profile

Be at X Speed Within t Time



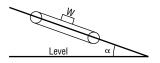
#### Additional Information or Alternate Profile:


### Customer Information

Name/Title:	TEL:	EXT:
Company:	FAX:	
Address:	Application:	
City/State/Zip:		

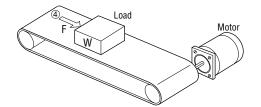
## **Product Recommendation Information Sheet**

## Belt and Pulley Application



#### Move *l* Distance Within t Time

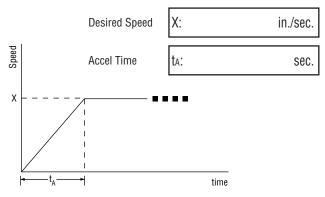
① Move Distance	<b>l</b> :	in.
② Time to Make Move	t: se	ec.
(3) Maximum Linear Speed	ν: in./se	ec.
Push/Pull Force Push Opposes, Pull Helps	F:	lb.
(5) Stopping Accuracy	±:	in.
(6) Work+Table Weight	W:	lb.



⑦ Screw Angle	α:	deg
Bistance per Pulse (Step Motor)	Δ ℓ:	in.
	ť:	sec.
@ Pulley Diameter	Dp:	in.
① Pulley Weight	Wp:	lb.

#### Alternate Motion Profile

Be at X Speed Within t Time



Additional Information or Alternate Profile:

### Customer Information

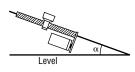
Name/Title:	TEL:	_EXT:
Company:	FAX:	
Address:	Application:	
City/State/Zip:		

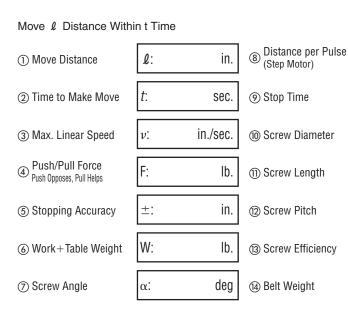
Safety Standards

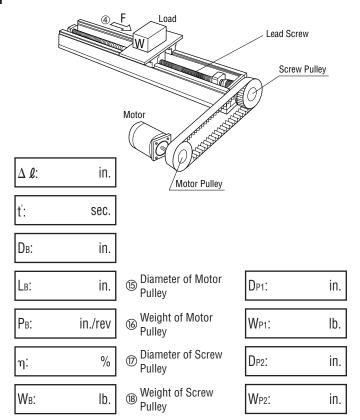
ISO9001/ ISO14001

## **Product Recommendation Information Sheet**

## Belt/Lead Screw Application Information

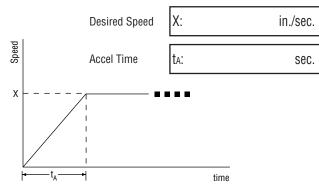






### Alternate Motion Profile

Be at X Speed Within t Time



#### Additional Information or Alternate Profile:

 Bibling
 Product Line
 Product
 Oriental Motor
 Product
 Conversion

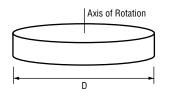
 Supply Voltages
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### Customer Information

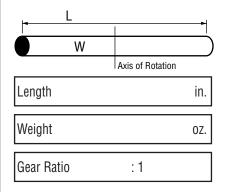
Name/Title:	TEL:E	XT:
Company:	FAX:	
Address:	Application:	
City/State/Zip:		

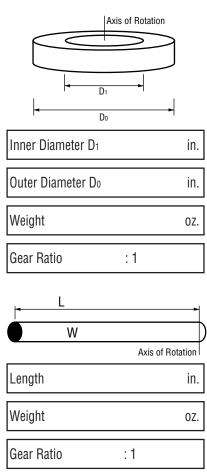
## **Product Recommendation Information Sheet**

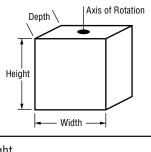
## Direct Drive/Gear Driven Rotary Load



Diameter		in.
Weight		0Z.
Gear Ratio	: 1	







Height		in.
Width		in.
Depth		in.
Weight		0Z.
Gear Ratio	: 1	

### Motion Profile

Move X Distance Within t Time

Distance	degrees	~
Time	Sec.	0

~	Speed	rev/sec.
	Time	Sec.

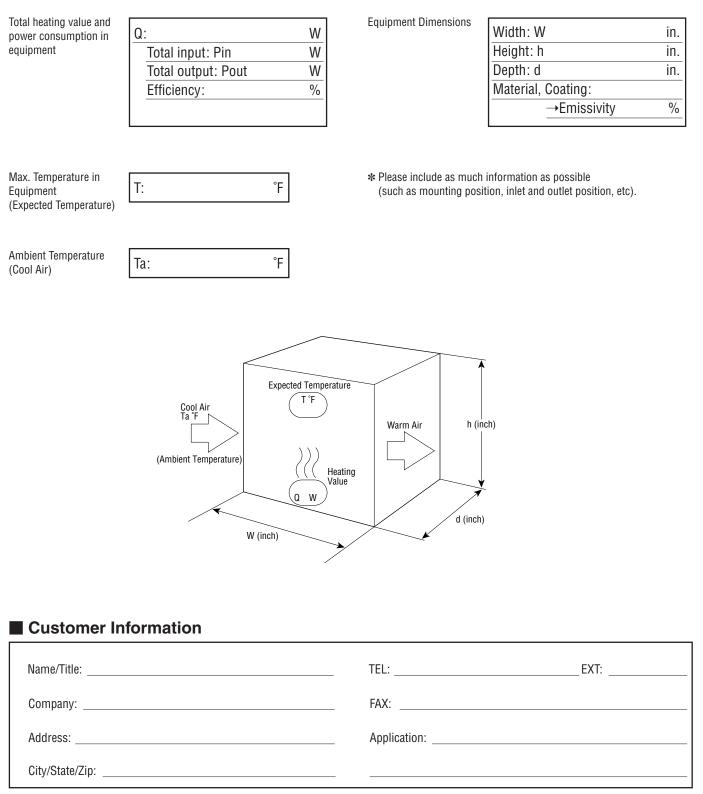
Be at X Speed Within t Time

Additional	Information	or	Alternate	Profile:	

## Customer Information

Name/Title:	TEL:EXT:
Company:	FAX:
Address:	Application:
City/State/Zip:	

### Ventilation Cooling, Exhaust



Please fill out as completely as possible and fax toll free: **1-800-309-7999** 

Safety Standards

ISO9001/ ISO14001

Global Power Supply Voltages

Product Line Updates

Product Index

Conversion Charts

## **Product Recommendation Information Sheet**

### Ducted Exhaust

Required Exhaust Volume	Q:	in. <sup>3</sup> /min	Duct Dimensions	$\phi$ D: in.×I:	in.
	Required air flow s : V Where	peed in./sec	Filter Characteristics		
				Air Flow Speed Pressure Loss	in./sec in. H <sub>2</sub> O
Suction Opening Shape	W: inch×D:	in.	Exhausted Air Temperature		°F
Exhaust Opening Shape	W: inch×D:	in.			
Customer In	formation	Exhaustion W (in.)		s much information as possib differences and mounting pos	
Name/Title:			TEL:	EXT:	
Company:			FAX:		
Address:			_ Application:		
L					
F	Please fill out as com	pletely as po	ossible and fax toll free: <b>1</b>	-800-309-7999	

 $\mathsf{B}=\mathsf{A}\times\mathsf{multiply}\mathsf{ unit}$ 

#### • Length

AB	mm	cm	m	in.
mm	1	0.1	0.001	0.0393701
cm	10	1	0.01	0.393701
m	1000	100	1	39.3701
in.	25.4	2.54	0.0254	1

### • Weight

AB	g	kg	0Z.	lb.
g	1	0.001	0.035274	0.00220462
kg	1000	1	35.274	2.20462
0Z.	28.3495	0.0283495	1	0.0625
lb.	453.592	0.453592	16	1

#### Inertia

A B	kg-cm <sup>2</sup>	g-cm <sup>2</sup>	oz-in <sup>2</sup>	oz-in-sec <sup>2</sup>	lb-in <sup>2</sup>	lb-in-sec <sup>2</sup>
kg-cm <sup>2</sup>	1	10 <sup>3</sup>	5.46745	0.0141612	0.341718	8.85076×10 <sup>-4</sup>
g-cm <sup>2</sup>	10 <sup>-3</sup>	1	5.46745×10 <sup>-3</sup>	1.41612×10 <sup>-5</sup>	3.41718×10 <sup>-4</sup>	8.85076×10 <sup>-7</sup>
oz-in <sup>2</sup>	0.182899	182.899	1	2.59009×10 <sup>-3</sup>	0.0625	1.61880×10 <sup>-4</sup>
oz-in-sec <sup>2</sup>	70.6154	7.06154×10 <sup>4</sup>	386.088	1	24.1305	0.0625
lb-in <sup>2</sup>	2.92630	2.92630×10 <sup>3</sup>	16	0.0414414	1	2.59007×10 <sup>-3</sup>
lb-in-sec <sup>2</sup>	1.12985×10 <sup>3</sup>	1.12985×10 <sup>6</sup>	6.17740×10 <sup>3</sup>	16	386.0892	1

### • Torque

AB	N∙m	N-cm	dyn-cm	kg-cm	g-cm	oz-in	lb-in
N⋅m	1	100	107	10.19716	1.019716×10 <sup>4</sup>	141.6121	8.850759
N-cm	10 <sup>-2</sup>	1	10 <sup>5</sup>	0.1019716	101.9716	1.416121	0.08850759
dyn-cm	10 <sup>-7</sup>	10 <sup>-5</sup>	1	1.019717×10 <sup>-6</sup>	1.019717×10 <sup>-3</sup>	1.416121×10 <sup>-5</sup>	8.850759×10 <sup>-7</sup>
kg-cm	9.80665×10 <sup>-2</sup>	9.80665	9.80665×10 <sup>5</sup>	1	10 <sup>3</sup>	13.887407	0.8679630
g-cm	9.80665×10 <sup>-5</sup>	9.80665×10 <sup>-3</sup>	980.665	10 <sup>-3</sup>	1	0.013887407	8.679630×10 <sup>-4</sup>
oz-in	7.061541×10 <sup>-3</sup>	0.7061541	7.061541×10 <sup>4</sup>	0.07200768	72.00768	1	0.0625
lb-in	0.1129846	11.29846	1.129846×10 <sup>6</sup>	1.1521228	1.1521228×10 <sup>3</sup>	16	1

#### • Air Flow

AB	l/s	<b>ℓ</b> /m	m³/m	m³/h	CFM
ℓ /s	1	60	0.06	3.6	2.11888
<b>ℓ</b> /m	1.67×10 <sup>-2</sup>	1	10 <sup>-4</sup>	0.06	3.531467×10 <sup>-2</sup>
m³/m	16.7	10 <sup>3</sup>	1	60	35.31467
m³/h	0.278	16.7	1.67×10 <sup>-2</sup>	1	0.58858
CFM	0.47195	28.31685	2.831685×10 <sup>-2</sup>	1.69901	1

#### Static Pressure

AB	Pa	mmH₂0	in.H <sub>2</sub> O
Pa	1	0.10197	4.01463×10 <sup>-3</sup>
mmH <sub>2</sub> O	9.80665	1	3.93701×10 <sup>-2</sup>
in.H <sub>2</sub> O	249.08891	25.4	1

#### • Temperature

$$(^{\circ}F-32) \times \frac{5}{9} = ^{\circ}C$$
  
[Temperature difference:  $^{\circ}F \times \frac{5}{9} = ^{\circ}C$ ]