

## OPERATING MANUAL

Brushless DC Fan

**MDS Series**  
**MDE Series**

### Introduction

#### ■ Before using the fan

Only qualified and educated personnel should work with the product. Use the product correctly after thoroughly reading the section "Safety precautions."

The product described in this manual has been designed and manufactured to be incorporated in general industrial equipment. Do not use for any other purpose. For the power supply use a DC power supply with reinforced insulation on its primary and secondary sides. Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.

#### ■ Standard · CE Marking

The product is recognized by UL and certified by DEMKO.

##### ● Standards

Standards	Certification body
UL 507	UL
CSA C22.2 No.113	UL, CSA
EN 60950-1	DEMKO, TÜV

The applicable standards and certification body vary according to the product.

#### ● Installation conditions (For EN Standards)

Overvoltage category I, Pollution degree 2, Class III equipment

#### ● Applicable standards

EMI	EN 61000-6-4
EMS	EN 61000-6-2

#### ■ RoHS Directive

The products do not contain the substances exceeding the restriction values of RoHS Directive (2011/65/EU).

#### ■ Republic of Korea, Radio Waves Act. (Only MDS1451/ MDE1451)

KC Mark is affixed to this product under the Radio Waves Act, the republic of Korea.



### Safety precautions

The precautions described below are intended to prevent danger or injury to the user and other personnel through safe, correct use of the product. Use the product only after carefully reading and fully understanding these instructions.

#### ⚠ Warning

Handling the product without observing the instructions that accompany a "Warning" symbol may result in serious injury or death.

- Do not use the product in explosive or corrosive environments, in the presence of flammable gases, locations subjected to splashing water, or near combustibles. Doing so may result in fire or injury.
- Only qualified and educated personnel should be allowed to perform installation, connection, operation and inspection/troubleshooting of the product. Failure to do so may result in fire or injury.
- Shut off the power to the fan in the event the lock-protection circuit is activated. Otherwise, the fan will start unexpectedly when released from the locked condition, causing bodily injury or equipment damage.
- Install the fan in an enclosure in order to prevent injury.
- Keep the input-power voltage within the specified range to avoid fire.
- Connect the cables securely according to the wiring diagram in order to prevent fire.

Thank you for purchasing an Oriental Motor product.

This Operating Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.

#### ⚠ Caution

Handling the product without observing the instructions that accompany a "Caution" symbol may result in injury or property damage.

- Do not forcibly bend, pull or pinch the cable. Doing so may fire.
  - For the power supply use a DC power supply with reinforced insulation on its primary and secondary sides. Failure to do so may result in electric shock.
  - Turn off the power in the event of a power failure, or the fan will suddenly start when the power is restored and may cause injury or damage to equipment.
  - Do not disassemble or modify the fan. This may cause injury. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.
  - Do not use the fan beyond its specifications, or injury or damage to equipment may result.
  - Keep your fingers and objects out of the openings in the fan. This may cause injury.
  - Do not hold the rotating parts (blades) of the fan or lead wire. This may cause injury.
  - Keep the area around the fan free of combustible materials in order to prevent fire or a burn.
  - To prevent the risk of damage to equipment, leave nothing around the fan that would obstruct ventilation.
  - Provide anti-static measures before installing the fan. Failure to do so may result in equipment damage.
  - Do not touch the rotating parts (blades) when the fan is in operation. This may cause injury. The use of the optional fingerguard is recommended to ensure protection.
- Wegen der Verletzungsgefahr dürfen die Lüfterflügel bei Ventilatorbetrieb nicht berührt werden. Der Gebrauch des als Sonderzubehör erhältlichen Fingerschutzes ist empfehlenswert, um erhöhte Sicherheit zu gewährleisten.*
- Immediately when trouble has occurred, stop running and turn off the power. Failure to do so may result in fire or injury.
  - Dispose the product correctly in accordance with laws and regulations, or instructions of local governments.

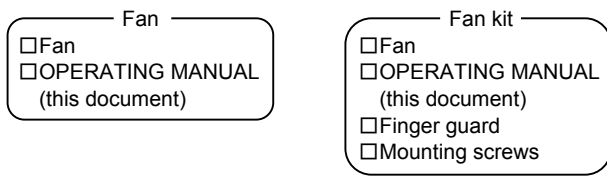
### Preparation

Verify the model number of the purchased product against the number shown on the package label. The fan model name is listed on the fan nameplate.

Type	Model
Standard type	MDS1451-24
	MDS1451-48
	MDS1751-24
	MDS1751H-24
	MDS1751FH-24
Stall alarm, electronic alarm type	MDS1451-24L
	MDS1451-48L
Long life models (Stall alarm, electronic alarm type)	MDE1451-24L2
	MDE1451-48L2
	MDE1751-24L
	MDE1751F-24L
Pulse sensor type	MDS1451-24S
	MDS1451-48S
	MDS1751-24S

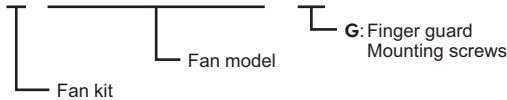
## ■ Checking the product

Verify that the items listed below are included. Report any missing or damaged items to the branch or sales office from which you purchased the product.



How to identify the fan kit model

**T- MDS1451-24L - G**



## Installation

### ■ Location for installation

The fan is designed and manufactured for installation in equipment. Install it in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

- Inside an enclosure that is installed indoors
- Operating ambient temperature  
-10 to +60 °C (+14 to +140 °F) (non-freezing)
- Operating ambient humidity 85% or less (non-condensing)
- Area that is free of explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles or the like
- Area not subject to splashing water (rains, water droplets), oil (oil droplets) or other liquids
- Area not subject to continuous vibration or excessive shocks
- Area free of radioactive materials, magnetic fields or vacuum
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)

When using near a switching circuit or high-frequency power supply, the induced current may flow inside the fan due to electromagnetic noise (conductive noise, radiative noise). If the induced current flows, the electric corrosion is caused in the bearings of the fan. As a result, it may generate the noise or shorten the service life of the products. Use the fan in the environment that the electromagnetic noise does not cause.

### ■ How to install the fan

Install the fan onto an appropriate flat metal plate having excellent vibration resistance and heat conductivity. Drill holes on the mounting plate and fix the fan on the plate using screws (not supplied).

Screw size: M4

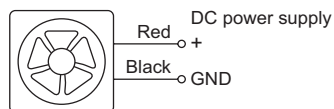
Tightening torque: 0.6 N·m (5.3 lb-in)

For air orientation and rotational direction, see the indications shown on the fan's side frame.

## Connecting the power supply

Connect the red wire to the positive (+) power supply and the black wire to the ground connection.

Check the voltage specification on the product identification plate and input the correct voltage.



### ■ Connecting Protective Earth Terminal (Only MDS1451/ MDE1451)

Ground the motor using the motors with a Protective Earth Terminal (⊕).

Applicable crimp terminal:

Insulated round crimp terminal

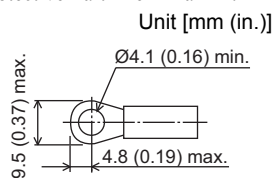
Terminal screw size: M4

Tightening torque:

1.0 to 1.3 N·m (8.8 to 11.5 lb-in)

Applicable minimum lead wire size:

AWG18 (0.75 mm<sup>2</sup>) or more

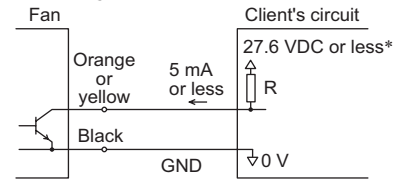


## Connection of the alarm/sensor

### ■ Stall alarm, electronic alarm type

The orange or yellow wire is lead wire for the alarm circuit. GND is common to the sensor and power supply.

If the fan stalls while the power is on, an alarm signal (H level) is output.



\* MDS1451, MDE1451 = 30 VDC or less

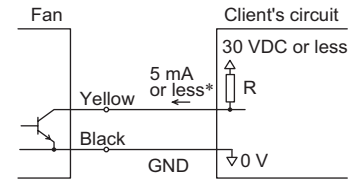
### Note

The stall alarm type of fan is not equipped with a delayed trip-point alarm circuit. Therefore, an external delay function is necessary to avoid the detection of fan start. The set time of the delay function should be at least one second.

### ■ Pulse sensor type

The yellow wire is lead wire for the pulse output. GND is common to the sensor and power supply.

Two cycles of rectangular waves are output per rotation.



\* MDS1751-24S = 10 mA or less

## Overheat protection

The fan is equipped with an internal protective circuit against overheating. In the event a lock-up condition is detected, this function automatically controls the current flow to the fan motor's windings, thus preventing the fan blades from locking and burning out. The fan resumes operation automatically as soon as it is released from the locked condition. Be sure to shut off the power to the fan before performing an inspection.

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• Please contact your nearest Oriental Motor office for further information.

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