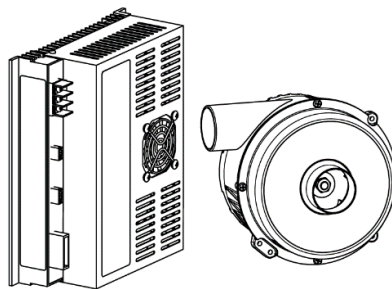


## BRUSHLESS BLOWER

60DCF-485、60DCF-486、60DCF-487

### Instruction Manual



manufacture and sales

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## **1. Introduction**

### **1. 1 Before using**

This product was designed for integration into industrial equipment in general.

Please do not use it for other purposes.

Use the power which give ground to the input supply.

We give reinforced insulation for external input and output signals of various, but for compensation of damage caused in the use of those mentioned above in connection method such as this manual in, we will not assume any liabilities, in advance please be aware.

That it may change without notice for improvement of performance products that are described in this manual, Design and specifications, please understand.

You can download this document from our product site below.

[https://product.minebeamitsumi.com/en/product/category/fanmotor/highpressure\\_blower/](https://product.minebeamitsumi.com/en/product/category/fanmotor/highpressure_blower/)



### **1. 2 Product summary**

This product is a compact high-power blower incorporating a DC brushless motor.

### **1. 3 Environment**

RoHS compliant

### **1. 4 Applicable standard**

Based on the EN standards, CE marking (LVD Directive) fit.

CB certification (Blower) : IEC/EN/UL62368-1  
(Driver) : IEC/EN/UL62368-1

cTUVus (Blower) : UL507, CSA C22.2 No.113  
(Driver) : UL62368-1, CSA C22.2 No.274-17

TU TUVus (Driver) : UL61800-5-1

### **1. 5 Protective construction**

IP00

### **1. 6 Contact**

For inquiries about our products, please contact us from the web page at the following URL or through the purchase route.

<https://product.minebeamitsumi.com/en/contact/>



**2. Safety Precautions**

- Thank you for adopting a MinebeaMitsumi product.
- For proper use, please carefully read this Instruction Manual and other supporting documents before usage (installation, operation, maintenance, inspection).
- Do not use until all technical/safety information and reminders are fully understood.
- Keep the Instruction Manual in an accessible place for ready reference and also make sure that it is delivered to end customers.


**General notes**

- This product was developed for use in industrial equipment. Do not use for equipment in areas which require a high degree of reliability and safety such as aerospace equipment, trunk-line communication equipment, nuclear control equipment, life support machines, automobiles, traffic signals, medical devices, and so forth.
- MinebeaMitsumi will take no responsibility for failures which arise from false or inappropriate use of the product, such as not complying with product usage conditions and precautions depicted in the instruction manual.
- Due to performance upgrades and production reasons, the product specifications, exterior, and configurations described in these specifications are subject to change without prior notice.
- Do not use it in outdoor.


- In this <Safety Precaution>, the safety precaution levels are classified as "WARNING" and

-  **WARNING** Indicates a potential situation that could result in death or serious injury to user if device is operated improperly.
-  **CAUTION** Indicates a potential situation that could result in injury to user or physical damage if device is operated improperly.


**Precautions** In order to use the product correctly, can be found in items under this heading, the matters that have to be followed strictly.

In addition, some items that are listed in the  **CAUTION** may lead to serious results depending on the situation.



**2. 1 Precautions against electrical shock**

- |   |  |
|---|--|
|  | <ul style="list-style-type: none"> <li>- Do not modify or disassemble this product. Doing so may cause electrical shock.</li> <li>- Before conducting wiring operations and inspection, confirm that no voltage is present at the driver terminal using a tester or the like 10 minutes after the power supply is turned OFF.</li> </ul>   |
| W<br>A<br>R<br>N<br>I<br>N<br>G   | <ul style="list-style-type: none"> <li>- Conduct a C-class(earth resistance 10Ω or less) or higher earth connection for the blower and driver.</li> <li>- Wiring work and inspection should be performed by a professional engineer (a Second Class Electrician or higher is recommended).</li> <li>- In order to prevent electric shock and injury, conduct wiring after the main body is set in place.</li> <li>- In order to prevent electric shock, avoid touching the blower and driver with wet hands.</li> <li>- In order to prevent electric shock, do not damage, forcibly pull, place heavy objects on, or pinch the blower cable.</li> <li>- In order to prevent electric shock, do not connect or disconnect the blower connector while AC power is being supplied (during Operation and Stand-by).</li> </ul> |

**2. 2 Precautions against fire**


 C A U T I O N	<ul style="list-style-type: none"> <li>- In case of blower or driver malfunction, cut off the power supply. Continuous flow of a large amount of current may cause fire.</li> <li>- Do not connect the control I/O connector to the AC power supply. Doing so may cause fire.</li> <li>- Do not block the vent hole and the air inlet of the driver. Doing so may cause fire.</li> <li>- Do not use with the air inlet or outlet of the blower completely blocked. Doing so may cause fire.</li> <li>- Please do not use in the state that could block the vent hole of the blower. This can cause a fire.</li> <li>- Please do not place flammable materials around the blower.</li> </ul>
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**2. 3 Precautions against failure**

 W A R N I N G	<ul style="list-style-type: none"> <li>- Please do not put your fingers, hands absolutely the air inlet or outlet of the blower . There is a risk of injury.</li> <li>- Please do not put your fingers, hands absolutely to the inside from vent hole of the blower. There is a risk of electric shock or injury.</li> </ul>
 C A U T I O N	<ul style="list-style-type: none"> <li>- Do not apply voltage other than the rated voltage specified for each terminal. Doing so may result in burst or damage.</li> <li>- Do not mix up the terminal connections. Doing so may result in burst or damage.</li> <li>- Do not reverse the polarity (+, -). Doing so may result in burst or damage.</li> <li>- Do not touch the blower and driver while power is turned on or for a while after power is turned off as they may be hot. Doing so may result in burns.</li> <li>- Please keep tools or foreign substances away from the blower's inlet/outlet, vent hole or driver's inlet and vent hole to prevent interfusion of foreign substances, injuries from foreign substance's damages or damages of the blower.</li> <li>-Please be careful so as not to be sucked foreign substances into the inlet.</li> </ul>

**2. 4 Miscellaneous Precautions**

Please pay adequate attention to the following precautions. Improper handling may cause unexpected accident, electrical shock, or injury.

 W A R N I N G	<ul style="list-style-type: none"> <li>- The blower does not have explosion-proof construction. Operating in an explosive or flammable gas atmosphere may cause explosion with motor's burnout.</li> <li>- Installation, connection, run, operation, inspection, fault diagnosis should be attempted by qualified persons. Otherwise, it may cause fire or injuries.</li> </ul>
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(1) About transportation and mounting

- Transport the product using a correct method that corresponds to the product weight. Failure to do so may cause injuries.
  - Do not stack blowers and drivers five or more stages.
  - Install blower using the main frame mounting feet. Do not install directly on air inlet or outlet.
  - Install driver using the main frame mounting feet. Do not mount in any direction other than that indicated in drawings.
  - Installation should be made on a structure that can withstand the product weight and vibration.
  - Do not operate with a damaged blower or driver installed.
  - Do not carry the product by holding the cover or lead wires(cables, harnesses). Do not hold cover or lead wire during active operation. Doing so may result in damage.
  - Do not step on or place objects on the product.
  - Direction of the blower duct (exhaustion and suction) must conform to the specified requirements.
  - If the blower is installed without ducting on the inlet and outlet, directly used in ambient air, an appropriate protection frame or screen must be applied to the inlet and outlet to ensure safety.
  - Prevent conductive objects such as screws and metal pieces and flammable objects such as oil as well as other foreign objects that can disturb the rotation of the blower from entering the inside of the blower and driver.
  - As the blower and driver are precision instruments, do not drop or apply unreasonable force.
  - Please use under the environmental conditions given below. Usage under other environmental conditions may lead to malfunction.
- For details, please refer to this instruction manual, section 10.
- Ambient Temperature: 0°C to +50°C (no freezing)  
 Ambient Humidity: 90 % RH or less (no condensation)  
 Storage Temperature: -20°C to +65°C  
 Other conditions: To be used indoors. No corrosive gases, flammable gases, oil mist, powder, dust, or salt corrosion.  
 Altitude above sea level: 1000 m or lower.  
 Vibration : Do not expose to continuous vibration or excessive shock.
- Do not use in a closed area. Use in a well-ventilated area.
  - This blower and driver is designed and manufactured for as industrial embedded equipment and for indoor use only, DO NOT assembled into appliance where will be used outdoor or damp locations.

(2) About wiring

- Connect load (ACL) and neutral (ACN) of the AC power supply input correctly.
  - Both of the blower and the driver should be connected to FG terminal with ground connection(C or more).
  - Do not apply AC power to the FG terminal.
  - In order to protect the Blower, connect a Current Overload Protection device (a breaker or an electromagnetic switch) of 15 A to the device.
  - Do not conduct an insulation resistance test or a dielectric strength voltage test.
  - If you are considering conforming to safety standards, install the product so that it is protected by branch circuit short circuit protection.
- Branch Circuit Short-Circuit Protection: to be protected by an external UL 489 Moulded Case Circuit Breaker or equivalent, Having A Current Rating of In = 15A, instantaneous short-circuit tripping current  $\leq 200A$ , in accordance with the National Electrical Code and any additional local codes or the end-product standard. Intergral short circuit protection devices such as fuse F1, F2 (AC 250V, 15A conforms standard UL 248-14) and solid state protection circuitry does not provide branch circuit protection.

 C A U T I O N	<p>Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes or the end-product standard.</p>
	<p>(3) About trial operations</p> <ul style="list-style-type: none"> <li>- Consider how to prevent malfunction of the blower and driver from affecting other devices.</li> </ul>
	<p>(4) About usage</p> <ul style="list-style-type: none"> <li>- The driver and blower, should be used at the specified combination. Failure to do so may result in fire.</li> <li>- Do not apply AC power while a control input signal is being provided. Doing so will cause the blower to restart suddenly.</li> <li>- Do not start/stop blower using the braker or the electromagnetic switch of the AC power supply. Always precede start/stop with a control input signal.</li> <li>- Reduce the effects of electromagnetic disturbance by placing a noise filter near the blower.</li> <li>- In using the blower in state of almost closed outlet's condition, the air temperature from the outlet rises. Please check the temperature and use within its specification.</li> <li>- In normal operation, sometimes the temperature of the motor's surface rises over 70°C. Please attach the motor to the appropriate place so as not to be affected by other device's heat. Please use in a place with good ventilation. Do not touch the motor and the driver during the operation of the blower and just after operating.</li> <li>- In using without connecting duct, the high frequency noise is occasionally made from the inlet by its resonance. In this case, please use a hose for connecting to the duct. For details, please refer to this instruction manual, section 5.4.</li> <li>- For the inlet, do not use in almost closing consition.</li> <li>- Please be sucked only air.</li> <li>- When the air of relative humidity of 100% is sucked, condensation occasionally appears due to change of the temperature. There is a possibility that the drops are leaked out by sucking the air. The part of the motor with dewing may lead to electric leakage or burnout. Repeating condensation may cause getting rusty on the component materials. In some cases, it may shorten the blower's duration.</li> </ul>
	<p>(5) Measures in case of abnormality</p> <ul style="list-style-type: none"> <li>- Install an emergency stop device so that the machinery, equipment is not in danger blower can also fail.</li> <li>-If the blower's protection device is activated, after making sure the cause of its error has been got rid of, turn on the power again.</li> </ul>
	<p>(6) About Maintenance and Inspection</p> <ul style="list-style-type: none"> <li>- Perform the contents below at least once a year.</li> <li>- Check for abnormalities (such as abnormal noise) while the device is in a running state.</li> <li>- If dust is attached to the vent hole, air inlet, or Driver cover, remove it.</li> <li>-The temperature of each part has risen just after the operation.</li> </ul> <p>Please touch the blower after checking temperature has fallen sufficiently so as not to get burned.</p> <ul style="list-style-type: none"> <li>- Disconnect the Blower and Driver from the power supply before servicing.</li> </ul>
	<p>(7) About storage</p> <ul style="list-style-type: none"> <li>- The storage period should not exceed 6 months.</li> <li>- The packaged Blower should be stored indoor in more less stable temperature and dry places.</li> <li>- For the installed blower, please be careful not to be affected by the water from the outside, oil, dust, vibration or heat.</li> </ul>

 C A U T I O N	(8) About disposal - Please treat as general industrial waste.
	(9) Operating Precautions - If an unusual noise or smell is noticed, immediately terminate the AC power supply and control input signal, stop usage, and then contact your dealer.

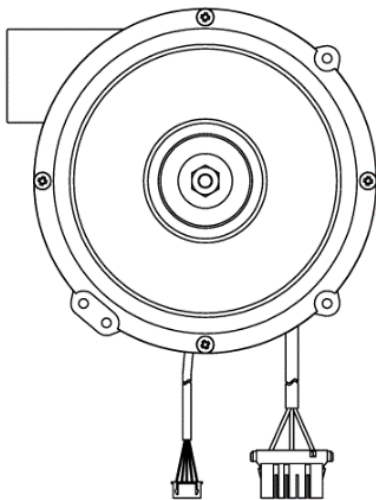
### 3. Unpacking

Check the following upon receipt of finished goods.  
 If you encounter any problems, contact your dealer.

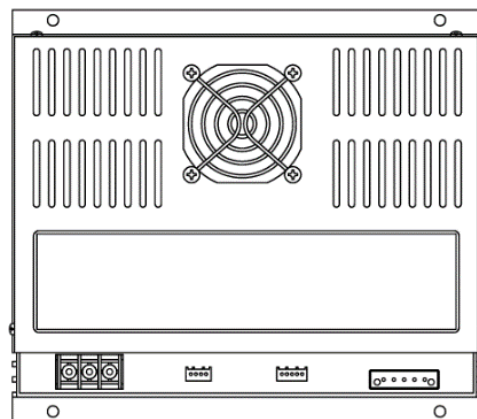
Check that the product is what you ordered.

Make sure that there are no missing parts and that the parts packaged together with the blower and driver have the correct part numbers.

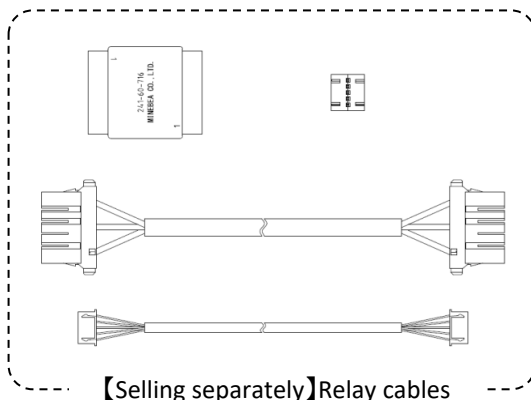
- Blower
- Driver
- Signal harness (Sample. Shipped together with Driver.)
- Instruction manual (this manual)
- **【Selling separately】**Relay cables (Optional accessories. See section 6.2)



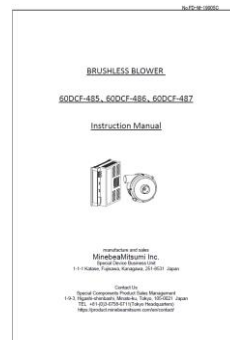
Blower×1



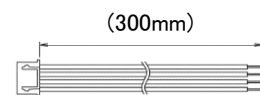
Driver×1



**【Selling separately】**Relay cables



Instruction Manual × 1



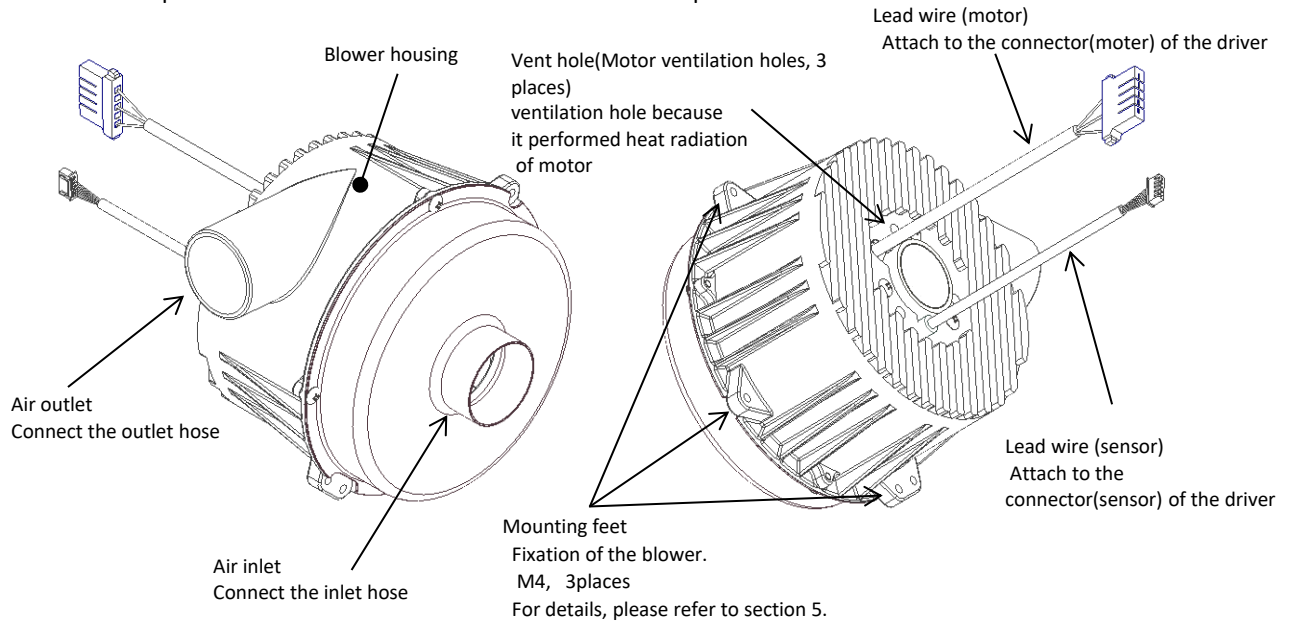
Signal harness × 1  
 (Sample. Shipped together with Driver.)

Check that no deformation, damage or dents has occurred during transport.

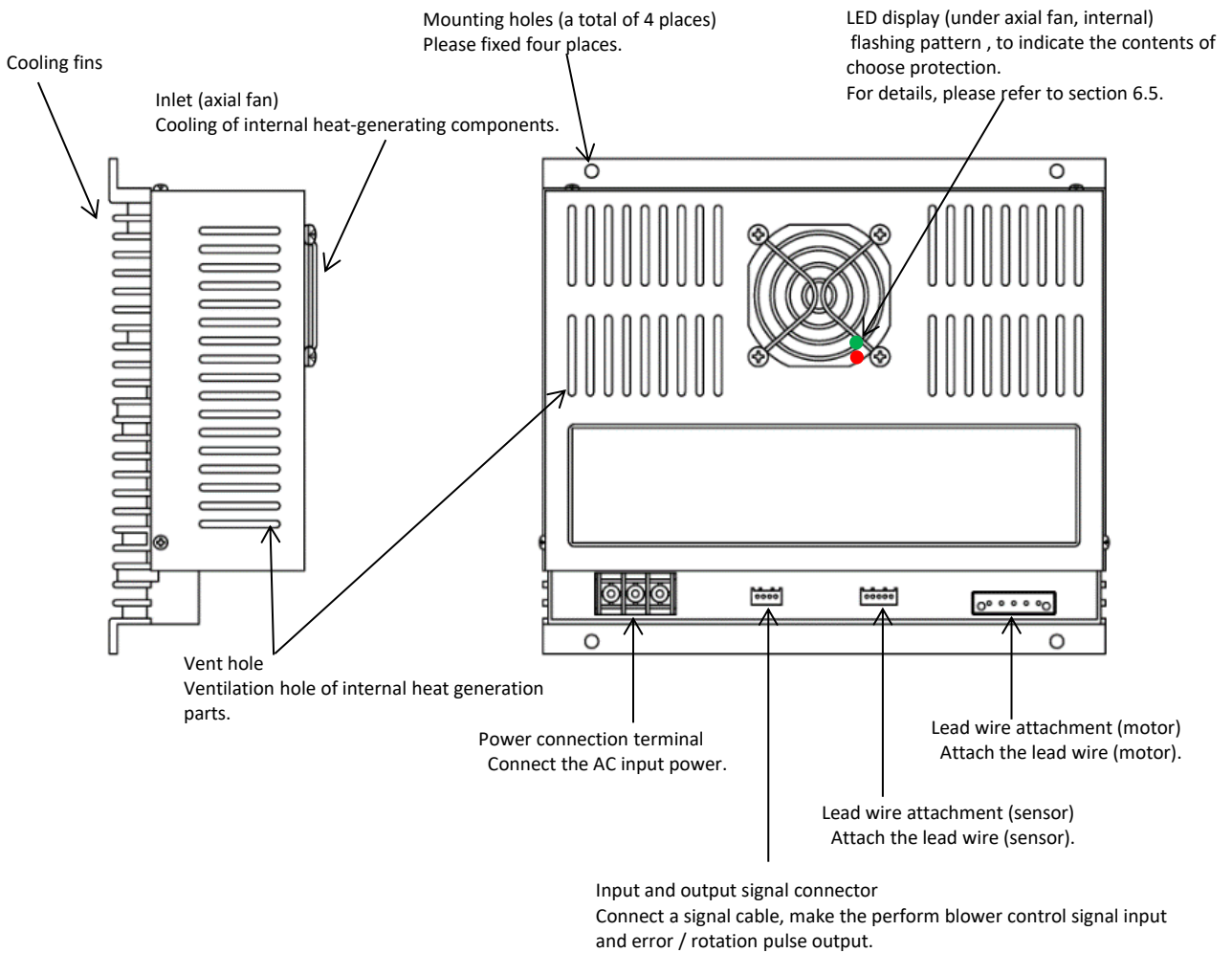


**4. Part names**

Description of the main features and the name of each part of the blower.



Description of the main features and the name of each part of the driver.



**5. For installation**

This section explains the installation location, installation procedure, and load application for the blower and driver. The blower and driver must be properly installed.

**5. 1 Installation site**

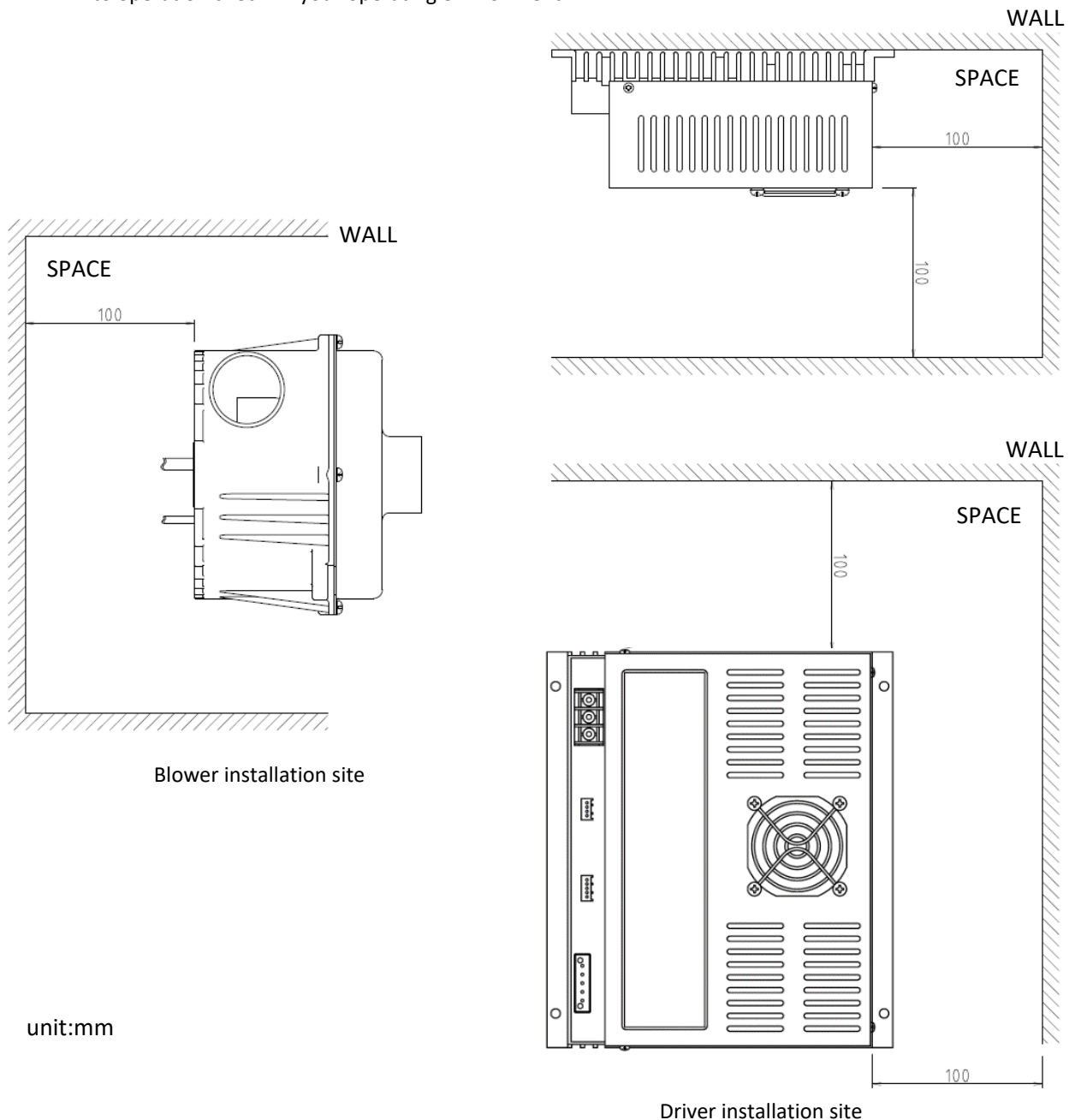
This blower and driver is designed and manufactured for as industrial embedded equipment and for indoor use only, DO NOT assembled into appliance where will be used outdoor or damp locations. Please, use the blower that are installed in the housing.

Install them in well ventilated areas with access to outside air and in areas that allow for easy inspection.

The Ventilating Opening for blower shall not vent into a concealed space where the spread of a fire can occur undetected.

The space around the cooling fan and vents should be far enough from the wall to allow for cooling.

For reference, the range shown in the following figure you ask placed so as to secure the space. The blower and driver mounting base is radiation heating and earth, so recommend the setting to a metal side. This diagram is for reference only, please be sure to operation check in your operating environment.



## 5. 2 Installation method

Install Blower in the axis horizontal direction.

Prepare the fixed base that has sufficient strength so as not to cause a resonance due to the vibration of the blower.

Install the driver on a surface with less vibration.

Install the driver in a vertical plane as shown in the example below.

We recommend metal as the material of the fixed base.

Please install them in the following environment.

-Do not use in explosive environments, corrosive gas environments, nor in flammable gas environments. No oil mist, dust, or iron powder should be present.

-Do not expose to water, oil and other liquids.

-Use in areas with very little salt.

-Do not expose to continuous vibration or excessive shock.

-There should be very little electromagnetic noise.

(welding and power equipment that generates sparks)

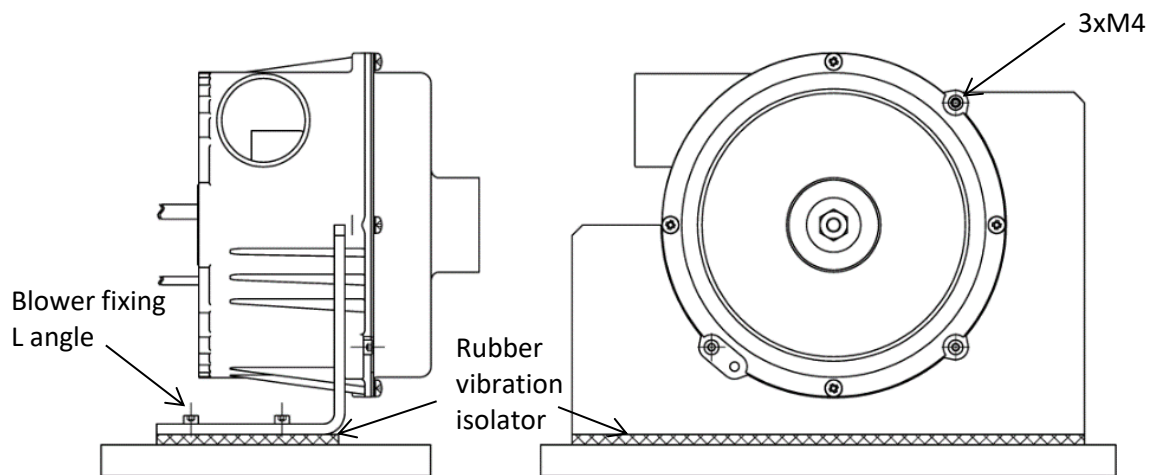
Mount the blower using items with adequate rigidity.

When running several blowers at once, vibrations may resonate amongst each blower.

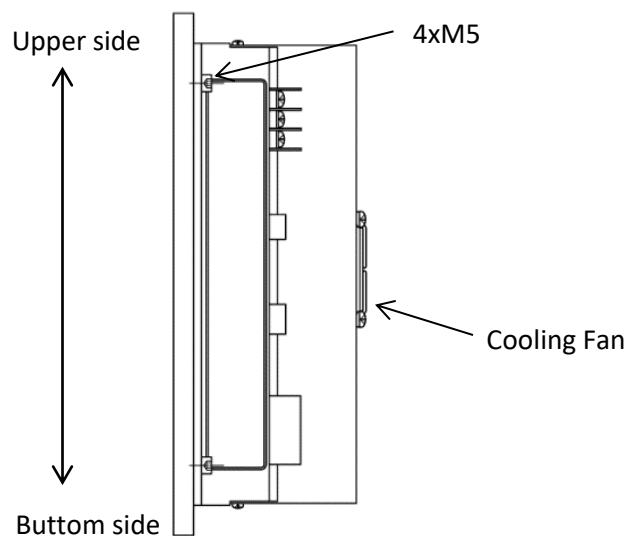
Set them apart so that the vibrations from each blower do not interfere with each other.

We recommend reducing vibration propagation by placing anti-vibration rubber, etc. underneath the mounting plate.

Be sure to mount the blower inside an metallic enclosure.



Blower installation example



Driver installation example(vertical)

**5. 3 Operating Environment**

Ambient temperature: 0°C to +50°C (no freezing)

Ambient humidity: 90% RH or less (no condensation)

Using the equipment outside the operating temperature range may cause breakdowns.

The blower has a cooling by internal fan.

Depending on the size of the equipment to be installed, you may be the ambient temperature of the blower is increased by the heat dissipation of the blower.

To prevent this, be extremely careful in so as not to exceed the above-mentioned operating temperature range.

Each location in which to incorporate the air of the blower, to be discharged, there is a risk of accident when you spit out the foreign body ingestion.

Give consideration to the suction and discharge of foreign matter.

The temperature of the blower surface and driver surface may increase under certain operating conditions.

Touching the equipment during and after operation with your fingers or hand may result in burns.

Be sure to mount the blower and motor inside an metallic enclosure ( 1.5mm thick or more )

so that they cannot be touched. Also, you may need to touch the blower during maintenance, etc.

Check to see if it's cool enough before touching it.

Do not wrap insulation around the blower or place any near it

because it prevents the blower from expelling heat which in turn lowers its service life.

**5. 4 For connecting hose**

If the blower is used without a hose connected for the intake port, a high pitch resonant sound may be generated.

If this happens, use a duct connection hose or the special opening.

Φ45 diameter hoses will fit.

Hoses manufactured by the Tiger Polymer Corporation, for example.

There are connection hoses by other manufacturers that will fit as well.

Consult with hose manufacturers regarding hose specifications that are best for your intended application and then select a hose.

The air temperature of discharge parts will increase under certain operating conditions and environments.

Therefore, we ask that you use a heat-resistant hose.

If the hose is used at high pressures, it may become disconnected so you must affix a band to it.

**5. 5 For Safety Standard Compliance**

This product has acquired cTUVus certification (North American safety standard certification by TÜV Rheinland) as a "built-in type" blower motor and driver, and confirmed that it complies with the European Low Voltage Directive according to EN62368-1. If you want the final product with this product to conform to European and/or North American safety standards, at least the following conditions must be considered.

This product assumes an environment of Over voltage category II , Pollution degree [Blower: PD3, Driver: PD2]. Be sure to ground the blower and driver. (See 2 and 6.3, 6.6)

Be sure to connect a hoses and other to the blower intake / exhaust port to prevent people from touching the internal fan. (See 5.4)

If a hoses and other cannot be connected, guard the intake / exhaust port with a protective frame to prevent contact with the internal fan according to the blower installation situation.

There is a cooling vent in the motor. Install it in the structure so that it cannot come into contact with the internal windings and rotor from the cooling vent.

Install in a structure so that it cannot touch the driver during operation.

Use within the operating environment conditions. (See 5.3 and 10.3)

Use a UL-compliant crimp terminal for AC power connection to the driver.

Use an appropriate wire size in consideration of the rated current of this product. (AWG16 (1.25mm<sup>2</sup>) or more)

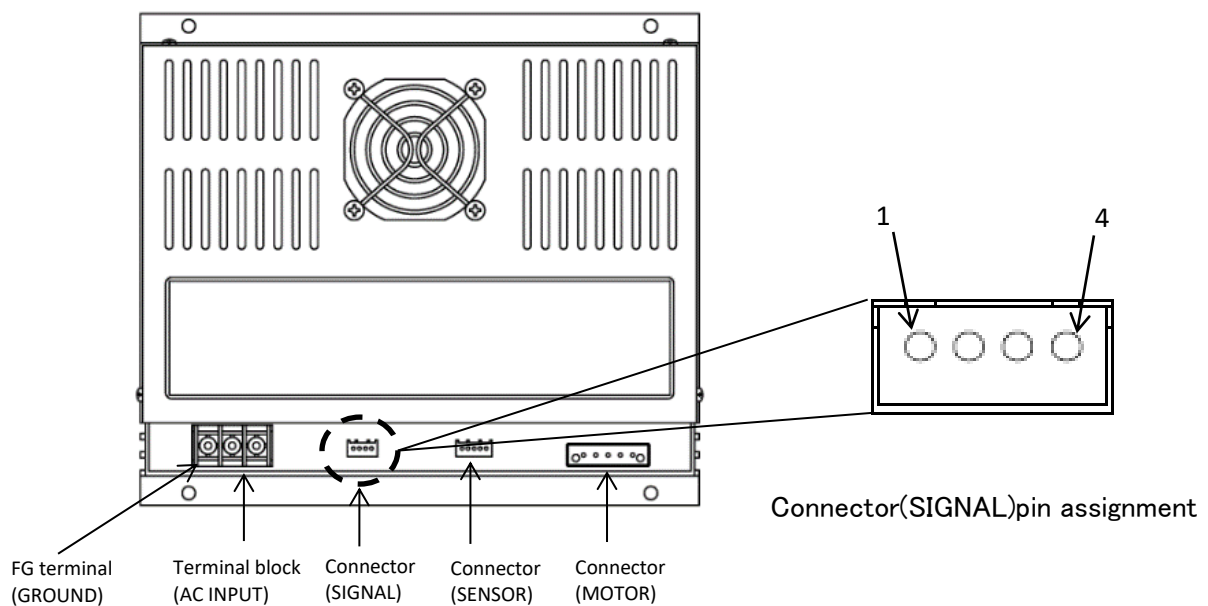
The customer is responsible for confirming compliance with the safety standards of the final product installing this product.

## 6 Connection

This section describes the blower and driver, power, the input signal and output signal, how to connect the Input/Output terminals, and gives connection examples.

### 6. 1 Input / Output terminal

Connection	Terminal No.	Terminal name	Contents	Specification	Remarks	
Connector (SIGNAL) (Note1)	1	S_CTR	Speed control input (+ side)	Between S_CTR terminal and CTR_GND terminal  Input voltage: DC 0 ~ 5 V Input current: 1 mA or less	The Blower output can be adjusted by adjusting the input voltage. Speed variable voltage range About 0~4.5V (Note 3)	
	2	CTR_GND	Speed control input (Internal insulation common GND)			
	3	FOLT	Error output in abnormal Rotation pulse output	Between FOLT and FOLT_GND terminal output pulse of the 18000 min <sup>-1</sup> at 60Hz Open collector output Pull up voltage: 15 V or less Sink current: 10 mA or less		The signal can be output by connecting the pull-up resistor on the outside. Rotation pulse Frequency[Hz] = revolution[min <sup>-1</sup> ] / 300 (Note 4, Note 5)
	4	FOLT_GND	Error output in abnormal Rotation pulse output (GND side)			
Terminal block (AC INPUT) (Note2)	1	FG	Frame GND	Rated Voltage AC 200-240V (※Only 60DCF-487 AC100--200-240V)	Possible Input range AC 180~264V (※Only 60DCF-487 AC90~264V)	
	2	SIN_ACL	AC single phase input (non-earth side)			
	3	SIN_ACN	AC single phase input (earth side)			
Connector (SENSOR)	—	CNT_1	Sensor connector input for blower	—	There is exclusive relay cable	
Connector (MOTOR)	—	CNT_2	Motor connector input for blower	—	There is exclusive relay cable	



- Note 1: The connection must use the connector (The maker: JST and model number: XHP-4).
- Note 2: Connection method, please use the insulation crimp terminal to the internal terminal block with M4 screws. (For example, the maker: JST and model number: V1.25-4)
- Note 3: Please input the DC voltage that meets the input voltage specification between the terminal S\_CTR and the terminal CTR\_GND.
- Note 4: FOLT terminal is open collector output of a photo coupler, so when using as signal output, please make the pull up outside in resistance which meets the specification outside. (FOLT output specification see section 6.8)
- Note 5: If you want to connect a large current device such as a relay, set up an external amplifier circuit.

- If terminal block is placed near the Blower, make sure vibration / air stream does not cause mechanical fatigue of wire.  
Fixed attachment to a nylon clamp and/or duct is recommended.
- Make sure connector is pushed all the way down.

## 6. 2 Connection of driver and blower

Connect the blower and driver with the blower lead wire (motor & sensor).  
Plug the connector of blower lead wire into the connector for the driver.  
The blower lead wires can be extended with a dedicated relay cable.

### Precautions

After Connection of the cable to work with the power off,  
Firmly insert the connector as far as it will go.  
If the connector is not in fully, the equipment may run improperly or the blower and driver could be damaged.

### Precautions

When connecting or disconnecting the connector, always grab hold by the connector. Do not pull by the lead wire.  
Do not force in a direction other than the direction intended for insertion and removal.

### Precautions

Do not try to modify the cable by cutting it to extend or shorten it.  
It may make the equipment run improperly or the blower and driver could be damaged.

Select a relay cable length that is best for the equipment you are using.

Name of part	Number of product
Relay cable 1m	241-60-725-01
Relay cable 3m	241-60-725-02
Relay cable 5m	241-60-725-03

When using a long cable, make certain that it is not susceptible to the external noise of equipment. (Detach the cable from the power line. Disconnect the sensor harness. Shield the cable.)  
Be sure to extend the cable using a dedicated relay cable.

Do not carry the blower and driver while they are in their cables.  
Do not connect 60DCF blower to 70DCF driver.  
Do not connect 60DCF driver to 70DCF blower.

### 6. 3 Connection of Power supply

The input power is as follows.

60DCF-485 & 486 : Rating AC200-240V (single phase). (Possible Input Range AC180~264V)  
 60DCF-487 : Rating AC100-200-240V (single phase). (Possible Input Range AC90~264V)

You must furnish the power cable.

The wiring for the lead wires to the AC input terminal block of the driver could short circuit if they contact the driver cover.

Therefore, use an insulated round crimped terminal.

We recommend you use cable with a wire diameter of AWG16 (1.25mm<sup>2</sup>) or higher

Connect a ground wire (AWG16 (1.25mm<sup>2</sup>) or higher) to the cases for the driver and blower, or firmly ground the case.

After wiring is complete, be sure to place the terminal block cover back on before using the blower.

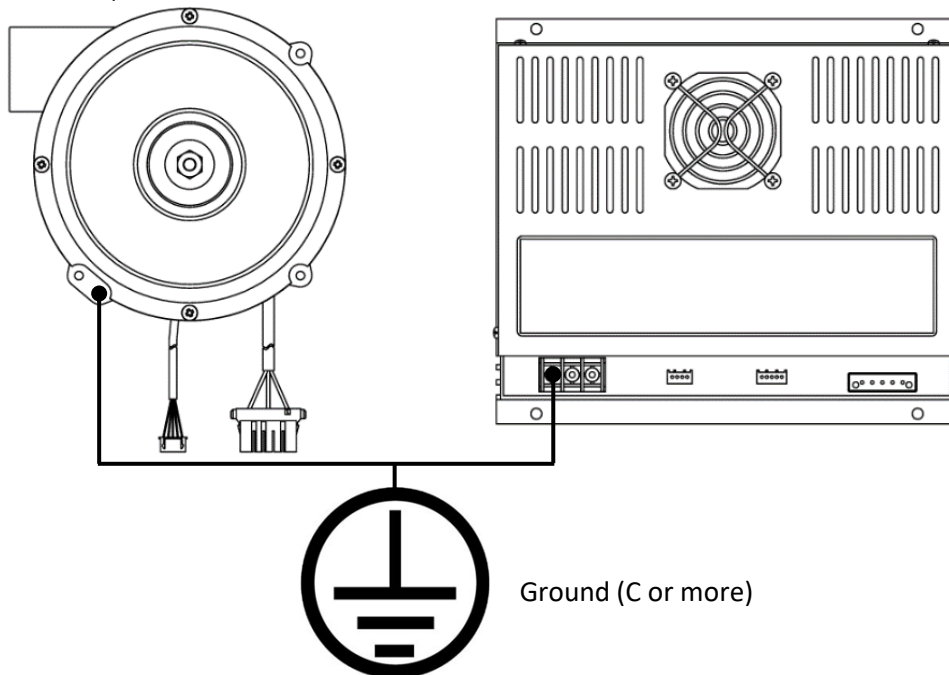
#### Precautions

When connecting the power supply wiring avoid placing wiring within the same ductwork so as to prevent the influence of noise on other signal lines. Remove the power cable after confirming that the electric potential for the power supply terminal block has dropped enough.

Use a wide, large, and uniform conductive surface as a ground location, ground so that no electric potential difference will be generated.

Ground in such a way that all grounding points are on the shortest path to a single point.

Ground example



### 6. 4 Connection of input and output signal terminal

Plug the I/O signal connector into the connector part for the driver.

If you do not use the Signal harness provided with the driver, you must make a harness using the parts described in the provision below.

Do not connect directly, do not soldering and do not use items of another name nor items by other manufacturers.

Name of part	Name of product	Manufacturer
Housing	XHP-4	JST
Terminal	SXH-001T-P0.6	JST

## 6. 5 Connection example input and output circuit

Shows the circuit of the signal input and output of the driver.

### 【Input signal】

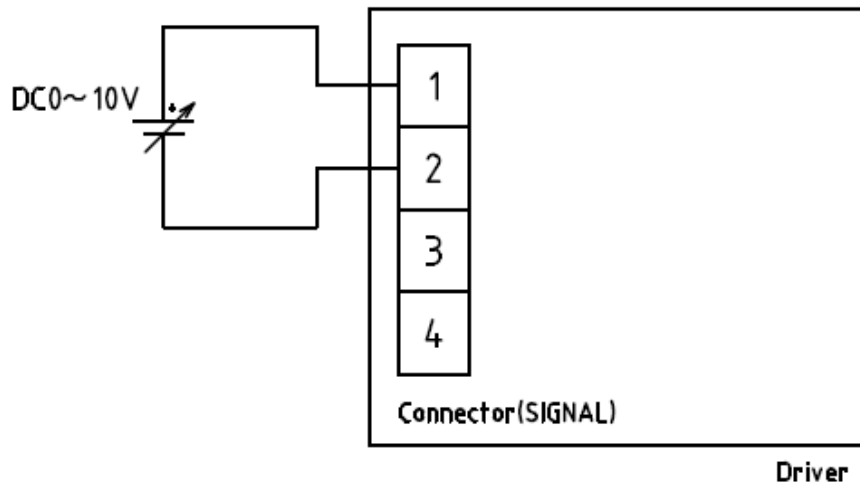
Do not start/stop blower using the braker or the electromagnetic switch of the AC power supply. Always precede start/stop with a control input signal.

### Precautions

The maximum DC voltage for an external input is 10V.

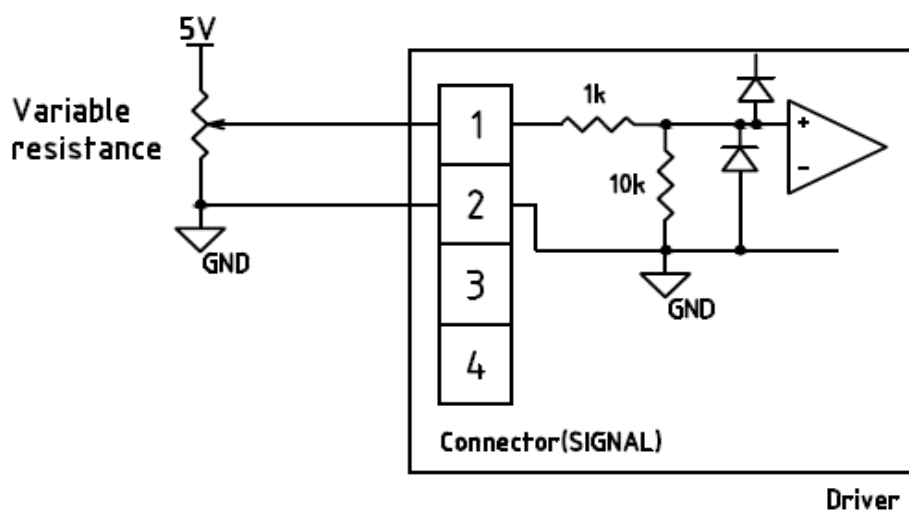
Use of a voltage higher than the maximum DC voltage may damage the circuit or make it malfunction.

#### ① Use external power supply



#### ① Use external power supply & Variable resistor

There is 11k $\Omega$  in the internal circuit between PIN1 and PIN2.





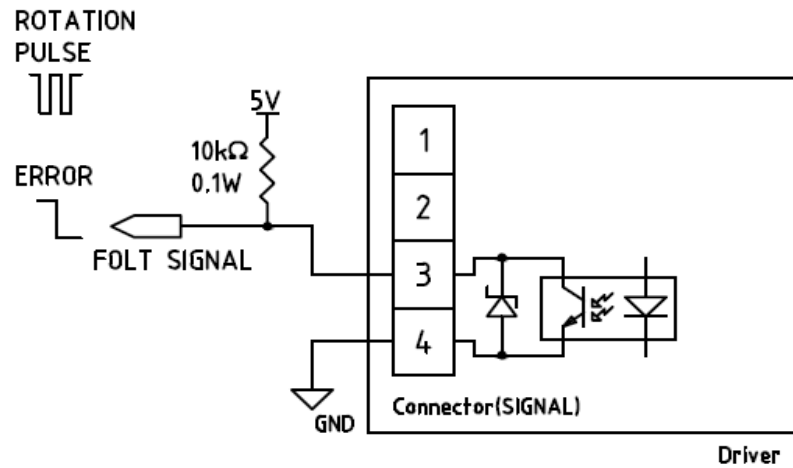
## 【Output signal】

- FOLT signal

For open collector output, use the pull-up.

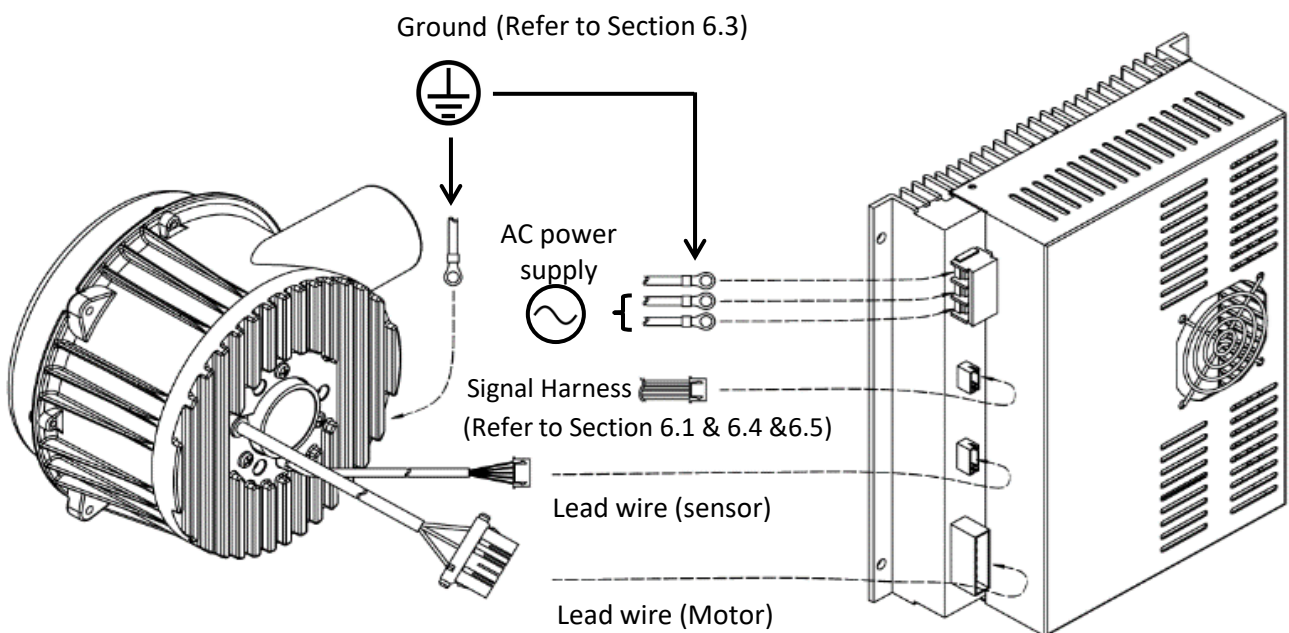
**Precautions**

As the allowable voltage is 15 V and the allowable current is 10 mA, be mindful of the pull-up voltage and resistance. Use of an allowable voltage and current higher than the allowable ranges may damage the circuit or make it malfunction.

**6. 6 Blower-Driver Connection Diagram**

Indicates connection between Blower and Driver.

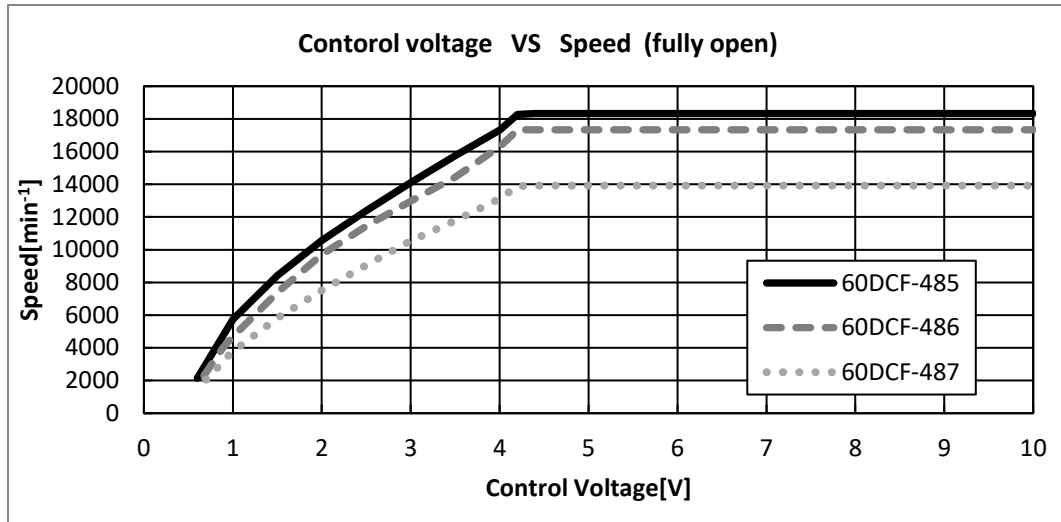
**Warning:** When complying with safety standards, Branch circuit protection must be provided in accordance with the National Code and any additional local codes or the end-product standard.



Note: The unit was tested in compliance with the standard requirements under the protection of an external branch short circuit protection circuit breaker UL489/CSA C22.2 No.5 Mounded-Case Circuit Breaker/Switch having a rating of:  $I_n = 15A$ , Instantaneous short-circuit tripping current  $\leq 200A$ .

## 6. 7 Setting operating speed

The speed of the blower can be changed with the connections in Section 6,5.  
The relationship between the control signal and speed roughly are as follows.



### Precautions

If you enter an external control signal voltage, it must always be less than 10 VDC.

You may damage the driver.

If you enter an external control signal voltage, the polarity must be correct.  
You may damage the driver.

## 6. 8 Parallel operating

If you run blowers in parallel, you must set up each of the drivers for the blowers.  
As there is ductwork loss properties, etc., check whether the blower can be used as well as its properties.

### Precautions

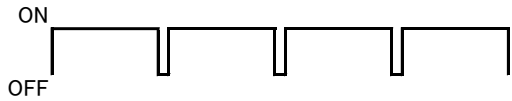
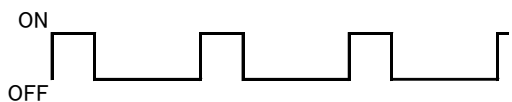

Do not try to run the blowers in series.

You may damage the blower.

When using several blowers side-by-side, be sure that they are sufficiently spaced apart.

## 6. 9 Error signal

The protection function of the driver and blower is triggered under any of the following situations. An error signal "LOW" will appear and the blower stops. At the same time, an LED(Note1) in the driver blinks and the description of the error will display. The errors details and LED display details are as follows:

Power state	Blower state	E_LED (red)	P_LED (green)	FOLT output ※
POWER INPUT before	STOP	Light off	Light off	High Impedance
POWER INPUT after	STOP	Light on	Light on	HIGH
	Normal rotation	Light off	Light on	Speed pulse (Note2)
	Overcurrent detection	Repeat flashing : 1000ms: ON / 100ms: OFF 	Light on	LOW
	Axis restraint detection Blower abnormal temperature rise detection (Note 3)	Repeat flashing : 400ms: ON / 1000ms: OFF 	Light on	LOW
Driver abnormal temperature rise detection	Repeat flashing : 200ms: ON / 200ms: OFF 200ms: ON / 1000ms: OFF 	Light on	LOW	

Note 1: The LED indication point, please refer to the below figure.

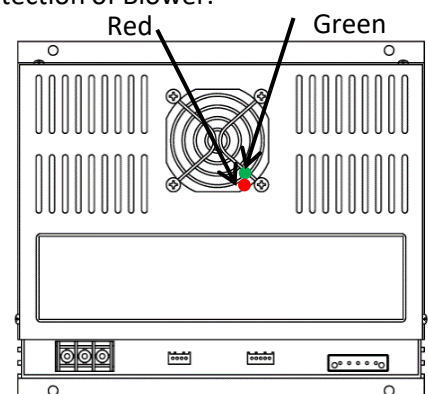
Note 2: PULSE output, for 0~18000min<sup>-1</sup> rotation speed of the blower, square wave of 0~60 Hz is output.

Note 3: Axis restraint detection includes abnormal temperature rise detection of Blower.

### Precautions

After the protection function for the driver is triggered, always turn off the power and then clear the source of the error signal.

If you continue to run the equipment without clearing the source, it will cause damage to the blower and driver.




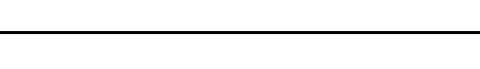




※Output Short-circuit, Over Current & Overload Protection  
Integral solid state motor protection circuitry of motor driver without provision of memory retention, intended for use and connection with external thermal cut-out, hall sensors contained within blower motors.

It would operate to disable the output of the driver immediately (< 1s) when the following faults occurred at output or the connected motor: "Motor rotor locked", "Over-heat of the motor", "Output current exceeded 10A", or short-circuit across the output terminals etc..

Check the error details of the blower and driver, and be sure to eliminate the cause of the abnormal condition.

※FOLT output (Open collector output)

ブLOW状態	FOLT出力	
Stop	High	
	Low	
Normal rotation	High	 Pulse frequency[Hz] = Rotation(min <sup>-1</sup> )/300
	Low	
Abnormal condition detection	High	
	Low	

## 7 Maintenance・Inspection

After running the blower, we recommend that you inspect for the following items regularly. If there is an abnormality, stop using the blower and contact your dealer.

Inspection items

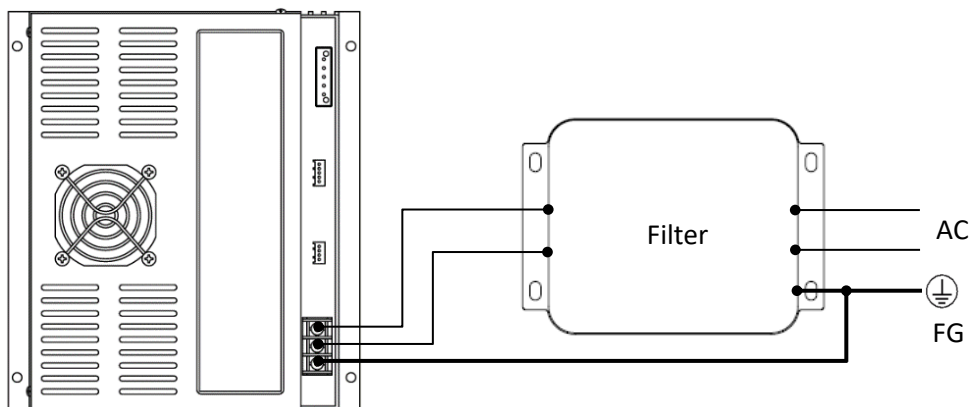
- Is there an abnormal sound coming from the bearings for the blower motor?
- Has the blower experienced an abnormal increase in vibration?
- Are there any cut cables, cuts on the signal harness or stress?
- Are there any loose connectors?
- Is there dust, etc. collecting in the blower and driver?

## 8 EMI correspondence

We recommend connecting a noise filter on power input parts as a countermeasure for noise emissions.

As properties will vary depending on the condition of the wiring and equipment to be installed, check whether the blower can be used as well as the properties.

Noise filter connection example



**9 Guaranteed term**

-The warranty period shall be up to The day one year has passed from initial delivery or up to the day in which 5000 hours of total operation has been exceeded, or whichever comes first. Accidents that occur as a result of design or material flaws, or defective work shall be repaired at no extra cost or replaced by Minebea.

These terms are not guaranteed under the following circumstances:

- (1)When it is admitted that the breakdown was caused by user's fault.
- (2)When it was used under the prescribed conditions for use and the condition beyond the environment.
- (3)When it is caused because of products other than blower.
- (4)When it depends on user's remodeling.
- (5)When fire and a natural disaster depend on irresistible force.

The warranty specified in this manual covers only the blower and driver. Opportunity loss, loss of profits and damage to products other than those of MinebeaMitsumi by customers who are responsible for the breakdown of our products, and compensation for replacing and readjustments of actual equipment by customers fall outside warranty obligations.

- The content provided in this manual is subject to change without notice.

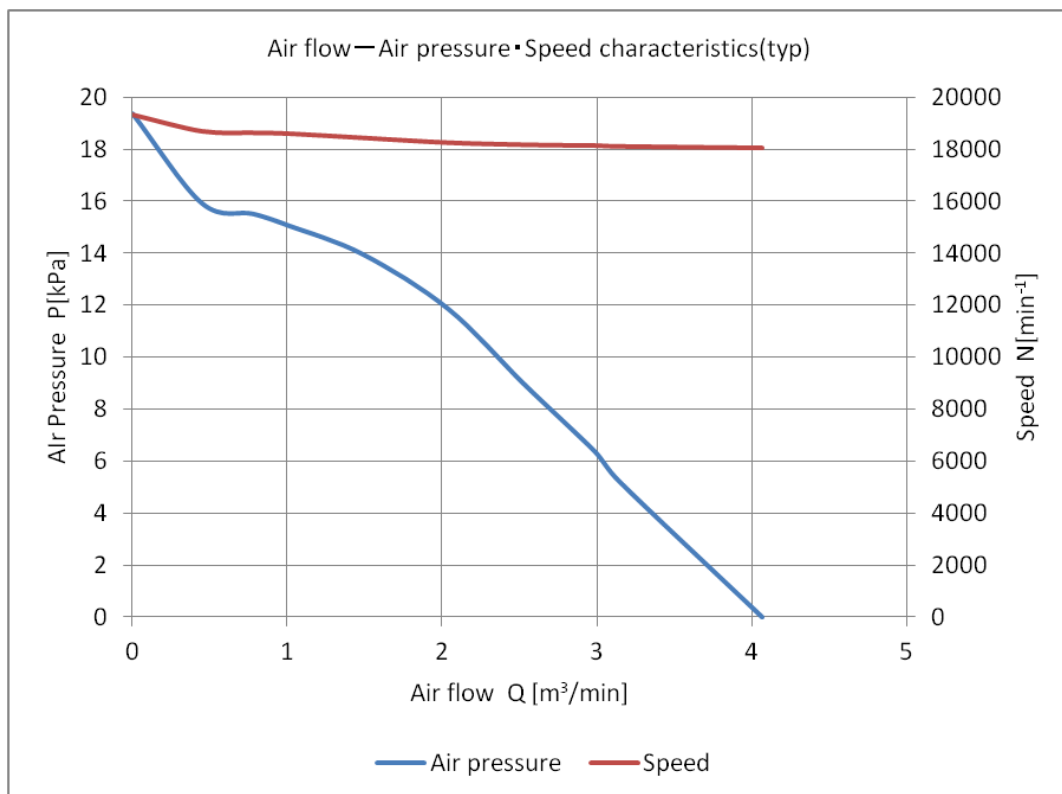
**10 Specification****10.1 60DCF-485 specifications**

&lt;Configuration&gt;

60DCF-485    { BLOWER    : 123-60-731  
                   { DRIVER        : MDS-01AL001-04

No.	Item	Specification	Remarks
1	Rated air flow	1.9 m <sup>3</sup> /min any more At air pressure 10 kPa	(20°C、1 atmosphere) AC 240V +10% -25%
2	Air flow MAX	3.5 m <sup>3</sup> /min any more	(20°C、1 atmosphere) AC 240V +10% -25%
3	Air pressure MAX	18kPa any more (※1)	(20°C、1 atmosphere) AC 240V +10% -25%
4	Current	At stop : AC 0.6 A or less At rating: AC 8.0 A or less	Including blower and drivers at AC 240V
5	Supply voltage	Rated Voltage AC200-240V Single phase 50/60Hz	Possible Input Range AC 240V +10% -25%(AC180V~264V)
6	Insulation class	class A	-
7	Mass	Blower : 3.0 kg or less Driver : 3.5 kg or less	-

- ※1. Maximum static pressure 18kPa is when the discharge port is fully closed.  
 Avoid continuous operation with the inlet or outlet fully closed.  
 It is recommended to use with an aperture ratio of 15% or more.  
 The area used should be 1 m<sup>3</sup>/min or more.  
 Please use it in reference to a characteristic graph to show as follows.



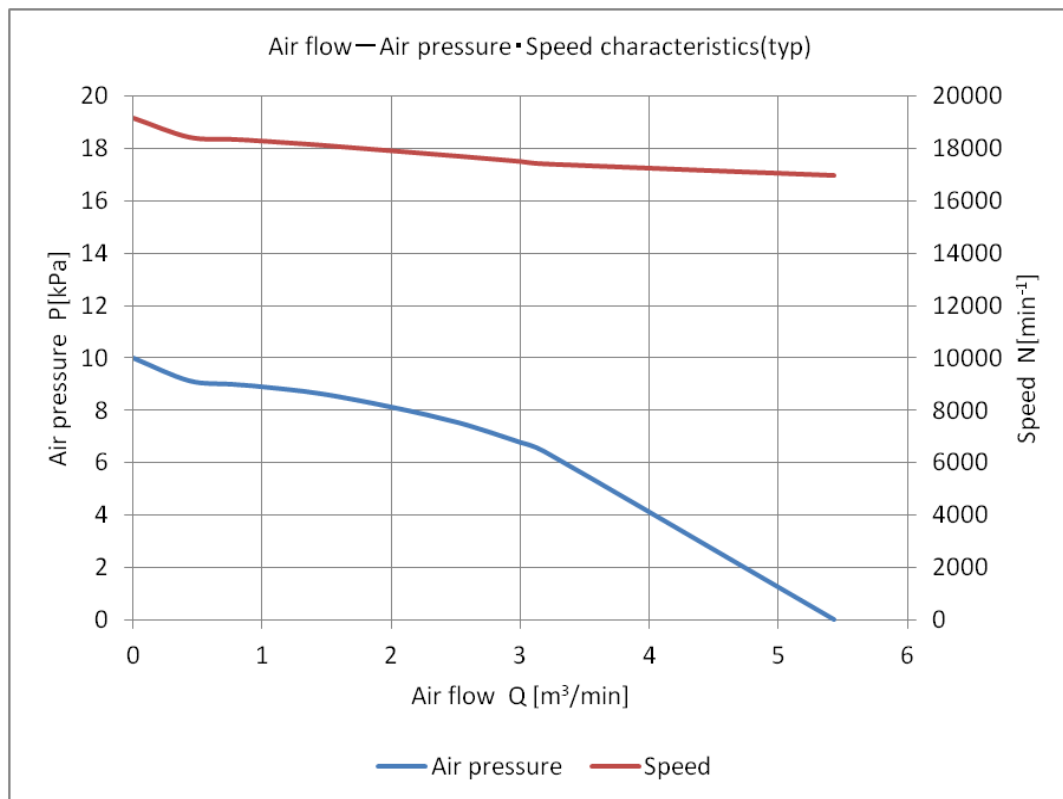
## 10. 2 60DCF-486 specifications

<Configuration>

60DCF-486      { BLOWER     : 123-60-732  
                               DRIVER        : MDS-01AL001-04

No.	Item	Specification	Remarks
1	Air flow MAX	5 m <sup>3</sup> /min any more	(20°C、1 atmosphere) AC 240V +10% -25%
2	Air pressure MAX	9 kPa any more (※1)	(20°C、1 atmosphere) AC 240V +10% -25%
3	Current	At stop : AC 0.6 A or less At rating : AC 8.0 A or less	Including blower and drivers at AC 240V
4	Supply voltage	Rated Voltage AC200-240V Single phase 50/60Hz	Possible Input Range AC 240V +10% -25%(AC180V~264V)
5	Insulation class	class A	-
6	Mass	Blower : 3.0 kg or less Driver : 3.5 kg or less	-

- ※1. Maximum static pressure 9kPa is when the discharge port is fully closed.  
 Avoid continuous operation with the inlet or outlet fully closed.  
 The area used should be 1 m<sup>3</sup>/min or more.  
 Please use it in reference to a characteristic graph to show as follows.



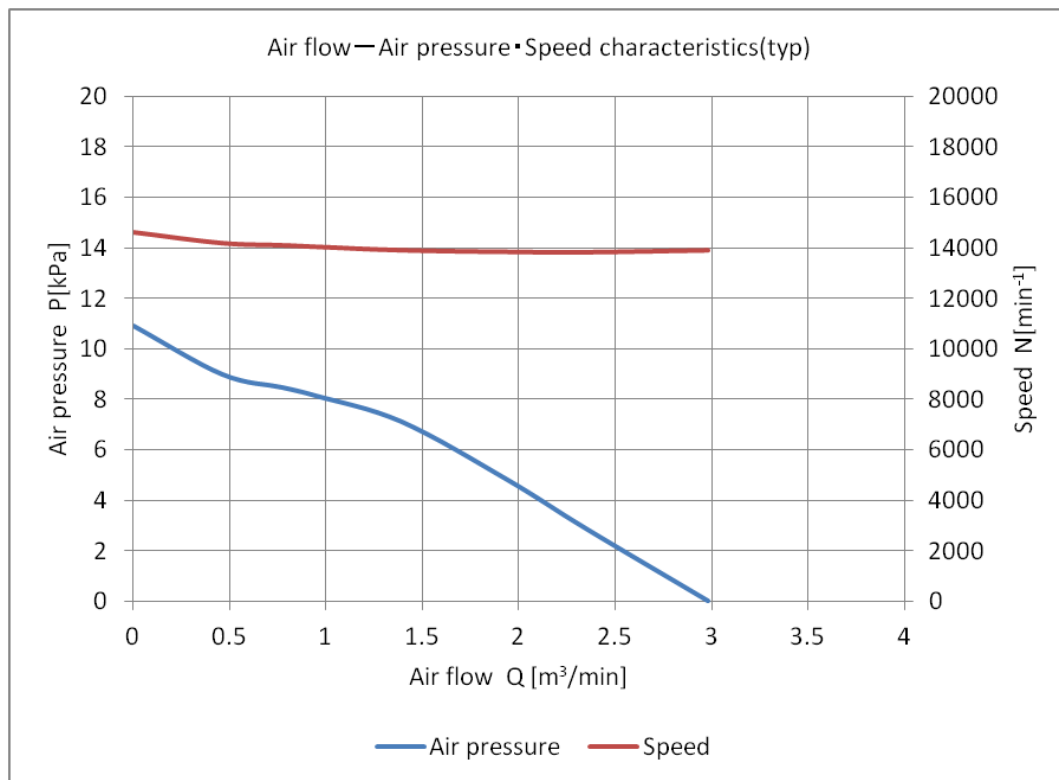
### 10. 3 60DCF-487 specifications

<Configuration>

60DCF-487      ( BLOWER     : 123-60-733  
                       ( DRIVER        : MDS-01AL001-04

No.	Item	Specification	Remarks
1	Air flow MAX	2.5 m <sup>3</sup> /min any more	(20°C、1 atmosphere) AC 100-240V ±10%
2	Air pressure MAX	10kPa any more (※1)	(20°C、1 atmosphere) AC 100-240V ±10%
4	Current	At stop : AC 0.6 A or less At rating : AC 8.0 A or less(at AC100V) AC 4.0 A or less(at AC200V)	Including blower and drivers
4	Supply voltage	Rated Voltage AC100-200-240V Single phase 50/60Hz	Only 123-60-733 Possible Input Range AC 100-240V ± 10%(AC90V~264V)
5	Insulation class	class A	-
6	Mass	Blower : 3.0 kg or less Driver : 3.5 kg or less	-

※1. Maximum static pressure 10kPa is when the discharge port is fully closed.  
 Avoid continuous operation with the inlet or outlet fully closed.  
 The area used should be 1 m<sup>3</sup>/min or more.  
 Please use it in reference to a characteristic graph to show as follows.





#### 10. 4 Common Specifications

No.	Item	Specification	Remarks	
1	Operating temperature range	0°C ~ +50 °C	Operating conditions in available.	
2	Storage temperature range	-20°C ~ +65 °C	Non-operating condition.	
3	Operating humidity range	90% or less	—	
4	Operating barometric pressure	81.3kPa ~ 103.3kPa	—	
5	Operating elevation	Les than 1000m above sea level	—	
6	Operating space	Indoor	Integration into equipment.	
7	Mounting direction	Blower : Axis horizontal direction Driver : Vertical	—	
8	Guaranteed Life ※1	5000hour cumulative time at Operating temperature range operation or 1 year. (See 9 Guaranteed term)	In the usage described in this instruction manual.	
9	Noize (Blower)	105dB or less at Exhaust port fully open. (reference)	A-Weighted Sound Pressure Level. At a	
10	Applicable standard	Blower	IEC/EN/UL62368-1	The EN standard supports only the LVD directive. CB certification.
			UL507 CSA C22.2 No.113	cTUVus
		Driver	IEC/EN/UL62368-1	The EN standard supports only the LVD directive. CB certification.
			UL62368-1 CSA C22.2 No.274-17	cTUVus
			UL61800-5-1	TU TUVus
		RoHS compliant		

※1 Product lifespan is not the same as Guaranteed life.

The Product lifespan can be expected to be longer than the Guaranteed life.

The main factors that affect the Product lifespan of the Blower are as follows.

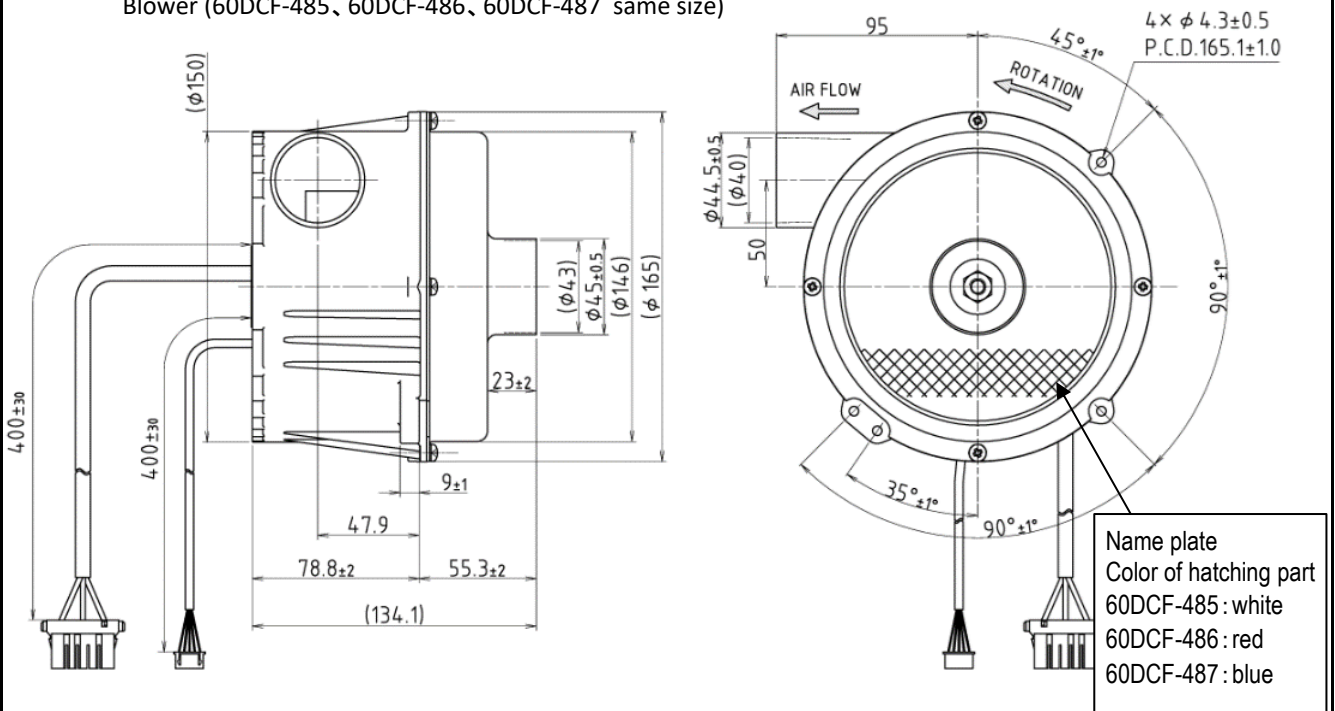
- Operating temperature
- Tenperature of Blower
- Vibration (The product itself and / or surrounding equipment)
- Blower Intake and exhaust conditon
- Rotation speed of Blower operating
- ON / OFF repeat Frequency of Blower operating

Please evaluate based on your usage and environment to see if the product lifespan is as expected.

**11 Dimensions**

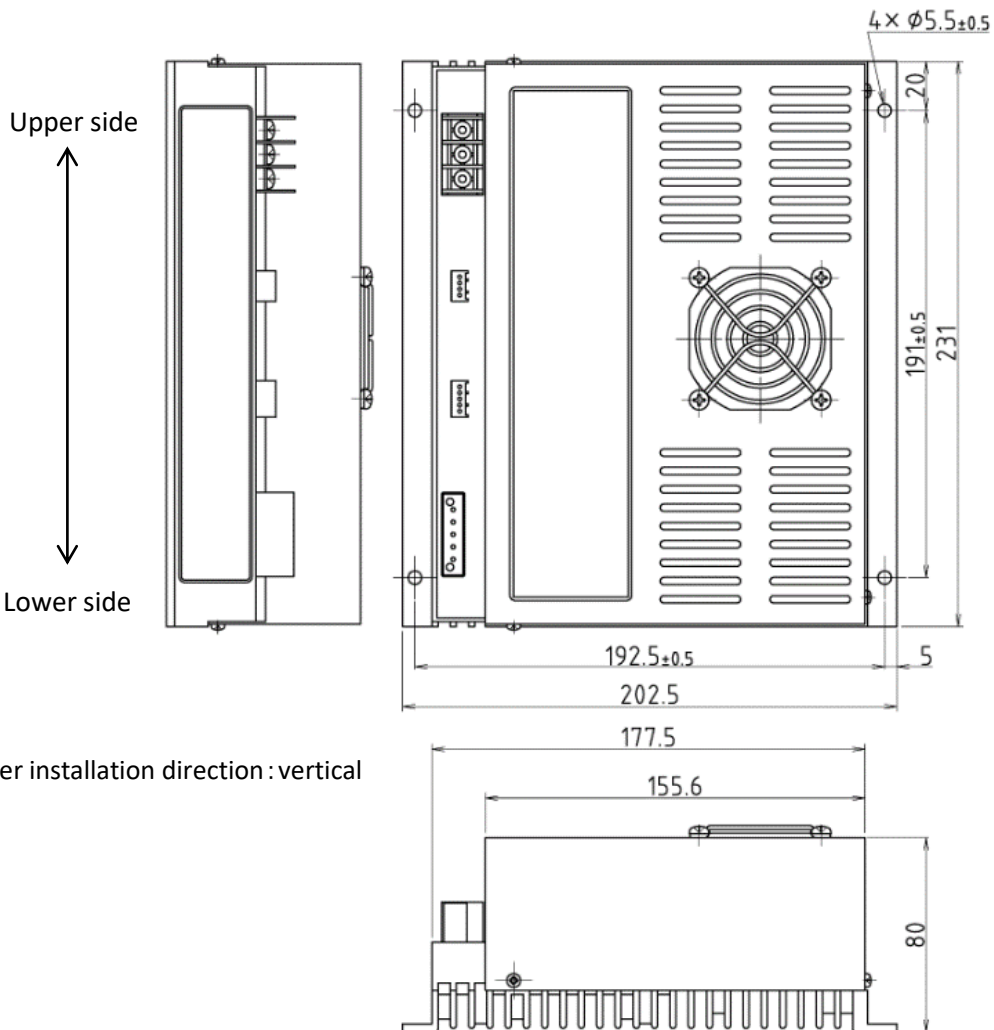
Unit:mm

Blower (60DCF-485, 60DCF-486, 60DCF-487 same size)



Blower installation direction : Axis horizontal direction

Driver



Driver installation direction : vertical