



C 600HT

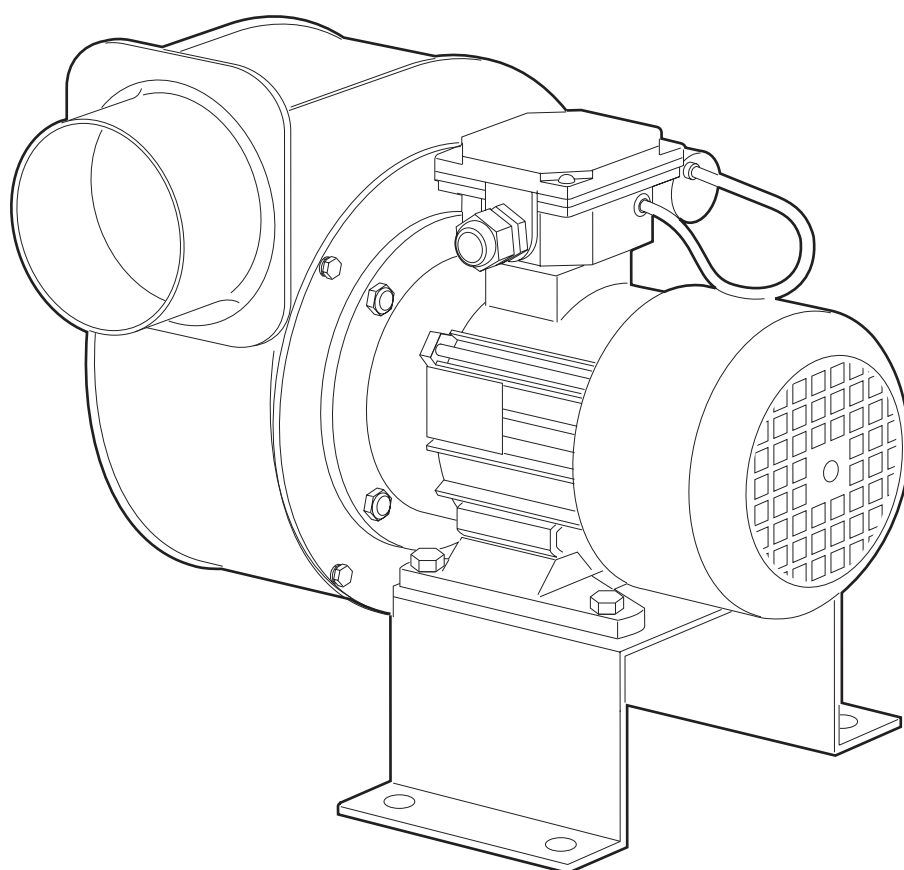


TABLE OF CONTENTS

1 Introduction	2
2 Safety	3
3 Product Description	5
4 Preparation for Use	6
5 Commissioning	8
6 Operation	8
7 Troubleshooting	9
8 Maintenance	10
9 Technical Information	11
10 Spare Parts	12

1 Introduction

1.1 General

These instructions apply to the fans listed on the cover page. To prevent injuries to personnel and damage to equipment, always follow the information contained in this document. Read these instructions carefully before use, make sure that the requirements are met and keep the instructions in a suitable place for users and service personnel. If you are not sure how the fan should be installed or used, please contact the manufacturer.

Further guidelines on how to use the motor are in the motor documentation, and these too must be followed.

Under Machinery Directive 2006/42/EC, the fan is classed as partly completed machinery.

The impellers are balanced according to quality class G6.3 of ISO 1940-1 and the entire fan is balanced according to category BV-3 of ISO 14694.

Check the following on delivery:

- The fan matches the order
- The correct parameters are indicated on the fan's rating plate
- The fan has not sustained damage during transport
- The motor documentation is included

If anything is not as it should be, contact your dealer or Fumex AB.

1.2 EC Declaration of Conformity

We declare under our sole responsibility that the product described in this document conforms to the standards (or documents having the force of standards) specified below. In the event that the product(s) is/are changed or modified without our prior consent, this Manufacturer Declaration will cease to be valid.



The fan mentioned above complies with all applicable regulations, directives and standards as set out below.

- Machinery Directive 2006/42/EC
- EMC Directive 2014/30/EU
- EN ISO 12100:2010
- EN 60204-1

The partly completed machinery must not be put into service until it has been incorporated into the final machinery and all requirements relating to health and safety specified in the Machinery Directive are met.

1.3 Warranty

Only use original parts and accessories. Repairs under warranty must be handled by Fumex AB or, subject to the manufacturer's approval, by a third party. The warranty is governed by Fumex AB's terms and conditions of delivery.

1.4 Manufacturer

FUMEX AB
Tel. no.: +46 (0)910 361 80
Email: info@fumex.se

Verkstadsvägen 2
SE-931 61 Skellefteå
Sweden

2 Safety

Throughout the fan's life cycle, to prevent personal injury and damage to peripherals or the fan itself, strict compliance with the following safety instructions is required:

2.1 General



The fan is designed for industrial use and must be handled by personnel with industrial training. The fan is not designed for use in a domestic or similar environment.

The fan is designed for transporting clean air and air containing certain types and volumes of chemically aggressive gases (contact the manufacturer for further information about the latter). The fan must not be used to transport explosive gases, solid particles, liquids, substances that can result in wear, or compounds that might react chemically with the structure of the fan (see **9.5 Material specification**). The minimum permissible temperature for the transported medium is -20°C. The maximum temperature is indicated on the rating plate.

The fan is not designed for outdoor use. This means it must not be exposed to snow, rain or excessive sunlight. The fan must not be installed in an environment containing explosive gases, wear-inducing, chemically aggressive or viscous substances, liquids or substances with high humidity. The minimum ambient temperature is -15°C. The maximum temperature is indicated on the rating plate.

The fan must not be exposed to radiation (such as microwaves, UV, laser or X-rays).

2.2 Moving parts



Beware of the fan's moving parts, as contact with them can result in serious injury and may prove fatal. Under no circumstances may the fan be used, unless sufficient protection against moving parts has been provided at the time of installation.

2.3 Suction



The fan produces significant suction, with the result that clothes, hair, loose objects and body parts can be easily drawn into the fan. Never allow any part of the body or loose-fitting clothing to be in the vicinity of the inlet. The fan must be secured and protected in such a way as to prevent any damage or injury as a result of the suction it produces.

2.4 Flying objects



The energy level of the air at the fan outlet is extremely high. Particles and small objects that reach the fan can therefore be expelled at very high speeds. The fan is of safe design, but if damaged or used incorrectly, parts (involving high kinetic energy) may be ejected from the fan at very high speeds. Check the surroundings of the inlet carefully, both before and during use, to ensure that there are no loose objects in the vicinity. Make sure too that there is no one in the direction of the airflow at either the outlet or the inlet.

Similarly, no one should approach the motor's cooling panel with their fingers, hair or other objects, as there is a risk of injury. Do not start the fan unless the inlet and outlet are secure and protected, and make sure moving parts are protected.

2.5 Sharp edges



During the manufacturing process, the edges of the fan are ground back, but sharp edges may still occur, representing a risk of injury through laceration. Protective gloves are recommended when handling the fan.

2.6 Secure mounting



The fan is very heavy. If the fan is not carefully fixed in place, it can cause uncontrolled movements. The fan may only be put into service after thorough and careful installation.

2.7 Sound level



The loudness of the fan depends on its operating point. Check the loudness of the fan and, if necessary, use noise-absorbing accessories and/or personal hearing protection.

2.8 Fire and transport of inappropriate media



In the event of fire or transport of the wrong medium, the fan can generate air which is harmful to health.

2.9 Environment



The fan can generate positive pressure as well as negative pressure. This means that positive or negative pressure can be generated in the relevant areas. Make sure that sufficient air is supplied in the right volumes to the area in question.

2.10 Temperature and fire safety



Fan housings and other parts become hotter when a heated medium is being transported. During operation, the temperature of the medium increases, which spreads to the fan parts. The electric motor can also get hot (especially in the event of overload). It is important that the necessary measures are taken to prevent fire and burns. In the event of a fire, make sure that a fire extinguisher designed for electrical equipment is used, and follow the relevant recommendations for fire and safety.

2.11 Unprepared start-up and electrical disconnection



Before starting any work on the fan (e.g. installation, maintenance, servicing or dismantling), the fan must be fully disconnected from the mains. Under no circumstances may the fan be reconnected while work is in progress.

NB: Single-phase fans with capacitors retain energy for a limited time after the current is disconnected.

The necessary safety measures must be taken to prevent unauthorised persons coming into contact with live parts.

The fan is not equipped with any built-in control system. This means that, when connected to the mains, the fan will start up immediately. Equally, the fan does not have a system that turns it off permanently in the event of a temporary power failure. Make sure there is no risk of injury in such an event.

Some motors have thermistors installed and, if these have tripped (due to the motor overheating), they will return to their original position after cooling down. Make sure nothing can cause a hazard in the event of a temporary power failure.

If the impeller jams, it can suddenly start moving on release. If the impeller jams, the fan must be disconnected and repaired.

On electrical disconnection, the impeller will continue to rotate for a limited time due to accumulated energy.

2.12 Use



Improper installation and/or use may result in damage to the fan and represent a hazard to its surroundings. The fan may only be installed, maintained, dismantled and used by qualified and authorised personnel (with due attention to the relevant safety rules). Users should know how the fan works and what the consequences of improper use can be.

It is not permitted to operate a dismantled or incompletely installed fan, e.g. where the connection box has no lid attached.

When working on the fan (during e.g. installation and maintenance), make sure that no unauthorised person enters the fan's vicinity.

Modification of the fan is not permitted. Complex maintenance work (such as removal of the motor or impeller) must be carried out by Fumex AB or with the latter's permission, in accordance with the latter's instructions. Improper assembly may result in poor fan characteristics, damage to the unit and/or risk of personal injury.

2.13 Dust



Avoid dust accumulation on and inside the fan. Accumulated dust on the impeller may cause imbalance. Dust on the grilles and filters impairs the fan's characteristics. Dust on the fan housing and motor may lead to impaired cooling, which may result in fire (see **2.10 Temperature and fire safety**).

2.14 Potentially explosive environments



Contact with potentially explosive environments can lead to ignition. Use of the fan in such environments is therefore not permitted.

3 Product Description

3.1 Serial number and product name

See product nameplate.

3.2 Labels and safety signs

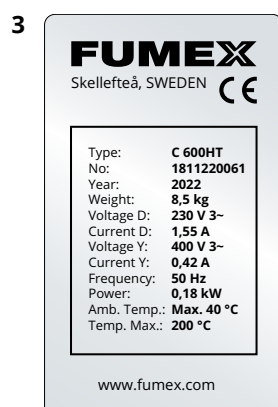
3.2.1 Nameplate



When connecting or maintaining the product, or ordering spare parts, refer to the data indicated on the nameplate in the first instance.

3.2.2 Labelling

1. Fumex logo
2. Labels/symbols relating to safe use of the fan.
3. Nameplate
 - Arrow indicating direction of rotation
 - Arrows indicating direction of flow



3.2.2.1 Area of use

The C 600HT fan is intended for the evacuation of gases, smoke and lighter particles with temperatures up to 200 °C.

3.3 Design

For a general description (simplified), see **Fig. 1**.

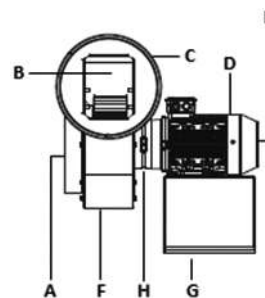


Fig. 1

- | | |
|---------------------|-------------------------|
| a) Inlet, impeller | e) Cooling panel, motor |
| b) Outlet, impeller | f) Fan housing |
| c) Outlet flange | g) Stand |
| d) Motor | h) Temperature barrier |

4 Preparation for Use

4.1 Transport and storage



Do not expose the fan to fertilisers, chlorinated lime, acids or other aggressive chemicals. The fan must be protected against tampering and other external ingress.

During handling, the fan should always be lifted in a way that does not risk damaging it or its surroundings.

Never remain in the vicinity of a fan that is being lifted. Any damage to the lifting equipment may cause the fan to fall, with resultant risk of serious and potentially fatal injury.



When lifting, it is important to remember where the centre of gravity is, so as to minimise the risk of the fan overturning.

The fan must be transported and stored in its original packaging. It should not be exposed to external damage in the form of impacts and shocks. The unit must also be protected against the weather and stored in a dry well-ventilated area, free of substances that could damage the fan.

Always handle the fan with care.

Do not lift the fan using the lifting parts of the motor (e.g. the motor's lifting eye).

The recommended storage period should not exceed one year. In the case of longer storage periods, the fan should be carefully checked before installation (see Chapter **8 Maintenance**).

4.2 Assembly and installation

4.2.1 General



During installation, follow the instructions provided in Chapter **2 Safety**.

Under Machinery Directive 2006/42/EC, the fan is classed as partly completed machinery. Before the fan is put into service, it must comply with the requirements of Machinery Directive 2006/42/EC. After installation, the unit must meet the requirements of standards EN ISO 12100, EN ISO 13857, EN ISO 13850 and EN 60204-1. For more information, see the manufacturer's declaration of conformity.

Before the fan is put into service, the temporary transport protectors need to be removed (e.g. the inlet and outlet protectors). Starting the fan with the transport protectors attached can damage the fan. Make sure that the fan has not sustained damage.

Make sure that there are no loose objects in the vicinity of the fan and that the fan is securely and safely installed (e.g. the cover of the connection box has been correctly fitted and the mounting screws have been tightened). Carry out the safety checks prior to and during operation, see section **5.1 Before commissioning** and **5.2 After 30 minutes of constant operation**.

When assembling and installing the fan, make sure that no dirt or objects enter the fan, as these can damage it.

4.2.2 Configuration

View from inlet side:



LG 90

4.2.3 Assembly



The fan must be installed at a safe distance from combustible materials. Particular attention should be paid to the hot parts of the fan.

The fan must never be installed with the motor facing downwards.

The supporting structure must be robust enough to take the weight of the fan and its vibrations. The fan must not be exposed to external vibrations.

Inlet and outlet grilles must be fitted. They must protect against contact with the impeller in accordance with ISO 13857.

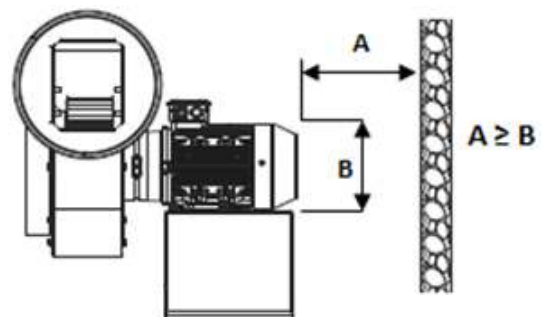


Fig. 2

Make sure that objects cannot be drawn into the fan (see section **2.4 Flying objects**). The inlet and outlet grilles must meet IP20 (EN 60529) requirements. NB: Some fans come equipped (by the manufacturer) with a suitable inlet grille. If there is still a risk of objects being drawn in, further measures must be taken.

The fan should be installed at a sufficient distance from other structures that may produce or be subjected to vibration. Where the fan is installed on vibration dampers, the fan's inlet and outlet must also be provided with flexible connections.

Make sure there is sufficient distance between the motor's cooling fan and other objects as per the motor documentation. This should never be less than that shown in **Fig. 2**.

During installation, make proper allowance for safety distances and protection against combustible materials and personal injury.

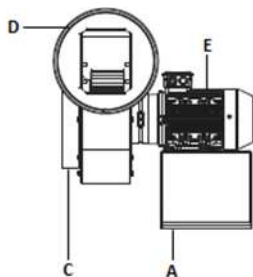


Fig. 3

- a) Stand
- b) Motor feet (not pictured)
- c) Inlet socket
- d) Outlet socket
- e) Motor

Fan without stand

The fan must be mounted in a horizontal position, viewed from the motor shaft, as shown in **Fig. 4**. Other mounting methods require the approval of Fumex AB. The mounting points of the fan are at the inlet flange, outlet flange and the motor feet (if present), where it is screwed tight into all mounting holes. Lock nuts or equivalent must be used to prevent the fan or accessories from working loose due to vibration.

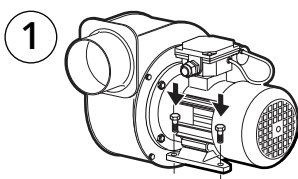


Fig. 4

Fan with stand

The fan must be mounted in a horizontal position, viewed from the motor shaft, as shown in **Fig. 5** with the stand at the bottom. All mounting holes in the stand must be used when installing the fan. When installing against a ventilation duct, connection must be made to the outlet and all mounting holes must be used. Lock nuts or equivalent must be used to prevent the fan or accessories from working loose due to vibration.

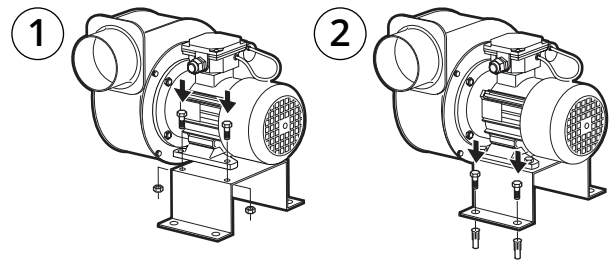


Fig. 5

4.2.4 Electrical connection



The fan must only be connected by a qualified electrician. The fan and power supply must be protected in accordance with local electrical safety regulations.

Earth cable must always be connected and then with the motor's ground screw.

Voltage and frequency must not deviate from the specifications on the fan's rating plate.

Protection against short circuit, overload and voltage dip must be connected to the fan. The fan must always be equipped with a motor protection switch.

Detailed information about electrical connection can be found in the motor documentation and/or on the motor's rating plate – NB: Always adhere to these specifications.

Use appropriate protection against electric shock. The fan must always be connected to a reliable earth connection in accordance with the motor documentation, motor rating plate and fan labelling.

Always use cables intended for the purpose, with adequate insulation and of sufficient cross-sectional area. Cables must always be positioned in such a way that they do not come into contact with moving parts. They must also not come into contact with any liquid (e.g. due to condensation) that might flow along and into the connection box. Cable grommets of the correct dimension must always be used and must be properly tightened to the correct torque.

Fan with TP sensor

Some fans are equipped with a bimetal sensor (the TP sensor is mounted near the front ball bearing on the electric motor). The sensor conductor is routed to the connection box. During normal operation, the sensor circuit is closed, and at too high a temperature the circuit breaks. The sensor conductor needs to be connected to some kind of relay that cuts the current when the sensor circuit is broken.

Fan with PTC sensor

Some fans are equipped with PTC sensors (mounted in the motor windings). The sensors' conductors are routed to the connection box. The resistance in the PTC sensors increases rapidly as the permissible motor temperature is exceeded. The sensor conductor needs to be connected to some kind of relay that cuts the current in the event the permissible motor temperature is exceeded.

4.2.5 Checking the direction of rotation

Always make sure that the impeller rotates in the correct direction, both during installation and during normal operation. After the fan has been fitted to its application, start the fan in a single pulse (less than 1 second) and check that the impeller rotates in the correct direction. The direction of rotation is checked by making sure that the cooling panel of the motor rotates in the correct direction. If the impeller rotates in the wrong direction, the fan's characteristics are impaired and there is a risk that the fan will be damaged. If the impeller rotates in the wrong direction, switch off the power supply, and as soon as the impeller has stopped, swap over the phases (e.g. L1 and L3 on a 3-phase fan) in the motor connection box. See the circuit diagram under section **4.2.4 Electrical connection**.

5 Commissioning

5.1 Before commissioning

Check to ensure the following:

- The type and model match the order.
- The fan is free of damage.
- The fan is clean and has no loose objects inside it.
- The fan is mounted securely and reliably, so that it is safe.
- Cables have been connected correctly.
- The ambient temperature and the temperature of the transported medium comply with the specifications on the fan labels.
- The correct electrical protective equipment has been used.
- The fan is earthed correctly.
- The mains supply matches the specification of the fan.
- The fan has been equipped with a power switch.
- Personnel who will use the fan have read and understood the operating and assembly instructions.
- Any filter and inlet and outlet grilles have been fitted.

5.2 After 30 minutes of constant operation

Make sure of the following points:

- Measured vibration values, with details of the point of measurement, have been noted (for future checks).
- Measured electrical current values, with details of the method of measurement, have been noted (for future checks).
- Check that the current value does not exceed the nominal value for any of the fan's phases.
- Measured vibrations do not exceed permissible values.
- The type and model match the order.

6 Operation



Make sure that starting the fan will not pose a hazard to personnel and surroundings. Follow the guidelines under Chapter **2 Safety**.

The fan is designed for continuous operation. Starting a fan at too high a frequency can lead to the motor overheating.

In the event of damage to electrical protective equipment, the fan must be switched off immediately.

The fan must not be operated at a voltage, frequency, or power consumption other than that indicated on the fan rating plate (even if the motor rating plate/manual indicates otherwise). Operation at a higher frequency can lead to damage to the motor and fan.

The fan must not be operated at a voltage lower than that specified on the fan label; this may lead to it overheating and damage to the motor.

The fan must not be operated at power consumption that exceeds that indicated on the rating plate.

The fan is adapted to operate under specific conditions. Insufficient back pressure, such as in the case of repeated start/stop of the fan with fully open inlet and outlet, can lead to overheating of the motor as a result of high power consumption.

The parameters of the fan correlate with the speed of rotation (e.g. temperature of medium, ambient temperature, minimum and maximum flow).

Further information on operation of the fan is indicated on the fan, see also section **3.2.1 Nameplate**.

7 Troubleshooting

TROUBLESHOOTING GUIDE	
Symptom	Possible cause
1. Too much vibration or noise.	Damaged impeller.
	The fan is not mounted fully level.
	Dirt or other accumulation on impeller that causes imbalance.
	Other cause of imbalance in the impeller.
	Parts rubbing against each other.
	Ball bearing damage or wear.
	Fault in measuring equipment that indicates imbalance.
	Deformed motor shaft.
	The impeller centre screw is loose or the screw to the motor cooling panel is loose.
	The motor cooling panel is damaged.
2. Motor overload.	Contact between impeller and fan housing.
	Ball bearing damage or wear.
	Damage to the motor windings (e.g. overheating, degraded insulation, winding failure).
	Fault on motor protection switch.
	Fault on one of the motor phases.
	The motor is exceeding the maximum permissible speed.
	Too little resistance in the airflow.
3. Fan fails to start.	Contact between impeller and fan housing.
	Foreign object inside fan.
	Fault on one of the motor phases.
	Starting equipment does not work as intended (e.g. Y/D starter).
	Safety equipment reset has not occurred/faulty safety equipment.
	Motor incorrectly connected or damaged.
	Mains voltage too low.
4. Protective equipment is activated during operation and fan overheats.	Extended start-up time.
	Motor overload.
	Motor start-ups too frequent.
	Wrong protective equipment for the purpose.
	Cross-sectional area of the connecting cables is incorrect.
	Motor cooling inadequate, e.g. damage to the motor's cooling fan.
	Too little resistance in the airflow.
	Too little resistance in the airflow.
5. Too little flow.	Broken fan.
	Frequency too low.
	Object in ventilation or pipe system.
	Damaged ball bearings.
	Fan is operated in wrong direction of rotation.

8 Maintenance



Repairs may only be carried out by the manufacturer. We are not liable for repairs carried out by third parties.

8.1 Maintenance guidelines



Maintenance must be in accordance with the guidelines under Chapter **2 Safety**.

The fan must be inspected regularly according to section **8.2 Inspection and maintenance**



Maintenance and inspection of the motor must be in accordance with the motor documentation and labelling. The motor's ball bearing must be replaced before its service life expires.

Dust and dirt

Prevent dust/dirt from accumulating on the inside and outside of the fan. Dirt on the grilles and filters can lead to a reduction in capacity. Dirt on the fan housing and motor can lead to impaired cooling, and dirt on hot surfaces incurs a risk of ignition. Particular attention should be paid to the motor's cooling panel and cover, as reduced cooling can lead to the motor overheating.

Corrosion

Corrosion can lead to mechanical damage to the fan. Do not use the fan if it has started to rust.

Overload

If the fan draws too much current, this may be due to:

- An incorrectly dimensioned fan
- Mechanical damage (e.g. to impeller or ball bearings)
- Incorrect electrical connection or peripherals.

The current must be measured and, if found to be too high, the potential cause of the fault must be established and rectified. The current must not exceed the nominal value.

Vibrations

Strong vibrations can cause mechanical damage to the fan structure and its fixings. Increased vibrations may be caused by damaged ball bearings or impaired balance in the impeller. The vibrations need to be measured and, if found to have increased, the cause must be established and rectified.

The maximum value for the vibrations at the motor ball bearing (perpendicular to the motor shaft) must not exceed the values in the table below:

Fixed mounted*		Flexibly mounted*	
Top	r.m.s	Top	r.m.s
6,4 mm/s	4,5 mm/s	8,8 mm/s	6.3 mm/s

*according to ISO 14694

8.2 Inspection and maintenance

The interval between inspection and maintenance should be determined by the user based on the load on the fan and its ambient factors.

In the event of any deviations from the norm, the fan must be taken out of service and inspected, maintained, cleaned and, where applicable, repaired. Examples of reasons why the fan may not work properly are provided in Appendix C.

Operating personnel must be aware of how the fan works under normal circumstances. If the fan deviates from its normal behaviour, it must be taken out of service and inspected.

Detailed information on components and their tightening torques is available upon request.

Daily inspection



It is recommended a general inspection be performed daily, and certainly at least once a week.

Check to ensure the following:

- The fan is undamaged, stable and flawless in operation.
- There is no leakage or smoke from the motor.
- The fan does not emit any abnormal sounds and does not get hotter than normal.
- The fan is clean and free of rust.
- Cables are intact.
- There is no unwanted leakage from the fan.
- Grilles, filters and guards are seated as they should be and are clean.

Monthly inspection

Check to ensure the following:

- The current value of the fan is no higher than at the time of commissioning.
- The vibrations are no greater than at the time of commissioning.
- Fan, grilles, filters and guards are clean.

Inspection every three to six months or after 3,000 hours of operation.

Whichever occurs first. Check to ensure the following:

- There is no sign of rust.
 - Mounting screws are correctly tightened.
 - Safety equipment works properly.
- The value for insulation resistance of the motor is correct.
 - The structure is fully intact, without damaged components (due to e.g. abrasion).

9 Technical Information

9.1 Dimensional drawing

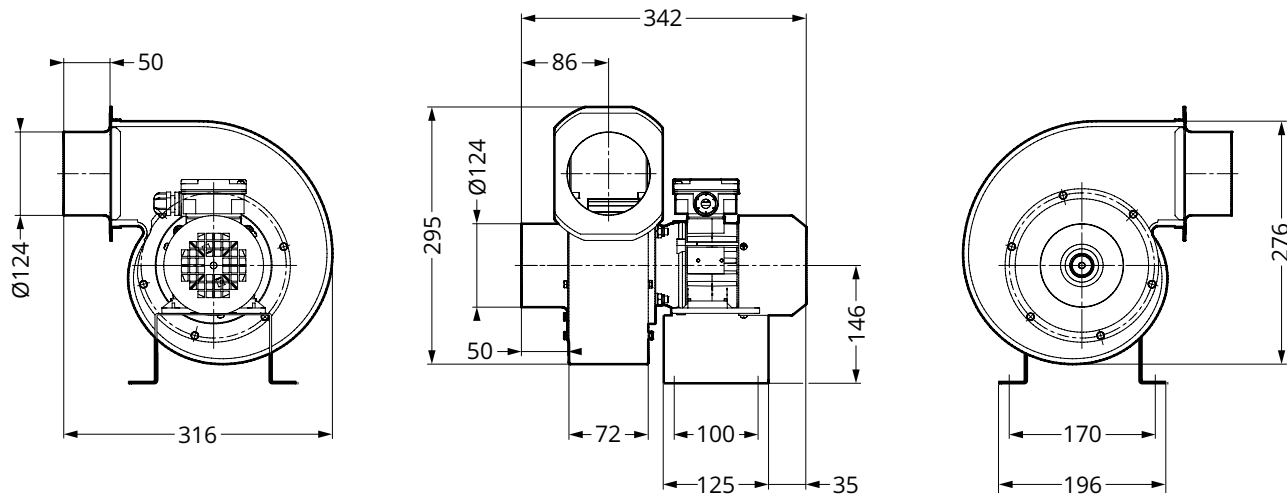


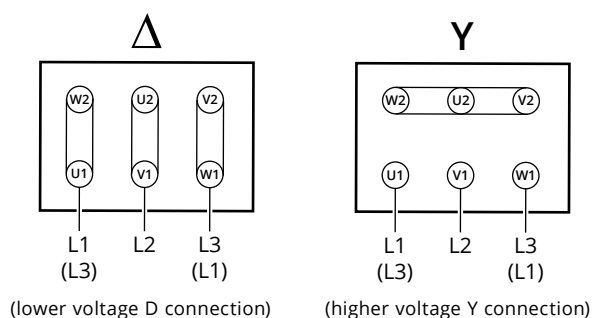
Fig. 6

9.2 Technical data

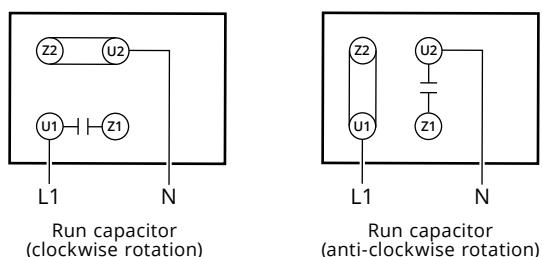
Model.....	C 600HT-1	C 600HT-3
Voltage:	1-phase 230 V	3-phase 230/400 V
Rated current:.....	1,55 A	0,85 A/0,50 A
Rated power:.....	0.18 kW	0.18 kW
Speed:.....	2800 rpm	2800 rpm
Enclosure:	IP55	IP55

9.3 Circuit diagram, electronics

3-phase alternating current:



1-phase alternating current:



9.4 Exploded-view drawing

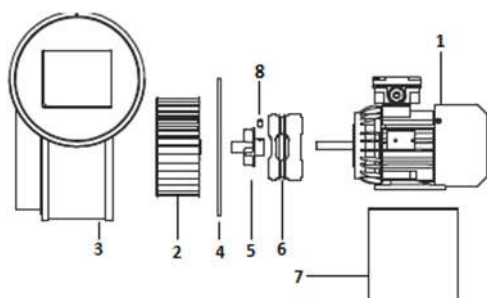


Fig. 7

- | | |
|-----------------|---------------------------------------|
| 1. Motor | 5. Temperature barrier, cooling panel |
| 2. Impeller | 6. Temperature barrier, housing |
| 3. Fan housing | 7. Stand |
| 4. Motor shield | 8. Temperature barrier, fasteners |

9.5 Material specification

See **9.4 Exploded-view drawing** for reference.

- Fan housing (3), motor shield (4) and stand (7) are made of stainless steel – 1.4301.
- Impeller (2) is made of 1.4301 stainless steel using stainless steel fasteners.
- Temperature barrier, cooling panel (5) and temperature barrier, housing (6) are made of cast aluminium.
- Screws for attaching the motor (not on drawing) are made of galvanised steel.
- Fasteners (not on drawing) are made of stainless steel.
- For execution of the seals, sealant and sealing tape (e.g. EPDM) have been used.

A complete list of the components and materials used can be obtained on request from the manufacturer.

10 Spare Parts

When ordering a spare part, always specify the fan type and size, as well as the number shown in **9.4 Exploded-view drawing**.