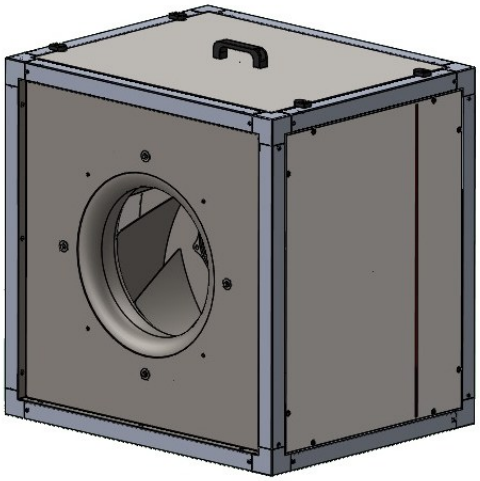
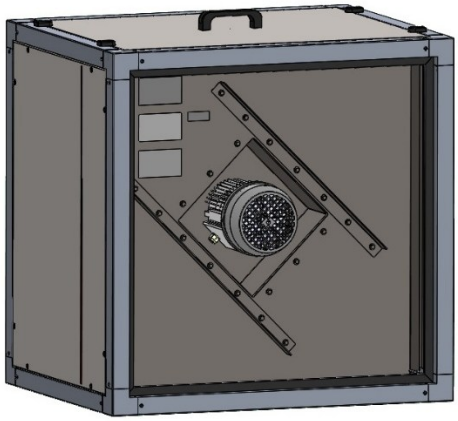
# Use and maintenance instructions

# VDI EC SERIES





# Table of Contents

1. Safety
2. Main information
3. Technical description
4. Transport
5. Installation/Mounting
6. Commissioning
7. Maintenance
8. Faults
9. Spare parts
10. EC declaration of incorporation

# 1. Safety

**The following symbols refer to particular hazards or provide advice for safe operation**

Caution! Safety notice! Danger !

Danger from electric current and high voltages!

Crushing hazard!

Danger! Do not stand or pass under suspended or moving materials!

Important information

# 2. Main information

The units manufactured by CMC Ventilazione Srl are designed and built in compliance with the health and safety requirements of the EU Machinery Directive.
All units are tested before leaving the factory to verify their proper operation. Laboratory tests are available upon request.
However, the units can be dangerous:
• If not installed, used, and maintained by qualified personnel.
• If not used for approved applications.
Please read these use and maintenance instructions carefully before starting to work with the units. Observe the following warnings to prevent malfunctions or physical harm to people and property.

**Caution!**
**These use and maintenance instructions may be duplicated and forwarded to all personnel involved in the use of the units, to inform them about potential hazards and their prevention.**

## The instructions for use:

- Describe the permitted use of the units and protect against improper use.
- Contain safety notes that must be strictly observed.
- Inform about hazards associated with the use of the units even when used correctly.
- Provide important rules on the safety and efficient use of the units.

**CMC Ventilazione accepts no responsibility for any injuries or damages that may occur due to failure to comply with the rules in this instruction manual.**

The manufacturing warranty does not apply following unauthorized and unacceptable conversions and modifications to the units.

**There is no liability for damages resulting from non-compliance with this manual and other applicable laws!**

# 3. Technical description

## 3.1 Description

The units are equipped with a brushless internal rotor motor with a matched but separate inverter and a reverse-blade fan. The units are suitable for transporting clean air and other non-aggressive gases or vapours in accordance with specific technical restrictions.

**Proper use:**

- Exclusive use in a fixed system.
- Provide for routine maintenance and cleaning.
- Use in environments with temperatures within the limits of use.

**Misuse:**

**Use of the units in the following ways is prohibited and may create risks:**

- Use of units operating with unbalanced impellers (unbalance may be caused, for example, by deposits of dirt, grease and excess dust).
- Use of the units in medical equipment.
- The transmission of vibrations to the units from external sources
- Movement of solid parts inside the units
- Painting of the units
- Use of the units in potentially explosive areas.
- Use of the units outside the limits of rpm, air flow, and pressure.
- All other uses not listed under proper use.

**Danger points: using the units outside the specified operating limits can cause injury to persons and material damage, for example due to fan breakage, fan shaft failure, fatigue cracks, or fires caused by sparks.**

All components of the units are made of unpainted galvanized steel sheet. The panels are not gas tight. The motor is IP54, insulation class F, as indicated on the unit label.

All motors are equipped internally with thermal protectors that open the motor's electrical circuit if the temperature reaches the threshold.

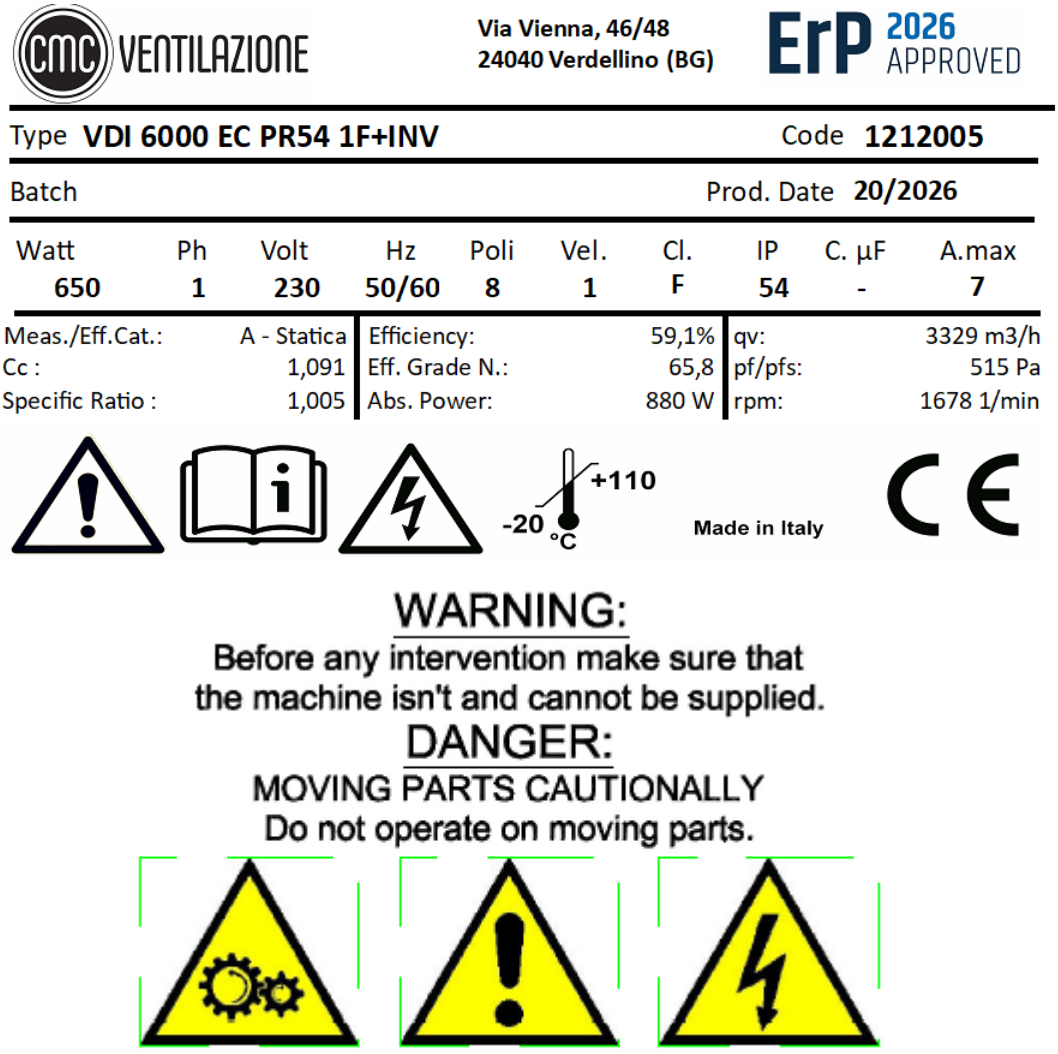
**The electrical connections are indicated in the inverter manual and in the quick start manual.**

**The units are designed and manufactured to be incorporated into equipment and are not supplied with specific guards. Appropriate protection must be provided in accordance with DIN EN ISO 13857. Only after this can the unit be put into operation.**

## 3.2 Technical data

The technical data and operating limits are shown on the unit nameplate, in the catalogues, or in the technical data sheets and must be observed.

For example: Label placed on the unit



# 4. Transport

## 4.1 Transport damage

During transport, the units may be damaged; before putting them into operation, check the integrity of the units and the packaging.

## 4.2 Handling and storage instructions

- The units must be handled with appropriate equipment according to their weight and structure
- Lift the units with the packaging. Do not lift the units by levering:
  - On the fan
  - From the shaft or the electric motor.

The units must be stored in the original packaging, in a dry and dust-free environment, with relative humidity below 75% and temperature between -20 °C and +40 °C.
If stored for more than 1 year, before assembly it is necessary to check the condition of the bearings by manually rotating the fan. Before commissioning, also check the clearances between the rotating components.
Avoid any deformation of the fan blades and prevent any additional damage during handling, storage, and installation.

**DANGER! Do not stop or pass under a transferred and lifted load!**

# 5. Assembly/Installation

## 5.1 Mechanical connection

**Be careful not to cut yourself or hit the unit when removing it from the packaging. Use safety shoes and cut-resistant gloves.**

- The units must be fixed to the support without stresses on the supporting structure.
- Inappropriate loads can cause damage or mechanical failure due to fatigue.
- Connect the extraction channel to the front opening. Connect the extraction channel to a side panel in the area delimited by the tape (see figure 1).

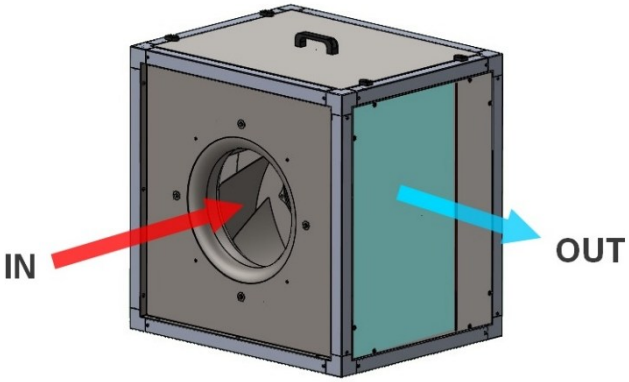



*Figure1*

- It is recommended, when possible, to use elastic joints to fasten the units to reduce vibrations.
- To improve the effectiveness of mechanical tightening, it is recommended to use a special tightening fluid.
- Check the correct rotation of the impeller; the impeller has an arrow indicating the correct direction. To reverse the rotation, turn the direction knob (see figure 2) on the inverter in the opposite direction. If the inverter knob is positioned towards the centre, the unit does not operate. Once the direction of the knob is set for the correct rotation, apply a label-type identifier to fix the correct operating position.

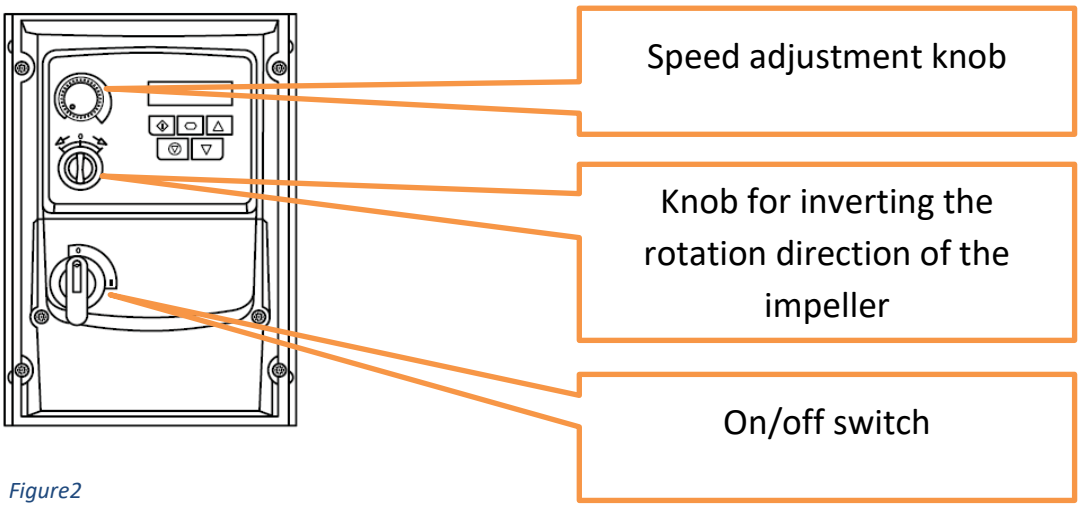



*Figure2*

- Install the inverter exclusively in a vertical position, on a flat, flame-retardant, and vibration-resistant support, using the mounting holes provided.

- Do not place flammable materials near the inverter.
- Ensure that the minimum ventilation space is free of obstructions, as illustrated in section 3.4. Guidelines for inverter installation.
- Ensure that the ambient temperatures do not exceed the permitted limits.
- The inverter must remain matched to the unit for proper operation. Verify that the matching labels between inverter and fan correspond.
- Read the inverter user manual.

## 5.2 Electrical connections

**The VDI EC units are supplied without an electrical plug; the electrical connection must be performed exclusively by trained personnel.**

As a first step, always ground the units according to their application, following the wiring diagram provided in the inverter manual and on the unit.

**Safety notes:**

- Use only cables suitable for insulation, voltage, current, load, etc. The earth wire (PE) must have a cross-sectional area greater than or equal to that of the other conductors.
- Ensure there is adequate protection against accidental contact.
- Connect the units only to a circuit that can be interrupted by a switch.
- When working on the units, it is necessary to disconnect the equipment or system in which they are integrated and wait at least 10 minutes before performing maintenance.
- Ensure that all electrical connections are correctly made and located in a dry area.
- The cable length between inverter and unit must be less than 10 m, or with shielded cables can reach a maximum of 100 m. For example, Berica cables B5704250. (See Figure 3)


Figure 3

| | |
|---|---|
| 1. | Conductor |
| 2. | Insulation |
| 3. | Separator |
| 4. | Shielding |
| 5. | Shielding |
| 6. | Sheath |

- Provide adequate electrical protection according to the installed product.

Indicative diagram of the conductive surface of the cables.

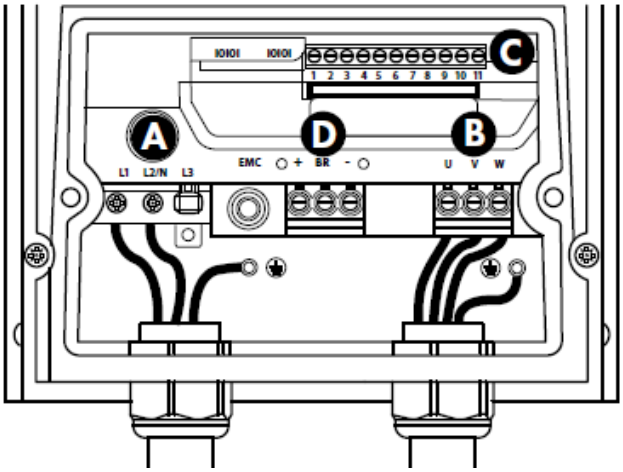
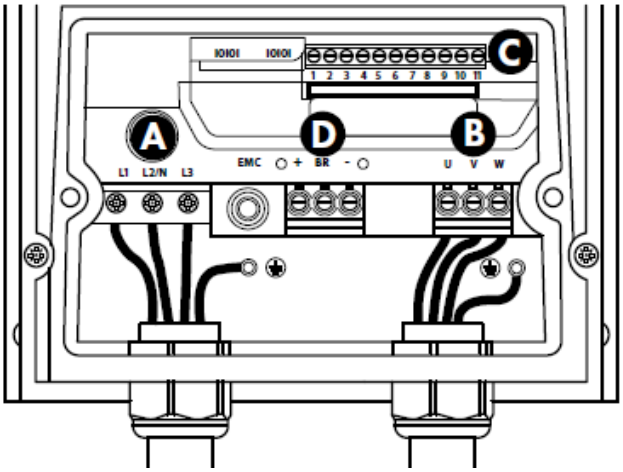
### Three-phase line

| Section mm² | | Minimum cross-section | Approximate sizing of a low voltage cable in metres | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P (kW) | I (A) | | 1.5 | 2.5 | 4 | 6 | 10 | 16 | 25 | 35 | 50 | 70 | 95 | 120 | 150 | 185 | 240 | 300 |
| 1 | 1.6 | 1.5 | 285 | 474 | 756 | 1132 | 1874 | 2948 | 4577 | | | | | | | | | |
| 2 | 3.3 | 1.5 | 143 | 237 | 378 | 566 | 937 | 1474 | 2288 | 3130 | | | | | | | | |
| 5 | 8.4 | 1.5 | 57 | 95 | 151 | 226 | 375 | 589 | 915 | 1252 | | | | | | | | |
| 10 | 16.8 | 1.5 | 28 | 47 | 76 | 113 | 187 | 295 | 457 | 626 | 832 | 1169 | 1558 | 1855 | | | | |
| 15 | 25.3 | 2.5 | | 31 | 50 | 75 | 125 | 196 | 305 | 417 | 554 | 780 | 1039 | 1237 | 1459 | 1729 | | |
| 20 | 33.7 | 4 | | | 38 | 57 | 94 | 147 | 229 | 313 | 416 | 585 | 779 | 928 | 1094 | 1297 | 1569 | 1813 |
| 25 | 42.2 | 6 | | | | 45 | 75 | 118 | 183 | 250 | 333 | 468 | 623 | 742 | 875 | 1037 | 1255 | 1450 |
| 30 | 50.6 | 6 | | | | 38 | 62 | 98 | 152 | 208 | 277 | 390 | 519 | 618 | 729 | 864 | 1046 | 1208 |
| 35 | 59 | 10 | | | | | 53 | 84 | 131 | 179 | 238 | 334 | 445 | 530 | 625 | 741 | 897 | 1036 |
| 40 | 67.5 | 10 | | | | | 47 | 74 | 114 | 156 | 208 | 292 | 389 | 463 | 547 | 648 | 784 | 906 |
| 50 | 84.4 | 16 | | | | | | 59 | 92 | 125 | 166 | 234 | 312 | 371 | 437 | 518 | 627 | 725 |
| 60 | 101.2 | 25 | | | | | | | 76 | 104 | 139 | 195 | 260 | 309 | 364 | 432 | 523 | 604 |
| 70 | 118.1 | 25 | | | | | | | 65 | 89 | 119 | 167 | 223 | 265 | 312 | 370 | 448 | 518 |
| 80 | 135 | 35 | | | | | | | | 78 | 104 | 146 | 194 | 231 | 273 | 324 | 392 | 453 |
| 90 | 151.9 | 35 | | | | | | | | 69 | 92 | 130 | 173 | 206 | 243 | 288 | 348 | 402 |
| 100 | 168.8 | 50 | | | | | | | | | 83 | 117 | 155 | 185 | 218 | 259 | 313 | 362 |
| 110 | 185.7 | 50 | | | | | | | | | 76 | 106 | 142 | 169 | 198 | 235 | 285 | 329 |
| 120 | 202.5 | 70 | | | | | | | | | | 97 | 130 | 155 | 182 | 216 | 261 | 302 |
| 150 | 253.2 | 95 | | | | | | | | | | | 104 | 123 | 146 | 172 | 209 | 241 |
| 200 | 337.6 | 120 | | | | | | | | | | | | 93 | 109 | 129 | 156 | 181 |
| 230 | 388.2 | 120 | | | | | | | | | | | | 81 | 95 | 112 | 136 | 157 |
| 250 | 422 | 150 | | | | | | | | | | | | | 87 | 103 | 125 | 145 |
| 300 | 506.4 | 185 | | | | | | | | | | | | | | 86 | 104 | 120 |
| 350 | 590.8 | 240 | | | | | | | | | | | | | | | 90 | 103 |

### Single-phase line

| Section mm² | | minimum section | 1.5 | 2.5 | 4 | 6 | 10 | 16 | 25 | 35 |
|---|---|---|---|---|---|---|---|---|---|---|
| P (kW) | I (A) | | Approximate sizing of a low voltage cable in metres | | | | | | | |
| **1** | **5** | **1.5** | 47 | 79 | 126 | 189 | 314 | 494 | 767 | 1049 |
| **1.5** | **7.5** | **1.5** | 32 | 53 | 84 | 126 | 209 | 329 | 511 | 699 |
| **2** | **10** | **1.5** | 24 | 40 | 63 | 95 | 157 | 247 | 383 | 524 |
| **3** | **15** | **1.5** | 16 | 26 | 42 | 63 | 105 | 165 | 255 | 350 |
| **5** | **25** | **2.5** | | 16 | 25 | 38 | 63 | 98 | 153 | 210 |
| **7.5** | **37** | **4** | | | 17 | 25 | 42 | 66 | 102 | 140 |
| **10** | **50** | **6** | | | | 19 | 31 | 49 | 76 | 105 |
| **12** | **61** | **10** | | | | | 26 | 41 | 64 | 87 |
| **15** | **76** | **16** | | | | | | 33 | 51 | 70 |
| **20** | **101** | **25** | | | | | | | 38 | 52 |
| **25** | **126** | **35** | | | | | | | | 42 |
| **29** | **146** | **35** | | | | | | | | 36 |

- Connection diagram of the inverter power supply, single-phase or three-phase type

| Single-phase power | | Three-phase power | |
|---|---|---|---|
|  | |  | |
| Inverter power supply | Unit power supply | Inverter power supply | Unit power supply |

### 5.2.1 Preliminary operations

Verify that the label data on the units matches the electrical data of the system in which they are installed.

### 5.2.2 Motor protection

The motors are equipped with thermal contacts (TP) that protect them from thermal overload by opening the motor's internal circuit.
The motors are designed for continuous duty S1.

### 5.2.3 Connection check

- Ensure that the voltage is interrupted in all phases.
- Check the wiring of each electrical pole.
- Ensure that a leak-tight connection is installed between the electrical cables of the motor and the electrical cables of the inverter.

## 6. Commissioning

| |
|---|
| **The surfaces of the motor are hot. Make sure that no flammable substance is placed near the motor.** |
| **Check that there are no objects inside the units or in the duct that could be introduced into the fan during operation.** |

**The units can only be put into service if all the safety devices have been installed correctly and if the fan is protected according to DIN EN ISO 13857.**

### 6.1 Test phases

The units must be switched on to check that the direction of rotation of the impeller is correct; if the impeller does not rotate in the correct direction, adjust the rotation direction knob on the inverter as indicated above in point 5.1. The direction of rotation is indicated on the impeller.

**When the units reach a stable rotational speed, measure the electric current and verify that it is below the maximum current indicated on the data label; in case of overcurrent, turn off immediately.**

**Check that the units do not generate unusual noises during operation.**

## 7. Maintenance

Before working on the units, it is absolutely necessary to ensure:

- That the drive motor is disconnected from the mains and that at least 10 minutes have passed
- The fan does not rotate.
- No surfaces are hot.
- There is no possibility of uncontrolled operation of the unit during maintenance.

**After disconnecting the power supply to the units, wait at least 10 minutes before working on the electrical contacts.**

Remove any dust deposits or other debris accumulated during the maintenance operation using the most appropriate method.

Do not use high-pressure jets, aggressive substances containing acids or solvents, or sharp tools for cleaning the fan.

**The frequency of checks and maintenance must be established based on the type of operation and the unit's working environment.**

| What must be verified? | How to verify? | Inspection frequency | What remedies to apply? |
|---|---|---|---|
| Check the fan to make sure it is not damaged. | Visual inspection. | At least once every 6 months | Replacement of the fan. |
| Check cable integrity. | Visual inspection. | At least once every 6 months | Motor replacement. |
| Check the effectiveness of the mechanical connections. | Visual inspection. | At least once every 6 months | Tightening |
| Check the vibration level. | Vibrometer. | At least once every 6 months | Rotor rebalancing. |

## 8. Faults

| Fault | Possible cause | Solution |
|---|---|---|
| The fan rotates in an unbalanced way. | Imbalance | Fan cleaning. If the imbalance does not improve after cleaning, the manufacturer's intervention is required for possible rebalancing or replacement of the impeller. |
| The motor is not working | Mechanical lock | Switch off the electrical supply and remove the mechanical lock. |
| | Power line interruption | Check the power supply and restore it in case of fault. |
| | Incorrect electrical connection | Switch off the power supply and check the wiring according to the connection diagram. |
| | Inverter misalignment | Follow the instructions in the inverter manual and perform an autotune using command P52-1 |

For other problems encountered, contact CMC Ventilation.

## 9. Spare parts

We recommend using only original spare parts supplied by CMC Ventilation.
The use of spare parts supplied by other manufacturers may jeopardise the correct operation of the unit and the safety of the installation site.
The use of spare parts supplied by other manufacturers instantly invalidates CMC Ventilation's warranty.
CMC Ventilazione accepts no liability or warranty cover for damage resulting from the use of spare parts supplied by other manufacturers.

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info@cmcventilazione.com
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# 10. Dichiarazione di incorporazione CE

The undersigned / *Il sottoscritto,*

| | |
|---|---|
| Manufacturer / *Costruttore:* | **CMC Ventilazione S.r.l.** |
| Address / *Indirizzo*: | via Vienna 46/48 24040 Verdellino (BG) |
| Country / *Nazione*: | Italy / *Italia* |
| Phone nr. / *Telefono*: | +39 (0)35 482.18.84 |

herewith declares, under its full responsibility, that the following products:
*qui dichiara, sotto la sua completa responsabilità, che i seguenti prodotti:*

Series / *Serie:* CBT, VDI, MCK

Description / *Descrizione:*

**Air extraction units with double inlet, belt driven or direct driven fans with asynchronous or brushless internal or external rotor motor;air extraction units with plug fans with asynchronous or brushless internal or external rotor motor**

***Unità di estrazione dell'aria equipaggiati con ventilatori a doppia aspirazione, a trasmissione o direttamente accoppiati, con motore a rotore interno o esterno, asincrono o brushless; unità di estrazione dell'aria equipaggiati con ventilatori plug fan con motore asincrono o brushless***

qualify as a partly-completed machines, according to Article 2, clause "g" and comply with the requirements of the articles of the European Directive here below:
*si qualificano come quasi-macchine, secondo l'articolo 2, clausola "g" e sono conformi a quanto richiesto dagli articoli della Direttiva Europea citata qui sotto:*

Directive / *Direttiva*:

| | |
|---|---|
| **2006/42/EC: Annex 1** / *2006/42/CE: Allegato 1* | **Machine Directive** / *Direttiva Macchine* |

Articles / *Capitoli*:

| | |
|---|---|
| **Article 1.1.2.** / *Capitolo 1.1.2.* | Principles of safety integration / *Principi di integrazione della sicurezza* |
| **Article 1.3.7.** / *Capitolo 1.3.7.* | Risks related to moving parts / *Prevenzione dei rischi dovuti agli elementi mobili* |
| **Article 1.5.1.** / *Capitolo 1.5.1.* | Risks related to electricity supply / *Prevenzione dei rischi dovuti all'energia elettrica* |

The following harmonized standards have been applied.
*Sono state applicate le seguenti norme armonizzate.*

**EN ISO 12100:2010**
**EN 60204-1:2019**
**ISO 21940-1: 2019**

This partly-completed machines must not be put into service until the final machinery into which they are to be incorporated has been declared in conformity with the provisions of the Machine Directive.
*Queste quasi-macchine devono essere messe in funzione solo a condizione che la macchina finale in cui verranno incorporate sia stata dichiarata conforme a quanto richiesto dalla Direttiva Macchine.*

The manufacturer is committing himself to make the special documents of partly-completed machines available to any state authority if required.
*Il costruttore si impegna a rendere disponibile specifiche dichiarazioni relative alla quasi-macchine su esplicita richiesta delle autorità competenti.*

Place and date of issue / *Data e luogo* Verdellino, 2025, December 18th / *Verdellino, 18 Dicembre 2025*

Sig.ra Maria Sagula, CEO
*Sig.ra Maria Sagula, AD*