

# TOROBOT: USER MANUAL FOR THE OPERATOR

- **MODEL S-POWER**

## Brushing robot for MECHANICAL CLEANING OF VENTILATION DUCTS



### **IMPORTANT!!! Read this manual before using the machine**

*These instructions must always be available to those who use the machine, Make sure that anyone using the machine, has read and understood the instructions in this manual.*

*Compliance with the instructions in this manual ensures a long life for the product and reduces the chances of creating damage to property or people.*

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- **GENERAL INFORMATION**

Airclean TOROBOT is a remote-controlled single-phase electric cleaning machine for ventilation ducts controlled by a joystick.

The TOROBOT is single-phase 110/230 V, the machine is controlled by three electronic power supplies that convert the mains voltage at 220 V into low voltage at 12-48 V.

TOROBOT has a 48 V power supply for the brush motor, a second 24 V power supply manages the lifting arm of the brush motor and internal chain drive on the wheels and the third 12 V power supply controls the lighting and cameras.

- **TECHNICAL INFORMATION**

**The ROBOT is not water resistant, it is not waterproof, never use the robot with accessories for liquid sprays or in the presence of water on surfaces**

It is not allowed to use the machine for purposes other than those specified in this manual, the manufacturer assumes no responsibility for damage to persons, animals or property resulting from incorrect use of the machine or from secondary consequences attributable to irrelevant use.

The machine must be used by personnel who have received specific instructions regarding the appropriate and specific use of the product. The person assigning the machine to the user must ensure that the user has read and understood the manual and the instructions for use.

Air-Clean is available to provide all the information necessary for the correct use of the machine and for any additional accessories to be installed for specific jobs.

*The safety functions cannot and should not be removed even temporarily when using the machine.*

The machine and accessories have been manufactured and assembled according to the directives of the European Union and its regulations. It is possible that rules and regulations may be updated from time to time or modified. Air-Clean thanks in advance those who will provide future updates that are not currently reflected in this manual

**IMPORTANT!!**

**Keep this manual over time, the safety regulations may vary or update progressively such as the CE and what is specified by the safety protocols.**

**!! ATTENZIONE: è vietato apportare qualsiasi modifica a questa macchina**

- **OPERATING INSTRUCTIONS**

The **CE mark** is placed on the bottom of the machine, on the electrical control unit and also on the joystick.

The information in this manual should be considered for the use of the machine, for any maintenance operations and for the request for spare parts.

**1. Permitted uses**

Torobot è una macchina semi automatica robotizzata per la pulizia dei condotti di ventilazione, si può utilizzare in condotte a sezione rettangolare, circolare o quadrata.

Il principio di funzionamento si basa sulla spazzolatura delle condotte che determina un processo di rimozione delle polveri di **tipo meccanico**\*\*.

Qualsiasi altro utilizzo non espressamente specificato non è consentito.

**2. General information**

Torobot has been designed to generate a cleaning process in ventilation ducts with dimensions ranging from 300 MM to 1000 MM. The innovative principle of this robot is the complete electrical autonomy and the management of the machine control and the work process, under constant control of a video joystick.

With the video joystick, you can control: direction and robot guidance forward and backward, left and right, raising and lowering the brush arm, selecting front or rear cameras, and video recording function of the cleaning process.

The power cable of the robot has only one connection plug, the connection that powers the machine is integrated into the robot.

The joystick connects to the control unit with a connection plug, the other part of the cable is fixed in the control unit.

**IMPORTANT: When using the Torobot, remember to unwind the power cable completely.**

**Caution: unwind the cable to avoid overheating as industrial extension cables are normally used**

**Never use the robot with the power cable coiled up on itself.**

Be careful with the connection sockets which, being metal, are sensitive to impacts such as falls on the floor.

**\*\* mechanical cleaning with any system requires the combination of an negative air machine equipped with adequate filters for the capture and retention of dust** For correct operating information, consult the protocol AIIA [www.aiisa.it](http://www.aiisa.it)

**3. Video recording**

The Torobot machine is equipped with two recording systems:

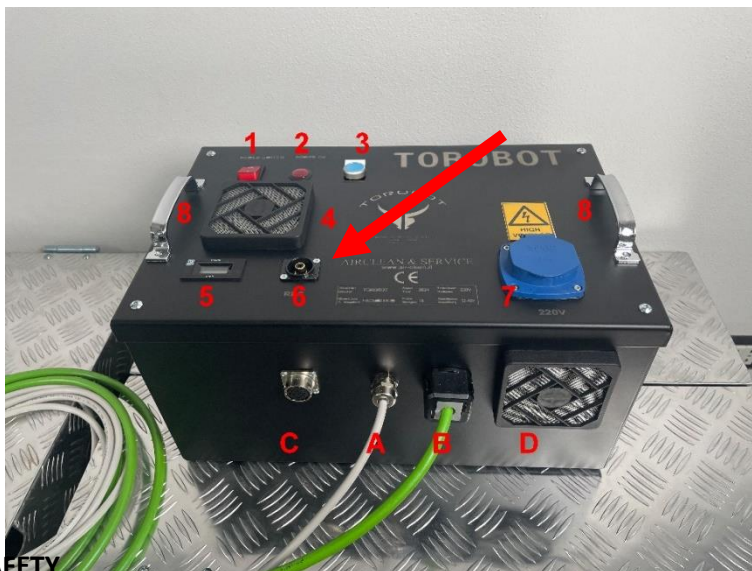
- a) Recorder integrated in the joystick on the left side via SD card.

**Fixed red light means that the recorder is functional, once the REC button is pressed the red light will start flashing, i.e. it has started recording.**

To stop recording, simply press the REC button again and the light will stop flashing.  
Later the recordings can be rewatched on computers with the SD card.



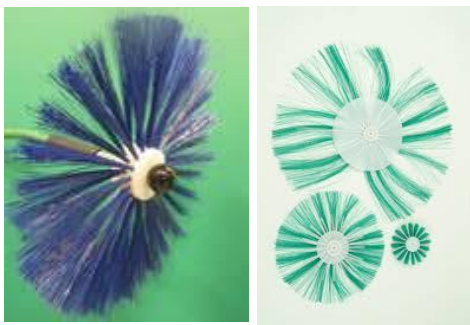
1. External recorder (optional) via REC socket "6" located on the electrical box.



- SAFETY

Before starting the work session, prepare all the accessories such as; set of brushes, shaft holder (avoids damage to the cable on the sharp edges of the duct) and anything else necessary to carry out the activity.

Brushes



Shaft holder



**To use the robot correctly , it is necessary to introduce it into the duct, the minimum opening to allow safe access of the machine is 400×300 MM.**

**We recommend disconnecting the camera arm from the robot to make it easier to insert the machine.**

**The camera mount and its electrical connection can be repositioned when the machine is in the duct. Do not use ladders to access the duct, the machine weighs 16 kg and it can be very dangerous to transport it at height, in case use specific scaffolding.**

SAFE



DANGEROUS



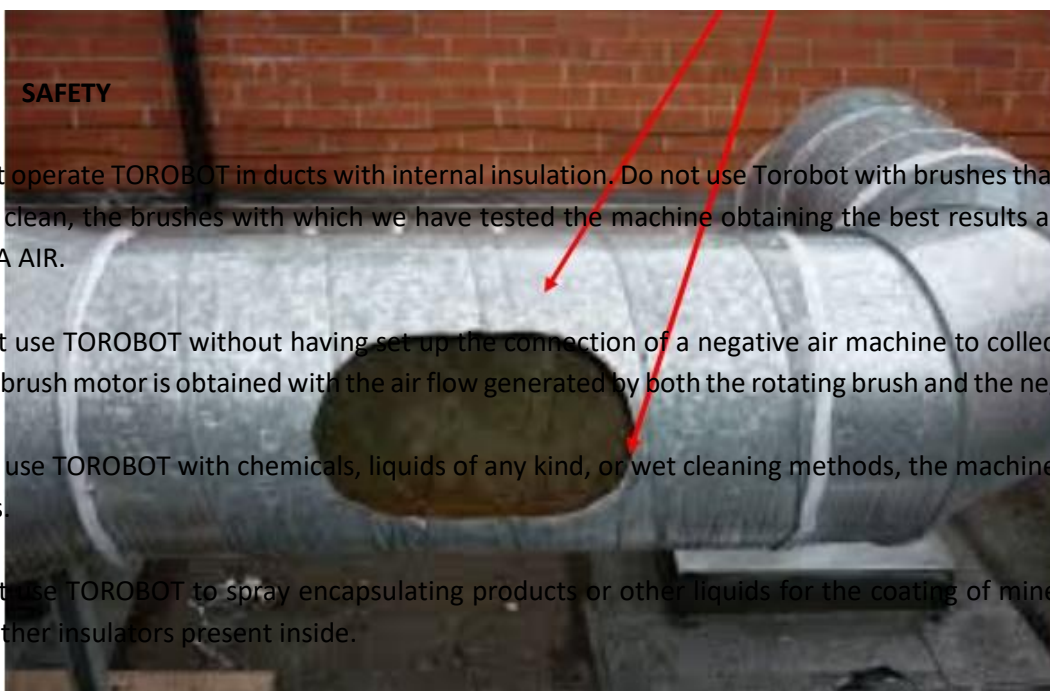
- **SAFETY**

Do not operate TOROBOT in ducts with internal insulation. Do not use Torobot with brushes that are not approved by Air clean, the brushes with which we have tested the machine obtaining the best results are those produced by LIFA AIR.

Do not use TOROBOT without having set up the connection of a negative air machine to collect dust, the cooling of the brush motor is obtained with the air flow generated by both the rotating brush and the negative air machine.

Never use TOROBOT with chemicals, liquids of any kind, or wet cleaning methods, the machine is not resistant to liquids.

Do not use TOROBOT to spray encapsulating products or other liquids for the coating of mineral fibers ducts or with other insulators present inside.



**Minimum access for Rectangular ducts 400×300 mm, for circular ducts diameter 300 MM.**

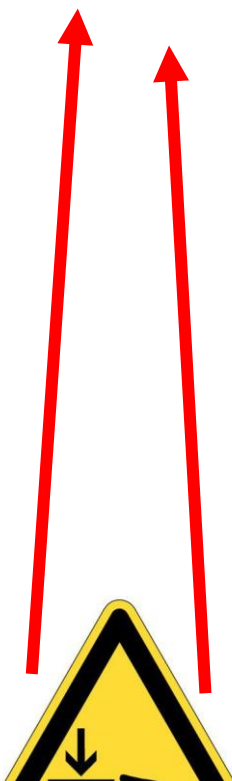
Protect the sharp sides of the duct with a gasket to prevent damage to the machine's electrical cable.

400 mm

300 mm



• SAFETY



**Pay attention to the rotation of the brush and the movement of the lifting arm.** Always turn off the main switch of the machine when it is being moved outside the duct, if the machine is operated by two operators, it is possible that the operator holding the joystick inadvertently turns on the switch of the brush motor or the arm lifting switch, in this case the operator carrying the robot could get fingers crushed between the lifting arm or the machine could fall increasing the risks unnecessarily.

- **SAFETY**

### **AVOIDING CROSS-CONTAMINATION**

The machine should be kept as clean as possible.

During the cleaning phase, contaminants such as dust, mold, bacteria can come into contact with the machine and settle on its surface, even the power cable can become covered with dirt and polluting sediments. Clean the cable well as you retrieve it by moving backwards with the robot, to do this use a microfiber cloth and a disinfectant detergent.

Ask your supplier for the most suitable system to keep your Torobot clean.

After using the robot, before repositioning it in its transport crate or transporting it to other areas that need to be cleaned, sanitize its surface and cable, taking care not to get the machine too wet.

Also clean the transport wheels on the metal crate well.

### **PREVENTIVE SAFETY**

**NEVER APPROACH THE ROBOT** while it is in operation, it is a good idea to always use specific PPE during work sessions.

Make sure that the correct lighting and proportional air changes are always available in the work area to allow healthy activity. If sparks are generated during the cleaning phase intended as mechanical brushing caused by static electricity due to the rubbing of the brush on the metal duct, replace the brush.

- **STRUCTURE AND PHOTOS**

Be careful not to damage the power cable, if the power cable should show abnormalities or deterioration such as cuts or crushing, contact the technical assistance service immediately.

The main power cable is fixed inside the robot, keep the cable clean constantly and be careful when rewinding it not to damage it with incorrect twisting.

## NOISE LEVEL

The only source of noise coming from the robot is, the motor BRUSH and it is less than 75 decibels (dB)



## MACHINE TRANSPORT AND STORAGE

**Torobot** is supplied with two sturdy crates that can be assembled together to safely contain and transport the machine.

**UPPER CASE** Aluminum case with plastic protection cover to store electrical box, joystick, camera arm (removable) and this manual.

**LOWER CASE** Aluminum case with plastic cover and 4 wheels (two with brakes) to hold Torobot and its connected cable.

Pocket (customizable) to store the joystick during the work session and transport.





**DO NOT TIGHTEN THESE SCREWS!!!**

The tensioning of the screws is predetermined by the factory, screws too tight could block the arm preventing the correct operation and cause stress to the brush lifting motor.

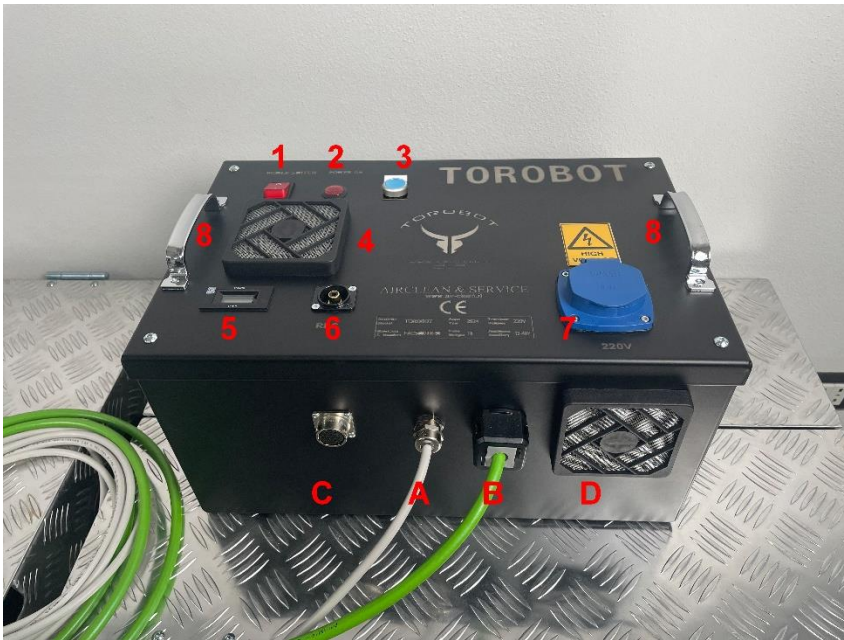


**JOYSTICK POCKET**

You can store the joystick inside the protective pocket even while working, there are two hooks that can be secured on a belt, or on the edge of the scaffolding



TOROBOT JOYSTICK PANEL CONTROL
1 Brush speed
2 Robot drive
3 Lifting Brush Arm (Up/Down)
4 Camera switch (front/rear)
5 Brush motor 3 positions right stop left
6 Emergency switch
7 Joystick plug to electrical box (connect to electrical box C)



**TOROBOT ELECTRICAL BOX (LOWER PART)**

- A) Main power cable**
- B) Joystick cable**
- C) CONNECTION for robot cable**
- D) Ventilation grid for cooling fan**

**SCATOLA ELETTRICA TOROBOT (PARTE SUPERIORE)**

- 1) Power switch
- 2) Power on led (When the main plug is connected, the red light must be on)
- 3) Reset switch
- 4) Cooling fan (24V)
- 5) Hour counter: operates only when the brush motor is running (brushing time)
- 6) REC, qualsiasi dispositivo di registrazione può essere collegato a questa presa
- 7) Auxiliary socket (220 V) to connect accessories as needed (camera, smartphone or video devices)
- 8) Maniglie di sollevamento

**DO NOT OPEN THE TOP OF THE ELECTRICAL BOX ELECTRICAL DANGER**

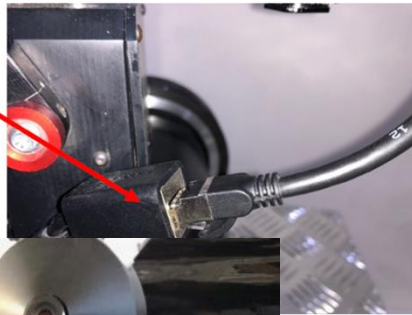
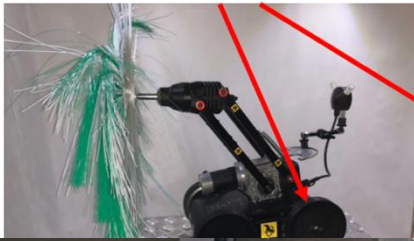
Any type of repair must be carried out by authorized operators

**SETTING UP THE CAMERA AND INFORMATION ON PROPER USE**

In order to facilitate the management of the front camera for the operator, we have applied a quick connection via RJ45 plug, to be disconnected with a "click" of the camera accessory.

In fact, many times it can be inconvenient to insert a heavy machine inside an air duct through an opening, so it is advisable to detach the camera mount, unscrewing the plastic knob and the cable plug before introducing Torobot; Then, when the machine is safely inside, reposition the camera mount and adjust it by looking at the correct view with the LCD display on the joystick panel.

CAMERA PLUG

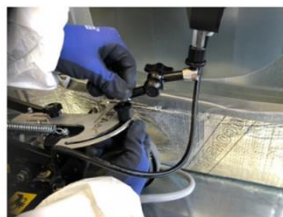


Shaft Holder (Robot cable protection)



Not OK damage risk !!

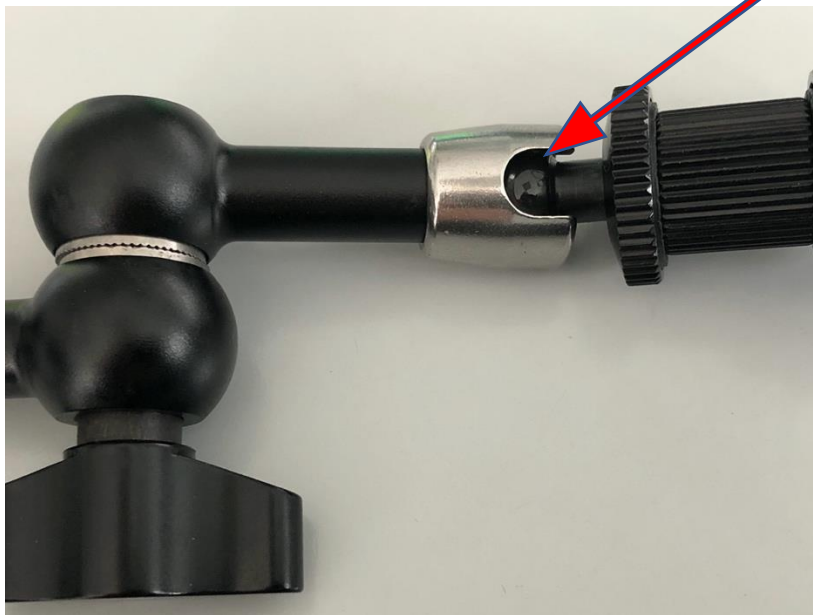
Disconnect camera plug and arm. Place robot inside duct then connect it again MINIMUM OPENING mm 400x300



### SETTING UP THE CAMERA AND INFORMATION ON PROPER USE

The front camera can be manually adjusted to the size of the duct very easily, simply by (gently) unscrewing the black knob on the camera arm.

By releasing it, the arm will be completely loosened, and you can rotate and secure it in any position you need. Once the position is reached, gently lock the knob and all arm positions will be locked at the same time.



**Take care!!**

When setting up the camera arm, remember to find this opening before turning the arm to the correct position, then release the plastic knob, when it is loose turn the arm to this opening, then find the position and lock it again

- **USES OF MACHINE**

1. **Operating position:** Place the robot on a flat surface, be careful when lifting it to possible excessive physical stress, the weight of the robot is 16kg Use your legs when lifting Do not strain your back

**Temperature and overheating:** ALWAYS take into consideration that the brush motor of the robot must have a continuous cooling source, during cleaning, the cooling source comes from the negative air machine, do not use the machine outside the duct without a cooling source. Machine operation ranges from -10 C° to +40C°

**ELECTRICAL CONNECTIONS** Torobot can operate at an electrical voltage between 100 and 230 V, so you can use it with UK and US electrical standards without any modifications

1. **Connections of electric cables (electric plugs)**

## Connection of the robot's main cable

This robot has a cable length of 21 meters, one end has a plug that needs to be connected to the robot's electrical box and the other part is directly connected inside the robot.



Plug (electrical box's end)

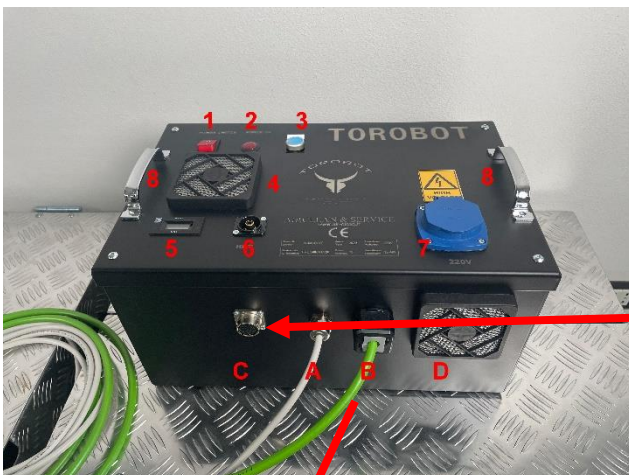
How to rewind the cable after your work session

Direct connection (inside the robot)

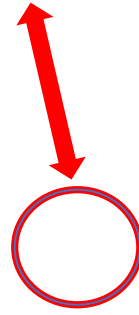


The robot is equipped with a spring at the back to prevent breakage on the electrical cable due to sharp bends during the work session.

## ELECTRICAL CABLE CONNECTION



F



Robot cable male plug "E" must be connected to the female socket on the electrical box "C"  
Joystick cable female plug "B" must be connected to the male socket of the remote control "F"  
**In either case, the connection must be matching with the two large notches on each part that must be aligned (Be careful not to damage the electrical pins inside both male plugs)**

- **INSTALLATION**

After connecting all the wires of the robot, connect the main plug, light POWER ON should turn RED means the machine is in tension and you can turn on the main switch.

**NOTE!** Every time the machine is turned on or after pressing the emergency button and releasing it, you must **ALWAYS** reset the control unit using the blue button "3" on the electrical box to restore all the various functions of the robot (except lights and cameras), without resetting the movement, arm and brush motor do not work.



When changing the rotation of the brush motor, you must always reposition the switch in the **center (stop position)** before operating the brush motor again, otherwise it may get stuck, if this happens, you must turn off the main power supply from the electrical box and turn it on again.

At this point it is possible to start testing the robot outside the duct by verifying all the operating functions, at this stage do not use the machine with the brush, it could be dangerous for people or property.

After achieving practical handling with the machine, it is possible to introduce it inside the duct with the negative air machine on, mount the right brush and start the cleaning session considering that:



The brush should not force too much into the ducts, a brush that is too large for the size of the duct can cause overloading of the machine.

To work properly with the machine, the brush arm should be kept height in the center of the duct and when necessary increase the arm pressure for the time necessary to brush away dust or debris, **do not use brushes larger than 1000 mm.**

Do not use Tynex brushes or antistatic brushes or other brushes that are too aggressive on pre-insulated ducts (the internal part is made of aluminum and can be damaged by strong mechanical action).

When guiding the robot to the negative air machine, make sure that the main cable is completely unwound and free to move inside the duct, be careful of the sharp edges of the metal of the access door opening, use the SHAFT HOLDER TO SLIDE THE CABLE WITHOUT ANY RISK OF CUTTING.



The clamp must be locked on the opening of the duct, inside the apposite passage welded on the clamp the cable must be inserted



he r safely, at the same time gently pull the cable back and use a damp microfiber cloth to wipe it as it leaves the duct.

Always use the LCD screen to see the progress of the work and do not go with your head inside the duct to see "how it works".

Do not use the robot if there is water or high humidity inside the air duct or with chemicals or grease cleaning products (kitchen or other ducts with liquid or muddy grease).

Do not use the robot for any other purpose but for cleaning air ducts.

- **MAINTENANCE**

It is recommended to check the machine after 80 hours of brushing (there is an hour counter on the electrical box), ask your supplier for a complete check of the machine in case of poor operating capacity or if you suspect that something is not working in the correct way.

**Before performing any maintenance work, disconnect the robot from the main power supply**

## **CLEANING THE MACHINE**

Always keep the machine clean with a damp microfiber cloth, the same for cameras, robot wheels and cables.

## SPARE PARTS

Any request for spare parts must be made with the serial number of the machine.

## REPAIRS

**Any repairs must be carried out by authorized persons, any type of mechanical or electrical service must be carried out by authorized technicians, do not modify this machine or disconnect any safety devices on this machine.**

**Any unauthorized repair will void warranty coverage.**

- **WARRANTY**

The warranty is one (1) year from the date of purchase in case that there is no misuse or Poor product handling.

Repairs or extraordinary maintenance must be carried out by the authorized dealer or Airclean & service srl

Airclean & service S.r.l. is not responsible for repairs carried out by third parties not authorized in writing by Airclean & service srl

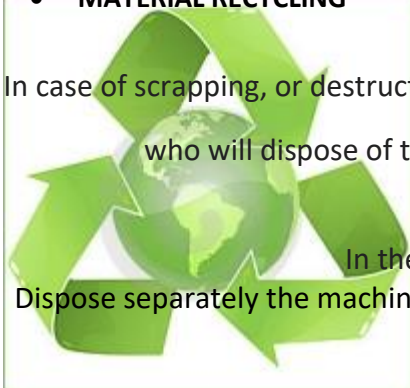
The warranty does not cover improper or unauthorized use by Airclean & service srl

Repairs will be carried out under warranty at no cost in the following cases:

- The problem occurs on the materials or design.
- Defects due to wear are not covered by warranty.
- It must be attached to the request a written description of the problem and any photos/ videos documenting the problem.

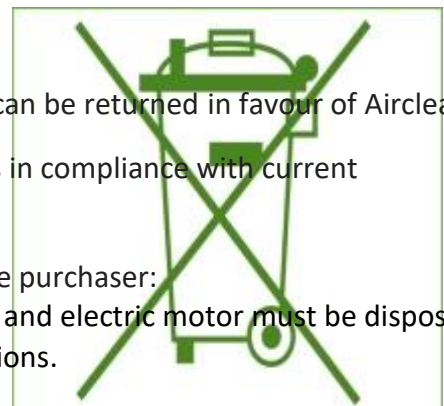
Warranty repairs are totally free, apart from shipment costs

- **MATERIAL RECYCLING**



In case of scrapping, or destruction of the Torobot product, it can be returned in favour of Airclean & service s.r.l. who will dispose of the product and its components in compliance with current normative.

In the event that it is disposed by the purchaser: Dispose separately the machine parts, electronic device parts and electric motor must be disposed according to disposal regulations.







## EC Declaration of Conformity for Machinery

Machinery Directive 2006/42/EC, Annex II, Part 1, Section A (Original Declaration)

**Manufacturer: Airclean&Service S.r.l.**

**Address: Corso Martiri, 162 - 41013 Castelfranco Emilia (MO)**

**Person authorized to prepare the Technical File: Airclean&Service S.r.l.**

**I declare regarding the following delivery**

**DESCRIPTION:** ELECTRIC ROBOT machine brushing for aeraulic ducts;  
Equipment designed to control the cleaning of ducts of various kinds.  
**SERIAL NUMBER: 300000-01 onwards**  
**PRODUCTION YEAR: 2016**

- That the machine complies with all relevant provisions of the Machinery Directive 2006/42/EC
- That the machinery is in conformity with the provisions of the following other directives:  
**Directive 2014/35/EU "Electromagnetic compatibility";**  
**Directive 2014/30/EU "Electrical equipment intended for use within certain voltage limits";**  
**Directive RoHS 2011/65/EU "Restriction of the use of certain hazardous substances in electrical and electronic equipment".**

**Source that harmonizes standards:**

**EN 55014-2 Electromagnetic compatibility part 2: Immunity**

**EN 60204-1:2018 "Safety of machinery – Electrical equipment of machines Part 1: General rules – Ed. 6.0**

**EN ISO 12100:2010 – Safety of machinery – General principles of design – Risk assessment and risk reduction.**

In accordance with the provisions of Annex II, part 1, section A of Directive 2006/42/EC, the manufacturer points out that this declaration relates exclusively to the machinery described above, in the state and with the intended use for which it was placed on the market, excluding any components added and/or operations carried out subsequently by the end user without the manufacturer's authorisation.

Castelfranco Emilia, 20/04/2022

Responsabile Tecnico

Roberto Ragazzi

**PRODUCER:** Airclean & service srl

**REGISTERED HEADQUARTERS**

**ADDRESS:** Corso Martiri 162 / E - 41013 Castelfranco Emilia Modena

**ADDRESS OF THE LOGISTICAL AND OPERATIONAL HEADQUARTERS:** Via Caduti sul lavoro, 2 -  
41013 Castelfranco Emilia - Modena

**PHONE:** +39 059 5801486

**WEB SITE:** [www.air-clean.it](http://www.air-clean.it)

Customer Name

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Machine serial number

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Purchasing date

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- **PROBLEMS AND SOLUTIONS**

### Brush motor doesn't work

1.
  - a) Turn the main power off and on again.
  - b) Check the **FU48S** fuse inside the electrical box.
  - c) Check the two relays RES1 and RES2 that the LEDs light up when the switch is operated and the two orange coils are engaged all the way in.
  - c) **If you do not experience any of the above problems, please contact support.**

### Arm up/down doesn't work

- a) Check the fuse **FU24A** inside the electrical box.
- b) Check the two relays REA1 and REA2 that the LEDs light up when the switch is operated and the two orange coils are hooked all the way.
- c) Check if the arm does not have free movement by hand (with the power off) for any gear problems on the gearbox, contact the service if this problem occurs.
- d) **If you do not experience any of the above problems, please contact support.**

### Robot movements doesn't work

- a) Check the FU24 fuse inside the electrical box.
- b) Check that the chain drive is all regular by moving the two front wheels by hand so that they don't freely move.
- c) **If you do not experience any of the above problems, please contact support.**

### Screen doesn't work

- a) Check that the screen is on AV1.
- b) If the robot lights also do not work, check the FU12C fuse inside the electrical box.
- c) **If you do not experience any of the above problems, please contact support.**

### Recording on SD card doesn't start

- a) The robot comes with 64GB SD card, you can use cards with a smaller size but not with a larger size as it would not be read properly by the DVR.

### Robot drive in circular ducts

- a) Be careful when advancing on circular ducts, the lack of the horizontal optical reference must be taken into consideration, the robot risks to crash unvoluntarily upside down, to correctly check the advance phase, it is advisable to check every meter with the rear camera in order to use the cable as an optical reference point to prevent the machine from unknowingly climbing to the side with the risk of crashing upside down.
- b) Optional anti-crash upside down kit available on request.

