



**ING. O. FIORENTINI S.p.A.**  
**INDUSTRIAL CLEANING MACHINES**

## **SCRUBBER MACHINE**

### **Mod. I42 I60 TEB**



## **OPERATING AND MAINTENANCE MANUAL**

## **Congratulations on your choice!**

Thank you for having chosen to purchase a product by **FIorentini S.p.A.**, a world-leading manufacturer and distributor of industrial cleaning machines.

Our long-standing experience and acquired know-how are the best guarantee of the technical quality of your purchase; all our products are built from top quality materials to ensure maximum reliability, sturdiness and functionality and to meet the requirements of even the most demanding customers. FIORENTINI was recently granted the quality system certificate to certify compliance with the requirements of UNI EN ISO 9001.

Feel free to contact us with any technical or commercial inquiry; we will be happy to supply any details and information that you may need.

## **CONTENTS**

<b>1. GENERAL INFORMATION</b>	
1.1. Symbols used.....page	4
1.2. Notes.....	4
1.3. Consulting the manual.....	4
1.4. Warranty.....	4
1.5. Declaration of Conformity.....	5
<b>2. MACHINE CHARACTERISTICS AND TECHNICAL DATA</b>	
2.1. Identification.....	7
2.2. Description and components.....	7
2.3. Technical data sheet.....	9
<b>3. SAFETY</b>	
3.1. Recommended machine use.....	10
3.2. Misuse.....	10
3.3. Recommended equipment.....	10
3.4. Operator qualifications.....	11
3.5. Safety and warning devices .....	11
3.6. Safety systems.....	12
3.7. Safety diagnostic signalling .....	12
3.8. Residual dangers .....	16
3.9. Safety signs.....	17
<b>4. START-UP AND OPERATION INSTRUCTIONS</b>	
4.1. Transport and handling.....	19
4.2. Storage.....	19
4.3. Machine unpacking.....	19
4.4. Unpacked machine handling .....	20
4.5. Installation.....	20
4.5.1. Batteries installation.....	20
4.5.2. Battery charger installation.....	21
4.6. Control devices.....	22
4.6.1. Dashboard.....	22
4.6.2. Parking electro-brakes.....	24
4.7. Operation.....	25
4.7.1. Machine preparation and start-up.....	25
4.7.2. Choosing the right detergent.....	25
4.7.3. Pedal and lever controlled functions .....	26
4.7.4. Squeegee adjustment .....	27
4.7.5. Water draining.....	28
4.7.6. Brushes replacement .....	29
4.7.7. Squeegee replacement.....	30

## **5. MAINTENANCE**



5.1. Routine maintenance table.....	31
5.2. Battery maintenance.....	31
5.2.1. Hydrometrics.....	32
5.2.2. Water topping-up .....	32
5.2.3. Charge limits.....	32
5.2.4. Standby or inactive batteries .....	32
5.2.5. Battery charger technical features.....	32
5.2.6. Battery disposal.....	33
5.3. Suction motor maintenance.....	33
5.4. Wiring system checks.....	34
5.5. Inspection summary table.....	34
5.6. Maintenance log.....	35

## **6. TECHNICAL ASSISTANCE**

6.1. Technical assistance contact information.....	36
6.2. Claim report .....	36

## 1. GENERAL INFORMATION

### 1.1. SYMBOLS USED

	<i>This symbol is used to alert the operator to important procedures or precautions to be followed in order to prevent damages to users or the machine</i>
	<i>This symbol is used to alert the operator to important general information.</i>

### 1.2. NOTES



**FIorentini S.p.A.** is the owner of this manual.

*The reproduction of all or part of this manual or its transmission to third parties by any mechanical or electronic system or otherwise is forbidden without a written authorisation by the manufacturer. This manual is supplied to the customers in a single original copy unless otherwise specified at the time of ordering.*

*This manual is supplied as an integral part of the machine and if the machine is transferred to a new owner, this manual should also be transferred. This manual should be stored at a safe location throughout the machine working life. The purchaser is responsible for making this manual available to all users. If this manual is lost, a duplicate should be obtained from FIORENTINI.*

*FIORENTINI S.p.a. will not be held responsible for any damages to persons and/or property resulting from failure to comply with the instructions in this manual.*

*FIORENTINI reserves the right to introduce any required technical and commercial changes without giving any notice. Therefore, any data and information contained in this manual may be changed and/or updated.*

### 1.3. CONSULTING THE MANUAL

This manual deals exhaustively with all the issues considered necessary for an easy and safe use of the machine, in compliance with European Directives on product safety.

**We therefore suggest to all authorised operators to carefully read this manual throughout and contact FIORENTINI in case of any doubt. This manual should also be used for reference whenever there are doubts concerning a procedure or operation to carry out or to train new operators.**

In print, pictures and drawings can look slightly different from actual machine parts, without however being perceived as confusing.

Special symbols and **bold** and/or *italic* fonts are used to highlight important information, particularly concerning safety.

The current revision code is indicated in the bottom left corner of every page. The list of revised pages is shown at the end of the manual.

### 1.4. WARRANTY

Warranty terms and conditions are stated here below unless otherwise specified in the order confirmation.

#### SCOPE OF THE WARRANTY

The machine has been designed and built for trouble-free use over several years. However, if any malfunctioning is observed during the warranty period, FIORENTINI S.p.A. undertakes to repair or replace free of charge any parts showing breaks or early wear due to faulty materials, working defects or incorrect assembly. The manufacturer warranty will not cover any parts whose early breaking or wear-and-tear are caused by:

- Failure to observe the instructions contained in this manual;
- Tampering or alterations introduced without FIORENTINI's specific approval;
- Use of non-original spare parts.
- Wear parts for use as: brushes, blades, squeegee, etc.

For installed electrical parts and commercially available parts, FIORENTINI will extend to purchasers the same warranty terms granted to FIORENTINI itself by the parts' suppliers.

#### WARRANTY VALIDITY

The Ing.O.Fiorentini S.p.A. general terms conditions also apply to the warranty.

The manufacturer cannot be held responsible in any way for damages resulting from unauthorised modifications made to the appliance, from the use of unsuitable brushes and accessories and after use of the device other than that intended.

#### WARRANTY APPLICATION TERMS

Defective components must be returned to FIORENTINI in order to establish the causes of any observed defects and determine warranty applicability. Repairing and replacement under the warranty will be carried out on FIORENTINI's premises, by subcontractors or on the customer's premises. For work carried out on site, the customer will have to provide power sources, special equipment and auxiliary personnel and cover FIORENTINI personnel's travelling and accommodation expenses and meals.

#### PRODUCT RETURNS

In case of parts to be returned for replacement or repairs under the warranty, a written authorisation must be obtained in advance from FIORENTINI's Technical Assistance Department.

All defective parts must be carefully repacked in order to avoid damages during transport. Products must be returned on a free-on-board basis, complete with:

- Serial number read from the equipment ID plate (point 2.1);
- Item code and installation position of the returned parts, read from the spare part list (point 7.2);
- Detailed description of the observed defect and conditions under which it became apparent.

In case of defective electric or electronic components, please return the parts separately from other materials, so that waste containing dangerous substances can be separated and Waste Electrical and Electronic Equipment (WEEE) can be recycled according to the 2002/96/EC Directive.



Any parts acknowledged as being under the warranty will be returned on a free-on-board basis; replaced parts will remain the property of FIORENTINI.

#### EXCLUSIONS

The warranty will not cover materials and components exposed to normal wear and those whose working life cannot be established beforehand.



*A missing machine data plate will imply the immediate loss of any warranty rights.*

### **1.5. DECLARATION OF CONFORMITY**

The Declaration of Conformity is supplied with the purchased machine and the use and maintenance manual.

**DICHIARAZIONE CE DI CONFORMITA'-DECLARATION OF CONFORMITY  
DECLARATION DE CONFORMITE-EG-KONFORMITÄTSERKLÄRUNG-  
DECLARACION DE CONFORMIDAD**

(ai sensi dell'allegato II 1.A della Direttiva Macchine 2006/42/CE)

**La ING.O.FIORENTINI SPA**

con sede in Via Piancaldoli 1896 Firenzuola, 50033, (FI)

**DICHIARA/DECLARES/DECLARE/ERKLÄRT/ DECLARA**

in qualità di costruttore sotto la propria responsabilità che la macchina  
As manufacturer under its own responsibility that the machine  
En tant que fabricant sous sa propre responsabilité que la machine  
Als Hersteller, erklären, in alleiniger Verantwortung, dass das Produkt  
Como fabricante, bajo su responsabilidad que la máquina



**Modello/model/modèle/Typ/modelo**

**Matricola/serial number/numero de série/**

**Fabriknummer/ Número matricula**

**Anno di costruzione /**

**Year of production/ Année de production/**

**Baujahr/ Año de producción**

a cui la presente dichiarazione si riferisce è conforme alle prescrizioni  
which this declaration refers to, is in conformity with the requirements  
à laquelle se réfère cette déclaration, est en conformité avec les prescriptions  
Auf das sich diese Erklärung bezieht, mit der normativen übereinstimmt.  
que esta declaración se refiere, está en conformidad con los requisitos

della direttiva macchine 2006/42/CE/ Directive 2006/42/CE / de la Directive 2006/42/CE / der EG-Richtlinie 2006/42/EG über  
Maschinen / De la directiva máquinas 2006/42/CE

della direttiva compatibilità elettromagnetica 2014/30/EU/ the Electromagnetic Compatibility Directive 2014/30 / EU / de la Directive  
Compatibilité Electromagnétique 2014/30 / EU / elektromagnetische Verträglichkeit (EMV) 2014/30/EU / la directiva de  
compatibilidad electromagnetica 2014/30/EU

della direttiva sui rifiuti di apparecchiature elettriche ed elettroniche (RAEE) 2012/19/UE/ Directive on Waste of Electrical and  
Electronic Equipment (WEEE) 2012/19 / EU/ de la directive relative aux déchets d'équipements électriques et électroniques (DEEE)  
2012/19 / UE / Elektrische und elektronische Geräte Abfälle (DEEE) 2012/19/UE Directiva sobre residuos de aparatos eléctricos y  
electrónicos (RAEE) 2012/19/UE/

(ISCRIZIONE AL REGISTRO PRODUTTORI A.E.E.: N° IT12010000007391)

In particolare alle disposizioni normative

In particular, the regulatory rules

En particulier, les dispositions réglementaires

Gemäß den Bestimmungen der Richtlinie

En particular, las normas reguladoras

**EN ISO 12100, EN ISO 13857, EN ISO 13850, EN 60204-1, EN 349,  
EN 953, EN ISO 4413, EN 60335, EN 60335-1, EN 60335-2-69, EN 60335-2-72, EN 55014-1, EN 55014-2,  
EN 62233, EN 61000-6-2, EN 61000-6-4**

Il fascicolo tecnico è costituito da Ing. O. Fiorentini S.p.a. in qualità di persona giuridica - via Piancaldoli 1896 Firenzuola 50033 Fraz. Piancaldoli (FI) - Italia  
The technical dossier consists of Ing. O. Fiorentini Spa as a legal person - via Piancaldoli 1896 Firenzuola 50033 Fraz. Piancaldoli (FI) - Italy  
Le dossier technique est constitué de Ing. O. Fiorentini Spa comme personne juridique - via Piancaldoli 1896 Firenzuola 50033 Fraz. Piancaldoli (FI) - Italie  
Die technische Dokumentation besteht aus Ing. O. Fiorentini Spa as a legal person - via Piancaldoli 1896 Firenzuola 50033 Fraz. Piancaldoli (FI) - Italy  
El expediente técnico se compone de Ing. O. Fiorentini Spa como una persona jurídica - via Piancaldoli 1896 Firenzuola 50033 Fraz. Piancaldoli (FI) - Italia

**Ing. O. Fiorentini S.p.a.**

Il Legale Rappresentante/president/gérant/ representante

**Angelica Maria Cerutti**

**Piancaldoli**

*Luogo e data*

*Firma*

*Scritta Angelica Maria*



## 2. MACHINE CHARACTERISTICS AND TECHNICAL DATA

### 2.1. MACHINE IDENTIFICATION

An adhesive machine identification label containing indelible “CE” marking details is affixed on the inside of the machine front nose/control panel.



*The label must never be removed and should always be kept legible. If the label is damaged a duplicate should be ordered. The machine may be sold without the label.*

### 2.2. DESCRIPTION AND COMPONENTS

The scrubber machine I42TEB has been designed to clean flat surfaces by means of washing followed by washing water suction. The electric drive system is equipped with a set of batteries supplying power to the brushes motor, the brush plate jack and the suction motor.

The machine I42TEB is manufactured with a three brush, front scrubbing unit and an (optional) single roller sweeping and scrubbing unit, designed to clean surfaces with water and detergent. When the machine moves forwards, the squeegee or back brush, in contact with the floor, takes up any water by suction for its subsequent delivery to the recovery tank.

When the ignition key is turned, the machine is powered on and prepares to scrub and dry the floor. The machine travelling direction can be chosen via the special lever selector.

The control panel controls all machine functions. In particular, it is possible to:

- start the machine scrubbing function;
- select the forward or backward movement direction;
- display the battery charge;
- lower the brush plate and start the brushes;
- start vacuum suction;
- turn the machine on and off.

The machine load-bearing structure consists in a steel frame submitted to electrophoretic paint finishing treatment to prevent corrosion which might affect machine reliability.

The main components of the machine are:

- carbon steel frame treated by electrophoretic paint finishing;
- LLDPE plastic washing solution filling tank;
- LLDPE plastic recovery tank for washing effluents complete with inlet and outlet hoses;

- set of batteries located in the compartment between the two tanks;
- front scrubbing unit with three rotating brushes;
- central sweeping unit with cylindrical brush (optional);
- squeegee;
- two motor-driven drive wheels;
- one idle steering front wheel;
- adjustable steering assembly;
- driving seat.

In consideration of recent EU concerns regarding product safety, FIORENTINI designed and built this machine in compliance with the safety and health requirements provided by applicable Directives. The high quality of the materials used, the applied advanced technology and FIORENTINI's long-standing experience are a guarantee of the performance and reliability of this machine. Each machine is submitted to rigorous testing during construction and to a thorough final test.



## 2.3. TECHNICAL DATA SHEET

### SPECIFICATIONS

	I42 TEB	I60 TEB
Power supply	36 Vdc – battery box 525Ah (625Ah optional) C5	
Drive system	cc electric motors on the two rear axles	
Scrubbing width	1250 mm	1500 mm
Squeegee width	1400 mm	1650 mm
No. of brushes	3x Ø380mm	3x Ø460mm
Brush pressure	0-150 kg	0-150 Kg
Hourly output	10000 m <sup>2</sup> /h	12000 m <sup>2</sup> /h
Working range for standard use	4 h	
Solution tank	260 l	
Recovery tank	260 l	
Water lift	166 mbar	
Forward speed	0-6 Km/h	

### ENGINE & MOTOR SPECIFICATIONS

Drive motor	2x750W
Suction motor	2x850W
Brush motor	3x750W

### DIMENSIONS

Length	2070 mm	
Width	1400 mm	1650 mm
Height	1370 mm (1510 mm with flashing light)	
Weight without load	590 Kg	610 Kg
Battery weight	650 kg	
Drive	On-board operator	
Min aisle width for U-turns	2900 mm	3020 mm
Max. gradient with full load	10%	
Noise	70 dB(A)	



*The above-mentioned specifications are not binding on the manufacturer and may therefore be changed without notice. FIORENTINI can be contacted at any time for further information (point 7.1.).*

### UNIT OF MEASURE CONVERSION TABLE

Length	1 inch = 1" = 25.4 mm	Power	1 kW = 1.36 CV = 1.34 BHP
Temperature	T (K) = t (°C) + 273 / t (°F) = 1.8 t (°C) + 32	Pressure	1 bar = 100 kPa = 14.5 psi

### 3. SAFETY

#### 3.1. RECOMMENDED USE



*This is a floor scrubbing machine designed and built for use in industrial environments, to carry out wet scrubbing, drying and effluent collection on flat horizontal surfaces or surfaces with a gradient not exceeding 10% at speeds not exceeding 3 km/h. U-turns are prohibited on any gradient slopes.*

#### 3.2. MISUSE



- *Machine operation by unauthorised personnel;*
- *scrubbing uneven and/or bumpy surfaces;*
- *scrubbing sloping surfaces;*
- *scrubbing surfaces whose gradient exceeds 10%;*
- *doing U-turns on any (even minimal) gradient slopes;*
- *using the machine in environments containing dangerous substances, and in particular, in explosive atmospheres or inadequate microclimatic conditions;*
- *cleaning machine surfaces in the presence of flammable substances;*
- *the machine may not be used as a means of transport for people or other vehicles;*
- *altering or tampering with safety devices;*
- *charging batteries at not sufficiently ventilated locations;*
- *failure to comply with applicable safety standards currently in force;*
- *fitting equipment/devices likely to interfere with machine operation;*
- *introducing changes or alterations not authorised by FIORENTINI;*
- *using acid solutions likely to damage the machine;*
- *failing to comply with use and maintenance manual specifications.*



*The informative labels provided on the machine should be carefully read and should not be covered for any reason. FIORENTINI shall not be liable in any case for any of the above not recommended uses of the machine (instances of misuse).*

#### 3.3. SUGGESTED EQUIPMENT

To make the best use of your machine, equipment specially designed and tested by Fiorentini and original spare parts should be used. The Design Department of FIORENTINI S.p.A. is willing to meet any design requirements concerning parts and components for personalised applications.

### 3.4. OPERATOR QUALIFICATIONS

The table here below specifies the operator qualifications required for each operation to carry out.

Type of Operation	Operator Qualification
Machine operation/control	Trained operator
Installation/removal	Fiorentini technician
Mechanical parts maintenance	Fiorentini technician
Electrical parts maintenance	Fiorentini technician
Cleaning maintenance	Trained operator
Dismantling and scrapping	Fiorentini technician

The personnel in charge of operating the machine should be specifically trained, particularly in regard to safety issues; machine operators must have read and become familiar with this manual.



*FIorentini declines all responsibility for accidents involving persons or property caused by not adequately skilled, unauthorised operators.*

### 3.5. SAFETY AND WARNING DEVICES



- ***It is strictly forbidden to tamper with, remove or deactivate safety and warning devices while the machine is in operation.***
- ***The efficiency of safety and warning devices should be regularly checked (see point 5.1.).***

<b>Seat emergency control</b>	This machine is equipped with an emergency microswitch located under the driver's seat to prevent machine operation unless an operator is sitting in the driver's seat.
<b>Float timer</b>	The machine is equipped with a timer for the float to prevent vacuum motor power on and power off.
<b>Filter</b>	The machine is equipped with an anti-foam filter
<b>Solenoid valve</b>	The machine is equipped with a solenoid valve preventing water from flowing out before brushes power-on.
<b>Warning devices</b>	<p>The machine I42-60 TEB is equipped with several warning devices to alert anyone who happens to be within the machine working range:</p> <ul style="list-style-type: none"> <li>➤ a horn-type acoustic signal to warn any persons who are near the machine during normal use;</li> <li>➤ an intermittent acoustic signal (buzzer) to warn any nearby persons while the machine is reversing;</li> <li>➤ a visual signal (yellow flashing light) to indicate that the machine is in operation.</li> </ul>

## 3.6 SAFETY SYSTEMS

The machine is equipped with the following safety systems:

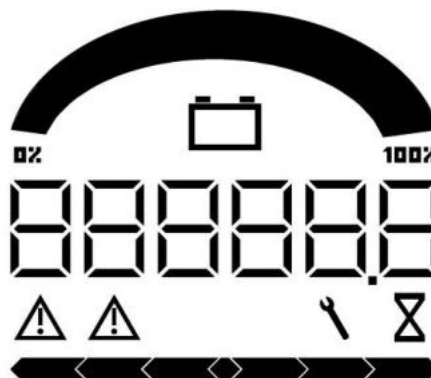
- **Emergency stop button:** A red emergency stop button is provided on the machine control panel. Before using the machine, the operator should become familiar with its safety devices, to be able to automatically actuate them in an emergency. The safety devices should never be reset before having corrected the cause of an observed problem; contact a skilled technician if necessary.
- **Presence-sensing device:** The machine is equipped with a presence sensor integrated in the seat. Without an operator on board, the machine will not start, and if the operator gets off the scrubbing machine without having first turned the key switch to its 0 position, the machine will shut down. To re-activate it, the operator must sit in the driving seat, turn the key switch to its OFF position, wait a few seconds and then return the key switch to its ON position.
- **Float:** The recovery tank is equipped with a float which prevents suction in case of overfilling; in this case, to restart the machine the tank must be emptied first (see the **WATER DRAINING** section).
- **Solenoid valve:** The machine is equipped with a solenoid valve to let scrubbing water through only after the brushes have been powered on, so as to prevent accidental leaking.
- **Float timer:** The machine is equipped with a timer on the waste water float to stop suction motor power on and power off due to wave-like water motion.

## 3.7 SAFETY DIAGNOSTIC SIGNALLING

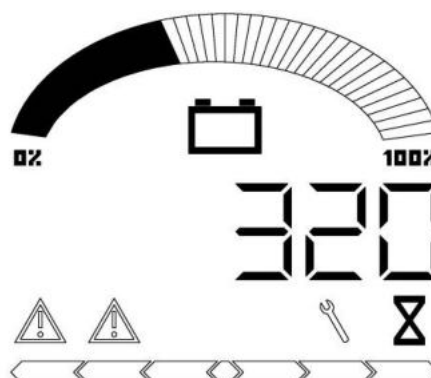
The machine has a display unit on which basic information concerning the machine work cycle can be viewed. The meaning of the various symbols that can be displayed is explained here below.

Upon power-on, the screen lights up. In this order:

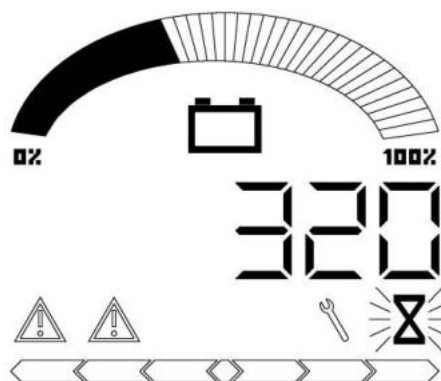
- A test is performed to check the correct operation of all the LCD display segments.
- The battery rated voltage, expressed in volts, is displayed in the numerical part of the display screen.



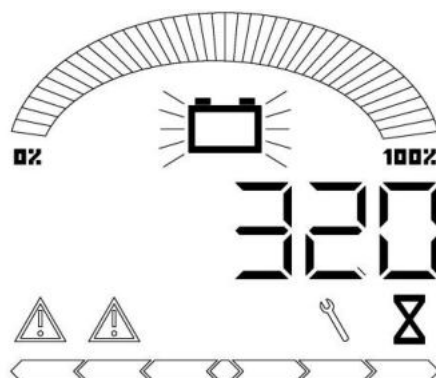
After initialisation completion, the display screen shows the per cent charge value (between 0% and 100%) in the top segment bar and the hour counter state in the alphanumeric part of the display unit



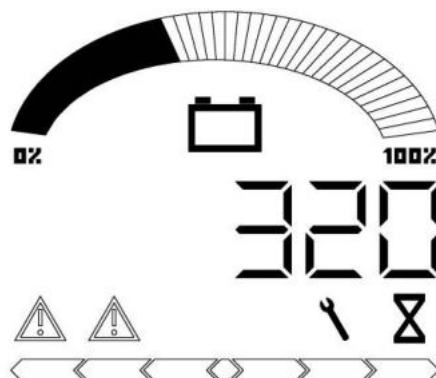
When the brushes are started the hour counter is enabled. The hourglass icon starts flashing.



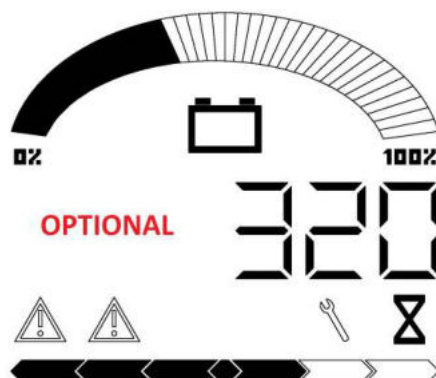
After reaching the minimum charge level the battery icon starts flashing. The brushes are lifted and turned off. It is no longer possible to use the brushes until the battery charge completion. The system will store the latest battery charge status. This is only reset if the charge level exceeds the voltage value by **2.07 V** per cell. For the I42-60 model, this value is equivalent to a total battery voltage value of **37.26 V**.



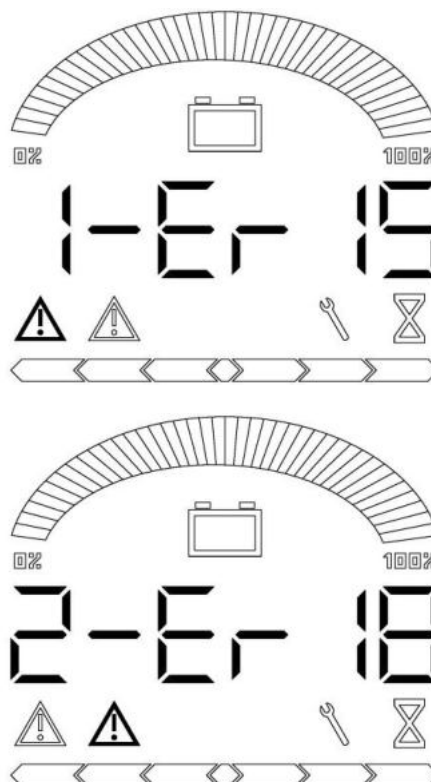
After 300 hours of operation, the spanner icon lights up to remind the user that a service is due. Servicing and icon resetting must be carried out by **Ing.O.Fiorentini S.p.A. authorised personnel**.



**Optional.** The bottom LED bar shows the solution tank filling level.



The machine is equipped with two separate electronic control systems - one for the drive system only and the other one for all the other utilities (brushes, suction, actuators etc.). They both have an internal diagnostic system which display messages separately. Utilities control is identified by number 1 while drive control is identified by number 2. Whenever a failure affects either board, the corresponding control identifier is shown (1 or 2) with a dash and the “Er” symbol followed by a number to code the type of occurred failure. One of two triangle icons - the one associated with the malfunctioning control - also lights up.



Below are the error codes for the two controls.

<b>Utilities Control (Identifier 2)</b>		
<b>Code</b>	<b>Error</b>	<b>Possible Causes and Remedies</b>
2	Automatic acquisition error	Automatic acquisition could not be completed
3	Too low input voltage	Input voltage has gone below Vmin (1.5V/el.). Check the battery and its wiring.
4	Too high input voltage	Input voltage has gone over Vmax (2.35V/el.) or has exceeded the max supported voltage. Check the battery wiring.
5	Lifting Overcurrent	Lifting current values have exceeded the limit settings. Check the wiring, the motor and the mechanical parts.
6	Brush Overcurrent	Brush current values have exceeded the system settings. Check the wiring, the motor and ensure that free rotation is not hindered.
9	E2prom programming error	Certain settings are incorrect. Check programming.
10	E2prom checksum error	The programming procedure was interrupted. The procedure must be repeated.
11	Program memory error	Contact service technicians.
12	Setting memory error	Contact service technicians.
13	Device not registered	Contact service technicians.

<b>Drive Control (Identifier 1)</b>		
<b>Code</b>	<b>Error</b>	<b>Possible Causes and Remedies</b>
1	Motor not at a stop on power-on	When the ignition key is turned the motor is moving. Power system damaging is possible if the error persists. Contact service staff.
2	Line contactor contact	Check line contactor
3	Too low battery voltage	Battery voltage has gone below the minimum voltage.
4	Too high battery voltage	Battery voltage has exceeded the max value or has gone over the control supported value.
5	Line contactor piloting	Check line contactor
6	Potentiometer cutout	Check connection of the two potentiometers.
7	Temperature outside permitted range	Check coupling between control and base. If the error persists contact service staff.
8	Power off with machine in motion	The control was powered off while the vehicle was in motion. Always turn control off after the vehicle has stopped.
9	Incorrect parameter setting	Certain settings are incorrect.
10	Incorrect Checksum	The programming procedure was interrupted. Repeat programming.
14	Excessive rotor current (on left motor)	Contact service technicians.
16	Excessive rotor current (on right motor)	Contact service technicians.
17	Standby error	The control standby time is longer than the set time.
19	Corrupt program memory	Contact service technicians.
20	Corrupt parameter memory	Contact service technicians.
21	Device not recorded	Contact service technicians.
22	External lock	A system lock has been controlled via the special input or serially from other equipment.
23	Serial communication error	Communication between machines has been interrupted. Check the serial port wiring.

Finally, the machine behaviour when the recovery tank has reached its maximum level is described. A float switch is activated which sends a signal to the control board. This will disconnect power to the suction devices. It is no longer possible to use the suction devices until the machine is restarted. However, until the tank is emptied, the raised float switch will continue to stop power input to the suction motors.

In order to prevent suction disabling every time the float is lifted even slightly (e.g. due to wave-like liquid motion in a not yet completely filled tank), the switch signal is only accepted by the electronic board when this is active for at least 5 seconds. This activation delay should be borne in mind when efficient float behaviour needs to be checked.



### 3.8 RESIDUAL DANGERS

Ever since the design phase, FIORENTINI has analysed all the possible dangers related to machine use in order to eliminate or at the very least minimise the risk of injuries for machine operators. In order to minimise the risk associated with residual dangers, danger signs and indications of accident-prevention systems and procedures have been provided for machine operators.

#### **DANGER OF CRUSHING**

Crushing risks are possible:

- during scrubbing brushes replacement;
- during battery charging should the battery cover suddenly snap shut in the central battery housing compartment.

During side brush replacement, the operator must ensure that the ignition key is not in its slot in the control panel, to prevent unwanted machine starts. During battery charging, the operator must keep all body parts out of the battery compartment.

#### **DANGER OF CRUSHING/SHEARING**

Crushing and shearing risks are possible:

- during squeegee adjustment.

During squeegee adjustment, ensure that no-one close to the machine is able to operate the device up- and down-stroke controls.

#### **DANGER OF OVERTURNING**

Machine overturning is possible:

- during normal machine operation when going over slopes with a higher gradient than the recommended value and when the machine is used to clean uneven/bumpy surfaces (see 3.2).





- **Do not use the machine to scrub surfaces with gradients exceeding 10% at speeds exceeding 3 km/h or bumpy or uneven surfaces likely to affect the stability of the machine.**





*FIORENTINI declines all responsibility for accidents involving persons or property caused by machine use on stability-affecting floors. The buyer must provide suitable signage to inform the user about the condition of the working surfaces.*


### 3.9. SAFETY SIGNALS


The safety signs include symbols indicating:


<b>DANGER</b>		Danger symbols are triangular with black pictograms on yellow background
<b>PROHIBITION</b>		Prohibition symbols are round with black pictograms on white background and a red stripe

	<b>What is it?</b>	This symbol indicates a crushing risk caused by the presence of moving parts inside the machine or by the operator actuating moving parts inside the machine (e.g. covers and partitions).
	<b>What to do?</b>	During installation or maintenance make sure that the ignition key is not in the dashboard. Ensure that any stops provided for moving parts are in the right position and carry out their design function correctly.

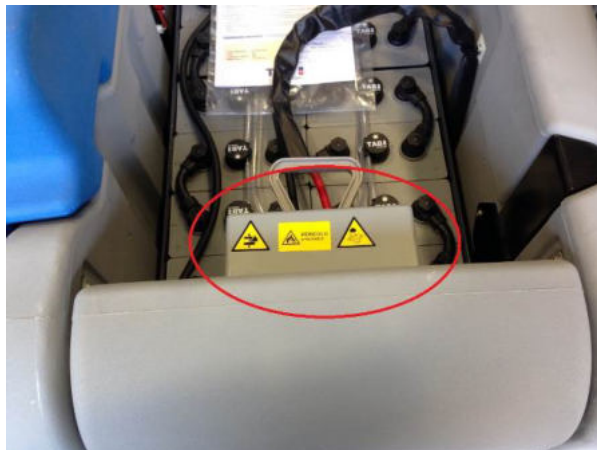
	<b>What is it?</b>	This symbol warns that it is forbidden to remove safety guards from around moving parts.
	<b>What to do?</b>	During installation/maintenance, before removing guards always ensure that the starter key is not in its slot in the control panel. Keep all body parts out of the machine during work.

	<b>What is it?</b>	Symbol warning of explosion risks during battery charging due to the released hydrogen.
	<b>What to do?</b>	During battery charging, ensure that the machine is under a suction hood or in a ventilated area and keep it away from heat sources and corrosive substances.

	<b>What is it?</b>	Symbol warning of fire risks during battery charging due to the released hydrogen.
	<b>What to do?</b>	During battery charging, ensure that the machine is under a suction hood or in a ventilated area and keep it away from heat sources and corrosive substances.

	<b>What is it?</b>	This sign indicates that it is forbidden to wash the concerned part of the machine with pressurised water jets.
	<b>What to do?</b>	Do not direct high-pressure water jets against guards or covers carrying this symbol.

The machine areas implying residual risks are pictured here below.



***If any signs become damaged, the purchaser must replace them with identical signage. It is strictly forbidden to remove or tamper with these signs.***

## 4. START-UP AND OPERATION INSTRUCTIONS

### 4.1. TRANSPORT AND HANDLING

The machine is delivered to the purchaser fully assembled and contained in a special package. A black arrow on the package indicates the centre of gravity. Truck or pallet truck forks must be inserted so as to ensure that the black arrow is centred between the forks. The package must be handled carefully. Do not stack packaged items.

If agreed with the purchaser, the machine can be delivered unpacked, on a pallet and secured with straps.



*The purchaser should check upon delivery that the machine has not been damaged during transport and that all the material listed in the shipping documentation has been received; otherwise, the forwarders and manufacturer should be promptly informed. Unless otherwise agreed, purchased goods will travel at the purchaser's own risk.*

Handling should be carried out with suitable lifting equipment, as shown in the following table. Always ensure that the forks of the lift truck, or the harness straps, are positioned so as to ensure that the arrow printed on the package is centrally positioned on the lifting equipment. The anchoring and/or harnessing points are arranged so as to ensure that, during lifting, the machine is always steady and well balanced.

Type of packaging	Handling equipment
Paperboard or plywood box on a pallet	Fork lift truck
None	Fork lift truck or truck crane with a two-strap balance harness



*The harness straps used must be suitable for the load to lift. All handling operations should be carried out at very slow speed to prevent load swinging and loss of stability. Any operation performed incorrectly may damage the machine and expose operators to dangers.*



*Refer to the technical data sheet for machine dimensions and weight. Machine handling should be carried out by authorised personnel trained for lifting equipment use only.*

### 4.2. STORAGE

If not immediately installed, the machine should be stored at a covered, dry location to ensure the perfect efficiency of all its parts. Relative humidity must be below 80% and the storage temperature must be between 15°C and 35 °C.

### 4.3. MACHINE UNPACKING

- Cut the straps bearing in mind that they might spring back
- Remove the staples fixing the carton to the pallet
- If the crate is made of plywood, remove the staples from each side and the base of each panel
- Cut the straps that secure the machine
- Place the machine on the floor

#### 4.4 UNPACKED MACHINE HANDLING

- Inspect the machine and install the batteries if not already installed
- To prepare the machine for short distance handling after use, disconnect the battery cables and remove the brushes and the squeegee; for longer-distance transport, the machine should be repacked in its original packaging.

#### 4.5. INSTALLATION



*Installation must be carried out by authorised personnel aware of the instructions contained in this manual.*

##### 4.5.1 BATTERY INSTALLATION

Follow these instructions for battery installation:

- Lift the battery compartment top cover (detail 1).
- Remove both side walls by pulling them upwards (detail 2).
- Hook up the battery box using the special lifting points. Handle the battery with suitable lifting equipment (overhead cranes, cranes ...). The battery weight is always printed on a special sticker. Check that the lifting equipment capacity is higher than the battery's - allowing for an adequate safety factor.
- Place the battery in the compartment between two pairs of stops (two on each side of the machine, detail 3). Make sure that the battery stops carry out their function efficiently. In particular, loose or deformed stops might fail to safely secure the battery while the machine is moving.
- Plug into the machine electric system.







**The weight of the battery box is several hundred kg. Failing to correctly position it between the two pairs of stops may cause severe injuries to the operators or other persons who happen to be near the machine during cleaning operations.**

## 4.5.2 BATTERY CHARGER INSTALLATION

The battery charging area must be provided with an efficient suction system for the gases released during charging. Alternatively, batteries must be charged in a dry, ventilated place, away from heat sources and corrosive environments.

Protect the factory power grid with a time-delay type switch or a fuse with a load exceeding the battery charger maximum load.

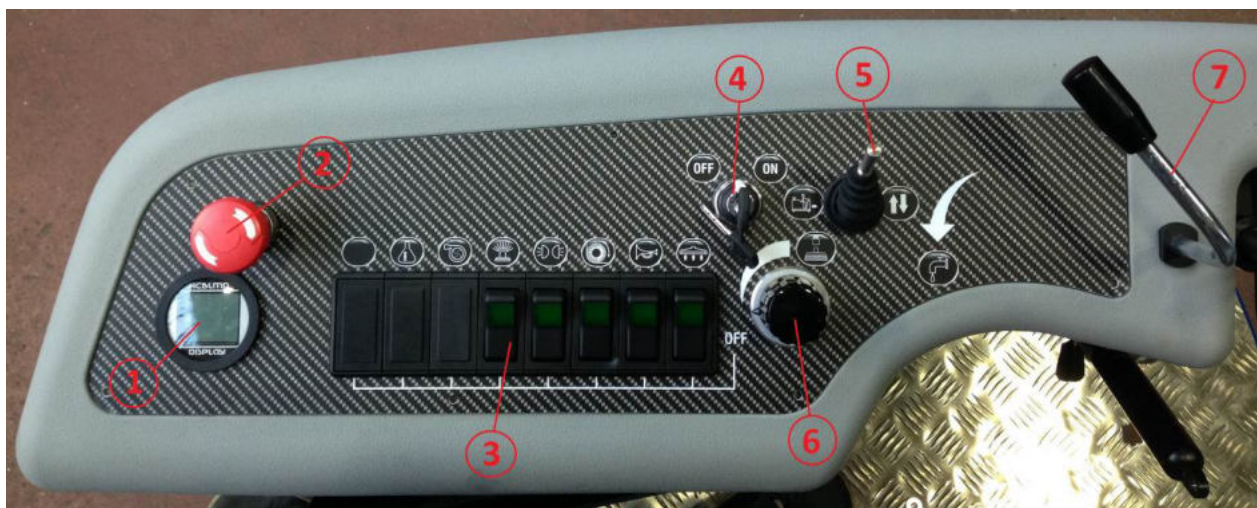
- Lift the battery compartment top cover (detail 1).
- Pull out the mains plug and plug in the battery charger.
- Wait for battery charge cycle completion. The battery charge cycle duration depends on battery type and battery charger characteristics. Refer to the technical literature supplied with the battery charger.



## 4.6. CONTROL AND MONITORING DEVICES.

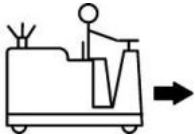
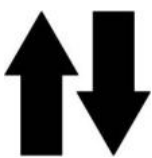
### 4.6.1. CONTROL PANEL

A number of controls are provided on the control panel (buttons, switches, levers, indicators, warning lights) to start, stop and monitor machine functions during cleaning operations. Each is associated with a pictogram to identify the controlled function. The control panel layout is shown here below to help you identify each control position.

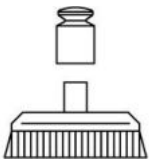
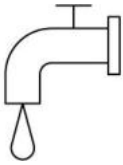
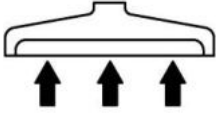
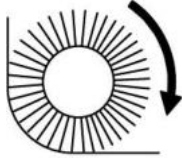
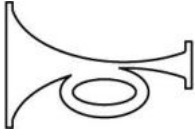
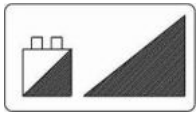

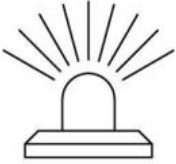

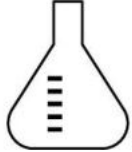


1	<b>Battery charger indicator - Diagnostics</b>
2	<b>Emergency stop button</b>
3	<b>Utilities start-stop buttons</b>
4	<b>Ignition key</b>
5	<b>Travelling direction lever</b>
6	<b>Brush pressure adjustment</b>
7	<b>Solution valve lever</b>

Table in which the meaning of the pictograms in the control panel is specified:

<b>Off</b>	Switched off	<b>On</b>	Switched on (first operating function)
	Travelling direction		Change of travelling direction



	Brush pressure		Gradual increase/decrease of solution flow rate.
	Suction Start		Sweeping unit start <b>(Optional)</b>
	Buzzer		Battery charge indicator
	Front headlights		Flash light
	Additional solution pump start <b>(Optional)</b>		Detergent dosing device start <b>(Optional)</b>

## 4.6.2. PARKING ELECTRO-BRAKES

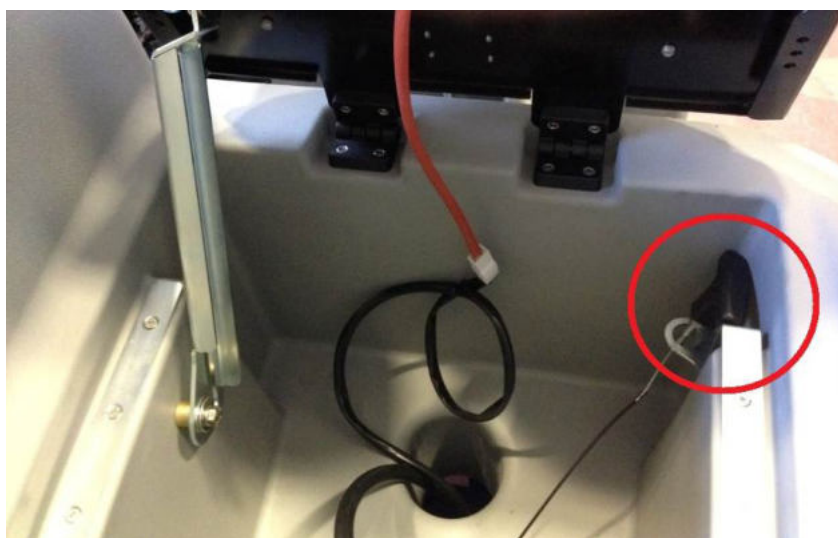
Two parking electro-brakes are mounted on the rear drive motors - one for each axle. The brakes are automatically operated as soon as the machine stops. The braking action is always applied, however, when the machine is off and there is no power input to the machine main logic board.

To move a machine without power input it is possible to temporarily and not permanently release both electro-brakes:

- unlock and lift the driver's seat
- Pull the black 'T' knob located inside the compartment under the driver's seat. The electro-brakes will stay off while the pulling action is applied. When the knob is released, the machine will be braked again.



***A fully loaded machine with an installed battery weighs over 1200 kg. Moving it in the manual mode may cause severe injuries to the operators or other persons who happen to be near the machine. In particular, machine movements on slopes increase the risk of crushing.***



## 4.7. OPERATION

Scrubbing operations are highly critical and specific experience will help you choose the right type of scrubbing brush and detergent and determine whether or not a double cleaning cycle is necessary.

To perform the scrubbing operation, start suction and lower the squeegee by pressing the special key; when the machine first moves forwards, the brush plate will be automatically lowered to the floor. Brush rotation will start simultaneously. As soon as the machine stops, after a delay of approximately 5 seconds, the brush plate will be lifted and the brush rotation will stop. Adjust the solution flow rate via the special lever.

After scrubbing completion, before drying completion, turn the water tap off.

When the brush motors stop, the solenoid valve is operated to cut off the solution flow. In this way, it will not be possible to accidentally allow all the solution to leak out to the floor.

If a floor is very dirty, a two-step cleaning action is recommended - including a first step with the squeegee in its raised position and the scrubbing brushes in their working position; after starting the brushes and operating the water lever, the first cleaning cycle will be performed over a surface of a few dozen square metres. The cleaning solution must be left on the floor to dissolve dirt by acting as a solvent until it is collected during the second cleaning cycle. The second cleaning cycle must be performed with lowered brushes, water lever turned off and the squeegee in contact with the floor (suction switch activated).

### 4.7.1 MACHINE PREPARATION AND START-UP

If the scrubbing machine battery charger is plugged in, unplug the battery charger connected to the machine battery and connect the battery plug to the machine power plug, then fill the machine with water through the filler plug.

The machine can now be powered on by turning the main key switch when the operator is sitting in the driver's seat. Scrubbing can now be carried out.



### 4.7.2 CHOOSING THE RIGHT DETERGENT

Choosing the right detergent is very important for efficient floor cleaning. Too strong a detergent could cause damages. Low-foaming detergents or foam preventing additives should be used to prevent damages to the suction motor; if these products cannot be procured, try adding 50cc of common wine vinegar to the recovery tank before starting the cleaning cycle.



*Make sure that the detergent used is suitable for the surface to clean. Fiorentini S.p.A. will not accept any responsibility for damages caused by too aggressive detergents.*

### **4.7.3 LEVER FUNCTIONS**

- **Forward movement lever.** By pressing the pedal you will control the machine forward or backward movement according to the selected setting on the control panel.
- **Solution adjustment lever.** To adjust the water flow, set the lever in the desired position.
- **Service brake pedal lever.** The machine has an electrical braking system. When the pedal is released, the actuator will brake the machine drive reversing the flow of energy from the battery to the motors. For safety reasons, a hydraulic control brake has been added to the front steering wheel. The brake is operated by pressing the pedal shown in the figure.

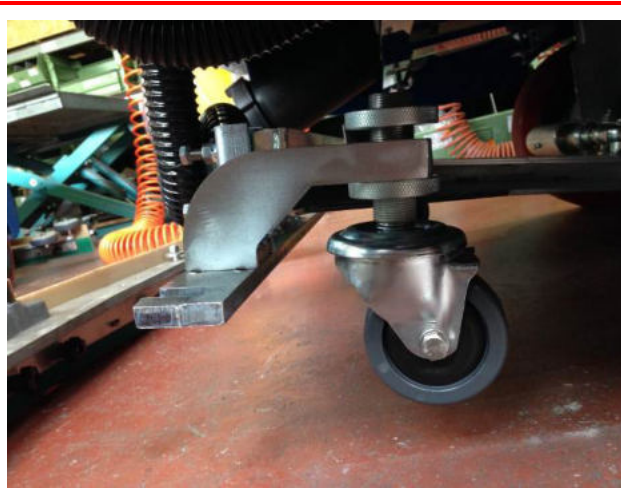
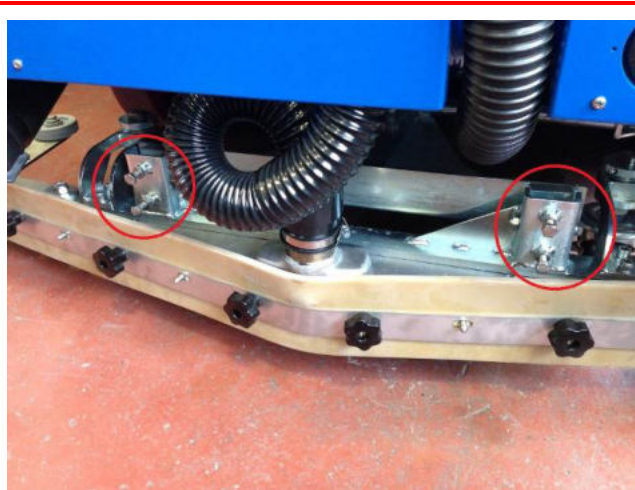




#### 4.7.4 SQUEEGEE ADJUSTMENT

To guarantee efficient drying, it is essential for the squeegee to be perfectly adjusted. This type of squeegee is very efficient in collecting water to facilitate pipe suction, but very sensitive to parallelism with the ground. To adjust the squeegee:

- Remove the key from the control panel to prevent unwanted machine starts.
- Adjust the squeegee angle by turning the four screws shown in the figure. The right pressure is achieved when the edge of the blade touches the floor with a 45° - 60° angle to the floor.
- To adjust the height of the blades turn the knobs on the two squeegee guiding wheels - tightening or loosening them.



*It is very important that the two wheels are adjusted so as to ensure that the squeegee blades are parallel and rest firmly on the ground.*

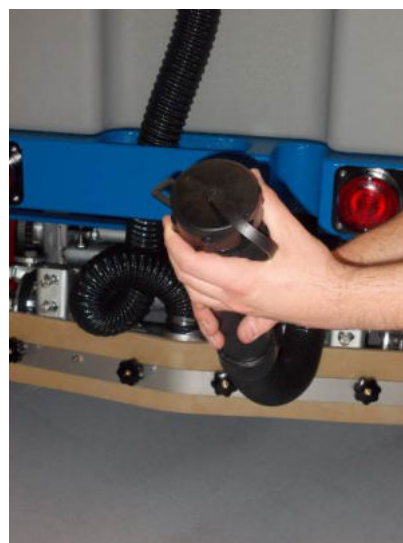
#### **4.7.5 WATER DRAINING**

Both tanks can be drained quickly.

The recovery tank can be emptied via the hose provided on the back of the machine. To drain water from the tank, position the machine over a sewer hole, disconnect the hose from its fixings on the tank and drain after removing the plug at the end of the hose.

The recovery tank is also provided with a screw-type plug with a large diameter ring nut at its lower end. Through it, all the sludge and solid matter that may have settled at the bottom of the tank can be removed.

The solution tank can be drained by opening the outlet valve located in the machine lower side. The valve position is shown by the pictogram cut in the metal plate.



#### 4.7.6 BRUSHES REPLACEMENT

Proceed as follows to replace the brushes:

- Remove the key from the control panel to prevent unwanted machine starts.
- Remove the brush guard from the plate by unscrewing the fixing knobs.
- Remove the brush by pulling out the bronze knob on the brush coupling.
- Place a new brush below the coupling and push it upwards until the spring stop will spring into position to retain the brush.
- After replacing all three brushes, replace the brush guard.



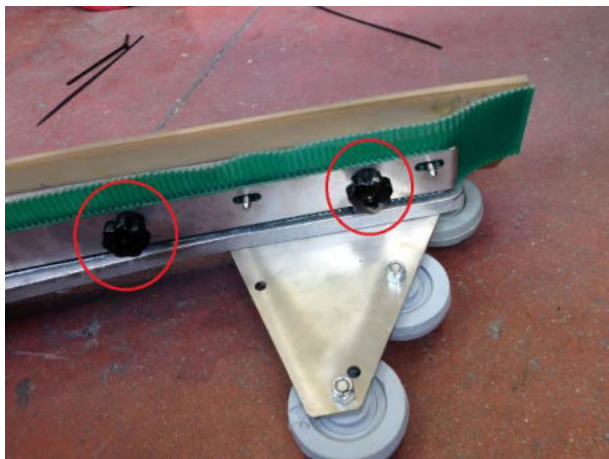


#### 4.7.7 SQUEEGEE BLADES REPLACEMENT

The squeegee blades must be replaced when the edges become worn; the blade edges must be sharp to ensure perfect drying.

To replace the squeegee proceed as follows:

- Remove the squeegee from the machine and place it on a bench.
- Remove the knobs from the front and rear of the squeegee unit, remove the strips and remove the worn blades.
- Insert the new blades and proceed by reversing the order of the operations.




## 5. MAINTENANCE

### 5.1. ROUTINE MAINTENANCE

Carrying out maintenance at regular intervals is extremely important to ensure the floor scrubber efficiency and prolong its working life to the end of the warranty time. The performed services should be logged in writing by using the special form contained in this manual.



- *Trained personnel only may service the machine and in particular, its electric and electromechanical parts. Specific tools and equipment should be used according to the type of service.*
- *For servicing and spare part requirements exclusively contact Fiorentini S.p.A.*

OPERATION	TASKS	FREQUENCY
Cleaning	Clean the recovery tank and the suction motor filter and float	Daily
	 <ul style="list-style-type: none"> <li>• <b>Do not use corrosive substances.</b></li> <li>• <b>Do not use pressurised water jets.</b></li> </ul>	
	➤ Check the cleanness of the suction pipes and squeegee	Weekly
Checks	<ul style="list-style-type: none"> <li>➤ Check the condition of the squeegee rubber suction blades</li> <li>➤ Check the battery water level</li> </ul>	Every 2 weeks
	Check the clean water tank filter	Monthly
	Check and adjust the braking system	Every 3 months
	<ul style="list-style-type: none"> <li>➤ Check battery cable tightening</li> <li>➤ Check and top up, if necessary, the hydraulic service brake oil. The oil tank is located in the compartment under the driver's seat.</li> </ul>	Every 6 months
	Check the brushes of each motor	Yearly
	<ul style="list-style-type: none"> <li>➤ Check the safety devices</li> <li>➤ Check the wiring system</li> </ul>	Yearly

### 5.2 BATTERY MAINTENANCE

The operator is expected to check the battery state of charge while the machine is in operation via the battery charge indicator on the dashboard.



- Leave the battery compartment open during charging*
- *Do not use naked flames or smoke near batteries*
  - *Warning: battery acid is corrosive*
  - *Do not produce sparks near batteries*
  - *Battery gases are explosive*
  - *Do not reverse battery polarity*

### 5.2.1 HYDROMETRY

The battery charge state should be checked while the batteries are charging by using a hydrometer. Proceed as follows:

- By using a syringe hydrometer draw a small quantity of electrolyte to cause the float to rise to the surface;
- Make sure that its top does not touch the rubber bulb or stick to the glass walls under the effect of capillarity.
- For hydrometric measurements, after adding distilled water wait for density to become homogeneous throughout the volume of liquid contained in the element.

### 5.2.2 WATER TOP-UPS

- Add distilled water to each battery cell before charging to bring liquid level to 6 mm above the plates.
- This operation should be repeated whenever the level goes down, or in any case, at no more than one week's intervals.

### 5.2.3 CHARGE LIMITS

Battery charging is not necessary if, at end of a day's work, hydrometric values have not gone below 1.24 (28 Bè). The highest recommended temperature is 45°C. If the electrolyte temperature is more than 10/12 °C higher than the environment temperature, the batteries could overcharge.

### 5.2.4 STANDBY OR INACTIVE BATTERIES

Inactive batteries will lose their charge spontaneously (self discharge). If a battery inactivity period is expected, carry out the following operations:

- Charge the batteries once a month by selecting a "charge end" current intensity, until considerable gas development is observed in all the cells, and voltage and specific gravity readings remain constant for 3-4 hours;
- This should also be done if specific gravity measurements are high. Store inactive batteries in a dry place for prolonged periods of time

### 5.2.5 BATTERY CHARGER TECHNICAL FEATURES

The battery charger must have the characteristics listed below and be up to the following standards and regulations:

INPUT	230Vac, 50Hz
OUTPUT	36Vdc, 80A

Directive:

Electromagnetic compatibility 2004/108/EEC

Low voltage 2006/95/EEC

**N.B.** The operator must refer to the battery charger user manual for maintenance and inspection instructions in case of any problems experienced with batteries.



Check recommended battery specifications in the section **TECHNICAL DATA SHEET**.

### 5.2.6 BATTERY DISPOSAL

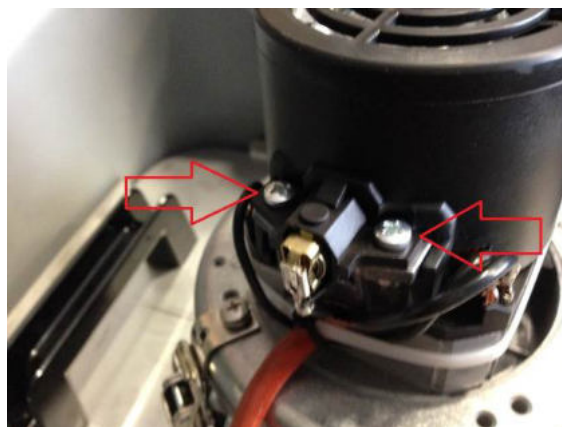
Batteries are classified as "toxic and hazardous" waste. For disposal purposes, they should be committed to specialised, specifically authorised companies whose qualifications must be ascertained by the battery owners. Temporary battery storage before collection by a specialised disposal company must be in line with the following legal requirements:

- A temporary storage authorisation must be obtained
- The batteries must be sealed in plastic containers having capacities not lower than the volume of the electrolyte contained in the batteries, or in any case, stored in such a way as to prevent rainwater seeping into the storage containers.

### 5.3 MAINTENANCE OF THE SUCTION MOTOR

The suction motors must be checked and cleaned. Every six months, the brushes should be checked and replaced, too - if necessary. Suction motor maintenance should be carried out as follows:

- Remove the key from the control panel to prevent unwanted machine starts.
- Lift the suction unit compartment cover (detail 1).
- Pull out the machine electric system plug (detail 2).
- Release the motor casing fixings (detail 3) to be able to separate the motors from their support plate.
- Replace the motor brushes by unscrewing the brush holder and removing the faston connector.



## 5.4 WIRING SYSTEM CHECKS

The machine wiring system should be inspected and examined every 2 years. It is very important to immediately correct any defects, e.g. disconnected wires or burnt cables.



*Any service on the wiring system should be carried out by a skilled technician.  
Any maintenance or repair not described as routine maintenance should be carried out by specialised personnel authorised by FIORENTINI.*

## 5.5 SUMMARY TABLE OF THE RECOMMENDED CHECKS

	FREQUENCY	REQUIRED TECHNICIAN
INSPECTIONS		
Safety devices	2 years	Skilled technician
Electrical wiring system	2 years	FIORENTINI technician
Braking system	3 months	Skilled technician
Complete overhauling	5 years	FIORENTINI technician
MAINTENANCE		
Recovery tank cleaning	Daily	operator
Suction motor filter	Daily	operator
Clean water tank filter	Monthly	operator
Suction pipe lines cleaning	Weekly	operator
Squeegee cleaning	Weekly	operator
State of blades inspection	Weekly	operator
Battery fluid level inspection	Weekly	operator
Battery cable fixing	6 months	Skilled technician
Motor brush level in each motor inspection	Yearly	Skilled technician



## 6. TECHNICAL ASSISTANCE

### 6.1. TECHNICAL ASSISTANCE CONTACT INFORMATION

For services under the warranty and/or to request maintenance or repairs, or for any inquiries, please contact the Technical Assistance Department of FIORENTINI S.p.A. at:

**ING. O. FIORENTINI S.p.A.**  
**“THE BEST IN FLOOR MACHINES”**

**BRANCH OFFICES:**

20132 MILAN – Fax. +39 02/2592779

Via Palmanova 211/a – Tel. + 39 02/27207783 - 2564810

00012 Guidonia Montecelio (ROME) – Fax. +39 0774 353419 - 353314

Via B. Pontecorvo 20 – Tel. + 39 0774 357184 - 378827

**PRODUCTION FACTORY:**

50030 PIANCALDOLI (FI) – Fax. +39 055/817144

Loc. Rombola – Tel. + 39 055/8173610

Most technical problems can be sorted with minor services. Before contacting our Technical Assistance Dept. we therefore advise to carefully read this manual.

If specialist service is required, please clearly specify the type and circumstances of the observed defect to help us find the best solution.

### 6.2 CLAIM REPORT

Fiorentini S.p.A., wishing to meet its customer requirements in the most effective manner and to constantly improve its products on the basis of valuable feedback obtained from customers themselves, has prepared a claim form to report any defects observed during use of its I42TEB - I60TEB floor scrubber and dryer.



**Form completed by:**

Company: \_\_\_\_\_

Writer's name: \_\_\_\_\_

Position within the  
company: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

**Machine description:**

Machine: \_\_\_\_\_

Model: \_\_\_\_\_

Purchase date: \_\_\_\_\_

S.N.: \_\_\_\_\_

Applicable  
Warranty:☐

YES

☐

NO

Worked hours: \_\_\_\_\_

Machine work  
environment: \_\_\_\_\_**Fault Description:**

Code of the faulty

component: \_\_\_\_\_

Component

name: \_\_\_\_\_

Fault type:

Short fault description:

☐

Faulty Mechanical component

☐

Faulty operation

☐

Wiring system failure

☐

Motor/Engine failure

☐

Missing component

☐

Excessively noisy operation

☐

Water leak

☐

Other

**Customer remarks:**

Please write below your comments and suggestions regarding the products and services supplied by Ing. O. Fiorentini S.p.A.

Mat no.  
Serial no.  
Nr. de série

\_\_\_\_\_

Data di spedizione  
Date of shipment  
Date d'expédition

\_\_\_\_\_

Distributed by:

**ING. O. FIORENTINI S.p.A.**  
**“THE BEST IN FLOOR MACHINES”**

**BRANCH OFFICES:**

20132 MILAN – Fax. +39 02/2592779

Via Palmanova 211/a – Tel. + 39 02/27207783 - 2564810

00012 Guidonia Montecelio (ROME) – Fax. +39 0774 353419 -  
353314

Via B. Pontecorvo 20 – Tel. + 39 0774 357184 - 353015

**PRODUCTION FACTORY:**

50030 PIANCALDOLI (FI) – Fax. +39 055/817144

Loc. Rombola – Tel. + 39 055/8173610