

Series 018

Industrial Deionizer

Instructions and Maintenance manual

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Destatic s.a.s. di Massimo Cavedagna & C.
Via Pizzoli, 8 – 40050 – Monte San Pietro – Bologna – Italia
☎ Tel. / Fax: 051 6760583
☎ Fax.: 051 6761934
✉ e-mail: *info@destatic.it*

Summary

Summary.....	2
Diagram index.....	3
Tables index.....	3
Introduction.....	4
Warnings!.....	4
Conformity Decalration.....	5
Warranty legislation and certificate.....	6
Starter kit.....	7
Technical Characteristic of Series 018 deionizer	8
Technical Specifications of the antistatic bars.....	9
Front Panel.....	10
Side and back panels.....	11
Installation of Series 018 deionizer.....	14
Maintenance of the deionizer Series 018.....	14
Maintenance of the antistatic bars.....	14
Troubleshooting.....	16
Mechanical Diagrams.....	17
Electrostatic principles.....	21
Introduction.....	21
The Coulombine force.....	21
Electrostatic field.....	21
electrostatic potential	22
Electrostatic induction.....	23
User's notes.....	24
Analytical index.....	26

Diagram index

Diagram 1 - CE certificate.....	5
Diagram 2 - Straight antistatic bar.....	9
Diagram 3 - Front panel Series 018.....	10
Diagram 4 - Side and back panel of model 018DC-REG-PLCSTOP.....	12
Diagram 5 - Side View.....	17
Diagram 6 - View of EAT bushings.....	18
Diagram 7 - View from above.....	19
Diagram 8 - Lines of force and equipotential lines.....	22
Diagram 9 - Electrostatic induction.....	23

Tables index

Table 1 - List of front panel connections.....	10
Table 2 - List of connections and settings for the side panel.....	13

N.B.:

All information contained in the following manual the technical characteristics and aesthetics , functions etc...of the industrial deionizer Series 018 may be varied by Destatic s.a.s. without obligation of prior notice.

Introduction


Congratulations for having purchased the Series 018 **deionizer**.

Over 20 year's experience and a consolidated professionalism consent DESTATIC to project and manufacture products of the highest quality and stability. Today optimisation of production processes has become a necessity; but it is a duty to warranty the safety of the instalments. DESTATIC has always applied this directive to all it's instalments.

Electrostatic energy causes noticeable problems to machinery function and the source of the causes are various: temperature variations, friction, etc..

With DESTATIC systems, static electricity formed in the production process is neutralised by a flow of ions generated by an ionising bar, powered by a high tensioned electronic generator.

DESTATIC systems can be applied in many production processes: labelling machines, woodworking machines, optical machines, cigarette machines, textile machines, printing machines, blistering machines, capsule weighing systems, boxing machines, machines for processing plastic materials etc....

DESTATIC has always projected and manufactured high technology and quality systems, today these are guaranteed by a  certification on all its products.

Warnings!

The DESTATIC deionzer series 018 is an electronic high tension generator (up to 8000VDC) and able to supply up to 1 mA, with a short-circuit protection of the output. This means that **before carrying out any kind of maintenance operation, cleaning, replacement etc... of the deionizing group + cables + bars, you have to switch off the device and disconnect it from the bars and from the power supply.**

DESTATIC declines any responsibility in case of opening, tampering, incorrect use etc...of the deionizer Series 018.

Summary of the main warnings:

- **DO NOT** switch on the generator if all the bars are not connected properly (be sure to screw the bayonet supplied, well down).
- **CLOSE** with their own plugs, the eventual EAT bushings not in use.
- **DO NOT** touch the bars when the generator is connected and in operation.
- **DO NOT** touch the bars if the generator has been switched off for less than 120 seconds. The internal circuits store electrical energy which will download in this time lapse.

Conformity Declaration

**Diagram 1 - CE
certificate.**

The product Series 018 complies to European Union standards (EU Council Directives). The conformity declaration is available at our offices:

Destatic s.a.s. di Cavedagna Massimo & C.
Via Pizzoli, 8 – Monte S. Pietro – 40050 – Bologna
☎ ***Tel.: 051 6760583***
☎ ***Fax.: 051 6761934***
✉ ***e-mail: info@destatic.it***

Warranty legislation and certificate

- For warranty validation, the purchaser has to fill in the following validation slip and enclose invoice or receipt.
- The length of the warranty is of 12 (twelve) months from date on purchase receipt and does not include any continuation due to inactivity against an eventual repair. The purchaser has to declare to DESTATIC any functioning defect before the expiry date and if not losing the right of warranty. Technical assistance under warranty is only held at our premises in Bologna.
- Upon request of a repair under warranty, the purchaser has to present the warranty certificate filled in all its parts together with the purchase receipt.
- The warranty only covers break downs of the product that result in the product malfunction. The warranted product has to have the same serial number as the one indicated on the certificate, if not the warranty will be null and void. The term warranty is only intended for repair or free replacement of the components which are recognised as faulty in manufacture or in the materials used, labour included.
- Warranty does not include damage caused by improper use, use and maintenance not conforming to the instructions supplied, tampering, damages caused by negligence on the part of the purchaser. Also it is not applied in case of break downs caused by wrong battery connection or to connections of the instrument to batteries which do not have the technical specifications quoted in this manual. Warranty does not cover break downs caused by charges provoked by lightening or other external phenomena.
- Warranty does not cover parts subject to wear, cables, connection wires and connectors that do not have factory defects.
- Warranty expires 12 months after purchase. After which all technical services, labour and replaced parts will be charged for at ruling price list.
- For any dispute the competent ruling tribunal is Bologna.

Model:

Serial number:

Purchase date:

Purchaser's signature:

P.S.: Remember to enclose this document copy with purchase receipt.

Sellers stamp and signature

Starter kit

The industrial deionizer Series 018 is supplied with the following accessories:

- Deionizer Series 018.
- The present instructions and maintenance manual.
- Closing plugs for EAT bushings

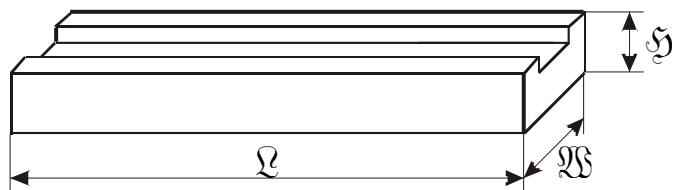
The antistatic bars and connecting cables are supplied separately as they have to be made to fit for the facility on which they will function.

Technical Characteristic of Series 018 deionizer

The series 018 represents a family of deionizers containing various models, these models are purposely studied to satisfy the greater part of industrial necessities. The series is available in the following models:

<i>Model</i>	<i>Power supply tension</i>	<i>Absorption</i>	<i>Fuse</i>	<i>Exit tension</i>	<i>Max exit current</i>	<i>Limitation / protection</i>	<i>N° of exits</i>	<i>Piloting capacity</i>	<i>Material</i>	<i>Operating Temperature</i>	<i>Weight</i>	<i>Dimension</i>
018AC-2S-24	24VAC / 50÷60Hz	1A	1.5A-Rit.	3500+3500 VDC	1.5 mA	Yes	2	Bars up to 6 m	ABS self-extinguishing	10 ÷ 50 °C	2 Kg	190x170x140 mm
020AC-4S-24	24VAC / 50÷60Hz	1A	1.5A-Rit.	4000+4000 VDC	1.5 mA	Yes	4	Bars up to 8 m	ABS self-extinguishing	10 ÷ 50 °C	2 Kg	190x170x140 mm
018AC-2S-110	110VAC / 50÷60Hz	300mA	500mA-Rit.	3500+3500 VDC	1.5 mA	Yes	2	Bars up to 6 m	ABS self-extinguishing	10 ÷ 50 °C	2 Kg	190x170x140 mm
020AC-4S-110	110VAC / 50÷60Hz	300mA	500mA-Rit.	4000+4000 VDC	1.5 mA	Yes	4	Bars up to 8 m	ABS self-extinguishing	10 ÷ 50 °C	2 Kg	190x170x140 mm
018AC-2S-230	230VAC / 50÷60Hz	150mA	250mA-Rit.	3500+3500 VDC	1.5 mA	Yes	2	Bars up to 6 m	ABS self-extinguishing	10 ÷ 50 °C	2 Kg	190x170x140 mm
020AC-4S-230	230VAC / 50÷60Hz	150mA	250mA-Rit.	4000+4000 VDC	1.5 mA	Yes	4	Bars up to 8 m	ABS self-extinguishing	10 ÷ 50 °C	2 Kg	190x170x140 mm
018DC-4S	24VDC	1A	1.5A-Rit.	3500+3500 VDC	1.5 mA	Yes	2	Bars up to 8 m	ABS self-extinguishing	10 ÷ 50 °C	2 Kg	190x170x140 mm
	Note:	<ul style="list-style-type: none"> You can replace the traditional fuse with an automatic self - setting fuse. 										
018DC-4S-PLCSTOP	24VDC	1A	1.5A-Rit.	3500+3500 VDC	1.5 mA	Yes	2	Bars up to 8 m	ABS self-extinguishing	10 ÷ 50 °C	2 Kg	190x170x140 mm
	Note:	<ul style="list-style-type: none"> You can replace the traditional fuse with an automatic self - setting fuse. Tension entrance from STOP to PLC. The levels are interpreted in the following way: >18VDC → Bars ON, <6VDC → Bars OFF. Exit state indicator LED. 										
018DC-4S-REG	24VDC	1A	1.5A-Rit.	up to 3500+3500 VDC	1.5 mA	Yes	2	Bars up to 8 m	ABS self-extinguishing	10 ÷ 50 °C	2 Kg	190x170x140 mm
	Note:	<ul style="list-style-type: none"> You can replace the traditional fuse with an automatic self - setting fuse. Exiting tension setting from 2000+2000VDC to 3500+3500VDC. Exit state indicator LED. 										
018DC-4S-REG-PLCSTOP	24VDC	1A	1.5A-Rit.	up to 3500+3500 VDC	1.5 mA	Yes	2	Bars up to 8 m	ABS self-extinguishing	10 ÷ 50 °C	2 Kg	190x170x140 mm
	Note:	<ul style="list-style-type: none"> You can replace the traditional fuse with an automatic self - setting fuse. Exiting tension setting from 2000+2000VDC to 3500+3500VDC. Exit state indicator LED Entrance tension from STOP to PLC. The levels are interpreted in the following way: >18VDC → Bars ON, <6VDC → Bars OFF. Exit state indicator LED. 										

Table 1 - list of Series 018 models

Technical Specifications of the antistatic bars**Diagram 2 - Straight antistatic bar**

- Material: self- extinguishing ABS
- Isolating tension: 10 KV
- Operating temperature: 10 ÷ 50 °C
- Connecting cable length: upon request (max. 20 m)
- Distance of bar from the surface to be treated: from 4 to 50 mm
- Fixing: By 2 MA4 screws
at requested distance
- Weight: ~800 g/m (excluding cable)
- Dimension (W H): 20 x 27 mm
- Dimension (L): upon request (from 80 to 5000 mm)

PS.: Other bar shapes(e.g. round) are available upon request.

Front Panel

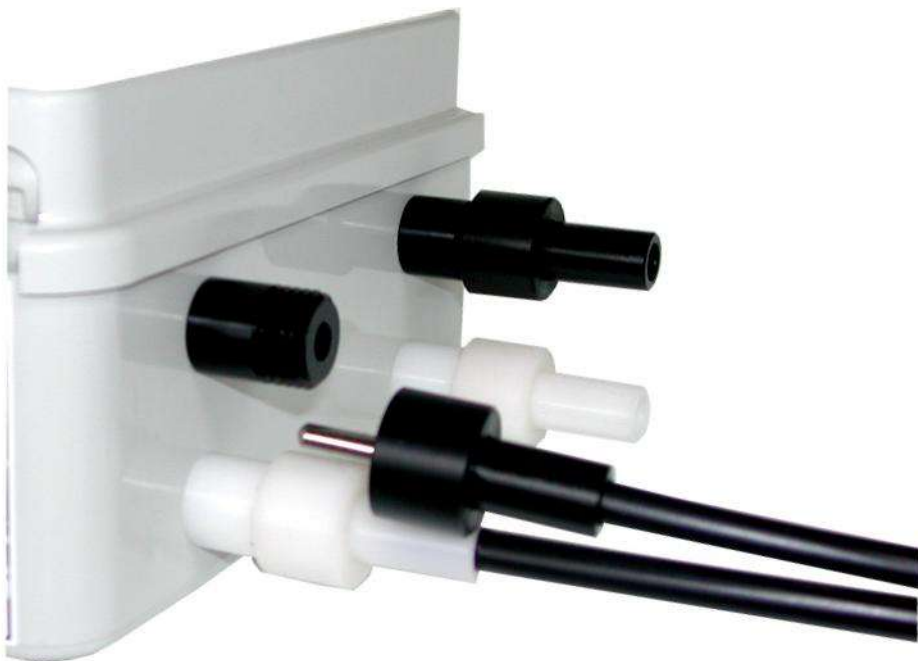


Diagram 3 - Front panel Series 018.


Key – Deionizer front panel		
A		Bushings for connecting antistatic bars: Series 018: Four bushings “+”, “-“, “+”, “-“.

Table 1 - List of front panel connections

The connection of the bars is made through the banana plugs, as per diagram. The connection of the bars has to be made with the power supply OFF (by at least 120 seconds) and the plug disconnected. The banana plug has to be inserted deeply into the hole and has to be secured to the same by a bayonet screw which the banana plug is supplied with.

The eventual bushings not in use have to be plugged with their proper accessory. Only once these operations are finished can it be possible to put the device into operation by activating the switch on the back of the appliance.

Side and back panels

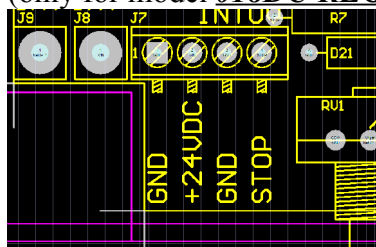


Diagram 4 - Side and back panel of model 018DC-REG-PLCSTOP.

Key – Deionizer front and side panel

A illuminated ON switch.

B power supply cable entrance / PLCSTOP (Connector J7) signal.
(only for model **018DC-REG-PLCSTOP**)



- Clamp 1 → power supply “-” BLACK cable
- Clamp 2 → power supply “+” RED cable
- Clamp 3 → PLCSTOP entrance “-” BLACK cable
- Clamp 4 → PLCSTOP entrance “+” WHITE cable

C	Tension exit potentiometer. (only on model <i>018DC-REG-PLCSTOP</i>)
D	LED indicating function of deionizer ¹ . (only on models 018DC)

Table 2 - List of connections and settings for the side panel.

¹ See paragraph "Using the series 018 deionizer"

Installation of Series 018 deionizer

The deionizer series 018 can be installed horizontally or vertically and does not need to be put in particularly ventilated areas.

All the same, the steps below have to be followed for a correct installation:

- The deionizer has to be well fixed onto a proper support, same for the cables which lead to the antistatic bars.
- The deionizer has to be fixed so access to the following is easy:
- **front panel** (bushings for bar connection),
- **back panel** (switch),
- **side panel** where power supply connections and cable hole are, PLC connection (only on Mod. 018DC-PLCSTOP), access to the output setting potentiometer (only on Mod. 018DC-REG) and the LED which indicates function status of the apparatus (only Mod. 018DC).
- Do not expose the deionizer to liquids, gas, metal shavings, production waste etc....
- Do not subject the deionizer to excessive vibrations, it can eventually be fixed to the body with rubber supports.
- When not in use, close the EAT bushings with the supplied accessory.

Maintenance of the deionizer Series 018

The series 018 deionizer does not require any maintenance.

DESTATIC declines any responsibility in case of opening, tampering, incorrect use etc... of the deionizer Series 018

Maintenance of the antistatic bars

The antistatic bars, seeing the work that they are designed to carry out, are subject to wear (the steel tips, with age tend to wear out and lose efficiency) and above all, they tend to accumulate dirt (in form of dust which sticks to the bars).

These are the major causes which call for a periodic cleaning of the bars and eventual replacement with new.

For cleaning the bars, the following steps have to followed:

- Switch off the deionizer Series 180 **and wait for at least 120 seconds**
- Disconnect the deionizer from the mains.
- Disconnect the screw plugs which connect the bars to the deionizer
- Proceed with cleaning the bars on site or disassemble them from the system on which they are mounted. Use compressed air for cleaning.
- Reposition the bars onto the system
- Reconnect the screw plugs
- Reconnect the deionizer to the power mains.
- Switch on the deionizer Series 018

Troubleshooting

A small anomaly is not always the result of a broken device. The following notes may come of some use when facing such situations.

<i>Symptom</i>	<i>Cause</i>	<i>Solution</i>
The luminous switch on the is OFF.	The deionizer is disconnected from the mains and/or the switch is OFF	Connect the deionizer to the mains and switch ON
	The fuse is broken.	Replace the fuse with one of same power
The deionizer is correctly connected to the mains and to the bars but it does not work.	The bars are not in the right position with relation to the instalment, one of them probably discharges to earth.	Reposition the antistatic bars.
	The PLC has stopped the EAT supply (only on models 018DC-PLCSTOP).	Check on PLC the cause of the system stop.
The deionizer is correctly connected to the mains and to the bars but it only works partially.	The bars are dirty and/or worn..	Clean the bars.
	The EAT potential generated is insufficient (only on models 018DC-REG).	Increase the EAT potential generated.

Table 4 - Troubleshooting

Mechanical Diagrams

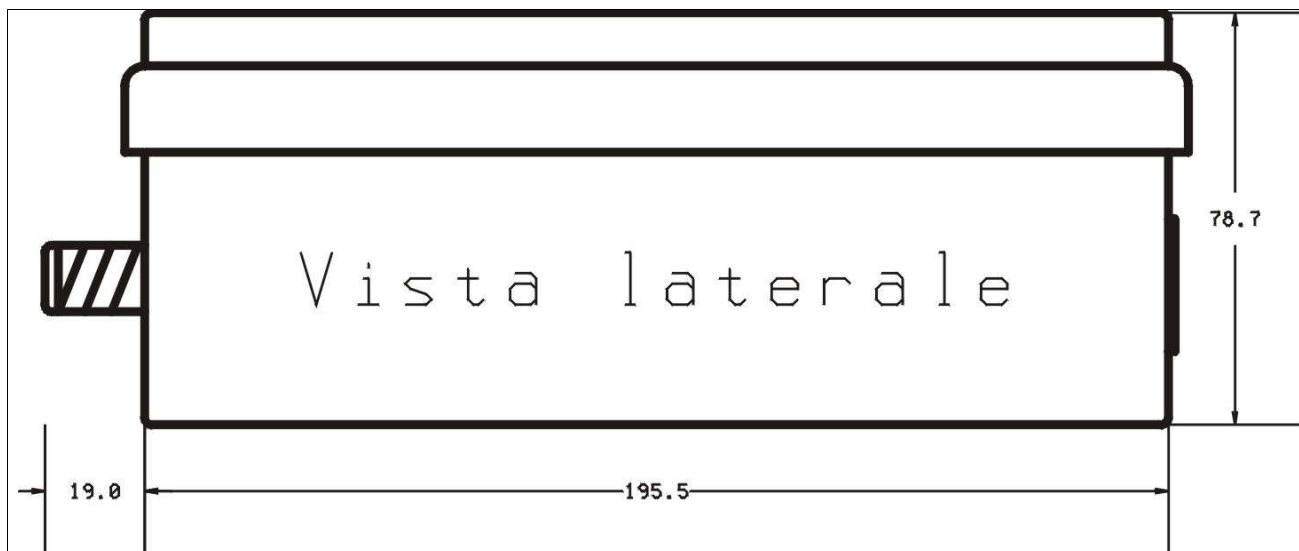


Diagram 5 - Side View

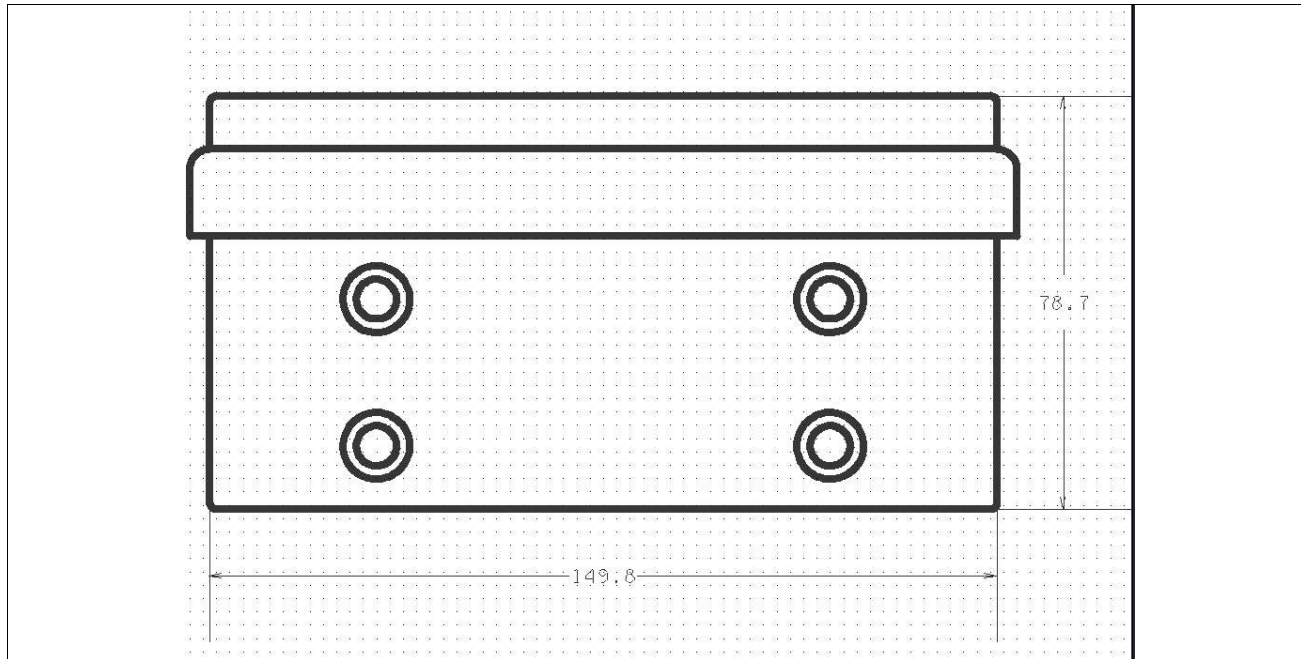


Diagram 6 - View of EAT bushings



Diagram 7 - View from above

For fixing down, keep in mind the matrix's of the four holes placed on the top lid of the deionizer. These measures are:

- **171 * 126 mm**

Electrostatic principles

Introduction

Electrostatic phenomena are all those electrical phenomena produced in space (and in the surrounding bodies) by electrical free charges, positive or negative which can be found in *static balance* (i.e. motionless) on bodies which are electrically charged anyway.

Coulomb's law states that electrical charges act mutually on each other with reciprocal attraction and repulsion, which extend and invest all the surrounding space.

A punctiform Q_1 electrical charge, positive or negative, acts in radius in all directions, resulting in a symmetrical sphere shaped *electrical field*. This means that, a test charge Q_2 positive or negative, immersed in this field will be repulsed or attracted by the Q_1 charge, independent of the fact that it's of the same Q_1 charge or not.

The Coulombine force

The coulombine force which is generated between the charges Q_1 and Q_2 has the following equation:

Equation 1 – Coulomb Law

$$F = K \cdot \frac{Q_1 \cdot Q_2}{d^2}$$

Where:

- K represents the Coulomb constant, which equals, in empty space, $K_0=9 \cdot 10^9$ [N·m²/C²].
- Q_1 e Q_2 represents the quantity of charge Q_1 and Q_2 expressed in Coulomb.
- d^2 represents the squared value of the distance between Q_1 and Q_2 expressed in m².

Electrostatic field.

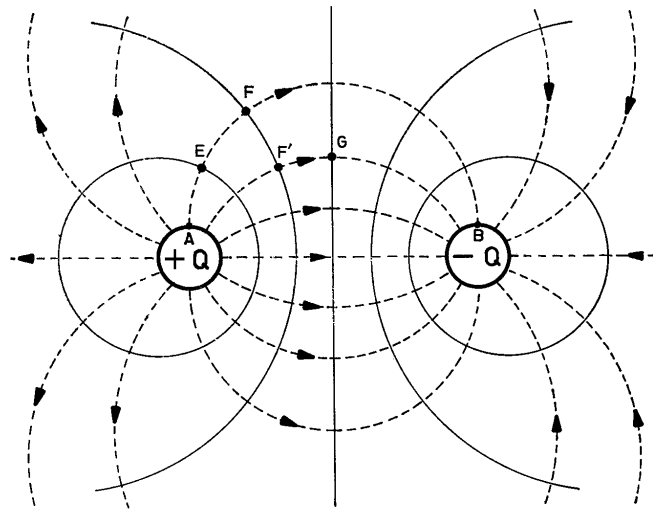
The intensity of the electrostatic field is defined in value and direction from the vector which is represented by the Coulombian force which the field imposes on the *positive charge whole* and ideally concentrated on the *considered point*.

The result is that the unit of measure of the electrostatic field is N/C or V/m. In this manual the second form of measure is used, which is also the most frequently used.

electrostatic potential

The electrostatic field bears long surfaces where electrostatic potential remains constant (equipotential lines). The result is an evident correlation between the electrostatic field and electrostatic potential. For example, knowledge of electrostatic field geometry, of electrostatic potential in the X2 generic point and the distance between charged objects and test charge enables you to determine the value of the field module and the electrostatic potential in that point.

In the same way, the knowledge of the electrostatic field module in the generic point X2 and of the distance between charged test object makes it possible to determine the value of the electrostatic potential in that point.

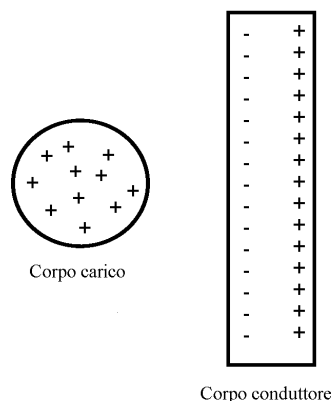


The diagram highlights the simplest combined diagram imaginable: two opposite charges forming an electrostatic field, the dotted lines are lines of force and the straight line is the equipotential surface and electrostatic potential.

Diagram 8 - Lines of force and equipotential lines.

Electrostatic induction.

If a conducting object of any form, isolated and discharged, is neared by an object charged with electrostatic you can notice how the former becomes electrified. More precisely the conducting part nearest to the charged object is charged with opposite energy, whilst the farthest away part shows charges of the same sign.

**Diagram 9 - Electrostatic induction**

This principle is employed by the static meter D99 DESTATIC. In fact the entrance sensor of the instrument is a *condenser* which is charged by electrostatic induction. As of this the condenser will show a difference in potential proportional to the value of the charge inducted. This ddp equals:

- $V=Q/C$

: Q is the value of the inducted charge and
C is the value of the equivalent measurement.

User's notes

<i>Analytical index</i>

018	3, 4, 7, 10, 14
Assorbimento	8
barre	9, 10, 14, 16
boccole	10, 14
Capacità di pilotaggio	8
cavo di alimentazione	12
Corrente di uscita massima	8
Coulomb	21
deionizzatore	4, 8, 10, 12, 14
DESTATIC	4, 23
Dimensioni	8
EAT	18
Fusibile	8
garanzia	6
led	13
Limitatore / protezione	8
Materiale	8
Modello	8
N° di uscite	8
Peso	8
Temperatura operativa	8
Tensione di alimentazione	8
Tensione di uscita	8
terra	14

