This manual contains important information about safe installation and operation of the unit. Strictly comply with this information to avoid harming people or damaging property.

It is strictly prohibited to use this equipment with radioactive chemicals!

Before switching this instrument on, read this manual in its entirety. Keep the manual near the instrument for future reference

In the event of restoring from alarms and / or exiting from inconfiguration menu, the instrument will dose water for about 5 minutes while displaying “H_2O Filling”

ERMES COMMUNICATION
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OPERATING INSTRUCTIONS FOR THE “LOTUS ULTRA” DIOXIDE SYSTEM

Il biossido di cloro, come tutti gli agenti ossidanti, potrebbe produrre fenomeni di corrosione dell’impianto. Si consiglia di effettuare verifiche cadenzate e di trattare l’impianto con prodotti chimici specifici. Si consiglia, inoltre, di utilizzare nel punto d’iniezione del prodotto materiali resistenti al biossido di cloro.

Chlorine dioxide, like all oxidizing agents, could produce corrosion phenomena of the plant. It is advisable to perform cadenced checks and to treat the plant with specific chemical products. It is also advisable to use chlorine dioxide resistant materials at the point of injection of the product.

Le dioxyde de chlore, comme tous les agents oxydants, pourrait produire des phénomènes de corrosion de l’installation hydraulique. Il est conseillé d’effectuer des contrôles cadencés et de traiter l’installation avec des produits chimiques spécifiques. Il est également conseillé d’utiliser des matériaux résistants au dioxyde de chlore au point d’injection du produit.

Read carefully!

ENGLISH edition
R14-07-21

This manual contains important information about SAFE installation and operation of the unit. Read and retain for future reference.

Strictly comply with this information to avoid harming people or damaging property.

The information contained in this manual may contain inaccuracies or typographical errors.

The information contained in this manual is subject to change at any time without prior notice.

Descrizione Prodotto *Product Description*	Sistemi di disinfezione, serie LOTUS ULTRA *Disinfection systems, LOTUS ULTRA series*
Codici Identificativi Prodotto (i simboli "_" completano il codice del prodotto in base alla configurazione delle varianti) *Product Identification Codes* *(the "_" symbols complete the product code based on the configuration of the variants)*	**112 _ _ _ _ 1 _ _ B**

GENERAL NOTES ON SAFETY

During installation, testing and inspection it is mandatory to comply with the following management and safety instructions.

The LOTUS ULTRA DIOXIDE generator is corresponding to the following EU-standards:

The following standards are considered:
- EU Machinery Directive (2006/42/EC)
- EU EMC Directive (2004/108/EC)
- Low-voltage directive 2006/95/EC according to Appendix I, No. 1.5.1 of the Machinery Directive 2006/42/EC
- EU Pressure Equipment Directive (97/23/EC)

The following harmonized standards are considered:
- EN ISO 12100-1, EN ISO 12100-2, EN 809
- EN 60206, EN 60529, EN 610000-6-1/2/3/4

The following harmonized national standards are considered:
- DVGW standards: Technical rules W 224 and W 624

WARNING:

follow European directive DIN EU 939 concerning HYDROCHLORIC ACID
follow European directive DIN EU 938 concerning SODIUM CHLORITE

Safety

This manual contains basic instructions for installation, operation and maintenance. It is therefore mandatory for the installation technician and the equipment administrator to study the entire manual prior to installing and commissioning. The manual must be found near the generator at all times. It is also mandatory for the operator to consider the general rules listed in the "Safety standards" chapter as well as the specific safety instructions in the other chapters of this manual.

Warning

Some of the functions described below may require other accessories (not included in the "Lotus Ultra" supply). Some of the features described may not be available with the "Lotus Ultra" software release purchased. Or some functions are available but not described in this manual. In this case, contact your dealer for more information.

Symbols

In accordance with the European guidelines concerning the characterisation of special risks, all safety instructions in this manual are marked with the following symbols:

Danger

This symbol draws attention to the risks that may be encountered.
Failure to comply can lead to serious consequences for personal safety and damage to property.

Attention

This symbol draws attention to the problems that can be caused by incorrect equipment operation.

Additional notes

This symbol indicates additional important information.

PART ON THE DOSING PUMPS IN THE "Lotus Ultra" SYSTEM

Attention

The pump must only be used for dosing liquid products.
It should not be used in explosive atmospheres (EX).
It should not be used to dose flammable chemicals.
It should not be used with radioactive chemicals.

Use the pump only after installation.

Use the pump in accordance with the data and technical specifications on the label.

Do not modify or use differently from that indicated in the user manual.

Additional notes

Keep the pump protected from sun and rain. Avoid splashing water.

The power to the system must be immediately disconnected and the pump disconnected from the electrical outlet during any emergency within the environment where the pump is installed.

If you use particularly aggressive chemicals strictly comply with the regulations concerning their use and storage.

Always comply with local safety regulations.

The manufacturer of the dosing pump cannot be held liable for damage to persons or property caused by incorrect installation, improper or incorrect use of the dosing pump!

Install the dosing pump so that it is accessible at all times for maintenance purposes.
Do not block the dosing pump area!

The unit must be controlled by an external control system. Dosing must be interrupted if there is no water.

Assistance and maintenance of the dosing pump and all its accessories must always be performed by qualified personnel.

Before any installation and maintenance:

- **carefully read the chemical characteristics of the product to be dosed and refer to the Safety Data Sheet of the product;**
- **wear the most suitable PROTECTIVE EQUIPMENT;**
- **drain the connection hoses of the dosing pump;**
- **carefully wash the hoses that have been used with particularly aggressive materials.**

General safety regulations

The manual describes the proper use of the "Lotus Ultra" generator.

Danger

Improper use of the generator compromises its safety function and that of the other devices connected to it and therefore such use is strictly forbidden.

Installation and maintenance must only be carried out by authorised technicians.

Maintenance repairs should only be carried out only by the manufacturer or by technicians authorised by the manufacturer. Interventions or alterations to the device that are not in accordance with the provisions of this manual, with respect to regular maintenance, shall be considered improper and render any product warranty null and void.

The operator is responsible for compliance with safety-related local regulations.

The device must be accessible at any time for operation and maintenance.

Before activating the dosing pumps, remove the pressure from the pump heads.

Before starting maintenance, drain and thoroughly wash the tested pumps.

Pay attention to the chemical safety data sheets!

Wear protective clothing when you must handle unknown or hazardous chemicals.

Additional notes

For proper compliance with European regulations concerning the use of this equipment with hazardous chemicals, refer to EU directives DIN 939 (HYDROCHLORIC ACID) and DIN 938 (SODIUM CHLORITE)

Operating safety instructions

Danger

Strict compliance with all national and local regulations is required when using the "Lotus Ultra" generator. The operator is responsible for compliance with safety-related local instructions.

The generator must be installed and operated in accordance with the instructions in this manual.

It is forbidden to use installation materials that are not approved by the manufacturer or supplier.

The generator can only be used with appropriate safety valves approved by the manufacturer. Failure to comply with this rule leads to be loss of the right to any kind of warranty!

Before operating the system, turn off the pressure from all parts of the system.

The system must never work with the valves closed as there lies the risk of the flexible hoses or rigid hoses bursting.

Disconnect the power supply before opening the controller container.

Pay attention to all the national regulations during installation.

Additional notes

The system must not be installed outdoors.

The system must be protected from unauthorised access.

The place where the unit is installed must be protected from direct sunlight and frost and should be well ventilated.

Places with temperatures below 10°C must be provided with appropriate systems that enhance the temperature.

It must be possible to transport the chemical containers to the system without any restriction.

An emergency exit is strictly required!

The system must be mounted on a vertical solid wall without stress.

The system must be mounted in such a way as not to cause vibrations.

Make sure free access from all sides is possible for operation and maintenance!

A valve and an attachable floor draining duct must be set up for any spilled chemicals to be eliminated without any risk.

Safety regulations in case of chemical spills I

Danger

If the odour of chlorine dioxide (a penetrating odour similar to that of chlorine) can be smelt, access is allowed only with the required personal protective equipment.

If the odour of chlorine dioxide is smelt, immediately turn off the system from a safe position, for example with an emergency stop switch away from the system

In rare error cases, the hazardous ClO_2 solution can leak. For example, install a gas detector that disables the system in case of a leak of ClO_2 and triggers an alarm that is recognised at a distance.

When using hazardous substances, keep in mind that their latest safety data sheets provided by the manufacturers are available. The safety data sheets indicate the measures to be adopted. Since the risk potential of a substance can be evaluated at any time based on newly learnt knowledge, the safety data sheet should be checked regularly and replaced if necessary.

The system administrator is responsible for the availability of the updated version of the safety data sheet and the preparation of the risk assessment of the relative workstations.

The administrator generates hazardous substances with this system.

The administrator is obliged to adjust the operating instructions according to the system if any recent knowledge concerning the risks of a particular hazardous substance is learnt and must include how to avoid them or if national regulations contain different provisions from those specified in the instruction manual supplied.

Safety regulations in case of chemical spills II

Attention

The following personal protective equipment is required to access the "Lotus Ultra" device

Face shield
Rubber or plastic boots
Protective gloves (ClO_2 sealed model)
Protective apron
Full face respirator

The composition and the type of personal protective equipment required may vary from one country to another and change over time.

Danger

If you come in contact with the acid: See the "Acid CE safety data sheet" of the supplier.

If you come in contact with the chlorite: See the ''Chlorite CE safety data sheet'' of the supplier.

If you come in contact with the ClO_2 solution or the ClO_2 gas: immediately remove the clothes that have come in contact with the chlorine dioxide or with the liquid solution, wash the skin thoroughly with soap and plenty of water. Splashes in the eye must be washed with running water for several minutes while keeping the eyelid wide open. If you have inhaled chlorine dioxide move to a place where there is fresh air, lying down in a position of absolute rest and protected from temperature changes. Consult a doctor immediately even if the affects do not appear immediately. If necessary, organise rapid transport to the hospital.

Orange-yellow ClO_2 gas has leaked: immediately clear the environment and disconnect the power supply, for example, from the emergency stop switch. Use complete protective equipment and water spray for the gas to settle.

Orange-yellow ClO_2 solution has leaked: immediately clear the environment and disconnect the power supply, for example, from the emergency stop switch. Wear protective equipment and pour a ClO_2 sodium thiosulphate solution then dilute with water and eliminate into the drain.

An incorrect dilution or with concentrated HCl in the HCl tank and with dosing pumps that have already pumped the concentrated chemicals to the reactor: immediately clear the environment and disconnect the power supply, for example, from the emergency stop switch. Alert the fire department and inform them of the risk of explosion due to concentrated ClO_2. The ClO_2 gas can explode even after hours!

Storage, transport and repairs

Additional notes

In case of repairs, return the unit after having cleaned it and having washed the hydraulic components. Attach the material decontamination declaration to be sent for repairs.
The unit can be damaged due to non-compliant storage or transport. Store or transport the unit adequately packed, preferably in its original packaging. Always follow the storage conditions when transporting or storing, even when the unit is packed. Although packed, always protect the unit from moisture and the action of chemicals.

First Start

For the first start-up and the hydraulic check it is necessary to **use FRESH WATER instead of chemical products** by inserting the suction lances into a water container. Refer to the numbering in the diagram on page 11.

1) Check that the fresh water container is full. then insert the suction tube.

2) Connect the wires of the acid and chlorite suction lance levels to the instrument in the respective inputs and the suction part to the relative pumps (acid and chlorite). Finally connect the fresh water suction pipe.

3) Check that the pumps are purged from the suction lances (side spout).

4) If the PEF is available for the reading of the dioxide through the probe, check that the water withdrawal point is installed on the discharge side of the recirculation pump and check that the output of the probe holder is in "discharge" or re-injected into the system.

5) If PEF is available, prepare the dioxide probe with the cleaning kit (hot water version) or with the membrane (cold water version). Follow the probe instructions.

6) Set the required work mode on the instrument, then return to the initial screen and leave it running, checking the correct dosage.

7) At the end of the procedure check that there are no leaks, then switch off the instrument. Move the lances into the cans with the respective products: acid and chlorite. Check that the pumps are primed correctly. The system will automatically restart producing dioxide.

Introduction

The chlorine dioxide generator named "LOTUS ULTRA" is used to produce liquid chlorine dioxide. This disinfectant kills all bacteria, germs, viruses and fungi very rapidly and works at very low concentration. The generator works according to the hydrochloric acid - chlorite process and uses diluted chemicals such as hydrochloric acid (HCl) and sodium chlorite ($NaClO_2$) in accordance with the following chemical formula:

Hydrochloric acid + Sodium chlorite = Chlorine dioxide + Sodium chlorite + Water

$$4\ HCl + 5\ NaClO_2 = 4\ ClO_2 + 5\ NaCl + 2\ H_2O$$

In the process, each chemical is pumped with a certain proportion in a reactor, which works pressurised, by means of two dosing pumps. The system can work proportionally with a contact water meter or constant mode..

Note: during first startup or during an alarm the system will let circulate water into reaction chamber for 5 minutes!

WARNING

follow European directive DIN EU 939 concerning HYDROCHLORIC ACID

follow European directive DIN EU 938 concerning SODIUM CHLORITE

follow Pressure Equipment Directive (97/23/EC)

Warnings for high pressure device

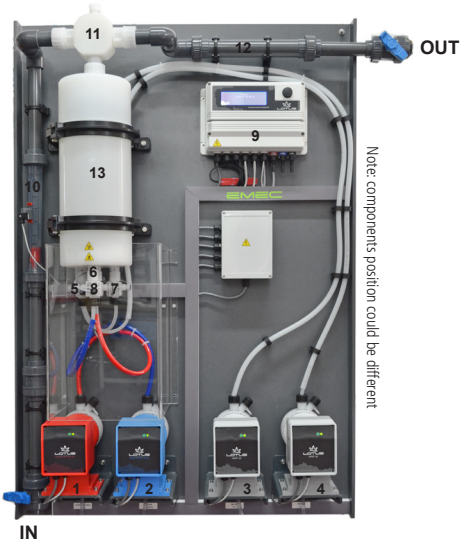
This machine may cause loss of life, severe bodily harm, or property damage if not correctly installed, operated and maintained. Read and understand all guidelines given in this bulletin before attempting to open, operate or service this machine. Failure to follow these guidelines and observe every precaution will result in malfunction and could result in catastrophic failure. Misuse, incorrect assembly, or use of damaged or corroded components can result in high-velocity release of the end closure. We recommend that only a qualified technician experienced in servicing high-pressure hydraulic systems, open, close and service this machine.

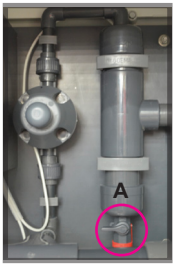
The reactor can explode: If the chlorine dioxide solution in the reactor becomes subject to a vacuum, it can explode. Hence the bypass line should be installed so that it is impossible for a vacuum to arise, not even when the plant is stand-by or in the case of a fault.

Risk of explosion in the bypass line: If the dosing remains switched on when there is no water flow, it can lead to an unacceptably high concentration of chlorine dioxide in the bypass line. If in addition, the bypass line is not completely full with water, a critical gas phase can occur, resulting in an explosion in the bypass line.

Main components for “LOTUS ULTRA” SYSTEM

“Lotus Ultra” system is made of the followings components:





Reactor Leakage Device

If the "REACTOR LEAKAGE" device is installed and the maximum pressure on the plant is exceeded, the LOTUS will stop and operator will need to discharge the dioxide through the faucet (A) on device.

IN / OUT PIPING D.40

1 - “Hydrochloric Acid” Pump
2- “Sodium Chlorite” Pump
3- Water Pump n.1
4- Water Pump n.2
5- “SEFL” for Water
6 - “SEFL” for Chlorite
7- “SEFL” for Water
8- “SEFL” for Acid
9 - “LOTUS ULTRA” main controllerr
10 - Fluximeter
11- Injection Valve (to “BYPASS” line)
12- Static mixer
13- Main Reactor Chamber

Concentration 33% Hcl ; 25% $NaClO_2$; Max pumps pressure 3bar / 40l ; Dioxide production capacity 4000gr/h*

*different model may achieve different performance and appearance, check label on controller

Hydraulic connections

The hydraulic components to be installed for the pumps to work properly are:

Suction Lance Hose.

Unscrew the suction ring nut completely on the suction body and draw the components required to assemble the hose: tightening ring nut, Holding ring and hose holder.

Assemble as shown, making sure that the hose is fully inserted on the hose holder.

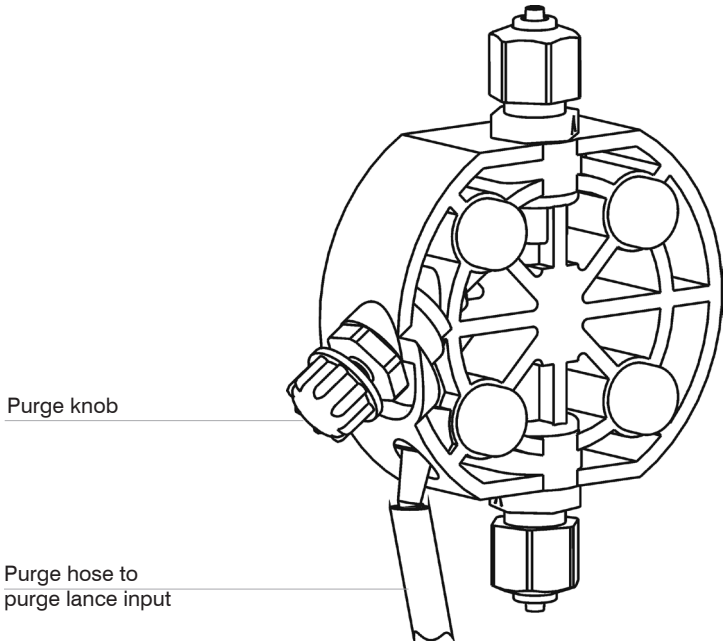
Tighten the hose on the pump body by tightening the ring nut with your hands.

Connect the other end of the hose to the bottom filter using the same procedure.

Figure A

Discharge hose.

Insert one end of the Discharge hose on the drain hose connection as shown in figure. Place the other end directly into the tank containing the product that is to be dosed. In this way, the liquid that leaked during the priming phase will return into the tank.

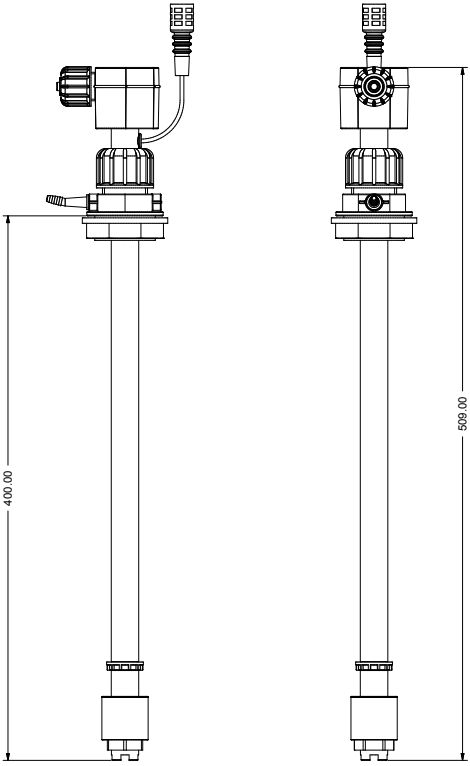


Assembling the bottom filter with a level probe.

Connect the BNC on the level input on the right side of the instrument. Connect RED CAP to Acid and BLUE CAP to Chlorite.

Before to operate ensure that lances are correctly installed. Test them using a water tank to check for leakage. This procedure can be used as a priming test for connected pumps.

Danger



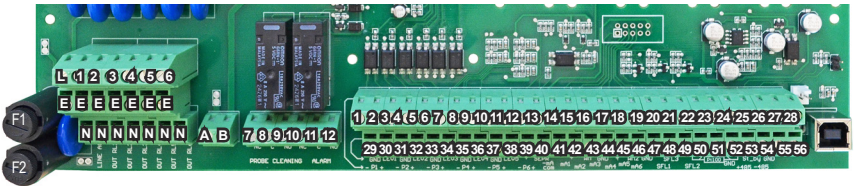
Connections to the mainboard

Before performing any operation on the Block board of the instrument, it is mandatory to disconnect it from the mains. To facilitate the connections to the mainboard, it has been divided into two blocks: electrical connections and I/O connections.

Unplug power cable from main power supply before operate

Danger

Blocks numbering is relative to the area on which you are working!



Electrical Connections

I/O Connections

Electrical connections:

F1: Main fuse (6.3AT)
F2: Instrument fuse (3.15AT)

MAIN POWER SUPPLY (115VAC / 240VAC): L(Phase), E(Earth), N(Neutral)

SET-POINT OUTPUTS (115VAC TO 240VAC):
(free contact outputs are not protected with a fuse and isolation between the outputs and the power supply is 250V MAX):

1 - E - N (F2 Fuse-protected) BYPASS Pump
2 - E - N (F2 Fuse-protected) Ventilation Unit
5 - E - N (F2 Fuse-protected) Alarm Out

GENERAL ALARM OUTPUT:

10(N.C.), 11(C), 12(N.O.) Free contact

Warning: Do not connect the power supply of the dosing pumps in PWM mode.
Warning: Maximum relay output power consumption in PWM mode: 5 W.

Attention: the connections must be implemented by qualified personnel

I/O Connections:

OUTPUTS FOR DIGITAL SIGNAL PROPORT. PUMP:

1(-) ; 2(+): Acid pump signal output
3(-) ; 4(+): Chlorine pump signal out
5(-) ; 6(+): Water 1 signal out
7(-) ; 8(+): Water 2 signal out

OUTPUTS FOR ANALOG PUMPS (MAX LOAD 500OHM):

mA Outputs Active – Do not connect any external voltage - Driver voltage without load: 15V

13: Common
15: Production
16: Reading

INPUTS:

49(-) ; 48(+): SEFL IN for Water 1
47(-) ; 46(+): SEFL IN for Water 2

21 (-) ; 20 (+) SEFL for Acid
23 (-) ; 22 (+) SEFL for Chlorine
33 (-) ; 34 (+) Bypass System

35 (-) ; 36 (+) Level Acid
37 (-) ; 38 (+) Level Chlorine

54(+) ; 55 (GND): Standby

FLOW INPUT for SEPR:

39(+ Brown) ; 40(Black) ; 41(- Blue)

Contact INPUT:

41 shortcut with block n.37
39(White) ; 40(Black)
41 shortcut with block n.37

REACTOR LEAKAGE:

29(-) ; 30(+)

RS485:

20: GND
26: + SIGNAL RS485 (A)
27: - SIGNAL RS485 (B)

PULSE EMITTING WATER METER (HALL EFFECT):

42(+12VDC) ; 43(INPUT) ; 44(GND)

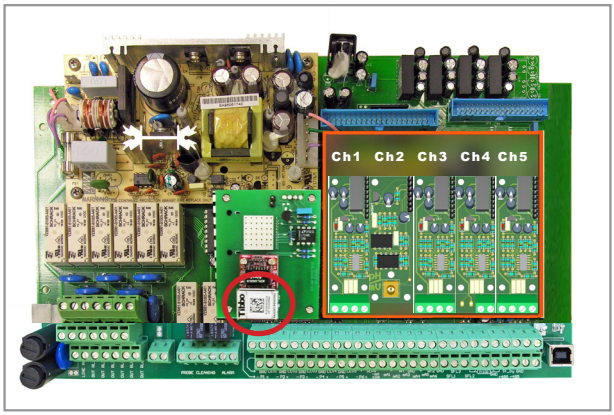
PULSE EMITTING WATER METER (CONTACT):

43(INPUT) ; 44(GND)

Probe modules connection

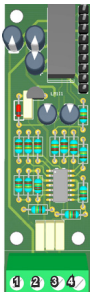
At the top of the mainboard there are 4 adaptors for the installation of the probe modules and inputs.
Upon request, these modules are installed by the manufacturer. For proper installation, check the installed modules and implement the required connections. A standard Ethernet cable (RJ45) is required for the ETHERNET version (module with red circle).

Attention: all connections must be executed by qualified personnel



Danger

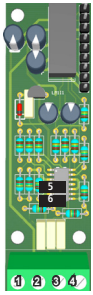
Unplug power cable from main power supply before operate



DIOXIDE SENSOR Ch2

Connection:

Block 1 : (+12VDC) Brown
Block 2 : (-12VDC) White
Block 3 : (V-out) Green
Block 4 : (GND) Yellow



MDCL Ch3

Cl probe connection:

ECL2/2
ECL2/20
ECL17/10
ECL18/10
Jumpers: 5 and 6 open
Block 1 : (+) Brown
Block 2 : (-) White
Block 3 : (IN) Green
Block 4 : (GND) Yellow

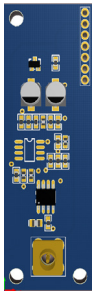
ECL4
ECL5
ECL6
ECL7
Jumpers 5 and 6 closed
Block 3 : (-) Black
Block 4 : (+) Red

MDSCL Ch3

Cl probe connection:

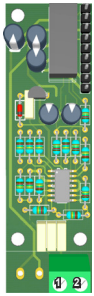
SCLxx

1 (-485) green wire
2 (+485) white wire
3 (GND) black wire
4 (+5VDC) red wire



MDMV Ch3

ORP probe connection



MDMA Ch4

Water meter module (mA) connection:

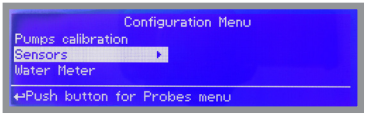
Block 1 : (+) Red
Block 2 : (-) Black

Browsing the menus

At the top right of the "Lotus Ultra", there is the wheel to browse and programme the instrument. The wheel can be rotated in both directions to move the cursor through the menus and the selection. The function is confirmed by pressing the relative function. **To gain access to "Configuration Menu" select "Menu" and enter "0916" as default password.**

NOTE: When the changes have been made press the wheel on "OK" to save and exit the sub-menu. Select "ESC" key and press the wheel to exit without saving. Access to configuration menu is enbled during reaction time or during storage tank filling only.

Configuration Menu



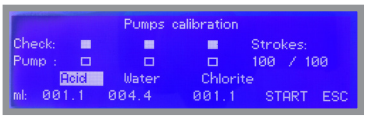
Pumps Calibration (page 20)
Sensors (page 21)
Water Meter (page 24)

Analog Outputs (page 25)
Mode Selection (page 26)
System Settings (page 19)

mA Input (page 27)
Service (page 30)
Bypass Alarm (page 27)

Communication (page 28)
Log Setup (page 30)
Exit (to main screen)

Status



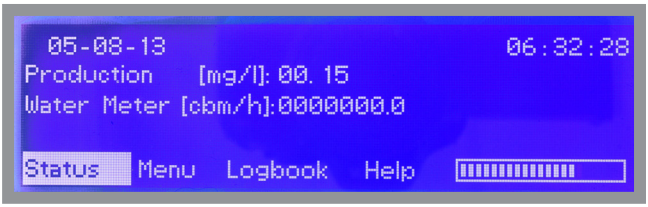
Press wheel on STATUS from main screen

Main screen

Local Date

Production Quantity

Water Meter Activity



Local Time

Activity Indicator

Wheel for browsing and selecting options

Additional notes

*The configuration and screens may differ (i.e.: different probes / modules when ordering).; you can download the latest version of this manual from the manufacturer's website or by contacting Technical Support. A lock icon means that access to main menu isn't available during a discharging or filling tank cycle.

System settings

All settings listed below must be properly configured to correctly use the "LOTUS ULTRA" system. It is recommended as first thing to do to set DATE & TIME. Enter this menu by selecting "MENU'" from the main screen, enter the PASSCODE **(default is: 0916)** and select "Settings". Save the settings by selecting "ESC", then confirm the changes by moving to "YES" and pressing the wheel.

DOS-Check

This option allows to set a number of strokes after which if a stroke is no longer received from pumps sefl (flow sensors) an alarm is shown on main screen (failure) and the system stops.

PASSCODES to access the menus of the instrument

To set a PASSCODE to access the instrument menu, choose "PASSCODE-2" and enter the 4-digit number. Move the cursor to "EXIT" and select "YES" to save. The new PASSCODE is now operational.
To set a PASSCODE to access the product capacity configuration menu, choose "PASSCODE-1" and enter the 4-digit number. Move the cursor to "EXIT" and select "YES" to save. The new PASSCODE is now operational.

Language / Time / Date

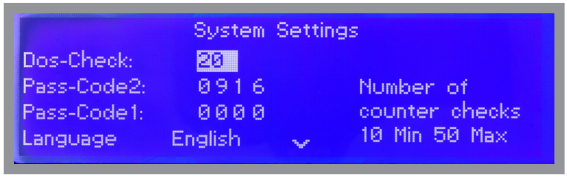
To set the display language of the instrument move the cursor to "ENGLISH/EU" (default language and metric system) and press the wheel to select. Note: when using the "ENGLISH/US" option, the units of measurement will be changed with respect to the United States. To adjust the time and/or date, move the cursor to the desired item and press the wheel to adjust the individual fields.

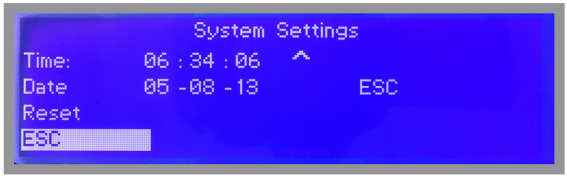
Reset

To restore the instrument to the factory settings, select this item and confirm with "YES". The instrument will restart with the initial configuration values. Note: this operation also deletes and restores the two PASSCODEs. Once restarted you must configure the instrument.

Probe (Dioxide Reading)

It is possible to enable the reading and the related alarms of the dioxide probe also for the working modes that normally do not need reading of the dioxide: COSTANT, BATCH and PROPORTIONAL + WM.

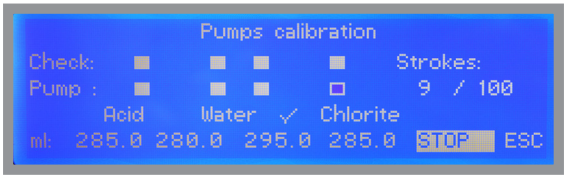


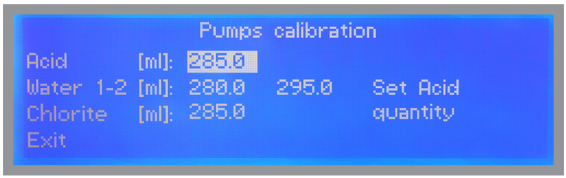


Pumps Calibration

This function allows the calibration for the dosing pump based on strokes capability. To calibrate, proceed as follows:

1. Select pump to calibrate then set strokes of the metering pump according to its capability (eg 100)
2. Place an additional suction hose in a graduated beaker and perform an initial purging using the "priming" function (main screen, "status" menu, "priming") and set procedure duration.
3. Move curson on selected pump (Acid, water or Chlorire), press wheel, select Start, then press the wheel.
4. Wait until the end of the 100 strokes
5. Measure the product in the Becker
6. Enter measured quantity in ml (ml field). The instrument calculates the cc/s that the pump is able to produce.
7. Move cursor on OK and press the wheel to save settings.





In the event of an emergency procedure can be interrupted moving cursor on Mode and selecting STOP.

SENSORS

Enter this menu by selecting "MENU'" from the main screen, enter the PASSCODE and select "SENSORS". Save the settings by selecting "ESC", then confirm the changes by moving to "YES" and pressing the wheel.

Available menus

Chlorine Dioxide probe calibration menu

Reserved to technical staff.

ECL probe selection menu

Reserved to technical staff. See page 22

Temperature calibration menu

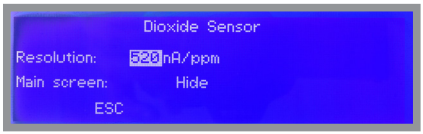
Use only if a temperature probe is installed.
See page 23

Temperature alarm menu

Options are:

HIDE or SHOW parameter into main screen

WARNING SAFETY SYSTEM



Dioxide Air Sensor menu

See page 23

Dioxide Air alarm menu

See page 23

WARNING SAFETY SYSTEM

WARNING SAFETY SYSTEM

Chlorine Dioxide Calibration & ECL Probe Selection

Before calibrating the chlorine probe (Ch3) verify that the selected model is the correct one. Select "SELECT PROBE" in the "PROBES" menu. If necessary, select the item and turn the wheel until you see the correct model of the probe. Confirm by pressing the wheel and moving the cursor to "ESC", then confirm the changes by moving to "YES" and pressing the wheel.

Probe	Scale (mg/l)
ECL 2/2	2,000mg/l ClO_2
ECL 2/20	20,00mg/l ClO_2
ECL4,5,6,7	10,00mg/l ClO_2
ECL 17/10	10,00mg/l ClO_2
None (rH only)*	999mV

*setpoints are related to Redox channel and chlorine view is disabled

Select "CHLORINE DIOXIDE" in the "SENSORS" menu to calibrate 2 points of the previously selected probe.

Attention

Attention: this procedure assumes that the instrument is configured properly and connected to a working probe, otherwise the results may not be reliable.

Calibrating the first point (P1)

- move the cursor to "P1" and press the wheel.
- install an "active carbon filter" in the probe-holder.
- let water flow into the probe-holder for 30 minutes.
- press the wheel with the cursor on "OK". Remove the filter.

Calibrating the first point (P2)

- move the cursor to "P2" and select it.
- use a photometer or DPD system to read the chlorine in the plant. Enter the value read in "Cal. at".
- press the wheel with the cursor on "OK".

If an error message is displayed repeat the calibration procedure!

Temperature Calibration

In order to complete this task, it is necessary to use a professional thermometer to take the temperature of the plant.

Warning: this procedure can be completed only if the instrument is correctly installed and the temperature probe is in good condition. Otherwise you could get unreliable results.

Take the temperature of the plant using a thermometer and enter it in the “Calib at.” field. Then press the wheel and move the cursor on “OK”. Confirm by pressing the wheel again. End by moving the cursor to “EXIT” and pressing the wheel. Then turn the wheel to select “YES” if you want to save the changes or “NO” to exit, restoring the previous values. Then press the wheel again to enforce your choice.

Temperature Alarm

Use this function to set a temperature value above which the instrument stops all activities, activates the main alarm output and generates a warning message. To set the temperature value proceed as follows:

- press on the wheel
- set the value by turning the wheel
- press the wheel and move the cursor on "ESC". Then press the wheel again to confirm ("YES") and save the setting.

Dioxide Probe

Use this function to setup sensor that detects dioxide into air. This option is useful during a plant’s dioxide leakage to prevent dangerous high dioxide concentration. To set this valure refer to the sensor sensitiveness as printed on head’s label (see below picture). **Do not edit this function if not otherwise specified or if unsure of value to enter.**

Other options are:

MAIN MENU: HIDE	to not show a warning message. Use exclusively if no sensor is connected.
MAIN MENU: SHOW	to enable warning message and related alarm on main screen. Enabled by default.

Attention

Attention: this procedure assumes that the instrument is configured properly and connected to a working sensor, otherwise the results may not be reliable.

Dioxide into air main sensor head

Dioxide into air alarm

Use this menu to set a maximum dioxide into air concentration value into environment. Don’t change this value if unsure of value to enter. **Do not edit this function if not otherwise specified.**

WATER METER

This menu allows you to set the operation mode of a pulse emitting water meter connected to the "Lotus Ultra" system. Enter this menu by selecting "MENU'" from the main screen, enter the PASSCODE and select "WATER METER". Save the settings by selecting "ESC", then confirm the changes by moving to "YES" and pressing the wheel.

Mode

This function allows you to set the display mode and to calculate the reading scale of the pulse emitting water meter connected to the "Lotus Ultra" system. The possible configurations are:

IMP/LTR (calculation based on number of pulses set in VALUE for each litre)
LTR/IMP (calculation based on number of litres set in VALUE for each pulse)
mA (calculation based on RESOLUTION and MAXFLOW)

Value

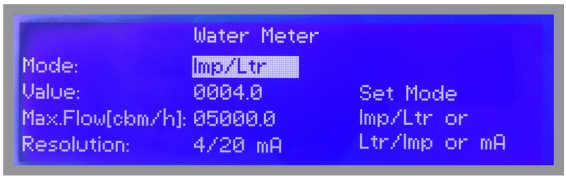
Setting the operation mode on "IMP/LTR" or "LTR/IMP" defines the number of pulses or litres necessary to complete a single unit for each pulse or litre.

Max.Flow (cbm/h) & Resolution

Set these values if you use the mA calculation method. Max Flow defines the maximum value of the flow in cbm/h (cubic meters per hour) to achieve compared with the highest resolution mode of 20mA.
Resolution determines the operation of the pulses based on the incoming signals received in 0-20mA or else 4/20mA. It is recommended to perform the calibration of this incoming signal, after having chosen the configuration type.

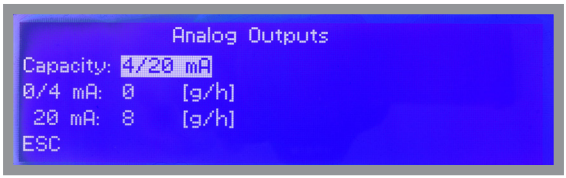
TIMEOUT

If no more pulses are received from water meter during seconds set (e.g.: 20s, max 99s) then "Lotus Ultra" system will end the dosage .



Analog Outputs

This menu allows to setup the analog outputs on mainboard: blocks 13-15 based on system capacity and 13-16 based on dioxide's probe readings.



Move cursor on capacity to set output at 0-20mA or 4/20mA. According to this enter how many grams per hour have to be at specified currunt output.

To end procedure move cursor on "OK" and press wheel to proceed to "Save" request screen. Move wheel on "YES" to save or "NO" to discard changes.

MODE SELECTION

This menu allows you to set the operation mode of the system. Enter this menu by selecting "MENU'" from the main screen, enter the PASSCODE and select "MODE SELECTION". Save the settings by selecting "ESC", then confirm the changes by moving to "YES" and pressing the wheel.
Capacity 1: Here you can adjust the production capacity for the digital input "Batch tank empty".
Capacity 2: Here you can adjust the production capacity for the digital input "Stand-by".

CONSTANT

This mode allows you to set the constant operation mode for the PUMP [pulses per minute].
The PUMP CL output (based on 180 strokes per minute) is referred to as ''Chlorine Pump" on the main board of the instrument. **Example: Set PUMP CL [P/m] to 180** The chlorine pump, when active, will dose to the maximum of its capacity (180 strokes per minute).

PRODUCTION

According to system capacity enter production value based on grams per hour. If not sure leave default value.

PROPORTIONAL (WaterMeter)

This function allows you to set the operation mode proportional to the PUMP output based on the flow detected by the pulse emitting water meter. The PUMP CL output (based on 180 strokes per minute) is referred to as "P1" on the main board of the instrument. **Example: Set PUMP CL [%] at 100 with flow at 10 m³/h.** The chlorine pump will dose to its full capacity (180 strokes per minute) for flux values greater than or equal to 10m³/h. The chlorine pump will dose at 50% of its capacity (90 strokes per minute) for values of flow reading of 5m³/h. The activity of the chlorine pump will be proportional to flux values lower than that set.

There are also two additional working modes that need to enter the SETPOINT target for dioxide: **PROPORTIONAL WM + READING CLO2** (proportional dosing based on reading of ClO_2 and flow detected by the pulse sender water meter) and **PROPORTIONAL CLO2** (dosing based on ClO_2 reading).

mA Input

This menu allows to properly calibrate the mA input module based on flow sensor readings. Note: according to settings in "Water Meter"menu it allows to calibrate 0-20mA or 4/20mA.

1) Connect a current input to the module (i.e. from a flow sensor or current generator)

2) Ensure that "cal. at." value for **P1** is the same as on module input (0 or 4 mA, not editable field)

3) Move curson on "OK" and press the wheel

4) Repeat procedure for **P2** (i.e. 20mA, editable field)

5) Move the cursor to "OK" and press the encoder. Select "SAVE" to save the settings or "NO" to cancel the changes.

6) This ends the calibration procedure

To end procedure move cursor on "OK" and press wheel to proceed to "Save" request screen. Move wheel on "YES" to save or "NO" to discard changes.

Bypass Input

This menu allows to properly set the bypass alarm system (see main board blocks for connection, input and bypass pump's relay) during a lack of water.

Modes available are:

"RESTART YES" to restart system when water is restored and after a set time (minimum 1 minute)
"RESTART NO" to not restart system when water is restored

COMMUNICATION (TCP/IP & GPRS)

This instrument can be controlled and programed remotely using the system called ERMES and a standard web browser (i.e.: Google Chrome or Safari). In order to use this service an internet connection is required (lan or wan) and user must configure the instrument to obtain a valid IP address (through a valid DHCP service or manually). If this instrument is installed within an office network please contact your system-administrator to obtain required parameters and eventually unlock TCP/IP port 2020.

Things to do before setup.

Network administrstor required

1. Ensure that on instrument MAC ADDRESS (see SERVICE menu) the TCP/IP port 2020 is unlocked. Check it with your system-administrator.

2. Connect to your ERMES account or create a new one at: **www.ermes-server.com**

3. Within ERMES account add the new instrument using the 6 digits code located into SERVICE menu. (choose LAN DEVICE or MODEM code based on connection type choosen prior to buy the instrument)

Parameters to be configured in the communication menu (TCP/IP)

In order to communicate **via LAN cable to ERMES** server the following parameters must be set:

Basic Network skills required

If configuration requires the presence of a ROUTER with automatic IP address assignment from TCP/IP menu select IP MODE and set it to DYNAMIC.

If local LAN needs to provide static IP address then from TCP/IP menu select STATIC IP MODE and enter the following parameters:

IP address: enter the unit unique available IP address using syntax xxx.xxx.xxx.xxx

SUBNET (netmask): range of belonging to the host within a subnet IP. For example: 255.255.255.0

GATEWAY: The IP address of the device that routes packets. For example: 192.168.1.1

DNS: IP address of the device that resolves the names of network nodes.
It is usually the same as the GATEWAY. It can bel also a public DNS address (e.g.: 8.8.8.8)

Parameters to be configured in the communication menu (GPRS)

In order to communicate **via GPRS modem to ERMES** server insert SIM into modem's slot the slot.
A data plan subscription is suggestes to reduce SIM costs. From GPRS menu set the following parameters:

Ermes SERVER: select YES to activate the traffic data with Ermes server or select NO to use the GPRS modem only for SMS and/or EMAIL alerts messages.

APN: ask SIM mobile company what is the name of the access point designated

APN Username & Password: ask SIM mobile company both these parameters

PIN: Enter the assigned 4 digits code to automatically unlock the SIM

COMMUNICATION (MESSAGES Setup - RS485)

This instrument can send emails and / or sms when a system failure or warning happens. If instrument is configured to operate through the LAN only email messages can be send. Otherwise if instruments has a mobile modem both SMS and emails messages can be send.

MESSAGES Setup

Within this menu is possible to setup up to three SMS (SMS1, SMS2, SMS3) recipients and two email (email 1, email 2) addresses. Editing MSG ALARM and MSG WARNING ALARM is possible to setup which type of error must be notified (see below table).

MSG warning	MSG alarm
MAXIMUM TIME REACHED	PROBE FLOW ALARM
HCl LEVEL	CHLORINE DIOXIDE IN STORAGE NO LONGER USABLE
NaClO2 LEVEL	SYSTEM NOT READY
ST.Tank Full	
SYSTEM NOT READY	

RS485 Setup

This instrument can be connected in a network of instruments via RS485 (max 32) to take advantage of a single modem or LAN connection for remote programming (through ERMES server) or local (ask your provider).

Make the cable connections as described in RS485 Block blocks (page 17) and then in the RS485 menu, set the RS485 unique ID NAME for each instrument.

CHECK if entered in ID NAME has been properly accepted by clicking on ID CHECK, if an error message is reported by the instrument modify it.

COMMUNICATION (LOGSETUP & LOGBOOK)

This function, when enabled, allows to record and send to ERMES server instrument activities for a set period (EVERY) and starting from a certain time (TIME)
.

Note: SET TIME AND DATE PRIOR TO ENABLE THE LOG. If not fed after 30 days the instrument will lose current date and time. **Local logbook records alarms only**

TIME: log starting time (format 23h 59min)

EVERY: frequency of recording (format 23h 59min)

E.g.: To set the instrument to begin logging events starting from 16:00 every hour set TOME to 16h: 00 and EVERY of 1h: 00m

Note: To view on instrument's display the archived logs select LOGBOOK

The LOTUS-controller has an internal logbook-memory. Two different types of data are stored together with a time-stamp: Operation data in periodic intervals and failure messages as soon as they appear. Turn the click-wheel to scroll forward and backwards through the logbook. Push the click-wheel on "ESC" for return to the main display.

SERVICE

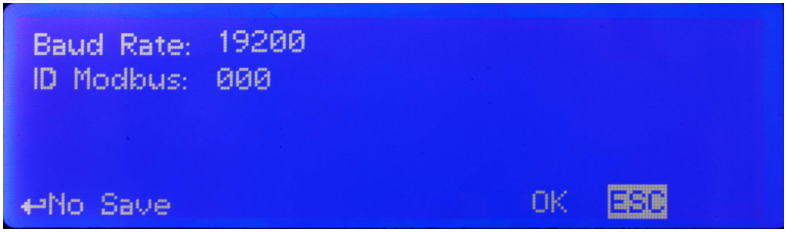
This "view only" menu shows probes reading live (mV) and instrument IDs for USB, LAN or ethernet (MAC address) connection for ERMES services. Refer to **www.ermes-server.com** for further instructions when registering the system.

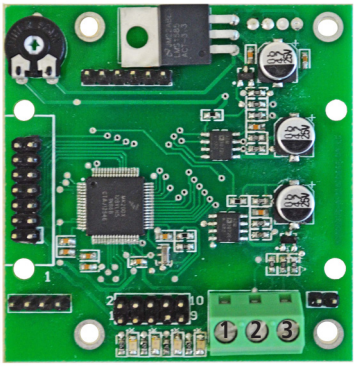
Press "ESC" to exit.

MODBUS

Modbus is a serial communications protocol originally published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs). Simple and robust, it has since become a de facto standard communication protocol, and it is now a commonly available means of connecting industrial electronic devices.

From main menu select COMMUNICATION then MODBUS to access the options. Set the communication speed according to the PLC system available. Set the ID assigning an UNIQUE address to avoid conflicts.





To access the module MODBUS open the instrument only after power is switched off!

Never make connections with the instrument powered!

WARNING

1: GND
2: A-RS485 (+)
3: B-RS485 (-)

STATUS MESSAGES

On main screen, the instrument displays the status of the dosing activities and bioxide chlorine dioxide production. See table below to better understand and solve any problems.

Message	Problem	Solution
Level Acid	One of the chemical cans or the dilution water storage tank is empty.	Change the chemical can and prime the pump.
Level Water		Check the supply line for the dilution water storage tank. Prime the pump.
Level Chlorite		Change the chemical can and prime the pump.
Reactor Leakage	**There is a massive leakage inside the reactor housing**	**Leave the room immediately and shut the door!** **Shut down the plant with emergency stop switch.** **Wear complete personal protective equipment.**
Contact Batch Tank Empty Level	The cable of the level-switch is disconnected or has a damage	Check the proper function of the level-switch.
Flow control Acid	A dosing control is recognizing lack of or no dosing.	Prime the corresponding pump. Readjust the flow-sensitivity at the dosing control.
Flow control Water		
Flow control Chlorite		
Contact SEFL Acid	A cable of the dosing control is damaged or disconnected.	
Contact SEFL Water		
Contact SEFL Chlorite		
Analog Input	The analog input signal is lower 3.5 mA.	Check the signal supply device. Check the signal cable for damages.

ERMES

The web-based application ERMES allows plants remote control: with it is possibile to read, analize and modify instruments parameters from PCs, smartphones or tablets.

PLUS

- It reduces plant intervention and inspections.
- It reports on the current status of the network's devices and connections (probes, outputs, alarms, setpoints)
- It instantly gives notification of alarms by sms or email
- It generates an up to date report of all plant instruments
- It can display the instruments activity log as line graphs and charts and it can download it to your pc in excel or pdf format

HOW TO USE WEB ERMES

Enter the website **www.ermes-server.com** and, after registration, set plants.
EMEC instruments with ETHERNET or GSM/GPRS Configuration will be immediatly connected and available for remote control. Furthermore, with ERMES you can receive alarm messages via email, with different report option on instrument status. If instrument has been bought with the GSM/GPRS option it's possible to receive SMS reports on any mobile phone.

Read "COMMUNICATION" chapters to better understand how to configure the instrument.

HAZARDS APPLICABLE TO BINKS EQUIPMENT COULD BE:

1. Pinch points: Do not reach into any pinch point area unless the equipment is completely de-energized. Pinch points are basically any area where there are moving parts. DO NOT reach under or around guards. DO NOT operate equipment without guards in place. Lockout and tag-out the equipment and all energy sources to the equipment before servicing.

2. Automatic equipment: The equipment may start suddenly without warning. DO NOT reach under or around guards. DO NOT operate equipment without guards in place. Lockout and tag-out the equipment and all energy sources to the equipment before servicing.

3. High pressure: can cause severe injury. Fluid pressure over 800 psi (55 bar) is possible. Wear proper protective equipment. Relieve all pressure before servicing. See high pressure warning else where in this manual.

4. Static Charge: fluid may develop a static charge that must be dissipated through proper grounding of the equipment and objects to be sprayed. Always connect grounding wire from air motor to earth ground. Periodically check continuity of system. See Fire and Explosion Hazard information else where in this manual.

5. Toxic fluids: can cause serious injury or death if splashed on the skin or in the eyes, or swallowed or inhaled or injected. LEARN and KNOW the specific hazards of the fluids you are using. Read all manufacturers warnings and MSDS sheets. See Toxic Fluid Hazard warning else where in this manual.

6. Injection Hazard: See Injection Hazard Information else where in this manual.

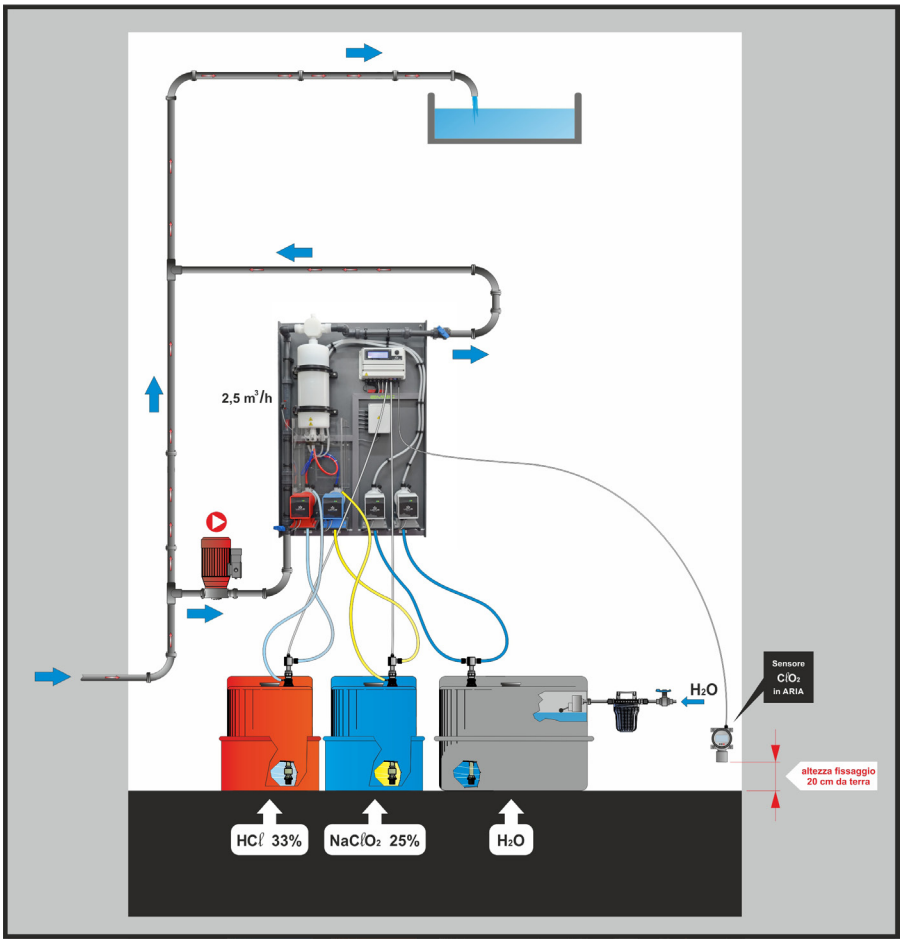
7. Heavy equipment: This system and many of its components are very heavy and difficult to handle alone. Caution should be taken while moving, assembling, disassembling, and maintaining equipment.

8. Fire and Explosion: See Fire and Explosion Hazard information in your Safety Booklet (77-5300).

9. Noise Hazard: Hearing protection may be required. You may be injured by a loud noise.

10. Projectile Hazard: You may be injured by venting liquids or gases, or flying debris.

INSTALLATION DRAW



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Information on this manual may contain technical inaccuracies or typographical errors.
The information contained may be changed at any time without prior notification or obligation.

PRECAUTIONS RELATING TO DIRECTIVES, REGULATIONS AND STANDARDS

§ CE/EU and UKCA marking

We guarantee that this product meets the essential requirements of the applicable Directives and Regulations based on the following specifications. Please carefully consider the following specifications for use of the product in European Union member countries and the United Kingdom.

• CE/EU harmonized directives and standards

Directives
DIRECTIVE 2006/42/EC
DIRECTIVE 2014/35/EU
DIRECTIVE 2014/30/EU
DIRECTIVE 2011/65/EU
DELEGATED DIRECTIVE (EU) 2015/863

Harmonized standards
EN ISO 12100
EN 809
EN ISO 20361
EN IEC 61326-1
EN 61010-1
EN IEC 63000

• UKCA harmonized regulations and standards

Regulations
2008 No. 1597
2008 2016 No. 1091
2016 No. 1101
2012 No. 3032

Harmonized standards
BS EN ISO 12100
BS EN 809
BS EN ISO 20361
BS EN IEC 61326-1
BS EN 61010-1
BS EN IEC 63000

All materials used in the construction of the instrument and for this manual can be recycled and therefore supporting the invaluable environmental resources of our planet. Do not dispose of harmful materials in the environment!
Check with the competent authority on the recycling programs for your area!