



# Vibrex Mini

Chlorine Dioxide Dosing System



Grayson Australia

TECNICA PTY LTD.

Unit 4/7-9 Newcastle Rd. Bayswater, VIC 3153

**Grayson Australia**

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**BATCH NUMBER:**

**TESTED TO 100 psi FOR LEAKS ON:**

**TESTING BY:**

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### Introduction

Effective water sanitation can be achieved through the use of Vibrex (Chlorine Dioxide). This compact system has been designed for use with the technology to provide safe and efficient means of dosing Vibrex into the customers water supply. The system works via proportional dosing based on a contact-type water meter.

The unit is designed to be flexible and easy to install; this guide will aid in installation and setup of the system. All the parts used have been sourced from high quality, well known manufacturers.

Please thoroughly read through this guide. It will explain how to correctly install the unit, how to safely mix chemicals and how to achieve optimum performance out of the system. Please only use the prescribed chemicals as Grayson does not guarantee compatibility with other chemicals. If you have any queries regarding the installation or operation of the unit, please contact us.

If you have any feedback or questions, please do not hesitate to give us call or send us an email.

### Contact details

Ph: (03) 8727 6900

Email: info@graysonaustralia.com

### Caution: Follow the guide

- Chemical usage exceeding the recommended guidelines can be hazardous and is not recommended for general water sanitation. If you wish to use the product for alternate disinfection applications please consult a Grayson staff member.
- Ensure to read the full guide prior to operation to ensure safe use of the system

### System Requirements

- Flows must not exceed 18 m<sup>3</sup>/h (18,000L/h)
- Pressure must not exceed 8 bar
- Frequent refilling of the batch solution stored in the drum may be required depending on irrigation requirements. Generally, a drum will last between 150,000L – 200,000L of irrigation water
- Outlet socket: 230 V/AC, 50/60 Hz

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## Contents

1	Overview of Equipment.....	4
1.1	Included Parts.....	4
1.2	Specifications.....	4
2	Health and Safety Information .....	5
3	Set Up and Installation .....	5
3.1	Pump Assembly .....	5
3.2	Installation.....	5
3.2.1	System Configuration.....	5
3.2.2	Determine Flow Direction for Pump .....	6
3.2.3	Plumbing .....	6
3.3	Mixture Concentration .....	7
3.4	Chemical Quantities Required.....	7
3.5	Mixing Instructions .....	7
4	Operation.....	7
4.1	Calibration .....	9
4.2	Mixture Efficacy.....	10
4.2.1	Troubleshooting .....	10
5	Measuring Chlorine Dioxide Levels (w/ CheckIt Comparator) – Sold Separately .....	11
6	System Maintenance & Repairs.....	11
6.1	Consumables .....	12
7	CheckIt Comparator Conversion Table .....	13
8	Vibrex Application Guidelines – Mix Rates.....	14

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# 1 Overview of Equipment

## 1.1 Included Parts

The following components are included as part of a

- 1) Natural coloured 220L Drum – Graduated PE. 2 x S56x4 openings
  - a. Standard tap adaptor (use with 12mm hose connector)
  - b. 2" Activated Carbon Filter
- 2) Brass Inlet/Outlet – DN40 (1½")
- 3) MAGDOS LD 6 Solenoid dosing pump, PVDF/FPM head
  - a. PVDF Injection Nozzle 4x6mm
  - b. Dosing tube - 4x6 mm PTFE tubing
- 4) Contact Water Flowmeter - Pulse
- 5) PVDF Suction Line, SL-2, w/float switch

### Sold Separately

- 1) Chlorine Dioxide (ClO<sub>2</sub>) Lo-Range Test Kit and Conversion Chart – Including 30 DPD No. 1 Tablets.
- 2) Chlorine Dioxide (ClO<sub>2</sub>) P15 Plus Photometer 0.02 to 11 ppm, Includes DPD tablets  
Note: Additional DPD1 tablets can be sourced in 100 & 500 tablet packages from Grayson Australia.

## 1.2 Specifications

Maximum Delivery Pressure	115 psi (8 bar)
Maximum Irrigation Flow rate	18 m <sup>3</sup> /h (18,000 L/h)
Pump Output	Up to 6.8l/h <sup>1</sup>
Pulse Sequence	1-10l/pulse
Chemical Storage Vessel Size	220L
Maximum Storage Period	1 month <sup>2</sup>
Protection Class	IP65
Interlock Setting	Active level input w/early warning & main alarm
Quality Control	Mechanically & Electronically tested

<sup>1</sup>At average backpressure (4 bar)

<sup>2</sup>Under controlled conditions. Excessive temperatures or light may reduce life-span of chemical.

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## **2 Health and Safety Information**

The chemicals used to make up the batch solution, like all chemicals, are potentially dangerous if mishandled. It is recommended to use chemically impervious gloves and wear safety glasses when handling the raw chemicals. Chemicals should be stored in a safe location and must adhere to all WorkSafe requirements. SDS documents are included with the chemical purchase should a loss of containment occur. It's recommended to consult these documents prior to use for a comprehensive understanding of the associated hazards.

All measures have been taken to ensure the system is safe to use & operate, however Grayson Australia still recommends the activated solution be kept out of reach from children and animals to minimise risk. It should not be disposed into the environment unless diluted to a safe level. An Activated Carbon filter has been fitted to prevent fumes from evolving into the atmosphere however it is possible minute volumes of gas may still be produced. Keep system in a well-ventilated area and use appropriate respiratory equipment when handling chemicals. If any symptoms arise from the use of Vibrex (Chlorine Dioxide) please seek medical assistance.

## **3 Set Up and Installation**

### **3.1 Pump Assembly**

The dosing unit comes partially disassembled for ease of packing and installation. Depending on your installation you may wish to fully assemble the system after connecting the system into the main line.

There are three main components that must be connected.

- 1) Magdomat In-line Pump Assembly
- 2) PE 220L Tight head Drum
- 3) Suction Assembly w/float switch & tubing

On the programmable face of the pump, remove the threaded cap for the 4-pin connector on the top left and rubber insulation inside. Connect the float switch cable to the respective 4-pin connector.

### **3.2 Installation**

#### **3.2.1 System Configuration**

The Vibrex Mini can be located in various configurations depending on the irrigation system. There are two main locations that will affect the chemical contact time and average chemical consumption.

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**Contact Time** - The time the chemical has to contact the microbes and disinfect the water. The time between Vibrex (Chlorine Dioxide) injection and the outlet (eg sprinkler, dripper etc) will affect how well the biocide kills free organisms in the water.

**Chemical Consumption** - Fluctuating water usage will affect the rates you will dose your chemicals. If there is a holding point (eg tank) in your irrigation system after your injection point, the residence time will be affected by water usage which will require dosing adjustments to account for residence time.

- **Prior to holding tank**

Installation prior to a storage tank is preferable as this generally allows for increased contact times between the activated solution and the water. Please note, fluctuations in water usage over the course of the year may necessitate recalibration if this method is employed.

- **In-line Irrigation**

Dosing directly into the irrigation grid is also possible however the overall contact time can suffer. Please note that reduced contact time lower kill rates on free organisms in the water stream but will generally not affect biofilm eradication.

Once the injection point has been determined ensure there is adequate space for the chemical drum to be placed in the vicinity on a flat surface in a well-ventilated area and proceed to installation of the dosing pump.

### **3.2.2 Determine Flow Direction for Pump**

It is critical that the flow direction through the pump is correct and incoming water is on the inlet side while chemical injection takes place on the outlet side. This is indicated via an arrow on the side of the flowmeter.

### **3.2.3 Plumbing**

The 1½" brass fitting (Male) will need to be plumbed into both sides of the irrigation line at the designated injection point. This will require the relevant adaptors to accommodate the change in pipe size to DN40. These should be readily available from any standard irrigation supplier (either hose-tail arrangements or hard plumbed PVC sockets). Ensure fittings are built to withstand irrigation pressures. These do not need to be chemical resistant as the chemical is diluted prior to contact. Ensure appropriate thread sealant/tape is employed to prevent leaks.

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### 3.3 Mixture Concentration

We recommended making a solution of approximately **1000pm ClO<sub>2</sub>**. At this concentration the solution will last for approximately **150,000L – 200,000L** of irrigation water while maintain stability and efficacy for up to a month without refilling. Bear this in mind for requirements to refill the drum as more irrigation water is used. Below is an outline of how to make up the required solution. Please take note of all the safety precautions as ClO<sub>2</sub> gas can be formed at this stage.

### 3.4 Chemical Quantities Required

Requirements: Vibrex M12 Activator 20L & Vibrex Horticare 20L

For the included 220L batch tight-head drum, 10L of each solution will suffice to produce a 1000 ppm solution when diluted to fill with water. Please follow the below mixing instructions to ensure accurate and safe mixing and activation of the solution.

### 3.5 Mixing Instructions

It is important to wear safety glasses and adequate chemical resistant gloves when using the chemicals. Please follow all safety instructions outlined in the SDS included with the supplied chemicals (also available upon request).

Before mixing commences ensure the pump is OFF. Undo the hose fitting on the 200L drum and check the drum is below the minimum level (indicated by the external marking).

Add 10L of both Vibrex Horticare and Vibrex M12 Activator into the open fitting, immediately replace the cap. Leave the solution to react over a period of 10-15 minutes. After time has passed promptly remove the cap, replace the hose fitting on the drum and connect a standard hose to it to begin filling the drum with water until it reaches the marked line (200L). **Do not fill above this line.**

At this stage the solution is now pre-mixed and ready to use.


Turn on the pump via the outlet and run water through your irrigation line to ensure the pump and flowmeter are working correctly.

## 4 Operation

Follow the below instructions to begin operating the dosing pump. Note: It is recommended to use water initially through the pump to ensure correct operation. When dosing via the flowmeter the pump will need to be in the **External** Operating mode



### 11.2.1.1 Selecting the operating mode

- ➔ Press the **Int** key to select the operating mode.
- ▶ The dosing pump displays the start screen of the *Intern* operating mode with the symbol .

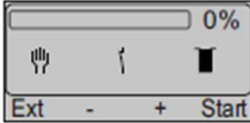
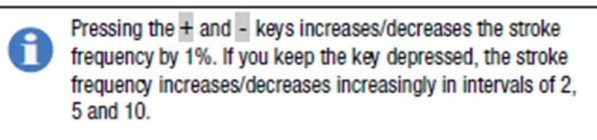


Fig. 11-2: Start display internal operation

### 11.2.1.2 Starting the dosing pump

1. Use the **+** and **-** keys to set the desired stroke frequency. Adjustment range: 0 – 100%



2. Press **Start**.

✓ **Dosing pump has started.**

### 11.2.1.3 Stopping the dosing pump


- ➔ Press **Stop**.
- ▶ The system displays the "Stop" signal and **Stop** changes to **Start**.

✓ **Dosing pump has stopped.**

## 11.2.2 External operation

The stroke frequency and consequently the delivery capacity of the dosing pump MAGDOS LDp in the *External* operating mode is determined by the quantity and interval of the incoming pulses in connection with the set transmission factor.

### 11.2.2.1 Selecting the operating mode

- ➔ Press **Ext** to start the device.
- ▶ The dosing pump displays the start screen of the *Extern* operating mode with the symbol .

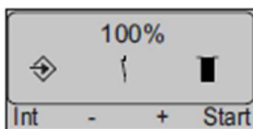


Fig. 11-3: Start display external operation

## 4.1 Calibration

Calibration involves a number of factors and is best conducted in conjunction with a ClO<sub>2</sub> Test Kit to trial increased rates until the desired residual has been reached. Typically, this resides between **0.2-0.3 mg/L (ppm)** for irrigation water treatment (see Sect.8 for alternative applications).

### 11.2.2.2 Setting the transmission and reduction

The transmission and reduction factors can be set in 1% intervals of 1% to 1000%. A set value of 100% means that the dosing pump executes one dosing stroke per incoming pulse signal. For values above 100%, the dosing pump executes more dosing strokes per pulse signal accordingly.

For values below 100%, the dosing pump executes less than one dosing stroke per pulse signal, meaning that several pulse signals are required before a dosing stroke is executed.

The number of pulse signals required for a dosing stroke is displayed on the dosing pump display for values below 100 %.

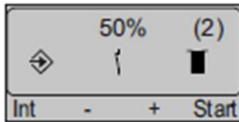


Fig. 11-4: Number of pulse signals required (here: 2)

Examples for transmission / reduction

Number of pulses	Setting	Dosing strokes
4	25%	1
2	50%	1
1	100%	1
2	100%	2
4	125%	5
1	1000%	10

Table 11-1: Examples for transmission / reduction of pulse signals

Increase the transmission factor and measure the discharge water for the Chlorine Dioxide residual to evaluate whether it resides in the desired range. Keep repeating this until the reading is within range. Ensure the ClO<sub>2</sub> has time to reach steady state – e.g. for a holding tank this may take several hours depending on the throughput.

Note the obtained residual will be affected by the water quality, contact/residence time or mixture discrepancies and can be subject to fluctuation over long periods of time. Consistent checks are recommended to maintain desired concentration.

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## 4.2 Mixture Efficacy

The 200L mixture will usually treat between 150,000L – 200,000L of throughput volume. Consistent monitoring of the solution is recommended to ensure drum is refilled regularly. If the solution runs dry – the interlock will switch off the pump to avoid pumping dry. If no water is treated for a prolonged period the drum will still retain its efficacy for up to a **single month**. After which the solution will have substantially degraded.

### 4.2.1 Troubleshooting

Please consult the below list if any issues arise with the system. If the issue persists or isn't listed below please contact Grayson Australia for further assistance.

Symptoms	Problem	Solution
Leaks in Tubing/Fittings	<ul style="list-style-type: none"><li>- Degradation of gaskets</li><li>- Loose fittings</li><li>- Tubing Degradation</li></ul>	<ul style="list-style-type: none"><li>- Checks seals and fitment</li><li>- Check integrity (also check for discolouration) of tubing, replace if necessary</li></ul>
Fumes evolving from drum/Carbon filter	<ul style="list-style-type: none"><li>- Loose seal/fittings</li><li>- Fumes aren't being scrubbed correctly</li></ul>	<ul style="list-style-type: none"><li>- Check seals/fittings</li><li>- Ensure mixture concentration is at specified levels</li><li>- Replace Carbon filling in filter housing</li></ul>
Fluctuating residual concentration	<ul style="list-style-type: none"><li>- Pump Efficiency decreased</li><li>- Water Quality fluctuations</li><li>- Holding time fluctuations</li><li>- Diaphragm has delaminated</li></ul>	<ul style="list-style-type: none"><li>- Check transmission settings on pump, adjust accordingly</li><li>- Replace diaphragm if necessary</li></ul>
Pump not priming correctly	<ul style="list-style-type: none"><li>- Bleed valve is blocked</li><li>- Diaphragm has delaminated</li><li>- Tubing is blocked upstream</li><li>- Deposits on pumps valves</li></ul>	<ul style="list-style-type: none"><li>- Pump diaphragm may need replacing</li><li>- Valves may need to be cleaned/replaced</li><li>- Ensure bleed is clear and opened</li><li>- Check tubing is clear</li></ul>
Air in tubing/pump	<ul style="list-style-type: none"><li>- Leak in tubing</li><li>- Loose fittings/seal</li><li>- Drum has run empty/Interlock failing</li></ul>	<ul style="list-style-type: none"><li>- Check all fittings/seals</li><li>- Check drum has sufficient solution – replace if level is low</li><li>- Check float switch is still mobile</li></ul>

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## 5 Measuring Chlorine Dioxide Levels (w/ CheckIt Comparator) – Sold Separately

Using the CheckIt Comparator, DPD1 tablets and the conversion chart you can quickly determine the chlorine dioxide residuals in your water. A spare conversion chart is at the rear of this manual (Sect. 7). Please note that treated samples should be observed at the furthest discharge point to ensure there is adequate residual distributed throughout the system. Photometer test kits are also available for Chlorine Dioxide testing (Contact us for further information).

1. Collect 10mL of treated water (to the upper most raised line on vial) in both vials in the kit
2. Without adding anything to one vial, place it in the left opening above the already coloured window with frosted dot facing forwards.
3. With the second vial, add 1 DPD1 tablet and crush with the pre-cleaned rod. Stir (or shake with cap on) until dissolved. Do not touch tablet or contact solution with skin as this will affect the result.
4. When the tablet has completely dissolved place in the right window with frosted dot facing forwards.
5. Remove the caps and aim vials diagonally to a light source such as the sun.
6. Rotate the colour wheel on the right side until a colour match occurs in the windows.
7. Read the number and use the included chart to convert the Comparator reading (left column) to concentration (middle column). Advice on the concentration is given (right column) so appropriate adjustments can be made.

## 6 System Maintenance & Repairs

Few parts need to be monitored over time as they are mechanically wearing parts and will need to be maintained accordingly.

Maintenance parts are listed below with their respective lifespans. Grayson Australia is able to facilitate replacement of these parts for an additional fee.

Parts	Lifespan
PTFE/PVC tubing	Replace as necessary
Pump Service Kits <ul style="list-style-type: none"><li>- Suction/Discharge Valves</li><li>- Diaphragms/Safety Diaphragms</li></ul>	Recommended replacement every 24 months
PVDF Injection Nozzle	Recommended replacement every 24 months

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Other parts may be susceptible to degradation under environmental conditions. Most of the parts are serviceable or can be swapped out relatively simply. Please contact Grayson Australia for more information.

## 6.1 Consumables

### Recommended Consumables

Product	Pack Sizes
Vibrex M12 Activator	20L, 200L
Vibrex Horticare	20L, 200L

Contact Grayson Australia for you nearest Distributor.

### Tablets

Additional DPD1 tablets can also be sourced in 100 & 500 tablet packages from Grayson Australia.

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**7 Checkit Comparator Conversion Table**

<b>Conversion Table CHECKIT Comparator to PPM Chlorine Dioxide</b>		
<b>Instructions:</b> Fill both vials to the 10 mL mark. In one vial add a DPD1 tablet. Using the white rod crush the tablet until completely dissolved. Facing the front of the comparator with wheel numbers visible put the sample without tablet in the left opening and the sample with a tablet in the right. Holding the comparator to a light source without the rubber caps on the vials rotate the wheel until a colour match occurs in the two windows. Stop rotating the wheel and match the number on the wheel with the left column below to determine the concentration and result.		
<b>Reading on Wheel</b>	<b>Concentration ClO<sub>2</sub> (ppm)</b>	<b>Result</b>
0.02	0.04	UNDERDOSE
0.04	0.08	UNDERDOSE
0.06	0.11	LOW
0.08	0.15	LOW
0.1	0.19	OK
0.12	0.23	GOOD
0.14	0.27	GOOD
0.16	0.30	GOOD
0.18	0.34	TOO HIGH
0.2	0.38	TOO HIGH
0.22	0.42	OVERDOSE
0.24	0.46	OVERDOSE
0.26	0.49	OVERDOSE
0.28	0.53	OVERDOSE
0.3	0.57	OVERDOSE

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## 8 Vibrex Application Guidelines – Mix Rates

### Application Guidelines - Horticare: 20,000ppm

Nurseries/Hydroponics						
Process	Sanitation		Disinfection	Foliar Disease Control	Biofilm & Water Pathogen Treatment	
Application	Trays, pots, media, benches	Equipment & Vehicles	Glasshouse disinfection	Regular bacterial, fungal or viral control program	Biofilm removal	Irrigation water treatment
Available ClO <sub>2</sub> Concentration	100-200ppm*		400-500ppm*	20-50ppm*	1-2ppm	
Volume per 100L	500ml-1000ml		2.0-2.5L	100-250ml	5.0-10ml	
Activating Acid	M12		M12	M12	M12	
Fruit and Vegetable Processing						
Process	Sanitation	Disinfection	Foliar Disease Control		Water Pathogen Treatment	
Application	Hard surfaces, equipment and vehicles	Coolroom Disinfection	Post harvest wash (herbs, less hardy species)	Post harvest wash (vegetables, fruit, hardier species)	Irrigation water treatment	
Available ClO <sub>2</sub> Concentration	100-200ppm*	400-500ppm*	2-3ppm*	1-3ppm*	1-2ppm	
Volume per 100L	500ml-1000ml	2.0-2.5L	10-15ml	5.0-15ml	5.0-10ml	
Activating Acid	M12	M12	M12	M12	M12	
Drinking Water						
Process	Water Pathogen Treatment					
Application	Drinking water treatment	Biofilm Removal				
Available ClO <sub>2</sub> Concentration	1-2ppm*					
Volume per 100L	5.0-10ml					
Activating Acid	M12					

\*For M12 or P6 activated solutions please add additional Activator until desired free residual concentration is reached



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