

ORP-XX Series

ORP Control Box

Installation & Operations Manual



DEL ozone™
advanced sanitation solutions

EPA Estab. No. 071472-CA-001

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🌐 www.delozone.com

IMPORTANT SAFETY INSTRUCTIONS

READ AND FOLLOW ALL INSTRUCTIONS

- Read and understand instruction manual before using this product.
- Electric shock hazard. Be sure to disconnect from power source before installation or maintenance is performed. Failure to do so could result in serious injury or death.
- Hazardous voltage may still be present inside product when the main power cord is disconnected.
- Wiring connections to this product should only be performed by qualified personnel and follow all applicable electrical codes.
- This product is designed to be connected to equipment, which can be hazardous to persons and property if connected or used incorrectly. Read and understand all associated equipment manuals and safety warnings before using this product.
- Do not exceed published specifications in the use of this product.
- This product should be mounted in a clean, protected area, which is not accessible to the public. Indoor mounting is preferable. For outdoor installation, first ensure that the year round climate is within the environmental specifications of the product and, if so, mount it out of direct sunlight.
- In case of power loss to this product:
 - The ozone dosing contacts will open
 - The 4-20mA signal outputs will go to 0mA
- In case of ORP signal loss to this product (ORP probe disconnected or failed):
 - The ozone dosing contacts and 4-20mA signal outputs will function as normal to erroneous measurement
- This product is factory configured with 800mV ORP setpoint(s) and 650mV low alarm setpoint(s). Before use, adjust these as required for your particular process.

SAVE THESE INSTRUCTIONS!

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SECTION 1 General Information

1A. Description

The DEL Ozone ORP-XX Series ORP Control Box is a flexible and comprehensive ORP control solution. This product comes standard with ORP probe, cable, and is housed in a NEMA 4X enclosure for simple installation and integration with your process. It features easy to read back lit LCD(s) and push button keys, which allows for editing the numerous features and settings available to be custom tailored to a wide variety of applications. Control contacts are conveniently located to allow direct connection to ozone generating equipment and/or to more advanced central control systems.

1B. Specifications

Refer to Appendix A: Product Specifications for complete ORP Control Box specifications by model number.

SECTION 2 Installation

2A. Location

The DEL Ozone ORP-XX Series ORP Control Box (hereafter called product) is designed for wall mounting. Mount the product in a clean, protected area, which allows for visibility of the readout and sufficient access for maintenance. Locate the product so that the factory 50' (15m) ORP cable reaches the ORP probe installation point (both in the case of dual ORP models).

Models ORP-11 & ORP-21: These models also must be mounted within reach of the ozone generating equipment power cord, which will be connected to the product.

Models ORP-13 & ORP-23: These models also must be mounted so that the factory 50' (15m) signal cable will reach the proportionally controlled ozone generating equipment (e.g. ozone generator).

2B. Wall Mounting

Refer to Appendix A: Product Specifications for complete mounting dimensions by model number.

1. Locate the top two mounting bracket holes.
2. Remove the terminal access cover to locate the bottom two mounting slots.
3. Install the four included #8 x 3/4" L sheet metal screws (or other hardware appropriate to mounting surface) through the four mounting hole/slot locations until the product is securely mounted.
4. Reinstall terminal access cover.

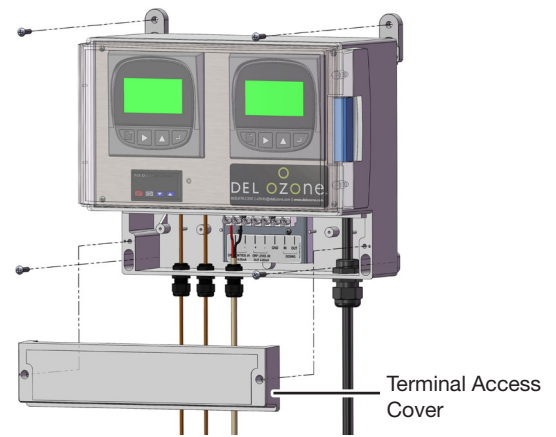


Figure 1: Wall Mounting

2C. Electrical

Refer to Appendix A: Product Specifications for complete electrical connection specifications by model number.

1. Input Power

The product comes prewired and outfitted with a power cord for input power connection to a standard AC power NEMA 5-15 receptacle.

The plug end of the product power cord can be removed and replaced as required for connection to other AC power sources. **Ensure that the alternate AC power source is within the product input power specifications** and wire the power cord black wire to Line (or Line 1), white wire to Neutral (or Line 2), and green wire to Ground.

2. Ozone Control Output

Remove the terminal access cover to locate the field wiring terminal block. Refer to Figure 1 and Figure 9 for details.

Models ORP-11 & ORP-21: These products switch complete AC power by direct connection to the ozone generating equipment power cord. **Ensure that the connected ozone generating equipment power rating is within the product ozone output control electrical specifications and matches product input AC power.** Remove the plug from the end of the power cord on the ozone generating equipment, and route the power cord through the installed but unused product strain relief. Connect the power cord wiring to the field wiring terminal block at AC POWER OUT positions. Tighten strain relief to power cord.

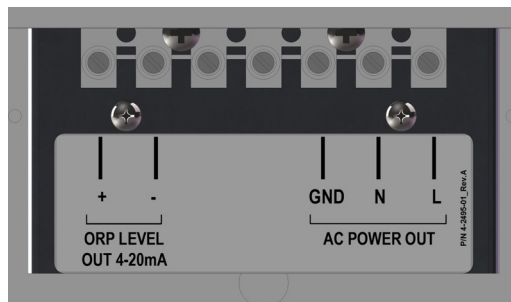


Figure 2: Field Wiring Terminal Block, ORP-11

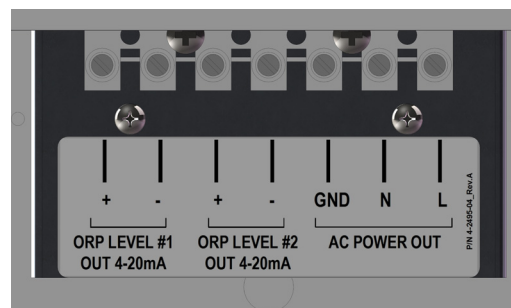


Figure 3: Field Wiring Terminal Block, ORP-21

Models ORP-12 & ORP-22: These products switch a two-wire connection to ozone generating equipment. **Ensure that the electrical load of the switched connection in the ozone generating equipment is within the product ozone output control electrical specifications.** Carefully drill the bottom of the product enclosure for preferred cable and strain relief or for wires and wiring conduit (not included). Connect unpowered wiring to the field wiring terminal block DOSING positions.

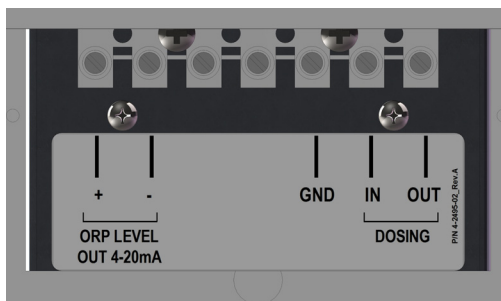


Figure 4: Field Wiring Terminal Block, ORP-12

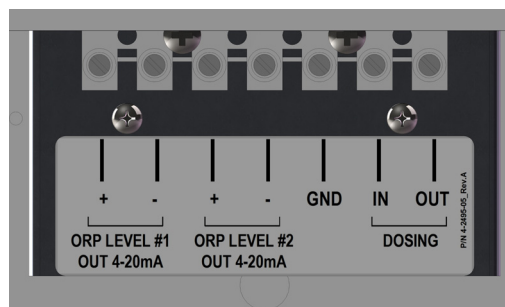


Figure 5: Field Wiring Terminal Block, ORP-22

Models ORP-13 & ORP-23: These products are for proportional control of ozone generating equipment though a 4-20mA analog signal from the installed process controller. They are prewired to the field wiring terminal block ORP CONTROL positions and outfitted with a 50' (15m) shielded twisted pair cable. Ensure that the ozone generating equipment analog input load resistance is less than 600Ω (all DEL Ozone proportionally controlled products are compatible) and connect the signal cable red wire to + and the black wire to -. For optional use, these products also switch a two-wire connection as described above under Models ORP-12 & ORP-22. It may be beneficial to utilize this optional connection when limit type control is also desired.

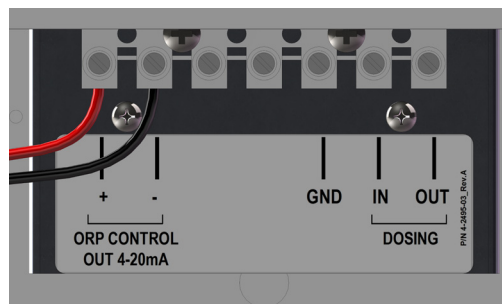


Figure 6: Field Wiring Terminal Block, ORP-13

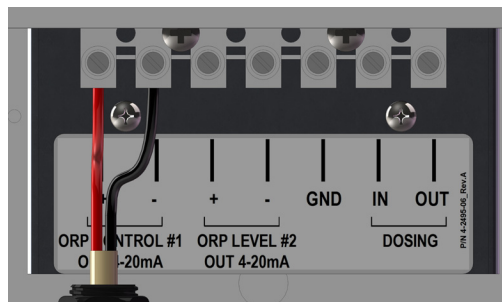


Figure 7: Field Wiring Terminal Block, ORP-23

3. ORP Level Output

Most models provide configurable 4-20mA analog signal output for ORP level (the exception to this is Model ORP-13, which sends this signal to the installed process controller). Ensure that the connected equipment analog input load resistance is less than 500Ω. Carefully drill the bottom of the product enclosure for preferred cable and strain relief or wire and wiring conduit (not included). Connect wiring to the field wiring terminal block ORP LEVEL positions.

Reinstall the terminal access cover.

4. ORP Signal Cable

The product comes prewired and outfitted with a 50' (15m) coaxial cable and BNC connector for ORP probe signal (two in the case of dual ORP models). ORP signal cable length is factory set and should not be shortened or extended. Contact DEL Customer Service for more information and options if the factory length will not work.

1. Route ORP signal cable to ORP probe location.
2. Secure the ORP signal cable away from surfaces that may cause damage (hot, sharp, vibrating, etc.) and from sources of electrical noise (AC wiring, fans, motors, etc.). If routing the ORP signal cable through a conduit is desired, it can be disconnected from the ORP controller, routed through the conduit, and then reconnected. Remove front panel to access connections.
3. Connect ORP signal cable to ORP probe.
4. Repeat process for second ORP signal cable (optional item).

2D. ORP Probe Installation

Refer to Appendix A: Product Specifications for complete ORP probe specifications.

1. Prior to installation, the ORP probe calibration should be checked. Refer to **SECTION 5A. Calibration** for details.
2. Apply PTFE tape to the ORP probe pipe threads on the sensor end.
3. Select a mounting location that positions the ORP probe vertically ($\pm 30^\circ$) and ensures continuous contact with the measured solution. Failure to do so may limit the life of the ORP probe and will not be covered under warranty. For mounting, calibration, and cleaning of the ORP probe, allow approximately 18" (46cm) of clearance. If a suitable mounting location cannot be found, it is recommended to use a separate flow cell.
4. Install ORP probe into pipe or fitting hand tight only; do not use a wrench or damage may result.
5. Connect ORP probe to ORP signal cable.
6. Repeat process for second ORP probe (optional item).

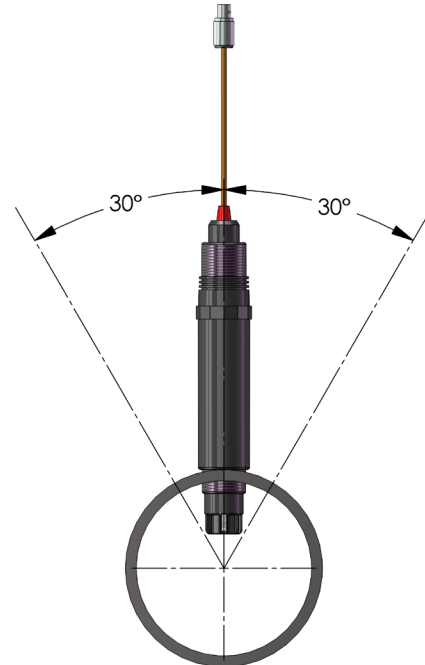


Figure 8: ORP Probe Installation

SECTION 3 System Overview

3A. System Overview Diagrams

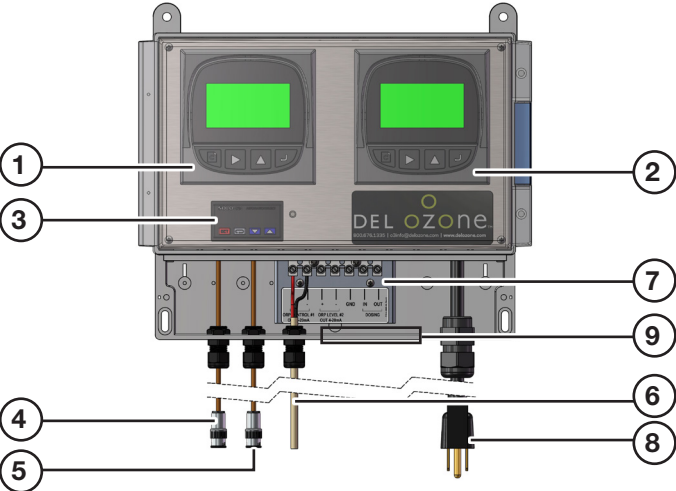


Figure 9: ORP Control Box (ORP-23 model shown without terminal access cover for clarity)

1	Main ORP Controller
2	Second ORP Controller (optional item)
3	Process Controller (optional item)
4	Main ORP Signal Cable
5	Second ORP Cable (optional item)
6	Ozone Output Analog Signal Cable (optional item)
7	Field Wiring Terminal Block
8	Input Power Cord
9	Recommended Drilling Location for Strain Reliefs or Wiring Conduits (not included)

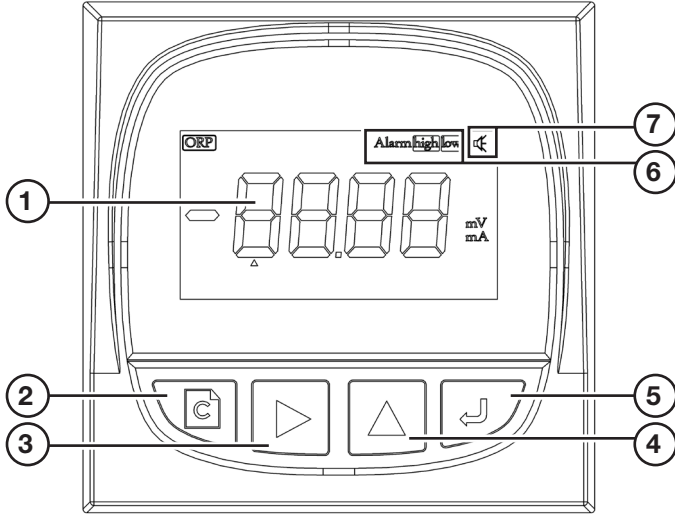


Figure 10: ORP Controller

1	ORP Display (mV)
2	Set Button (enter settings menu)
3	Select Button (select character position)
4	Add Button (adjust character value)
5	Enter Button (confirmation of setting)
6	Alarm Status Indicators
7	Audible Alarm Indicator

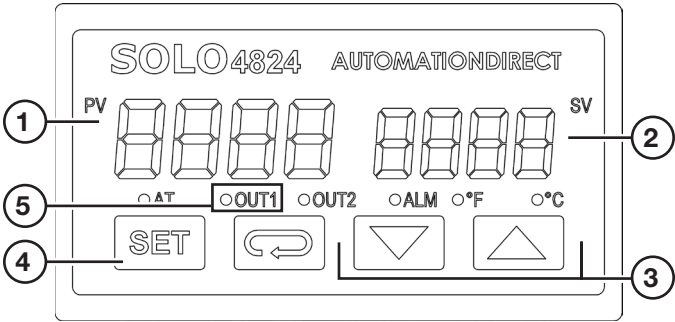
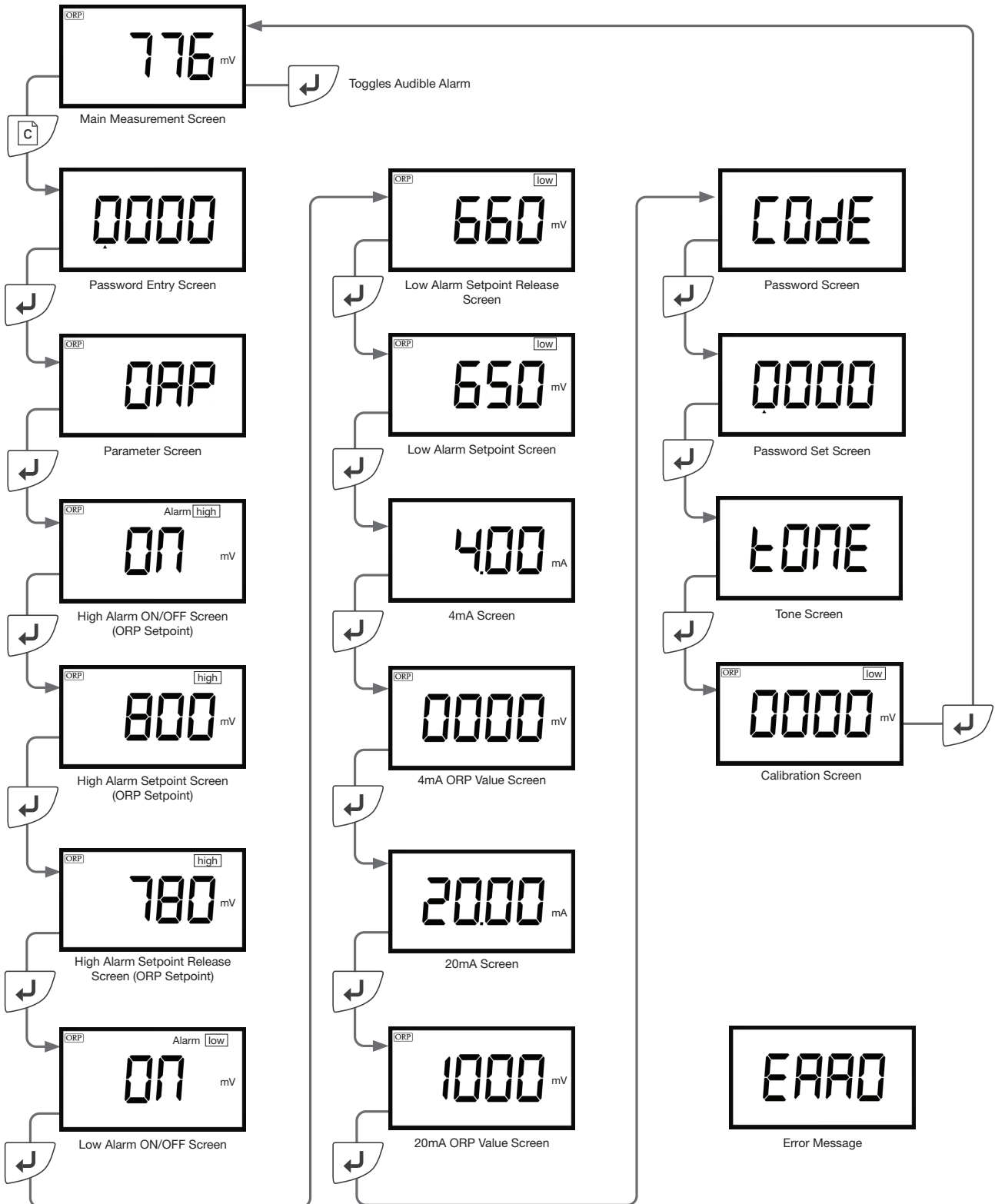


Figure 11: Process Controller (optional item)

1	ORP Display (mV)
2	Setpoint Display (mV)
3	Setpoint Adjust Buttons
4	Setpoint Confirmation Button
5	Output Indicator (blinks proportional to output percentage, solid green = 100% power, no light = 0% power)

3B. ORP Controller Menu & Settings

Follow arrow pattern. After the Password Entry Screen, the enter button (↵) leads to next screen. If an error occurs, the Error Message at the bottom right side of this diagram will display.



SECTION 4 Operation

4A. ORP Overview

The Oxidation Reduction Potential (ORP) controller is designed to provide a reading that is expressed in millivolts (mV). A range of -1000mV to 1000mV is common with most ORP instruments used in the industry. ORP measures the total activity of a solution in mV, or the total reducing or oxidizing activities in a given solution. This method is useful for monitoring or controlling chemical addition of oxidizing or reducing agents. Oxidizing agents include ozone, chlorine, and bromine. Reducing agents include cyanide and sodium bisulfite or metabisulfite.

An ORP sensing electrode employs a noble metal, such as platinum, to sense total electron transfer in oxidizing or reducing reactions, or, more simply, if a chemical mix has more oxidizers or reducers in it. Platinum is usually the metal of choice for the sensing electrode, however, gold and other noble metals can be used depending on application requirements. The ORP potential generated at the sensing electrode varies as the chemicals in the solution change. This signal is compared to that of the reference electrode, one so constructed that its potential remains constant even when the chemicals in the solution change. The most commonly used reference electrode is a silver or silver chloride (Ag/AgCl) type. The sensing and reference electrodes are contained in the ORP probe.

4B. Main ORP Setpoint Adjustment

Models ORP-11, ORP-12, ORP-21, and ORP-22:

1. On the ORP controller main measurement screen, press C, enter password (default is 0000), and then press Enter.
2. Press Enter repeatedly until "on" is displayed and "Alarm high" flashes and press Enter.
3. Enter the new ORP setpoint (default is 800mV) and then press Enter.
4. Enter the new ORP setpoint release (default is 780mV) and press Enter.
NOTE: To avoid relay chatter and over-active cycling of the ozone generating equipment, it is important to maintain at least a 20mV difference between the ORP setpoint and ORP setpoint release.
5. Allow the screen to return to the main measurement screen (40 seconds of inactivity).

6. Repeat process for second ORP controller (optional item).

NOTE: Main ORP setpoint can be different for the second ORP controller. ORP controller contacts are wired in series with each other so if either setpoint is reached, the connected ozone generator, for example, will stop production.

On these models, the main ORP setpoint control is handled by the ORP controller high alarm contacts and a relay. This is on-off type control. The following graph shows the relationship of the control output to relay setpoints.

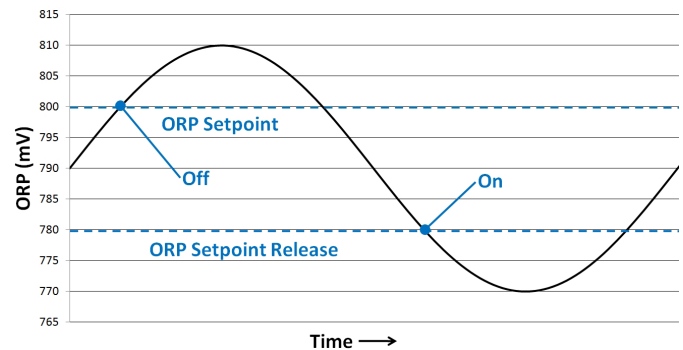


Figure 12: ORP Setpoints and Control

Models ORP-13 and ORP-23:

1. On the process controller, use the Up or Down buttons to enter the new ORP setpoint (default is 800mV).
2. Press Set to save the value.
3. When optional limit type control is also desired and connected, follow the previous section instructions to setup ORP controller limit setpoints.

On these models, the main ORP setpoint is controlled by the process controller. The process controller receives the ORP value from the main ORP controller through a 4-20mA analog signal. Small differences in ORP display values between the process controller and the main ORP controller are normal and are due to rounding errors — it will not affect the performance of the product. Output to the ozone generating equipment from the process controller is also a 4-20mA analog signal. This forms a precise, closed-loop control system that is generally more effective than on-off type control. The process controller includes many advanced settings, including an auto-tune function, to achieve ORP control in a wide variety of applications.

For more details, refer to the process controller manual, which may be downloaded at: <https://cdn.automationdirect.com/static/manuals/solocontrolm/solocontrolm.html>

NOTE: Closed-loop tuning (the selection of PID values) typically needs to be performed by qualified personnel to the specific process and is beyond the scope of this document. For reference, default values for this product are P = 47.6, I = 260, D = 41.

4C. Low Alarm Setpoint

1. On the ORP controller main measurement screen, press C, enter password (default is 0000), and press Enter.
2. Press Enter repeatedly until “on” is displayed and “Alarm low” flashes and then press Enter.
3. Enter the new alarm setpoint release (default is 660mV) and press Enter.
4. Enter the new alarm setpoint (default is 650mV) and press Enter.
5. Allow the screen to return to the main measurement screen (40 seconds of inactivity).
6. Repeat process for second ORP controller (optional item).
NOTE: Low alarm setpoint can be different for the second ORP controller. ORP controller alarms are independent of each other.

4D. Password

The ORP controller includes password protection to prevent unauthorized adjustment of settings. The default password is 0000, but can be adjusted by the user.

1. On the ORP controller main measurement screen, press C, enter password (default is 0000), and press Enter.
2. Press Enter repeatedly until “COdE” is displayed and press Enter.
3. Enter the new password and press Enter.
4. Allow the screen to return to the main measurement screen (40 seconds of inactivity).
5. Repeat process for second ORP controller (optional item).
NOTE: In the event of a forgotten password, the ORP controller menu can be accessed to set a new password by entering the factory password of 7571.

4E. Audible Alarm

The ORP controller includes an audible alarm setting that is factory disabled. When enabled, the upper right corner of the ORP controller display will show the speaker icon and will beep when the ORP value is above the main ORP setpoint (typically not desired) or below the low alarm setpoint. To toggle the audible alarm, press the Enter button on the ORP controller main measurement screen.

SECTION 5 Maintenance & Service

5A. Calibration

The ORP controller is factory calibrated and periodic calibration of the instrument is not normally required. However, measurement error can occur due to ORP probe variance as a result of aging, contamination, or coatings. Therefore, the ORP controller provides an adjustable offset to match with the ORP probe sensitivity. ORP probe calibration should be performed regularly, and always after installing a new ORP probe or performing ORP probe cleaning.

1. Identify the ORP probe calibration value:
 - a. Immerse connected ORP probe sensor end in ORP solution/mV standard.
 - b. Shake ORP probe briefly and wait for the reading on the connected ORP controller to stabilize.
 - c. Compare ORP controller and ORP solution/mV standard value range. If outside of the range, proceed with the remaining steps.
2. On the ORP controller main measurement screen, press C, enter password (default is 0000), and press Enter.
3. Press Enter repeatedly until "tonE" is displayed and press Enter.
4. Enter the new calibration offset (up to ± 99 mV max) and press Enter.
5. Repeat process for second ORP controller (optional item).

5B. ORP Probe Cleaning

If calibration is successful, no further steps are required. If the values are incorrect, clean the ORP probe sensor end with 5% hydrochloric acid for two minutes and then rinse thoroughly with water. Scratches to the metal surface should be avoided. However, if acid treatment is not effective, very lightly abrade the platinum sensing surface with toothpaste using a circular polishing motion. After such abrasive cleaning, the ORP sensor end should be rinsed thoroughly with water and immersed in 3mol/L KCl for six hours. If these cleaning procedures do not restore the ORP probe's calibration, it will need to be replaced.

5C. ORP Probe Characteristics

Life: All ORP probes are life limited. For this reason, it is recommended that extra ORP probes be kept on hand for all process applications. To obtain maximum life, always store the ORP probe sensor end in ORP storage solution when not in use. Do not allow the ORP probe sensor end to dry out.

Speed of Response: New ORP probes will respond to within 95% of their final value in less than 30 seconds in ORP solutions/mV standards. Response in the solution being measured may be slow and could take hours to equilibrate. As electrodes age, the speed of response will become slower. Coatings or scratches on the platinum sensing surface will also give a slower response time.

Offset: A perfect ORP probe will read within the range of the respective ORP solution/mV standard as shown on the label. Offset is defined as the difference between the ORP probe measurement and the ORP solution/mV standard range. An ORP probe that measures outside of the range should be evaluated further. Cleaning the ORP probe should rectify the offset.

Span: A perfect ORP probe will have 100% of the theoretical span. As a guideline, if the ORP probe is measured in 2 different ORP solution/mV standards and the difference is calculated to be within 10% of the ideal span, then the ORP probe can continue to be used. Normal ORP aging will reduce the span.

Ground Loops: When an ORP reading is unstable, erratic, or the offset drifts, the most common problem is an electrical ground loop in the system, particularly if the tank and/or pipes are plastic. To verify this problem, remove the ORP probe and calibrate it to a known ORP solution/mV standard in a beaker. If the ORP probe measures within specification (stable and adjustable offset) when calibrated, place a copper wire into the beaker and the other end of the wire into your system. This will permit the voltage in the system to be transferred through the wire into the solution in the beaker. If the reading becomes unstable or shifts, a ground loop is the problem. To fix the ground loop, ground the solution to a known earth ground source.

Troubleshooting:

The following tools are recommended to assist you in problem identification:

1. Portable ORP meter with interconnect cable (this can help verify operational status of the ORP probe independent of the ORP controller)
2. Digital volt meter (if you do not have a portable ORP meter with interconnect cable you can read the ORP probe output with the digital volt meter set to DC mV scale)
3. ORP solution/mV standard(s)

5D. Replacement Parts

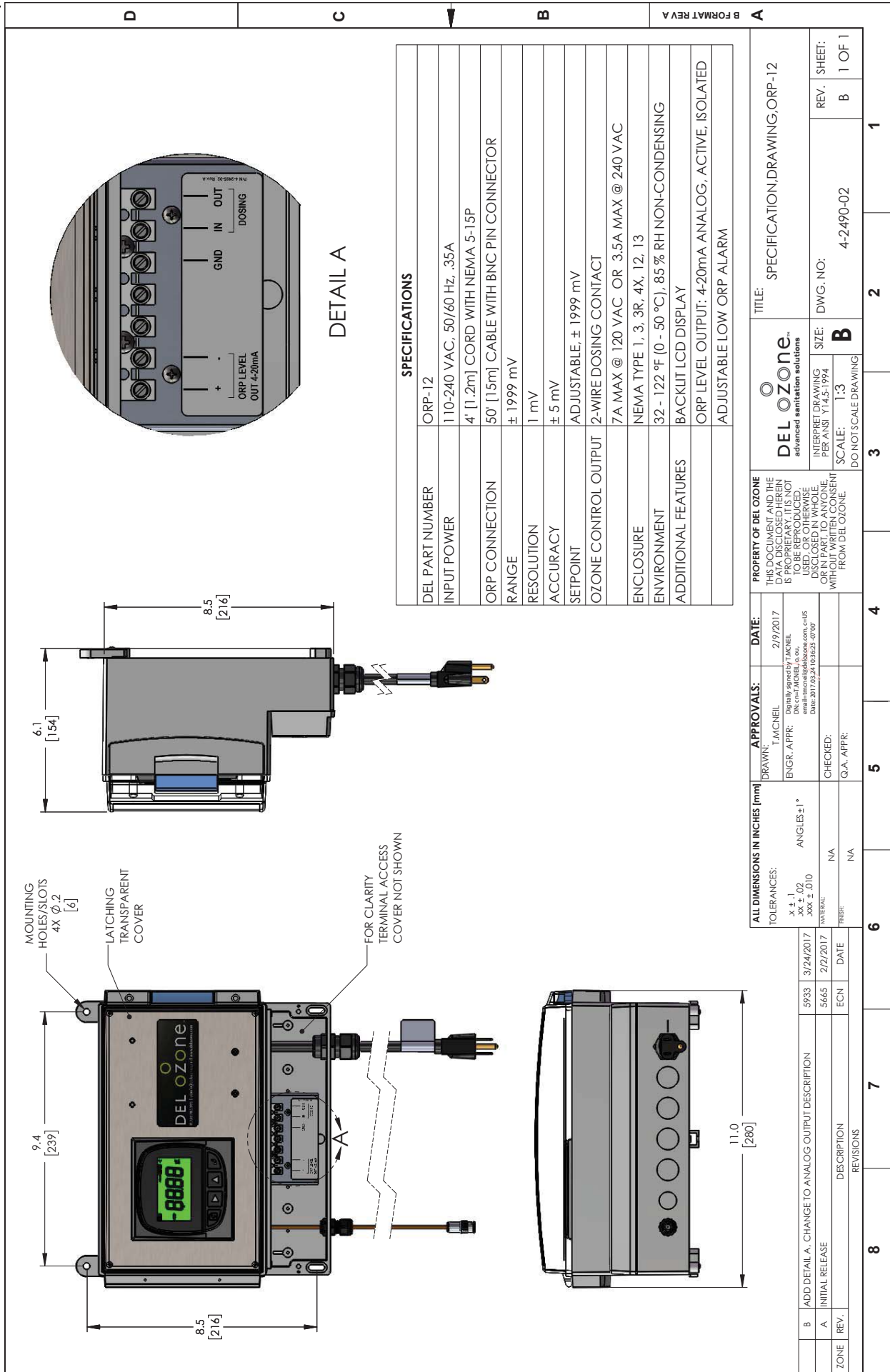
For replacement parts, please call DEL Customer Service at 1-800-676-1335. Be prepared to provide the following information:

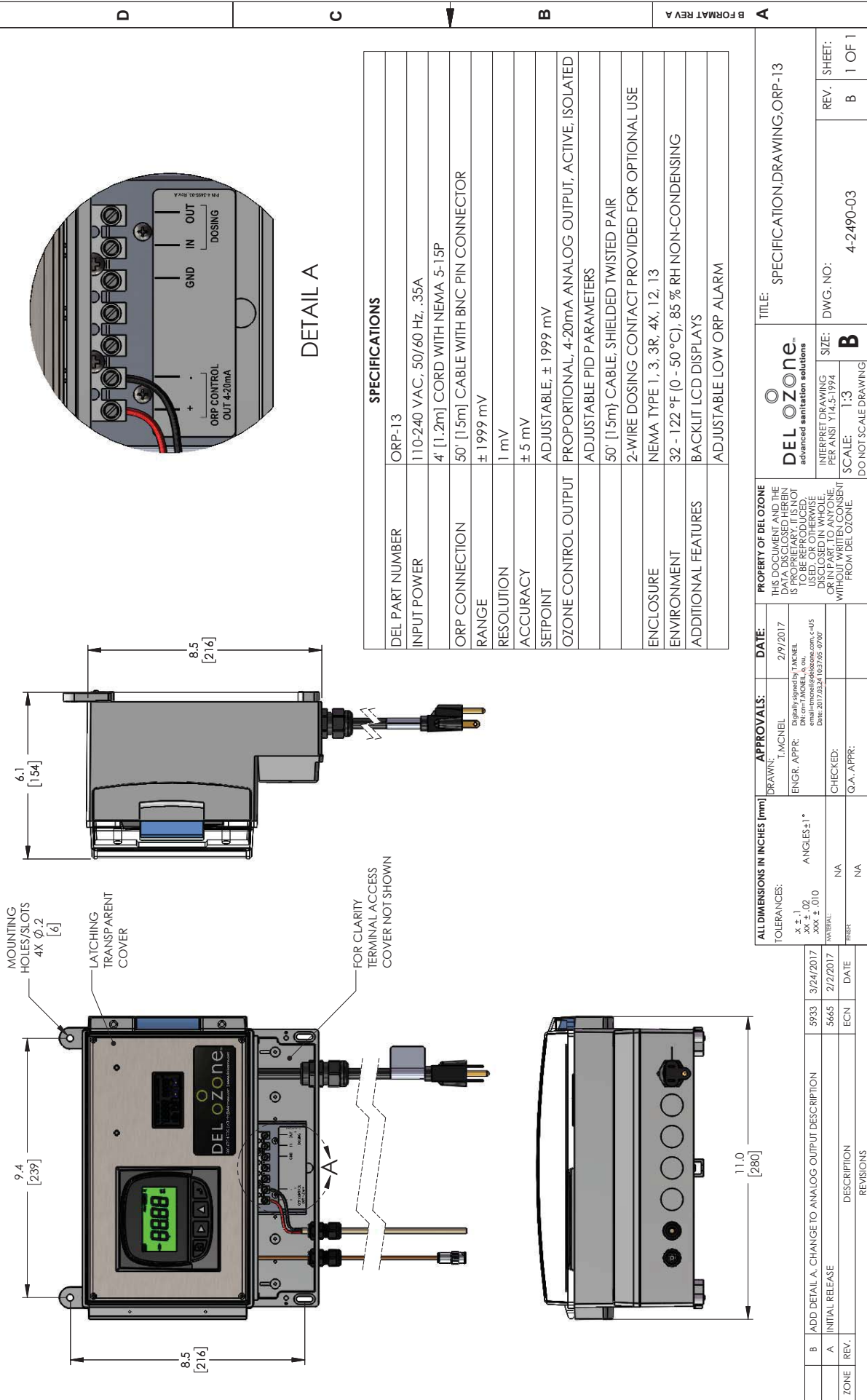
- Customer Name
- Customer Address
- Product Model Number

The specific product model number may be found on the specification label affixed to the right side of the product. In the event that the product is connected to a DEL Ozone generator, also provide the ozone generator serial number.

ORP Solution/mV Standard Output	Possible Cause	Corrective Action
0 mV in all ORP solutions/mV standards	Bad connection	Check/fix connection
	Internal short	Contact DEL customer service
Reads close to ORP solution/mV standard value but response is slow	Dirty ORP probe	Clean ORP probe
Large Offset	ORP solution/mv standard expired or contaminated	Replace ORP solution/mV standard
	Ground loop	Ground the solution to a known earth ground source
Short Span	Dirty or scratched ORP probe	Clean or replace ORP probe
	Aged ORP probe	Replace ORP probe
Unstable or drifting readings	Dirty ORP probe	Clean ORP probe
	Ground Loop	Ground the solution to a known earth ground source

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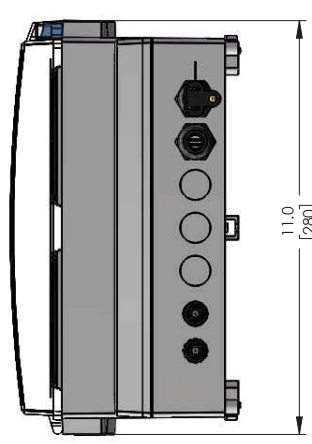
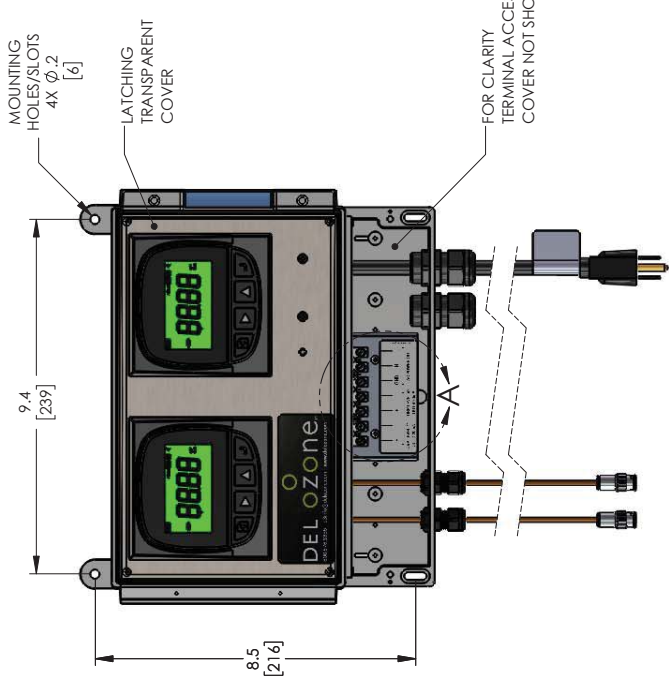
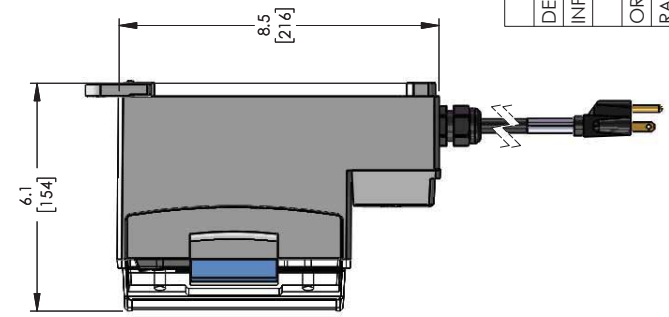
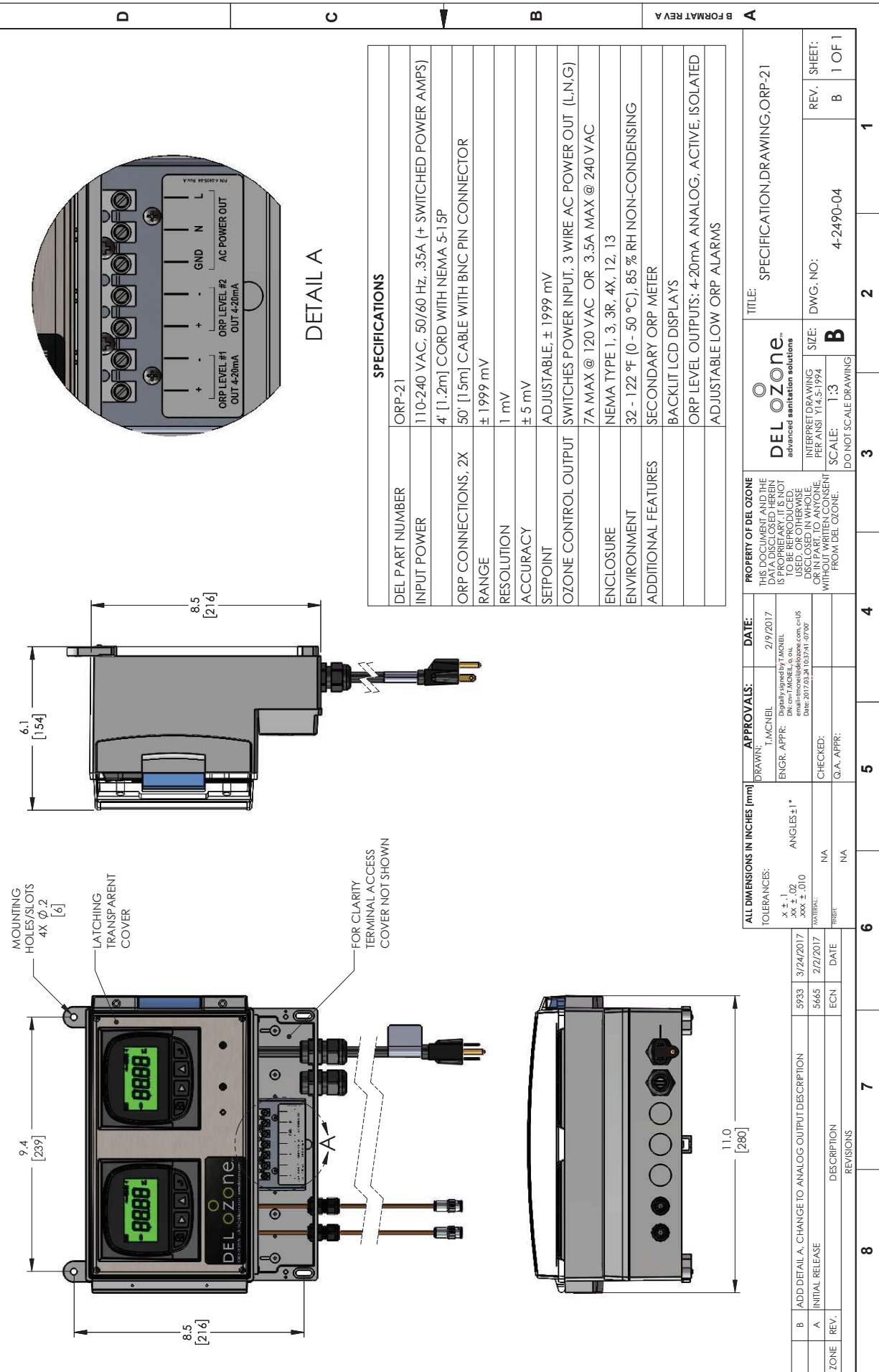


DETAIL A

SPECIFICATIONS

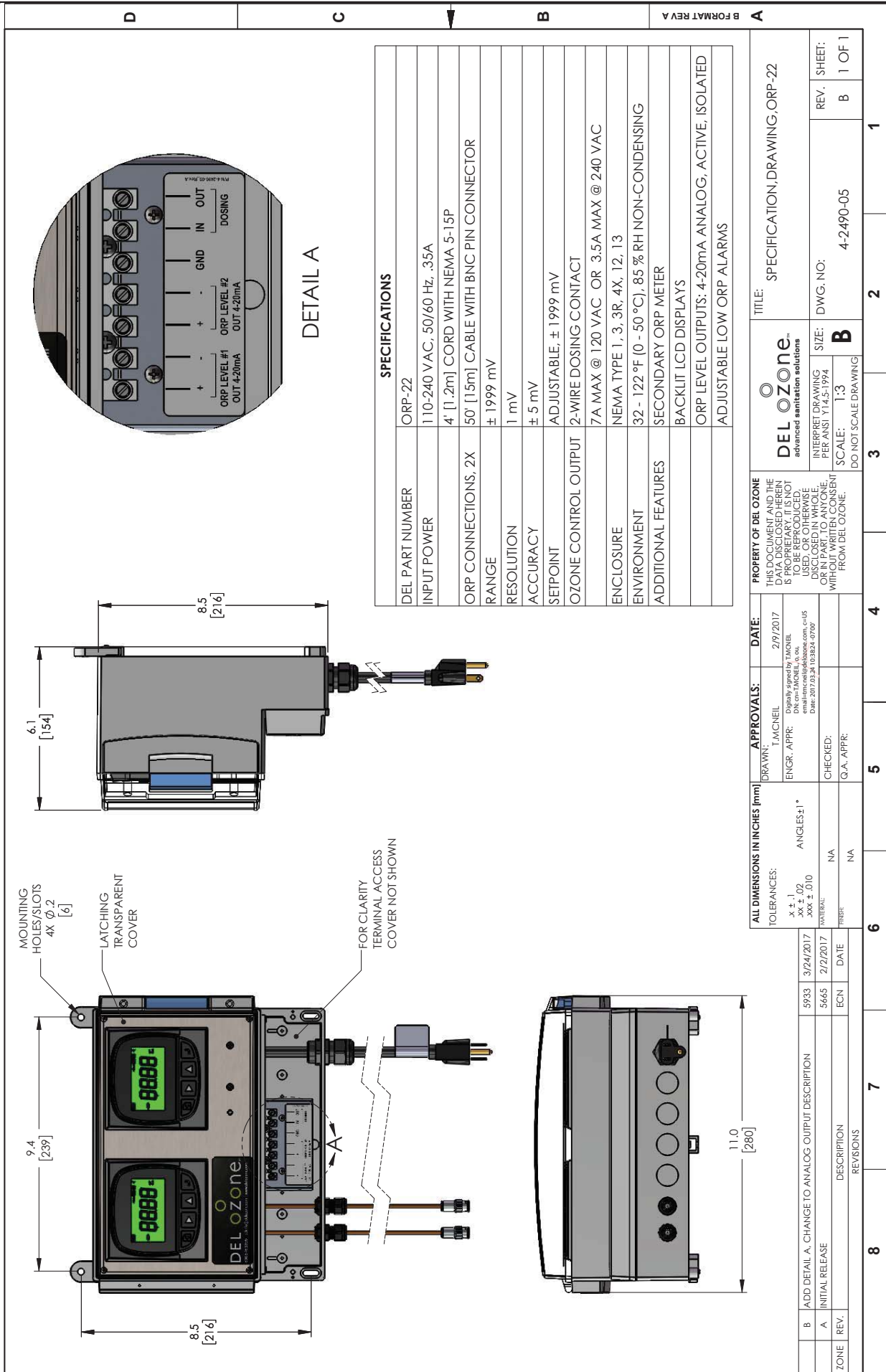
DEL PART NUMBER	ORP-13
INPUT POWER	110-240 VAC, 50/60 Hz, .35A
ORP CONNECTION	4' [1.2m] CORD WITH NEMA 5-15P
RANGE	50' [15m] CABLE WITH BNC PIN CONNECTOR
RESOLUTION	± 1999 mV
ACCURACY	± 5 mV
SETPOINT	ADJUSTABLE, ± 1999 mV
OZONE CONTROL OUTPUT	PROPORTIONAL, 4-20mA ANALOG OUTPUT, ACTIVE, ISOLATED
	ADJUSTABLE PID PARAMETERS
	50' [15m] CABLE; SHIELDED TWISTED PAIR
	2-WIRE DOSING CONTACT PROVIDED FOR OPTIONAL USE
ENCLOSURE	NEMA TYPE 1, 3, 3R, 4X, 12, 13
ENVIRONMENT	32 - 122 °F [0 - 50 °C], 85 % RH NON-CONDENSING
ADDITIONAL FEATURES	BACKLIT LCD DISPLAYS
	ADJUSTABLE LOW ORP ALARM

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SPECIFICATIONS	
DEL PART NUMBER	ORP-21
INPUT POWER	110-240 VAC, 50/60 Hz, .35A (+ SWITCHED POWER AMPS)
ORP CONNECTIONS, 2X	4 [1.2m] CORD WITH NEMA 5-15P
RANGE	50' [15m] CABLE WITH BNC PIN CONNECTOR
RESOLUTION	± 1999 mV
ACCURACY	1 mV
SETPOINT	± 5 mV
OZONE CONTROL OUTPUT	ADJUSTABLE, ± 1999 mV
ENCLOSURE	SWITCHES POWER INPUT, 3 WIRE AC POWER OUT (L,N,G)
ENVIRONMENT	7A MAX @ 120 VAC OR 3.5A MAX @ 240 VAC
ADDITIONAL FEATURES	NEMA TYPE 1, 3, 3R, 4X, 12, 13
	32 - 122 °F (0 - 50 °C), 85 % RH NON-CONDENSING
	SECONDARY ORP METER
	BACKLIT LCD DISPLAYS
	ORP LEVEL OUTPUTS: 4-20mA ANALOG, ACTIVE, ISOLATED
	ADJUSTABLE LOW ORP ALARMS

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APPROVALS: DRAWN: T.MCNEIL DATE: 2/9/2017 ENGR. APPR: DOROTHY SHIBBY T.MCNEIL DATE: 2/9/2017 email: tmcneil@delozone.com, c145 Date: 2017/02/09 10:27:41 -07:00		INTERPRET DRAWING PER ANSI 114.5-1994 SIZE: B SCALE: 1:3 DO NOT SCALE DRAWING	
ALL DIMENSIONS IN INCHES [mm] TOLERANCES: X ± .1 ANGLES ± 1° .XX ± .02 .XXX ± .010 MATERIAL: NA FINISH: NA		DWG. NO: 4-2490-04 REV. SHEET: B 1 OF 1	
DATE: 3/24/2017 ECN: 5665 DATE: 2/2/2017		REVISIONS:	
ADD DETAIL A, CHANGE TO ANALOG OUTPUT DESCRIPTION		5933	
INITIAL RELEASE		5665	
ZONE REV. DESCRIPTION REVISIONS		8	

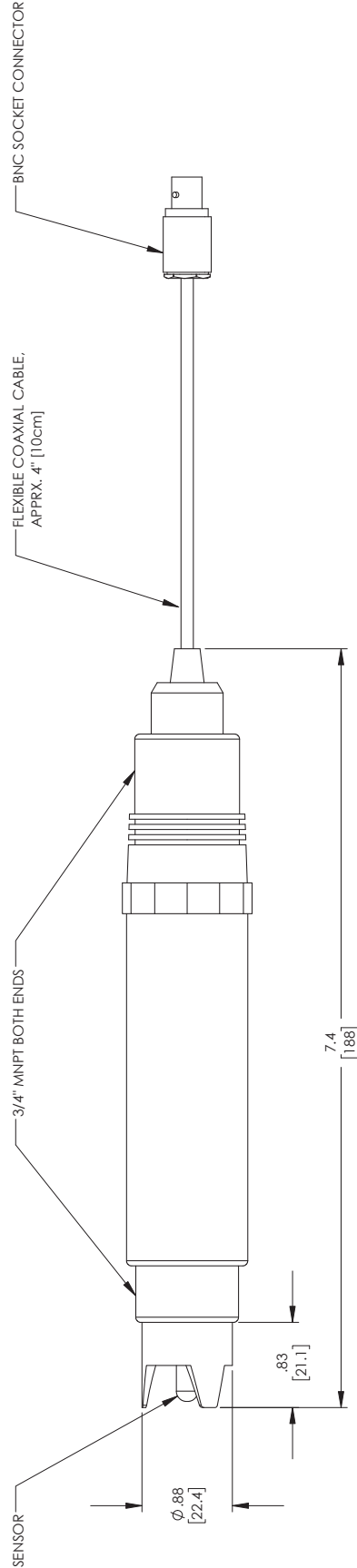
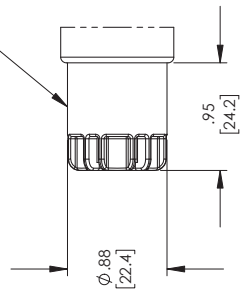


SPECIFICATIONS	
DEL PART NUMBER	ORP-22
INPUT POWER	110-240 VAC, 50/60 Hz, .35A
ORP CONNECTIONS, 2X	4' [1.2m] CORD WITH NEMA 5-15P
RANGE	50' [15m] CABLE WITH BNC PIN CONNECTOR
RESOLUTION	± 1999 mV
ACCURACY	± 1 mV
SETPOINT	ADJUSTABLE, ± 1999 mV
OZONE CONTROL OUTPUT	2-WIRE DOSING CONTACT
ENCLOSURE	7A MAX @ 120 VAC OR 3.5A MAX @ 240 VAC
ENVIRONMENT	NEMA TYPE 1, 3, 3R, 4X, 12, 13
ADDITIONAL FEATURES	32 - 122 °F [0 - 50 °C], 85 % RH NON-CONDENSING
	SECONDARY ORP METER
	BACKLIT LCD DISPLAYS
	ORP LEVEL OUTPUTS: 4-20mA ANALOG, ACTIVE, ISOLATED
	ADJUSTABLE LOW ORP ALARMS

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DATE:	2/9/2017
APPROVALS:	DRAWN: T.MCNEIL ENGR. APPR: Digitally signed by TACHEL DN: cn=TACHEL,o=del
ALL DIMENSIONS IN INCHES [mm]	TOLERANCES: X .4 .1 ANGLES ± 1° XXX ± .010
WATER:	NA
FRESH:	NA
DATE:	3/24/2017
ECN:	5933
DESCRIPTION REVISIONS:	5665
ZONE REV.	
TITLE: SPECIFICATION, DRAWING, ORP-22	
INTERPRET DRAWING PER ANSI Y14.5-1994	SCALE: 1:3
SIZE: B	DWG. NO: 4-2490-05
REV. B	SHEET 1 OF 1

SPECIFICATIONS	
DEL PART NUMBER	5-2392-01
MEASURING RANGE	± 1999 mV
SENSOR	PLATINUM ELECTRODE
TEMPERATURE RANGE	40 - 122 °F (5 - 50 °C)
PRESSURE RANGE	0 - 60 PSI (0 - 4 MPa)
PROTECTION LEVEL	IP65
CONNECTION	BNC SOCKET
MOUNTING	± 30° FROM VERTICAL

ALTERNATE PROTECTIVE CAP SHOWN



A		B		C		D	
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APPROVALS: DRAWN: T. MCNEIL ENGR. APPR: Digitally signed by T. MCNEIL DN: cn=T. MCNEIL, o=delozone.com, c=US Date: 2017.02.02 10:27:21 -0800		DATE: 2/2/2017		SIZE: B		DWG. NO: 4-2522-01	
ALL DIMENSIONS IN INCHES [mm]		TOLERANCES: X ± .1 XX ± .02 XXX ± .010		INTERPRET DRAWING PER ANSI Y14.5-1974		SCALE: 1:1	
MATERIAL: NA		CHECKED: NA		DO NOT SCALE DRAWING		3	
FINISH: NA		Q.A. APPR: NA		4		2	
5903 2/2/2017		6		7		8	
ECN DATE		7		8		8	
INITIAL RELEASE		7		8		8	
DESCRIPTION		7		8		8	
REVISIONS		7		8		8	

DEL OZONE LIMITED ONE YEAR WARRANTY

The limited warranty set forth below applies to products manufactured by DEL OZONE and sold by DEL OZONE or its authorized dealers. This limited warranty is given only to the first retail purchaser of such products and is not transferable to any subsequent owners or purchasers of such products.

DEL Ozone warrants that it or its authorized dealers will repair or replace, at its option, any part of such products proven to be defective in materials or workmanship within ONE (1) year from the date of retail purchase of such products. (All parts) ANY REPAIR OR REPLACEMENT WILL BE WARRANTED ONLY FOR THE BALANCE OF THE ORIGINAL WARRANTY PERIOD OR NINETY (90) DAYS, Whichever is greater.

NOTE: USE ONLY DEL AUTHORIZED DEL REPLACEMENT PARTS. USE OF ANY OTHER PART(S) WILL VOID THIS WARRANTY.

Any replaced parts must be returned to DEL OZONE for warranty evaluation.

THIS LIMITED WARRANTY DOES NOT INCLUDE ANY OF THE FOLLOWING:

- (a) Any labor charges for troubleshooting, removal, or installation of such parts.
- (b) Any repair or replacement of such parts necessitated by faulty installation, improper maintenance, improper operation, misuse, abuse, negligence, accident, fire, flood, repair materials, and/or unauthorized accessories.
- (c) Any such products installed without regard to required local codes and accepted trade practices.
- (d) Damage to unit caused by water backflow.
- (e) Any implied warranty of merchantability or implied warranty of fitness for particular purpose, and such warranties are hereby disclaimed.
- (f) DEL Ozone shall not be liable under any circumstances for loss of use of such product, loss of profits, direct damages, indirect damages, consequential damages, and / or incidental damages.

This warranty gives you specific legal rights. You may have other rights which vary from state to state.

TO OBTAIN WARRANTY SERVICE:

Customer Service Number:	(800) 676-1335	
Fax Number:	(805) 541-8459	
Email:	warrantysupport@delozone.com	(residential)
	service@delozone.com	(commercial)

PROVIDE:

1. Customer name, mailing address, and telephone.
2. Installer/Mechanical Contractor or Dealer name.
3. Unit Part Number, Serial Number or Manufacture Date, and date of purchase.
4. The date of failure.
5. A description of the failure.

After this information is provided, DEL Ozone may release a *RETURN GOODS AUTHORIZATION (RGA) NUMBER*. After receiving the RGA number the part in question must be returned to DEL Ozone, freight prepaid, with the RGA number clearly marked on the outside of the package. All preauthorized defective parts must be returned to DEL Ozone within thirty (30) days. Under no circumstances may any product be returned to DEL Ozone without prior authorization. Returns without the assigned RGA number on the outside of the package will be refused and shipped back to the sender at their expense. Upon receipt of preauthorized returned goods, DEL Ozone will repair or replace, at DEL Ozone's option, the defective product(s) and return them (freight prepaid for products under warranty). Buyer's acceptance of the product and use thereof constitutes acceptance of these terms.



EPA Estab. No. 071472-CA-001

 (800) 676-1335

 o3info@delozone.com

 www.delozone.com