



#### **Welcome to PowerPlant Park**

A Master Planned Cannabis Community & Campus

- 44 Tier 2 Mixed Light indoor Greenhouses
- Onsite state-of-the-art Nursery
- Tissue culture genetics
- Exclusive cultivars from Ca top breeders
- Medical grade post-harvest processing
- 9 County Delivery, retail Garages/Kiosks
- Onsite manufacturing, extraction, kitchen, preroll lab
- Wholesale distribution, presold contracts to Ca brands
- Compliant packaging/fulfillment
- Waterfront Restaurant-Bay Trail access
- Off-grid micro-turbine/high-pressure LNG power solution
- Situated along 2200 ft. of Richmond's North Shoreline

#### Greenhouse Owners Manual - 2025

Each State-of-the-Art Building includes \$400K in upgrades Latest indoor Tier 2 Mixed Light technology available: Zero-GeN Exclsive Tissue Culture Genetics Fluence VYPR 4i LED Lighting -Bloom Arrays Custom Trough & Gutter Irrigation & Dosing Systems Wadsworth Environmental Controller Rolling Benches, Co2 Infusion - Polycarbonate Glass Roof Ubiquitous Quantum Dots - 400 sq. ft. Work Corridor Dehumidification - Automated Misting System Integration - Controlled Dashboard Supplied Tablet



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Situated on 2,400 ft of Richmond's North Shoreline Unobstructed Views of San Francisco Bay, Mt. Tamalpias & Marin County mountains Designated as Ocean Grown Facility - "OG" - due to sea level location

#### **Property Highlights**

- 18.8-acre waterfront Campus
- 44 state-of-the-art Tier 2 Mixed-Light indoor Greenhouses
- \$400K in building upgrades
- Onsite Nursery
- Exclusive genetics from California's top breeders
- Medical grade post-harvest processing
- Onsite manufacturing, extraction, kitchen & preroll lab
- Compliant packaging/fulfillment
- Wholesale distribution-pre-sold contracts to prominent Ca brands
- 9 County delivery service, retail "Garages" & "Kiosks"

#### Location, Location

- 2 Entertainment venues
- Private 24x7 restaurant/town hall
- "Ocean Grown" (OG) designation
- Town hall meeting center
- Dog park-outdoor oasis
- San Francisco Bay Trail access
- Sunsets over Mt. Tamalpais 365 days a year
- 15 minutes to Oakland/30 minutes San Fran
- 15 minutes to Marin County/1 hour to Sacramento
- 2 hours to San Jose/1 hour to Napa Valley





#### Introduction

PowerPlant Park is the largest Tier 2 Mixed Light facility in the State of California. State-of-the-art facilities and vertically integrated, including cultivation, nursery, processing, manufacturing, distribution and retail. Only a handful of other operations that can match PowerPlant Parks license profile. The 18.8-acre site is in heart of the San Francisco Bay Area. The Park is situated on 2,400 ft. of Richmond's North Shoreline, with stunning unobstructed views of Mt. Tamalpais, San Francisco Bay, and Marin County mountains. Glorious sunsets 365 days a year, at sea level designated as a true "ocean grown" (OG) campus. The SF Bay Area is home to over 8 million residents, is ranked #1 for retail sales per capita and has the highest concentration of "canna-connoisseurs". In 2024 legal sales (statewide) came in just under \$5B, \$8B forecast for 2025.

Part A of Phase I is 90-120 days from receiving its Certificate of Occupancy. 80% of PowerPlant Park's production will be sold at retail, thru four in-house brands, starting with Delivery. The Park maintains Hubs, (Microbusiness) in Sacramento, Sonoma, Oakland and San Francisco, soon onsite in Richmond. After the second harvest, the Park will launch two unique retail concepts, (Garages and Kiosks) that minimize time-to-market at a cost of 80% less than a traditional Storefront. The other 20% of production will be presold in bulk to a handful of prominent Ca brands. Brands that our cultivation team/breeders have worked with for years.

All genetics have been brought through an advanced tissue culture process and are 100% exclusive to PowerPlant Park's in-house brands. New strains will be introduced in each of the six flower cycles per year. Buildings are designed and equipped for a bloom only environment. The Park's 3-tier advanced Nursery has 18,787 plant positions, mothers' room and tissue culture lab. This nursery will provide all necessary flip-ready teens for all of Phase I. The Nursery will also provide a secondary library of strains that will be sold exclusively to retail customers, other distributors and direct to brands. The Park's Nursery manager is a tissue culture expert w/over a decade of experience.

PowerPlant Park has sold 14 of 18 Units in Phase I, 1 Unit is available in Part A and 3 are left in Part B. Thus far the company has spent over \$14mm purchasing land, construction of Phase I, and permits/licenses/drawings. Based on proximity of stabilization of Part A, the Park has just begun selling 24 Units in Phase II & III. Ownership includes title to the Building, which includes all leasehold improvements and interior/exterior equipment. The value of the building once operational is approx. \$1,200 - \$1,500 per sq. ft. Unlike most commercial operations, where buildings are gutter connected, all Park buildings (in all 4 Phases) are standalone and private. If the reader is not aware, indoor Tier 2 Mixed-Light has the same light footprint as indoor, (25-watts per sq. ft.). We like to say, all the best of indoor, [much more] plus the sun, leading to elevated cannabinoid and terpene profiles.

#### **Project Status**

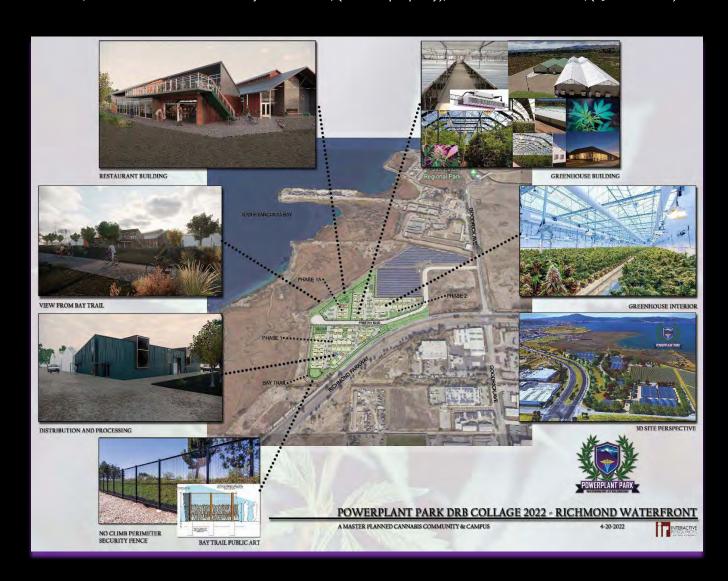
PowerPlant Park received its Building Permit for Phase I from the City of Richmond on Jan 2, 2024. From 2021-2023 the Park completed all major site prep, including finished grading, lime treatment, private joint trench and 95% of onsite and offsite utilities. The first five foundations have been completed. See Master Project Schedule for details of work completed to date. The first 10 Greenhouses have been delivered to the Phase I site. The Greenhouse Builder has completed 80% of the construction for 4 Units and Nursery. The greenhouse builder was supplied to PowerPlant Park by the building manufacturer, Nexus/Prospiant, the premier manufacturer of indoor Tier 2 Mixed Light Buildings in the country.





#### **Park Amenities**

- 24-hour access to PowerPlant Park's private restaurant/conference center, including temp office space, boardroom, kitchen, large waterfront decks w/ unobstructed panoramic views to San Francisco Bay, Mount Tamalpais, and Marin County mountains
- 24-hour "white-house" level security, park rangers, security drones, sensors embedded in perimeter fencing, guard-gate w/automatic bollards, voice enabled perimeter cameras and private road, (see Security Plan).
- Greenhouse delivered to Buyer 100% state compliant, including key card entry/exit, latest in security cameras with 24hr viewing
- High tech Drones will be deployed in each Building for 24-hour crop monitoring and health checks
- Phase 1 powered by a 3MW turbine micro-grid fueled by high-pressure liquefied natural gas, considered green energy, and operates off-grid
- For the Grower model, all city/state permits and licenses are managed by PowerPlant Parks licensing & compliance agency, with assistance from PPP legal counsel. The entire process is managed through the issuance of Buyer's Certificate of Occupancy
- The Grower model also includes 40 hours (per month) of professional consulting with the Park's cultivation team, breeder, geneticist, and PhD level scientists
- Growers, (both models) will have access to very hi-tech at-will testing equipment, (portable). This
  "cannalyzer" is critical to monitoring outcomes during the flower cycle. It can measure 8 different
  cannabinoid profiles, terpenes, moisture, residual fertilizer to name a few
- 24-hour direct San Francisco "Bay Trail" access, (borders property), free Park shuttle service, (25-mile radius)



# POWERPLANT PARK | CULTIVATION-PHASE I-INTIAL CULTIVARS



PowerPlant Park's cultivation team has over 150 years of combined cannabis experience. Their goal is to leverage the latest advances in Tier 2 mixed-light technology while incorporating their tried/trued old-school techniques and their application of these forces into our growing environment. Our initial strains from the states top breeders are Zero-Gen Tissue Culture, several exclusive to the Park





#### PowerPlant Park Purple

- Indica Dominant Hybrid
- Secret
- Potency 29% -36
- Flower time: 55-60 Days



#### **Tropicana Cookies**

- Sativa Dominant Hybrid
- GSC x Tangie
- Potency 23% -28%
- Flower time: 65-70 Days



#### Crostata

- Sativa Dominant Hybrid
- Sunset Punch x Biscotti Sundae
- Potency: 29% 32%
- Flower time: 56 Days

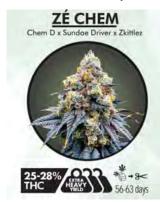


# POWERPLANT PARK | CULTIVATION-PHASE I-INTIAL CULTIVARS



#### Strawberry Jamz

- Sativa Dominant Hybrid
- Strawberries and Cream x Runtz
- Potency: 25 30%
- Flower time: 56 Days



#### Ze Chem

- Sativa Dominant Hybrid
- Chem D x Sundae Driver x Zkittlez
- Potency: 15 28%
- Flower time: 56 63 Days



#### Limoncello Runtz

- Indica Dominent Hybrid
- Lemonchello x Runtz
- Potency: 23 28%
- Flowering time: 60 63 Days



#### Carbon Fiber

- Indica Dominant Hybrid
- Biscotti x Cookies N Cream x Grape Pie
- Potency: 26 36%
- Flowering time: 63 70 Days



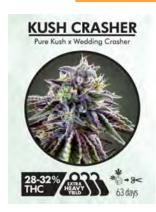
#### Chauffeur

- Indica Dominant Hybrid
- Wedding Cake x Zkittlez x Sundae Driver
- Potency: 28 34%
- Flowering time: 63 70 Days



#### **Grapes and Cream**

- Indica Dominant Hybrid
- Grape Pie x Cookies and Cream
- Potency: 30% +
- 63 Days



#### **Kush Crasher**

- Indica Dominant Hybrid
- Pure Kush x Wedding Crasher
- Potency: 28 32%
- Flowering time: 63 Days



#### Strawberry Poison

- Sativa Dominant Hybrid
- F1 Durb x Gushers x Strawnana
- Potency 30%
- Flower time: 56 63 Days

# N.E.X.U.S

HYBRID INDOOR GREENHOUSES









# NEXUS SYSTEM 420™ HYBRID GREENHOUSES

As a horticulture industry leader for 50 years, Nexus helps clients design the best possible growing system using the latest technology. This consultation involves assessing the project's geographic location and integrating heating/cooling, light deprivation, lighting, environmental controllers, benches, insect screening, odor control, and much more to create a systematic and productive growing approach.



#### STRUCTURES/COVERINGS ◀

Nexus structures are U.S. manufactured from galvanized steel. These structures contain fabricated steel components with factory-welded trusses and pre-drilled purlins for ease of construction. Customized, trussed roof systems are designed by Nexus engineers to meet municipal building codes including geographic-specific snow and wind loads.

A variety of coverings are available with a range of light transmitting and diffusing capabilities. Side and end walls may feature insulated metal panels to increase energy savings and provide security.

#### LIGHT DEPRIVATION >

Prolonged periods of consistent darkness are nature's trigger for marijuana flowering. To induce flowering, plants need to be placed under 12 hours of darkness along with 12 hours of light each day. This process can be managed using side walls and curtains along the roof of a greenhouse in combination with light trap filters on ventilation equipment.

These curtain systems conserve heat by reducing operating costs through increased energy efficiency. The grower will also have extra harvests over outdoor growing.





#### LIGHTING ◀

Greenhouse cannabis production provides the opportunity to capture and utilize nature's sunlight. Natural light helps maximize plant production and decrease operating costs due to less supplemental lighting.

Supplemental light is often necessary on low light days, and separate growing zones require different levels of accumulated light. These lighting systems ensure consistent light levels for year-long production and extra crop turns.

#### HEATING/COOLING ▼

Heating primarily occurs with overhead gas-fired heaters with vertical or horizontal air fans that circulate warm air throughout the greenhouse. Hot water radiant heat can be added closer to the plant either under benches or imbedded in the greenhouse floor.

Cooling systems provide cannabis crops with healthy growing temperatures during the summer months even in desert or high humidity conditions. These systems include evaporative fan and pad mechanical cooling, natural ventilation with roof and side vents, shade curtains, and dehumidification systems.



#### **ODOR CONTROL**

Odor mitigation can be a major concern in populated areas. Misting vapor units and automatic pneumatic control systems help keep growing facilities in compliance with municipal laws resulting in far fewer complaints from neighbors.

#### INSECT SCREENING ▼

Minimizing insects inside a greenhouse is essential for organic growing practices. Selecting the best type of screens for specific geographic locations help create a low pest growing environment.





#### **ENVIRONMENTAL CONTROLS**

Effective climate control is a crucial step towards producing any greenhouse crops particularly cannabis. The environmental climate control system's design needs to consider outside conditions along with indoor readings to create the best possible environment for plant growth.



#### ROLLING & STATIONARY BENCHES ▲

Benching systems increase overall crop yield in growing operations by reducing aisles, increasing air circulation, and improving growth management and operational efficiency. Bench systems can be covered with expanded metal or plastic trays to water plants and control run-off.

#### IRRIGATION/FERTILIZATION

Let Nexus design your irrigation and fertilization systems to ensure proper nutrient levels reach the plant.



# WHY NEXUS?

Nexus is a cannabis industry innovator with System 420™ hybrid greenhouse designs. An in-house engineering staff, licensed in 49 states, provides customized designs for high quality greenhouses. Headquartered in Colorado, the epicenter of the cannabis market, Nexus has two manufacturing facilities located in Colorado and Illinois for convenient delivery to the entire U.S. Over the past 50 years, Nexus has served the horticulture industry with technical expertise, exceptional customer design, and product leadership.



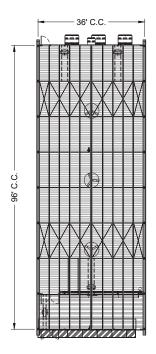
Nexus provides multi-use structures for drying, trim, mother plants, cloning, shipping, receiving, and administrative offices.



#### **POWER PLANT PARK 1**

3153 GOODRICK AVENUE RICHMOND, CA 94801

PAGE	DESCRIPTION
GH-0.0	TITLE PAGE
GH-1.0	COLUMN LAYOUT, ROOF PLAN AND BASE PLATE DETAILS
GH-1.1	EQUIPMENT AND DOOR SCHEDULES
GH-1.1	GABLE ELEVATIONS AND BENCH LAYOUT
GH-2.0	SIDE WALL ELEVATIONS
GH-2.0	LIGHTING LAYOUT
GH-3.0	CORRUGATED POLYCARBONATE ROOF COVERING DETAILS



1 OVERVIEW SCALE: 3/32" = 1'-0"

#### NOTE:

1. NEXUS IS RESPONSIBLE FOR THE DESIGN OF THE STRUCTURE ONLY. FOUNDATION AND SLAB DESIGNS ARE BY OTHERS. VERIFICATION OF THE CONCRETE IS THE RESPONSIBILITY OF OTHERS.

2. DESIGN DATA:

2018 INTERNATIONAL BUILDING CODE, CHAPTER 16/ ASCE 7-10

RISK CATEGORY DEAD LOAD (PURLIN DESIGN) DL = 3.0 psf DEAD LOAD (TRUSS DESIGN) DEAD LOAD (COLUMN DESIGN) DL = 4.0 psf DL = 5.0 psf ROOF LIVE LOAD LL = 20 psf

SNOW DESIGN GROUND SNOW LOAD SNOW EXPOSURE FACTOR  $\begin{array}{l} P_g \ = \ 0 \ psf \\ C_e \ = \ 1.0 \\ I \ = \ 0.8 \\ C_t \ = \ 1.0 \end{array}$ SNOW LOAD IMPORTANCE FACTOR THERMAL FACTOR

ROOF SNOW LOAD  $P_f = 0.7^*C_e^*C_t^*I^*P_g = 0 psf$ MINIMUM ROOF SNOW LOAD Pfmin = 0 psf

WIND DESIGN ULTIMATE WIND SPEED (3 SECOND GUST) NOMINAL WIND SPEED (3 SECOND GUST)
WIND EXPOSURE Vasd = 77 mph INTERNAL PRESSURE COEFFICIENT GCpi = +/- 0.18 BASIC WIND PRESSURE SEISMIC DESIGN
SEISMIC IMPORTANCE FACTOR q = 23.3 psf

I = 1.00 SPECTRAL RESPONSE ACCELERATION SPECTRAL RESPONSE ACCELERATION Ss = 2.161 S1 = 0.833SITE CLASS SPECTRAL RESPONSE COEFFICIENT D Sps = 1.441 S<sub>D1</sub> = 0.833 E

Cs = 0.41

SPECTRAL RESPONSE COEFFICIENT SEISMIC DESIGN CATEGORY LATERAL - ORDINARY STEEL MOMENT FRAME DESIGN BASE SHEAR V = 0.41 x W R = 3.5

RESPONSE MODIFICATION FACTOR SEISMIC RESPONSE COEFFICIENT LONGITUDINAL - ORDINARY STEEL CONCENTRICALLY BRACED FRAME DESIGN BASE SHEAR

V = 0.44 x W RESPONSE MODIFICATION FACTOR R = 3.25 Cs = 0.44 SEISMIC RESPONSE COEFFICIENT EQUIVALENT LATERAL FORCE PROCEDURE

3. TYPICAL COLUMN AND POST DIMENSIONS ARE CENTER TO CENTER (C.C.) OF MEMBERS UNLESS OTHERWISE NOTED. TYPICAL WALL MEMBER DIMENSIONS ARE FROM GRADE TO TOP OF MEMBER.

4. R.O. = ROUGH OPENING DIMENSION C.C. = CENTER TO CENTER DIMENSION O.O. = OUT TO OUT DIMENSION V.I.F. = VERIFY IN FIELD U.G. = UNDER GUTTER HEIGHT C.H. = COLUMN HEIGHT

5. DEPENDING ON SITE AND PROJECT CONDITIONS, SOME FIELD FABRICATION MAY BE REQUIRED, INCLUDING DRILLING, CUTTING AND WELDING OF STEEL OR ALUMINUM MATERIALS.

REVISED PLANS FOR APPROVAL ONLY

NOT FOR CONSTRUCTION

#### **PRCOSPIANT**

PROFESSIONAL SEAL

ENGINEER'S SEAL APPLIES TO DESIGN OF STRUCTURAL COMPONENTS ONLY

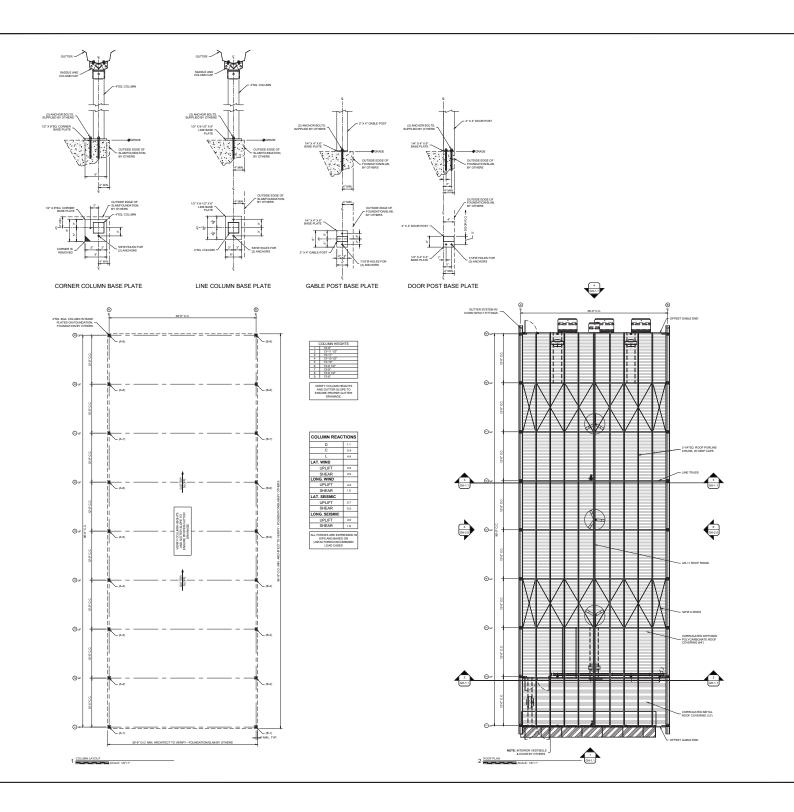
**PARK** GREENHOUSE **PLANT** OWER



Δ.

PROJECT & ADDRESS: (1) 36' X 96' VAIL GH POWER PLANT PARK 1 3153 GOODRICK AVENUE, RICHMOND, CA 94801 N33985 05-08-2018 G PENA D. WEISENSAL SHEET TITLE: TITLE PAGE

GH-0.0



**PRCOSPIANT** 

■ PROFESSIONAL SEAL

ENGINEER'S SEAL APPLIES TO DESIGN OF STRUCTURAL COMPONENTS ONLY

**PLANT PARK** GREENHOUSE



**POWER** 

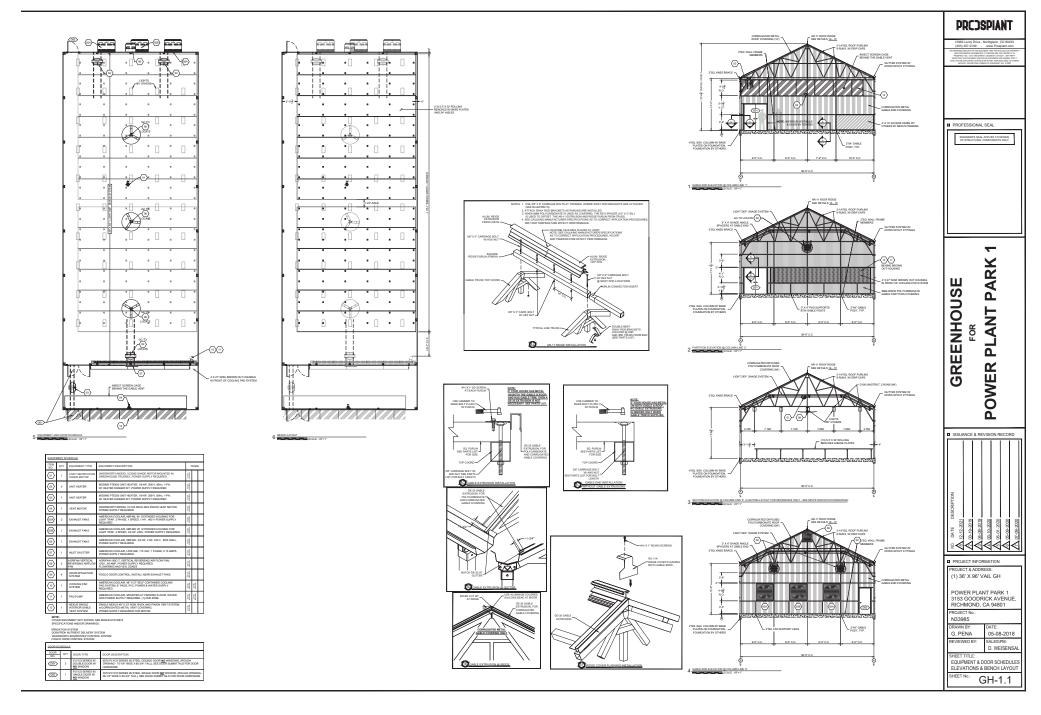
PROJECT & ADDRESS: (1) 36' X 96' VAIL GH

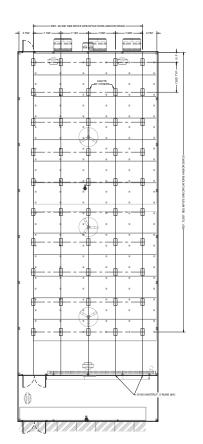
POWER PLANT PARK 1 3153 GOODRICK AVENUE, RICHMOND, CA 94801

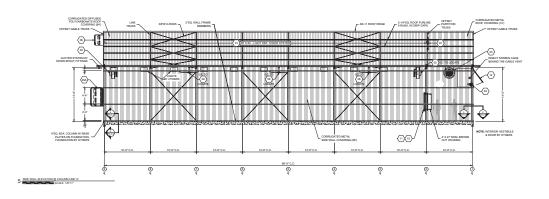
PROJECT No. N33985

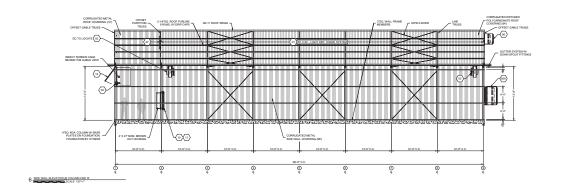
DRAWN BY: G. PENA DATE: 05-08-2018 REVIEWED BY: SALES\PM: D. WEISENSAL

SHEET TITLE: COLUMN LAYOUT, ROOF PLAN AND BASE PLATE DETAILS SHEET No.: GH-1.0

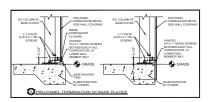




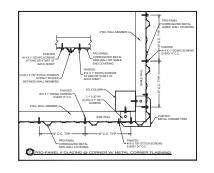




7 LIGHTING LAYOUT (FOR REFERENCE ONLY - SEE MFG'S SPECIFICATIONS/DWGS







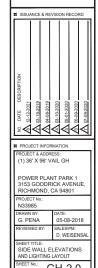
NO.	QTY	EQUIPMENT TYPE	EQUIPMENT DESCRIPTION	1	TRAD
(a)	1	LIGHT DEPRIVATION SHADE MOTOR	WADSWORTH MODEL VC2000 SHADE MOTOR MOUNTED IN GREENHOUSE TRUSSES, POWER SUPPLY REQUIRED.	8013 10000	П
(E)	3	UNITHEATER	MODINE PTE460 UNIT HEATER, 115-HP, 208-V, 60Hz, 1-PH, WI HEATER HANGER KIT, POWER SUPPLY REQUIRED.	200 200 200 200 200 200 200 200 200 200	П
	1	UNITHEATER	MODINE PTE300 UNIT HEATER, 115-HP, 208-V, 60Hz, 1-PH, WI HEATER HANGER KIT, POWER SUPPLY REQUIRED.	100	П
(a)	1	VENT MOTOR	WADSWORTH MODEL VC100 RACK AND PINION VENT MOTOR, POWER SUPPLY REQUIRED.	27.00	П
	2	EXHAUST FANS	AMERICAN COOLAIR, NEF4IL WI EXTENDED HOUSING FOR LIGHT TRAP, 3 PHASE, 1 SPEED, 1 HP, 460 V POWER SUPPLY REQUIRED.	1000	П
<b>◎</b>	1	EXHAUST FANS	AMERICAN COOLAIR, NBF48K WI EXTENDED HOUSING FOR LIGHT TRAP, 2 SPEED, 3/4 HP, 230V, POWER SUPPLY REQUIRED.	70F53 Eurosa	
	1	EXHAUST FANS	AMERICAN COOLAIR, NBF24K, 3/4 HP, 2 SP, 230 V, BOX WALL, POWER SUPPLY REQUIRED.	8.65	
(II)	1	INLET SHUTTER	AMERICAN COOLAIR, LRW-39E, 115 VAC, 1 PHASE, 0.15 AMPS, POWER SUPPLY REQUIRED.	10	П
⊚	3	AGRIFAN VERTICAL REVERSING AIRFLOW FAN	AGRIFAN 1905-7, VERTICAL REVERSING AIR FLOW FAN, 120V, 54 AMP, POWER SUPPLY REQUIRED. FLOWERING AND VEG. ZONES	100	П
(a)	4	ODOR MITIGATION SYSTEM	FOGCO ODOR CONTROL, INSTALL NEAR EXHAUST FAMS	100	
(E)	1	COOLING PAD SYSTEM	AMERICAN COOLAIR, 46" X 27" SELF CONTAINED COOLING PAD SYSTEM, 6" PADS, PVC, POWER & WATER SUPPLY REQUIRED.	63163 83163	634/0334
(1)	1	PAD PUMP	AMERICAN COOLAIR, MOUNTED AT FINISHED FLOOR, WATER AND POWER SUPPLY REQUIRED. (1) PER ZONE	Rev. 1	41/11
(2)	1	NEXUS SINGLE INTERIOR GABLE VENT SYSTEM	SINGLE NEXUS 46" X 33" NOM. RACK AND PRION VENT SYSTEM WCORRUGATED METAL VENT COVERING, DOWNERS LIDEN V BOYN LIBERD FOR MOTOR	11	П

DOOR SC	HEDULE		
DOOR NO.	QTY	DOOR TYPE	DOOR DESCRIPTION
(B)	2	PLYCO SERIES 95 DOUBLE DOOR W NO WINDOW	6070 PLYCO SERIES 9S STEEL DOUBLE DOOR NO WINDOWS, (ROUGH OPENING - 75-787 WIDE X 85-314" TALL), SEE GOOR SUBMITTALS FOR DOOR MARDWARD.
⊚	1	PLYCO SERIES 95 SINGLE DOOR W NO WINDOW	3670 PLYCO SERES 85 STEEL SINGLE DOOR NO WINDOW, (ROUGH OPENING - 36-12" WIDE X 85-34" TALL), SEE DOOR SUBMITTALS FOR DOOR HARDWARE

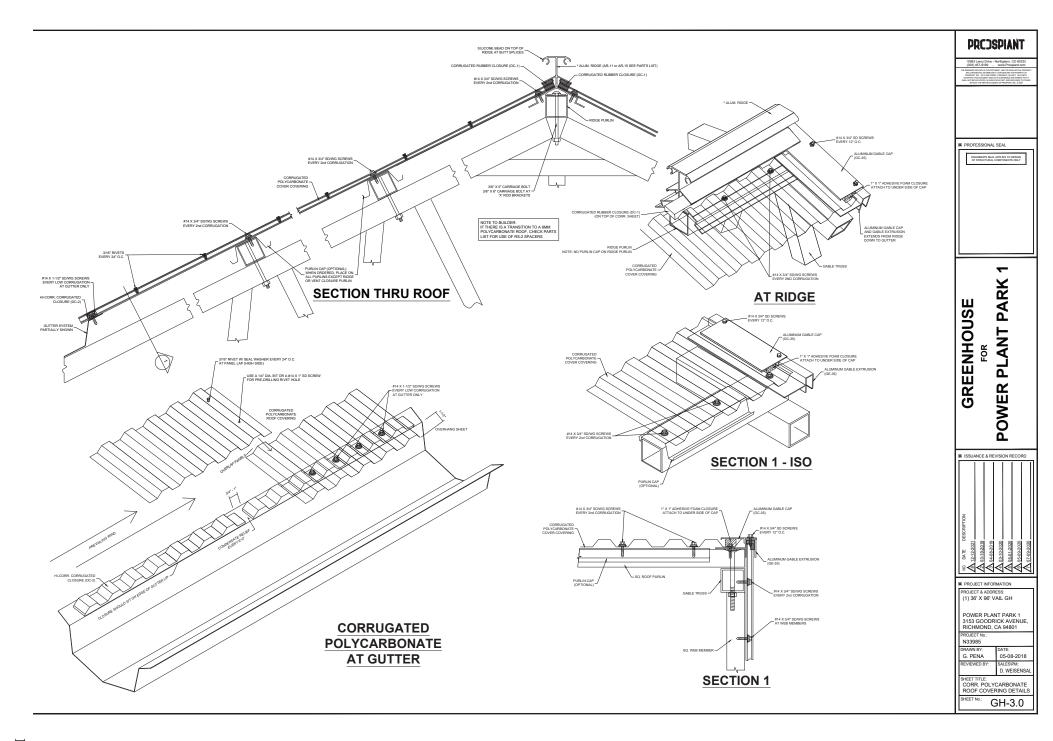
#### **PRCDSPIANT**

ENGINEER'S SEAL APPLIES TO DESIGN OF STRUCTURAL COMPONENTS ONLY

PARK GREENHOUSE **POWER PLANT** 



GH-2.0



#### PPP Prospiant Supplied 36' x 96' Greenhouse Components, Max Electrical Load Estimates v10

Prospiant Supplied Equipment Greenhouse Electrical Load Estimates							
Lighting	Count	НР	PH	Voltage (V)	Current (A)	Power (kW)	Real Total Power
LED Lights "Supplied by others"	0		3	240	1.33	0.6	0.0
Cooling & Msc Equipment	Count	HP	PH	Voltage (V)		Power (kW)	Total Power (kW)
48" single speed exhaust fans	2	1	1	230	1.7	0.4	0.8
48" two speed exhaust fan	1	3/4	1	230	6.3	1.4	1.4
24" Peak Fans	1	3/4	1	230	6.3	1.4	1.4
Evaporative pad wall pump P-25	1	1/3	1	115	10	1.2	1.2
Drive motor for gable vent	1	0	1	115	0.68	0.1	0.1
Shutter Peak Motor 27"	1		1	120	0.28	0.0	0.0
Agri Fans Vertical Airflow Revesible	3		1	120	0.69	0.1	0.2
Fogco Odor Mitigation Pump, VFD 10.6 gal/min	1		1	230	10.2	2.3	2.3
Fogco Zone Valves	2		1	120	2	0.2	0.5
H.E. Anderson JA160D Fertigation Unit	1		1	120	2	0.2	0.2
Irrigation Zone Solenoid Valves	4		1	24	0.22	0.0	0.0
Fresh Water Pump	1		1	230	10	2.3	2.3
Compressor Nutrient Dosing System	1		1	230	40	9.2	9.2
Reverse Osmosis System	1		1	110	8.2	0.9	0.9
Heating	Count	НР	PH	Voltage (V)	Current (A)	Power (kW)	Total Power (kW)
Unit heaters in the grow area PTE 400	3		3	480	49.6	41.2	123.7
Unit heater in the Central Corridor PTE 300	1		3	480	37.6	31.3	31.3
Shade & Heat Curtain/ Light Dep Curtain	Count	НР	PH	Voltage (V)	Current (A)	Power (kW)	Total Power (kW)
Drive motor for curtain system	1		1	115	2.5	0.3	0.3
CO2 Generators	Count	НР	PH	Voltage (V)	Current (A)	Power (kW)	Total Power (kW)
CO2 Burners "supplied by others"	0		1	120	1.00	0.1	0.0
Maximum coincident load: the largest load you can expect at any time	(kW or	KVA)					175.9
, , , , , , , , , , , , , , , , , , ,	(Amps (	១ 480V, :	3ph)				211.6
Total of equipment minus lighting	(kW or		. ,				175.9
	•	១ 480V, :	3ph)				211.6











# **OUR CUSTOMER SUPPORT STRATEGY**

#### THE GROWER IS AT THE CENTER OF EVERYTHING THAT WE DO

Our customer support strategy is quite simple; ensuring that our clients are successful. That is why we don't make transactions; we make partnerships to ensure success from cultivation to revenue.

Our strategy is uniquely focused on providing value to the grower to ensure optimal experience and results

In March 2022 we streamlined our organization and created a single Sales Services Team that works in complete coordination to ensure the optimum support for our grower community.

- Horticulture Services (HS)
- Lighting Design Team
- **Utility Rebates**
- Field Application Engineers (FAE)
- Strategic Sales Support (S3)

We have also implemented a 2-in the box structure for our customers:

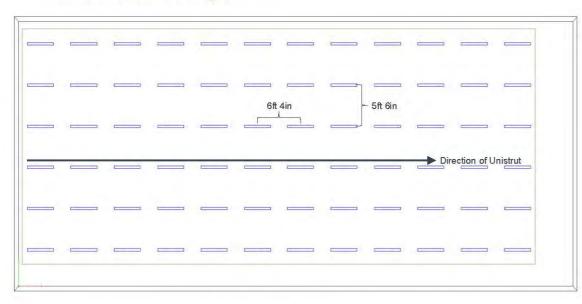
- Strategic Account Managers (SAM)
- Strategic Sales Support (S3)





# PowerPlantPark – GH Lighting with 72 VYPR 4i 825W

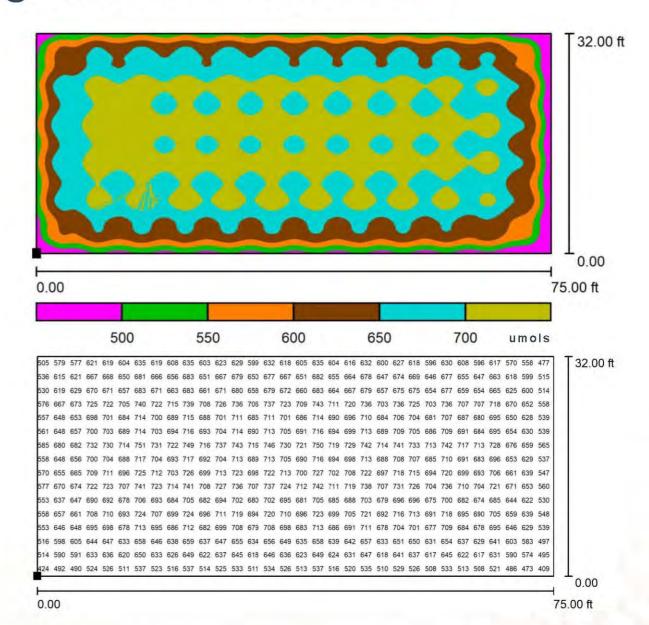
### 6 rows of 12 lights



#### Fixture Summary Per House

Fixture Quantity	72 Fluence VYPR 4i 825W
PPFD Average / Max	660 / 755 µmol/m²/s
Total Electrical Input	59,400 watts
Power Density (W/ft²)	24.75 W/ft <sup>2</sup>
Fixture Mounting Height	12.5' from floor, est. 6ft from max plant height



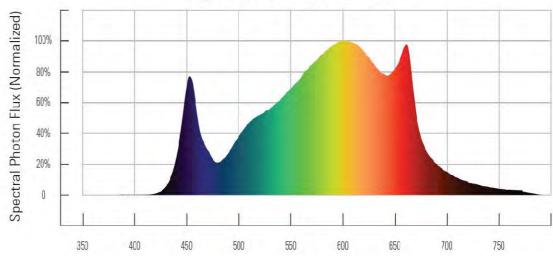


# **VYPR 4i Fixture Specifications**

SPE	CIFICATIONS
Light Source	LED
Spectrum	PhysioSpec™ Broad R4, R8, R8+FR, R9, R9+FR
Output	1320 - 3030 µmol/s
Efficacy	2.7 - 3.6 µmol/J
Efficacy @50% Dimmed	2.9 - 3.9 µmol/J
AC Input Power	413W-847W @ 400V AC
AC Input Voltage	120V-480V AC, 50/60 Hz
Light Distribution	Lambertian, Wide Beam Optic
Thermal Management	Passive
Max. Ambient Temperature	104°F / 40°C
Dimming	Source Signal Driver, 0-10V, Dim to off, Dimming: 10%-100%
Dimming Connector and Transmission Hardware/Type	Other Wired/M12 3-pin Male (1-Channel or M12- 5pin Male (2-Channel)
Power Factor	> 0,97
Total Harmonic Distortion	< 20%
Lifetime Q90	>50,000hrs
IP Rating	IP66; RH <90% non-condensing
Certifications	cETLus, CE, UKCA, Wet Location
Industry Standards	UL1598, UL8750, UL8800, IEC 60598-1
Warranty	5 Year Limited
Photobiological Safety IEC 62471	Risk Group 1
DLC Reported Controlled Environment	Indoor (Non-Stacked) or Greenhouse
DLC Reported Lighting Scheme Position / Use Case	Top Light / Sole-Source or Supplemental

PHOTON FLUX AND EFFICACY @400V AC						
PHYSIOSPEC™ SPECTRUM / CONFIGURATION	WAC	OUTPUT PPF (µmol/s) (400-700nm)	OUTPUT PF (µmol/s) (400-800nm)	Efficacy (PE) (µmol/J)	Efficacy (PE) (µmol/J) Ø50% Dim	
BROAD R4 (BW4) CG	825 W	2290	2340	2.8	2.9	

# PhysioSpec™ **BROAD BW4**



		DIMENSIO	ONS   WEIGHT		
	VYPR 4	Length	Width	Height	Weight
4i	Light Bar 800w	46.1" 1170mm	2.9" 107mm	3.3" 91mm	11.7 lbs 5.3 kg
POW	ER SUPPLY	Length	Width	Height	Weight







# Fluence History











# FLUENCE

#### SEPTEMBER 2012

Build My LED (BML) brand was launched at an industry trade show in Dallas, TX

2015

Build My LED (BML) rebranded to Fluence Bioengineering

**JANUARY 2016** 

Broad Spectrum lighting introduced to the market

**MAY 2018** 

OSRAM acquired Fluence Bioengineering, become Fluence by OSRAM

2018

Expanded global support team in EMEA and APAC

2019

Expanded to global manufacturing in China and Mexico

**MAY 2022** 

Signify acquired Fluence Bioengineering, become Fluence





Expanded out of cannabis - won first produce customer Shenandoah Growers

#### **NOVEMBER 2015**

First PHOTOx event in San Diego, CA



#### **MARCH 2016**

First set of case studies published showcasing cannabis, food, and academic/research partners and customers

#### **NOVEMBER 2018**

Fluence wins top lighting company of 2018 at Canadian Cannabis Awards hosted by Lift & Co.



#### **MAY 2019**

Fluence solutions obtain DLC certification

Fluence solutions introduced to Europe



#### **DECEMBER 2019**

Doubled revenue year over year



# **FLUENCE SUPPORT TEAMS**

#### STRATEGIC SALES SUPPORT

- The strategic sales support team collaborates with the Strategic Account Managers to evaluate project needs and support any internal actions required to ensure a smooth and comprehensive process.
- Supports the customer from the time that a PO is obtained, to long after the order has been shipped and received.
- · Well versed on each project and are poised to assist should anything not go to plan.

#### HORTICULTURE SERVICES

- The horticulture services team educates and empowers growers to utilize Fluence lights to their maximum potential while ensuring that all aspects of their overall setup are working in harmony.
- Provides any relevant feedback from ongoing research, trials, and/or professional experience that may
  assist in making an informed decision on the needs of the customer.

#### LIGHTING DESIGN

- The lighting design team carefully evaluates the information provided by the customer to create a custom lighting design with a complete list of all products needed and how each product will connect and work together
- The Lighting Design team analyzes cost structures vs. design/engineering variability vs. customer needs. The lighting designs are used during the final review to ensure that quotes, P.O.s, and lighting designs match prior to promoting an opportunity.

#### **UTILITY REBATES**

 The Utility Rebates team works with the customer to educate them on the utility rebate process, submit utility rebate applications on the behalf of the customer, and inform them of the status of their rebate submission.

#### FIELD APPLICATION ENGINEERING

- The field application engineers participate with site and electrical planning, advice on use of AC and DC flex wiring for custom lighting configurations, and are ready to visit customers, as needed
- Assists in installation, final install review, and any post-sale needs that may arise. This could involve technical questions, site visits, and ongoing customer project involvement.

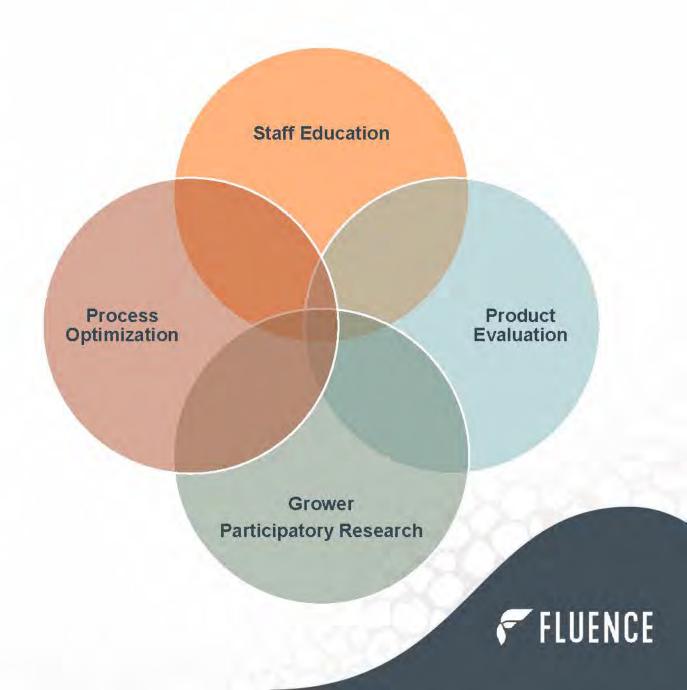




# **Horticulture Services**

Fluence supports strategic customers in getting the most out of their investment in supplemental lighting through ongoing Horticulture Services. When light spectrum and levels are optimized and the latest LED technology is used, some adjustments will need to be to other factors made to optimize production. Our Horticulture Service team is here to support and ensure success through:

- Direct access to our HS specialists
- Onsite visits and video calls with cultivators
  - Visits enable cohesive progression plans to supplement current growing strategies
- Customized protocols to optimize performance associated with Fluence solutions
- Recommendations to optimize current, general cultivation strategy, including processes and/or materials.





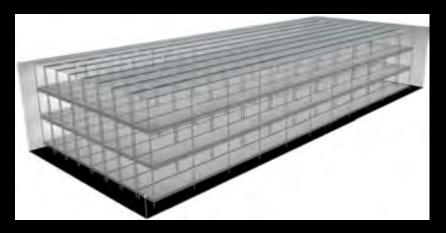


# **Welcome to PowerPlant Park**

A Master Planned Cannabis Community & Campus

PowerPlant Park Nursery Tissue Culture Lab Building 111 - Phase I - Part A



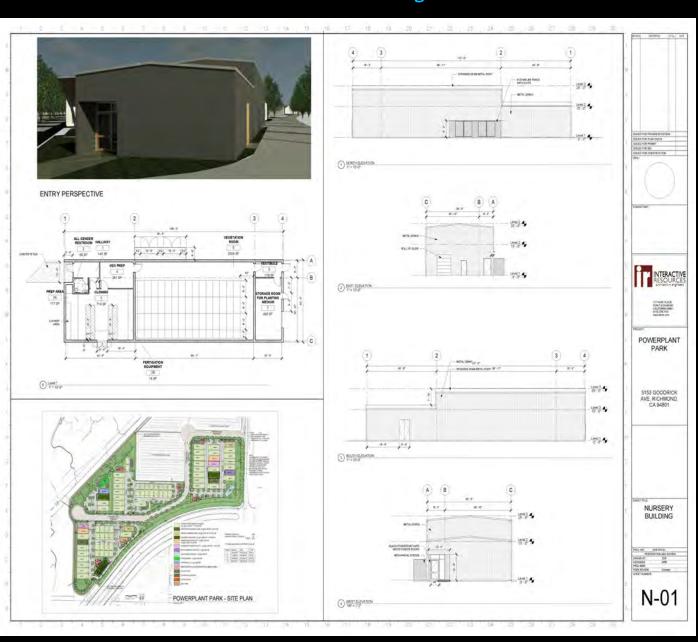






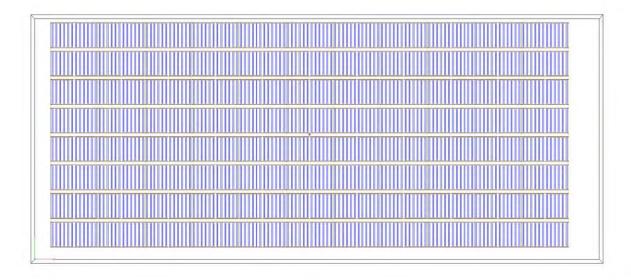
#### PowerPlant Park Nursery Tissue Culture Lab Building 111 - Phase I - Part A

# **Architectural Drawing**

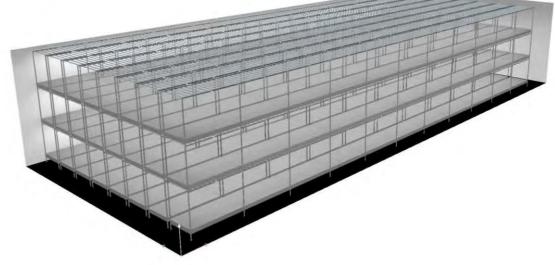


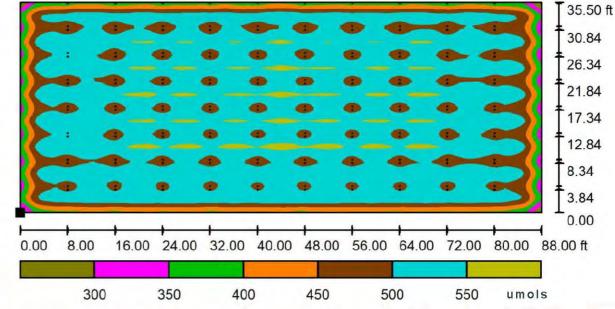
# **PowerPlantPark – Nursery Space**

3 Tiers; 8 rows of 22 fixtures



Fixture Quantity	528 Fluence SPYDR 2x fixtures
PPFD Average / Max	504 / 577 µmol/m²/s
PPFD Average / Max at Minimum Dimming (10%)	50.4 / 57.7 µmol/m²/s
Total Electrical Input	183,744 watts
Fixture Mounting Height	Est. 3ft to 8in above plant canopy







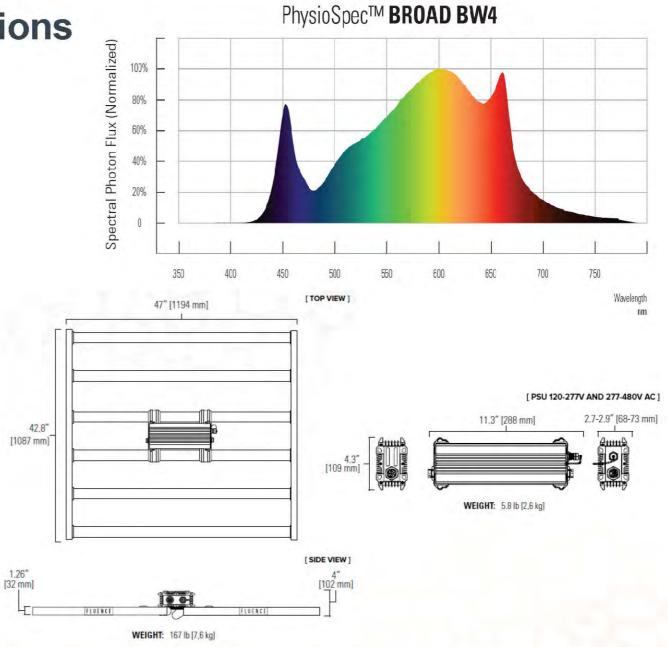
# **SPYDR 2x Fixture Specifications**

SPEC	IFICATIONS
Light Source	LED
Spectrum	PhysioSpec™ Broad R4
Light Output PPF	860 µmol/s
Efficacy	2.5 µmol/J @ 277 V AC
AC Input Power	348 W @ 277 V AC
AC Input Voltage	120-277 V AC, 277-480 V AC, 50/60Hz
Light Distribution	120°
Mounting Height Above Canopy	6" - 12" [15-30 cm]
Thermal Management	Passive
Max. Ambient Temperature	95°F [35°C], 90% RH
Dimming	Source Signal Driver, 0-10 V, Dim to Off / Dimming: 10-100%
Total Harmonic Distortion (THD)	< 10% at 100% output
Lifetime (Driver and LED L90)	> 50,000 hrs
IP Rating IEC 60529	IP66
Certifications	UL 8800, UL 1598 Wet Location, DLC
Warranty	5 Year Limited Warranty
DLC Reported Application Position/Use case	Indoor (Stacked and Non-stacked), Top light/Sole-source

#### NOMINAL ELECTRICAL AC INPUT\*

AC VOLTAGE	120V	208V	277V	347V	480V
AC Current	2.97 A	1.70 A	1.38 A	1.05 A	0.72
AC Power	354 W	346 W	348 W	342 W	334 W
Power Factor	0.997	0.975	0.913	0.939	0.966

<sup>\*</sup> At 77°F (25°C) ambient temperature









# SPYDR 2x47

SPYDR 2x is an early-development stage top-lighting solution for commercial horticulture cultivation, or a full-cycle top-lighting solution for home hobbyists cultivating without CO<sub>2</sub> supplementation at ambient conditions around 400 ppm.



# SPYDR 2x47



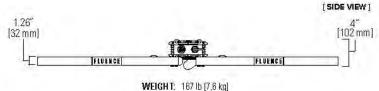
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Max. Ambient Temperature	95°F [35°C], 90% RH
Dimming	Source Signal Driver, 0-10 V, Dim to Off / Dimming: 10-100%
Total Harmonic Distortion (THD)	< 10% at 100% output
Lifetime (Driver and LED L90)	> 50,000 hrs
IP Rating IEC 60529	IP66
Certifications	UL 8800, UL 1598 Wet Location, DLC
Warranty	5 Year Limited Warranty
DLC Reported Application Position/Use case	Indoor (Stacked and Non-stacked), Top light/Sole-source

# 42.8" [1087 mm]

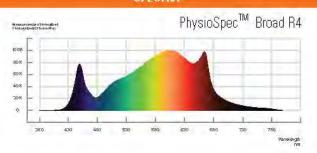
#### NOMINAL ELECTRICAL AC INPUT\*

AC VOLTAGE			2731	347V	480V
AC Current	2.97 A	1.70 A	1.38 A	1.05 A	0.72
AC Power	354 W	346 W	348 W	342 W	334 W
Power Factor	0.997	0.975	0.913	0.939	0.966

\* At 77°F [25°C] ambient temperature

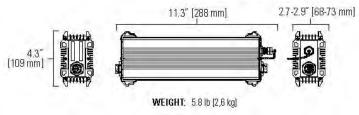


#### SPECTRA



**Disclaimer:** Performance values are from representative tests performed in accordance industry standards listed. Actual application performance may vary due to component tolerances and installation, environmental, and field measurements conditions.

#### [ PSU 120-277V AND 277-480V AC ]





Contact FLUENCE®

support@fluence-led.com@

www.fluence-led.com/products/spydr-series

# SPYDR 2x47



AC POWER CABLE (Power Supply to AC Line)

Description	Regional Commercial Code	Ordering PN 12NC Single Pack (S)	Ordering PN 12NC Bulk Pack (B)	Bulk Pack Carton Quantity
6 FT (1.83 m) AC Extension Cable, NEMA 5-15P Plug, M19 Push Lock, Max 125 V AC	CAA-XXU3P9FN5P1.8	9124 017 01611	9124 016 88454	10.
6 FT (1.83 m) AC Extension Cable, NEMA 6-15P Plug, M19 Push Lock, Max 250 V AC	CAA-XXU3P9FN6P1.8	9124 017 01613	9124 016 88456	10
6 FT (1.83 m) AC Extension Cable, NEMA L7-15P Plug, M19 Push Lock, Max 277 V AC	CAA-XXU3P9FL7P1.8	9124 017 01625	9124 016 55898	10
6 FT (1.83 m) AC Extension Cable, Pigtail, M19 Push Lock, Max 480 V AC	CAA-XXU3P9FL3X1.8	9124 017 01624	9124 016 55875	10
15 FT (4.57 m) AC Extension Cable, NEMA 5-15P Plug, M19 Push Lock, Max 125 V AC	CAA-XXU3P9FN5P4.6	9124 017 01612	9124 016 88455	5
15 FT (4.57 m) AC Extension Cable, NEMA 6-15P Plug, M19 Push Lock, Max 250 V AC	CAA-XXU3P9FN6P4.6	9124 017 01614	9124 016 88457	5
15 FT (4.57 m) AC Extension Cable, NEMA L7-15P Plug, M19 Push Lock, Max 277 V AC	CAA-XXU3P9FL7P4.6	9124 017 01626	9124 016 55899	5
15 FT (4.57 m) AC Extension Cable, Pigtail, M19 Push Lock, Max 480 V AC	CAA-XXU3P9FL3X4.6	9124 017 01610	9124 016 88461	5
6 FT (1.83 m) AC Cable, AXH3, Type I SAA Plug, M19 Push Lock Female	CAZ-XXS3P9FTIP1.81	9124 017 01618	9124 016 88467	10
6 FT (1.83 m) AC Cable, VDE H07 RN-F, Pigtail, M19 Push Lock (CE countries)	CAR-XXV3P9FL3X1.81	9124 017 01616	9124 016 88464	10
15 FT (4.57 m) AC Cable, VDE H07RN-F, Pigtail, M19 Push Lock (CE countries)	CAR-XXV3P9FL3X4.61	9124 017 01617	9124 016 88465	5

<sup>1.</sup> Extended lead time applies. Consult Fluence operations for details.

#### LIGHT BARS

Description	tion Regional		Ordering PN 12NC	Bulk Pack
	Commercial Code		Bulk Pack (-B)	Pallet Quantity
SPYDR, 2x47, Light Bar, R4	SR-2X47-I	9124 016 55427	9124 017 01649	15

#### **POWER SUPPLIES**

	AC Connector Type	DC Current	Regional Commercial Code	Ordering PN 12NC Single Pack (-5)	Ordering FN 12NC Bulk Fack (-B)	Bulk Pack Pallet Quaritity
120-277 V	M19	6.2 A	PLMG-V3B-320-062	9124 016 56230	9124 016 56264	30
277 -480 V	M19	6.2 A	PHMG-V3B-320-062	9124 016 56232	9124 016 56266	30

#### **POWER SUPPLY ACCESSORIES**

Description	Used with Power Sypply	Regional Commercial Gode	Ordering PN 12NC Single Pack (-5)	Ordering PN 12NC Bulk Pack (-B)	Bulk Pack Carron Quantity
320W PSU Fixture Mounting Bracket Kit	PLMG-V3B-320-062 PHMG-V3B-320-062	MF-S2-MB-3V	9124 017 01634	9124 016 55908	20
320W PSU Wall/Surface Mounting Kit	PLMG-V3B-320-062 PHMG-V3B-320-062	MS-PS-MB-3V	9124 016 56290	9124 016 56012	10

DC CABLE (Fixture to Remote Power Supply)

	Regional Commercial Code	Ordering PN TZNC Single Pack (S)	Ordering PN 12NC. Bulk Pack (B)	Bulk Pack Carton Quantity
3 FT (0.91 m) DC Extension Cable, M19 Push Lock	CDG-XXU2P9MP9F0.9	9124 017 01619	9124 016 55876	10
6 FT (1.83 m) DC Extenstion Cable, M19 Push Lock	CDG-XXU2P9MP9F1.81	9124 017 01620	9124 016 55880	10

<sup>1.</sup> Extended lead time applies. Consult Fluence operations for details.







#### LUMINAIRE WITH POWER SUPPLY

Description	Regional Commercial Gode	Ordering PN 12NC Single Pack (-5)	Ordering PN 12NC Bulk Fack (-B)	Bulk Pack Quantity
SPYDR 2x47, Broad R4, LVG	SR-2X47-J-LVG	9124 017 01675	9124 017 01682	Varies
SPYDR 2x47, Broad R4, HVG	SR-2X47-I-HVG	9124 017 01676	9124 017 01683	Varies

LUMINAIRE WITH POWER SUPPLY (Retail Kits)

Description	Regional Catalog Løde	Ordering PN 12NC Single Papi:
SPYDR 2x47, Broad R4, LVG, No AC Cord, Retail Kit (Includes 11" dimming cable and lance hangers)	SR-2X47-I-LV-XXX-R	9124 017 01751
SPYDR 2x47, Broad R4, LVG, SAA AC Cord, Type I Plug, Retail Kit (Includes 80 cm dimming cable and lance hangers)	SR-2X47-I-LV-ASP-R1	9124 017 01752

<sup>1.</sup> Extended leadtime applies. Consult Fluence operations for details.

#### MOUNTING HARWARE

Description	Pcs per kits	Regional Commercial Code	Ordering PN 12NC Single Pack (-S)	Ordering PN 12NC Bulk Pack ( B)	Bulk-Fack Carton Quantity
Adjustable Hanging Kit	2	MT-SR-GM-05	9124 017 01641	9124 016 55893	10
Lance Wire Hanger Kit	2	MT-SR-M2-XX	9124 017 01633	9124 016 88765	20
Offset Solid Deck Mounting Kit	4	MR-S2-SD-OS	9124 017 01630	9124 016 887 62	20
Solid Deck Wire Hanger Kit 4.38 IN	4	MR-S2-SD-XX	9124 017 01638	9124 016 55894	20
Waterfall Wire Hanger Kit, Twisted V (8.375")	4	MR-S2-WL-XX	9124 017 01639	9124 016 55895	20
Waterfall Wire Hanger Kit, Twisted V (5.5")	4	MR-S2-WS-XX	9124 017 01640	9124 016 887 63	20
PIPP Rack Hanger Kit - ABS Tray (4"Spacing)	4	MR-S2-VS-XX	9124 017 01632	9124 016 88771	20
PIPP Rack Hanger Kit - ABS Tray with VAS (6"Spacing)	-4	MR-S2-VL-XX	9124 017 01631	9124 016 56014	20
PIPP Rack Hanger Kit - ABS Tray with VAS Long (8"Spacing)	4	MR-S2-VL-XL <sup>1</sup>	9124 017 01761	9124 017 01760	20
PIPP Rack Hanger Kit - Offset Drip/Flood Tray with VAS	4	MR-S2-VL-OS1	9123 000 02431	9124 016 88773	20
PIPP Rack Hanger Kit - Offset Drip/Flood Tray	4	MR-S2-VS-OS	9124 017 01642	9124 016 88775	20

<sup>1.</sup> Extended leadtime applies. Consult Fluence operations for details.

DIMMING SIGNAL CABLE (Power Supply to Dimming Control)

Description-	Regional Commercial Code	Ordering PM 12NC Single Pack (3)	Ordering PN 12NC Bulk Pack (B)	Bulk Pack Carton Quantity
11 IN (28 cm) Dimming Signal Cable, Pigtail, M12 Connector	CCA-XXU3T2FL3X0.3	9124 017 01621	9124 016 55902	10
5 FT (1.52 m) Dimming Signal Cable, Pigtail, M12 Connector	CCA-XXU3T2FL3X1.5	9124 017 01622	9124 016 55881	10
80 cm (31,5 IN) Dimming Signal Cable, Cca, Pigtail, M12 Connector	CCE-XXC3T2FL3X0.81	9124 017 01623	9124 016 55883	10

<sup>1.</sup> Extended leadtime applies. Consult Fluence operations for details.





Date: 6/17/2022

#### Sold To:

PowerPlant Park, Phase 1A 116 Washington Ave, Suite C Richmond, CA 94804 Phone: 415 233-3131 Contact: Richard Treiber

Email: richard@powerplantpark.com

#### Ship To:

PowerPlant Park Phase 1A 3153 Goodrick Avenue Richmond, CA 94801 Phone: 415 233-3131 Contact: Richard Treiber

#### **Primary Structure:**

Vail style greenhouses (10) - 36" wide x 96' long

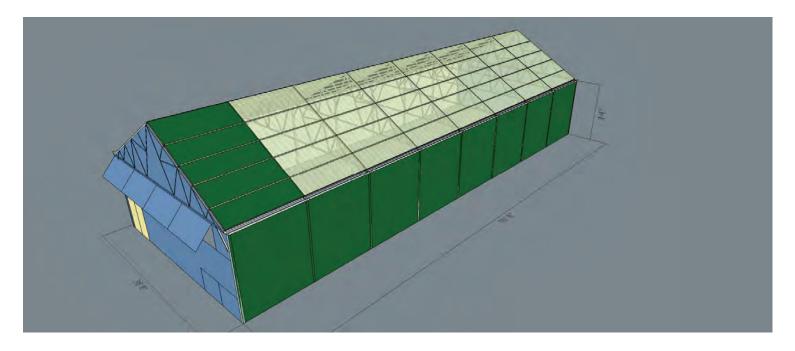
Total of 3,456 square feet ea. x 10 Greenhouses = 34,560 sqft total

- 3024 sqft of Flower Zone (each single greenhouse)
- 432 sqft of work corridor/air mixing plenum (each single greenhouse)

12 ft. bay spacing, 9 purlin runs per house

14 ft. under-gutter height

(ANCHOR BOLTS for column base plates are NOT included unless specified)





Date: 6/17/2022

#### Framing and covering accessories for roof, sides, and ends:

Gable framing for 30 ends

Gable attaching accessories for 30 ends

Gable flashing for 30 ends

Sidewall framing for 160 - 12ft. bay sections

Sidewall attaching accessories and flashing for 160 - 12ft. bay sections

Gable Extrusions: 10-Gable ends, 6 Ft. Sheets

#### **Doors and entry ways:**

(10) ea. Door framing kit (3070 walk door opening)

(20) ea. Door framing kit (6070 dbl. door)

#### **Ventilation:**

(10) End wall gable vents - single vent, curved interior rack arms 48 in. x 32 ft. (corrugated metal)

- Each greenhouse has an upper-gable shutter and fan above the curtain system for attic space ventilation (dehumidification and winter condensation control)
- Each greenhouse has three Agrifans (reversible vertical air flow fans) to increase air mixing in the canopy, truss-mounted
- (10) ea. Air intake vent motors & controller VC100A ILS-Open/Close (LST) (M-1001)
- (9) ea. Split vent kit

#### Additional items and accessories:

(7680) ft. Purlin drip cap

(50) ea. Equipment framing(s)

(360) ft. Pad stringer framing

(20) ea. Gutter end cap(s)

(20) ea. Gutter down spout(s)

(1920) ft. Under gutter drip channel

(10) Light grid for LED lighting, 5 runs perpendicular to trusses, attached directly to the bottom cord of the trusses. (fixtures supplied by others)

#### **Environmental Controls by Wadsworth:**

(10) SEED Environmental Controls including:

- Wiring diagram(s) controller and greenhouse equipment
- Contactor panels
- Light sensor: PAR Light sensor and leveling fixture
- Temperature and humidity aspirators with cable
- Integrated with the H.E Anderson fertigation unit

Site Visits by Wadsworth Rep:

- Single day preliminary visit (during installation)
- Four days of training (two, 2-day sessions)

Additional adjustments to the control system will require a change order once this contract is in place.



Date: 6/17/2022

#### **Rolling Benches:**

(130) - 66in. x 32ft. long rolling benches (unassembled, complete bench)

18" Web spacing, 21in. aisle, legs w/ plates, 1.315" 14ga rollers, alum. bench rail w/ 1" lip, 18" std.ht.

- Plant counts 1144 per greenhouse flower zone
- (1560) Trellis Bracket system, 6ft on center, 12 trellis bracket risers per bench, including screws
- (6240) ft. Trellis Bracket Risers
- (1) Staal Plast ebb flood trays bench wide for Storage GH (one set of 13 benches)
- (14,976) Troughs 1,664 LF per greenhouse Flower Production GHs
  - 4 troughs per bench
  - 10.5" wide on benches (air space between allows for vertical air flow through the canopy)

#### **H.E. Anderson Fertigation Unit:**

- J+ Advanced Fertigation Unit, water meter, 4 position manifold, 16 gal blending tank, frame, pipefittings, three fertilizer pumps, two pumps acid and sanitizer, EC monitor, PH monitor
- Air compressor for HE Anderson
- Fully automated integrated with Wadsworth SEED
- 2 Site Visits for onsite training, inspection, setup, H.E. Anderson Rep

#### **Irrigation:**

- (10) Water storage tanks
- (10) Fresh water pump and fittings
- (10) Solenoid valves and misc. parts, for 4 grow zones per greenhouse including inline media filter
- (10) PVC components supply lines schedule 40,
- (10) Bench Top Irrigation components, PVC, tubing, Netafim pressure compensating drip emitters
- (10) Axeon Reverse Osmosis Systems, with softeners and prefilters

#### **Odor Mitigation System Fogco:**

Atomizing mist ring on each exhaust fan.

• Including all necessary parts – VFD pump, vinyl supply lines, steel ring, stainless nozzles

#### **Light Deprivation Systems- Fully Automated:**

- (30) ea. Light Traps Blackout BW56x56
- (10) ea. Light Traps Brownout Light Trap Pad Wall Brownout
- (30) ea. Extended Wall Housing-Fan (48")
- (720) ft. Light Dep Flashing Gable
- (1680) ft. Light Dep Flashing Exterior Sidewall
- (270) ft. Light Trap Flashing/Housing
  - (10) 3024 sqft. Shade System(s), OBSCURA A+B+B Triple layer blackout curtain system

#### **Insect Screen:**

- Anti-Thrips screen OptiNet Cust.intl
- Box insect screen cage to the interior of the vent in work corridor



Date: 6/17/2022

## **Covering:**

(39,000) sqft. greenhouse roof - corrugated

• High light transmission - high diffusion

(54,750) sqft. Exterior walls - metal corrugated. 26ga, single layer

- PVDF Paint System (70% Kynar) see provided paint finish specs
- Double bright white interior / painted exterior
- 37,500 sqft Forest Green (corridor roof and side walls)
- 17,250 sqft Ocean Blue (greenhouse gable ends)

(8,000) sqft. Interior gable wall - 8mm twin wall polycarbonate

• Color – White / Black / White with extrusions and attaching accessories

## **Cooling Equipment:**

(20) Coolair Fan(s): NBF48L 1HP (1-Speed, 1 Phase, Box-wall housing)

- Below curtain exhaust
- (10) Coolair Fan(s): NBF48K 3/4HP (2-Speed, 230V, Box-wall housing)
  - Adjustable air intake speed, for winter dehumidification
- (10) Coolair Fan(s): NBF24K 3/4HP (2-Speed, 230V, Box-wall housing)
  - Above curtain dehumidification / cooling
- (10) ea. Automatic Shutter(s): LRW39E
  - Air intake above the curtain, dehumidification
- (10) Evaporative Cooling Pad System: 19 4' x 32',
  - Including all necessary parts, pumps, sumps, 6" PVC, & end kits, cool cell cooling pads
- (30) Agrifans reversible vertical airflow fans through canopy air circulation
- (680) ft. 8" Roll Flashing

## **Heating Equipment:**

- (30) Modine Electric Heaters PTE400 (3) grow zones
- (10) Modine Electric Heaters PTE300 (1) work corridor
- (30) ea. Heater hanging kits (4-rod)
- (10) ea. Heater hanging kits (2-rod)

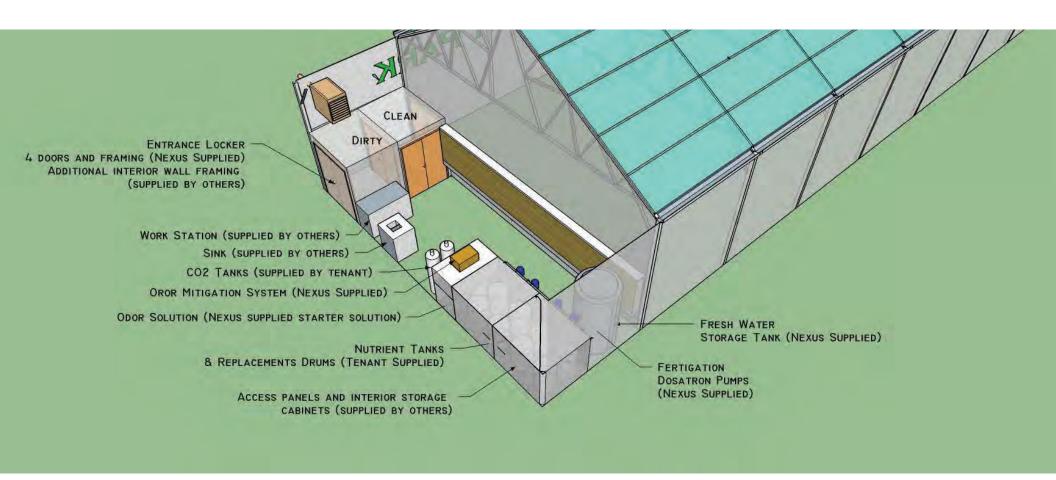
## **Exclusions:**

Construction Labor - Prospiant is not responsible for the construction labor ( \_\_\_\_\_\_initial). Customer understands and agrees that Prospiant has no liability for the builder selected, the quality of the builder's installation, estimates of installation time or costs, supervision of the installation contractor, or any other issues relating to the construction labor.

This proposal specifically excludes electrical materials including low voltage service (up to and including equipment point of connections).

MEP design work (other than supplied irrigation drawings, and Wadsworth environmental control drawings). Please see additional exclusions in the Proposal above and included in Prospiant terms and conditions below.





# [ POWER PLANT PARK ]

3153 GOODRICK AVENUE | RICHMOND, CA 94801

MANUFACTURER/SUPPLIER:

# PRCJSPIANT GROWTH PROOTED IN PARTNERSHIP

5513 VINE STREET CINCINNATI, OH 45217 WWW.PROSPIANT.COM PH. (513) 242-0310 FAX (513) 242-0816 PROSPIANT, INC. JOB NO. 2216002

#### IRRIGATION SYSTEM

Sheet List Table						
No. TITLE						
SY0.0	COVER PAGE					
SY0.1	GENERAL NOTES					
SY0.2	SCHEDULES					
SY1.0	IRRIGATION P&ID					
SY1.1	WM OVERHEAD					
SY1.2	ELEVATION DETAILS					
SY2.0	MANIFOLD DETAILS					
SY2.1	IRRIGATION DRIP DETAILS					
SY2.2	BENCH DRAIN DETAILS					

PROJECT CONTACT: RYAN CHAREK
COVER PAGE
THE DRAWINGS AND DATA IN THIS DOCUMENT, AND THE INTELLECTUAL PROPERTY AND CONFIDENTIAL INFORMATION IT CONTAINS ARE THE PROPERTY OF PROPERTY AND CONFIDENCIAL INFORMATION IT CONTAINS ARE THE PROPERTY OF PROPERTY AND THE PROPERTY

- CONTRACT DRAWINGS ARE DIAGRAMMATIC. INTENDED TO CONVEY SCOPE OF WORK, AND SHOW GENERAL ARRANGEMENT OF EQUIPMENT AND SERVICES FIELD VERIFY DIMENSIONS OF EXISTING CONDITIONS PRIOR TO EXECUTION OF WORK, REFER TO DETAIL AND SCHEDULES FOR ADDITIONAL INFORMATION OR REQUIREMENTS
- A SET OF CONSTRUCTION DRAWINGS SHALL BE MAINTAINED AT THE JOB SITE TO BE USED TO DOCUMENT DATA. INCLUDING BUT NOT LIMITED TO LOCATIONS AND EQUIPMENT SCHEDULES.
- FOR ALL ITEMS PROSPIANT IS CONTROLLING BUT NOT PROVIDING OR INSTALLING, PROSPIANT DRAWINGS

  3. ARE SUPERCEDED BY SUPPLYING/ INSTALLING CONTRACTOR'S. PROSPIANT SCHEDULES ARE FOR REFERENCE ONLY
- 4. DRAWINGS MAY DIFFER FROM ACTUAL INSTALLATION. DRAWINGS AND DESIGNS ARE DEPENDANT ON ACCURATE VENDOR INFORMATION.
- 5. PROSPIANT EQUIPMENT LOCATION IS PRECEDENT OVER ELECTRICAL DISCONNECT LOCATIONS.

INSTALLATION NOTES (UNLESS OTHERWISE SPECIFIED)

- 1. ALWAYS REFER TO EQUIPMENT MANUFACTURER'S INSTALLATION MANUALS FOR PROPERLY INSTALLING PIPING TO EQUIPMENT.
- 2. ALL PIPING TO BE SUPPORTED AS NECESSARY PER PIPING SUPPORT SCHEDULE.
- 3. INSTALLING SUBCONTRACTOR SHALL ASSEMBLE PARTS SUPPLIED BY PROSPIANT PER DETAILS.
- 4. ATTACHMENTS TO STRUCTURE SHALL BE SUPPLIED BY INSTALLING SUBCONTRACTOR AS REQUIRED
- 5. INSTALLATING SUBCONTRACTOR WILL BE REQUIRED TO MEASURE AND CUT SECTIONS OF THREADED ROD, STRUT, PIPE BASED ON FIELD CONDITIONS
- STRUT, PIPE BASED ON FIELD CONDITIONS.
   HIS IS A CORROSIVE ENVIRONMENT AND PROPER MATERIALS MUST BE USED. HARDWARE SHALL BE STALL CALVANIZED BY OF OR HIDE AS NOTED ON THE DETAIL.
- 6. STAINLESS STEEL, GALVANIZED, PVC, PE, OR HDPE AS NOTED ON THE DETAIL.
- 7. PVC CONNECTIONS TO HAVE PTFE FILM TAPE IF THREADED AND CLEAR PVC GLUE IF SOCKET WELDED

MATERIALS EXCLUDED (UNLESS OTHERWISE SPECIFIED)

- ALL LINE VOLTAGE AND LOW VOLTAGE WIRING, CONDUIT, AND DISCONNECTS SHALL BE SUPPLIED AND INSTALLED BY ELECTRIC CONTRACTOR.
- WATER LINE AND BACKFLOW PREVENTER SHALL BE SUPPLIED AND INSTALLED BY OTHERS.

SITE CONDITIONS EXCLUSIONS (UNLESS OTHERWISE SPECIFIED)

- . .....
- 2. PERMITS AND STATE OR LOCAL GOVERNMENT APPROVALS
- 3. SITE/FOUNDATION/SOIL PREPARATION, TESTING, DEMOLITION, DEBRIS REMOVAL SERVICES, OR EQUIPMENT

4 TEMPORARY ELECTRICAL AND WATER

5. CRANING/HOISTING OF EQUIPMENT

3. CUTTING, CORE DRILLING, OR PATCHING OF WALLS, FLOORS, DOORS, CEILINGS, OR ROOFS

7. ACCESS PANELS AND PENETRATIONS, FIRESTOP, AND CAULKING

8. PAINTING OF EXPOSED PIPING AND EQUIPMENT

9. CONCRETE PADS AND/OR STEEL EQUIPMENT SUPPORTS AND FOUNDATIONS

10. SYSTEM BALANCING

MATERIALS SUPPLIED (UNLESS OTHERWISE SPECIFIED)

SUPPLIED MATERIAL WILL BE PER CUSTOMER APPROVED QUOTE AND CONSTRUCTION DRAWINGS PROVIDED BY PROSPIANT

TESTING NOTES (UNLESS OTHERWISE SPECIFIED)

1. FLUSH, PRESSURE, AND LEAK TEST SYSTEM AT 125 PSI FOR 6 HOURS AFTER INSTALLATION IS COMPLETE.

#### SOCKET CONNECTIONS

CUT PIPE SQUARE. OHAMFER AND DEBURR PIPE. SURFACES MUST BE CLEANED AND FREE OF DIRT, MOISTURE, OIL AND OTHER FOREIGN MATERIAL. APPLY PRIMER TO INSIDE OF SOCKET SURFACE. USE A SCRUBBING MOTION, REPEAT APPLICATIONS, MAY BE NECESSARY TO SOFTEN THE SURFACE OF THE SOCKET. NEXT, LIBERALLY APPLY PRIMER TO THE MALE END OF THE THE PIPE TO THE LENGTH OF THE SOCKET DEPTH, AGAIN APPLY TO THE SUCKET, WITHOUT DELAY APPLY CEMENT TO THE PIPE WHILE THE SURFACE IS STILL WET WITH PRIMER, NEXT APPLY CEMENT LIGHTLY, BUT UNFORMLY TO THE INSIDE OF THE SOCKET. APPLY AS EXCHANGE THE PIPE PIPE INTO THE SOCKET TO THE SOCKET. THE PIPE SHOULD BE HELD IN POSITION FOR APPROXIMATELY 30 SECONDS TO ALLOW THE CONNECTION TO SET, AFTER ASSEMBLY WITHOUT DELAY THE PIPE SOCKET. THE PIPE SHOULD BE HELD IN POSITION FOR APPROXIMATELY 30 SECONDS TO ALLOW THE CONNECTION TO SET, AFTER ASSEMBLY WITHOUT DELAY THE PIPE SOCKET. THE PIPE SHOULD BE HELD FOR "JOINT CURE THE ABLE BELOW"

#### THREADED CONNECTIONS

WRAP THEADS OF PIPE WITH TEFLON TAPE OF 3 TO 3-12 MIL THICKNESS. THE TAPE SHOULD BE WRAPPED IN A CLOCKWISE DIRECTION STARTING AT THE FIRST OR SECOND FULL THEAD. OVERLAP EACH WRAP BY, I THE WITH OF THE TAPE. THE WRAP SHOULD BE APPLIED WITH SUFFICIENT TENSION TO ALLOW THE THREADS OF A SINGLE WRAPPED AREA TO SHOW THROUGH WITHOUT CUTTING THE TAPE. THE WRAP SHOULD CONTINUE FOR THE FULL EFFECTIVE LENGTH OF THE THREADS TO PROVIDE A LEAK PROOF JOINT, THE PIPE SHOULD BE THREADED INTO THE BULKHEAD FITTING HAND TIGHT. USING A STRAP WRENCH ONLY TIGHTEN THE JOINT AN ADDITIONAL J. 3-1-12 TURNS PAST HAND TIGHT.

JOINT CURE SCHEDULE								
	TEST PRESSURE FOR PIPE SIZES ½" TO 1-1/4"	TEST PRESSURE FOR PIPE SIZES 1-½" TO 3"	TEST PRESSURE FOR PIPE SIZES 4" TO 5"					
TEMPERATURE RANGE DURING CURE PERIOD (F)	UP TO 180 PSI (1240 KPA)	UP TO 180 PSI (1240 KPA)	UP TO 180 PSI (1240 KPA)					
60 TO 100	1 HOUR	2 HOURS	6 HOURS					
40 TO 60	2 HOURS	4 HOURS	12 HOURS					
20 TO 40	6 HOURS	12 HOURS	36 HOURS					
10 TO 20	8 HOURS	16 HOURS	3 DAYS					
COLDER THAN 10		HOULD BE EXERCIS E, FITTINGS OR CEN						

INSTALLATION INSTRUCTIONS (BULKHEAD FITTINGS IN INCHES)							
BULKHEAD SIZE	MIN RIGID TANK RADIUS (SF= STANDARD FLANGE, LF= LARGE FLANGE)	MAX WALL	MIN/MAX HOLE SIZE				
1"	11.75" SF / 20.50" LF	2.08"	1.87" / 1.91"				
1-1/4"	16.25"	2.00"	2.63" / 2.67"				
1-1/2"	16.25"	2.00"	2.63" / 2.67"				
2*	25.75"	2.00"	3.25" / 3.28"				
3"	30.00"	2.12"	4.50" / 4.54"				

Piping Supports								
Pipe Size	Pipe Material	Maximum Span	Hanger Rod Size	Plastic Clips				
10	PVC - SCH 40	4'	3/4"-16	No				
1 1/2	PVC - SCH 40	5*	%"-16	·No				
2"	PVC-SCH 40	5'	14"-16	No				
3"	PVC - SCH 40	6'	<b>%"-16</b>	No				

**PRCOSPIANT** 

5513 Vine Street - Cincinnati, OH 462 (513) 242-0310 - www.Prospiant is the previous accords in the popularity, not be instancial accordinate, according in constant are the recommitatives for - sets the presidence accordinate to a accordinate the popularity obes to incommission accordinate accordinate the popularity obes to provide accordinate accordinate accordinate the popularity obes to the providence accordinate accordinate the popularity obes to the providence accordinate accordinate to the providence accordinate a

ENGINEER'S SEAL APPLIES TO DESIGN

POWER PLANT PARK

IRRIGATION SYSTEM



D/JRD 9/15/2022

WED BY: SCALE:
AS NOTED

GENERAL NOTES

SY0.1

2216002 DRAWN BY: MCO/JRD

A GENERAL NOTES
SCALE: NONE

## **PRCOSPIANT**

ENGINEER'S SEAL APPLIES TO DESIGN OF MECHANICAL COMPONENTS ONLY

POWER PLANT PARK

DA TE	5/2/3	5/31	6/21	١.	١.	
	22	2022	2022			
DESCRIPTION	5/2/2022 POWER PLANT PARK PROGRESS SET	5/31/2022 CUSTOMER APPROVAL SET	6/21/2022 CUSTOMER APPROVAL SET			

2444444<

POWER PLANT PARK 3153 GOODRICK AVENUE RICHMOND, CA 94801

2216002	SALESIPM:
DRAWN BY:	DATE:
MCO/JRD	9/15/2022
REVIEWED BY:	SCALE:
JTF	AS NOTED

SCHEDULES SY0.2

**Cultivation Equipment** Connection VAC Ø Item Qty Description Manufacturer Model Capacity Amperage Size IBP-1 Irrigation Booster Pump Dab E.Sybox 10-32 GPM 230 V 10.A AT-1000S 1000 GPD 1" x 3/8" RO-1 Reverse Osmisis Axeon 110 V 8.2 A IRV-1E Imgation Valve Netafim 61ET1.0GH2 10 24 V <1.0 A INJ-1 Nutrient Injector HE Anderson J+ Advanced Control 40 120 V 4 A AC-1 Air Compressor Ingersoll Rand SS4L5 135 psi max 60 gal 19 230 V 21.5 A TLPS-1 1 Tank Level Pressure Sensor Axeon

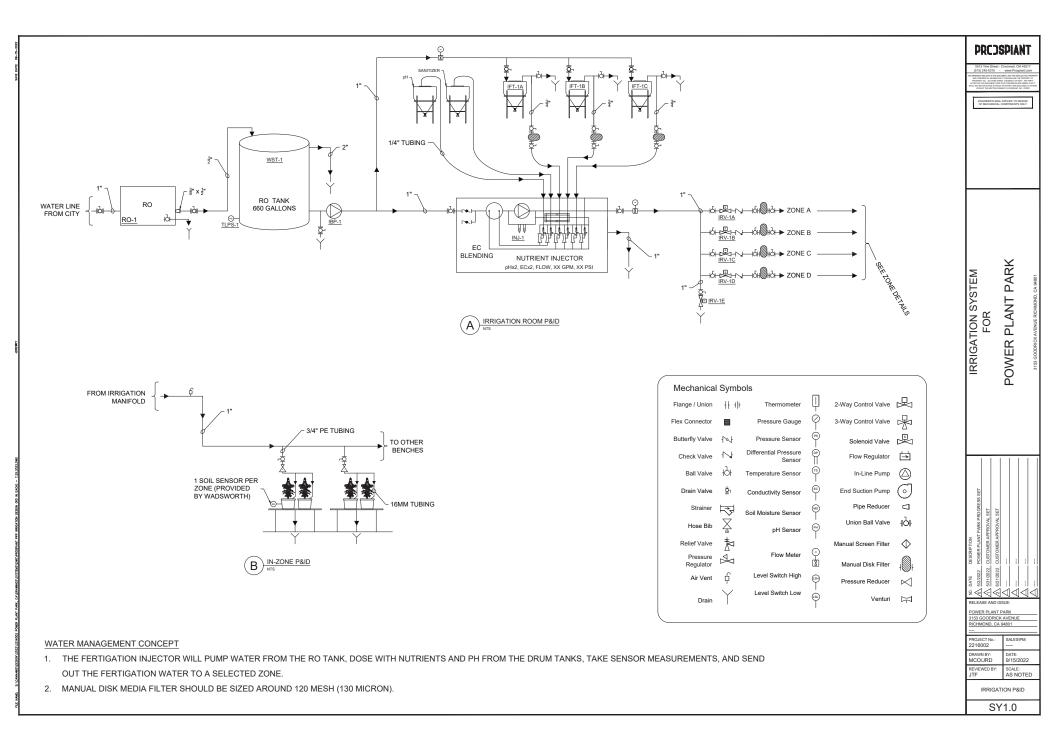
Irrigation Details												
Control Valve				lve		Zone Details						
Zone	Location	Tag	Size	VAC	# of Benches	Bench Width (ft)	Bench Length (ft)	Plant Count per Bench	Plant Count per Zone	Dripper Size (GPH)	Drippers per Plant	GPM per Zone
1A	Zone	IRV-1A	10	24	4	5'	32'-0"	84	336	1.0	2	11.2
1B	Zone	IRV-1B	1"	24	3	5'	32'-0"	84	252	1.0	2	8.4
1C	Zone	IRV-1C	1"	24	3	5'	32-0"	84	252	1.0	2	8.4
1D	Zone	IRV-1D	1"	24	3	5'	32-0"	84	252	1.0	2	8.4

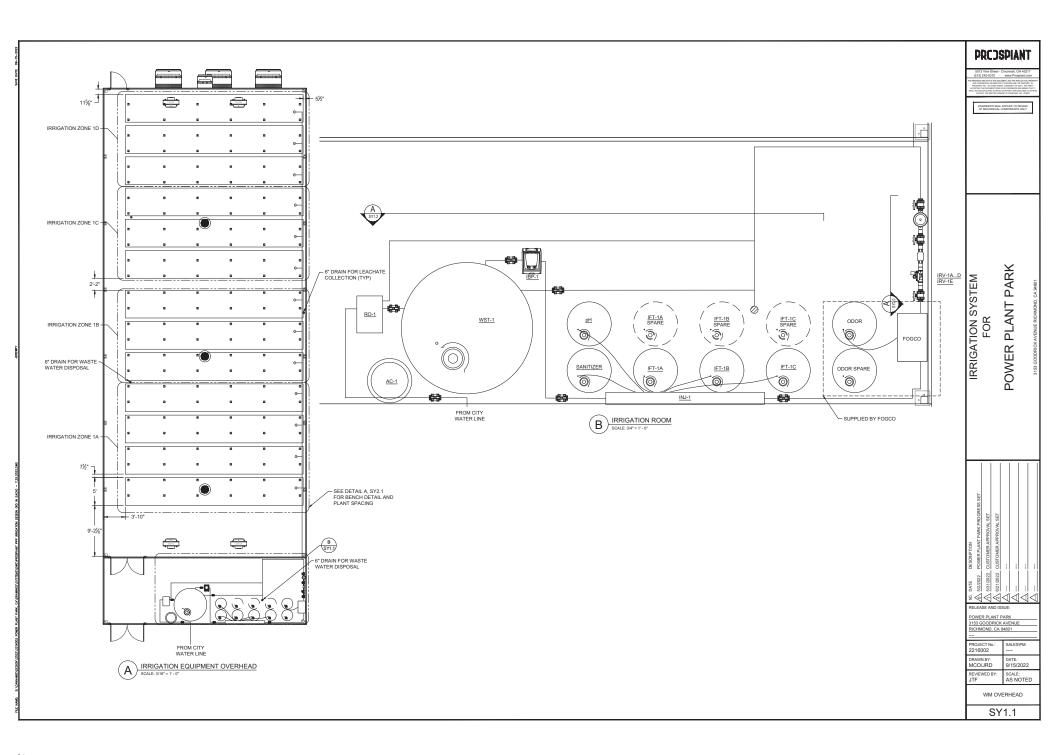
Piping Summary							
Tone / Augliculius	Dine Metaviel	Elisten lates	Valves		7 7		
Type / Application	Pipe Material	Fitting Joints	Valve Type	Pressure /	Class	<b>Body Material</b>	<b>End Connections</b>
Irrigation (1"-2")	PVC-SCH 40	PVC Hub	Ball	125 ps	1	PVC	Threaded

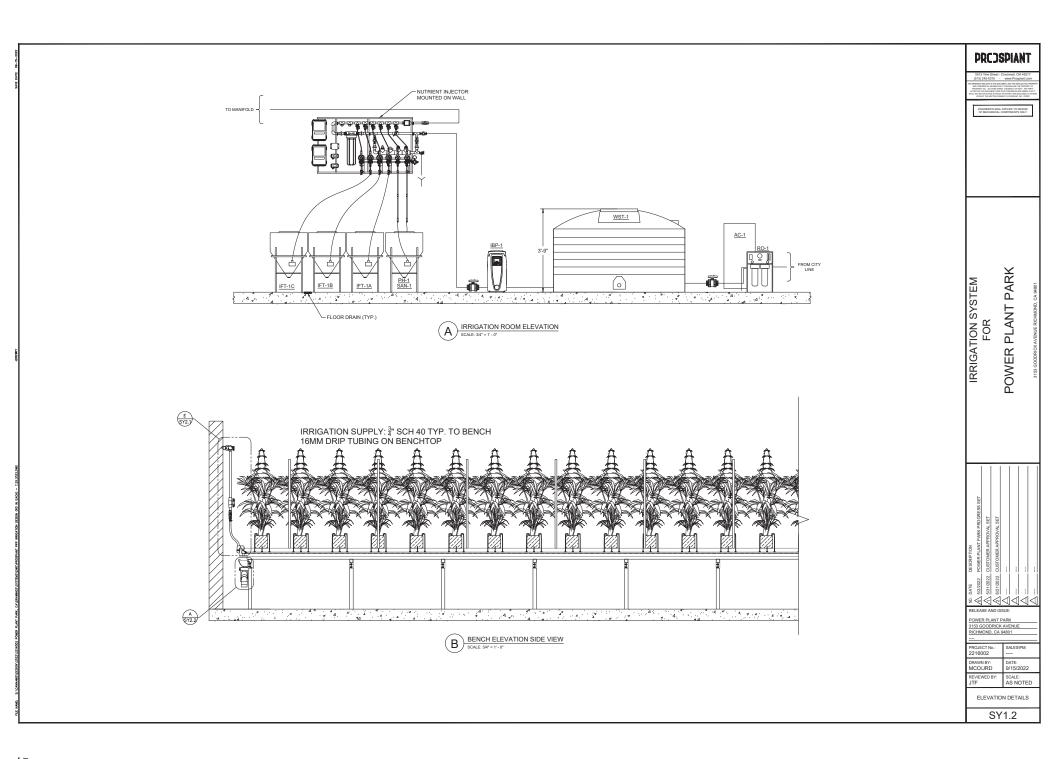
Tag	Qty	Location	Material	Contents	Capacity	Diameter	Height
WST-1	1	Irrigation Room	HDPE	Water Storage	660	71"	38"
IFT-1A1B.1C	3	Irrigation Room	HDPE	Fertilizer	30	24"	28"
PH-1	1	Irrigation Room	HDPE	pH	30	24"	28"
SAN-1	1	Irrigation Room	HDPE	Sanitizer	30	24"	28*

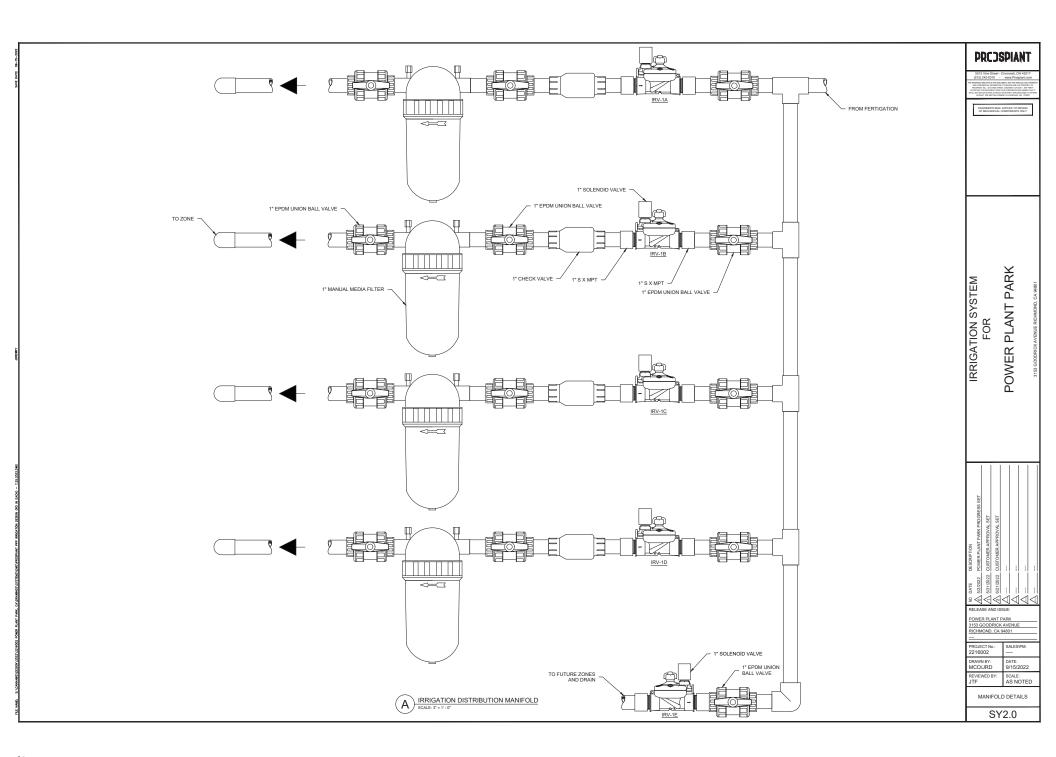
Pipe Size	Pipe Material	Maximum Span	Hanger Rod Size	Plastic Clips
4"	PVC - SCH 40	4	%"-16	No
1 1/4"	PVC - SCH 40	4'	3/4"-16	No
1 1/2"	PVC - SCH 40	5	3/c"-16	No
2"	PVC - SCH 40	5'	%"-16	No

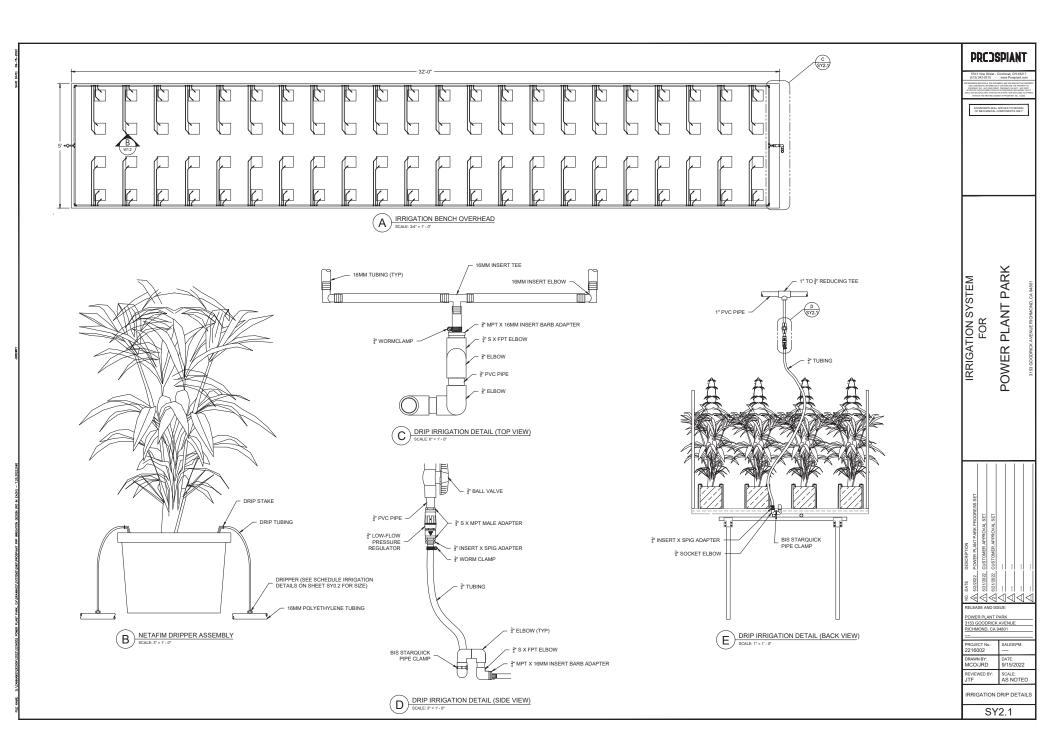


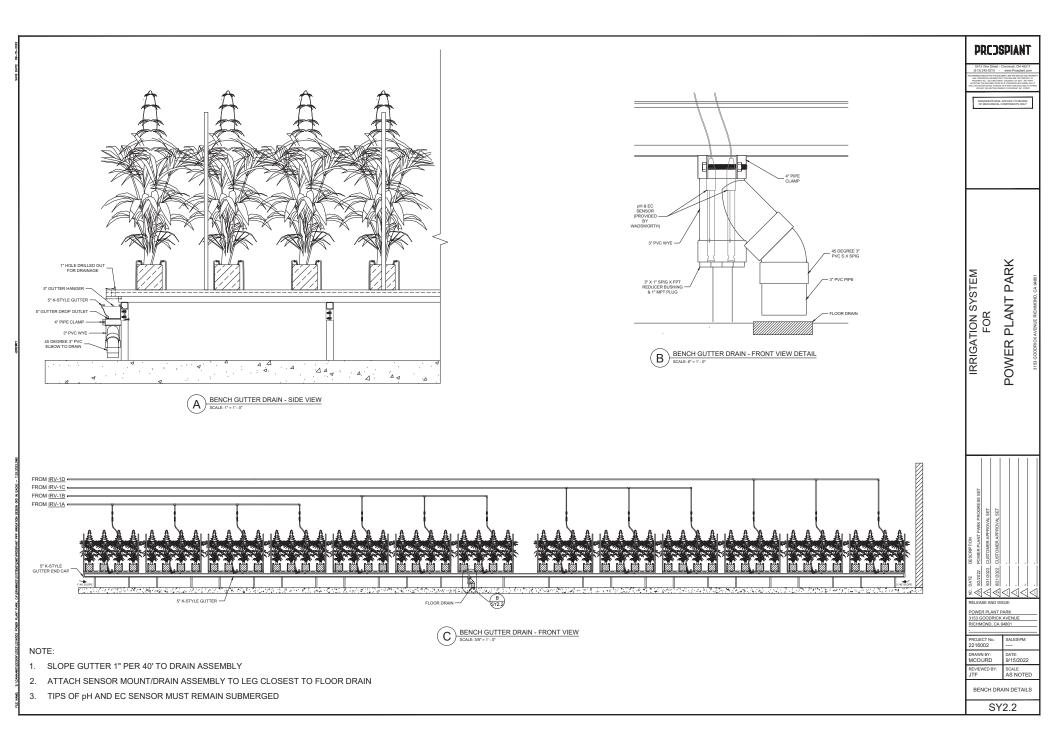














J+ Advanced Ratio:Feeder® Controller Building the Best Injectors for Over 50 Years



H.E. Anderson Co. is proud to introduce the new J+ Advanced Ratio:Feeder® controller. This new product features 8 outputs, a 4 line alpha/numeric display and a 12 button keypad. This continues the J Series reputation as the most reliable, accurate and flexible injection system on the market. Up to 8 chemicals can be injected simultaneously at different rates. Common applications include dosing fertilizer, pH adjustment, sanitation, and injecting wetting agents, soaps and many other chemicals.

Please call or email with any questions.

Gary Fay – Eastern Sales Manager gary@heanderson.com

Peter Driver – Atlantic Field Sales peter@heanderson.com

Randy Nester – HEA Sales randy@heanderson.com

Bruce Walters – HEA Sales bruce@heanderson.com



## J+ Advanced Ratio:Feeder® Controller

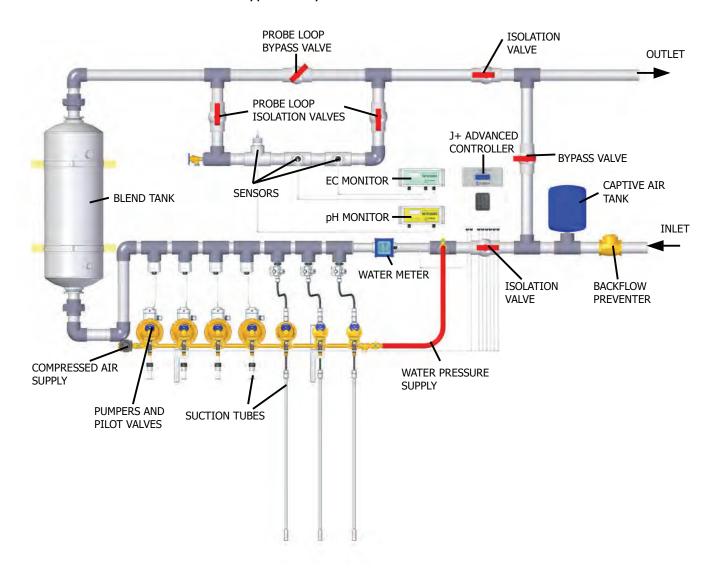
#### **Features**

- Controls 8 individual outputs
- Easy to use 4 x 20 LCD and 12 button interface
- Works with existing H.E. Anderson components
- Controls various solenoid pumps
- Interfaces with other devices via Modbus
- · Easy installation and operation
- Legendary accuracy and dependability
- Expandable and flexible

#### Specifications

- 8 individual 12VDC outputs
- Flow rate display
- Re-settable and permanent flow totalizers
- RS485 Modbus communication
- Power required: 12VDC or 120VAC
- 15 month warranty

## Typical J System Installation



## Please call or email with any questions.

Gary Fay – Eastern Sales Manager gary@heanderson.com

Peter Driver – Atlantic Field Sales peter@heanderson.com

Randy Nester – HEA Sales randy@heanderson.com

Bruce Walters – HEA Sales bruce@heanderson.com



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
ANGLES ±0.5° X/X ± I/64 X.XXX ±0.005

SHEET 1 OF	REVISION HISTORY	BY	DESCRIPTION	DATE
SIZE: A		Eric	DRAWING CREATED	08/22/19
SCALE:				
			The state of the s	

H.E. Anderson
COMPANY
www.heanderson.com
1-800-331-9620

Proprietary Rights Apply To The Subject Shown And Are Property Of H.E. Anderson Co., Inc.

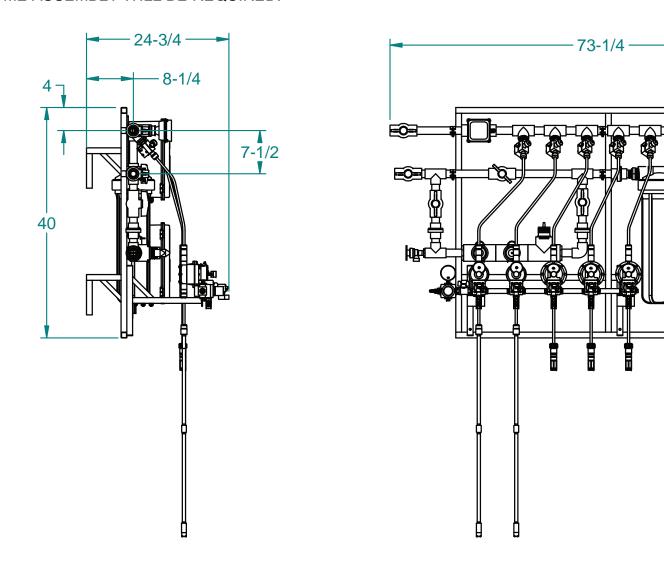
NAME: DIMENSIONS AND AS SHIPPED

MATERIAL:

FILE NAME: Nexus - Power Plant Park 2020-04-29.dft

NOTE: DRAWING SHOWS PARTS CUSTOMER WILL RECEIVE. SOME ASSEMBLY WILL BE REQUIRED.

1" SCHEDULE 80 PVC PLUMBING



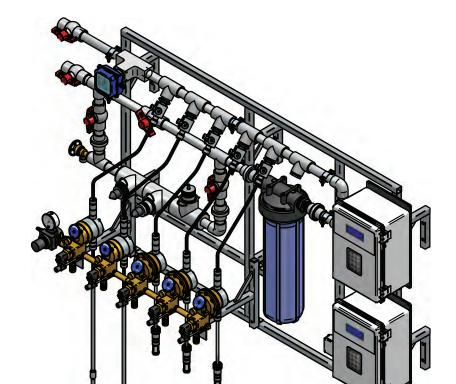
Approval:
Print Name:
Signature:
Date:

UNLESS OTHERWISE SPECIFIED	SHEET 2 OF	REVISION HISTORY	BY	DESCRIPTION	DATE
DIMENSIONS ARE IN INCHES	SIZE: A		Eric	DRAWING CREATED	08/22/19
ANGLES ±0.5° X/X ± 1/64 X.XXX ±0.005	SCALE:				
NAME: ISOMETRIC VIEW					
MATERIAL:					

FILE NAME: Nexus - Power Plant Park 2020-04-29.dft



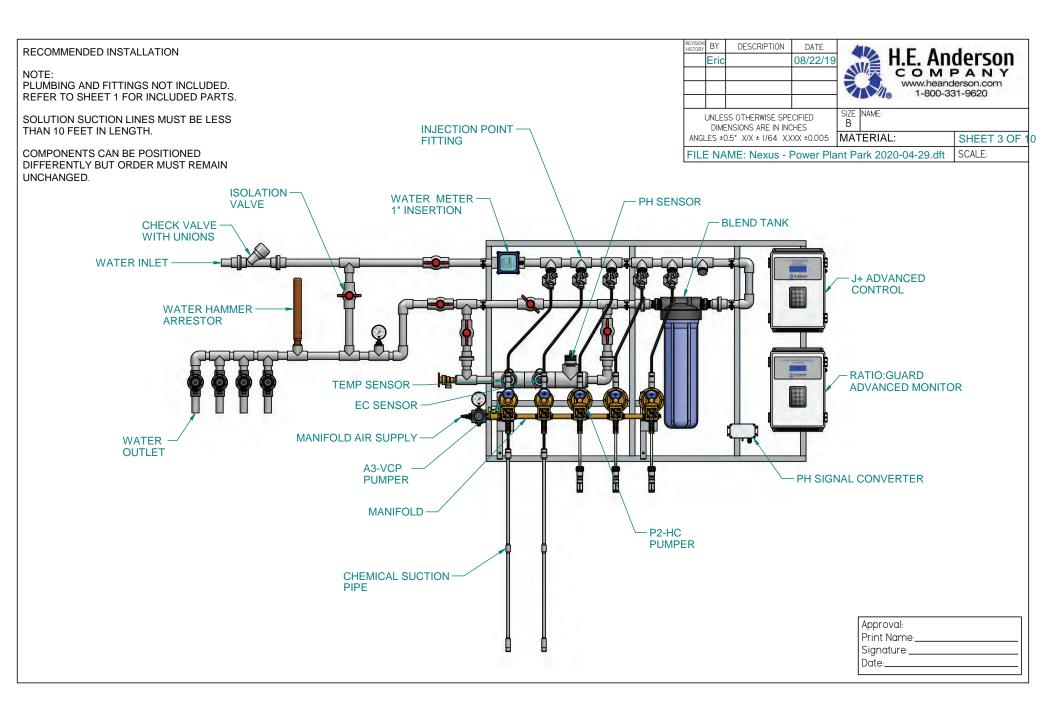
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#### **INCLUDED ITEMS:**

- J+ ADVANCED CONTROL
- 1" WATER METER
- 2 A3-VCP PUMPERS
- 3 -P2-HC PUMPERS
- 5 POSITION MANIFOLD
- 1.9 GALLON BLEND TANK
- RATIO:GUARD ADVANCED MONITOR
- PH SENSORS
- EC SENSOR
- TEMPERATURE SENSOR
- STAINLESS STEEL FRAME
- PLUMBING

	Approval:
	Print Name:
	Signature:
-	Date:
- 1	



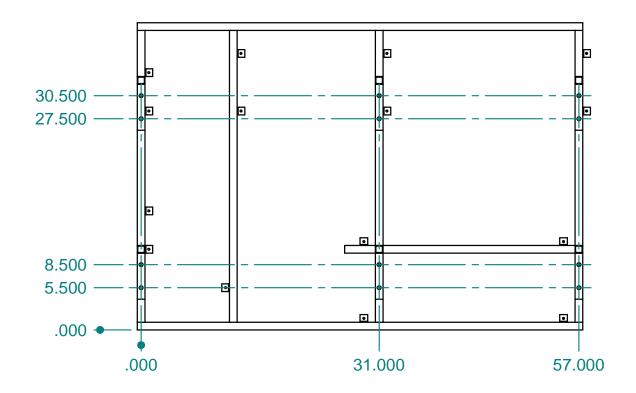
UNLESS OTHERWISE SPECIFIED	SHEET 4 OF	REVISION HISTORY	BY	DESCRIPTION	DATE 08/22/19
DIMENSIONS ARE IN INCHES	SIZE: A		Eric	DRAWING CREATED	
ANGLES ±0.5° X/X ± 1/64 XXXX ±0.005	SCALE:				
NAME: MOUNTING DIMENSIO	NS				
MATERIAL:					



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FILE NAME: Nexus - Power Plant Park 2020-04-29.dft

## VIEW FROM BACK



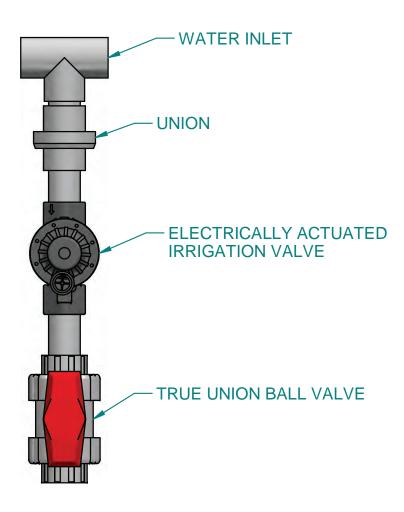
UNLESS OTHERWISE SPECIFIED	SHEET 5 OF	REVISION HISTORY	BY	DESCRIPTION	DATE
DIMENSIONS ARE IN INCHES	SIZE: A		Eric	DRAWING CREATED	08/22/19
ANGLES ±0.5° X/X ± I/64 X.XXX ±0.005	SCALE:				
NAME: IRRIGATION VALVE IN	STALLATION				
MATERIAL:					
FILE NAME: Nexus - Power Pla	ant Park 2020-0	4-29	.dft		

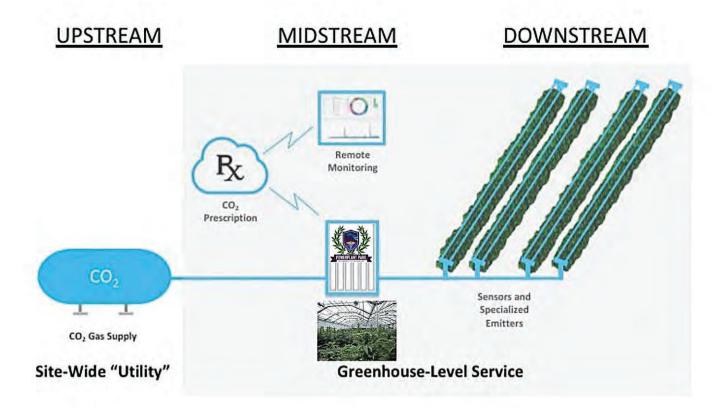


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## NOTE:

- •DO NOT POSITION VALVES OVER SENSITIVE EQUIPMENT SUCH AS ELECTRONIC CONTROLS
- •INSTALL VALVE WITH UNIONS SO VALVE CAN BE SERVICED
- •SLOW CLOSING AND OPENING VALVES REDUCE DAMAGE DUE TO WATER HAMMER





# Wireless Emitter System



## Power Plant Park

## Richmond, CA

- 44 greenhouses, 3456 ft2 each
- Nexus Greenhouses, Fluence LED Lighting, 25 W/ft2-Tier
   2 Mixed-Light ~72 fixtures per Greenhouse
- 18.8 acre campus: Processing & Mfg, retail and distribution facilities, solar farm
- 1,144 plants/GH, 2000 lbs/yr/GH
- POWERPLANT PARK SITE PLAN

- Call 3/24/24 via John Selby
- Richard had met Hunter @Arcview
- Facility opens Dec 2024
- Wants to do trial in 4 GH in Dec



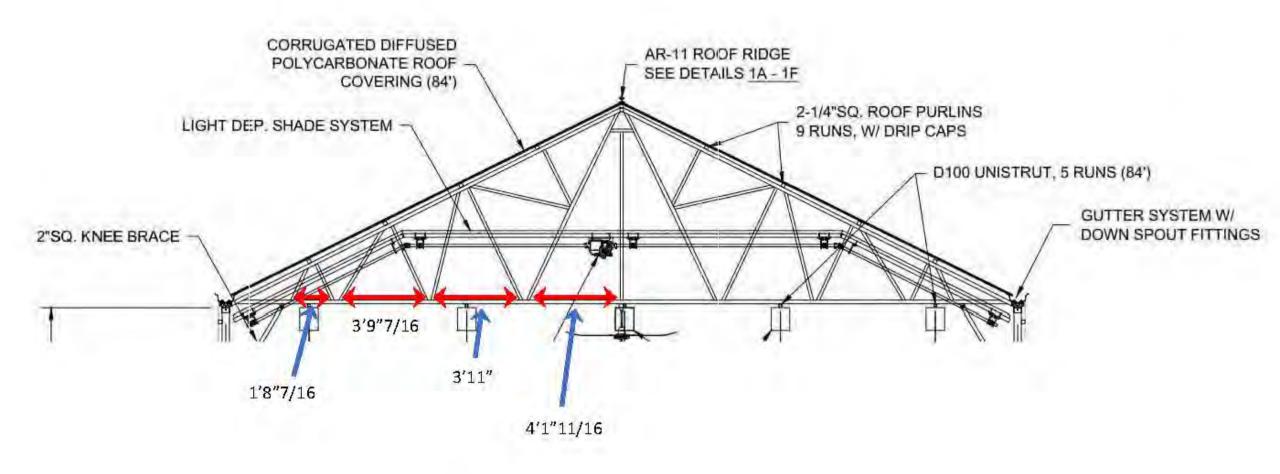
## Each greenhouse

- 1 bay
- 36' x 96' = 3456 ft2
- 12 strips, 2' wide, 96' each = 1152 ft (linear)
  - 12 x 96' x 2' = 2304 ft2
  - Recommend 5% overage = 2,419 ft2 / greenhouse

## 12 greenhouses = 29,028 ft2

- @\$1.50/ft2 (pilot discount price) = \$43,542
  - Plus shipping
  - Hardware cost
    - UbiGro bar clamps
      - 12/greenhouse, 144 total @ \$5/ea = \$720
  - TOTAL Project \$44,262 + shipping
  - ½ due as deposit with 3 month lead time
  - Remainder due prior to shipping





Plan: use 24"-wide strips, small amount of overlap 12 strips per greenhouse, 96' long Similar install



Similar install







## Nobel Prize for Quantum Dots Validates the Broad Applicability of UbiQD's Core Technology



**UbiQD, Inc.** 06 Oct 2023, 09:00 ET

## Congratulations to Nobel Laureates Bawendi, Brus, Ekimov, and the Entire QD Community on the Pinnacle of Scientific Achievement

LOS ALAMOS, N.M., Oct. 6, 2023 /PRNewswire-PRWeb/ -- <u>UbiQD, Inc.</u>, the New Mexico-based leader in quantum dot (QD) manufacturing and technology, is today highlighting the important work of nanotechnology pioneers and <u>2023 Nobel Prize in Chemistry</u> awardees, Alexei Ekimov, Louis Brus, and Moungi Bawendi. UbiQD is exclusively licensing several patents co-authored by Professor Bawendi from M.I.T. and scaling up QD production to supply rapidly emerging markets primarily related to sustainability and energy efficiency.

#### "The Nobel Prize is the ultimate milestone for any technology, and we are proud to be part of the story." - UbiQD CEO

Vials of brightly emitting QDs made with UbiQD's Nobel Prize-winning technology based on I-III-VI semiconductors of various sizes make for a rainbow of colors.

"Many people have contributed to the success of quantum dots," said Victor Klimov, Los Alamos National Laboratory Fellow and QD innovator. "This honor, being for chemistry, focuses on those who first practically realized these fascinating materials. Alexey Ekimov pioneered the synthesis of the very first generation of QD samples – nanosized semiconductor crystals dispersed in glass matrices. Louis Brus worked independently on a different type of QDs – colloidal particles freely floating in liquid solutions. The groundbreaking works of these researchers date back to the early 1980s. A new colloidal synthesis invented by Moungi Bawendi was reported in 1993. This innovation was very important because it made high-quality QDs readily available to a broad research community. Congratulations to my friends and collaborators for winning the Nobel Prize!"



Quantum dots are semiconductor nanoparticles that exhibit high efficiency photoluminescence over a wide range of tunable colors, making them effective at optimizing light spectra. UbiQD has <u>launched several greenhouse products</u> under its UbiGro® brand that adjust the spectrum of sunlight to enhance crop growth. More recently, the company began engineering these materials for <u>applications in utility-scale solar</u> with the aim of significantly increasing the efficiency of current photovoltaic technologies. The company is pursuing multiple commercial product applications with a growing list of strategic partners.

"We are over the moon with the news this week, that the 2023 Nobel Prize in Chemistry has been awarded for the development of quantum dots," added Hunter McDaniel, UbiQD CEO. "This is an important milestone, maybe the ultimate milestone for any technology, and we are proud to be part of the story."

#### About UbiQD, Inc.

UbiQD (pronounced 'ubiquity') is the global leader in quantum dot manufacturing and technology. Founded in 2014, the company is powering product innovation in agriculture, clean energy, and security. Our quantum dots enable products that harness the power of color and light. Headquartered in Los Alamos, New Mexico, UbiQD is licensing technology developed at leading research institutions, including Los Alamos National Laboratory and M.I.T. The company was recently recognized as the 'Best Overall Venture' at the 2023 National Renewable Energy Laboratory (NREL) Industry Growth Forum (IGF) in Denver. To learn more, please visit <a href="https://ubiqd.com">https://ubiqd.com</a>, <a href="https://ubiqd.com">https://u

### Quantum Dot Leader Unveils UbiGro® Cover to Enhance Greenhouse Productivity

UbiQD, Inc., the New Mexico-based leader in quantum dot (QD) technology and manufacturing, is today announcing a major step forward for sustainable...





## <u>UbiQD Expands Collaboration with First Solar on Quantum Dot-Enhanced Solar Modules</u>

UbiQD, Inc., a New Mexico-based nanotechnology company, announced today that it has entered into a joint development agreement, with First Solar, Inc....

UbiQD, Inc.

134 Eastgate Dr. Los Alamos, NM 87544 US +1 5056955738 sales@ubiqd.com www.ubiqd.com



## Estimate

**ADDRESS** 

Richard Trieber PowerPlant Park 116 Washington Ave Point Richmond, CA 94801 USA SHIP TO

Richard Trieber PowerPlant Park 116 Washington Ave Point Richmond, CA 94801 USA ESTIMATE # 0324

DATE 05/24/2022 EXPIRATION DATE 06/24/2022

PRODUCT/SERVICE	DESCRIPTION		QTY	RATE	AMOUNT
UbiGro Film	Orange luminescent retrofit gre film. Contains CIS quantum do emission centered near 600 nn ~ 29,720 sq. ft. Price \$3.00/sq.ft. Pilot Discoun	ts with peak n. 4.10' wide	29,720	1.50	44,580.00
Shipping/Freight	TBD		1 -	0.00	0.00
Payment fee	Payment fee Bank Transfer \$10 / Credit Card \$30		t	10.00	10.00
Deposit: 50% due ASAP to se	SUBTOTAL			44,590.00	
due prior to shipping		TAX			0.00
		TOTAL		\$44	.590.00

Accepted By

Accepted Date



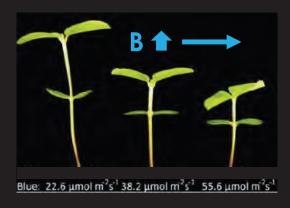


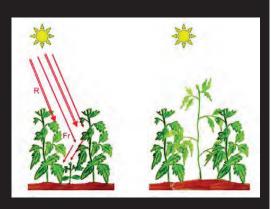
## LIGHT QUALITY: COLOR

## **Photosynthesis**

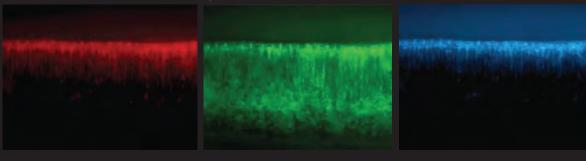
# Highest efficiency Action Spectrum Wavelength (nm)

## **Plant Morphology**





## **Light Absorption**



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## **OUR SOLUTION: ENHANCE SUNLIGHT**

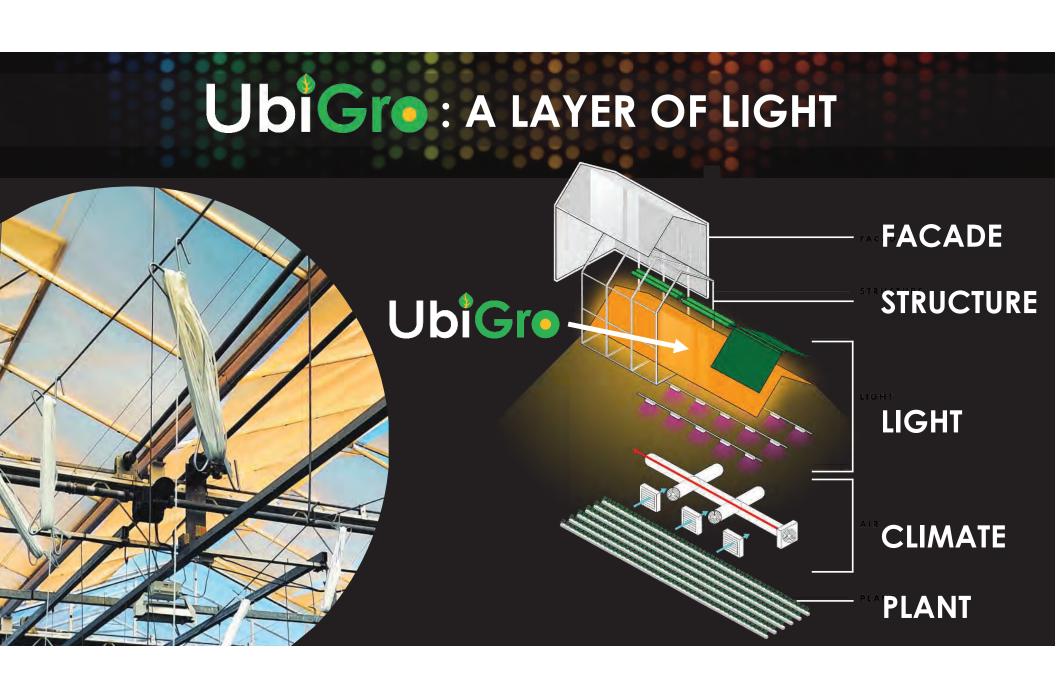


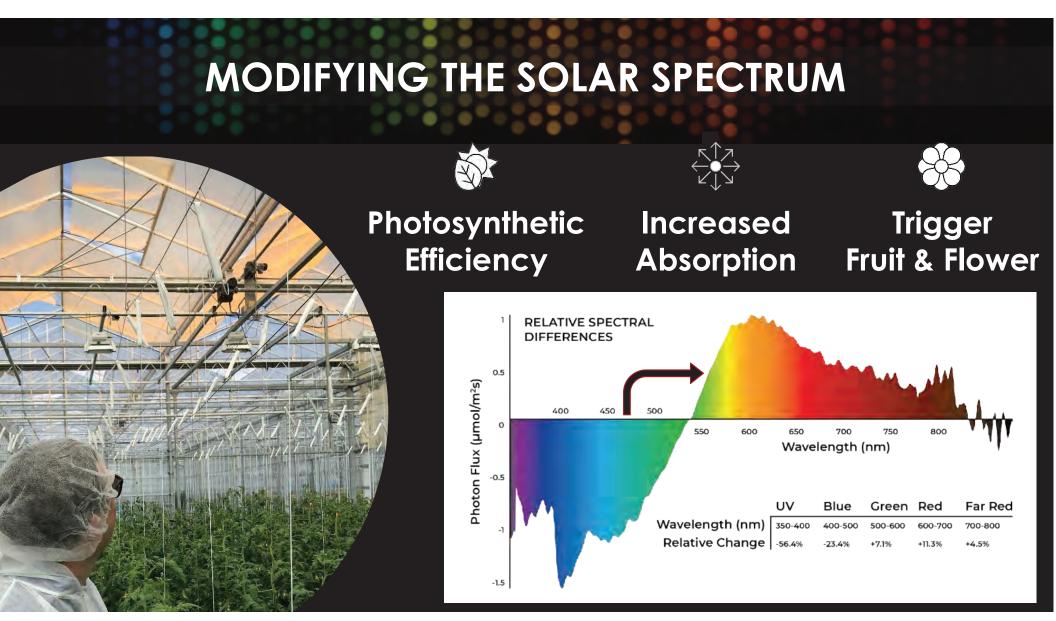
Color-shifting sunlight with quantum dots (QDs) for:

- Higher crop **yield** (5-20%)
- Improved crop **quality**
- → Fast Payback times
- →4-6 year lifetime in GH

USES NO ELECTRICITY!

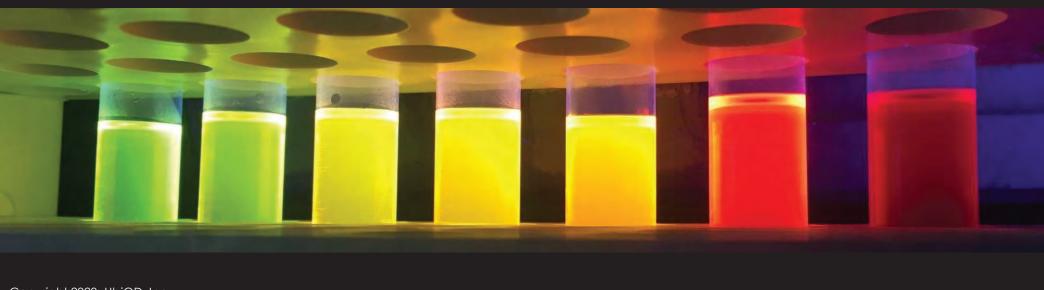
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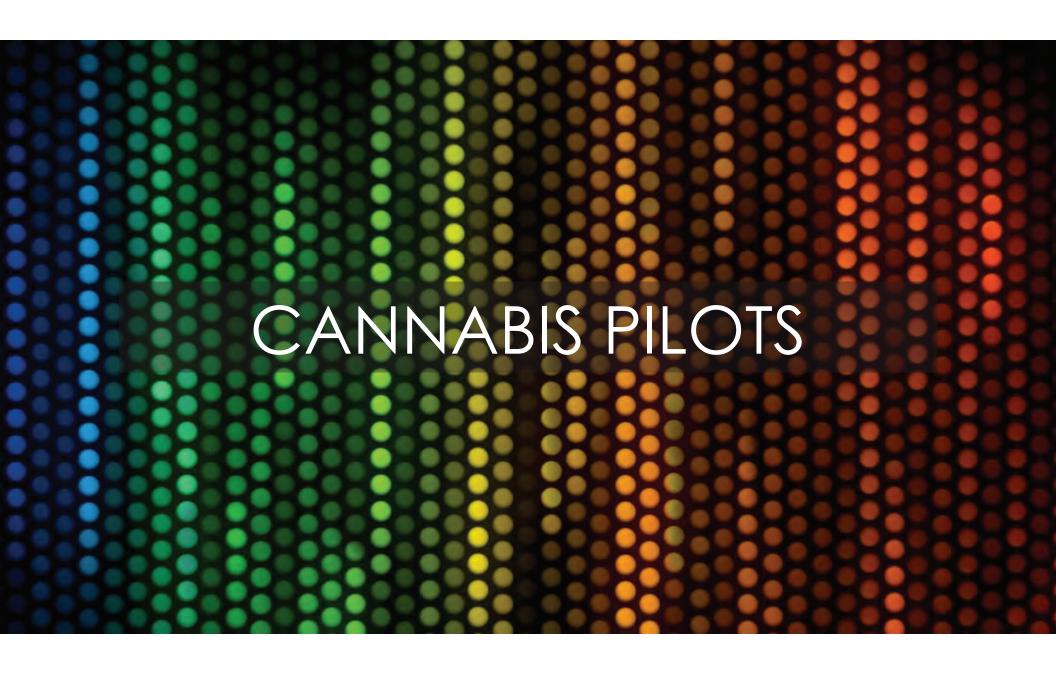




- Quantum dots are tiny 'nano' particles that enable efficient manipulation of color and light (luminescence)
- Our proprietary dots are safer, cheaper, & more stable
- Tunable colors



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# UbiGro Luminescent Greenhouse Technology Improves Crop Yields

UbiGro is a layer of light that helps plants get more from the sun. It uses fluorescence to create an optimal light environment for greenhouse crops. With proven yield boosts in commercial greenhouses, UbiGro is an electricity free spectrum enhancement technology designed for any greenhouse construction.



# +7.7% Yield Increase

12 month payback

- Hood River, OR
- 96 cannabis plants
- \$12.3k increased revenue per greenhouse per year



# +16.0%\* & 5.4%\*\* Yield Increase

4 month payback

- Trinity County, CA
- 248 cannabis plants
- \$37.5k increased revenue per greenhouse per year

\* full season round, \*\* light deprivation round



## +20.5% Yield Increase

11 month payback

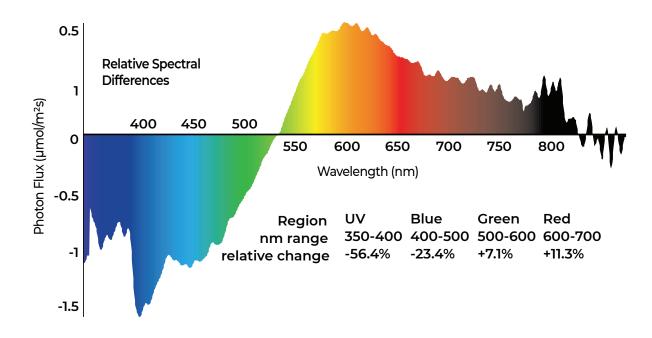
- Alcalde, NM
- 126 beefsteak tomato plants
- \$15k increased revenue per greenhouse per year

Read about these case studies & more in the full white paper at www.UbiGro.com

# Color Optimization with Nanotechnology



UbiGro emits light centered in the orange (600nm). The graph and table below demonstrate how UbiGro modifies the solar spectrum by absorbing shorter wavelengths of light and converting them to longer wavelengths.



Comparison of Different Lighting Technologies

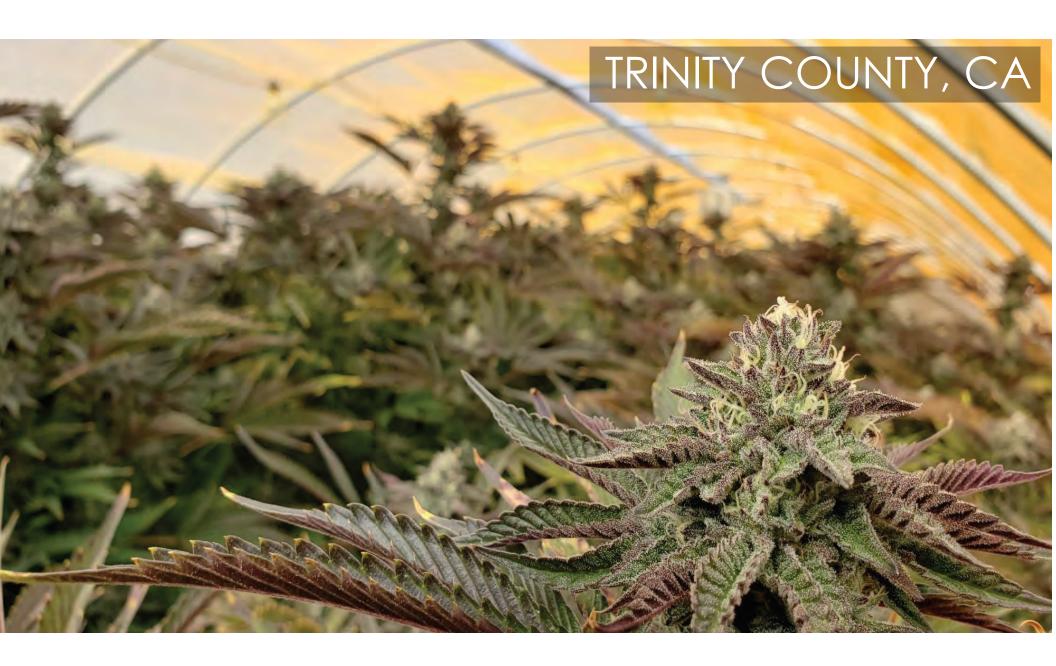
	رور	et et	-	time y	id Boost AOI Hrs*	
Technology		O <sub>Ó</sub> ,	Ţļ,		, <sup>4</sup> 0,	
LED Top Lighting	\$\$\$\$\$	\$\$\$\$\$	10	++	5.9	
LED Intracanopy Lighting	\$\$\$\$	\$\$\$\$	7	+	10.9	
UbiGro	\$\$	0	4	+	0.9	

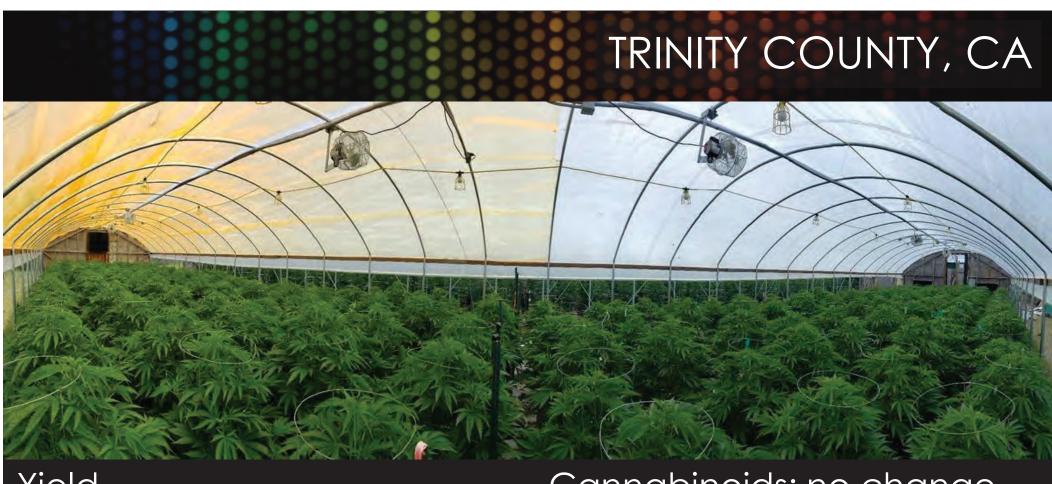
<sup>\*</sup> ROI for greenhouse-grown tomatoes

Read about our case studies & more in the full white paper at www.UbiGro.com

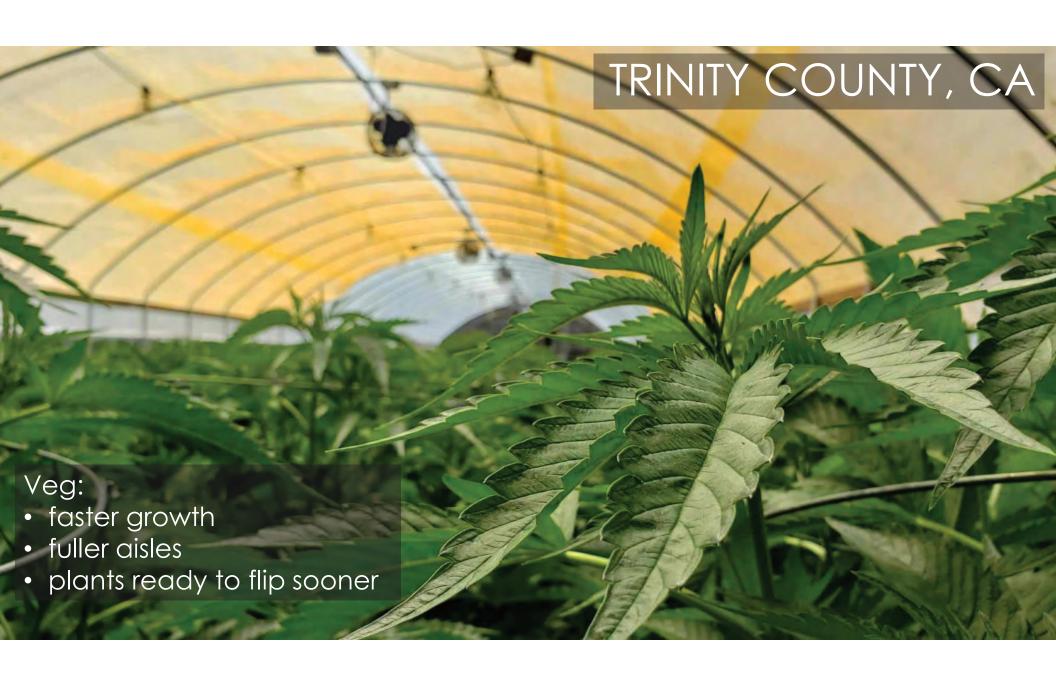


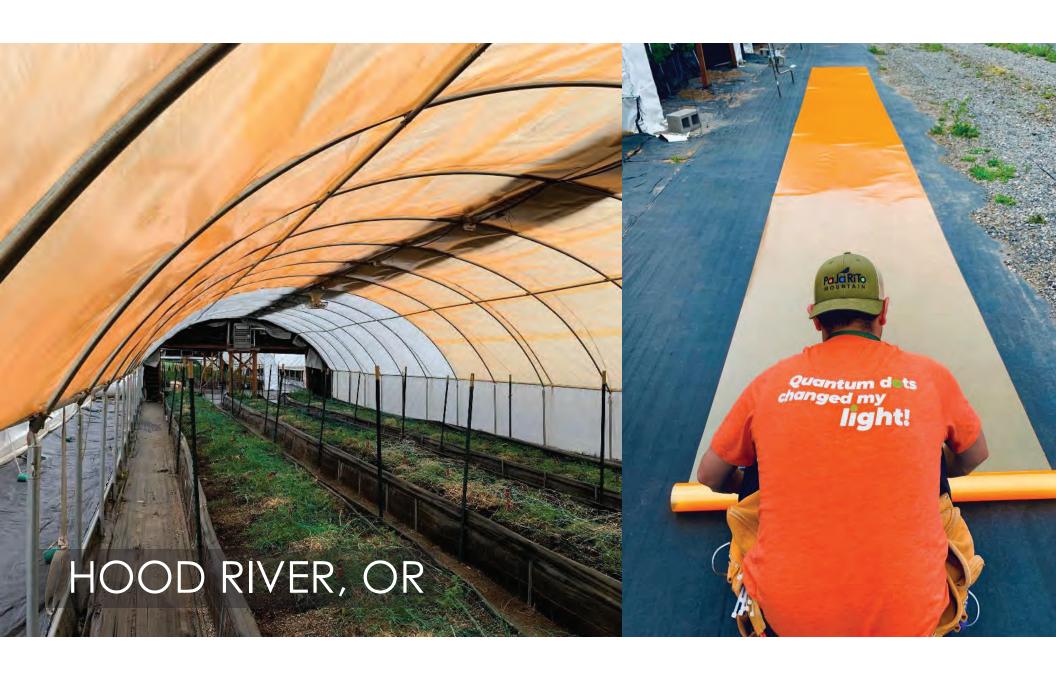
3



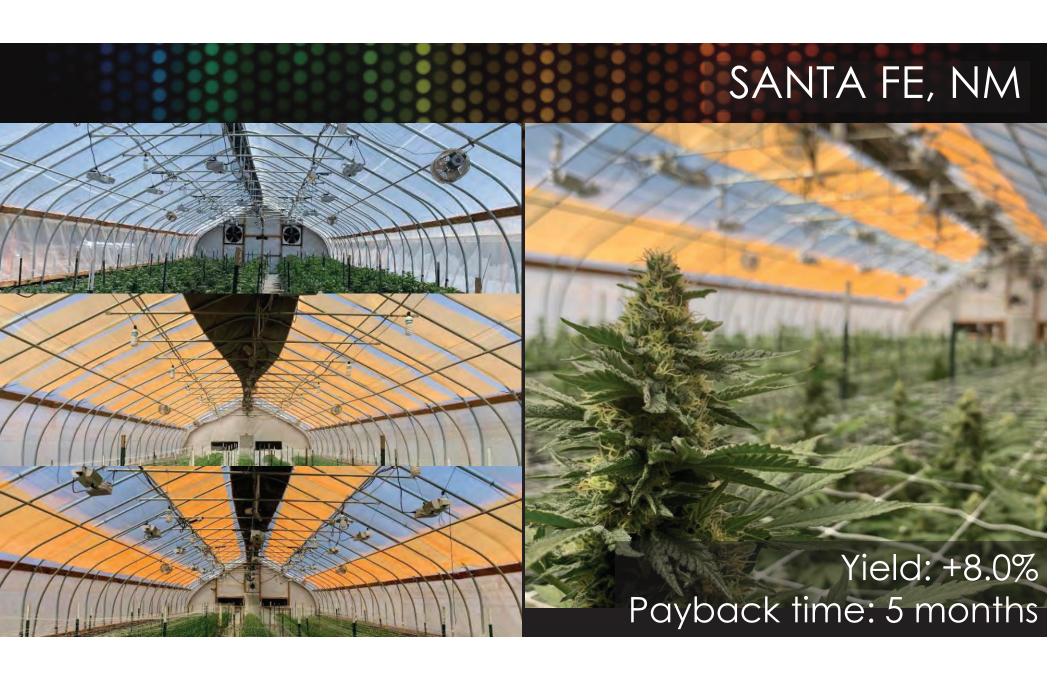


Yield First harvest (Aug): +5.4% Second harvest (Oct):+16.0% Cannabinoids: no change Terpenes: +7.9% Payback time: 5 months



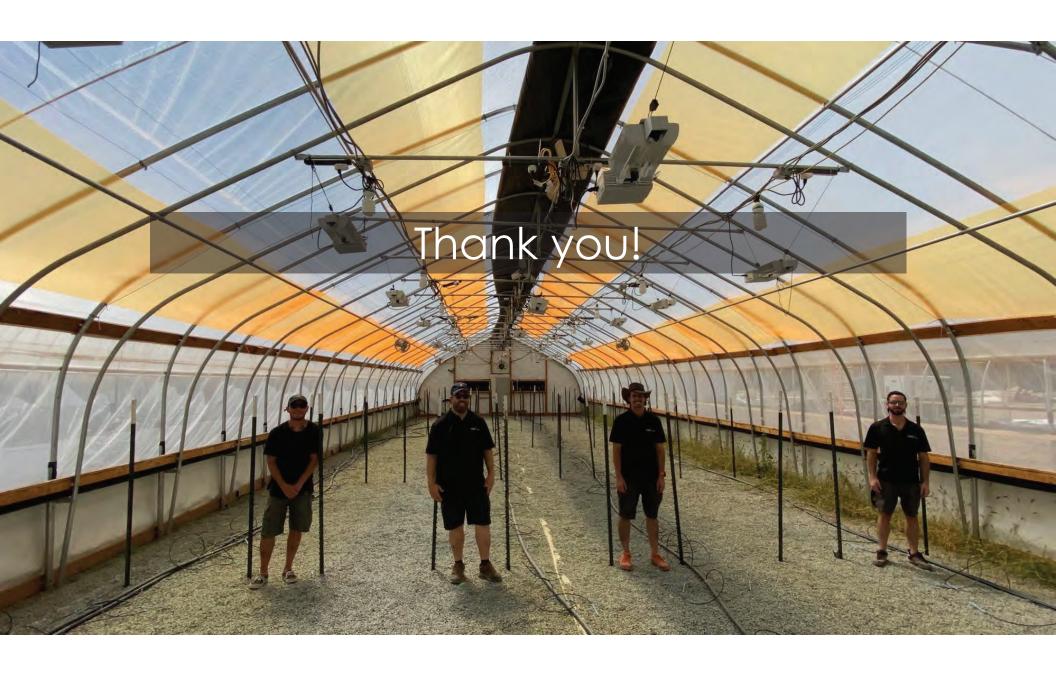












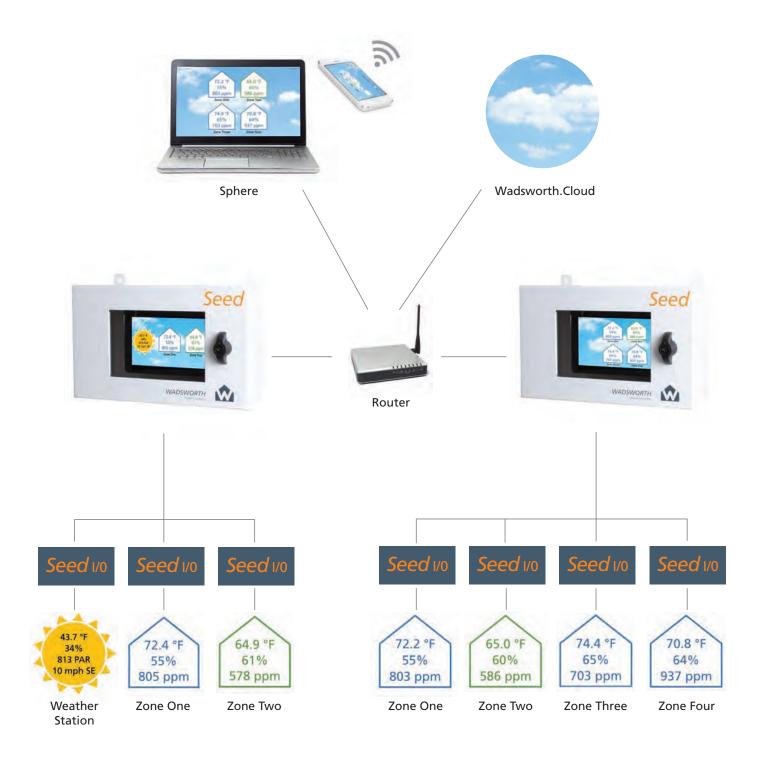
# Something new under the sun



A remarkable touchscreen climate control with a user interface that makes managing complex growing environments child's play. Engineered for power; designed for ease.



# Seed CONFIGURATION





# Seed

Seed combines the accessibility of an intuitive touchscreen interface with the expansive power of the Seed I/O input and output system, providing exact information at a glance.

#### **BENEFITS**

- · Improve the yield and quality of your crop
- · Increase labor and energy efficiency
- Intuitive interface accommodates beginners and experts

#### **FEATURES**

- Graphic interface provides extensive information at a glance
- · Advanced humidity control
- Zone screen displays comprehensive information for each zone including:
- Current sensor and equipment status
- Displays explanation for equipment status including anticipated changes
- Select view to display equipment response based on temperature or humidity
- Quick access to graphs, setpoints and equipment settings
- Bulk override allows user to quickly turn on or off multiple equipments
- Zone profiles save settings for seasonal or crop transitions
- · Individual alarms for each sensor
- · Graph data can be viewed from weeks to minutes and anything in-between
- View any zone at your facility, from any Seed control
- · Zones in alarm are easily identified on the home screen
- View outside weather data
- · Background reflects day, night, rain or snow conditions
- · Adjust settings, limits, overrides and view status on individual equipment screen

#### **NEW IN VERSION 2**

- · Browser-style navigation for guick access
- · Easily adjust settings using sliders or direct entry
- HE Anderson Fertigation Interface
- Configure zone-specific recipes and schedules
- Customize which zones are displayed and sensor readings within each zone
- · User Profiles with three different levels of access
- User tracking system logs who made changes and when
- Influences mode allows custom equipment responses specific to your needs
- Custom programmed to include all your equipment
- View and adjust settings from the app, Sphere software or at the control
- Sensor Pools Screen allows calculated responses involving of multiple sensors including:
- Vapor Pressure Deficit (VPD), Daily Light Integral (DLI),
   Wet Bulb Dry Bulb Relative Humidity
- Allows for averaging multiple sensors over time

# Seed 110 FLEXIBLE, STRONG AND SUPPORTIVE: THE PERFECT PARTNER

The key to Seed's adaptability is Seed I/O. Sensors send readings to the Seed control, which sends directives to equipment based on user settings. Sensors communicate with Seed I/O inputs, equipment communicates with outputs.



- Ports can be assigned to any zone
- Add additional Seed I/Os after the project has been installed
- Pre-wired for easy installation
- Flexible options to meet your needs:
   Seed I/O comes in a variety of sizes and configurations
- 0-10v connections
- Lightning protection on both RS485 ports
- Overvoltage protection on all sensor inputs
- Toggle switches for manual override.
- Certified
- Professionally designed UL Certified Industrial Control Panels
- NEMA 4 enclosures

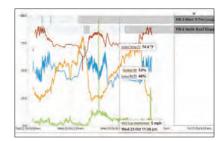
- Sensors
- Temperature and humidity aspirator
   Weather station with PAR light sensor.
- weather station with PAR light sensor,
   wind speed and direction, outdoor
   temperature and humidity and precipitation.
- Temperature Probes for Boiler Supply/
  Return, Chiller Supply/Return, Slab/Water,
  Soil or Bench temperatures
- Soil moisture
- pH/EC & Dissolved oxygen sensors
- CO2 & CO sensors
- Wet bulb/Dry Bulb Relative Humidity
- VPD & DLI Calculations
- Light Sensors Full Spectrum PAR

# Seed Sphere TAKE A BROADER VIEW

Make your Seed control more powerful than ever. Seed Sphere expands Seed's capabilities and gives you a better way to see your growing world.

- View and change any setting using Sphere and your Mac or PC
- Back up and restore your Seed control's settings
- Enhanced graphing functionality including:
- Quick Reports (User saved reports for easy access)
- Ability to analyze all zones, sensors, equipment on one graph
- Export data to Excel or CSV, database, or any analysis tool
- · Create multiple zone profiles for seasonal changes
- Live data readings
- Customizable alarm notifications

Requirements: Mac OSX or Windows 7 (32 or 64-bit)



## Sphere is even more powerful with Wadsworth.Cloud

- Download the latest software
- . No need to remote in to an onsite computer
- Log in off-site to access your Seed controls via Seed Sphere
- No third-party software required
- A remote connection for easy access or Log in anytime to access your Seed controls
- Subscription based
- Available as an app for your iPhone or Android
- Manage multiple sites great for consultants

"This is the most intuitive control I've ever seen.
It speaks to my generation."

— Andy Sacks, Ilera



# **Control Systems**

5541 MARSHALL STREET \* ARVADA, CO 80002 \* 303-424-4461

# POWER PLANT PARK 1 RICHMOND, CA CONTROL & ELECTRICAL DIAGRAMS

PAGE		
NO.	REV.	DESCRIPTION
1.	A	GENERAL NOTES
2.	A	SEED I/O 1/2 LOAD SCHEDULE & SWITCH ASSIGNMENTS
3.	A	SEED I/O 1 EXTERNAL CONNECTION DIAGRAM
4.	A	SEED I/O 2 EXTERNAL CONNECTION DIAGRAM (WEATHER)
5.	A	SEED I/O 1/2 INTERNAL CONNECTION DIAGRAM
6.	A	SEED NETWORK WIRING OVERVIEW
		UPS WIRING DETAIL
8.	A	SEED CONTROL PANEL WIRING DIAGRAM
9.	A	SEED I/O 1 CONTROL SCHEMATIC
10.	A	SEED I/O 2 CONTROL SCHEMATIC
11.	A	LV CONTACTOR PANEL TB-8 LAYOUT
12.	A	SEED ONE LINE POWER (PAGE 1)
13.	A	SEED ONE LINE POWER (PAGE 2)
14.	A	LOW VOLTAGE WIRING LAYOUT
15.	A	CONDUIT & WIRING LAYOUT
16.	_	GABLE MOUNT WEATHER STATION DETAIL
17.	A	PANEL LAYOUT

### GENERAL NOTES

## FOUIPMENT MOUNTING NOTES:

NOTE:
IT IS CUSTOMARY TO MOUNT THE SEED AND CONTACTOR PANEL TO ALLOW COMFORTABLE READING OF THE MAIN SCREEN AND EASY ACCESS TO OVERRIDE SWITCHES.

MOUNT PANELS TO PREVENT DOORS FROM SWINGING SHUT WHILE WORKING INSIDE THE PANELS.

DO NOT MOUNT ASPIRATOR IN DIRECT CONTACT WITH WATER SPRAY

PLEASE CONTACT WADSWORTH CONTROLS FOR PROPER INSTALLATION EXAMPLES IF

NOTE:
DO NOT COMPROMISE STRUCTURAL MEMBERS WHEN DRILLING HOLES OR SCREWS FOR MOUNTING ELECTRICAL EQUIPMENT. CHECK WITH GREENHOUSE MANUFACTURER WHEN IN DOUBT.

WADSWORTH CONTROL SYSTEMS, INC, WILL NOT BE HELD LIABLE FOR PRODUCTS THAT HAVE BEEN SUBJECT TO: (A) MODIFICATIONS, ALTERATIONS, TAMPERING, OR INSTALLATION, TESTING, OR USE NOT IN ACCORDANCE WITH ANY USER'S GUIDE, ENGINEERED DRAWINGS, OR OTHER INSTRUCTIONS PROVIDED BY WADSWORTH CONTROL SYSTEMS: (B) IMPROPER MAINTENANCE OR REPAIRS, HANDLING, STORAGE; (C) ABUSE OR MISUSE OF THE PRODUCT; (D) BREAKDOWNS, FLUCTUATIONS, OR INTERRUPTIONS IN ELECTRIC POWER OR THE TELECOMMUNICATIONS NETWORK. REFER TO PRODUCT USER'S GUIDE AND WADSWORTH CONTROL SYSTEMS WEBSITE FOR FULL WARRANTY.

QUESTIONS? CONTACT TECHNICAL SUPPORT AT TECH@WADSWORTHCONTROLS.COM. 800-521-5829. FOR AFTER-HOURS EMERGENCY TECHNICAL SUPPORT 720-879-3936.

## FLECTRICAL INSTALLATION NOTES:

FOR 18/2, 18/3, ETC. WIRE DO NOT USE THERMOSTAT WIRE. USE CAROL #C-2830 SERIES OR EQUIVALENT 80° 300V UL2484 CSAT-1 STRANDED TINNED COPPER W/ 300V P.V.C. JACKET.

1) PROTECT EACH MOTOR WITH A SAFETY DISCONNECT SWITCH IN COMPLIANCE WITH NEC STANDARDS 430.109 & 430.110. 2) ALL CONDUCTORS ARE SPECIFIED TO BE THHN CU STR. WIRE. 3) WIRING PRACTICES TO CONFORM TO NEC STANDARDS AND LOCAL ELECTRICAL CODES.

ROUTE ALL SYSTEM SENSOR CABLES AWAY FROM LINE VOLTAGE.

NOTE.
IF SENSOR OR COMMUNICATION CABLES
ARE INSTALLED UNDERGROUND, OUTSIDE
OF BUILDINGS, IT MUST BE IN STEEL CONDUIT CONDUIT MUST BE BONDED TO BUILDING STEEL ON BOTH ENDS.

\*\* IMPORTANT NOTE \*\* NO CONDUITS OR CABLES TO ENTER THROUGH THE TOP OF WADSWORTH CONTROL PANELS

IT IS THE INSTALLING ELECTRICIAN'S RESPONSIBILITY TO MAKE ALL CONNECTIONS TO THE CONTROL RELAYS

POWER CIRCUIT FIELD WIRING TERMINALS USE THHN CU. 90° C CONDUCTORS TORQUE SCREWS TO 7.1 lbs. in. ENTRELAC: 4.4 TO 7.1 lbs. in. > 4/6MM

ONE LINE POWER AND CONDUIT & WIRING DIAGRAMS ARE FOR INFORMATION ONLY. INSTALLATION LABOR AND ELECTRICAL MATERIALS (BREAKER PANELS, CONDUITS WIRE, CABLES, TROUGHS, DISCONNECTS ETC.) TO BE PROVIDED BY ELECTRICAL CONTRACTOR OR OTHERS. THE CABLES FOR ASPIRATOR SENSORS AND WEATHER STATION ARE NORMALLY SUPPLIED BY WADSWORTH CONTROLS AND ARE SO DESIGNATED ON THE PRINTS

NOTE: DO NOT SPLICE ASPIRATOR CABLES. DO NOT CUT ASPIRATOR CABLES. INSTALLER TO PROVIDE ANY EXTRA CABLE LENGTH TO ALLOW GROWER THE ABILITY TO RELOCATE THE ASPIRATOR AROUND CROP.

CONNECT ALL MOTORS WITH SUFFICIENT FLEX-CONDUIT TO ALLOW FOR MOTOR SERVICING AND ADJUSTMENTS.

ALWAYS DE-ENERGIZE WADSWORTH PRODUCTS WHEN SERVICING.

USE SUPPLIED WEATHER STATION CABLES. DO NOT SPLICE WEATHER STATION CABLES. DO NOT CUT WEATHER STATION CABLES, LEAVE A SERVICE LOOP

	CON	TACTOR RA	TINGS
CONTACTOR	AC-1	AC-3	AUX (AC-12 / AC-15)
3N□	40A	17A	10A
4N□	35A	15.5A	10A
SNOSNC	40A	25A	10A

#### MOTOR INSTALLATION NOTES:

WADSWORTH CONTROLS VENT MOTORS ARE SUPPLIED WITH TEMPORARY CORDS USED TO SET LIMIT SWITCHES. DO NOT USE THIS CORD FOR PERMANENT INSTALLATION.

WARNING: DO NOT OPERATE MOTORS WITHOUT PROPERLY SETTING THE LIMIT SWITCHES. RISK OF DAMAGE TO YOUR EQUIPMENT COULD OCCUR.

REV	DATE	RE∨ISI□N	BY
Α	5/9/22	ADDED NOTES	R.G.

CONFERENTALY NOTICE

THIS INFORMATION IS INTOIDED ONLY FOR THE USE OF THE INDIVIDUAL OR ENTITY TO WHICH IT WAS SENT, IT MAY CONTAIN INFORMATION THAT IS PRIVILEGED, CONFEDENTIA, AND EXEMPT FROM DISCLOSURE UNDER MEPLUABLE UM. IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR, PLESSE DO NOT DISTRIBUTE, AND DELETE THE ORGANIL PLESSES ONLY THE SENDER OF LAWAR. AT INFORMATION/ONTO/CONTINUENCE, THAT TO YOU FOUND.

DESCAPED TO THE CREATE AND A CHECK WITH ANY ATTACHMENTS, IS COPERED BY FEDERAL AND STATE LAW CONFERENCE ELECTRONIC COMMUNICATIONS AND MAY CONTAIN THOSP THE ADDRESSEE. IF YOU ARE READNED THIS DESCAPE, BUT YOU ARE NEEDED RECORDERS, NOT THE CANDED RECORDERS, TO A CHECK THE CONTROL OF THE CREATE AND THE STATE OF THE CHECK THE CH





5541 MARSHALL ST. ARVADA, CO. 80002 PH. 303-424-4461 FAX: 303-424-6012 WWW.WADSWORTHCONTROLS CON

POWER PLANT PARK 1 \* RICHMOND, CA GENERAL NOTES
NEXUS GREENHOUSE CORPORATION \* P.O. # 091142-00

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## SEED I/O 1/2 LOAD SCHEDULE & SWITCH ASSIGNMENTS

	/ /							
	GREENHOUSE EQUIPMENT L	_OAD	SCH	HEDULI	-			
QTY	DESCRIPTION	HP	ф	VOLTS	AMPS	ΙφΑ	ΙφΒ	ΙφС
3	VAF FANS - AGRIFAN	1/10	1	120	0.7	2.1	_	-
1	GABLE SHUTTER - BELIMO TFB120-S	_	1	120	0.3	0.3	_	_
1	GABLE EX. FAN - COOLAIR - NBF24K 1-SPD	3/4	1	208	3.4	-	3.4	3.4
1	EXHAUST FAN - COOLAIR - NBF48K 2-SPD	3/4	1	208	6.3	_	6.3	6.3
1	PAD PUMP - COOLAIR P25	2/5	1	120	10.0	10.0	_	_
1	PAD VENT - WADSWORTH VC100A	1/20	1	120	0.7	_	0.7	_
1	BLACKOUT CURTAIN - WADSWORTH VC2000ILS	1/5	1	120	2.5	_	2.5	_
6	IRRIGATION VALVES - GLOBE VIA 120 V XFMR	-	1	120	0.07	0.42	_	_
3	FOG ODOR CONTROL VALVES	_	1	120	0.07	0.21	_	_
1	WADSWORTH SEED CONTROL	_	1	120	2.0	-	_	2.0
	w/ WEATHER STATION							
	120/208V CONNECTED LOAD	3.6	К	W @ 80%	, P.F.	13	13	12
3	UNIT HEATERS - MODINE PTE400B	1/6	3	480	49.6	148.8	148.8	148.8
1	UNIT HEATER - MODINE PTE300B	1/6	3	480	37.6	37.6	37.6	37.6
2	EXHAUST FANS - COOLAIR NBF48L 1-SPEED	1	3	480	1.6	3.2	3,2	3,2
48	GROW LIGHTS - FOSHE	-	1	277	3.77	60.3	60.3	60.3
	277/480V CONNECTED LOAD	197.3	К	W @ 95	% P.F.	250	250	250

REV	DATE	RE∨ISION	BY
А	5/9/22	CHANGED LIGHTS SITE POWER CHANGED ADDED 0-10VDC FOR LIGHTS HEATERS CHANGED TO ELECTRIC REMOVED COR VAF VOLTAGE UPDATED LOAD SCHEDULE ADDED INFLUENCE	R.G.

	ADDITIONAL EQUIP. / SHIPPING WITH	
X	WEATHER STATION - C	GABLE
X	ALARM MANAGER - CE	LLULAR
X	SOFTWARE PROGRAM	
]	LATITUDE/LONGITUDE	TIME ZONE
	37.93°/-122.34°	-8
S	OFTWARE VERSION:	2.01.XX
F	'IRMWARE VERSION:	REV 3.01

INFLUENCE: GABLE OVERRIDE 1-OP8 = "ON" & 2-OP1 < 90%

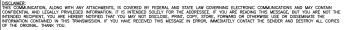
\*-NOTE: USE BUILDING NUMBER AS ZONE NUMBER

\* ALL SOFTWARE TO BE EQUAL TO OR GREATER THAN VERSION INDICATED.

	F	ACTORY D	EFAULT SETPOI	NTS
PERIOD	HEATING	COOLING	HUMIDIFICATION	DEHUMIDIFICATION
DAY	64	70	30%	70%
NIGHT	62	68	30%	70%

				SEED I/O 1 SWITCH ASSIGNMENT CHART		
SWITCH	ZONE	EQUIP. CODE	SWITCH LABEL	DESCRIPTION	ON	OFF
1-0P 1	1*	11	UNIT HEATER 2	UNIT HEATER #2 "ON"	-1	1
1-OP 2	1*	11	UNIT HEATERS 1/3	UNIT HEATER #1/3 "ON"	-2	0
1-OP 3	1*	19	VAF FANS	VAF FANS "ON" / "OFF" WITH FIRST STAGE OF EXHAUST OPERATES BASED ON VENT POSITION	10%	25%
1-0P 4	1*	4	GABLE FAN & SHUTTER	GABLE EXHAUST FAN "ON" AND GABLE SHUTTER "OPEN"  ODOR CONTROL "ON" / MIN VENT POSITION = DISABLED  GABLE OVERRIDE - ACTIVE = "OFF" INACTIVE = CONT EVAL	1	-1
1-OP 5	1*	4	EXHAUST FAN 2 LOW	EXHAUST FAN #2 LOW SPEED "ON" / ODOR CONTROL "ON" MIN VENT POSITION = 10% ANY	3	1
1-0P 6	1*	4	EXHAUST FAN 2 HIGH	EXHAUST FAN #2 HIGH SPEED "ON" MIN VENT POSITION - 10% ANY	4	2
1-0P 7	1*	4	EXHAUST FANS 1 & 3	EXHAUST FANS #1 & #3 "ON" / ODOR CONTROL "ON" MIN VENT POSITION = 10% ANY	5	3
1-OP 8	1°	7	PAD PUMP	PAD PUMP "ON"	6	2
1-0P 9	1*	62	GROW LIGHTS 1	GROW LIGHTS #1 "ENABLE"		
1-0P 10	1*	62	GROW LIGHTS 2	GROW LIGHTS #2 "ENABLE"		
1-0P 11	1*	2	PAD VENT OPEN	PAD VENT "OPEN" FAN / PAD LIMITS = DISABLED	2	
1-0P 12	1*	2	PAD VENT CLOSE	PAD VENT "CLOSE"		0
1-0P 13	ZONE 1° & CORRIDOR 1°	62		ALARM ZONE 1° & CORRIDOR 1°	-10	25
1-A1-OUT	1*	48		GROW LIGHTS #1 "0-10VDC" OPERATES BASED ON TIME & LIGHT ASSOC 1-0P9		
1-A2-OUT	1*	48		GROW LIGHTS #2 "0-10VDC" OPERATES BASED ON TIME & LIGHT ASSOC 1-0P10		

				SEED I/O 2 SWITCH ASSIGNMENT CHART			
SWITCH	ZONE	EQUIP. CODE	SWITCH LABEL	DESCRIPTION	ON	OFF	
2-0P 1	1*	17	BLACKOUT UNCOVER	BLACKOUT "UNCOVER"  OPERATES BASED ON TIME / TEMP & LIGHT = DISABLED			
2-0P 2	1*	17	BLACKOUT COVER	BLACKOUT "COVER"			
2-0P 3				SPARE			
2-0P 4	1*	37	IRRIGATION VALVE 1	IRRIGATION VALVE #1 "ON" OPERATES BASED ON TIME, LIGHT, & VPD			
2-OP 5	1*	37	IRRIGATION VALVE 2	IRRIGATION VALVE #2 "ON" OPERATES BASED ON TIME, LIGHT, & VPD			
2-0P 6	1*	37	IRRIGATION VALVE 3	IRRIGATION VALVE #3 "ON" OPERATES BASED ON TIME, LIGHT, & VPD			SPARE IN
2-0P 7	1*	37	IRRIGATION VALVE 4	IRRIGATION VALVE #4 "ON" OPERATES BASED ON TIME, LIGHT, & VPD			MOTHER ZONE
2-0P 8	1°	37	IRRIGATION VALVE 5	IRRIGATION VALVE #5 "ON" OPERATES BASED ON TIME, LIGHT, & VPD			
2-0P 9	1*	37	IRRIGATION VALVE 6	IRRIGATION VALVE #6 "ON" OPERATES BASED ON TIME, LIGHT, & VPD			
2-OP 10	CORRIDOR 1*	11	UNIT HEATER CORRIDOR	UNIT HEATER "ON"	-1	1	
2-0P 11				SPARE			
2-OP 12				SPARE			
2-OP 13				NOT USED			
2-A1-OUT				SPARE			
2-A2-OUT				SPARE			

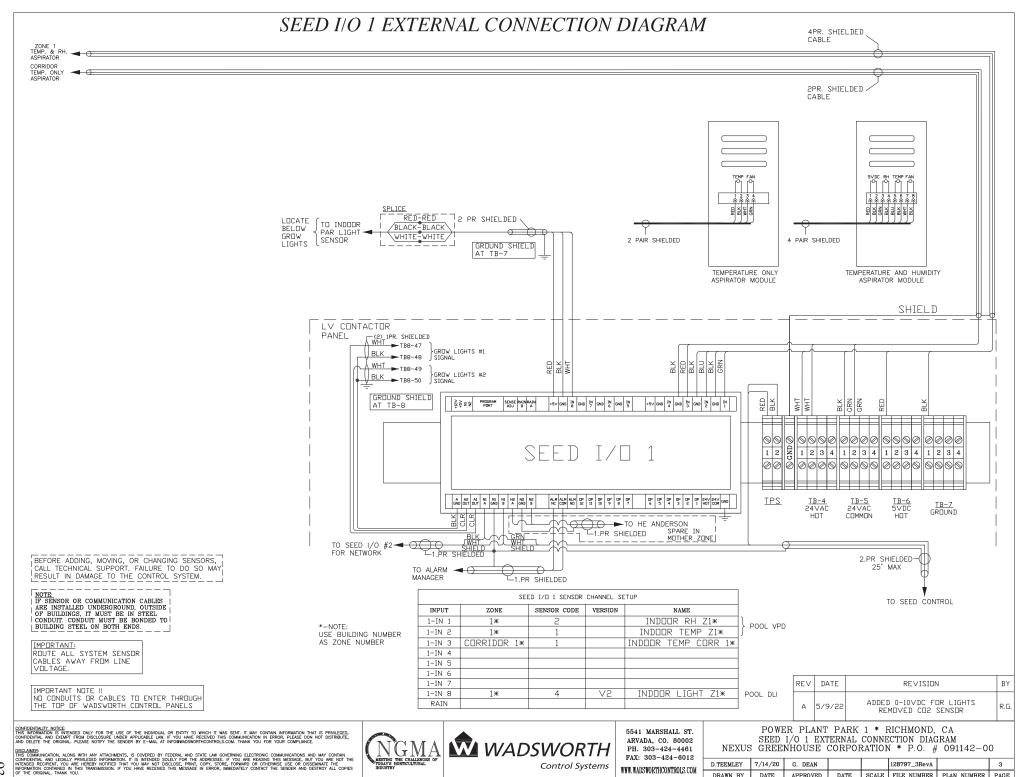






5541 MARSHALL ST. ARVADA, CO. 80002 PH. 303-424-4461 FAX: 303-424-6012 WWW. WADSWORTHCONTROLS.COM POWER PLANT PARK 1 \* RICHMOND, CA SEED I/O 1/2 LOAD SCHEDULE & SWITCH ASSIGNMENTS NEXUS GREENHOUSE CORPORATION \* P.O. # 091142-00

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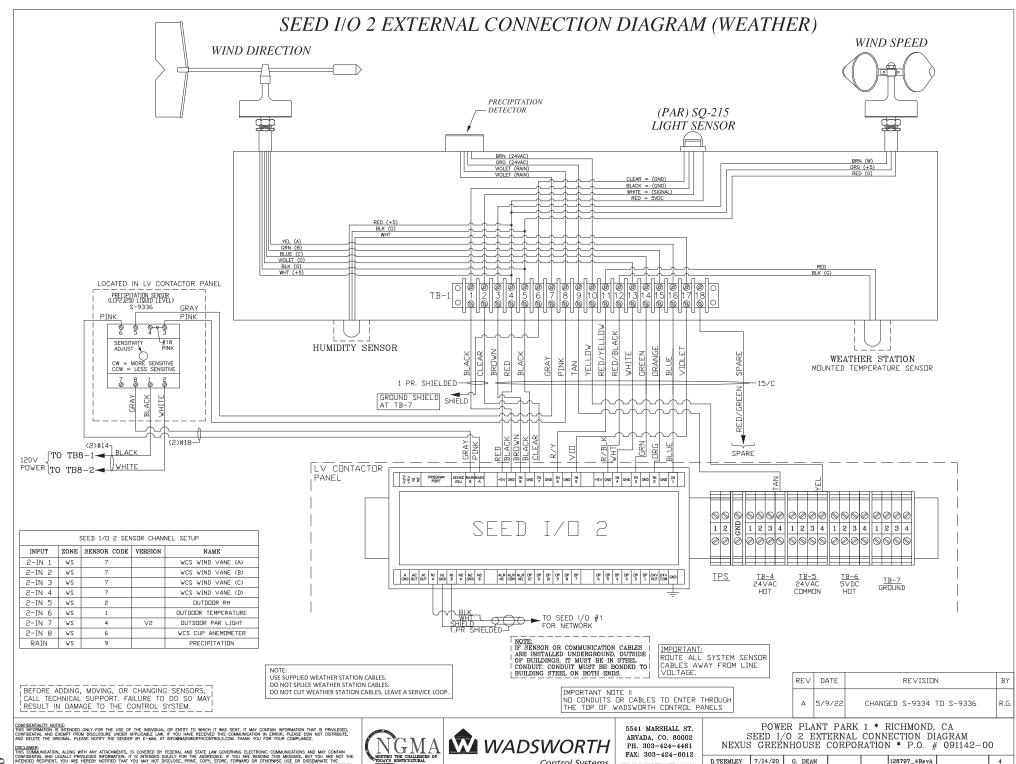
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DATE

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Control Systems

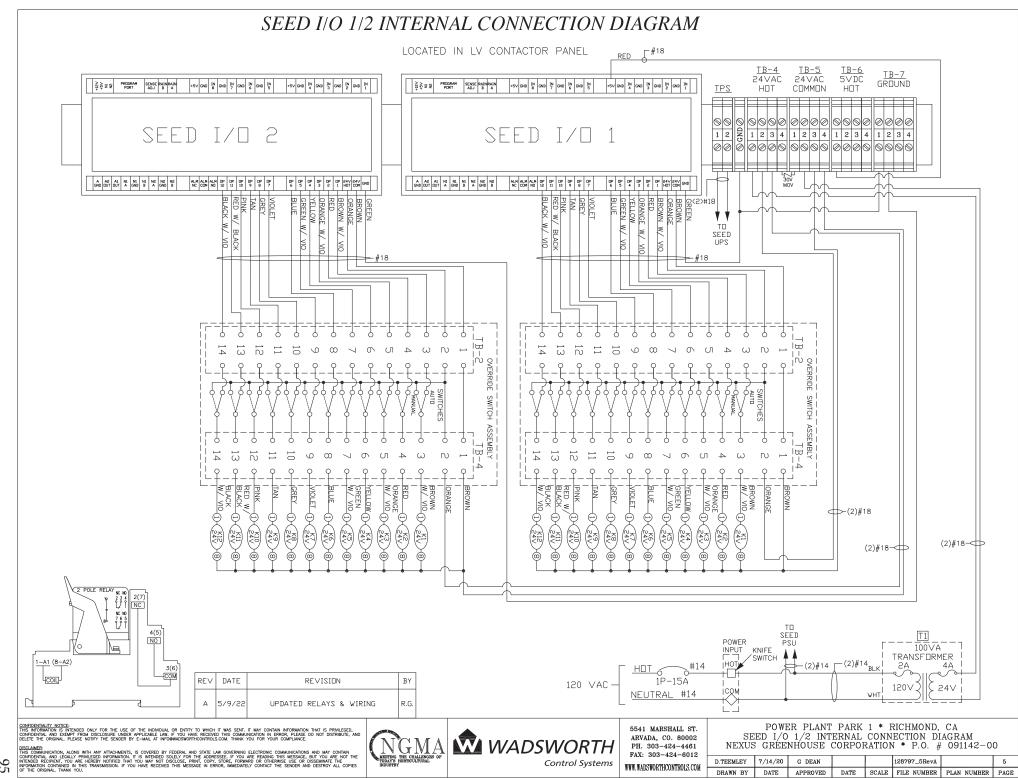
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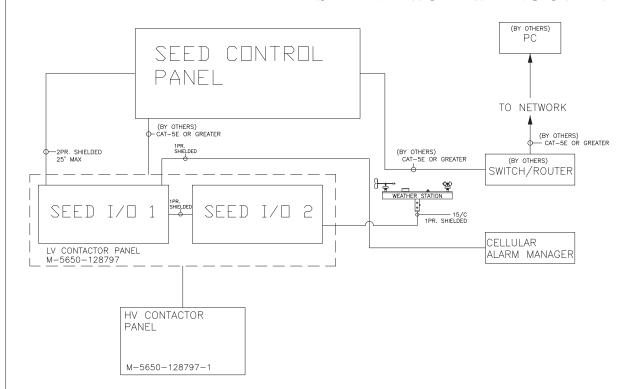
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## SEED NETWORK WIRING OVERVIEW



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Α	5/9/22	ADDED WIRE BETWEEN SEED & CONTACTOR PANEL	R.G.

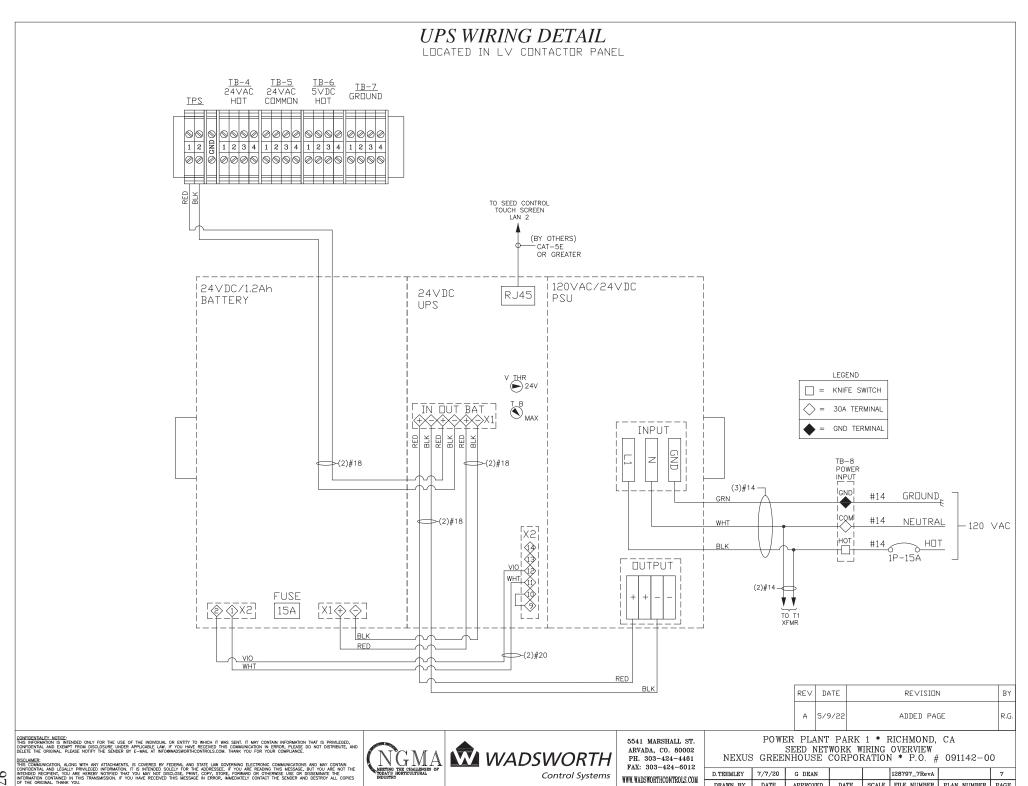




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POWER PLANT PARK 1 \* RICHMOND. CA SEED NETWORK WIRING OVERVIEW
NEXUS GREENHOUSE CORPORATION \* P.O. # 091142-00

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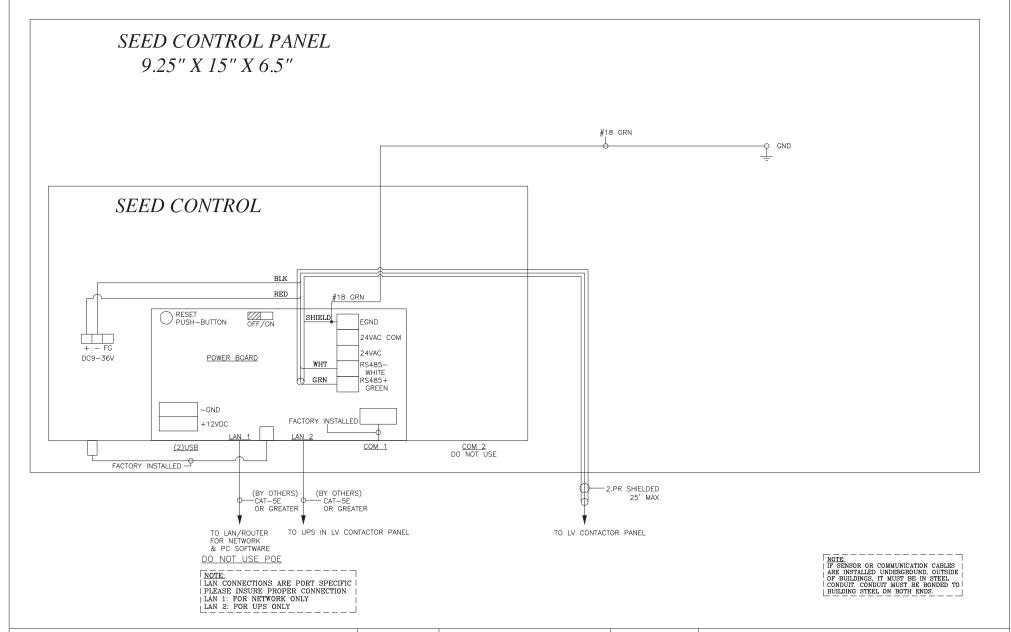
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## SEED CONTROL PANEL WIRING DIAGRAM

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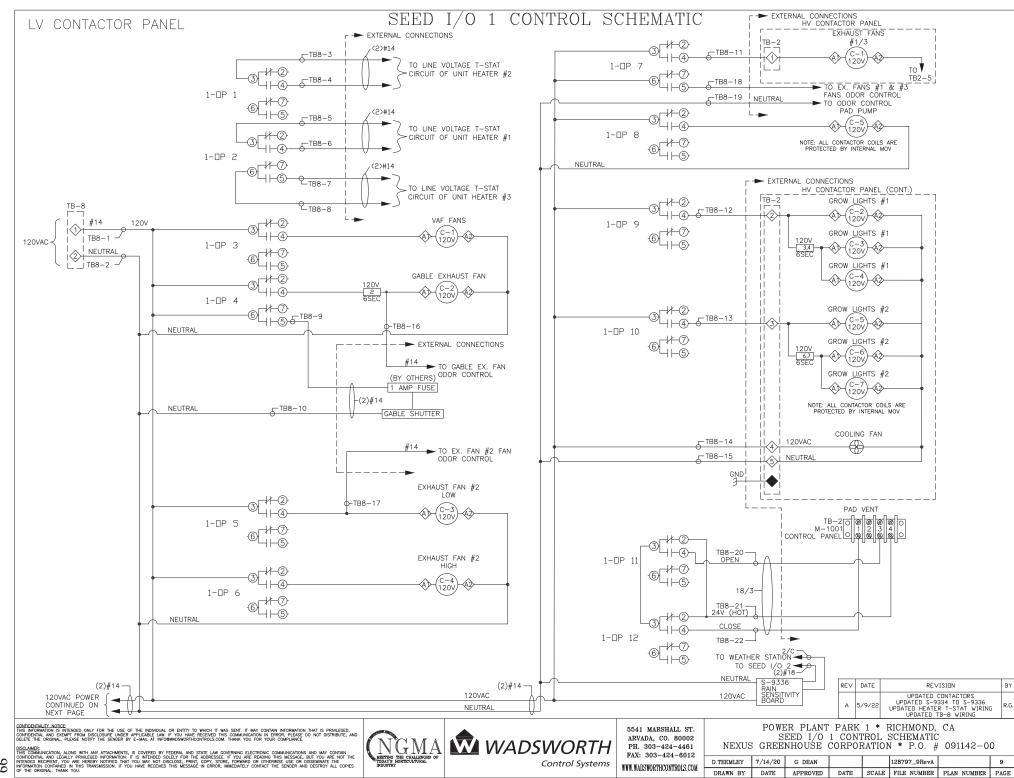


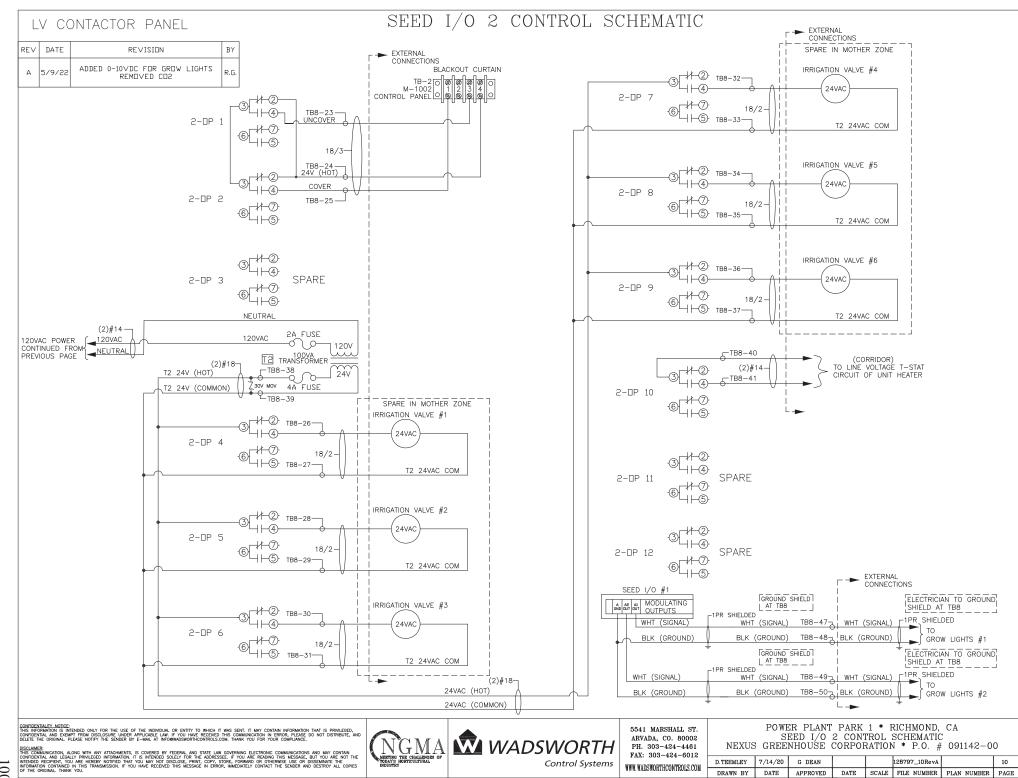


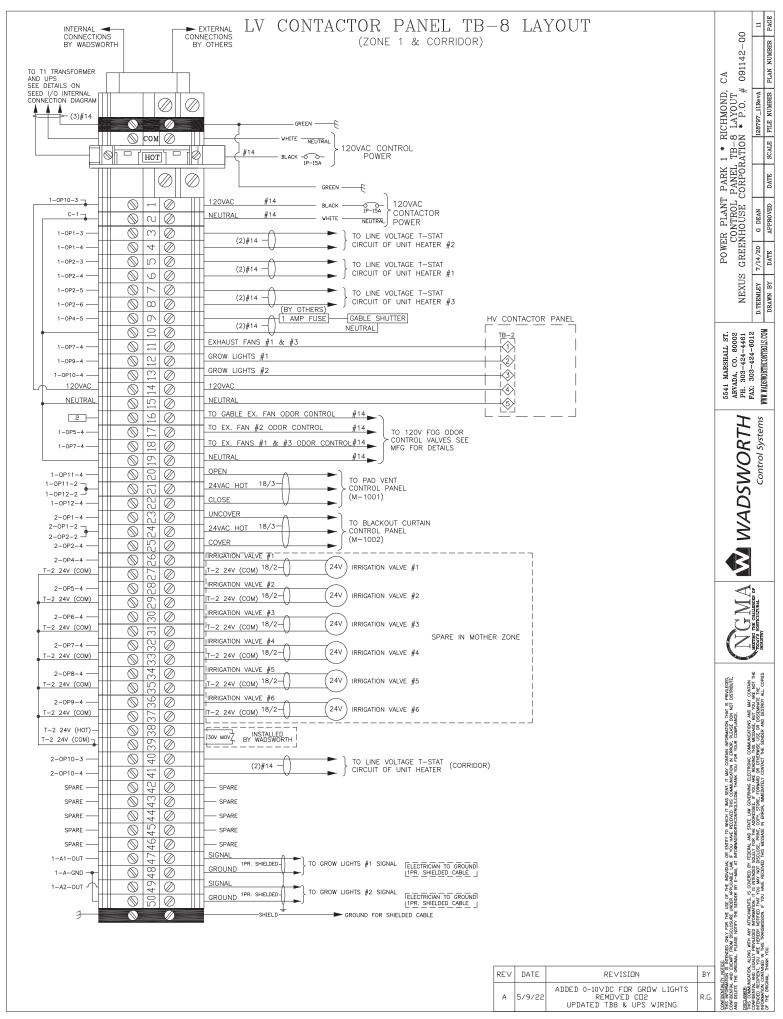


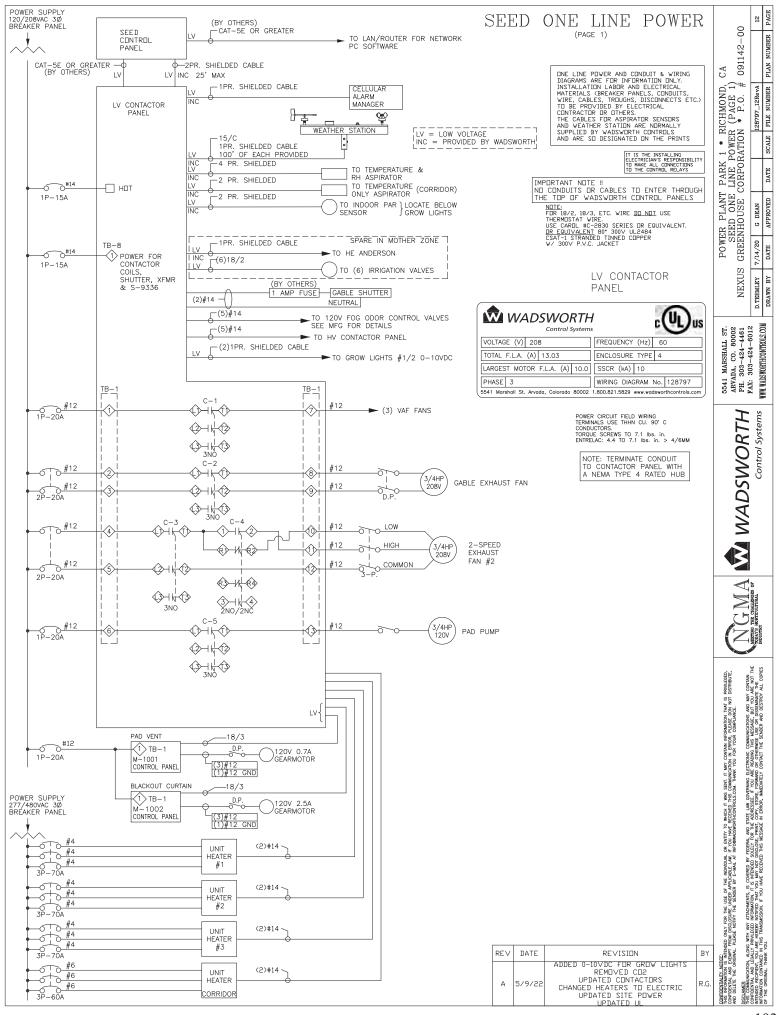
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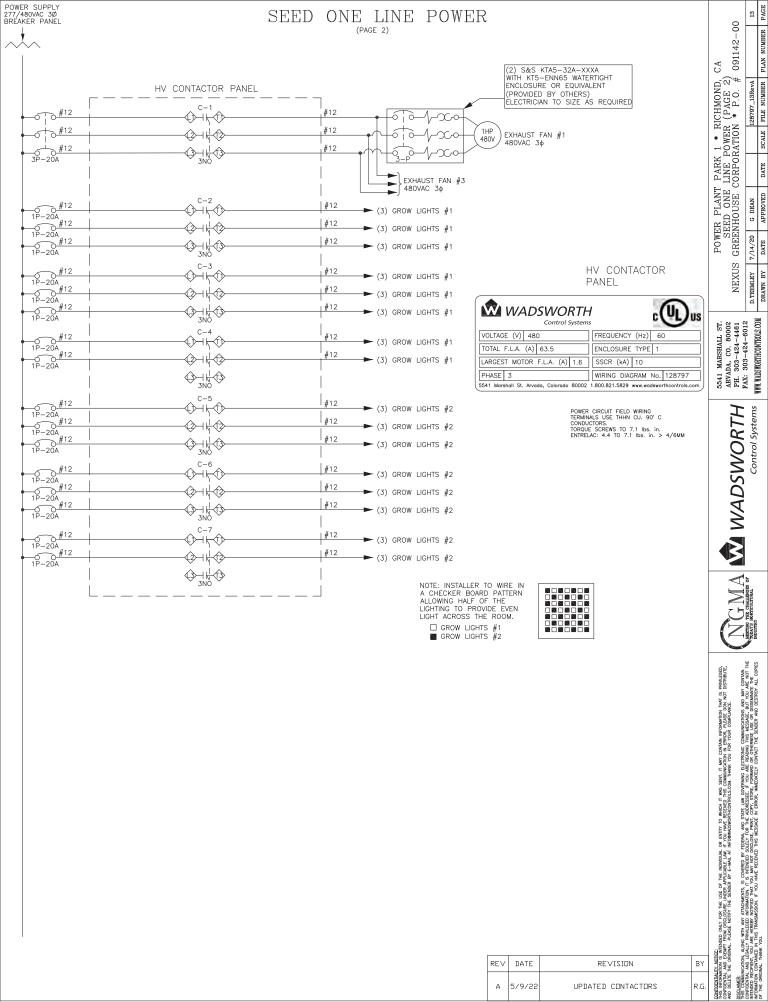
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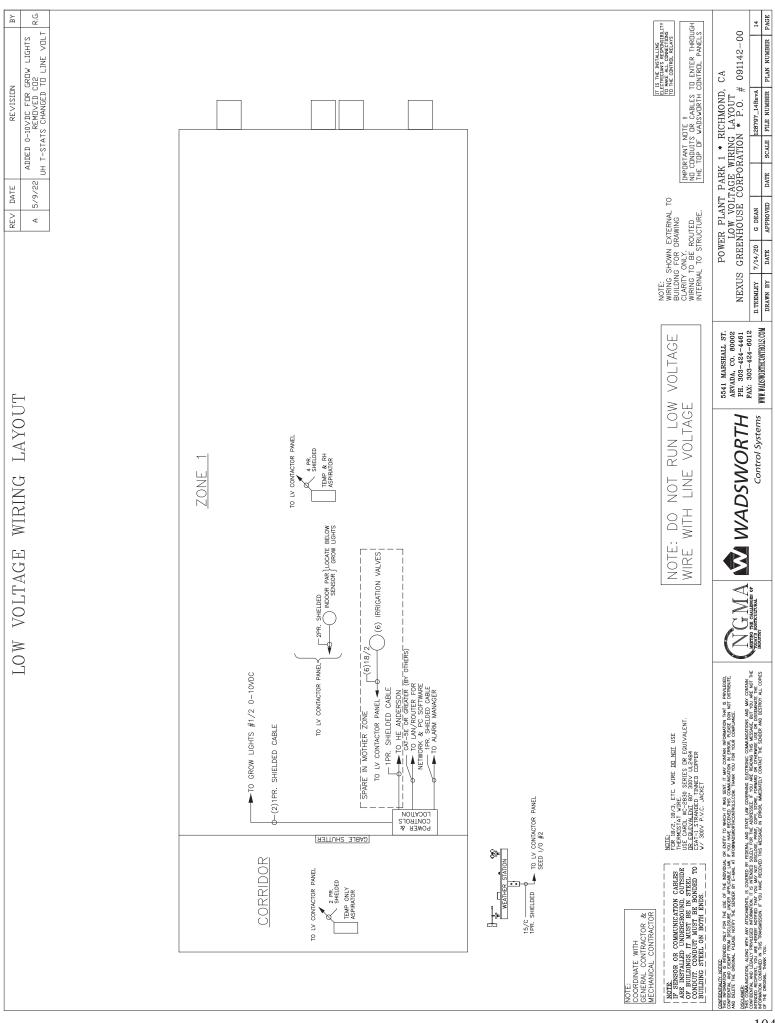


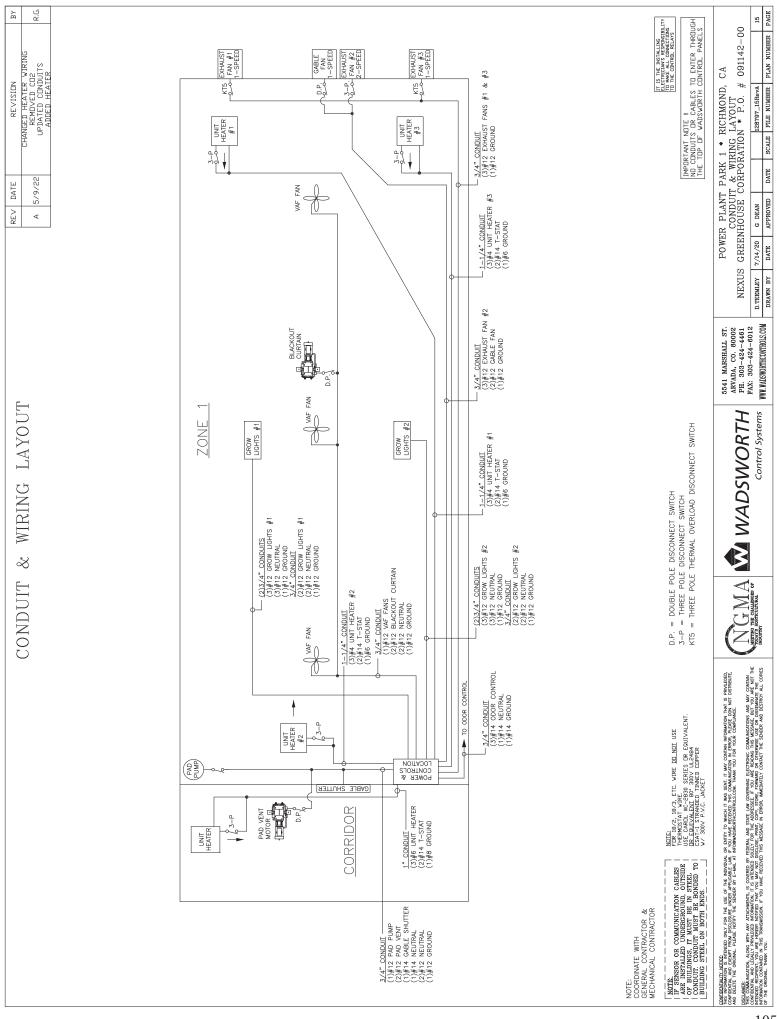


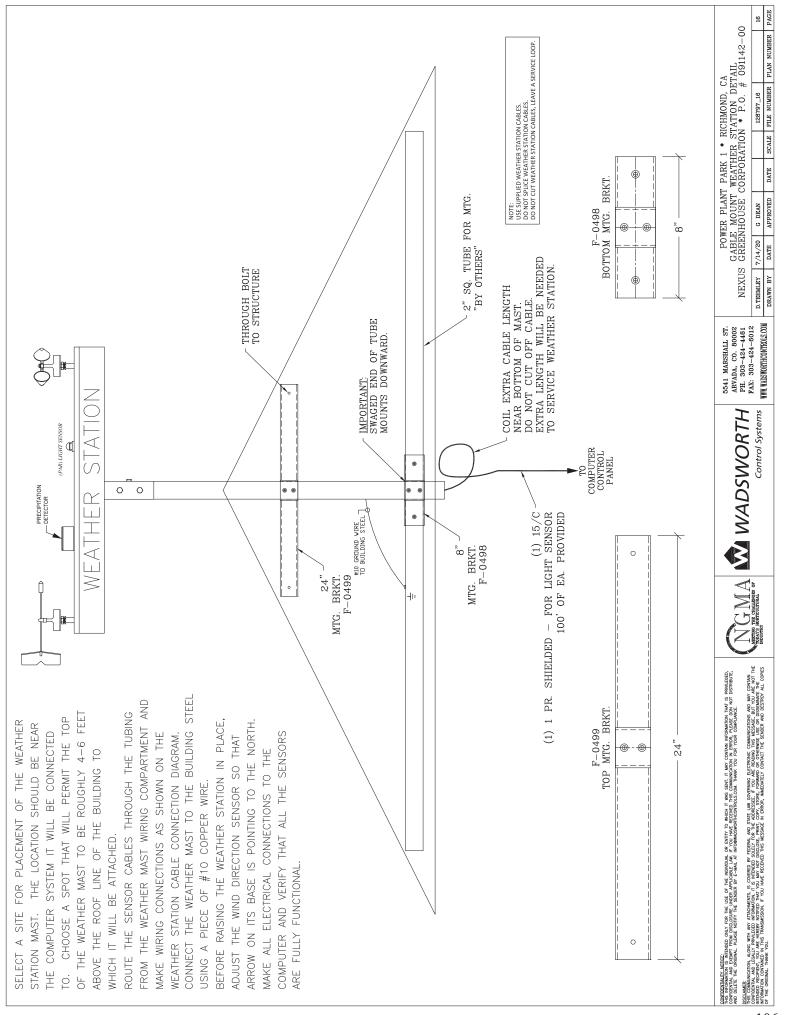












PANEL LAYOUT
NEXUS GREENHOUSE CORPORATION \* P.O. # 091142-00 
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NGMA WADSWORTH



# **ELECTRIC UNIT HEATERS FOR STANDARD AND HAZARDOUS (CLASSIFIED) LOCATIONS**



**MODEL HER** 



**MODEL VE** 



**MODEL PTE** 



**MODEL HEX** 



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### Selectable using the Modine Breeze™ AccuSpec Selection Software.





As Modine Manufacturing Company has a continuous product improvement program, it reserves the right to change design and specifications without notice.

### Wide Range of Sizes and Types

#### Horizontal air delivery unit heater type (HER series):

32 models, 8 sizes from 3 kW through 25 kW.

Recommended for buildings with low ceilings, they are equipped with horizontal air deflector blades to adjust airflow either up or down. Optional vertical deflector blades are also available to deflect air to the right or left, providing complete directional control over discharge of heated air. Horizontal delivery units are normally placed around the perimeter of the building where heat loss is greatest, so that the air stream from each heater "wipes" the wall to produce a blanket of warm air along the outside walls.

#### Vertical air delivery unit heater type (VE series):

21 models, 9 sizes from 5 kW through 50 kW.

Recommended for buildings with high ceilings are high and where obstructions do not permit good horizontal movement of air. Various optional air deflectors are available to produce a variety of distribution patterns (see page 12). Vertical unit heaters are usually oriented so that the heat spread from one overlaps the heat spread of another unit heater.

#### Power-Throw<sup>™</sup> unit heater type (PTE series):

3 models, 3 sizes from 15 kW through 50 kW.

For applications requiring heat throw greater than can be provided by HER units, Power-Throw<sup>™</sup> unit heaters should be considered. For hard-to-heat areas, such as near frequently opened loading dock doors or large warehouses, Power-Throw<sup>™</sup> units are frequently an ideal choice. They are equipped with horizontal air deflector blades to adjust airflow either up or down. Due to the higher velocity of discharge air, their air streams should not be directed at room occupants. A single Power-Throw<sup>™</sup> unit heater can often be used to replace as many as three smaller horizontal delivery units, thereby reducing equipment, installation, and maintenance costs.

# Explosion Proof Horizontal Air Delivery Unit Heater Type (HEX series):

## **A** WARNING

Before installing and operating heaters confirm location, classification and properties of flammable vapors, liquids, gases, dusts and fibers which may be present. Each room, section or area should be considered individually.

26 model combinations, 9 sizes from 3 kW through 35 kW.

These horizontal heaters are designed for rugged industrial applications in hazardous locations such as oil refineries, petrochemical plants, pulp and paper mills, coal mines, grain elevators, etc., where the possibility of explosion or fire exists due to the presence of flammable gases, vapors, powdered metals or dusts. Heaters are UL Listed for Class I, Divisions 1 & 2, Groups C and D; Class II, Division 1, Groups E, F and G, and Class II, Division 2, Groups F and G. The UL temperature code shall be T3B 329°F (165°C) for Class I and II, indicating maximum operating surface temperatures. Before selecting any heater for a particular application, refer to Article 500 of the National Electric Code, as well as other applicable Standards. Abbreviated descriptions of UL classes, groups, and divisions are as follows.

Class I: Locations in which flammable gas or vapors may be present, such as, but not limited to:

 Group C: Atmospheres such as ethylene, alcohol, carbon monoxide, or hydrogen sulfide.



 Group D: Atmospheres such as acetone, gasoline, natural gas, propane or other gases or vapors of equivalent hazard.

**Class II:** Locations in which combustible dusts may be present, such as, but not limited to:

- Group E: Atmospheres containing combustible metal dust regardless of resistivity or other combustible dust of similar hazard characteristics.
- Group F: Atmospheres containing carbon black, charcoal, coal or coke dust or dust of similar hazard characteristics.
- Group G: Atmospheres containing flour, starch, grain dust or dusts of similar hazards.

**Division I:** Location in which ignitable concentrations of flammable material exist under normal operating conditions.

**Division II:** Locations in which flammable materials will normally be confined within closed containers and escape only in the case of abnormal conditions. Any equipment approved for Division I is automatically also approved for Division II.

For further information, please consult the National Electric Code (NEC) and National Fire Prevention Association (NFPA) standards.

#### **Low Installation Cost**

Transformers, contactors and fuses are factory-furnished and factory-wired when required. Terminal blocks facilitate connection of power supply and control wiring. Modine electric unit heaters are lightweight and require no special reinforcement to suspend them.

#### **Easy to Service**

Fan and motor are exposed and can be removed without lowering the unit heater. A hinged bottom panel permits full access to controls on models HER, horizontal units. Vertical delivery and Power-Throw™ models have separate control boxes externally mounted on the units. Motors are totally enclosed, permanently lubricated, and thermally protected. Electrical contactors, fuses, and transformers are all safely enclosed in control compartments.

#### **Application Flexibility**

#### **Total Heating**

Units can meet the total heating requirement in most industrial plants, commercial and recreational buildings, and in special-purpose structures such as animal shelters. The features that make them the ideal selection for these types of buildings are a long heat throw, uniform heat delivery and low installation and maintenance costs. High up and out-of-the-way, unit heaters provide heat into work areas for clean, safe, economical heating comfort.

#### **Supplemental Heating**

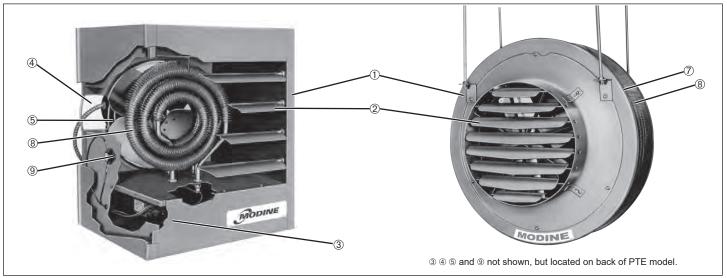
They are ideal for spot heating applications during short periods of occupancy in the area to be heated. In out-of-the-way locations, remote from areas served by the building's main heating systems, electric unit heaters can often eliminate the expense of extending gas, steam, or hot water lines.

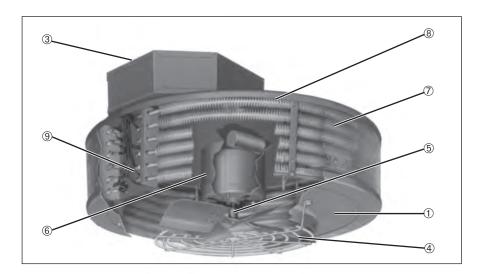
#### Stand-by/Back-up Heating

Where fossil fuel supplies are interruptible or undependable, electric unit heaters are recommended as a stand-by or back-up heating system to supply comfort to an entire building or any part of it.



Figure 4.1 - Model HER & PTE Controls and Features





- ① Casing The casing is cleaned and phosphatized prior to electrostatic application of a baked-on, gray-green polyester powdercoat paint.
- ② Adjustable Air Deflector Blades (HER & PTE units only) -Adjustable up and down, blades provide control over the horizontal air delivery of the unit heater.
- ③ Control Compartment Safely encloses power and control terminal blocks, contactor(s), fuses and transformer. Terminal blocks provide easy access for field wiring. On model HER horizontal units, a hinged bottom panel swings down for full access to the control compartment.
- Safety Fan Guard Formed from heavy gauge steel rod stock, the fan guard is attached to the unit heater casing and provides a rigid support for the motor and protection from the exposed fan.
- Motor/Fan The totally enclosed, thermally protected, continuous-duty motor is mounted to the fan guard utilizing rubber vibration absorbing material. The lightweight aluminum propeller type fan is connected directly to the motor shaft and is statically balanced for peak performance and low sound level.

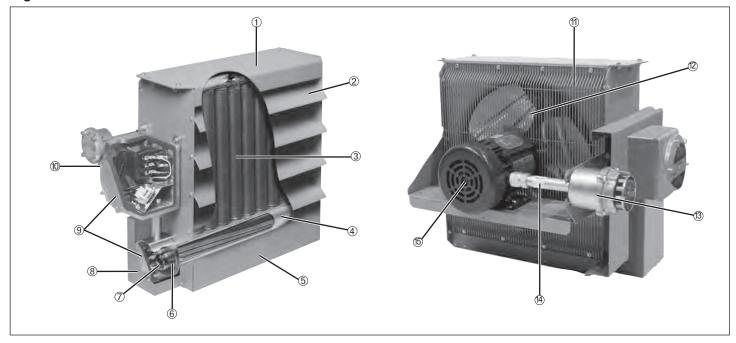
- Motor Heat Shield (VE units only) Protects the motor from heated air passing through the unit heater.
- Protective Screen (VE & PTE units only) The aluminum screen protects heating elements from accidental damage and further enhances the appearance of the unit heater.
- ® Heating Element Nickel-chromium wire elements are enclosed in powder-filled aluminum coated steel tubes to which spiraled fins are permanently fused for maximum heat transfer. Elements are resistant to thermal shock and vibration.
- Automatic Reset Overheat Control In the event of overheating, this control interrupts the power supply to the heating elements. The control automatically resets itself once the heater cools to a safe temperature. Control includes a switch located in terminal box with a capillary tube around bottom heating element.

#### DESIGN FEATURES - EXPLOSION-PROOF MODEL HEX





Figure 5.1 - Model HEX Controls and Features



- ① Epoxy coated 14 gauge steel cabinet contains heater core, motor, and fan assembly. All fasteners are plated for corrosion protection.
- ② Adjustable extruded aluminum louvers allow directional control of airflow.
- ③ Liquid to air finned tube heat exchanger core. An Ethylene Glycol and water solution is used as the heat transfer fluid, providing freeze protection to -49°F (-45°C). A pressure relief valve protects the core from overpressure damage. Heaters are UL Listed for Class I, Divisions 1 & 2, Groups C and D, and Class II, Division 1, Groups E, F and G, and Class II, Division 2, Groups F and G. UL temperature code shall be T3B 329°F (165°C) for Class I and II, indicating maximum operating surface temperatures. Refer to page 3 for additional details.
- 4 Low watt density metal sheathed immersion type heating elements in the liquid filled lower tank feature a Teflon® liner to keep elements away from outer surfaces. (Teflon® is a registered trademark of E.I du Pont de Nemours & Co.).
- The core is easily removable through the bottom of the heater for ease of service.
- Automatic reset, bimetal, high-limit provides over temperature protection and is rated for 100,000 cycles of service.

- Factory wiring to tin plated copper bus bars for effective handling of high current flow.
- ® Outer protective cover protects against high surface temperatures.
- Threaded explosion proof covers on junction boxes.
- ® NEMA Type 7 & 9 enclosures with large, heavy-duty aluminum data plate houses the built-in control transformer, convenient terminals for 120V room thermostat wiring connection, load carrying contactor with severe duty coil, and fuse protection for contactor coil, including a spare fuse in a convenient holder.
- Marrow gap two-piece safety fan guard shields all moving parts.
- Property Beauty Beau
- (9) Optional factory installed explosion proof thermostat.
- Factory wired motor connections with copper conductor wires enclosed in steel conduit. Conduit is reverse threaded for easy motor removal.
- ⑤ Thermally protected, automatic reset explosion-proof motor

Teflon® is a registered trademark of E.I du Pont de Nemours & Co.

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### **PERFORMANCE DATA - ALL MODELS**



Location & Air		H		Heating (	Capacity	у			I. D. 4. 0		
				Model	High	n Stage	Low	Stage		А	ir Data ①
Delivery <sup>*</sup>	Туре		kW	Btu/hr	kW	Btu/hr	Airflow (CFM) ②	Temp Rise (°F)	Heat Throw (ft.)	Maximum Mounting Height (ft.)	
		HER 30	3	10,200	n/a	n/a	380	25	12	8	
		HER 50	5	17,100	n/a	n/a	380	42	12	8	
	چ	HER 75	7.5	25,600	n/a	n/a	530	45	14	8	
	Horizontal Delivery	HER100	10	34,100	n/a	n/a	830	38	20	9	
		HER125	12.5	42,700	n/a	n/a	830	48	20	10	
	a	HER150	15	51,200	n/a	n/a	830	57	20	10	
(n	G	HER200	20	68,200	n/a	n/a	1300	49	25	11	
öü	r.	HER250	25	85,300	n/a	n/a	1300	61	25	12	
ati	윤	PTE300	30	102,400	15	51,200	2575	40	75	17	
ŏ			PTE400	40	136,500	20	68,200	2575	54	60	15
1 P		PTE500	50	170,600	25	85,300	2575	70	45	14	
Standard Locations		VE 50	5	17,100	n/a	n/a	800	21			
tan	Vertical Delivery	VE 75	7.5	25,600	n/a	n/a	800	31			
Ó		VE 100	10	34,100	n/a	n/a	940	36	1		
	<del> </del>	VE 150	15	51,200	n/a	n/a	1340	38		4.6 Ti (5.4 ()	
	Ď	VE 200	19	64,800	n/a	n/a	1600	41	See Table 7.1 for Throw/Mountir Height Data.		
	<u>ica</u>	VE 250	25	85,300	n/a	n/a	1600	55			
	ert	VE 300	30	102,400	15	51,200	2575	40	1		
		VE 400	40	136,500	20	68,200	2575	54	1		
		VE 500	50	170,600	25	85,300	2575	70			
		HEX -3	3	10,250	n/a	n/a	500	19	15	7	
o ⊚		HEX -5	5	17,050	n/a	n/a	500	31.6	15	7	
Locations Proof) ③	Horizontal Delivery	HEX -7.5	7.5	25,600	n/a	n/a	850	27.9	30	10	
) oc	) el	HEX -10	10	34,100	n/a	n/a	850	37.2	30	10	
s L	a	HEX -15	15	51,200	n/a	n/a	1750	27.1	40	10	
lous	out Dit	HEX -20	20	68,250	n/a	n/a	1750	36.1	40	10	
ard plo	ľž	HEX -25	25	85,300	n/a	n/a	3600	21.9	70	20	
Hazardous Locations (Explosion Proof)	운	HEX -30	30	102,350	n/a	n/a	3600	26.3	70	20	
Ξ •		HEX -35	35	119,450	n/a	n/a	3950	28	70	20	

 Airflow shown is at 70°F ambient and heating at full rated capacity.

Table 6.2 - Unit Motor Data - All Models

	notor Bata						
	Motor Information						
Model	Motor HP	Motor Type	Motor Bearing Type				
HER 30							
HER 50	1/40						
HER 75							
HER 100		Totally Enclosed,	Sleeve				
HER 125		Shaded Pole	Sieeve				
HER 150	1/15						
HER 200							
HER 250							
PTE300		Totally Enclosed,					
PTE400	1/6	Permanent Split	Ball				
PTE500		Capacitor					
VE 50		Tatalla Farala and					
VE 75	1/15	Totally Enclosed, Shaded Pole	Sleeve				
VE 100		Orladed Fole					
VE 150							
VE 200	1/8	T-4-III - FIII					
VE 250		Totally Enclosed, Permanent Split	Ball				
VE 300		Capacitor	Baii				
VE 400	1/6						
VE 500							
HEX412- <u>⑤</u> 60-3.0							
HEX412- <u>⑤</u> 60-5.0							
HEX412- <u>⑤</u> 60-7.5							
HEX412- <u>\$</u> 60-10.0	4/0	Frankski D. (	D-II				
HEX416- <u>\$</u> 60-15.0	1/2	Explosion Proof	Ball				
HEX416- <u>\$</u> 60-20.0							
HEX420- <u>\$</u> 60-25.0 HEX420- \$ 60-30.0							
HEX420- © 60-35.0							
□□△420- <u>◎</u> 00-33.0							

<sup>©</sup> For HER, airflow CFM is for inlet. For PTE and VE, airflow CFM is outlet. ® For HEX units above

③ For HEX units above 6000 feet above sea level, altitude limits may exist. Refer to the latest revision of Installation & Service Manual 2-519.

### **HEAT SPREAD AND MOUNTING HEIGHT - MODEL VE**

#### **Performance Data**

#### **Heat Spread and Mounting Height**

Refer to Table 7.1 and Figures 7.2 through 7.5 for the recommended mounting heights and accompanying heat spread of vertical units without an air deflector and with the three air deflectors offered.

Table 7.1 - Heat Spread and Mounting Height (Ft.) ®

	Wit	h No	With Deflector								
		ector	Trun	cone	Con	Cone-Jet		Louvers			
Model	Man	Coreed			Vert	ical3	Verti	cal3	45	<b>5°</b> 3	
No.	Max. Height	Spread (S)	Н	S	Н	S	Н	S	Н	S	
VE 50	13	20	9	24	18	23	15	13	8	23	
VE 75	11	17	8	20	15	20	13	11	8	20	
VE100	12	18	8	22	17	22	14	12	8	22	
VE150	17	26	11	30	23	30	20	17	10	30	
VE200	20	30	13	36	27	35	23	20	12	35	
VE250	17	26	11	31	23	31	20	18	10	31	
VE300	20	31	15	36	28	36	24	21	12	36	
VE400	18	27	13	32	24	32	21	18	11	32	
VE500	16	24	12	29	22	29	19	16	10	29	

① With 70°F ambient air and heating at full capacity

Figure 7.1 - Vertical Air Outlet Accessories

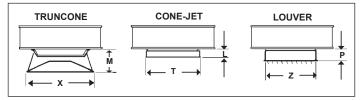


Table 7.2 - Vertical Air Outlet Accessories

Model	Trun	cone	Con	e-Jet	Lou	ıvers
No.	M	Х	L	T	Р	Z
VE50-VE250	12 1/2	22	6 1/2	18 7/8	6 1/2	16 7/8
VE300-VE-500	12 1/2	27	7 1/2	24 3/4	7 1/2	19 3/4

#### Figure 7.2 - Without Deflector

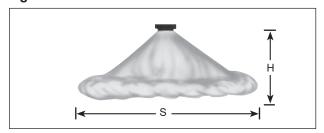


Figure 7.3 - With Truncone

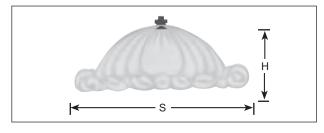


Figure 7.4 - With Cone-Jet

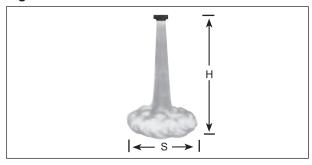


Figure 7.5 - With One- or Two-Way Louvers

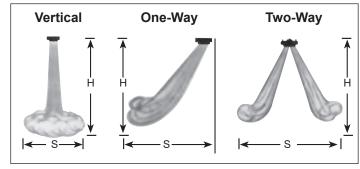
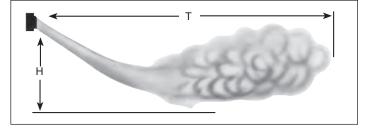


Figure 7.6 - Mounting Height & Heat Throw - Models HER, PTE, & HEX (refer to Table 6.1)



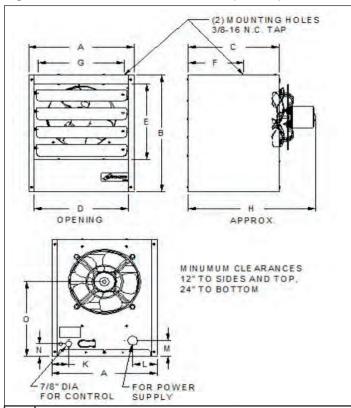
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② Indicates pitch of adjustable louvers. 45° louvers are available for one- or two-way deflection

# MODINE

#### **Dimensional Data**

Figure 8.1 - Model HER Dimensions (inches)



		MODEL								
Dim.	HER 30	HER 50	HER 75	HER 100	HER 125	HER 150	HER 200	HER 250		
Α	14-1/4	14-1/4	16-7/8	16-7/8	16-7/8	16-7/8	18-7/8	18-7/8		
В	17-1/2	17-1/2	20-7/8	20-7/8	20-7/8	20-7/8	24	24		
С	12-1/4	12-1/4	14-3/4	14-3/4	14-3/4	14-3/4	20	20		
D	12-7/8	12-7/8	14-1/2	14-1/2	14-1/2	14-1/2	16-1/2	16-1/2		
E	11-3/8	11-3/8	13	13	13	13	16	16		
F	7-1/2	7-1/2	8-7/8	9-5/8	9-5/8	9-5/8	12-5/8	12-5/8		
G	11-5/8	11-5/8	13-1/2	13-1/2	13-1/2	13-1/2	15-1/2	15-1/2		
Н	17-1/4	17-1/4	20-1/4	21-1/4	21-1/4	21-1/4	26-1/2	26-1/2		
K	2-1/4	2-1/4	2-1/4	2-1/4	2-1/4	2-1/4	3-1/4	3-1/4		
L	3-3/8	3-3/8	3-1/4	3-1/4	3-1/4	3-1/4	4-1/4	4-1/4		
М	2-3/8	2-3/8	2-1/4	2-1/4	2-1/4	2-1/4	2-1/2	2-1/2		
N	1-7/8	1-7/8	2-1/4	2-1/4	2-1/4	2-1/4	2-1/2	2-1/2		
0	11-1/8	11-1/8	12-3/4	12-3/4	12-3/4	12-3/4	14-1/2	14-1/2		
Fan Dia.	9	9	12	12	12	12	14	14		
Wt. Lbs. ①	<b>34</b> ①	<b>34</b> ①	<b>52</b> ①	67 ①	65 ①	<b>74</b> ①	97 ①	98 ①		

① Approximate Shipping Weight Add 7 lbs. for 480 Volt Models.

Figure 8.2 - Model PTE Dimensions (inches)

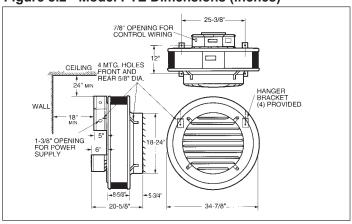


Figure 8.3 - Model VE Dimensions (inches)

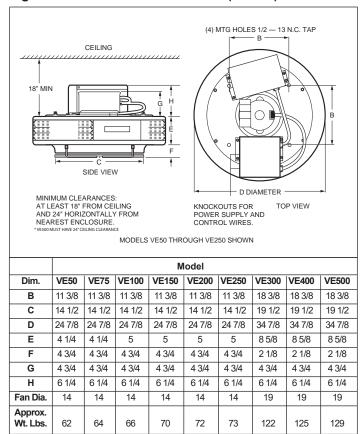
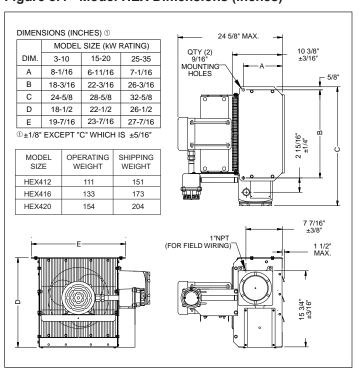


Figure 8.4 - Model HEX Dimensions (inches)



2-116.8



#### **Thermostats**

The unit-mounted thermostat in Figure 9.1 is provided as a field installed kit for a model HER series only. Temperature range of the dial setting is from 40°F to 90°F.

Other thermostats offered (not unit-mounted) are:

- Line-voltage single stage
- Line-voltage, 2-stage (available on PTE and VE models 300, 400 and 500)
- Low-voltage single stage (requires Low-Voltage Control kit.)

Figure 9.1 - Unit-Mounted Thermostat



#### **Low-Voltage Control**

This control permits use of a low-voltage thermostat control of electric unit heaters. High capacity models VE300, VE400, VE500 and all PTE series heaters cannot operate in two stages with a low-voltage thermostat; however, they will respond in one stage with full operation of all elements. On model HER series, this control cannot be combined with the unit-mounted thermostat

#### Summer-Winter Switch

In the winter position, the thermostat will cycle the fan and heating elements. In the summer position, the switch will permit the fan to run continuously while the heating elements are controlled by the thermostat. Maximum switch rating is 10A at 250 volts. Kit includes switch, conduit box, wire nuts, and installation instructions.

Figure 9.2 **Low-Voltage Control** 

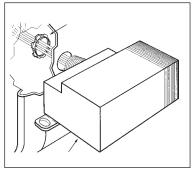


Figure 9.3 **Summer-Winter Switch** 



#### **Vertical Unit Air Deflector Blades**

Blades used to deflect airflow in directions left or right of unit heater. Used in addition to standard horizontal deflector blades. Not available for Power-Throw<sup>™</sup> models.

#### **Vertical Unit Air Deflectors** (refer to page 7 for more info)

- The cone-jet allows the discharge air stream to be adjusted from a concentrated high velocity jet to a broadened air stream to cover a larger area.
- The truncone causes a broad discharge air stream covering a larger area than possible with the cone-jet.
- The one-way louver allows the discharge air stream to be adjusted in one direction.
- The two-way louver allows the discharge air stream to be adjusted in two directions.

#### **Pipe Suspension Adapter Kit**

To facilitate threaded-pipe suspension mounting, a pipe-adapter kit is available that includes two drilled pipe caps and two 3/8 - 16 x 1 1/2" capscrews. One kit is required to pipe-mount HER series and two kits must be ordered to mount VE series unit heaters. (On models VE50 through VE250 supplied with 480 volt, 3 phase service, clearance is not adequate for utilization of this kit.) This kit cannot be used with Power-Throw<sup>™</sup> (PTE series) unit heaters.

#### **Wall Mounting Bracket**

For easier unit installation, where ceiling suspension is not feasible, a wall-mounting bracket is available for models HER50 through HER250 and PTE300 through PTE500. The one-point suspension illustrated in Figure 9.4 permits swiveling the unit 90° horizontally for most effective air flow direction. Fasteners for mounting to wall are not furnished.

Figure 9.4 **Wall Mounting Bracket** 



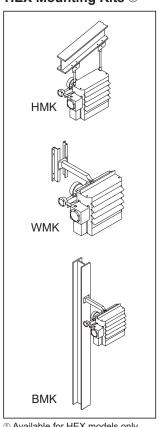
Hanging Mounting Kit (HMK) ① Simple and economical if adequate overhead structure exists. Requires 1/2"

pipe, cut and threaded (not supplied)

Wall Mounting Kit (WMK) ① Ideal for use in buildings that have substantial walls. the Z sections provide additional support where necessary.

**Basic Mounting Kit (BMK)** ① Suitable for applications where the support arm can be bolted or welded directly to structural steel or concrete.

Figure 9.5 **HEX Mounting Kits** ①



① Available for HEX models only.

### **UNIT SELECTION - ALL MODELS**

To order a Modine electric unit heater, specify:



- 1. Model Number:
  - HER Horizontal Electric Unit Heater
  - VE Vertical Electric Unit Heater
  - PTE Power-Throw™ Horizontal Electric Unit Heater
  - HEX Horizontal Explosion Proof Electric Unit Heater
- 2. Select the full model number from Table 10.1 by locating the model series from Step 1 within Table 10.1 at the intersection of the kW rating and supply voltage required. If that selection shows "-", then there is not a model available matching those parameters.
- 3. Add any required accessories as shown on page 7 and 9.

Table 10.1 - Full Model Number Selection

				Su	pply Voltage and Power (	Code	
			208V/1ph	240V/1ph	208V/3ph	240V/3ph	480V/3ph
Electric Unit Heater Type		kW Rating	11	12	31	32	33
		3	HER 30B 1101	HER 30B 1201	HER 30B 3101	HER 30B 3201	HER 30B 3301
		5	HER 50B 1101	HER 50B 1201	HER 50B 3101	HER 50B 3201	HER 50B 3301
	ery	7.5	HER 75B 1101	HER 75B 1201	HER 75B 3101	HER 75B 3201	HER 75B 3301
	A	10	HER100B 1101	HER100B 1201	HER100B 3101	HER100B 3201	HER100B 3301
	Ğ	12.5	-	-	HER125B 3101	HER125B 3201	HER125B 3301
	Ĭ₹	15	-	-	HER150B 3101	HER150B 3201	HER150B 3301
	nta	20	-	-	HER200B 3101	HER200B 3201	HER200B 3301
Standard Locations	Horizontal Air Delivery	25	-	-	HER250B 3101	HER250B 3201	HER250B 3301
atic	Hor	30	-	-	-	-	PTE300B 3301
Poc		40	-	-	-	-	PTE400B 3301
5		50	-	-	-	-	PTE500B 3301
apu	>	5	-	VE 50B 1201	VE 50B 3101	VE 50B 3201	VE 50B 3301
Stal		7.5	-	VE 75B 1201	VE 75B 3101	VE 75B 3201	VE 75B 3301
•	i ve	10	-	VE 100B 1201	VE 100B 3101	VE 100B 3201	VE 100B 3301
	Del	15	-	-	VE 150B 3101	VE 150B 3201	VE 150B 3301
	Vertical Air Delivery	20	-	-	-	VE 200B 3201	VE 200B 3301
	al,	25	-	-	-	-	VE 250B 3301
	ıti	30	-	-	-	-	VE 300B 3301
	> >	40	-	-	-	-	VE 400B 3301
		50	-	-	-	-	VE 500B 3301
		3	HEX412-208160-3.0	HEX412-240160-3.0	HEX412-208360-3.0	HEX412-240360-3.0	HEX412-480360-3.0
ns (	ery	5	HEX412-208160-5.0	HEX412-240160-5.0	HEX412-208360-5.0	HEX412-240360-5.0	HEX412-480360-5.0
atio	ie	7.5	HEX412-208160-7.5	HEX412-240160-7.5	HEX412-208360-7.5	HEX412-240360-7.5	HEX412-480360-7.5
Locations n Proof)	ŗ	10	-	HEX412-240160-10.0	HEX412-208360-10.0	HEX412-240360-10.0	HEX412-480360-10.0
IS L ion	Ξ	15	-	-	HEX416-208360-15.0	HEX416-240360-15.0	HEX416-480360-15.0
dot	nta	20	-	-	-	-	HEX416-480360-20.0
Hazardous Locatior (Explosion Proof)	Horizontal Air Delivery	25	-	-	-	-	HEX420-480360-25.0
Ha )	Hor	30	-	-	-	-	HEX420-480360-30.0
		35	-	-	-	-	HEX420-480360-35.0



#### A. Standards

- A.1.a. Units shall be UL and C-UL listed for safe operation, construction, and performance. Units shall be listed for use in both the U.S. and Canada for commercial and industrial installations. (Models HER, VE, and PTE)
- A.1.b. Explosion proof units, model HEX4 shall be UL listed and CSA certified for use in the following hazardous areas:
  - Class I, Divisions 1 & 2, Groups C & D
    Class II, Division 1, Groups E, F & G
    Class II, Division 2, Groups F & G
    Class I, Zones 1 & 2, Group IIA & IIB

Units shall be rated for National Electrical Code and Canadian Electrical Code Temperature Code T3B 165°C (329°F).

#### **B.** Mechanical Configuration

- B.1.a. Heater shall be a Modine model HER horizontal air delivery electric unit heater of the size, capacity, and voltage as listed in the equipment schedule.
- B.1.b. Heater shall be a Modine Power-Throw<sup>™</sup> model PTE horizontal air delivery electric unit heater of the size, capacity, and voltage as listed in the equipment schedule.
- B.1.c. Heater shall be a Modine model VE vertical air delivery electric unit heater of the size, capacity, and voltage as listed in the equipment schedule.
- B.1.d. Heater shall be a Modine model HEX4 horizontal air delivery electric unit heater of the size, capacity, and voltage as listed in the equipment schedule.

#### C. Unit Casing

- C.1. Unit shall have a steel casing that is treated for corrosion resistance and painted with an electrostatically applied, baked on, gray-green polyester powdercoat paint finish. (Models HER, VE, and PTE)
- C.2.a. Model HER unit shall have a squared corner casing and the top shall have two threaded holes (3/8" - 16 TAP) for threaded rod suspension. The bottom of casing shall have a hinged panel for service access to wiring and controls.
- C.2.b. Model PTE unit shall consist of two circular steel covers bolted together with the heating element supports. The air discharge side cover shall have a die-formed fan venturi. The back cover shall have a depression for motor mounting with openings for cooling-air circulation for the motor. Four hanging brackets shall be provided for use with 5/8" diameter suspension rods.
- C.2.c. Model VE unit shall consist of two circular steel covers bolted together with the heating element supports. The bottom cover shall have a die-formed fan venturi. The top cover shall include an inner cone for motor mounting and to provide a heat shield from radiant and convective heat from the heating elements.
- C.2.d. Model HEX4 shall be fabricated from 14 gauge steel with a baked epoxy powder coating over a 5-stage pretreatment including iron phosphate, for protection from corrosive atmospheres. The cabinet shall include two (2) 9/16" mounting holes located on the top.

#### D. Heating Elements

- D.1.a. Elements shall consist of a nickel-chromium resistance wire surrounded with magnesium oxide and sheathed in steel spiral-finned tubes. Elements shall have kilowatt rating as listed in the equipment schedule. (Models HER, VE, and PTE)
- D.1.b. The heat exchanger shall be fluid-to-air type consisting of steel tubes with roll-formed aluminum fins and be vacuum charged. The heat exchanger shall be protected by a preset 100 psig (690 kPa) pressure-relief valve, aluminum body, no services be parts. The heat exchanger shall be filled to design level with a custom-

blended, long-life solution of ethylene-glycol, water, and corrosion inhibitors. The heat exchanger shall have three heavy-duty immersion heating elements brazed into a heavy steel bulkhead. The elements shall consist of high-quality resistance wire embedded in a compacted magnesium oxide refractory and sheathed in metal tubing. The heater is to be protected by a snap-action bimetal temperature high-limit, which shall not be affected by altitude or changes in atmospheric pressure. The high-limit shall be an automatic reset type, and will shut off the heater if the exchanger temperature rises due to a lack of heat dissipation.

#### E. Motor and Propeller Fan

- E.1.a. Each unit shall have a single 208-230V/60Hz/1ph motor. The motor shall be totally enclosed, continuous-duty, with automatic resetting, thermal-overload protection. Propeller fan shall be directly connected to the motor shaft and be statically balanced. The motor shall be mounted to the unit with rubber vibration absorbing material. (Models HER, VE, and PTE)
- E.1.b. Each unit shall have a ball bearing, permanently lubricated, thermally protected explosion-proof motor rated for continuous duty. The fan blades shall be aluminum to prevent sparking. Propeller fan shall be directly connected to the motor shaft and be statically balanced. The fan shall be shielded with a heavy-duty epoxy coated guard of two piece construction to provide easy maintenance and cleaning of the fan and motor.
  The guard shall not allow a 1/4" or larger probe to enter. (Model HEX4 only)

#### F. Electrical

- All units shall have built-in contactors and control circuit transformers (where required) to provide single-source power connection.
- F.1.a. Models VE and PTE, sizes 300 through 500 shall have two sets of contactors to provide for two-stage operation.
- F.1.b. Model HEX4 shall have a contactor coil that is encapsulated severe duty and separately fuse-protected.
- Fuse blocks and factory-supplied fuses shall be installed on all models except HER 30, 50, and 75 with 208 volt or 230-volt single or 3-phase power supply. A wiring diagram and grounding lug shall be included in each control compartment.
- F.3.a. Transformers shall be factory installed on all models with 460 volt, 3 phase power supply to permit 230 volt motor operation. (Models HER, VE, and PTE)
- F.3.b. Transformers shall be factory installed on all HEX4 models with the primary voltage being the same as the heater voltage and the secondary being 120V grounded
- Electrical control components shall be safely enclosed in a separate junction box. A wiring diagram and a grounding lug shall be included in each power junction box.
- F.4.a. The Model HEX4 control center shall be enclosed in an explosion-proof control enclosure with a large threaded cover for easy access. The control center shall include a printed circuit board with a terminal block for room thermostat connection and in-line fuse protection, with both an operating fuse and a spare fuse.
- (opt) The HEX4 heater shall be supplied with a built-in explosion-proof room thermostat mounted on the control enclosure side of the heater.

#### G. Air Deflectors

- G.1.a. Adjustable horizontal air deflectors shall be furnished. (Models HER and PTE)
- G.1.b. Louvers shall be individually adjustable and made of anodized extruded aluminum. (Model HEX4)

2-116.8

Products from Modine are designed to provide indoor air-comfort and ventilation solutions for residential, commercial, institutional and industrial applications. Whatever your heating, ventilating and air conditioning requirements, Modine has the product to satisfy your needs, including:

#### **HVAC**

- Unit Heaters:
  - Gas
  - Hydronic
  - Electric
  - Oil
- Ceiling Cassettes
- Duct Furnaces
- Hydronic Cabinet Unit Heaters, Fin Tube, Convectors
- Infrared Heaters
- Make-up Air Systems
- Unit Ventilators

#### Ventilation

• Packaged Rooftop Ventilation

#### **School Products**

- Vertical Packaged Classroom HVAC:
- DX Cooling/Heat Pump
- Water/Ground Source Heat Pump
- Horizontal/Vertical Unit Ventilators

#### **Geothermal**

- Water-to-Water
- Water-to-Air
- Combination

Specific catalogs are available for each product. Catalogs 75-136 and 75-137 provide details on all Modine HVAC equipment.



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#### SAFETY PRECAUTIONS

Read the installation, operation and maintenance instructions carefully before installing and operating this device. Proper adherence to these instructions is essential to obtain maximum benefit from your Quest Dehumidifier.

#### **READ AND SAVE THESE INSTRUCTIONS**

- The device is designed to be installed INDOORS IN A SPACE THAT IS PROTECTED FROM RAIN AND FLOODING.
- Install the unit with space to access the back or side panels for maintenance and service. DO NOT INSTALL UNIT WITH THE SERVICE PANELS INACCESSIBLE.
- Avoid directing the discharge air at people, or over the water in pool areas.
- If used near a pool, spa or water; be certain there is NO chance the unit could fall into the water, be splashed and that it is plugged into an outlet that is a GROUND FAULT INTERRUPT protected circuit.
- DO NOT use the device as a bench or table.
- DO NOT place the device directly on structural members. Provide vibration isolation in order to minimize operational vibration and/or noise.
- A drain pan MUST be placed under the unit if installed above a living area or above an area where water leakage could cause damage
- Never operate a unit with a damaged power cord. If the power cord is damaged it must be replaced by the manufacturer, its service agent, or similarly qualified person in order to avoid a hazard.
- Make all electrical connections in accordance with the current edition of the NEC ANSI/NFPA 70 and any national and local codes or ordinances that may apply.
- Maintain a minimum 1ft. (.3m) clearance to avoid obstructing the air return and supply.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
- Not intended for use at altitudes over 6500 ft (2000M).

### 1. INTENDED APPLICATION FOR QUEST 335

The Quest 335 Dehumidifier is designed to operate in temperatures between 56° and 95°F.

In order to efficiently control humidity levels, the area in which the dehumidifier is to be operated must be free of water intrusion or excessive fresh (outside) air infiltration. Before installing the Quest 335 Dehumidifier, water intrusion and air infiltration problems should be addressed or noted in calculations.

#### 2. REGISTRATIONS

The Quest 335 Dehumidifier units conform to unified standard UL 60335-2-40, CSA C22,2#60335-2-40. US Patents: D570,988 / 8,069,681 / 9,052,132.

### 3. SPECIFICATIONS @ 80°F/60% RH

UNIT		ST 335 42500		T <b>335</b> 277V	
BLOWER: (TESTED WITH DUCT COLLARS ON)	900 CFN	1 @ 0.6" WG	900 CFM @ 0.6" WG		
POWER:	156	5 Watts	178	39 Watts	
SUPPLY VOLTAGE:		and 230V - se - 60 Hz	1	277V - ase - 60 Hz	
CURRENT DRAW:		@ 230V @ 208V	6.8	A @ 277V	
ENERGY FACTOR:	4.4	L/kWh	4.	O L/kWh	
OPERATING TEMP:	56 F Mi	n-95 F Max	56 F M	lin-95 F Max	
WATER REMOVAL:	350 F	Pints/Day	350	Pints/Day	
EFFICIENCY:	9.3 P	ints/kWh	8.5 Pints/kWh		
AIR FILTER:	MERV-13 Size	e: 22" x 20" x 2"	MERV-13 Siz	ze: 22" x 20" x 2"	
POWER CORD: 10 <sup>7</sup> 14/3 SJTW	NEM	A 6-15P	NEMA L7-15P		
DRAIN CONNECTION:	3/4" Thi	readed NPT	3/4" Threaded NPT		
REFRIGERANT TYPE:	R	410A		R410A	
REFRIGERANT AMOUNT:	4 lb 12 oz		4	lb 12 oz	
DIMENSIONS:	Unit	Shipping	Unit	Shipping	
WIDTH:	32.88"	36"	32.88"	36"	
HEIGHT:	24.38"	30"	24.38"	30"	
LENGTH:	23.5"	28"	23.5"	28"	
WEIGHT:	215 lb	255 lb	215 lb	255 lb	

#### 4. INSTALLATION

#### 4.1 LOCATION

The Quest 335 Dehumidifier can be installed in a variety of locations to meet the owner's needs as listed below. In all cases keep the following cautions in mind:

- Place the Quest 335 Dehumidifier on supports that raise the base of the unit 6" above the secondary drain pan so a P-trap can be installed. See Section 4.3.
- The Quest 335 Dehumidifier may be suspended with steel hanger, straps, or a suitable alternative from structural members, unit must be supported from underneath. Don't hang from sides or ends. See section 4.4
- If installing on ground, use included plugs to cover hanging locations on top of the machine.
- · If hanging machine in air, use included plugs to cover holes in base pan for leveling feet.

#### 4.2 NO DUCTING (FIG. 1)

The Quest 335 Dehumidifier plugs into NEMA rated receptacles. The amp draws for each unit under normal operating conditions are listed on page 4. A ground fault interrupter protected circuit is required.

Install the remote hygrostat in a central area of the structure where it will sense the relative humidity of the structure accurately. Do not install the hygrostat where it may not accurately sense the relative humidity such as near HVAC supply registers, near exterior doors, or near a pool or spa. The installer must supply the wiring between the Quest 335 Dehumidifier and the hygrostat. Be sure to safely route the control wiring to prevent damage during installation. Be careful not to cross the wires when connecting the Quest 335 Dehumidifier and the remote hygrostat.

The remote controls of the Quest 335 Dehumidifier are powered by a low voltage circuit (24 VAC) and must NEVER contact or be connected to a high voltage circuit. The control terminals and remote control are labeled and numbered to prevent confusion. Be sure to consult the electrical schematic in this manual or inside the access panel of the Quest 335 Dehumidifier before making the control connections.

**CAUTION!** Always disconnect the Quest 335 from a power source when working with the high voltage control wires.

**CAUTION!** For proper drainage, the unit must be mounted so the drain outlet is at least 6.75" above the floor drain, and must be fully supported under the base.

#### **4.3 CONDENSATE WATER REMOVAL**

Condensate drains by gravity via the drain port. Use 3/4" male NPT PVC pipe. An optional condensate pump kit may be installed if a lift is required to dispose of the condensate. Optional parts list for information on the kit.

#### **FOLLOW DIAGRAM:**

### **QUEST 335**

H = 4"

J = 2"

L = 6.75"

#### Vent:

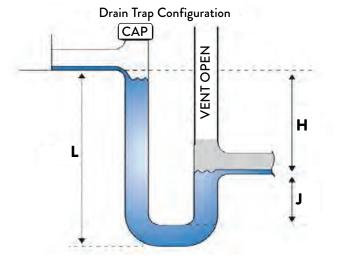
- Place vent after the trap.
- Vent should be open.
- · Height of vent should be higher than drain ou

#### Cap:

A clean out can be placed before trap but must be sealed with a cap.

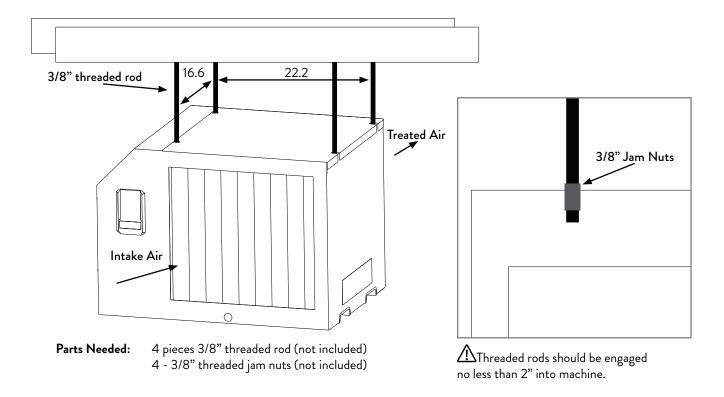
#### **Drain Line:**

- Drain line should go in a downward slope to the drain.
- 1/4" drop per foot.



#### **4.3 HANGING DIAGRAM**

### **QUEST 335**



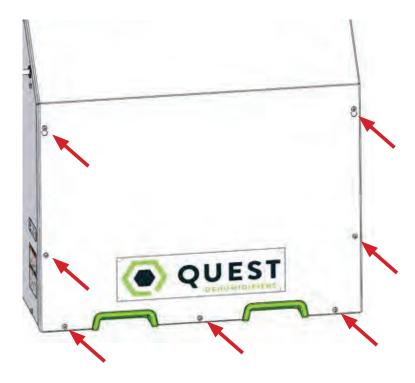
#### 4.5 HARD-WIRING INSTRUCTIONS

**WARNING!** Servicing the Quest 335 Dehumidifier, with its high pressure refrigerant system and high voltage circuitry presents a health hazard which could result in death, serious bodily injury, and/or property damage. Only qualified service people should service this unit.

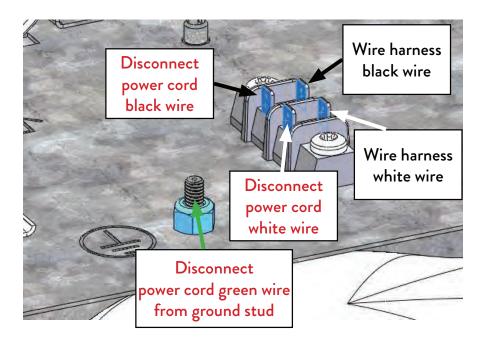
### **TOOLS REQUIRED:**

- T25 Torx Driver
- 11/32" Driver

Following all local and national electrical codes and standards, route electrical service to the location that the dehumidifier will be installed.



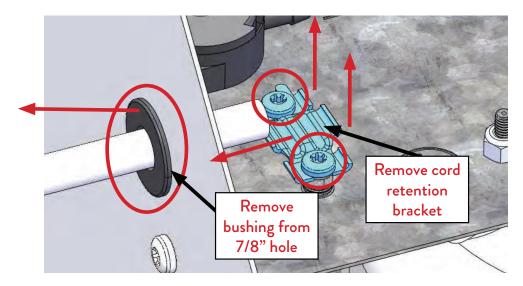
Remove 7 screws on access panel using T25 Torx driver, remove panel.



Disconnect POWER CORD BLACK wire from terminal

Disconnect POWER CORD WHITE wire from terminal.

Use 11/32" driver to remove nut from ground stud and disconnect POWER CORD GREEN wire from ground stud.

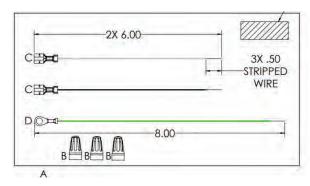


Remove the 2 screws holding the cord retention bracket using T25 Torx driver and remove retention bracket.

Remove power cord and black bushing.

Route incoming power service wires through 7/8" hole and secure using clamps intended for the conduit or cable.





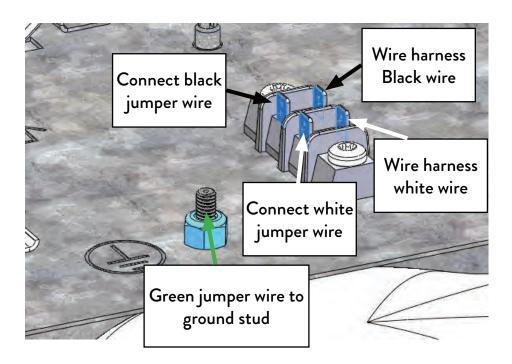
Connect BLACK and WHITE jumper wires to terminal block as shown.

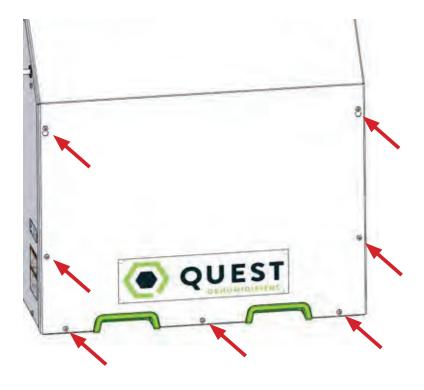
Place GREEN jumper wire ring terminal on ground stud and use 11/32" driver to secure nut to stud.

Attach incoming service LINE 1 wire to BLACK jumper wire with the provided wirenut.

Attach incoming service LINE 2 wire to WHITE jumper wire with the provided wirenut.

Attach incoming service GROUND wire to GREEN jumper wire with the provided wirenut.



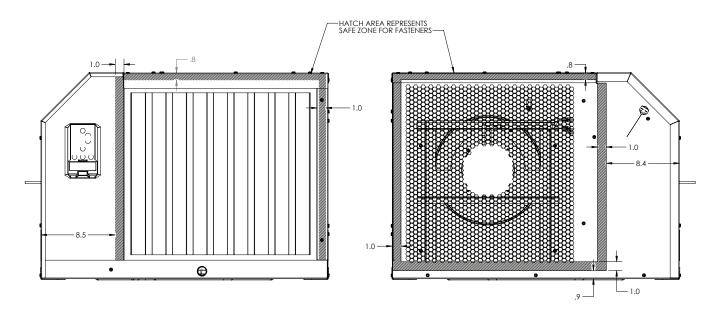


Replace access panel using T25 Torx driver to secure 7 screws.

### 4.6 QUEST 335 SUPPLY AND RETURN DUCT KIT (P/N 4042685)

If factory duct kit accessory was purchased, follow instructions included with duct kit.

If owner chooses to have a licensed HVAC contractor fabricate a duct kit, please follow the drawing below for safe zones for self tapping screws.



#### 5. CONTROL OPTIONS

The Quest 335 Dehumidifier can be controlled by its on board dehumidistat or with an external control using its low voltage terminal block.

#### **5.1A QUEST 335 ON BOARD DEHUMIDISTAT**

Off Mode: Fan, Compressor, Display and all LEDs are off

To Turn Unit On: Press the power button

On Mode: Display is on and shows the set point (Initial set point: 55% RH)

To Change Set Point:

- Press the up or down arrow once, the 2-digit display will begin to blink.
- Adjust to desired RH. Each push of the button will change the SP 1% RH.
- After 6 seconds without a button being pushed the number showing will become the new SP

#### **DEFROST LIGHT**



• The light over the snowflake will light up when defrost is occurring (ice is detected on coils). The fan will be on, and the compressor will be off during defrost.

#### **FILTER RESET**



- Filter reset button will light up after the fan has been running for 2,000 hours, or if the pressure switch detects excessive pressure build-up indicating that the filter must be changed.
- After changing the filter, press and hold the filter reset button to reset the 2,000-hour timer. Light flashes while button is held.

#### **DARK MODE**



- Press the Dark Mode button to activate Dark Mode.
- Once Dark Mode is activated, lights will remain on for 20 seconds before the unit's hygrostat will go dark. Dark Mode light will flash for 3 seconds before unit goes dark.
- Unit will temporarily leave dark mode when any button is pushed and will go dark 20 seconds after the last button is pushed.
- To turn off Dark Mode, press the Dark Mode button and ensure light above Dark Mode button is off.
- This mode is for applications where the user would like the unit to operate without emitting any light.

#### **FAN**



Pressing the Fan button alternates the unit between 3 fan speeds:

- (Hi)gh: Increased fan speed to be used exclusively in ducted applications. Deactivates filter-life compensation mode.
- (Au)to: Default fan speed. Filter-life compensation mode active.
- (Lo)w: Decreased fan speed that lowers the volume and performance of the unit. Deactivates filterlife compensation mode.

Filter-life compensation mode measures the static pressure increase due to the filter particulate build-up and increases fan speed to maintain optimum airflow and performance.

#### Changing Max Fan Speed

- Hold the FAN button for 3 seconds, the 2-digit display will begin to flash.
- Once the display is flashing, the maximum fan speed can be adjusted 1% at at time (in the range of 20-99%).
- The new maximum fan speed can be locked by not pressing any buttons for 6 seconds or by pressing the FAN button.
- This will disable filter life compensation functionality.

#### **TERMINAL CONTROL**

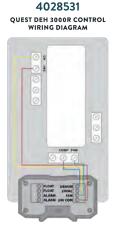


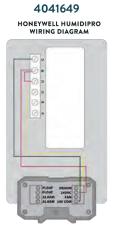
- When the Terminal Control button is pressed, the display will show "tc".
- The Terminal Control button is used to activate the "DEHUM" input on the terminal block. (see section 5.1B)
- This must be activated when an external control is used to control RH. When Terminal Control is active, the internal RH sensor is disabled.

### **5.1B QUEST 335 EXTERNAL CONTROL OPTIONS**

Quest offers three external control options: Quest DEH 3000R, Honeywell Remote Analog Humidistat, and Honeywell Humidipro.



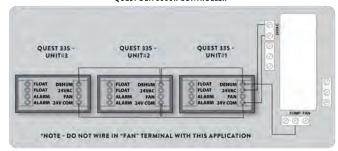




#### **5.2 QUEST 335 EXTERNAL CONTROL**



### DAISY CHAIN OUEST DEH 3000R CONTROLLER



NOTE: 22 ga wire needed for sensor

To order, contact your dealer, call 1-877-420-1330, or go to: www.questclimate.com/product-category/accessories

Remove the cover from the user interface to expose the terminal block inputs & outputs.

#### Quest 335 Terminal Block Control Operations:

**DEHUM:** Dehumidification (Fan and Compressor) Control Input. **24VAC:** Transformer High Side Output to External Control.

Fan: Fan Control Input.

**24V COM:** 24VAC Power Transformer Neutral Side Output to External Control.

FLOAT: External Low Voltage Float Switch or Water Sensor Input (Use Normally Closed Switch).

External Low Voltage Float Switch or Water Sensor Input (Use Normally Closed Switch).

Alarm: Normally Closed Relay Output - Indicates when dehumidifier is in an alarm state.

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**NOTE:** Alarm terminals are used to interface with a remote alarm or building automation system. The terminals switch when the unit has a malfunction and are factory set to

"normally closed" but can be changed to "normally open".

#### 6. MAINTENANCE

WARNING! NOTE: Do not operate the unit without the filter or with a less effective filter. The heat exchange coils inside the unit could become clogged and require disassembly to clean. Filter non-compliance invalidates the product warranty.

#### **6.1 STANDARD AIR FILTER**

The Quest 335 Dehumidifier ships with a standard MERV 13 efficient pleated fabric filter. This filter should be checked every six months. Operating the unit with a dirty filter will reduce dehumidifier capacity and efficiency and may cause the compressor to cycle off and on unnecessarily on the defrost control.

To access the air filter, remove the filter access panel from the end of the Quest 335 Dehumidifier. The filter should be readily visible and can be removed by pulling it straight out of the Quest 335 Dehumidifier.

We recommend changing the filter at least every 6 months. For agriculture we recommend changing the filter with every grow cycle.

#### **6.2 IMPELLER FAN OILING**

The impeller fan motor is factory lubricated for many years of normal operation, and no further oiling is required.

#### 7. SERVICE

**WARNING!** Servicing the Quest 335 with its high pressure refrigerant system and high voltage circuitry presents a health hazard which could result in death, serious bodily injury, and/or property damage. Only qualified service people should service this unit.

#### 7.1 WARRANTY

A warranty certificate has been enclosed with this unit; read it before any repair is initiated. If a warranty repair is required, call the factory first at 1-877-420-1330 for warranty claim authorization and technical assistance.

#### 7.2 TECHNICAL DESCRIPTION

The Quest 335 Dehumidifier uses a refrigeration system similar to an air conditioner's to remove heat and moisture from incoming air, and add heat to the air that is discharged.

Hot, high-pressure refrigerant gas is routed from the compressor to the condenser coil. The refrigerant is cooled and condensed by giving up its heat to the air that is about to be discharged from the unit. The refrigerant liquid then passes through a filter/drier and expanion device which causes the refrigerant pressure and temperature to drop. It next enters the evaporator coil where it absorbs heat from the incoming air and evaporates. The evaporator operates in a flooded condition, which means that all the evaporator tubes contain liquid refrigerant during normal operation. A flooded evaporator should maintain nearly constant pressure and temperature across the entire coil, from inlet to outlet.

The compressor collects the cool refrigerant gas and compresses it to a high pressure and temperature to repeat the process.

#### 7.3 TROUBLESHOOTING

#### Unit Test to determine problem:

- Detach any exterior control wiring by removing terminal block but jump both FLOAT terminals together.
- 2. Reinstall terminal block into the control.
- 3. Plug unit in to known good power outlet. 208 to 240 volts.
- 4. Power unit on by pressing power button on top of control.
- 5. Make sure the Terminal Control light is NOT illuminated. Press button to change.
- 6. Press down arrow to set the unit below 20% until "on" is displayed. This will force the unit on.
- 7. Listen for the fan to turn on almost immediately.
- 8. Wait 1 to 2 minutes for the compressor to turn on.
- 9. If these tests work, the problem is most likely in the control or field wiring.

#### Neither fan nor compressor running. Dehumidification is being called for. No fan call.

- Unit unplugged or no power to outlet.
- 2. Humidity control set too high.
- 3. Loose connection in internal or control wiring.
- 4. Bad control or power board.
- 5. Defective control transformer.

#### Compressor is not running. Dehumidification is being called for. No fan call.

- 1. Defective compressor run capacitor.
- 2. Loose connection in compressor circuit.
- 3. High pressure switch open or unplugged.
- 4. Defective compressor.
- 5. Compressor relay defective or unplugged.
- 6. Temp & RH sensor reading above 120°F or below 40°F, or sensor is bad or unplugged.

#### Compressor cycles on and off. Dehumidification is being called for. No fan call.

- Low ambient temperature and/or humidity causing unit to cycle through defrost mode.
- 2. Evaporator temp sensor bad or unplugged.
- 3. Defective compressor.
- 4. High pressure switch defective.
- 5. Dirty air filter(s) or air flow restricted.
- 6. Bad control or power board.

#### Fan is not running. Dehumidification or fan is being called for.

- 7. Loose connection in fan circuit.
- 8. Obstruction prevents fan impeller rotation.
- 9. Defective fan.
- 10. Bad control or power board.

#### Low dehumidification capacity (evaporator is frosted continuously). Dehumidification is being called for.

- 11. Evaporator temp sensor bad or unplugged.
- 12. Low refrigerant charge.
- 13. Dirty air filter(s) or air flow restricted.
- 14. Excessively restrictive ducting connected to unit.

#### Unit removes some water, but not as much as expected.

- 15. Air temperature and/or humidity have dropped.
- 16. Humidity meter and or thermometer used are out of calibration.
- 17. Unit has entered defrost cycle.
- 18. Air filter dirty.
- 19. Low refrigerant charge.
- 20. Air leak (eg. loose cover or ducting leaks).
- 21. Defective compressor.
- 22. Restrictive ducting.
- 23. Unit is in (Lo)w fan mode.
- 24. Evaporator temp sensor bad or unplugged.
- 25. Temp and RH sensor off calibration. Reading lower than actual.
- 26. Air pressure switch off calibration.



#### Filter Change Light illuminated (too frequently):

- 1. Change filter if dirty.
- 2. Hold filter change button to reset filter life hours.
- 3. Ducting configuration causing poor airflow. Disable filter change light by selecting a different fan speed.

#### 7.4 REFRIGERANT CHARGING

If the refrigerant charge is lost due to service or a leak, a new charge must be accurately weighed in. If any of the old charge is left in the system, it must be recovered before weighing in the new charge. Refer to the unit nameplate for the correct charge weight and refrigerant type.

#### 7.5 IMPELLER FAN REPLACEMENT

The motorized impeller fan is a unitary assembly consisting of the motor and impeller fan. If defective, the complete assembly must be replaced.

- 1. Unplug the power cord.
- 2. Remove the access panel, and top panel.
- 3. Remove the screws attaching the impeller fan support bracket to the base.
- 4. Disconnect the impeller fan leads inside the electric box.
- 5. Remove fan/bracket assembly by removing 3 screws from the bracket and inlet ring assembly.
- 6. Remove the defective impeller fan from the bracket and replace with it with the new impeller fan.
- 7. Reassemble the new impeller fan by reversing the above procedure. Note: There are two pins on the backside of the cabinet that must align with the two holes in the impeller fan support bracket.

#### 7.6 COMPRESSOR/CAPACITOR REPLACEMENT

This compressor is equipped with a run capacitor, but no start capacitor or start relay.

#### 7.6A CHECKING COMPRESSOR MOTOR CIRCUITS

Perform the following tests if the impeller fan runs but the compressor does not with a call for dehumidification.

- 1. Remove the cabinet side to gian access to the electrical components.
- 2. Plug in the unit and turn the humidity control to ON. Check for volts from compressor black wires on compressor relay to white wire on compressor capacitor using an AC voltmeter.
  - 2.1 If correct voltage is present, go to next step.
  - 2.2 If no voltage, there may be a loose connection in the compressor circuit. Test each component for continuity. See the appropriate section if a defect is suspected.
- 3. Unplug the unit and then disconnect the connector from the side of the compressor. Using an ohmmeter, check continuity between the points listed below.
- 4. Compressor terminals C and S: No continuity indicates an open start winding. The compressor must be replaced. Normal start winding resistance is 3 to 7 ohms.
- 5. Compressor terminals C and R: No continuity indicates an open run winding. The compresor must be replaced. Normal run winding resistance is .5 to 2 ohms.
- 6. Compressor terminal C and compressor case: Continuity indicates a grounded motor. The compressor must be replaced.
- 7. Disconnect the wires from the run capacitor. The capacitor is shorted and must be replaced if continuity exists between any terminal and ground.

- 8. Using capacitor or MFD setting on meter test between both capacitor terminals. Compare reading to capacitor spec on capacitor.
- 9. If the above test pass but the compressor does not work, the compressor has an internal mechanical defect and must be replaced.

#### 7.6B CHECKING COMPRESSOR MOTOR CIRCUITS

The refrigerant and oil mixture in a compressor is chemically very stable under normal operating conditions. However, when an electrical short occurs in the compressor motor, the resulting high temperature arc causes a portion of the refrigerant oil mixture to break down into carbonaceous sludge, a very corrosive acid, and water. These contaminants must be carefully removed otherwise even small residues will attack replacement compressor motors and cause failures.

The following procedure is effective only if the system is monitored after replacing the compressor to insure that the clean up was complete.

- This procedure assumes that the previously listed compressor motor circuit tests revealed a shorted or open winding.
- 2. Remove and properly dispose of the system charge. **DO NOT** vent the refrigerant or allow it to contact your eyes or skin.
- Remove the burned out compressor. Use rubber gloves if there is any possibility of contacting the oil or sludge.
- 4. To facilitate subsequent steps, determine the type of burn out that occurred. If the discharge line shows no evidence of sludge and the suction line is also clean or perhaps has some light carbon deposits, the burn out occurred while the compressor was not rotating. Contaminants are therefore largely confined to the compressor housing. A single installation of liquid and suction line filter/driers will probably clean up the system.
  - If sludge is evident in the discharge line, it will likely be found in the suction line. This indicates the compressor burned out will running. Sludge and acid have been pumped throughout the system. Several changes of the liquid and suction filter/driers will probably be necessary to cleanse the system.
- 5. Correct the system fault that caused the burn out. Consult the factory for advice.
- 6. Install the replacement compressor with a new capacitor and an oversized liquid line filter.
  - In a running burn out, install an oversized suction line filter/drier between the accumulator and compressor. Thoroughly flush the accumulator with refrigerant to remove all trapped sludge and to prevent the oil hole from becoming plugged. A standing burn out does not require a suction line filter/drier.
- Evacuate the system with a good vacuum pump and accurate vacuum gauge. Leave the pump on the system for at least an hour.
- 8. Operate the system for a short period of time, monitoring the suction pressure to determine that the suction filter is not becoming plugged. Replace the suction filter/drier if pressure drop occurs. If a severe running burn out has occurred, several filter/driers may have to be replaced to remove all of the acid and moisture.

#### NOTE: NEVER USE THE COMPRESSOR TO EVACUATE THE SYSTEM OR ANY PART OF IT.

#### 7.6C REPLACING A COMPRESSOR, NON BURN OUT

Remove the refrigerant from the system. Replace the compressor and liquid line filter/drier. Charge the system to 50 PSIG and check for leaks. Remove the charge and weigh in the refrigerant quantity listed on the nameplate. Operate the system to verify performance.

#### 7.7 REMOTE CONTROLS

The Quest 335 Dehumidifier is controlled by devices mounted on a panel that is remote from the unit. You may or may not have the devices listed below depending on the model of the remote hygrostat you purchased.

If the Quest 335 Dehumidifier fails to operate as desired, always check the settings of the controls to ensure that they are correct. Check that the controls are receiving 24VAC from the Quest 335 Dehumidifier. Check the connections between the Quest 335 Dehumidifier, the hygrostat, and the field control wiring.

#### 7.7A HUMIDITY CONTROL

The humidity control is an adjustable switch that closes when the relative humidity of the air in which it is located rises to the set point. It opens when the RH drops 4 to 6% below the set point. If the Quest 335 Dehumidifier does not run, try turning the humidity control Down using arrow on control pad. If it then runs, the humidity control is out of calibration or the RH is below setpoint.

#### 7.8 DEFROST SYSTEM

The Quest 335 Dehumidifier is equipped with an automatic defrost mechanism. If the Quest 335 Dehumidifier operates in conditions that develop frost on the evaporator, it will sense the frost build-up and automatically defrost the evaporator. The Quest 335 Dehumidifier may not appear to be operating correctly during the defrost sequence, but once the defrost sequence is completed, the Quest 335 Dehumidifier will resume dehumidifying.

The evaporator temperature sensor is installed into the center of the evaporator coil. It will automatically shut the compressor off if the temperature drops due to excessive frost formation on the evaporator coil. The impeller fan will continue to run, causing air to flow through the evaporator coil and melt the ice. When the ice has melted, the evaporator temperature will rise, and the control will restart the compressor.

#### 7.9 CONDENSATE PUMP KIT

An optional condensate pump kit is available from the factory for use with the Quest 335 Dehumidifier. Condensate is automatically pumped to a remote location when the water level in the pump's reservoir rises to close the float switch.

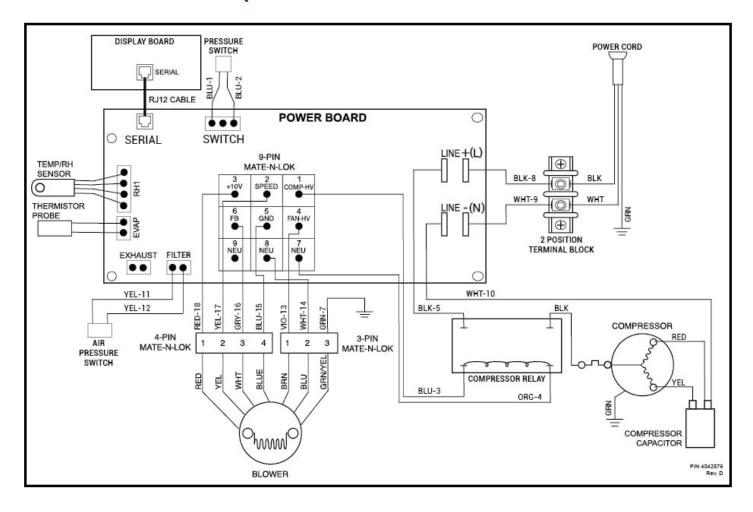
The pump also contains a safety float switch. The white leads from this switch extend from beneath the pump cover. These leads should be extended to the FLOAT terminals on the terminal block and the factory float jumper removed. If the pump fails, the safety switch opens causing the compressor to stop and water production to cease before the reservoir overflows. E4 will be displayed on the control panel. The Quest 335 Dehumidifier will not dehumidify until this switch closes.

A warranty certificate has been enclosed with this unit; read it before any repair is initiated. If a warranty repair is required, call the factory first at 1-877-420-1330 for warranty claim authorization and technical assistance.

### **8. QUEST 335 ERROR CODES**

#	NAME	MACHINE DISPLAY	POSSIBLE CAUSE(S)	CRITICAL?
1	RH SENSOR Error code "E1"		Broken sensor, unplugged sensor	No Displays E1, but keeps running.
2	NOT USED	-	-	-
3	OUT OF REFRIGERANT	Error code "E3" • compressor off • fan off	Refrigeration leak	Yes
4	4 FLOAT SWITCH TRIPPED Error code "E4" • compressor off • fan off		Tripped float switch, Loose wire	Yes
5	EVAPORATOR SENSOR ERROR  • dehu mode: 15 minutes • defrost mode: 30 minutes		Broken sensor, Loose connection	No
6	TEMPERATURE TOO HIGH	Error code "E6" • compressor off • fan off	Temperature too high, Broken sensor	Yes
7	TEMPERATURE TOO LOW  Error code "E7"  compressor off fan off		Temperature too low, Broken sensor	Yes
8	COMM ERROR	Error code "E8"  Power board continutes to run unit	RJ12 cable / connection issue	No. Displays E8, but keeps running.
9	HIGH PRESSURE CUT-OUT	Error code "E9" Power board will be in system protection mode	Loose connection, High pressure in refrigeration system	Yes. Display E9 on all state that the seven segment display is illuminated.

### WIRING DIAGRAM OF THE QUEST 335 DEHUMIDIFIER

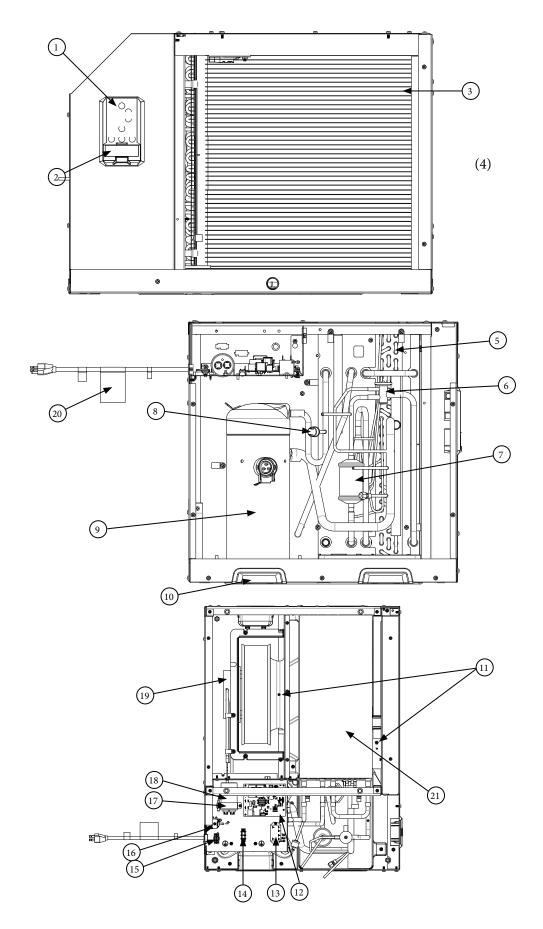


### **SERVICE PARTS LIST FOR QUEST 335**

Item	Part No Qty	Description	Item	Part No Qty	Description
1	4041909	UI Control Board	13	4042467	Relay
2	4042009	Cover, UI, 24VAC		4042818	Relay (277v)
3	4042061	Sensor, Temp & RH, Digital	14	4042505	Block, Wiring
4	4042545-01	Filter (Not Shown)		4042505	Block, wiring (277v)
5	4042647	Coil Assembly	15	4041892	Clip, Cord Retention
6	4042469	TXV	16	4042486	Switch, Pressure
7	4042468	Filter, Drier		4042978	Switch, Pressure (277v)
8	4029507	Control, High Pressure	17	4022160	Clamp, Capacitor
9	4042482	Compressor	18	4035949-03	Capacitor
	4042816	Compressor (277v)		4035949-04	Capacitor (277v)
10	4042528	Handle, Pocket	19	4042483	Fan, Motorized Impeller
11	4028459	Pressure Tap		4042827	Fan, Motorized Impeller (277v)
12	4042291	Control Board	20	4036494	Cord
	4042824	Control Board (277v)		4042817	Cord (277v)
			21	4034716-03	Sensor, Evaporator

### **OPTIONAL PARTS LIST**

Part No	Qty Description	Part No	Qty Description
4022220	1 Pump Kit (110-120V)	4028531	1 DEH 3000R Control, Remote
4028607	1 Supply Duct Kit	4020175	1 Controller, Humidity
4028610	1 Return Duct Kit	4036668	2 Bracket, Hanging (2 Required)



### **QUEST 335 DEHUMIDIFIER LIMITED WARRANTY**

WARRANTOR: Therma-Stor LLC 4201 Lien Rd Madison, WI 53704 Telephone: 1-800-420-1330

WHO IS COVERED: This warranty extends only to the original end-user of the Quest 335 Dehumidifier, and may not be assigned or transferred.

FIRST YEAR WARRANTY: Therma-Stor LLC warrants that, for one (1) year the Quest Dehumidifier will operate free from any defects in materials and workmanship, or Therma-Stor LLC will, at its option, repair or replace the defective part(s), free of any charge.

SECOND THROUGH FIFTH YEAR WARRANTY: Therma-Stor LLC further warrants that for a period of five (5) years, the condenser, evaporator, and compressor of the Quest Dehumidifier will operate free of any defects in material or workmanship, or Therma-Stor LLC, at its option, will repair or replace the defective part(s), provided that all labor and transportation charges for the part(s) shall be borne by the end-user.

END-USER RESPONSIBILITIES: Warranty service must be performed by a Servicer authorized by Therma-Stor LLC. If the end-user is unable to locate or obtain warranty service from an authorized Servicer, he should call Therma-Stor LLC at the above number and ask for the Therma-Stor LLC Service Department, which will then arrange for covered warranty service. Warranty service will be performed during normal working hours.

The End-user must present proof of purchase (lease) upon request, by use of the warranty card or other reasonable and reliable means. The end-user is responsible for normal care. This warranty does not cover any defect, malfunction, etc. resulting from misuse, abuse, lack of normal care, corrosion, freezing, tampering, modification, unauthorized or improper repair or installation, accident, acts of nature or any other cause beyond Therma-Stor LLC's reasonable control.

LIMITATIONS AND EXCLUSIONS: If any Quest Dehumidifier part is repaired or replaced, the new part shall be warranted for only the remainder of the original warranty period applicable thereto (but all warranty periods will be extended by the period of time, if any, that the Quest 335 Dehumidifier is out of service while awaiting covered warranty service).

UPON THE EXPIRATION OF THE WRITTEN WARRANTY APPLICABLE TO THE Quest Dual DEHUMIDIFIER OR ANY PART THEREOF, ALL OTHER WARRANTIES IMPLIED BY LAW, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL ALSO EXPIRE. ALL WARRANTIES MADE BY THERMA-STOR LLC ARE SET FORTH HEREIN, AND NO CLAIM MAY BE MADE AGAINST THERMA-STOR LLC BASED ON ANY ORAL WARRANTY. IN NO EVENT SHALL THERMA-STOR LLC, IN CONNECTION WITH THE SALE, INSTALLATION, USE, REPAIR OR REPLACEMENT OF ANY QUEST DUAL DEHUMIDIFIER OR PART THEREOF BE LIABLE UNDER ANY LEGAL THEORY FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES INCLUDING WITHOUT LIMITATION WATER DAMAGE (THE END-USER SHOULD TAKE PRECAUTIONS AGAINST SAME), LOST PROFITS, DELAY, OR LOSS OF USE OR DAMAGE TO ANY REAL OR PERSONAL PROPERTY.

Some states do not allow limitations on how long an implied warranty lasts, and some do not allow the exclusion or limitation of incidental or consequential damages, so one or both of these limitation may not apply to you.

**LEGAL RIGHTS**: This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

# **Quest 335**

# High-Efficiency Dehumidifier

1.877.420.1330 www.QuestClimate.com



Unit:	Quest 335 4042500
Impeller:	Backward curved
Power (Watts):	1565
Supply voltage:	208-230 VAC - 1
	Phase - 60 Hz.
Current Draw (Amps):	7.9A @208v
-	6.9A @ 230v
Rated Current Draw (Amps):	10.3A @ 208v
(104°F 36%)	8.8A @ 230v
Minimum Circuit Ampacity	15.8A @ 208v
(MCA):	14.4A @ 230v
Maximum Overcurrent Protection	25A @ 208v
(MOP):	20A @ 230v
Energy Factor (L/kWh):	4.3
Operating Temp:	56°F Min - 95°F Max
Water Removal (Pints/Day):	335
Efficiency (Pints/kWh):	9.3
Air Filter (MERV-13):	Size: 20" x 22" x 2"

Power Cord:	NEM	NA 6-15P
Drain Connection:	3/4 Threaded NPT	
Refrigerant Type:	R410A	
Refrigerant Amount:	4lb. 12oz.	
Dimensions:	Unit	Shipping
Width:	32.9"	36"
Height:	24.4"	30"
Length:	23.5"	28"
Weight:	215 lbs	255 lbs



<sup>\*</sup> requires buck/boost transformer to run on 277V