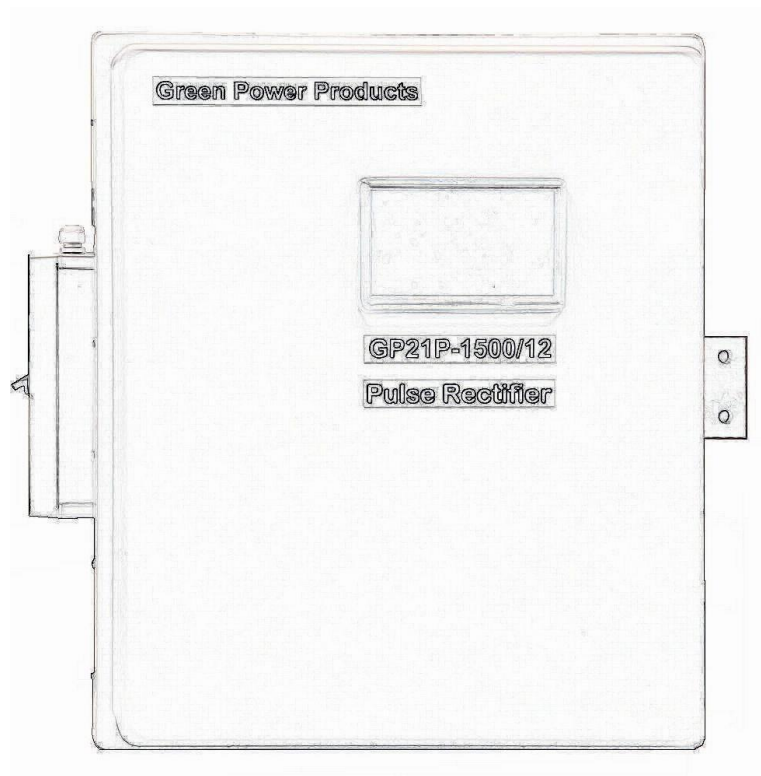




21P-1000/12

Pulse Rectifier – 1000Amps -12V
Water cooled



INSTALLATION MANUAL

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PURPOSE OF MANUAL

This is a guide for the installation of rectifiers and applies to ION RECTIFIERS built in the USA from 2019 onward.

1. Safety Instructions

- This product is intended only for industrial applications such as plating, anodizing or similar.
- The user must read this manual before Installation operation.



Warning: HIGH VOLTAGE inside, risk of death.

This equipment must be installed and serviced by authorized qualified personnel in accordance with local regulations and following the instructions on this manual.

WARNINGS:



The AC Power must be disconnected before service or maintenance.



The Main Circuit Breaker box cover, must be in place when the AC power is connected and live, and during operation.



The main door enclosure must remain closed and locked when the Main Circuit Breaker is "ON" and during operation.



The enclosure main door must always be closed and locked to avoid corrosion inside the cabinet due to hazardous vapors.

2. General Description

USA GPP Pulse Rectifiers are designed to replace regular DC rectifiers with several improvements and increased productivity. Also work as DC with very low ripple current.

The topology is based on Switch Mode Power Supply, using high frequency step down transformer with PWM IGBT control.

Friendly 7" color touch screen panel interface, used for control and extensively programming resources for almost all the applications including detailed operation history.

The units can be connected in parallel using a single wireless remote panel based on the same touch screen control, turning to be very useful for future production line expansions.

Remote and local control are transparent for the operators, offering programmable authorizations levels for each one.

Small footprint, noise free water cooled, easy hook up and commissioning.

Rugged corrosion proof construction allied to digital precision offers a long life and reliability even when working next to the process tanks with expected life above 30 years.

GPP – *Datalink* supported. This wireless 900MHz network system, allows the remote operation of up to 250 rectifiers using one single Windows OS based computer.

This is an optional feature that can be implemented any time after purchase.

3. Technical Data

MODEL:	GP21P-1000/12
Type:	Pulse Rectifier
AC LINE SUPPLY INPUT	
Connection:	3 phase + ground
Line voltage:	220 ~ 240VAC +/- 10% - 60Hz
Line current:	40Amps / phase max.
Power consumption:	15KW max.
Power factor:	> 0.9
Main circuit breaker:	30KA SCCR rating
OUTPUT DC or PULSE	
Voltage range:	0-12VDC
Average current:	0-1000Amps DC
Peak current:	0-2000Amps Pulsed
Current ripple:	< 1% DC or during ON pulse

Connections:	Copper bus bar 4"x1/4"
Pulse type:	Constant voltage

COLOR 7" TOUCH SCREEN CONTROL PANEL

Local Panel (RS-232):	Default on the front door
Optional Remote Panel:	WiFi range 6m (any WinOS device)
Optional Remote Panel:	900MHz range up to 1000 meters
Optional Remote Panel:	Parallel Operation for 2 to 32 units

Refer to USER'S GUIDE – REMOTE PANEL

ENVIRONMENT

Operating temperature:	68°F (16°C) to 104°F (40°C) – RH ≤ 90%
Elevation:	Less than 6,000 feet – 2000 meters
Protection:	Not designed for classified areas

GPP – *Datalink* (optional)

OS	Windows 10
Communication:	900MHz
Range:	1000 meters
Channels:	32
Number of Rectifiers Supported	250 per channel

Refer to USER'S GUIDE – GPP-*Datalink*

ENCLOSURE

Material:	Fiberglass with stainless steel locks
Dimensions:	H=24 x W=20 x D=12 inches
Mounting:	on the top of a stand or wall mounting
Protection:	IP-54 for the MCB external box
Protection:	IP-66 for the main enclosure

WATER COOLING	
Water flow:	1 gal/minute
Water quality:	tap water PH 6~8
Inlet temperature max:	95°F (35°C) max.
Inlet temperature min:	68°F (16°C)
Inlet pressure:	0.2 ~ 0.5 MPa
System:	Copper pipes open system flow through
Recirculation pump:	do not have internal pump
Connection:	¾ NPT female with 5/8" hose adapter
Polarity:	inlet or outlet with no polarity
Water reuse:	water can be reused
Filter for tap water:	100µm polypropylene cartridge canister housing
Filter for well water:	15µm polypropylene cartridge canister housing

3. Installation

3.1. General



Installation and service must be done by qualified technicians.

Danger! HIGH VOLTAGE



Caution!

Visually check for transportation damage.
Do not drop the rectifier.

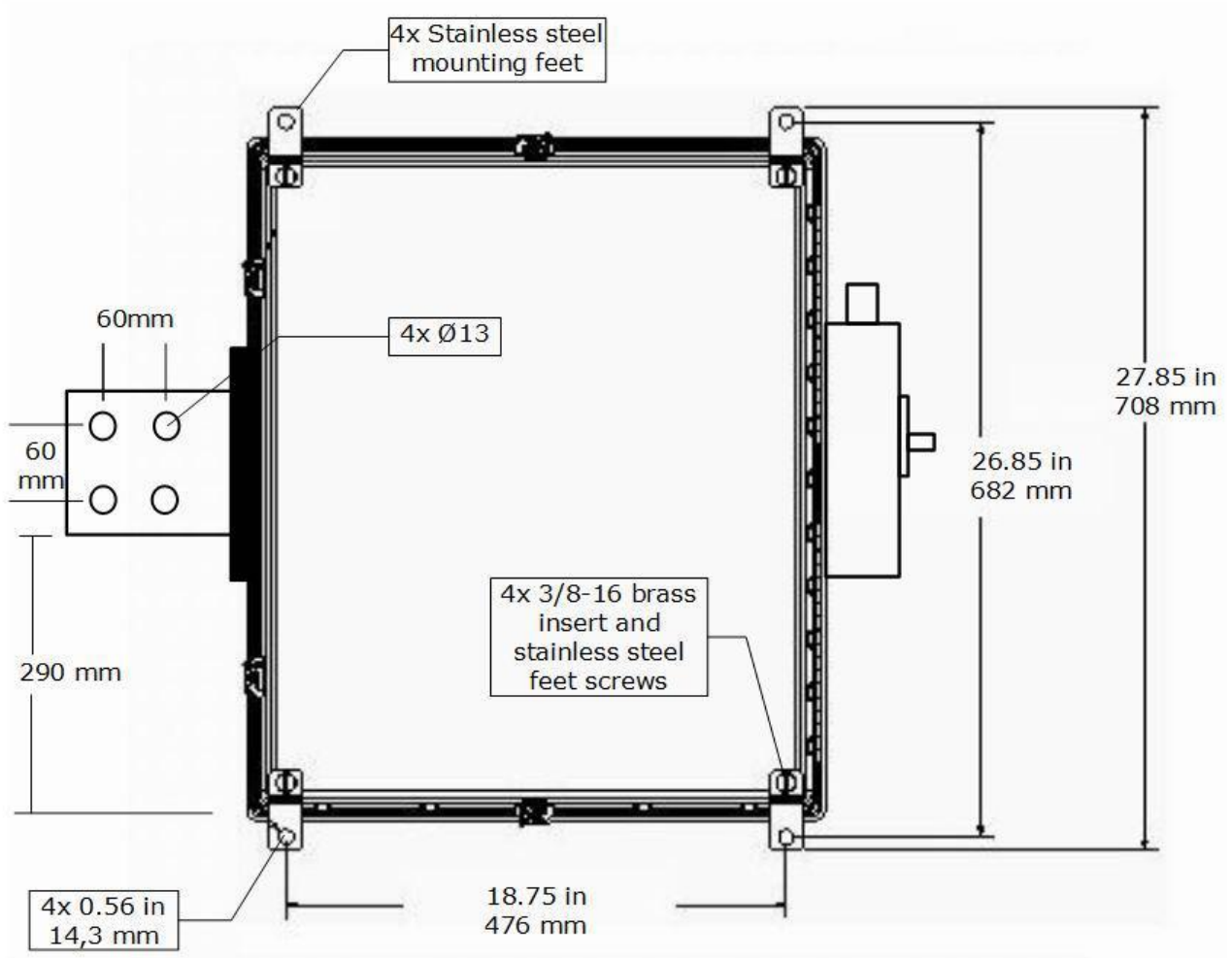
Keep the main door closed and latched at all times for long service life.

The touch screen panel is glass. Avoid heat, mechanical shock or electrical discharge.

3.2. Placing the Rectifier

The rectifier is designed for indoor use only with ambient temperature between 68°F (16°C) to 104°F (40°C). Avoid direct sunlight and high ambient temperature.

Place the rectifier as close as possible to the process tank.



Dimensions - Back view

For wall mounting or standing follow the figure above. The base should be from 3 to 4 feet (0,9 to 1,2m) above the ground

3.3. Electrical Installation – AC Power Line



Turn off the AC power line, before proceeding the connections.

Danger! HIGH VOLTAGE

Remove the main circuit breaker box cover to get access to connecting the cables.

Connect the 3 phase AC cables to the top of the main circuit breaker and connect the ground cable to the ground connector on the side.

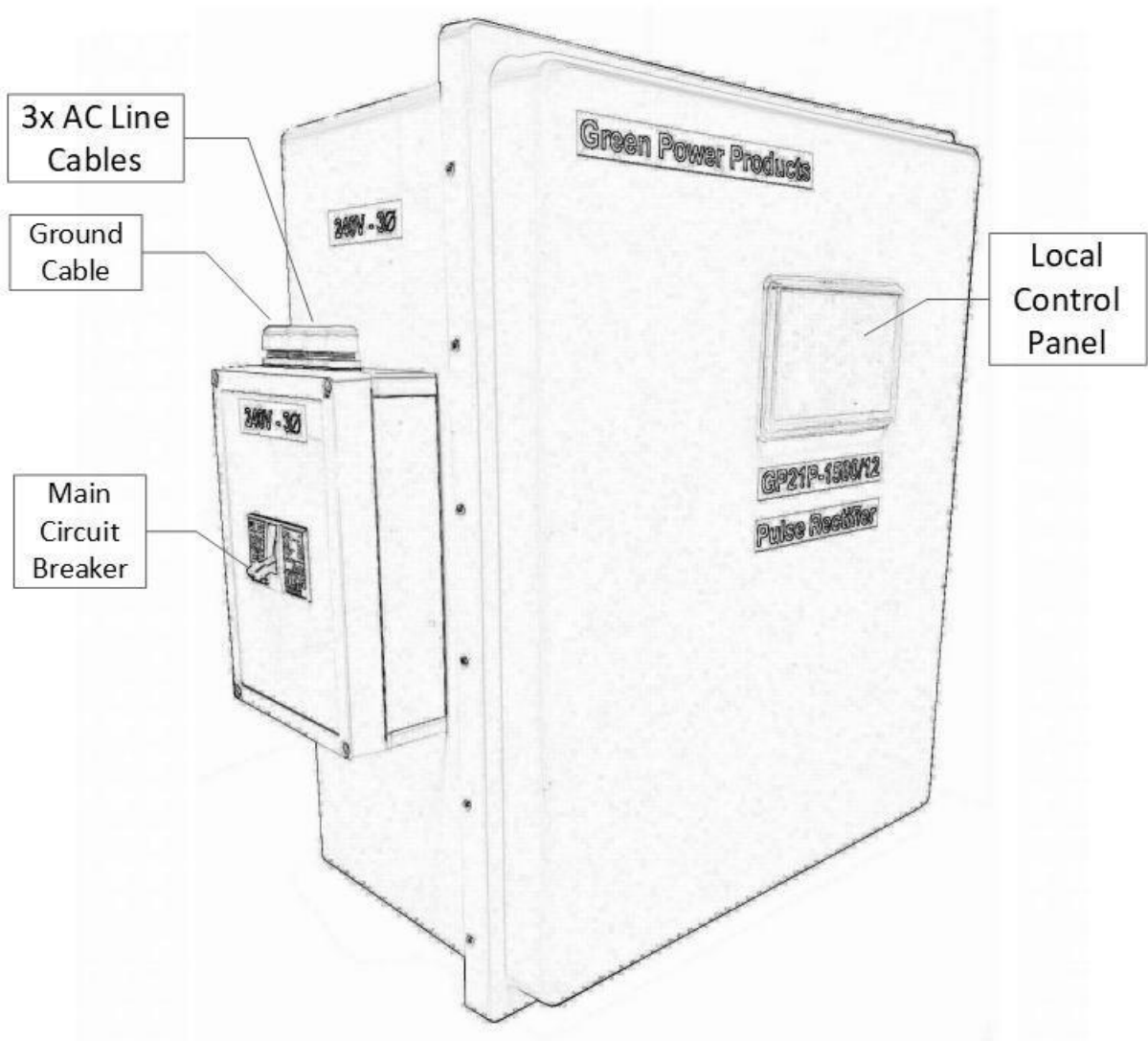
#4 AWG (25mm²) copper cables are recommended for line and ground.

No phase sequence required.

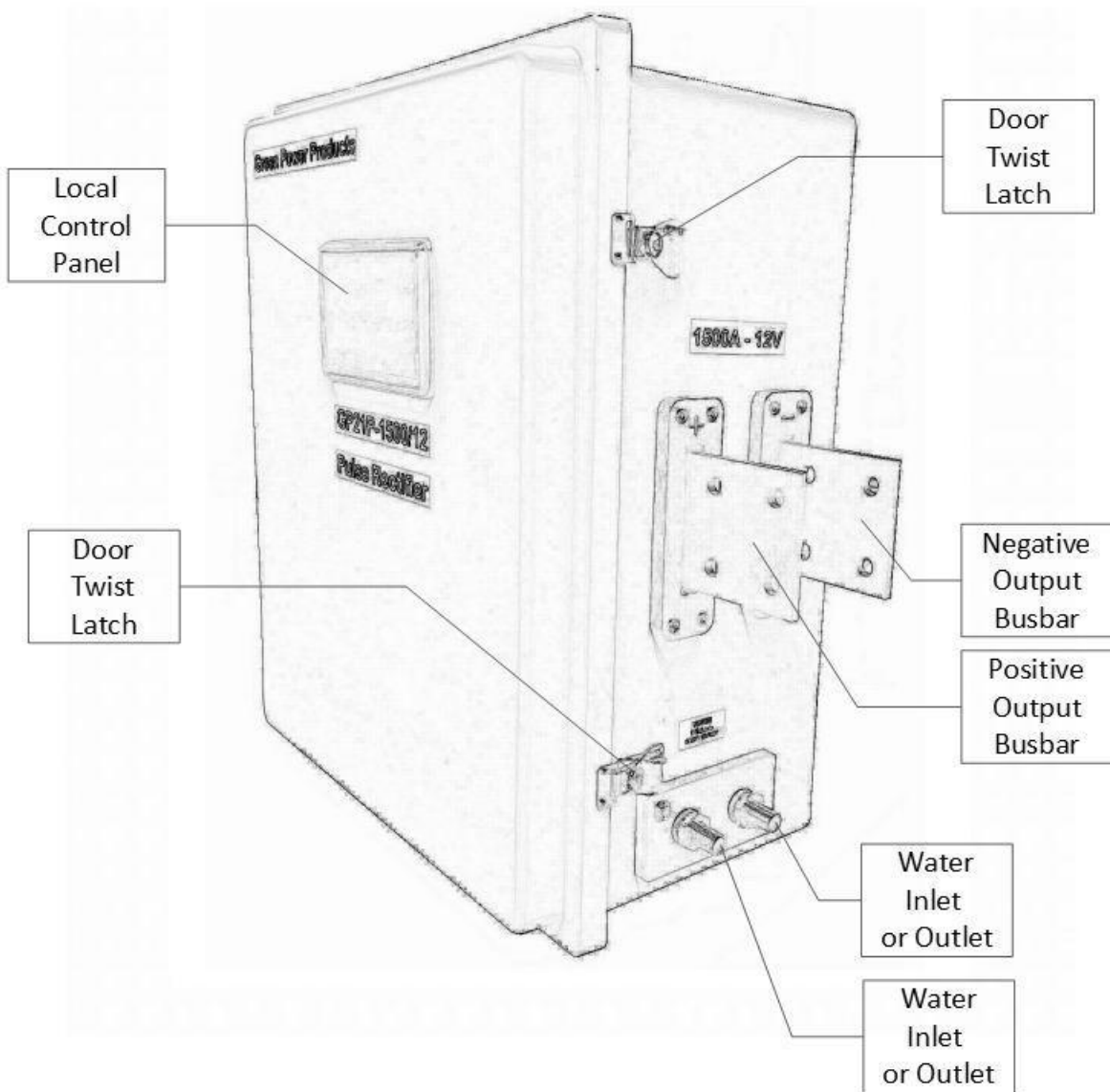
Connections with loose screws and or oxidation may damage the rectifier permanently.

After connecting the cables, replace the main circuit breaker cover box.

When the main circuit breaker is "ON", the local control panel is lit.



Left side view



Right side view

3.4 Electrical Installation – Output bus bars



The main circuit breaker must be “OFF” while connecting the output bars or cables



Caution!
HIGH CURRENT!



NEVER connect the output of a pulse rectifier to any DC rectifier or rheostat.



Caution!
Check the polarity before connecting the output

The output connections can be done with cables or bars.

The current density for copper must not exceed $3\text{A}/\text{mm}^2$ ($2\text{A}/\text{mm}^2$ recommended) and for aluminum max $1.5\text{A}/\text{mm}^2$.

Example: for 1000Amps a copper conductor must have between 330mm^2 and 500mm^2 section.

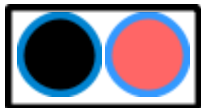
Aluminum connections must use electrical conductive paste either aluminum/aluminum or aluminum/copper. The terminals must be free of oxidation before using the paste.

The connections must be as short as possible.

When running Pulse, if the efficiency in current distribution is not achieved, please refer to the recommendations below:

The distance between the output cables or bars should be as short as possible. When using cables, tie the cables together for better result.

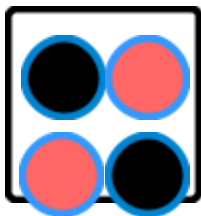
Cables



Good

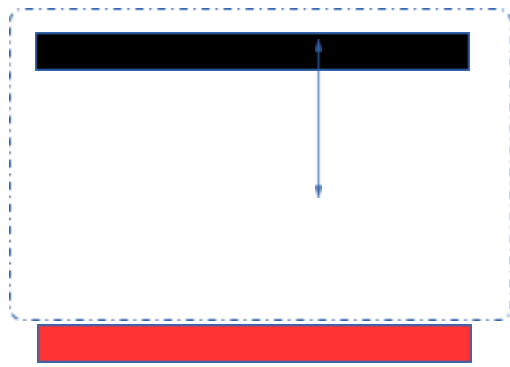


Poor



Better

Bus Bars



Good



Better



Poor

3.4. Water Installation

The water cooling is open circuit, and need a flow enough to keep the electrical components temperature within the limits.

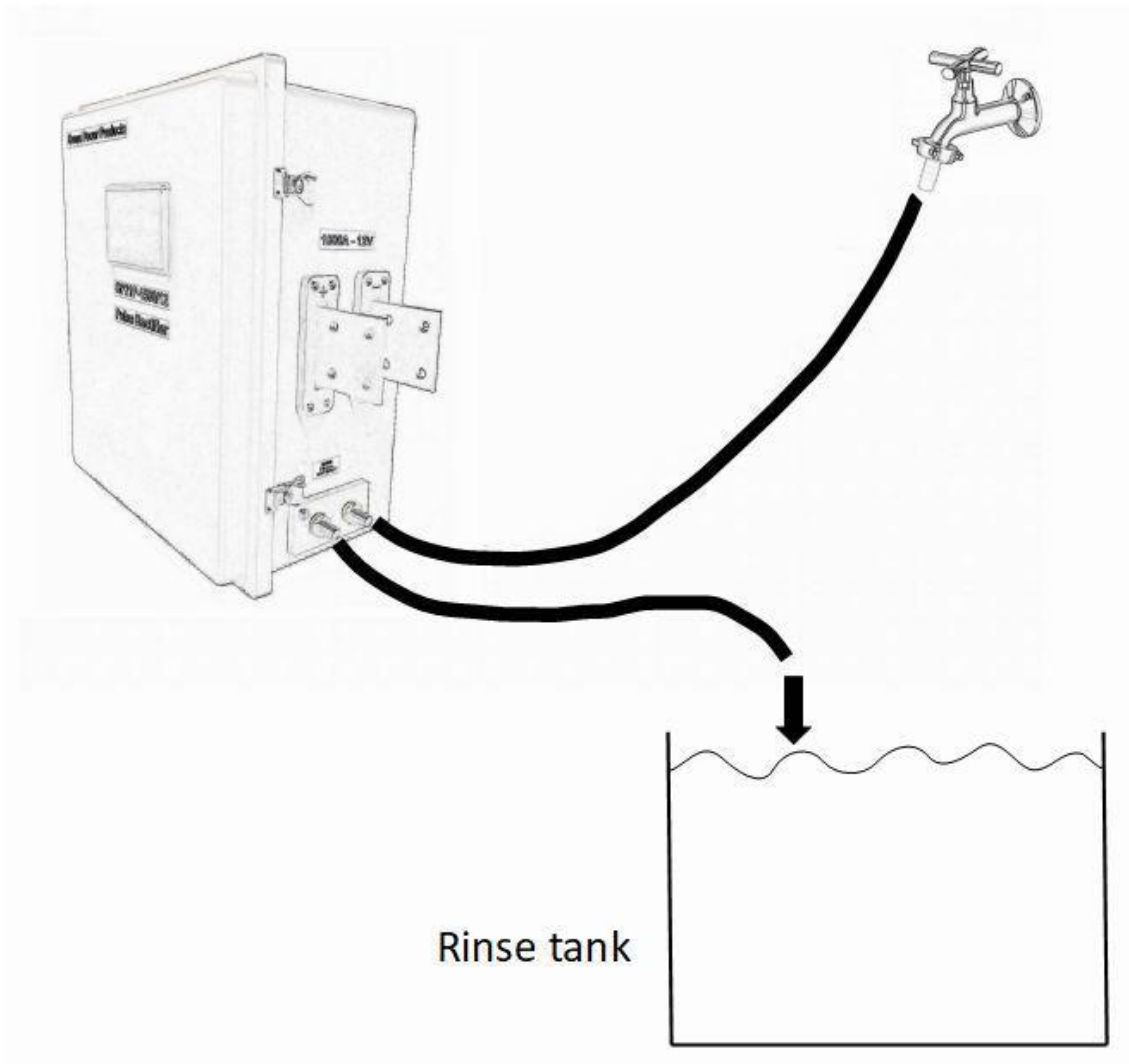
The circuit pipes inside the rectifier are copper, so the water can be reused.

The connectors allow hard plumbing or hoses and there is no polarity, so the water can get into either connector.

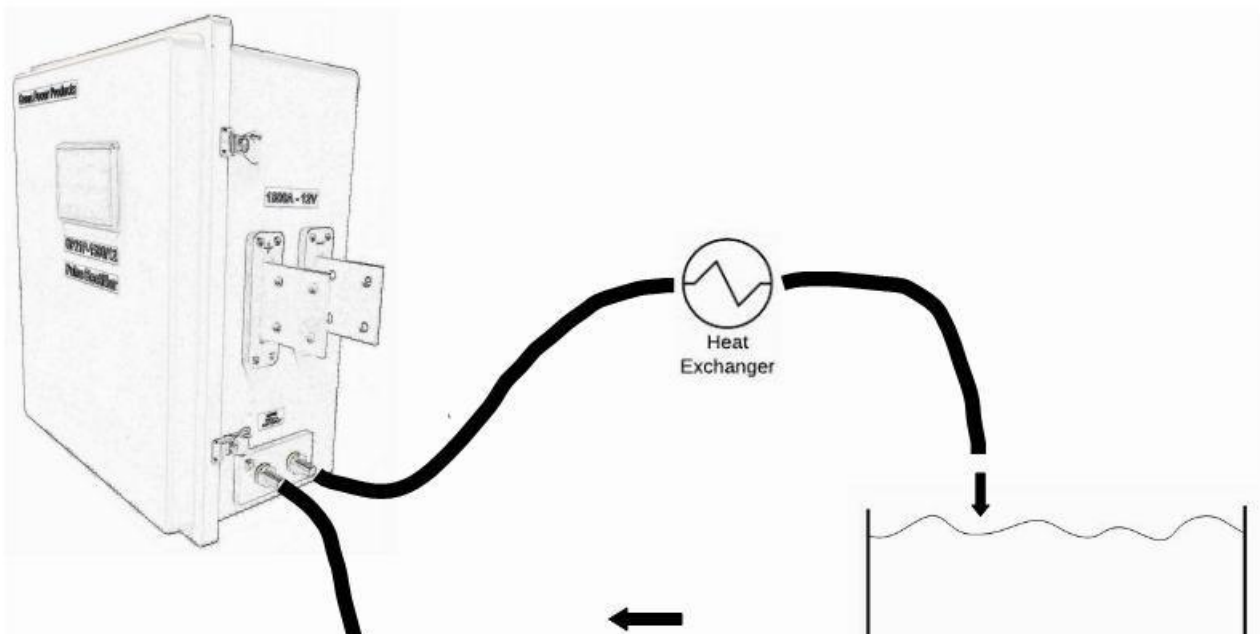
There are several ways to install:

1 - Using a water tap with hose and discharging in the rinse tanks:

2 -



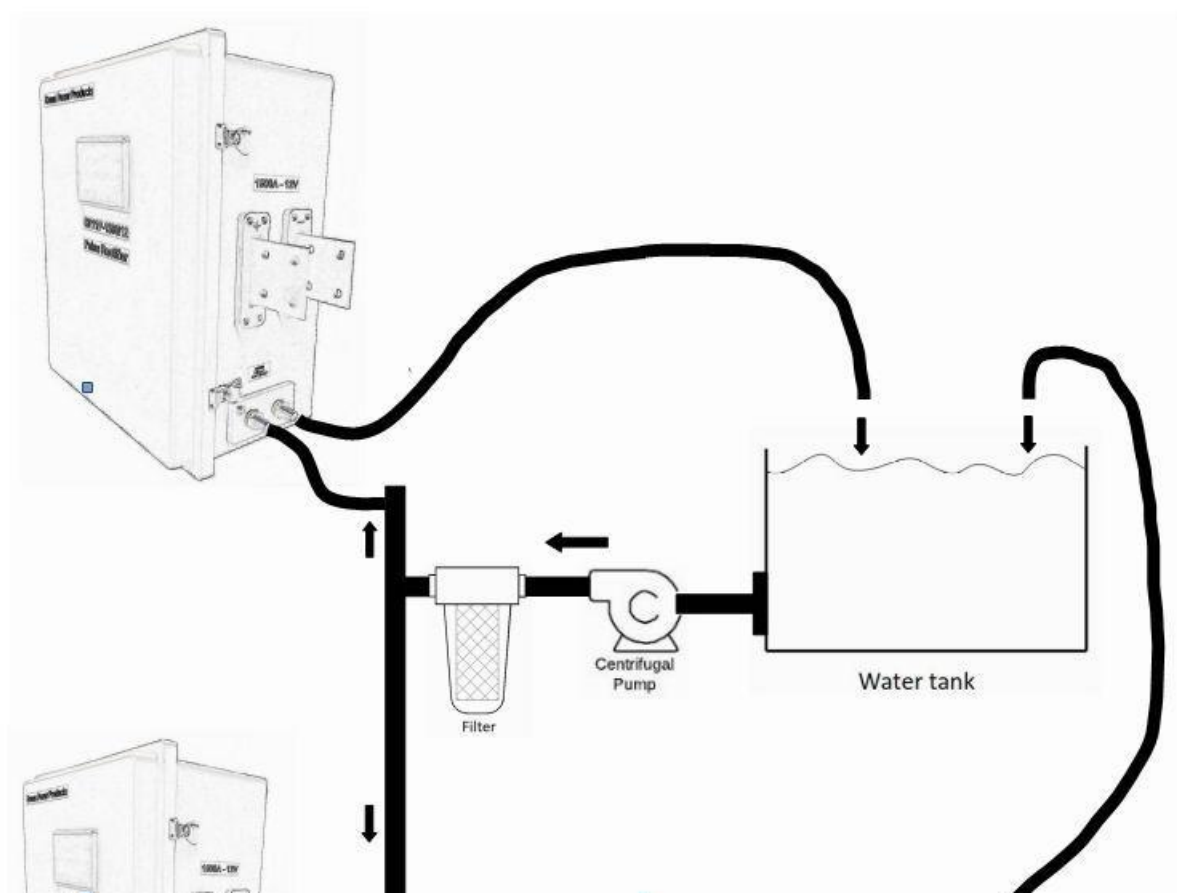
Using a water tank and a recirculating pump:



The heat exchanger can be a chiller or water to air exchanger.

When the heat exchanger option is not used, the tank volume should be 750gal (500 gallons per each 1000Amps) for 8 hour shift a day.

3 – Water connection for 2 or more rectifiers:



When cooling 2 or more rectifiers, using the same pump, the water return must be separated from each other.

End

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Suggestions, doubts and corrections are welcome.

Please e-mail to: sales@ionrectifiers.com

Thank you very much