

# GEW RHINO UV SYSTEM INSTALLATION MANUAL

## MODULE 3: Cooling System Installation Original Instructions



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## MODULE 3: Cooling System Installation

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## Document Issue Status

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1.0	10.03.16	First issue -JNO.
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3.0	04.07.17	NetZero system, duct pressure testing instruction and Intelligent Manifold added-JNO.





# 1 About This Manual

## 1.1 Introduction

This Installation Manual provides Original Instructions, as defined in Machinery Directive 2006-42-EC, for the installation and commissioning of your GEW UV system. Read it carefully before attempting to install or commission the equipment it describes.

Always use trained and competent people for installation, operations, maintenance, repairs or modifications. Each GEW UV system is engineered to meet the requirements of a given installation. Any change in requirements may require re-commissioning or modification of the system.

Do not modify any GEW UV system without the prior written approval of GEW.

## 1.2 Symbols, Warnings, Cautions and Information

This document, and GEW equipment, use the symbols set out below. They highlight possible dangers where you need to take safety precautions and follow good practice. Failure to follow the Warnings and Cautions may invalidate your warranty.



**WARNING:** Risk of electric shock.



**Caution:** a reminder of safety practices, or directs attention to unsafe practices that could result in personal injury or damage to the equipment, or its components, or to the environment.



**Caution:** Hot surface.



**WARNING:** Risk of exposure to ultra violet light.



**Additional information and/or essential documentation:** Read before attempting to install or operate equipment.



**Check list:** Follow a structured set of checks to install or operate equipment.

Electronic copies of this document contain [underlined links](#) to essential documentation.

## 1.3 Installation Manual Structure

This installation manual is divided into modules. Each module describes the installation procedures for different types of GEW equipment, as follows:

- Module 1** Provides general and statutory information about installing GEW products, explains how to activate the GEW warranty and includes a glossary of terms.
- Module 2** Applies to the installation of GEW UV lampheads.
- Module 3** Applies to the installation of GEW and RHINO supplied cooling systems, including chillers, fans and ducting.
- Module 4** Applies to the installation of GEW RHINO power supply systems.
- Module 5** Applies to the installation of GEW HMI control panels.
- Module 6** Contains the commissioning checklist.

**NOTE:** The installation of GEW custom components including inert nitrogen systems may be detailed separately if appropriate.



## 2 About Cooling Systems

### 2.1 Description

GEW cooling systems serve to reduce the heat generated by GEW UV lampheads whilst in operation. Each system is custom built and can consist of either or both of:

- Air cooled systems
- Liquid (chilled water) cooled systems

as described in Sections 2.2 and 2.4 below.

### 2.2 Standard Air Cooled Systems

Air cooled systems draw air through the lampheads in order to maintain them at their optimum working temperature. Fresh air is drawn through the lampheads via slots in their casings and extracted via flexible ducting and an autodamper to rigid modular ducting by AC powered fan(s). It is then discharged from the installation to atmosphere via rigid exhaust ducting. Air-cooled systems may also include acoustic hoods for the fans, and in-line ozone filters in the rigid ducting.

Figure 1 shows a typical GEW cooling fan.

Figure 2 shows a typical GEW autodamper.



The Installation Drawings provide the specifications of the air-cooling equipment supplied with your cooling system.



Figure 1: GEW fan



Figure 2: GEW autodamper

## 2.3 'NetZero' Air Cooled Systems

GEW's 'NetZero' system features additional ducting and fan(s) which provide cooling air at positive pressure to the inlet of each lamphead. The air is drawn from outside the print room thereby avoiding consumption of the heated/conditioned air from the print room.

## 2.4 Chilled Water Cooling Systems

Water cooling systems are used to cool rollers and heatsinks when these are fitted to the UV lampheads. They consist of an AC powered water chiller that circulates chilled, conditioned water in a closed loop circuit. The system is fitted with a distribution manifold that distributes water at approximately 20°C to the UV lampheads. A flow indicator is fitted to the manifold.

Figure 3 shows a typical GEW supplied chiller unit.



**Figure 3: Typical chiller unit**

## 2.5 Certifications



Refer to Module 1 of this Installation Manual and chiller OEM literature.





## 3 Installing Air Cooling Systems

### 3.1 Preliminary Steps



**WARNING:** Risk of electrocution if the press is not isolated.

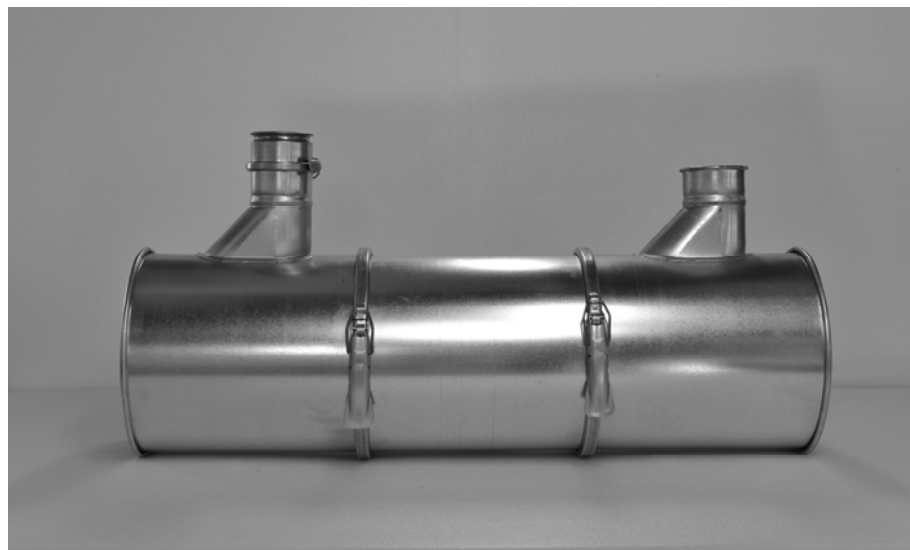
1. Ensure that electrical power to the host press is off and that the power supply is isolated. If possible, lock the supply off. Place a warning notice beside the isolator advising that power is not to be restored until the installation is complete.
2. Ensure the host press is clean.
3. Ensure that the location selected to site the cooling system fan is clean, level, and capable of supporting the weight of the fan.



Ensure that ducting runs for both flexible and rigid ducting do not exceed GEW specified limits. Refer to the Installation Drawings provided with your system.

### 3.2 Rigid Ducting

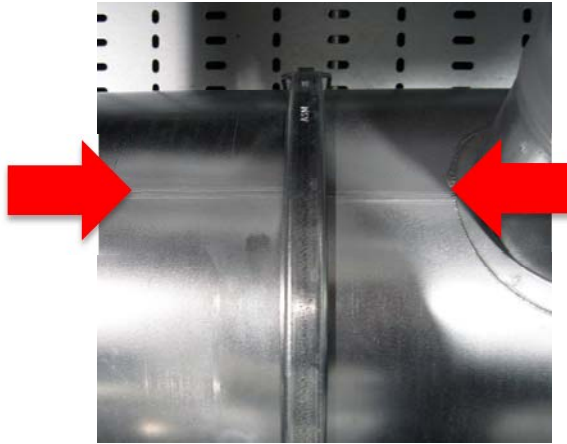
GEW rigid ducting consist of modular clip-together elements in various diameters manufactured in hot dip galvanised steel. Rigid ducting can be suspended, floor mounted, or mounted within the host press itself. Figure 4 shows a typical rigid ducting run with connections for the autodampers.



**Figure 4: Rigid ducting assembly**

1. Inspect ducting for dents or other damage before assembling.
2. If rigid ducting is to be assembled inside the host press ensure there is sufficient clearance to fit autodampers and flexible ducting. See Sections 3.3 and 3.4 below.
3. Lay out sections of ducting alongside mounting to check connections will align with UV lampheads and cooling fan.
4. Clip ducting together using ducting clamps. Ensure rubber seal inside each clamp is undamaged.
5. Ensure sections of ducting are aligned using weld seams as guides. See Figure 5.

6. Clamp ducting caps onto each end of the ducting run.
7. Fix assembled rigid ducting run to mounts.
8. Connect rigid ducting to cooling fan.
9. Fit locking pins to all duct clamps.



**Figure 5: Rigid ducting connection showing sections correctly aligned**

### 3.3 Autodamper(s)

Autodamper(s) are fitted between the ducting and the lampheads to control the flow of air over the lampheads. Autodamper(s) are 24V DC powered, and are connected to the power supply using GEW supplied cables with male/female locking connectors. Figure 6 shows an autodamper connected to a section of rigid ducting, and to flexible ducting that leads to the UV lamphead.



**Figure 6: Autodamper connected to ducting**

1. Connect autodamper to rigid ducting using duct clamp. The motor end of the damper should be closest to the rigid ducting. See Figure 6. Ensure rubber seal inside clamp is intact and correctly seated.

2. Fit collar for connection to flexible ducting to other end of autodamper using a duct clamp.
3. Fit locking pins to clamps as shown in Figure 7.
4. Ensure connections are airtight.



**Figure 7: Locking pin fitted to clamp**

### 3.4 Flexible Ducting

Flexible ducting is used to connect the autodampers to the UV lampheads. It is secured with jubilee clips. Flexible ducting runs should be as short as possible with no bends greater than 90°.



**Caution: flexible ducting runs should not exceed 2 metres in length.**

1. Cut flexible ducting to required length.
2. Attach to collar on autodamper with worm drive clip. See Figure 6.
3. Attach to lamphead outlet with worm drive clip.
4. Ensure connections are airtight.

### 3.5 Cooling Fan(s)

The cooling fan(s) are connected to the rigid ducting either directly, using a collar and duct clamp of the correct diameter, or via a collar and short length of flexible ducting secured with worm drive clips. Figure 8 shows a typical installation.



Refer to the Installation Drawings for details of how to connect the cooling fans to the ducting run.

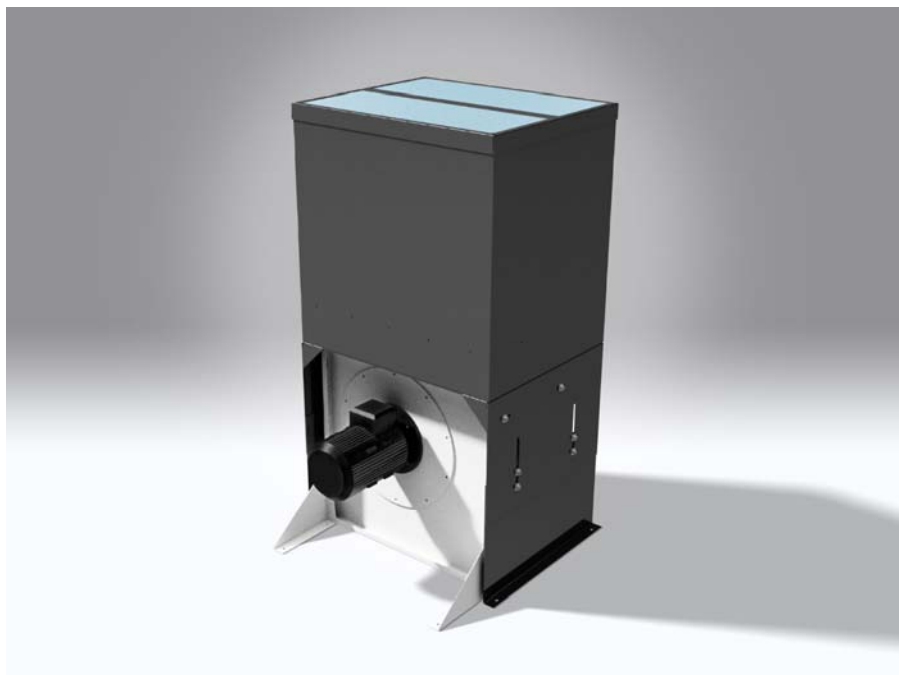
1. Tighten all installation fixings evenly.
2. Ensure connections are airtight.



**Figure 8: Cooling fan connection to ducting run**

### 3.6 Ozone Filter(s)

GEW supplied Ozone filter(s) may be fitted to your air-cooling system. Each filter contains a cell manufactured from transparent Makrolon that can withstand temperatures of up to 115°C. The filter breaks down Ozone through a catalytic process and reduces the Ozone concentration to less than 0.01ppm. The threshold limit value over an 8-hour period is (typically) 0.1ppm (US/UK). Each cell contains active pellets which are purple in colour whilst active and gradually turn to brown or white when in need of replacement. See DOC7002 GEW RHINO System Operating Manual for further details and servicing information.



**Figure 9: Typical ozone filter shown mounted directly above the cooling fan**



Mount ozone filter(s) in accordance with the instructions set out in the Installation Drawings.

### 3.7 Exhaust Ducting (Customer Supplied)

A qualified ducting engineer must install exhaust ducting. Ducting must be sized so that back-pressure at the exhaust fan(s) does not exceed 0.15kPa at full flow.

1. Refer to Figures 9 to 13 for exhaust ducting design guidelines.
2. Ensure exhaust ducting is airtight and free from obstructions.
3. During commissioning, the exhaust duct back-pressure must be measured as described in section 3.10.



**Exhaust ducting for GEW cooling systems is customer supplied** and must fall within the parameters specified in the Installation Drawings.

GEW recommends a hot-dip galvanised steel construction. Plastic ducting should not be used.

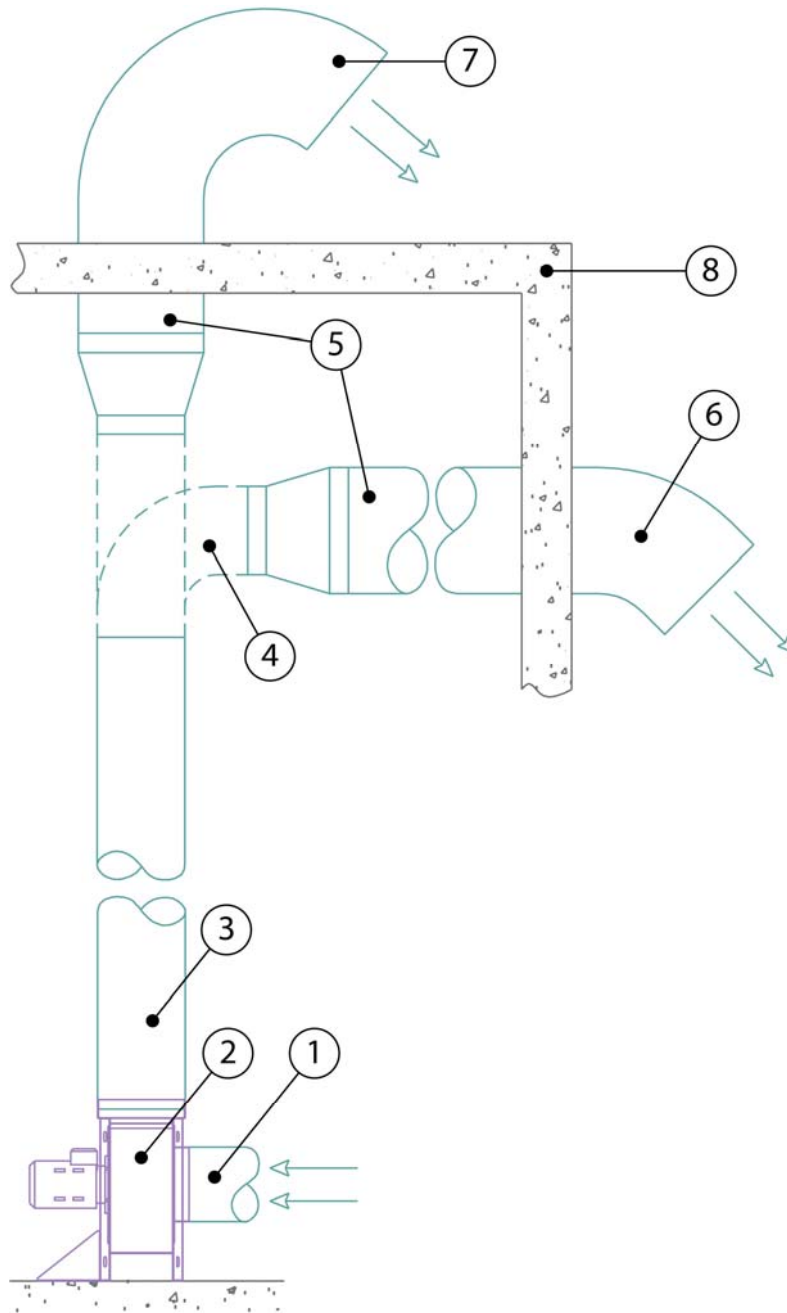
The air flow rate for this installation can be found in the GEW Order Confirmation.

### 3.8 Exhaust Ducting Terminations

1. Refer to Figures 11 to 14 for ducting termination design guidelines.
2. GEW recommends that duct terminations should exhaust downwards at an angle of approximately 45 degrees as shown in Figure 13A.
3. Ensure all fixings are secure.



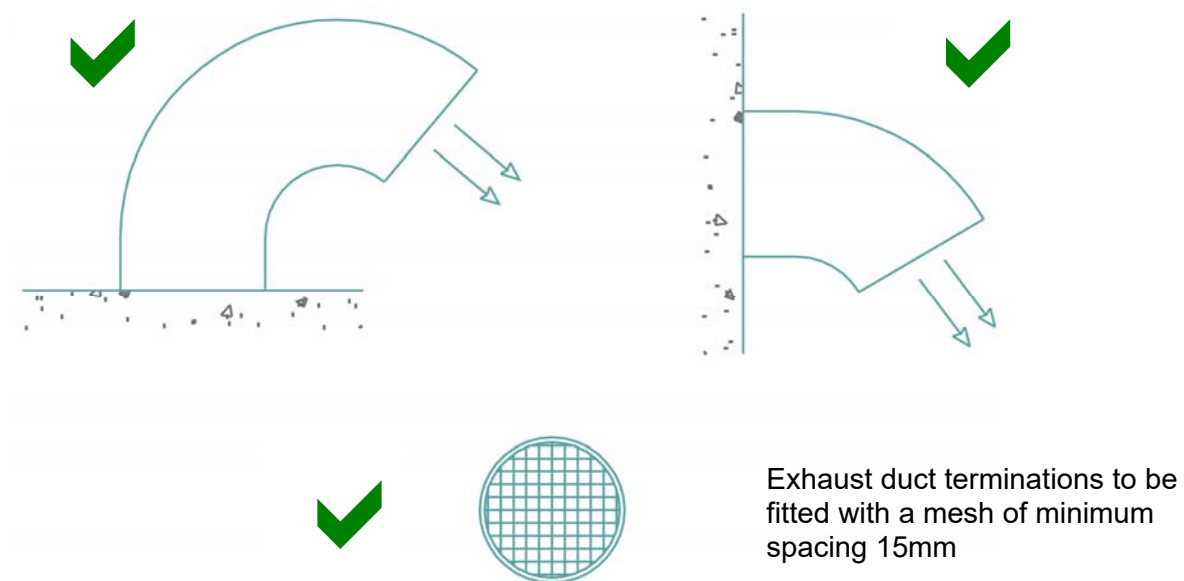
**WARNING:** ducting and terminations must be installed in accordance with the directions set out in figures 9 to 13. Do not exceed maximum recommended exhaust ducting runs. Incorrect installation may result in excessive backpressure in the cooling system, leading to UV system performance issues. If in doubt, contact GEW for advice.



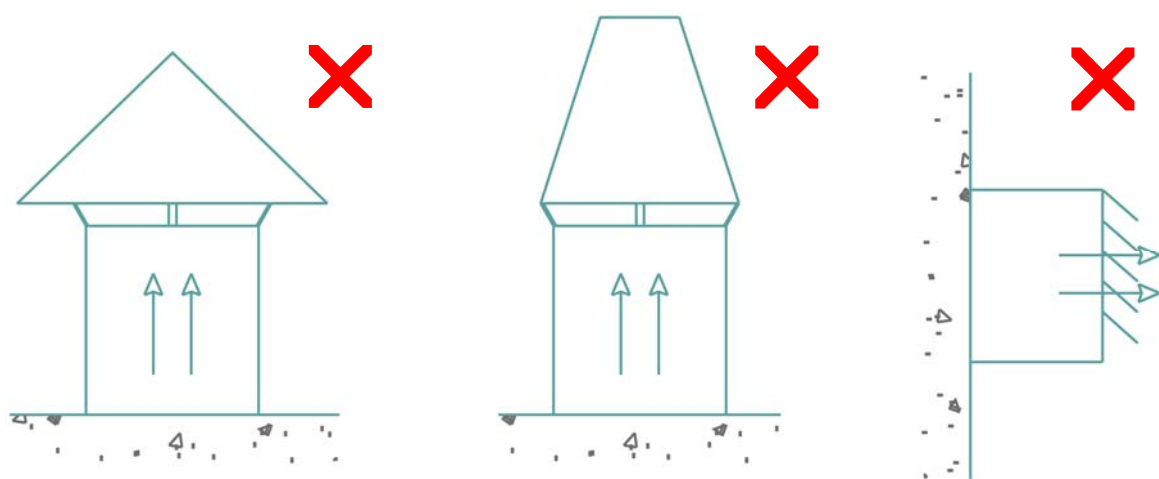
**Figure 10: Typical final exhaust ducting designs**

- 1 GEW ducting
- 2 GEW fan
- 3 Rigid ducting, diameter 350 mm, maximum length 15m
- 4 Rigid bend
- 5 Rigid ducting, diameter 500 mm, maximum length 10m
- 6 Wall mounted ducting termination
- 7 Roof mounted ducting termination
- 8 Exterior roof / wall

**NOTE:** Items 3 to 8 are not included with the GEW UV system. These must be provided by the customer.



**Figure 11: Correct exhaust ducting terminations**



**Figure 12: Unacceptable exhaust ducting terminations**



**Figure 13: Examples of good ducting installations**



**Figure 14: Examples of unacceptable ducting installations**

### 3.9 Taking Temperature Readings

Temperature is measured for the commissioning tables by inserting a probe into the flexible ducting between lamphead and autodamper. See Figure 15.

4. Insert probe through flexible ducting.
5. Allow temperature reading to stabilise over 10 seconds.
6. Read temperature from probe.



Figure 15: Using a temperature probe.

### 3.10 Taking Pressure Readings

Duct pressure readings must be taken at the exhaust fan(s) to ensure that the back-pressure from customer-supplied exhaust ducting does not exceed 0.15kPa. A low back-pressure is required to achieve satisfactory cooling of the UV system.

Run the UV system at full power for at least five minutes and, using the GEW supplied manometer (part #65083), measure and record the duct pressures for each exhaust fan in accordance with the pictorial instructions below. See Figure 16, Figure 17 and Figure 18.

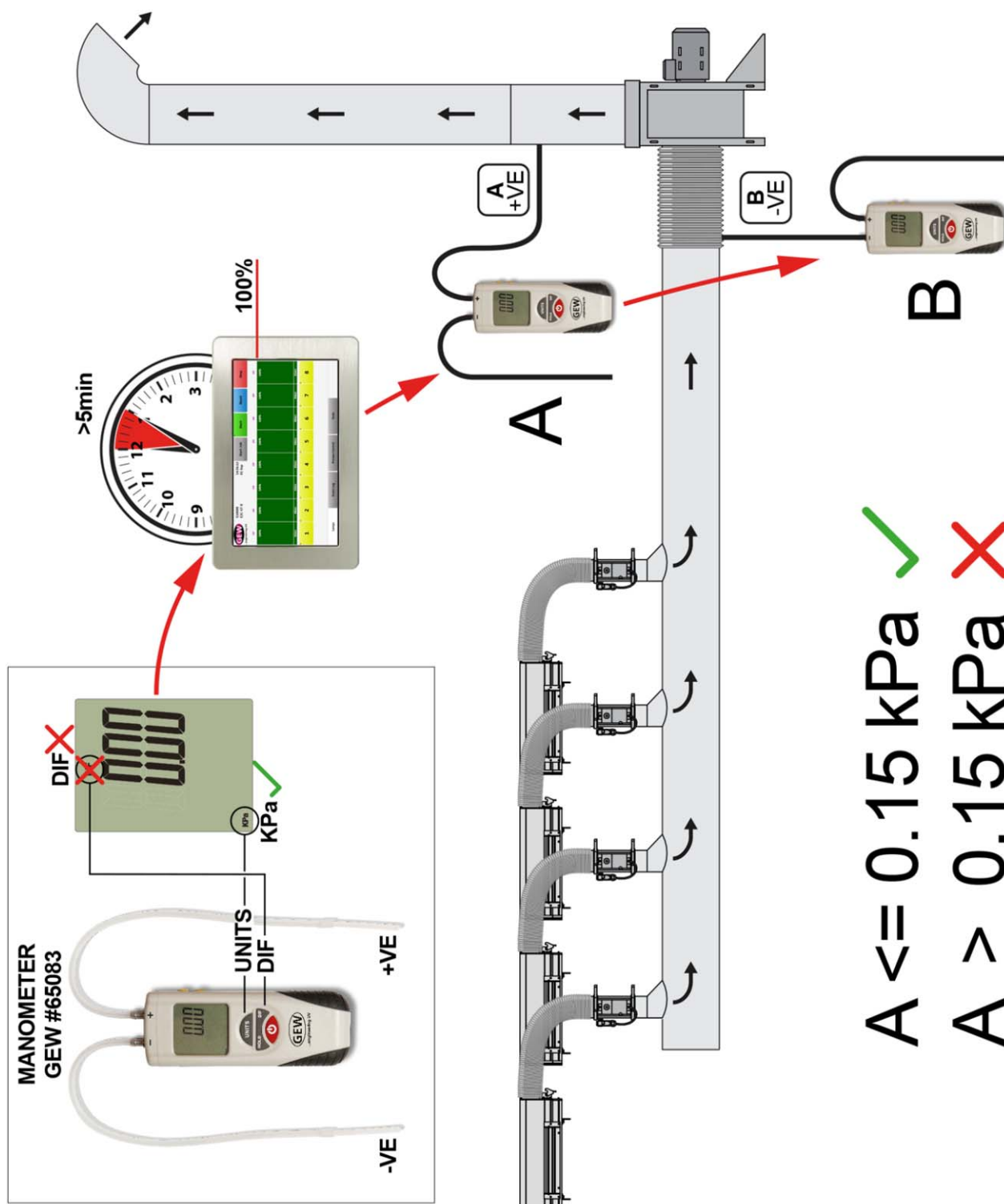


**WARNING: DO NOT RUN THE UV SYSTEM IF THE BACK-PRESSURE "A" EXCEEDS 0.15kPa. Excessive back-pressure leads to UV system performance issues. If in doubt, contact GEW for advice.**

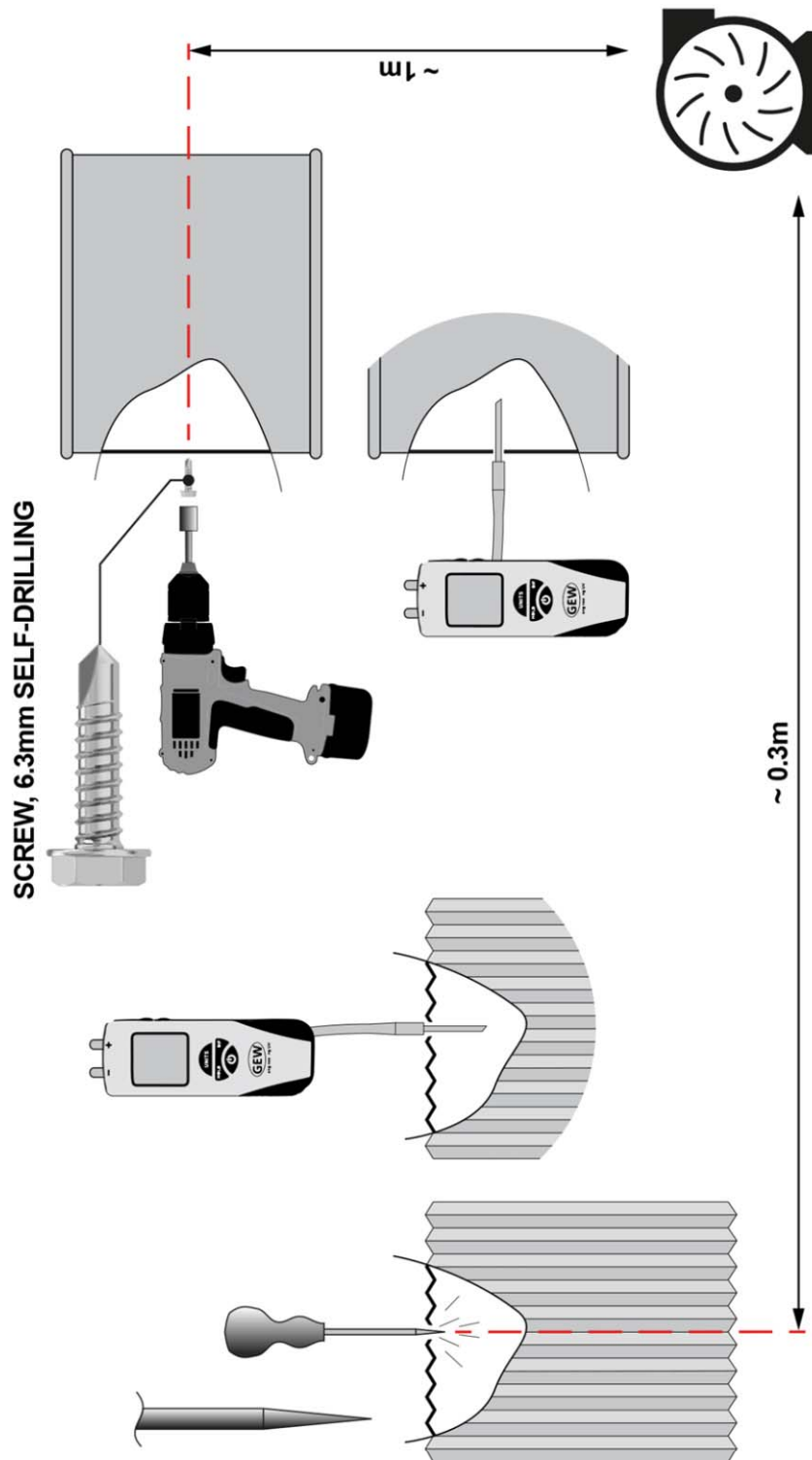
A Microsoft Excel spreadsheet is provided to record the readings and this must be emailed to [service@gewuv.com](mailto:service@gewuv.com) to satisfy commissioning requirements. A soft-copy of the spreadsheet can be found on USB flash drive supplied in the documentation pack that came with your system (Module 6 of this installation Manual).



**Figure 16: Taking a pressure reading using the manometer**



**Figure 17: Standard air-cooled system - duct pressure testing.**



**Figure 18: Duct pressure test point provisioning.**

### 3.11 Completion Checklist



When the air-cooling installation is complete fill out the relevant section of the Commissioning Checklist in Module 6 of this Manual.





## 4 Installing Water Cooling Systems

### 4.1 Chiller



**WARNING:** Risk of electrocution if the press is not isolated from the mains supply.



Mount chiller in accordance with the instructions set out in the Installation Drawings, and the chiller OEM literature.

1. The chiller must have at least 1 metre of clear space for access on all sides.
2. The chiller should not be more than 4 metres away from the coolant distribution manifold.

### 4.2 Water Connection to the Distribution Manifold



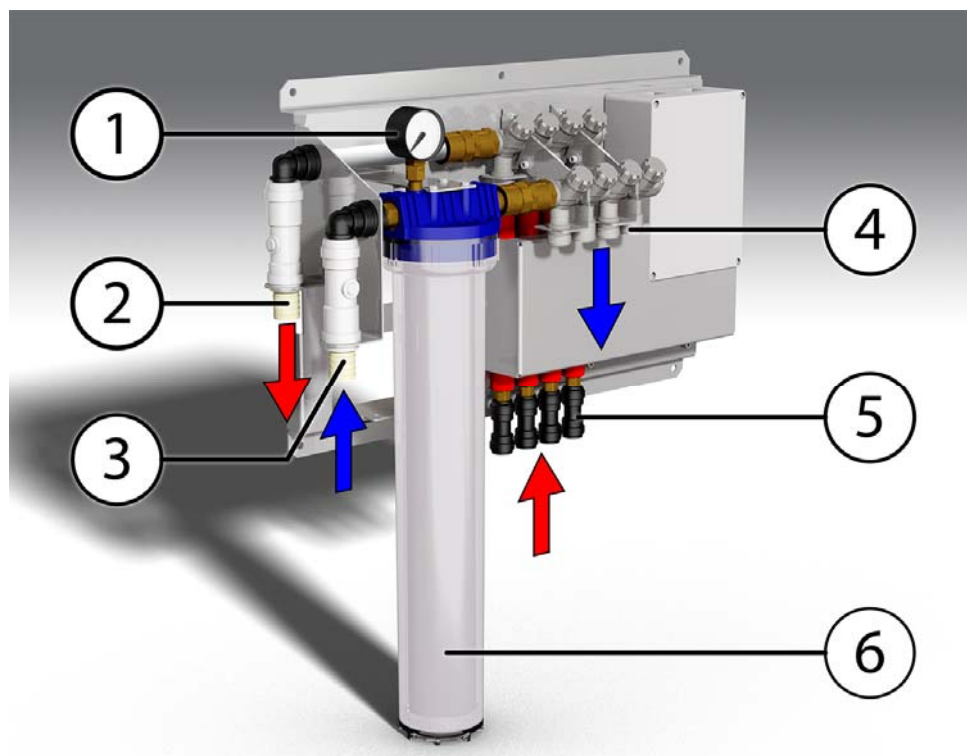
Connect distribution manifold in accordance with the instructions set out in the Installation Drawings and the chiller OEM literature.



**WARNING:** Ensure water supply piping to manifold is separated from electrical cabling runs.

Figure 19 shows an “Intelligent Manifold” which evenly distributes the cooling water to the lampheads and any associated water cooled devices. It electronically senses the return water flow rate and temperature for each water-cooled device and feeds data back to the HMI for processing. The standard water manifold has a similar layout but mechanical balancers/flow meters are fitted in place of the electronic devices.

1. Connect all feed and return water hoses to the manifold using Figure 19 as a connection guide. Secure all hoses in place using worm drive clips.



**Figure 19: Typical water manifold.**

Key, Figure 19:

- 1 Pressure gauge.
- 2 Return water connection, to chiller.
- 3 Feed water connection, from chiller.
- 4 Feed water connections, to lampheads. (Black pipework).
- 5 Return water connections, from lampheads. (Red pipework).
- 6 Water filter.

### 4.3 Intelligent Manifold Communications Bus Connection

Connect the Intelligent Manifold(s) to the RPSU CANbus system in accordance with the installation drawings supplied.

### 4.4 Water Connection to UV Lampheads



Connect chilled water supply to lamphead rollers and heatsinks in accordance with the instructions set out in the Installation Drawings.

1. Fit supply and return pipework to lamphead connections. See Figure 20. Hoses are colour coded, BLACK-SUPPLY, RED-RETURN.
2. Secure tubes with worm drive clips.
3. Run chiller and test system for leaks.



**Figure 20: Typical water connections to lamphead**

### 4.5 Chiller Interlock Connection

The chiller interlock connections are detailed in module 4 of this manual, 'Connecting a Chiller to the RHINO Rack'.

## 4.6 Filling the Chiller and Adding Inhibitors



Fill chiller in accordance with the instructions set out in the chiller OEM literature. The water supply must comply with the minimum standards specified in the literature.

1. Fill chiller and run to check for leaks.
2. Drain chiller and refill.
3. Add Fernox AF10 biocide (currently not for use with systems in USA), Fernox Central Heating Protector F1 or Fernox Alphi-11 Protector (as required) to chiller coolant following instructions on product data sheets.

NOTE: A water test kit is available from GEW, part number 42885. The kit confirms the presence and strength of appropriate additives. GEW recommends its use to ensure the longevity and trouble-free operation of the water system. For systems featuring LED lampheads, its use is a mandatory part of the warranty approval process.



**Caution:** observe all safety advice on Fernox product data sheets before handling inhibitor and other additives. Wear PPE as applicable.

## 4.7 Completion Checklist



When the water-cooling installation is complete fill out the relevant section of the Commissioning Checklist in Module 6 of this Manual.

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