



**SYSTEM: HVAC**

**GRAVITY COILS**

**REF.: D-MO5462-007**



## TABLE OF CONTENTS

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	Page
<b>1. TECHNICAL SPECIFICATION .....</b>	<b>3</b>
1.1. INTRODUCTION.....	3
1.2. PROPER USE.....	3
1.3. QUALIFICATION OF PERSONNEL.....	4
<b>2. TRANSPORT AND STORAGE .....</b>	<b>5</b>
2.1. SAFETY PRESCRIPTIONS.....	5
2.2. SCOPE OF DELIVERY .....	5
2.4. TRANSPORT – HOISTING INSTRUCTIONS .....	5
2.5. PRESERVATION METHOD .....	6
2.6 DISPOSAL.....	6
<b>3. INSTALLATION .....</b>	<b>7</b>
3.1. UNIT INSTALLATION .....	7
3.2. CONNECTING THE CHILLED WATER.....	9
3.3. CONNECTING THE CONDENSATE DRAIN .....	10
<b>4. COMMISSIONING .....</b>	<b>11</b>
4.1. SAFETY INSPECTION .....	11
4.2. CHECKING THE UNIT .....	11
4.3. SWITCH ON UNIT .....	11
<b>5. TROUBLESHOOTING .....</b>	<b>11</b>
<b>6. MAINTENANCE .....</b>	<b>12</b>
6.1. PREVENTIVE MAINTENANCE .....	13
6.2. CORRECTIVE MAINTENANCE.....	13
6.2.1. Replacing complete unit .....	13
6.3 RECOMMENDED SPARE PARTS / SPECIAL TOOLS .....	13
<b>7. MAINTENANCE DATA RECORD.....</b>	<b>14</b>
7.1. GENERAL.....	14
7.2. PERIODICAL INSPECTIONS.....	14
7.3. REPAIR AND MAINTENANCE.....	14
7.4. REPLACEMENT OF COMPONENTS AND REVISION OF INSTALLATION .....	14
7.5. PARTICULAR EVENTS .....	14

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# 1. Technical specification

## 1.1. Introduction

Gravity coils are used primarily in spaces where the load is small, and where electrical equipment (that could spark) would constitute a hazard, such as magazines where air conditioning is required.

The coils acts as a heat exchanger, cooling the space in which it is installed, fitted as high as possible in the ceiling. Ambient heat is absorbed by the cooling water in the coolers, thus cooling the atmosphere. Each gravity cooler shall include a condensate drip pan with drain connections.

### MATERIALS

CASING	Stainless Steel AISI304. painted
COOLING COIL	Copper
FLANGES	Stainless Steel AISI304

For more detailed information of each gravity coils, such Tags, coil models, etc, please see “Annex B. Item list” at the end of this document

## 1.2. Proper use

The units are designed exclusively for cooling. Water can be used as the medium with the following limit values:

- TDS of 4 ppm at 20 °C
- Conductivity < 10 µS/cm at 20 °C
- Alkalinity < 5,5
- pH : between 5 and 6.
- TSS: < 0,002 microns

Additionally the following values are recommended as optimal to achieve the maximum operative life of the units.

Parameter	Unit	Value
pH value		7.3 – 8
Conductivity	μS	80-1000
Hardness	ppm	50 - 500
Silica		0
Pressure	bar	1 - 8

**Table 1.2-1** Recommended optimal values for the water quality



**DAMAGE TO THE UNIT!**

***The water used should be cleansed of suspended matter by means. Otherwise there is a risk of erosion due to suspended matter (observe limit values in Table 1.2-1).***

***You must also ensure that the unit is protected from dust and other substances that cause an acidic or alkali reaction when combined with water (aluminum corrosion).***

### 1.3. Qualification of personnel

The unit must be installed, operated and maintained only by qualified, specially trained and authorized persons. The following tasks described in the operating and maintenance instructions may only be performed by qualified personnel:

- Transport/storage
- Installation
- Hydraulic connection
- Electrical connection
- Commissioning
- Maintenance

## 2. Transport and storage

### 2.1. Safety prescriptions

In this section, general safety prescriptions are indicated for carrying out transport operations of the equipment. Other safety prescriptions are indicated in different sections of this document.



#### **DANGER DUE TO OVERHEAD LOADS!**

- *It is extremely dangerous to stand under overhead loads.*
- *Make sure that no-one is standing under an overhead load!*



#### **DAMAGE TO THE UNIT!**

- *Improper transport can cause damage to the unit.*
- *If damage has been caused by impacts to the unit or by dropping it, carefully check that the gravity cooler is working correctly.*

*Take care when transporting the unit!*

### 2.2. Scope of delivery

As soon as the unit has been delivered, remove the packaging and check the unit for any damage caused in transit (if so, submit a complaint to the carrier), and check that the shipment is complete and correct. To do so, compare the details of the unit nameplate with the details on the delivery note.

This also applies to all accessories. Missing parts or damage in transit can only be claimed against the transport insurance if the damage has been confirmed by the carrier.

### 2.3. Packaging

The unit is shipped on pallets and packaged in box. The protective cap on the unit discharge port should only be removed when the unit is installed.

### 2.4. Transport – Hoisting instructions



#### **DAMAGE TO UNIT AND PERSONAL INJURY!**

- Use protective gloves to avoid injury due to sharp edges.
- Ensure that at least two people carry the unit to avoid injury.
- In the case of palletized deliveries, use only lifting and transport vehicles with sufficient carrying capacity.
- Secure the load during transit to prevent it from tipping or falling.

## 2.5. Preservation method

When storing the unit for a temporary period, the following points must be noted:

- Store the unit in its original packaging.
- The storage location must be protected from the elements, dry and free of dust.



### ***DAMAGE TO THE UNIT!***

- *Any residual water must be removed from the unit! Frost risk!*
- *The unit must be protected from impacts, vibrations etc.*

## 2.6 Disposal

### ***RECYCLING***

Ensure that operating supplies, packaging and replacement parts are disposed of in a safe and environmentally friendly manner. Use any available local recycling facilities and observe recycling regulations.

During disposal, the parts of the units should be separated as far is possible and sorted by material type.

### 3. Installation



#### **PERSONAL INJURY!**

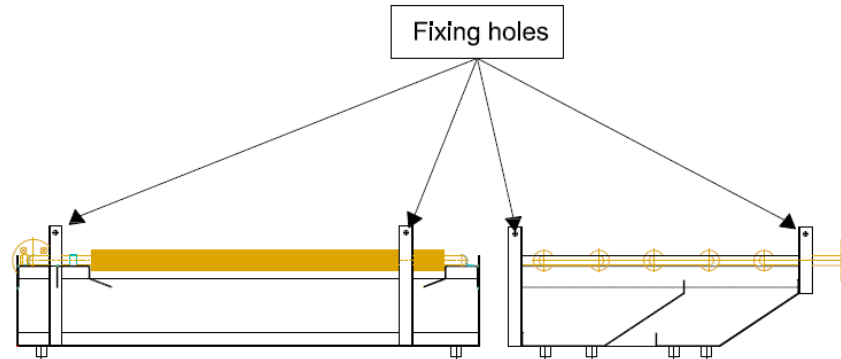
- There is a risk of accidents due to parts dropping down and sharp edges.
- When installing the unit, wear a helmet, safety footwear and protective gloves.

#### **NOTE:**

You must ensure that no mechanical deformation or twisting occurs during installation of all models in all installation locations.

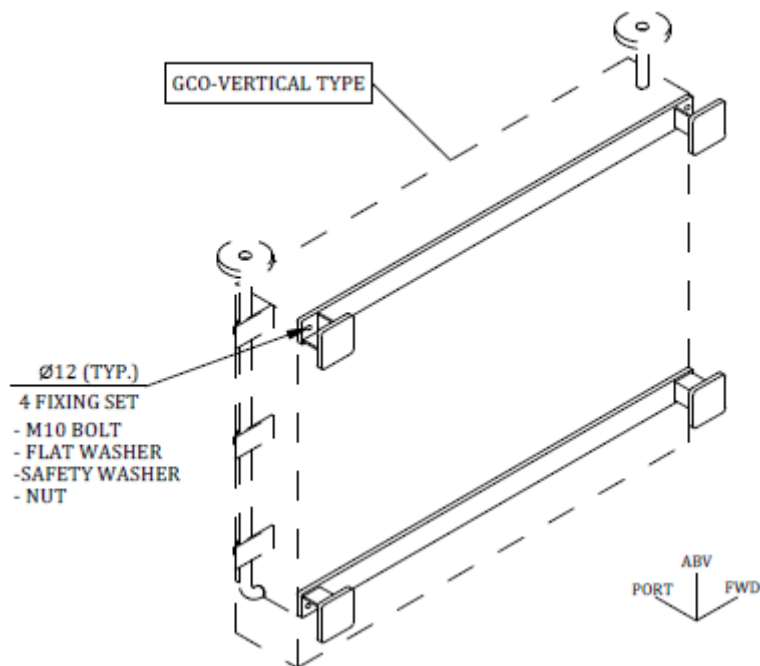
#### 3.1. Unit installation

Fasten the gravity coolers by means of bolts. Stainless steel channel with holes of 10 mm diameter are provided for securing the units. You will require fixings which correspond with the fixing method used.



**Figure 3.1-1 Fixing holes**

For vertical type units the following typical fixing method will be used:



### WARNING

*The lifting ropes, the spacing bar and/or scales must be strong enough to support the machine safely.*

### WARNING

*The machine must be lifted with the utmost attention and care. Avoid jolting when lifting. Lift the machine very slowly, keeping it perfectly horizontal.*

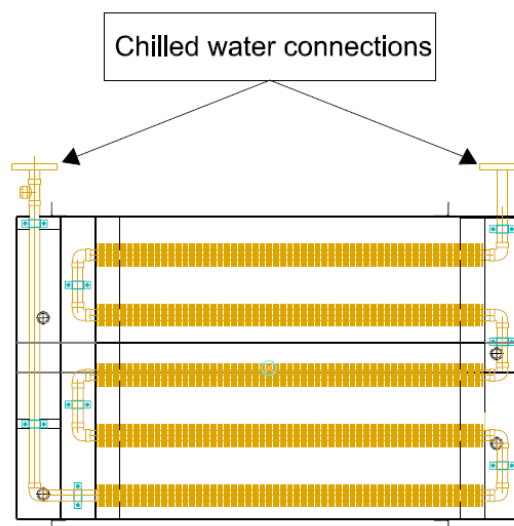


### 3.2. Connecting the chilled water

Before the on-site piping and the unit chilled water connection is set up, the chilled water system should be shut off and secured against being opened unintentionally.

Connection to the pipe system is made by the pipe contractor. Cooling coils must always be connected so that the expansibility or own weight of the pipe system does not load the pipe connections of the coolers. The gravity coils are provided with chilled water flange connections.

All on-site pipes for the cooling medium must be insulated against condensate formation.



**Figure 3.2-1 Chilled water connection**

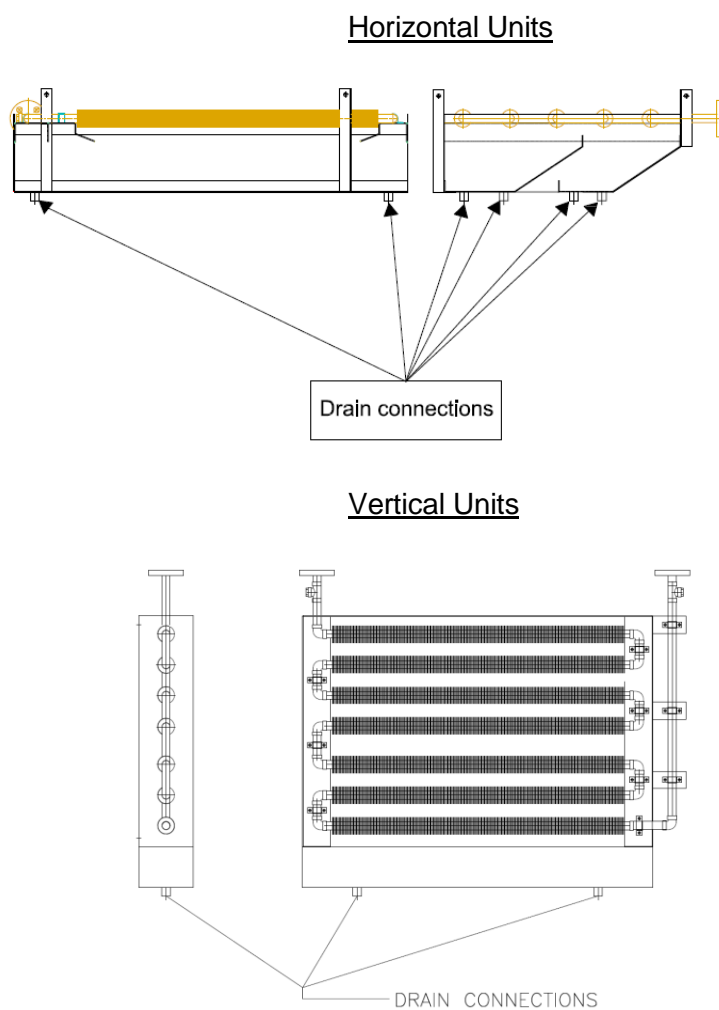
When all connections have been completed, all screw connections should be tightened and checked that they are free of mechanical stress.

- At the beginning of the fitting procedure, remove the covers of the water inlet and outlet pipes.
- Fit the connections, ensuring they are free of mechanical stress.
- Make sure that there is sufficient room for the valve installation.
- Lead the pipes off at a right angle to the side or to the rear.
- Seal the connections.
- Screw on the connections.

### 3.3. Connecting the condensate drain

In order for the condensate to be drained off properly, the condensate drain by others must be connected to the drip pan.

- Connect a hose or a pipe on to the appropriate drip pan connector and seal it
- When connecting the condensate drain to the wastewater system, observe the wastewater regulations.
- Gravity coolers are provided with drip pan with drain connections. Clean cooling coil by flushing with water, and drip pan as well as drain must be kept clean to avoid formation of algae.



**Figure 3.3-1 Drain connections**

## **4. Commissioning**

### **4.1. Safety inspection**

Before commissioning, ensure that the following conditions are true:

- The entire system of which this unit is part has been installed both mechanically.
- All medium pipes have been rinsed and are free from residues and foreign bodies.
- The system is properly filled with the correct water

### **4.2. Checking the unit**

The following checks should be made before commissioning:

- Check that the unit has been properly mounted.
- Check that all water and steam pipes are properly connected.
- Check that any devices used to secure the equipment in transit have been removed from vibration absorbers, batteries, etc.
- Check whether the shut-off valves are open.
- Any valves fitted on site should be checked in accordance with the manufacturer's guidelines.
- Check that the connection of the condensate is laid such that the condensate water can drain away without obstruction. You should ensure that the pipe is laid at a suitable incline and the siphon is installed.

### **4.3. Switch on unit**

- Open all shut-off valves of the chilled water.

## **5. Troubleshooting**

Deviations from normal operating states of the gravity coil units are evidence of malfunctions and must be investigated by maintenance personnel.

The following table should serve as a starting point for maintenance personnel regarding possible causes of trouble and their correction:

Fault	Possible cause of fault	Remedy
<b>Unit does not cool/cool insufficiently (chilled water)</b>	Air intake or discharge area blocked	Un-obstruct or clean airways
	Cooling medium is not cold	Check chilled water system
	Water flow rate too low	Check chilled water system
	Shut-off valve does not open	Check chilled water system
<b>Water leakage in unit area</b>	Main drip pan drain blocked	Clean the main drip pan and the condensate drain
	Chilled water pipes not (correctly) insulated	Insulate the chilled water pipes (performed by technical personal, if required)
<b>Fault</b>	<b>Possible cause of fault</b>	<b>Remedy</b>
	Cooling coil or hydraulic connections leaking	Check the cooling coil and valve connections for leaks
		If necessary, retighten connections, clean screw insert or reseal the connections

**Table 5-1 Causes of malfunction and possible remedies**

## 6. Maintenance

The unit is a high-quality and reliable unit. However, to guarantee the permanent functioning and performance of the unit, regular maintenance and inspection by technical experts is necessary.



***Maintenance must only be performed by trained technical personnel in observance of this operation manual and the regulations in force.***

***The warranty will be invalidated by damage which is attributable to the non-performance of regular essential inspections.***

## 6.1. Preventive maintenance

Though the units are maintenance free, the following tasks must be performed at regular basis.

Task	Frequency	Time estimate	Skill of personnel	Required special tools	Reference paragraph	Remarks
Visual inspection	Regularly	10 min.	Qualified Technician	None		
Clean unit	Annual	15 min.	Qualified Technician	Brush, compressed air		Clean only if required

**Table 6.1-1 Regular maintenance tasks**

## 6.2. Corrective maintenance

### 6.2.1. Replacing complete unit

- Close the shut-off valves.
- Disconnect the chilled water.
- Disconnect the drain.
- Unbolt the fixing bolts
- Remove the unit
- Install the new unit
- 

## 6.3 Recommended spare parts / special tools

Item Name	Part Number	Name of Manufacturer
Gravity Coil 5GC (HORIZONTAL)	FRIZONIA FZ5GCH	FRIZONIA
Gravity Coil 3GC (HORIZONTAL)	FRIZONIA FZ3GCH	FRIZONIA
Gravity Coil 3GC (VERTICAL)	FRIZONIA FZ3GCV	FRIZONIA

## **7. Maintenance Data Record**

### **7.1. General**

For adequate maintenance management a log-book should be maintained. A log-book comprises:

- All inspections.
- All executed repairs and replacements of components.
- Particular events like:
- Deviations from the normal management/operation.
- Dangerous situations.

### **7.2. Periodical inspections**

Records of periodical inspections could contain:

- The periodical inspections to be carried out.
- The executor who should carry out these inspections;
- The time interval between inspections
- Persons who should be informed about these inspections.

### **7.3. Repair and maintenance**

Repairs should only be carried out by skilled personnel and after permission of the management. Each repair and case of maintenance should be recorded in the log-book.

### **7.4. Replacement of components and revision of installation**

Revisions and replacement of components of the refrigerating installation should be recorded in the log-book.

### **7.5. Particular events**

Faults, accidents, deviations of normal management and other particular events should be recorded in the log-book.