

Installation Instruction

Transport | Installation | Operation | Maintenance



ADCHD

High Density Condensers and Fluid Coolers ADCHD



Consider these instructions to be part of the unit.

Read and follow these instructions carefully before performing any work on the unit.

Always keep these instructions accessible in the immediate vicinity of the unit.

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Content

1. Warranty statement	5
2. General safety information	6
2.1 Safety instructions	6
2.1.1 Observing operating instructions	6
2.2 Safety Responsibilities	6
2.2.1 Manufacturer's responsibilities	6
2.2.2 Responsibilities of the system's installer	6
2.3 Safety symbols	7
2.3.1 Warning symbols and their meaning in these operating instructions	8
2.3.2 Prohibitory signs and their meaning in these operating instructions	9
2.3.3 Mandatory signs and their meaning in these operating instructions.	9
2.4 Process fluid/refrigerant safety	9
2.4.1 General Refrigerant / fluid safety	9
2.4.2 How to act in an emergency for halocarbon refrigerants	10
2.4.3 How to act in an emergency NH3	10
2.4.4 How to act in an emergency Glycol	11
2.5 Proper and improper operation of process fluids/refrigerants	12
2.5.1 Improper use NH3	14
2.5.2 Improper use Glycol	15
2.6 Mechanical hazards and safety	16
2.6.1 Fins, sharp unit corners and edges	16
2.6.2 Fans	16
2.7 Electrical hazards and safety	17
2.8 Thermal hazards and safety	17
2.8.1 Danger of burns	17
2.8.2 Freeze hazard	17
2.9 Residual hazards due to process fluids/refrigerant	18
2.9.1 Residual hazards due to halocarbon refrigerants	18
2.9.2 Residual hazards due to NH3 refrigerant	19
2.9.3 Residual hazards with the heat carrier due to glycol	20
2.10 Residual hazards caused by vibrations	22
2.11 Residual hazards caused by pressurized parts	22
2.12 Residual hazards caused by defective installation	22
2.13 Residual hazards with breaks in operation	24
2.14 Residual hazards caused by escaping objects or liquids	24
2.15 Residual hazards with disposal of process fluids/refrigerants	24

2.15.1 Residual hazards with disposal halocarbons	24
2.15.2 Residual hazards with disposal NH3	25
2.15.3 Residual hazards with disposal Glycol	26
3. General information	27
4. High density condenser / Fluid cooler terminologies	28
5. Installation	30
5.1 Location layout	30
5.2 Equipment layout	31
5.3 ADCHD Layout requirements	31
5.4 Support structure	34
5.5 Installation Procedures	53
5.5.1 Receiving & Inspection	53
5.6 Offloading & assembly	54
5.6.1 Rigging	54
5.6.2 Bottom section	63
5.6.3 Upper section	63
5.6.4 Connection joint	64
5.6.5 Riser pipe union nut Installation	65
5.6.6 Electrical start-up wiring	65
5.6.7 Ladder & external service walkway package (OPTIONAL)	66
5.7 Piping	66
6. Operating instructions	67
6.1 Pre-start up inspection	67
6.2 Water quality guidelines	69
6.3 Cooling pad media guidelines	70
6.4 hydroBLU™ system check-up	70
6.5 Operation mode	71
7. Extended shut down	72
8. Electrical	72
8.1 Adiabatic cooling system controls	72
8.1.1 Güntner hydro management (GHM)	72
8.1.2 Dry mode	73
8.1.3 GHM water saving mode	73
8.1.4 GHM Energy efficiency mode	73
8.1.5 GHM mode	73
8.1.6 Manual mode ON/OFF:	74
8.1.7 Adjusting settings on the GHM	75
8.2 EC Motors - generic schematic	77
8.3 hydroBLU™ components - generic schematic	79

9 Maintenance	84
9.1 Inspection and maintenance frequencies	84
9.2 Cooling pad removal	85
9.3 Water distribution headers	85

1. Warranty statement

The supplier warrants the product to be free from defects in workmanship and materials under normal usage for the period outlined below. The supplier further warrants against defects in workmanship and materials of the product for a period of 24 months from the date of purchase (the "Warranty Period"), provided that the product is correctly installed and operated within the recommended limits of the manufacturer's technical documentation.

The supplier at its option shall repair or replace, free of charge to the purchaser, all components of the product which are or become defective during the Warranty Period as a result of defects in design, workmanship or materials, ordinary wear and tear excluded, provided, however, that:

- The product is applied correctly
- All operating and installation instructions for the product are complied with
- System component and piping design is in accordance with good refrigeration practice
- Nitrogen or an inert gas is introduced into the piping during the brazing of the piping installation

This warranty shall not include ordinary maintenance or cleaning of the product, or defects in the installation of the product. This warranty also does not cover physical damage to the product during transit, after purchase of the product but before installation.

The purchaser must request repair or replacement of the defective component through a written notice to the supplier, and must provide the purchaser with the time and opportunity to make such repair or replacement. Otherwise, the supplier will be freed from liability for the defect.

Any transport and exchange costs for the repair or replacement shall be borne by the purchaser. The supplier shall also not be liable for costs incurred in dismantling or fitting replacement parts or for any independent inspection undertaken by the purchaser.

The purchaser shall return any allegedly defective goods, postage or freight paid, to the supplier at the address below. Upon receipt of the goods and inspection thereof the supplier shall repair or replace, at the supplier's discretion, the defective components and shall return the same to the purchaser, return postage and freight paid. This shall constitute full compliance of the supplier's warranty obligations hereunder.

The seller accepts no liability for the direct or indirect consequences of any modifications of or repairs to the product made out by the purchaser or by a third party without the prior consent of the supplier.

This warranty applies only to the repair or replacement of components of the product and expressly excludes responsibility for damage and consequential damages not occurring to the product itself.

This warranty is the purchaser's exclusive remedy. The supplier expressly acknowledges that it shall not be liable to the purchaser or any client of the purchaser for any direct or indirect damages, injury to persons or property or any consequential damage or loss of profits arising from defective goods or workmanship or from any other cause whatsoever.

To obtain warranty service or to ask any questions regarding the foregoing, please contact our office:

Güntner US LLC
3601 Algonquin Road Suite 925
Rolling Meadows, Illinois 60008
847- 781-0900 Tel
847-781-0901 Fax
dg-us-service@guentner.com or sales.us@Guntner.com
Online support: <https://www.guntner-solutions.us/contact>

2. General safety information

2.1 Safety instructions

- Installation and maintenance must only be carried out by qualified personnel who are familiar with this type of equipment
- Always wear safety glasses, gloves and head protection when working on the equipment
- Avoid contact with sharp edges as these can cause painful lacerations
- All units must be properly evacuated prior to charging the system
- Prior to any work being undertaken, verify that the power is switched off and that the unit is properly disconnected, locked out and tagged out!
- Never apply heat to a sealed refrigeration system
- Keep hands away from fans when the unit is running
- Ensure all mounting bolts are tight and are the correct length for the specific application
- Do not remove any of the safety labels from the unit
- Maintain all safety labels on the unit in good condition. If required replace with new
- Do not place any over weight on the unit
- Do not open the door when the unit is in operation
- Do not try to lift the unit in both sections together

2.1.1 Observing operating instructions

 WARNING
Always keep the operating instructions in the unit's immediate vicinity at all times.
Ensure that the operating instructions are accessible to all people that have anything at all to do with the unit at all times.
Ensure that the operating instructions are read and understood by all people that have anything at all to do with the unit.

2.2 Safety Responsibilities

2.2.1 Manufacturer's responsibilities

The notes provided in these operating instructions on maintaining the unit's functional safety, preventing possible hazards when transporting, setting up and installing, start-up and operation, and with maintenance activities (cleaning, servicing and repairing) refer exclusively to the unit.

The materials used in the construction and for welding are designed to withstand the foreseeable mechanical, thermal and chemical stresses, and are resistant to the working fluids used and to mixtures of such working fluids and the oils used to lubricate refrigeration compressors.

The working fluid-carrying parts of the unit (core tubes, distributor tube and header outlet) are configured so that they remain tight with the foreseeable mechanical, thermal and chemical stresses, and withstand the maximum permissible operating pressure.

Material, wall thickness, tensile strength, corrosive resistance, shaping process and testing are suitable for the working fluid used and withstand the possible pressures and stresses that might occur.

All responsibility for the equipment into which the unit is integrated, are the exclusive responsibility of the people involved in the individual workflows.

2.2.2 Responsibilities of the system's installer

The system should be installed according to all applicable local regulations.

Component supplier-system installer interfaces :

- In the event of any malfunction, inform Güntner US LLC immediately if faults occur during the set-up, installation, start-up and operation..

The responsibilities of the system installer in particular include:

- Planning and preparing emergency measures:

To avoid consequential damage caused by operational disruptions, a warning system which immediately signals all faults must be provided on-site. Prepare emergency measures that prevent consequential damage for people and property should faults occur.

- Specify checking and maintenance intervals:

The system must be configured and equipped with all required equipment for maintenance and sufficient servicing and testing in accordance with all applicable local regulations.

When the unit is integrated into the refrigeration system , the working fluid and version must not deviate from the order-related information specified in the order-related documents.

The installer of the system must refer to the requirement for sufficient instruction of the operating and supervision staff when operating and maintaining the equipment .

It is recommended that the future customer staff – if possible – be present during the set-up and installation, for tightness tests and cleaning, while the system is being filled with working fluid and for the adjustment of the equipment .

2.2.3 Owner or operator responsibilities

The owner or operator responsibilities are documented in the operation, maintenance, servicing and recovery of the system in accordance with all applicable local regulations.

The owner or operator must ensure that the proper people are sufficiently trained and qualified for operating, monitoring and servicing the system .

The operating personnel for the system must have sufficient knowledge and experience with regard to the mode of operation, operation and daily monitoring of this system .

Before starting up the system, the owner or operator must ensure that the operating personnel are sufficiently instructed about the system's documentation (which is part of the operating instructions) on the set-up, monitoring, mode of operation and servicing of the system and the safety measures to be observed, and with regard to the properties and handling of the working fluid to be used.

The owner or operator must ensure that when operating, monitoring and maintaining the system the working fluid and version must not deviate from the details specified in the order-related documents.

Planning and preparing emergency measures: To avoid consequential damage caused by operational disruptions, a warning system must be installed on the customer's premises. Prepare emergency measures that prevent consequential damage for people and property should faults occur.

Responsibility remains with the owner or operator of the system , if the system are used by any- body else, unless there is a contrary agreement on sharing responsibility.

2.3 Safety symbols

 WARNING
Addresses a hazardous situation which, if encountered, will result in death or serious injury.
 WARNING
Addresses a hazardous situation which, if encountered, might result in death or serious injury.
 WARNING
Addresses a hazardous situation which, if encountered, could result in minor or moderate injury.

NOTICE

Indicates instructions that pertain to safe equipment operation. Failure to comply with these instructions could result in damage to the equipment.

2.3.1 Warning symbols and their meaning in these operating instructions



Warns against hot surfaces!

The temperature is over +113°F (at which protein clots) and can cause burns.



Warns against dangerous electrical voltage!

Danger of an electric shock if voltage-carrying parts are touched.



Warns against fire-risk substances at set-up point.

Use of ignition sources can cause fire at set-up point.



Warns against harmful to health or irritant substances at set-up point

Contact with or inhaling substances that are irritant or harmful to health can cause injuries or damage peoples' health.



Warning of automatic start-up

If the unit starts up automatically during maintenance work there is a danger of pinching/trapping the hands and fingers.



Warns against potentially explosive substances at set-up point

Use of ignition sources can cause explosions at set-up point.



Warns against toxic substances at set-up point

Contact with or inhaling toxic substances can cause injuries or damage the health



Warns against hand injuries!

Failure to comply with warnings may result in hands or fingers being crushed, dragged in or otherwise injured.



Warns against corrosive substances

Contact with corrosive substances can cause injuries, especially with the eyes.

2.3.2 Prohibitory signs and their meaning in these operating instructions



Fire, open fire and smoking prohibited!

Ignition sources must be kept away and ignition sources must not develop!



No smoking!

Smoking is forbidden.

2.3.3 Mandatory signs and their meaning in these operating instructions.



Use eye protection!

Eye protection: Use protective cover, protective glasses or face protection.



Use hand protection!

Protective gloves must protect against mechanical and chemical dangers (see im- printed pictograms).



Use respiratory protection!

Breathing apparatus must be suitable for the working fluid used. Breathing apparatus must consist of:

- At least two independent breathing devices (self-contained breathing apparatus)



Use protective clothing!

Personal protective clothing must be suitable for the working fluid used and for low temperatures, and must have good heat insulation properties.



Activate before work!

Activate the electrical system and secure against switching on again before starting installation, maintenance and repair work.

2.4 Process fluid/refrigerant safety

2.4.1 General Refrigerant / fluid safety

⚠ WARNING

Although halocarbon refrigerants are classified as safe refrigerants, certain precautions must be observed when handling them. Refrigerants can be harmful if inhaled. When released to the atmosphere in the liquid state refrigerants evaporate rapidly, freezing anything, they contact. Refrigerants must be used and recovered responsibly.

Failure to follow this warning may result in personal injury or death.

⚠ WARNING

Anhydrous Ammonia (NH₃):

Specific precaution must be adhered to when people are working with or are exposed to Anhydrous Ammonia.

Ammonia is considered a high health hazard because it is corrosive to the skin, eyes, and lungs. Exposure to 300 parts per million (ppm) is life threatening. Ammonia is also flammable at concentrations of approximately 15% to 28% by volume in air. When mixed with lubricating oils, its flammable concentration range is increased. It can explode if released in an enclosed space with a source of ignition present, or if a vessel containing anhydrous ammonia is exposed to fire.

Personal protective equipment must be worn at all times when working with Ammonia. For systems that have an operating charge greater than 10,000 lbs a process safety management program is mandatory. More information on this topic is available from OSHA.

Failure to follow this warning may result in personal injury or death.

2.4.2 How to act in an emergency for halocarbon refrigerants

⚠ WARNING

Safety measures and procedure:

In the event of serious unexpected leakage of refrigerant, activate the emergency measures provided, e.g. if:

Visibly escaping refrigerant liquid or vapor from the heat exchanger or pipe components.

There is a sizeable sudden escape (escape and evaporation of the greater part of the entire refrigerant filling within a short time, e.g. in less than 5 minutes);

Activation of the refrigerant detector (limit value in accordance with the local regulations):

Have experienced, trained personnel with prescribed protective clothing perform all necessary protective and other measures:

- Use respiratory protection.
- Use a room air-independent breathing apparatus with maintenance work in high refrigerant concentrations in the room air.
- Divert escaped refrigerant vapor and escaped refrigerant liquid safely.
- Ensure that no refrigerant enters water systems or sewage.

2.4.3 How to act in an emergency NH₃

⚠ WARNING

Danger of injuries and damage to property!

The unit contains ammonia as a refrigerant (NH₃). Ammonia is a potentially explosive and fire-risk substance. Unintentionally carried in oil residues and unintentionally carried in refrigerant can ignite. An explosion can cause the most serious injuries and loss of limb.

Ammonia is a corrosive, toxic irritant gas. From an ammonia concentration of 0.2 vol % in the ambient air or with a long stay in the ammonia-containing ambient air ammonia can be life-threatening or fatal.

Safety measures and procedure:

•With unexpected serious refrigerant escapes, leave the set-up room immediately and activate the emergency STOP switch set up in a safe place, e.g. with:

- Visibly escaping ammonia liquid or vapor from the heat exchanger or pipe components.

- Sudden large release (release and evaporation of the greater part of the entire refrigerant filling in a short time, e.g. in less than 5 minutes).
- Sudden strong smell; very irritating; immediate irritation of the eyes, nose and air passages.
- Activate NH₃ alarm device (NH₃ concentration > 200 ppm):
- Have experienced, trained personnel with prescribed protective clothing perform all necessary protective and other measures:
 - Use respiratory protection.
 - Use a room air-independent breathing apparatus with maintenance work in high ammonia concentrations in the room air.
 - Ensure the set-up room is well ventilated.
 - Divert escaped refrigerant vapor and escaped refrigerant liquid safely.
- Instructions for dealing with injuries:
 - Call an emergency doctor immediately!
 - Liquid ammonia can cause frostbite or corrosive injuries on the skin or eyes.
 - The injured person must keep breathing apparatus on until further notice to prevent inhalation of vapors from ammonia contaminated clothing.
 - Shower the injured person for five to fifteen minutes with water. Remove the clothing careful during the shower. If ammonia-contaminated clothing is removed without wetting with water first, the injury can worsen, as firmly frozen skin may be torn away. Showering should be with warm water as much as possible to prevent a temperature shock. If available, use an emergency shower; otherwise use a water hose.

2.4.4 How to act in an emergency Glycol

⚠ WARNING	
	Danger of injuries and damage to property! The unit is operated as standard with the heat carrier, ethylene glycol (synonyms: ethane-1,2-diol, glycol). When using other heat carriers, prior agreement with the manufacturer is an absolute must.
	Ethylene glycol is a colorless, slightly viscous, not very fluid, water-mixable, deliquescent liquid with a sweet smell or taste. Ethylene glycol is flammable and explosive at higher temperatures in a vapor/gaseous state. With skin contact ethylene glycol causes slight irritation with the danger of skin absorption; with eye contact mucous membrane irritation; with ingestion agitation with disruption of the central nervous system; with prolonged endangering effect – fatigue, coordination disruption, unconsciousness, kidney damage.

⚠ WARNING



Keep ethylene glycol away from ignition sources. No smoking! Ethylene glycol vapors are heavier than air and may flow off to rooms on a lower level. In still air there may be an increase of the ground level concentration. With high concentrations, there is a danger of suffocation due to reduced oxygen concentration, especially at ground level.



Avoid contact with skin, floor, and clothing! Remove contaminated, soaked clothing immediately! Do allow contact with heavy oxidation agents (chromo-sulphuric acid, potassium permanganate, smoking sulphuric acid, or similar)! Danger of strong reactions! Unauthorized people must not have access to the unit. When setting up it must be ensured that the heat carrier escaping from the unit cannot penetrate the interior of the building or put people at risk in any other way.

Safety measures and procedure:

- With unexpected serious heat carrier breaks, activate the emergency STOP switch set up in a safe place, e.g. with:
 - Visibly escaping heat carrier from the heat exchanger or pipe components.
 - Sudden large release (release and evaporation of the greater part of the entire heat carrier/ in a short time, e.g. in less than 5 minutes).
- Have experienced, trained personnel with prescribed protective clothing perform all necessary protective and other measures:
 - Use respiratory protection.
 - Use a room air-independent breathing apparatus with maintenance work in high heat carrier concentrations in the room air.
 - Ensure the set-up room is well ventilated.
 - Divert escaped heat carrier liquid safely in acc. with current regulations.



2.5 Proper and improper operation of process fluids/refrigerants

The unit is a cooling system component, including its working fluid circuit. The purpose of these operating instructions, as part of the operating instructions manual (of which these operating instructions are a part), is to minimize the danger to people and property and the environment from the unit and the working fluid used in it. These dangers are essentially connected with the physical and chemical properties of the working fluid and with the pressures and temperatures that occur in the working fluid-carrying components of the unit.

⚠ WARNING

Danger of injuries and damage to property!

The unit may be used only in accordance with the proper intended use. The operator must ensure that when operating, monitoring, and maintaining the unit, the fluid used, and the mode of operation do not deviate from the order-related information specified in the order-specific documents.

The operator must ensure that maintenance measures are performed in compliance with the system's operating instructions manual.

Filling the unit with a different fluid than specified on individual unit submittals is permitted only following written approval by the manufacturer. You will find the order-related proper use as intended in the order-specific documents.

Do not exceed the max. operating pressure given on the unit's type plate

⚠ WARNING

ADCHD units may not be used where:

- Where it is possible that short or prolonged effect caused by contact, inhalation or ingestion of the working fluid might result in harmful hazards.
- Where the possibility exists of a sudden large release (release and evaporation) of the greater part of the entire working fluid filling in a short time (e.g. in less than 5 minutes).

The unit must not be changed without the prior written consent of Güntner US LLC
Changes to the unit are:

- Changing the operating point
- Changing the fan capacity (air volume)
- Changing the working fluid flow-through volume
- Changing over to another working fluid

The unit must not be operated if safety devices recommended by the manufacturer are not available, not properly installed or not fully functional.

The unit must not be operated if it is damaged or demonstrates faults. All damage and faults must be reported to Güntner US LLC immediately and dealt with promptly.

Work on the unit must not be performed without the personal protective equipment specified in these operating instructions.

⚠ WARNING

Danger of injuries and damage to property!

Working fluids and their combinations with water or other substances in the working fluid-carrying components have chemical and physical effects from the inside on the materials surrounding them.

⚠ WARNING

Danger of injuries and damage to property!

Working fluids and their combinations with water or other substances in the working fluid-carrying components have chemical and physical effects from the inside on the materials surrounding them. The unit may be pressurized only with fluid specified in individual unit submittals. Pressurizing the unit with another working fluid would result in,

- The structural and welding materials used do not withstand the foreseeable mechanical, thermal and chemical stresses, and the pressure that can occur during operation and when shutdown is not withstood.
- Material, wall thickness, tensile strength, corrosive resistance, shaping process and testing are not suitable for the working fluid used and do not withstand the possible pressures and stresses that might occur.
- The unit would not be resistant to the other working fluid and the combination of the other working fluid and
- The unit not remaining tight during operation and when shut down.

- A possible sudden escape of working fluids could directly endanger people and/or property and the environment.

The maximum permissible operating temperature specified on the type plate must not be exceeded! If the operating temperature is exceeded,

- The unit would be exposed to an impermissibly high pressure (pressure/temperature correlation),
- Signs of material fatigue would emerge,

The maximum permissible operating pressure specified on the type plate must not be exceeded! If the operating pressure is exceeded,

- The parts of the unit carrying the working fluid might not withstand the foreseeable mechanical, thermal, and chemical stresses and the pressures that may occur during operation and when shut down
- The unit would not remain tight during operation and when shut down,
- There may be a possible sudden escaping of working fluids after a break or leakage on working fluid-carrying components, which would result in the following dangers:

- Danger of escaping materials
- Danger of poisoning
- Dangers caused by oxygen displacement
- Fire hazard (caused by refrigerator oil parts)
- Danger of frostbite (caused by liquid coolant squirting/splashing),
- Suffocation hazard
- Chemical burn hazard
- Hazards caused by panic reactions,
- Environmental pollution

2.5.1 Improper use NH3

⚠ WARNING

NH3 Condenser may not be used:

- Where it is possible that short or prolonged effect caused by contact, inhalation or ingestion of the working fluid NH3 might result in harmful or fatal hazards.
- Where it is possible that the lowest concentrations of the NH3 refrigerant in a homogeneous mixture with air could ignite.
- Where the possibility exists of a sudden large release (release and evaporation) of the greater part of the entire working fluid filling in a short time (e.g. in less than 5 minutes).
- Where the possibility exists that the longest time that people are exposed to a large release of the NH3 refrigerant is more than 10 minutes when in an area where people are present, which is not a special machine room. The refrigerant filling (NH3) of the unit exceeds 110. lbs, the occupancy density in the cold room in which the unit is installed exceeds 1 person per 107 ft² and the number of clearly identified emergency exits for the number of usually present people are not available.

The unit must not be changed without prior written consent by Güntner US LLC. Changes to the unit are:

- Changing the operating point (see chapter Unit)
- Changing the fan capacity (air volume)
- Changing the working fluid flow-through volume

■ Changing over to another working fluid

The unit must not be operated if safety devices recommended by the manufacturer are not available, not properly installed or not fully functional.

The unit must not be operated if it is damaged or demonstrates faults. All damages and faults must be reported to Güntner US LLC immediately and must be removed immediately.

Work on the unit must not be performed without the personal protective equipment specified in these operating instructions.

2.5.2 Improper use Glycol

WARNING

Danger of injuries and damage to property!

Heat carriers and their combinations with water or other substances in the heat carrier-carrying components have chemical and physical effects from the inside on the materials surrounding them. The unit must only be pressurized with heat carrier glycol. Pressurizing the unit with another heat carrier results in,

Material, wall thickness, tensile strength, corrosive resistance, shaping process and testing are not suitable for the heat carrier used and do not withstand the possible pressures and stresses that might occur.

The unit not being resistant to the other heat carrier and the other heat carrier mixture.

The unit not remaining tight during operation and when shut down.

A possible sudden escaping of heat carriers could directly endanger people and/or property and the environment.

The maximum permissible operating pressure specified on the type plate must not be exceeded! If the operating pressure is exceeded,

The structural and welding materials will not withstand the foreseeable mechanical, thermal and chemical stresses and the pressure that can occur during operation and when shut down.

The unit will not remain tight during operation and when shut down.

There may be a possible sudden escaping of heat carriers after a break or leakage on heat carrier-carrying components, which would result in the following dangers:

- Danger of escaping materials
- Suffocation hazard
- Hazards caused by panic reactions
- Environmental pollution

2.6 Mechanical hazards and safety

2.6.1 Fins, sharp unit corners and edges

⚠ WARNING	
	Warns against hand injuries! Danger of cuts on hands and fingers on the fins and on sharp corners and edges of the unit.
	Use reliable hand protection!

2.6.2 Fans

⚠ WARNING	
	Danger of cutting off, pulling in! There is a danger of cutting off fingers on the rotating fan blades, injury hazard for the hands and pulling in danger for loose elements such as hair, necklaces or clothing parts.
	Do not operate fans without guard grille. Pinch/trap point hazard! With automatic fan start during maintenance work there is a danger of pinching/trapping for the hands and fingers.
	Power off the unit before you begin maintenance work with which you must remove the guard grille. Secure the unit against unintentional switching on again by removing the electric fuses for the unit. Secure the unit with a suitable warning sign referring to unintentional switching on.

2.7 Electrical hazards and safety

⚠ WARNING	
 	Warns against dangerous electrical voltage! Direct and indirect contact with voltage-carrying parts of motors and electrical lines can cause serious injuries or death . Power off the unit before you begin maintenance work. See the refrigeration system's system documentation for this. Secure the unit against unintentional switching on again by removing the electric fuses for the unit. Secure the unit with a suitable warn- ing sign referring to unintentional switching on. Please note that the mains cables may also be carrying voltage, even if the unit is powered off. Work on electrical equipment may be performed only by people that have the required expertise (e.g. an electrician or an electro-technically instructed person) and who are authorised to do so by the operator.

2.8 Thermal hazards and safety

2.8.1 Danger of burns

⚠ WARNING	
 	Warns against hot surfaces! When operated the unit's heat exchanger and pipes will be at temperatures of over +113 °F. Touching them may cause burns. With refrigerant temperatures of above +113 °F there is hazard of burns on pipe com- ponents and header inlets. With refrigerant temperatures of above +113 °F there is hazard of burns on pipe com- ponents and header inlets. Use hand protection!

2.8.2 Freeze hazard

⚠ WARNING	
Warns against freezing! With insufficient frost protection filling and operation in areas with frost hazard the unit can cause freezing in the unit. With units that cannot be drained completely the hazard of freezing also remains after draining. It is imperative that the proper ventilation be ensured when draining the unit. With pressure test, operation and shutdown of units filled with water or insufficient frost protection filling or insufficient setting of the heat carrier, these are disrupted at minus temperatures.	

2.9 Residual hazards due to process fluids/refrigerant

2.9.1 Residual hazards due to halocarbon refrigerants

- Refrigerants that, when gaseous, are non-flammable irrelevant of their concentration in air.
- Refrigerants with a time-weighted, averaged concentration that have no adverse effects on the majority of staff that are exposed every day during a normal 8 hour working day and a 40 hour working week to this concentration, which is greater than or equal to 400 ml/m³ (400 ppm (V/V)).

There is no imminent danger for the staff. With good air ventilation and removal by suction, it will fall easily and clearly below the allowed limit values.

⚠ WARNING

Danger of harm to health and environmental damage!

With high concentrations of refrigerants there is a danger of suffering from disordered cardiac rhythm and suffocation due to a reduced oxygen concentration, especially at ground level.

- Unauthorized people must not have access to the unit.
- Ensure working rooms are well-ventilated in order to prevent inhalation of high vapor concentrations.
- Please ensure that the halocarbon refrigerant escaping from the unit cannot penetrate the interior of the building or put people at risk in any other way. Halocarbon refrigerant vapor must be kept from penetrating neighboring rooms, staircases, yards, passages, or drainage systems and must
- be discharged without risk
- Monitor the halocarbon refrigerant concentration in the ambient air to ensure constant compliance with limit values.
- Test the tightness of the unit regularly, as specified in these operating instructions.

Ignition and fire hazard!



- With work involving fire or sparks, e.g. grinding, welding, etc., ensure suitable fire fighting equipment is on-site.
- In particular be aware of the danger of ignition of unintentionally carried in oil residues or halocarbon refrigerant.
- Ensure that the provided fire fighting equipment is provided in sufficient quantities, that it functions properly and that the extinguishing agent does not react with the halocarbon refrigerant.
- Smoke during work is forbidden!



Frostbite hazard



- Splashes of halocarbon refrigerant that is superheated can cause frostbite to the eyes and skin.
- When removing faults after spills of halocarbon refrigerant, you must be vigilant for any remaining superheated halocarbon refrigerant.

Danger of poisoning!



- Halocarbon refrigerant contact with fire can form toxic combustion products.
- Prevent halocarbon refrigerant contact with open fire.
- Welding and soldering may therefore take place only after completely draining the relevant section of the system of the halocarbon refrigerant. Ensure good ventilation here!
- With emergency work in high refrigerant concentrations in the room air wear a room air-independent breathing apparatus.



2.9.2 Residual hazards due to NH3 refrigerant

⚠ WARNING	
Danger of injuries and damage to property with ammonia as refrigerant! The unit is operated with ammonia (NH₃) as a refrigerant. Refrigerant can cause the following hazard situations and injuries:	
Explosion hazard! Fire hazard!	
	Ammonia is a flammable, explosive gas. The fire and explosion hazard is low because of the high ignition temperature, small ignition range, low explosiveness potential and high affinity with air humidity. Leaks in the unit can cause the NH₃ refrigerant to escape into the set-up area. Direct and indirect ignition sources can cause the refrigerant NH₃ to burn and explode.
	- Do not store potentially explosive and fire-risk substances in the set-up room! - Test the tightness of the unit regularly, as specified in these operating instructions. Provide firefighting equipment in sufficient numbers in the unit's set-up area. Observe the details for firefighting in the NH₃ refrigerant safety data sheet.
Chemical burn hazard!	
	Leaks in the unit can cause the NH₃ refrigerant to escape into the set-up area. NH₃ refrigerant is corrosive in combination with humidity. Contact with the skin, mucous membranes and the eyes with the NH₃ refrigerant causes chemical burns on the skin, mucous membranes and the eyes. If the NH₃ refrigerant gets into the eyes, the eyes can no longer be kept open because of the strong burning, and orientation is lost.
	Test the tightness of the unit regularly, as specified in these operating instructions.
Danger of poisoning!	
	Leaks in the unit can cause the NH₃ refrigerant to escape into the set-up area. Ammonia is a toxic irritant gas. Inhaled NH₃ refrigerant causes agitation, dizziness, vomiting and cramps; with heavy concentrations suffocation and life-threatening pulmonary edema. Panic sets in. From an ammonia concentration of 0.2 vol % in the ambient air or with a long stay in the ammonia-containing ambient air ammonia can be life-threatening or fatal.
	- Test the tightness of the unit regularly, as specified in these operating instructions. - Ensure that the max. permissible limit values in the set-up room are not exceeded. - Monitor the ammonia concentration in the ambient air with detectors and alarm devices.
Frostbite hazard	
	Leaks in the unit can cause the NH₃ refrigerant to escape into the set-up area. Liquid NH₃ refrigerant has a temperature of -27.4 °F. Contact with the skin and eyes with liquid refrigerant causes frostbite of the eyes and skin.
	Test the tightness of the unit regularly, as specified in these operating instructions.

⚠ WARNING

Danger of injury, damage to property or the environment with ammonia-water combinations! If water contacts with liquid ammonia, this can result in strong gas development and liquid ammonia splashing about.

- Never sprinkle water on liquid ammonia!
- Do not use water in the machine room to bind vaporous ammonia!
- Ensure that ammonia-water (ammonia solution) never enters water systems or sewage

2.9.3 Residual hazards with the heat carrier due to glycol**⚠ WARNING**

Danger of injuries and damage to property! General description of hazards:

The unit is operated as standard with the heat carrier ethylene glycol as the heat carrier (synonyms: ethane-1,2-diol, glycol) . When using other heat carriers prior agreement with the manufacturer is an absolute must.

Ethylene glycol is a colorless, slightly viscous, not very fluid, water-mixable, deliquescent liquid with a sweet smell or taste.

Unauthorized people must not have access to the unit. When setting up it must be ensured that the heat carrier/ escaping from the unit cannot penetrate the interior of the building or put people at risk.

⚠ WARNING

Danger of harm to health!

- With skin contact ethylene glycol causes slight irritation with the danger of skin absorption; with eye contact mucous membrane irritation; with ingestion agitation with disruption of the central nervous system; with prolonged endangering effect – fatigue, coordination disruption, unconsciousness, kidney damage.
- Avoid contact with skin, eyes and clothing! Remove contaminated, soaked clothing immediately!
- Ethylene glycol vapors are heavier than air and may flow off to rooms on a lower level. In still air there may be an increase of the ground level concentration. With high concentrations, there is a danger of suffocation due to reduced oxygen concentration, especially at ground level.
- To avoid the inhalation of high vapor concentrations, the working rooms must be well aired.
- Test the tightness of the unit regularly, as specified in these operating instructions.



Ignition and fire hazard!

Ethylene glycol is flammable and explosive at higher temperatures in a vapor/ gaseous state.

Keep ethylene glycol away from ignition sources.

Suitable fire fighting equipment must be provided on site with work involving fire or sparks, such as grinding, welding, etc.

Ensure that the provided fire fighting equipment is provided in sufficient quantities, that it functions properly and that the extinguishing agent does not react with the heat carrier.

No smoking!

Danger of poisoning!

Contact of the heat carrier with open fire must be prevented, as toxic combustion products can form.

Prevent heat carrier contact with open fire!

Welding and soldering must therefore only take place after completely draining the relevant section of the system of the heat carrier. Ensure good ventilation here!

Do not bring into contact with heavy oxidation agents (chromo-sulphuric acid, potassium permanganate, smoking sulphuric acid, or similar)! Danger of strong reactions!

Frostbite hazard!

With insufficient frost protection filling and operation in areas with frost hazard the unit can cause freezing. With units that cannot be drained completely the hazard of freezing also remains after draining.



It is imperative that the proper ventilation be ensured when draining the unit.

With pressure test, operation and shutdown of units filled with water or insufficient frost protection filling or insufficient setting of the heat carrier, these are disrupted at minus temperatures.



2.10 Residual hazards caused by vibrations

⚠ WARNING

Danger of injuries and damage to property caused by escaping materials

If fans are damaged during fan operation, flying parts of the fan blades can injure people or cause damage to property close to the fan.

Fans, components, and cables in system, must be designed, constructed, and integrated so that dangers caused by vibrations that it or other parts of the system generate, are reduced to an absolute minimum, while incorporating all available means for reducing vibrations, preferably at the source.

NOTICE

Damage to property caused by vibrations

Vibrations that are increased by imbalances, as created by dirt or fan blade damage, are regularly caused with fan operation. The vibrations are transferred to the unit, where they can cause damage and damage the unit mounting or refrigeration system components connected to the unit.

Check fan blades and protection grill regularly for contamination and make sure the fans run smoothly.

2.11 Residual hazards caused by pressurized parts

⚠ WARNING

Injury and damage to property caused by pressurized parts that contain process fluids/refrigerants!

Breaks in pressurized pipes or pressurized components of the unit can cause injuries or damage to property caused by escaping materials (A sudden large release of the working fluid with its hazardous properties after a break or leak on pressurized components of the unit can cause the following hazards:

- Oxygen displacement
- Flammability caused by proportion of lubricating oil for refrigerating compressors present
- Frostbite (caused by liquid refrigerant squirting/splashing)
- Suffocation
- Panic,
- Environmental pollution

Ensure that the unit in question is pressure-free before maintenance work begins or remove the working fluid from the unit in question.

Perform maintenance work – especially soldering – on the unit in question only after completely removing the working fluid from the unit.

2.12 Residual hazards caused by defective installation

⚠ WARNING

Injuries and damage to property caused by defective installation! Defective installation results in hazards caused by:

- Break or leak on liquid-carrying unit components and pipes

- Absence of release devices to prevent liquid escape: Liquid that can heat up during a refrigeration system shutdown state and cause pipes or connection flanges to break when it expands must not be locked in.
- Uneven load distribution on the fixtures with the danger of stresses within the unit or unit displacement (breaks or leaks on fluid-carrying components of the unit and pipes; danger of breaking off).
- Insufficient securing of working fluid-carrying lines against mechanical damage! On-site connections: loaded installation; effect of forces on the distribution and header pipes with the danger of breaks or leaks on fluid-carrying components of the unit and pipes; danger of breaking off!
- Break-off danger of the unit with hazard of escaping working fluid and exposed electrical cables.
- Danger of damage caused by environment-conditional hazard sources (production, transport and other processes at the set-up point).
- Unit functional faults caused by air inlet/outlet obstructions.
- Obstruction of all-side inspection checks and maintenance, no unobstructed accessibility to the working fluid-carrying and electrical components, connections and cables, no recognizable identifiers on the pipes and insufficient space for tests.

Ensure that:

- The units are to be installed on the fixing points corresponding with their weights and tightened with fixing bolts. The operator or installer is responsible for ensuring that the bolted connections are of an adequate strength.
- The diameters of the mounting holes have been statically determined by the manufacturer and the fixing bolts are adapted accordingly.
- The fixing bolts are secured against loosening by means of an appropriate locking device.
- The fixing bolts are not overtightened or stripped.
- All fixing bolts are tightened equally to achieve a load distribution on the connections that is as balanced as possible.
- All fixing points maintain the same spacing to the fixing level permanently and under load, so that no mechanical stress occurs in the unit structure. The units are anchored in their fixing position in order to prevent the equipment from moving.
- The functional safety of the fixing bolts is tested as part of the maintenance periods.
- The unit is fixed and set up so that it is not damaged by environment-conditional hazard sources (production, transport, and other processes at the set-up point) or its functioning is not disturbed by the interventions of unauthorized persons.
- The units are fixed and set up so that unobstructed air inlet/outlet is constantly available without any air short circuiting.
- The units are fixed so that they can be inspected, checked, and always maintained from all sides, i.e., there must be unobstructed access to the refrigerant-carrying and electrical components, connections and lines, the pipeline labelling must be identifiable and adequate space must be available for testing.
- The working fluid-carrying lines must be protected against mechanical damage. On-site connections: when installing keep the unit free of load; force must not be exerted on the distribution and header pipes.

WARNING

The following must be observed without fail when installing the unit:

Imperative adherence to spacing from objects that could be endangered by an effect of the CFC/ HFC refrigerant.

Provision of measures to safeguard protective objects from a CFC/HFC refrigerant

concentration higher than that permitted by the local restrictions.

Easily flammable materials must not be placed below the unit.

Set up and fix units as follows: In areas that are used for inner-plant traffic, the pipelines to and from the unit must be installed only with connections and fittings that cannot be removed.

Release devices to prevent liquid escapes must be provided and available.

Subcooled liquid may be present in only the lowest possible amount in system sections in shut- down state – minimized number of "fluid sacks".

2.13 Residual hazards with breaks in operation

⚠ WARNING

Ensure that:

- The installation is fault-free.
- The maximum permissible operating pressure is always adhered to.
- Pressurised line sections are depressurized before all maintenance and repair work.
- Vibrations from the refrigeration system (vibrations caused by the complete system's compressors, components and lines,) and from the fan (imbalances caused by frost, ice, accumulations of dirt or damage) are reduced with all available means and brought down to an absolute minimum.
- Release devices to prevent liquid escapes are provided and available.
- Undercooled liquid is only present in the lowest possible amount in system sections in shutdown state – minimized number of "fluid sacks".

2.14 Residual hazards caused by escaping objects or liquids

⚠ WARNING

Injuries and damage to property caused by escaping objects or liquids!

Residual hazards caused by escaping objects and liquids.

2.15 Residual hazards with disposal of process fluids/refrigerants

2.15.1 Residual hazards with disposal halocarbons

⚠ WARNING

Danger of injuries and damage to property caused by halocarbon working fluid, The following notes are recommendations for the proper professional disposal of the unit. Applicable waste disposal laws are binding for the country of operation:

- Disposal must only be carried out by experts.
- All unit components, e.g., working fluids, refrigerator oil, heat exchangers, fans, must be disposed of properly as specified.
- Used working fluid that is not determined for reuse, must be treated as waste, and safely disposed of. There must be no emissions into the environment.
- The halocarbon refrigerant must be filled into a special refrigerant container in compliance with the respective safety measures. This special refrigerant container must be suitable for the refrigerant. It must be easy to identify and labelled for the refrigerant, e.g., "HFC R-4304A recovered".
- A disposable single-use container must not be used, as refrigerant vapor residues in the container escape during disposal.

- The working liquid receiver must not be overfilled. The maximum permissible pressure of the working fluid container must not be exceeded during the work process.
- The working fluid must not be filled in a liquid container that contains another or an unknown working fluid. This other or unknown working fluid must not be released into the atmosphere, but rather identified, treated again, or properly disposed of as specified.
- An officially authorized facility can be used for destroying the working fluid.
- Used refrigerator oil that has been recovered from the unit and cannot be treated again, must be kept in a separate, suitable container, treated as waste, and safely disposed of.
- It must be ensured that all unit components containing working fluids and refrigerator oil, are disposed of properly as specified.
- The unit consists predominantly of the basic materials, copper, aluminum, galvanized steel (heat exchangers and casings), steel, aluminum, copper, polyamide (motors). These materials can be handled by the waste industry, including in paint-treated state, to recycling via mechanical and thermal separation.
- Before scrapping the working fluid-carrying unit components must be drained, whereby the pressure must be reduced to at least 8.70 psi absolute for a unit pipe volume up to and including 52.8 gal, and to 4.35 psi absolute for a unit pipe volume over 52.8 gal. The pressure reduction process is then ended when the pressure no longer increases and remains constant, and the unit is at ambient temperature.

⚠ WARNING

Danger of environmental pollution!

The facility for recovering or disposing of the refrigerant must be operated so that the danger of a refrigerant or refrigerator oil emission into the environment is kept as low as possible.

Ensure that no working fluid enters water systems or sewage.

Operate the facility for recovering or disposing of working fluids so that the danger of a working fluid or refrigerator oil emission into the environment is kept as low as possible.

Güntner US LLC transportation packaging is made from environmentally compatible material and is suitable for recycling.

2.15.2 Residual hazards with disposal NH3

⚠ WARNING

Danger of injuries and damage to property caused by working fluid, ammonia NH₃,
The following notes are recommendations for the proper professional disposal of the unit. Applicable waste disposal laws are binding for the country of operation:

Disposal must only be carried out by experts.

- All unit components, e.g. working fluids, refrigerator oil, heat exchangers, fans must be disposed of properly as specified.
- Used working fluid that is not determined for reuse, must be treated as waste and safely disposed of. There must be no emissions into the environment.
- The NH₃ refrigerant must be filled into a special refrigerant container in compliance with the respective safety measures. This special refrigerant container must be suitable for the NH₃ refrigerant. It must be easy to identify and labelled for the refrigerant, e.g. "NH₃ (ammonia) recovered".
- A disposable single-use container must not be used, as refrigerant vapor residues in the container escape during disposal.

- The working fluid container must not be overfilled. The maximum permissible pressure of the working fluid container must not be exceeded during the work process.
- The working fluid must not be filled in a liquid container that contains another or an unknown working fluid. This other or unknown working fluid must not be released into the atmosphere, but rather identified, treated again, or properly disposed of as specified.
- An officially authorized facility can be used for destroying the working fluid.
- Used refrigerator oil that has been recovered from the unit and cannot be treated again, must be kept in a separate, suitable container, treated as waste and safely disposed of.
- It must be ensured that all unit components containing working fluids and refrigerator oil, are disposed of properly as specified.
- The unit consists predominantly of the basic materials galvanized steel, aluminum, coated steel (tube and tube coil (heat exchanger) and casing), steel, aluminum, copper, polyamide(motors), stainless steel, copper, insulating material, (heater rods for electrical defrost; option; accessory available on request). These materials can be handled by the waste industry, including in paint-treated state, to recycling via mechanical and thermal separation.
- Before scrapping the working fluid-carrying unit components must be drained, whereby the pressure must be reduced to at least 8.70 psi absolute for a unit pipe volume up to and including 52.8 gal, and to 4.35 psi absolute for a unit pipe volume over 52.8 gal. The pressure reduction process is then ended when the pressure no longer increases and remains constant, and the unit is at ambient temperature

⚠ WARNING

Danger of environmental pollution!

The ammonia (NH₃) refrigerant is classified in acc. with the "Catalogue of Substances Hazardous to Waters" as water hazard class 2.

Escaping ammonia can enter the environment wind-born. Ammonia is lighter than air and rises quickly. It is diluted with the air to harmless concentrations. But even if the concentration is harmless, the ammonia smell is still irritating. Ammonia's classification as "toxic" means that people in the area will be concerned.

- Ensure that no working fluid enters water systems or sewage.
- With serious ammonia escapes into the waste water system, for example when ammonia vapor is broken down by water: immediately report the incident to the responsible office for the local waste water system.
- Operate the facility for recovering or disposing of working fluids so that the danger of a working fluid or refrigerator oil emission into the environment is kept as low as possible

2.15.3 Residual hazards with disposal Glycol

⚠ WARNING

Danger of injuries and damage to property caused by heat carrier glycol!

The following notes are recommendations for the proper professional disposal of the unit. Applicable waste disposal laws are binding for the country of operation:

- Disposal must only be carried out by experts.
- All unit components, e.g. heat carriers, heat exchangers, fans, etc. must be disposed of properly as specified.
- Used heat carrier that is not determined for reuse, must be treated as waste and safely disposed of. There must be no emissions into the environment.
- A disposable single-use container must not be used, as it is possible that heat carrier residues in the container may escape during disposal.
- The heat carrier container must not be overfilled. The maximum permissible pressure of the heat carrier container must not be exceeded during the work process.
- The heat carrier must not be filled in a liquid container that contains another or an

unknown heat carrier. This other or unknown heat carrier must not be released into the atmosphere, but rather identified, treated again, or properly disposed of as specified.

- An officially authorized facility can be used for destroying the heat carrier.

- It must be ensured that all unit components containing heat carriers are disposed of properly as specified.

- The unit consists predominantly of the basic materials, copper, aluminum, galvanized steel (heat exchangers and enclosures), steel, polyamide (motors). These materials can be handled by the waste industry, including in paint-treated state, to recycling via mechanical and thermal separation.

- Before scrapping the heat carrier-carrying unit components must be drained, whereby the pressure must be reduced to at least 0.6 bar absolute for a unit pipe volume up to and including 200 l and to 0.3 bar absolute for a unit pipe volume over 200 l. The pressure reduction process is then ended when the pressure no longer increases and remains constant, and the unit is at ambient temperature.

⚠ WARNING

Danger of environmental pollution!

Ensure that no heat carrier enters water systems or sewage.

Operate the facility for recovery or disposing of the refrigerant, so that the danger of a heat carrier emission into the environment is kept as low as possible.

Güntner's transportation packaging is made from environmentally compatible material and is suitable for recycling.

3. General information

ADCHD units are designed to provide optimum efficiency and an extended life when properly installed, operated and maintained. It is therefore highly recommended that a comprehensive maintenance schedule be developed and undertaken on a regular pre-determined basis. This manual will assist the owner – operator in developing such a schedule.

This equipment is relatively complicated and the installation, operation, maintenance and servicing should only be carried out by suitable individuals who are qualified to carry out these functions. These individuals shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the function(s).

NOTICE

The type of refrigerant must comply with what is indicated on the submittal drawings and / or unit's nameplate. Design operating pressures, as indicated on the nameplate, must never be exceeded!

NOTICE

High density condensers and fluid coolers and all piping systems must be correctly evacuated prior to charging the system with refrigerant, to ensure the complete removal of moisture and non – condensable from the entire refrigerant circuit.

NOTICE

For high density condenser and fluid coolers installations that will be installed at or near coastal areas please speak to your Güntner representative to confirm the material combination compatibility.

NOTICE

In locations where the fluid within the high-density fluid cooler could possibly freeze due to ambient temperatures dropping below freezing, the fluid should be drained from the coil when the ambient temperature is at or below 40°F.

⚠ WARNING

Failure to comply with any of these requirements could result in serious damage to the equipment and / or the property where it is installed, as well as personal injury and / or death to themselves and / or people at the specific location.

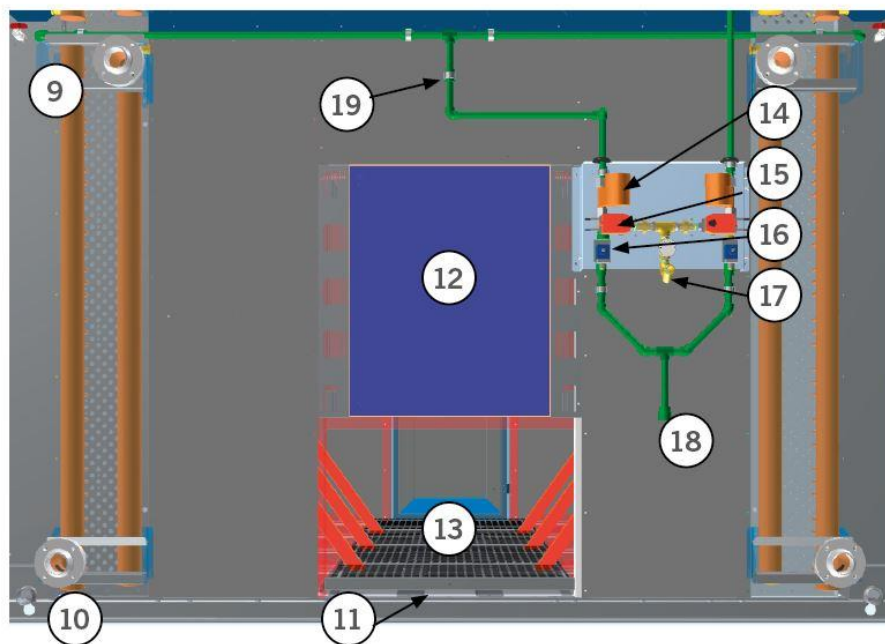
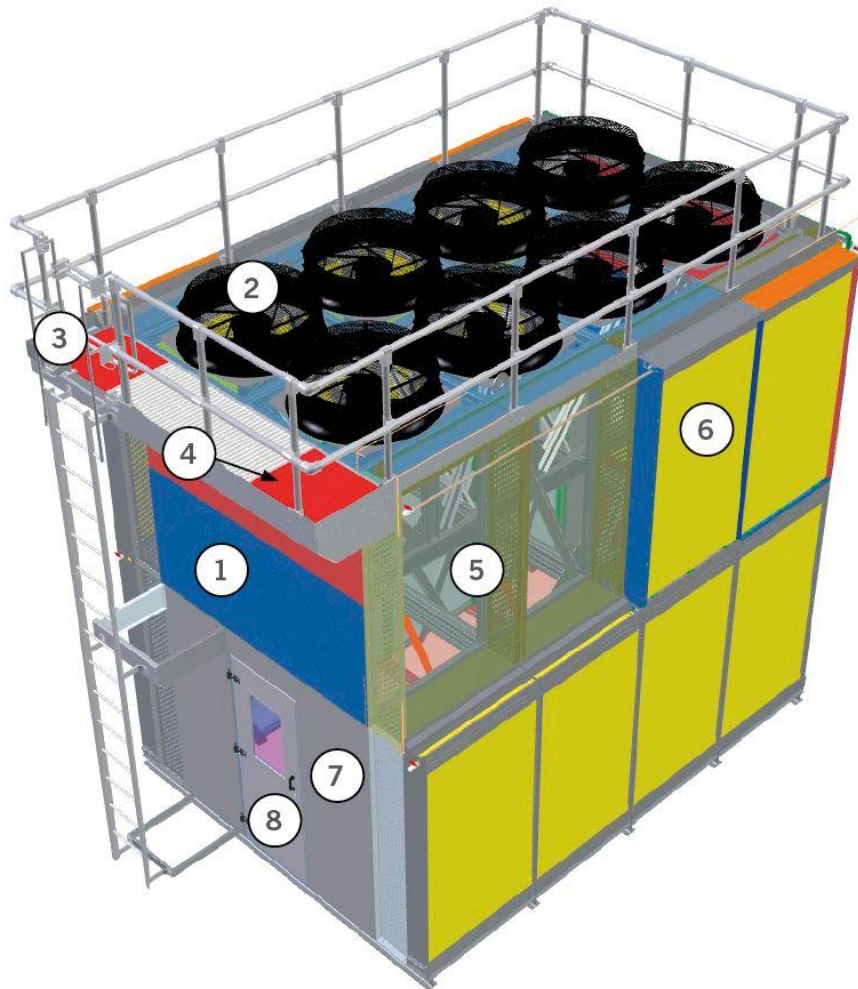
4. High density condenser / Fluid cooler terminologies

The following descriptions are provided to ensure all persons working with the ADCHD equipment are familiar with the terminologies used.

- **Upper Section:** The ADCHD is made in two sections, the top which include structural frames, fans and his correspond coils.
- **Bottom Section:** Below the upper section contains one access door, external control panel box and an internal middle walkway grilled.
- **Water Distribution System:** An assembly of valve box, water green riser pipes and distributions headers, two independents lines for each section.
- **Water Distribution Headers:** Located in the upper pad frame assembly distributing water the length of the pad assembly.
- **High Efficiency Evaporative Cooling Pads:** Covers the coils on the air inlet face of coils to cool the inlet air by way of saturation.
- **Distributor Pad:** Located above the cooling pad to distribute water evenly.
- **GMM:** Günter Motor Management Controller. The intelligence behind the Güntner Dry Cooler, which regulates the fan speed in order to optimize energy consumption.
- **GHM:** The Güntner Hydro Management controllers are located on the control panel viewing window. This controller is the intelligence behind optimized water usage and distribution while still meeting higher demands.
- **Rotary Valve:** Located in valve box to regulate the water flow to the distribution headers.
- **Internal Walkway:** Maintenance walkway in the interior of the unit.
- **External Walkway:** Optional walkway on top of the unit with handrails for safety in maintenance.

See the following images for reference:

1. Upper Section
2. Fan
3. Handrailing and ladder
4. External walk way
5. Coil heat exchanger
6. Cooling pad
7. Bottom Section
8. Door
9. Flush manual valve
10. 3" Threaded drain
11. I structural beam
12. Electrical Control Panel
13. Internal grilled walk way
14. Water flow meter
15. Rotary Valve
16. Solenoid Valve
17. Inlet water supply
18. Threaded Drain Line
19. Water riser pipe



5. Installation

⚠ WARNING

The unit may be installed, put into operation, operated, maintained and repaired only by trained, experienced and qualified personnel. In order to be considered qualified, people who are to be responsible for the operation, maintenance, repair and evaluation of systems and their components must have the necessary training and specialist knowledge for such work, as stipulated in the local regulations. Qualified or expert means the ability to satisfactorily perform the activities required for the operation, maintenance, repair and evaluation of refrigeration systems and their components

The unit may be operated by operating personnel that have no specific knowledge of refrigeration engineering, but have sufficient knowledge and experience with regard to the mode of operation, operation and daily monitoring of this system. These operating personnel may not make any interventions or settings on the system.

Changes to the unit, which the manufacturer has first agreed to in writing, may only be made by the instructed and qualified personnel.

Electrical installation:

Work on the electrical equipment may only be performed by personnel that have the required expertise (e.g. an electrician or an electro-technically instructed person), and who are authorized by the operator, in compliance with the respective regulations.

5.1 Location layout

Ensuring optimum performance of the unit with unobstructed air flow is the responsibility of the installing contractor. In order to not compromise the performance of the unit(s) locations on open roof tops or at ground level with no obstructions such as walls or adjacent buildings are optimal.

When optimal locations are not possible, units must be positioned such that the discharge air is either level or higher than these adjacent obstacles. It is imperative that the location allows for unrestricted airflow into each unit and that there is no recirculation of the saturated discharge air. It is also advisable that the discharge air is not in the direction of, or in close proximity to, any air intake location for the building's ventilation system.

Other points to consider when selecting the installation location:

- Place the unit so that it can be monitored and controlled from all sides at all times.
- Ensure that sufficient space is provided for maintenance.
- Ensure that all liquid-carrying components, connections, lines and all electrical connections and lines are easy to access.
- Ensure that the pipe connection points are visible.

NOTICE

Lightning protection rods beside the unit(s) are recommended.

NOTICE

Refer to the submittal package for specific unit information.

5.2 Equipment layout

The ADC HD is an induced draft, counter flow, adiabatically cooled product line utilizing a four coil configuration. Properly evaluating equipment location leads to a successful installation and subsequent proper operation. This manual provides recommendations for various layout scenarios including placing equipment in close proximity to an obstruction (e.g. wall or other unit).

The minimum clearance(s) listed between an obstruction and the air inlet side (or end) is a guideline only. There are always circumstances (i.e. prevailing winds, etc.) coupled with field experience which lead to alternate layouts and thus would increase a minimum clearance presented in this manual to achieve proper operation.

It is recommended to place the equipment in a free-field environment (when possible) to ensure the required ambient air flow and prevent recirculation of the saturated discharge air. Units located on open roof tops or at ground level with no obstructions such as walls or adjacent buildings will be the optimum location. However, in many instances this cannot be realized. Positioning in wells, next to high walls, adjacent buildings, occupied areas or specific enclosures all pose a risk of recirculating the saturated discharge air. This will increase the temperature of the intake air and compromise the performance of the unit, typically resulting in higher chiller or compressor loads. Discharge hoods or duct extensions should be used in such instances. Units that are in a well, an enclosure or close to adjacent walls or buildings must be positioned such that the discharge of the unit (top) is either level or higher than these adjacent obstacles.

If the unit/s is to be located in occupied areas or close to adjacent buildings, it is good engineering practice that the discharge air is not in the direction of, or in close proximity to, any air intake location for the building's ventilation system.

5.3 ADCHD Layout requirements

The below chart and diagrams illustrate the spacing requirements for different size ADCHD units in various situations. The 9 cases below represent the different possibilities for long(x) and short(y) side obstructions, and their purpose is to provide the free space envelope required for each unit. Given that there are effectively infinite numbers of possibilities for layout configurations, the diagrams shown for each case present examples of the required envelopes, but they can apply to many more not shown

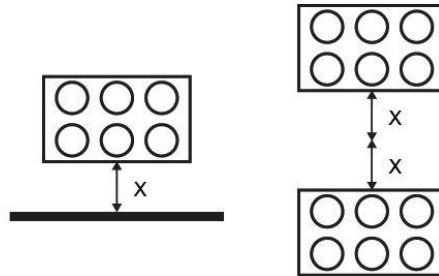
In cases where the obstruction is not another air moving device, the distance required from the short side is "y" and the distance required from the long side is "x". However, if the obstruction is another ADCHD or some other type of air-moving equipment, then the distance required for the envelope of each piece of equipment needs to be allowed for. For example, Case 1 illustrates one long side blocked, which means that it needs to be Case 1 "x" distance away from a wall for the proper airflow. However, if the obstruction is another ADCHD unit, each unit needs to have their own free area envelope, so the distance between the units will be doubled at "2x" distance.

This method can be applied to all unit quantity and layout possibilities, since it ensures the free area envelope is maintained on a per unit basis. However, should there be any doubts, please contact your Güntner representative for further assistance.

Minimum Clearances Required for Each Case and Unit Size												
Model	CASE 1 X(FT)	CASE 2 Y(FT)	CASE 3 X(FT)	CASE 3 Y(FT)	CASE 4 X(FT)	CASE 4 Y(FT)	CASE 5 X(FT)	CASE 5 Y(FT)	CASE 6 X(FT)	CASE 6 Y(FT)	CASE 7 Y(FT)	CASE 8 X(FT)
ADC HD 2x3	3	3	3	3	3	3	4.5	4.5	7	7	3	3
ADC HD 2x4	3	3	3	3	3	3	6.5	6.5	8	8	3	3
ADC HD 2x5	3	3	3	3	3.5	3.5	7.5	7.5	8.5	8.5	3	3
ADC HD 2x6	3	3	3.5	3.5	4.5	4.5	8.5	8.5	9.5	9.5	3	3
ADC HD 2x7	3	3	4.5	4.5	5.5	5.5	9.5	9.5	10	10	3	3
ADC HD 2x8	3	3	5	5	6.5	6.5	10	10	10.5	10.5	3	3
ADC HD 2x9	3.5	3	6	6	7	7	10.5	10.5	11	11	3	3.5
ADC HD 2x10	4	3	6.5	6.5	7.5	7.5	11	11	11.5	11.5	3	4
ADC HD 2x11	5	3	7	7	8	8	11.5	11.5	12	12	3	5

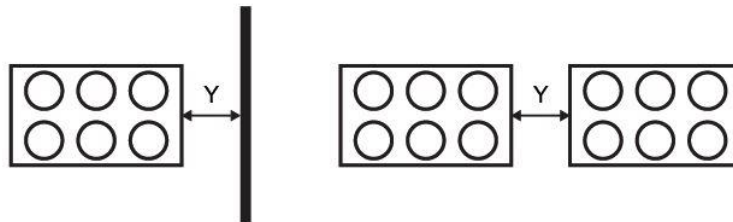
CASE 1

1X obstructed



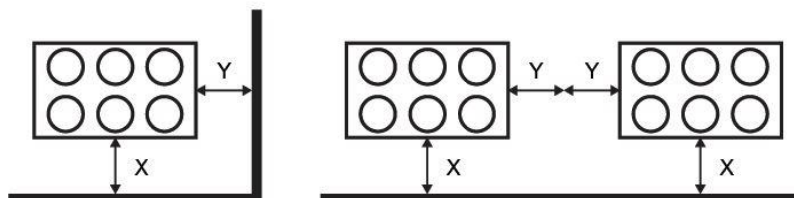
CASE 2

1Y obstructed



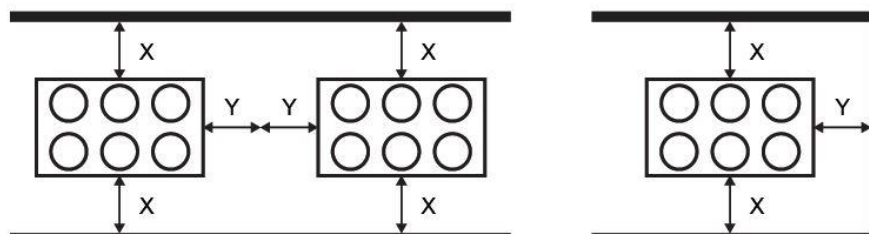
CASE 3

1X 1Y obstructed



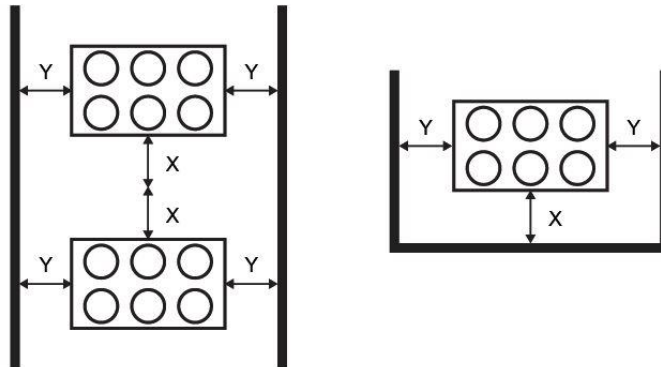
CASE 4

2X 1Y obstructed



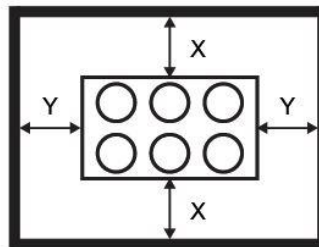
CASE 5

1X 2Y obstructed



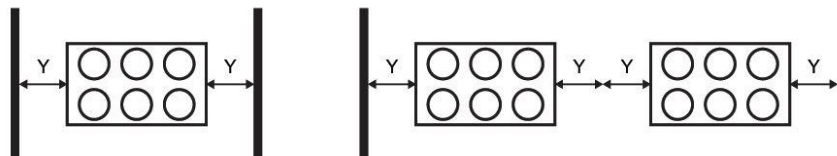
CASE 6

2X 2Y obstructed



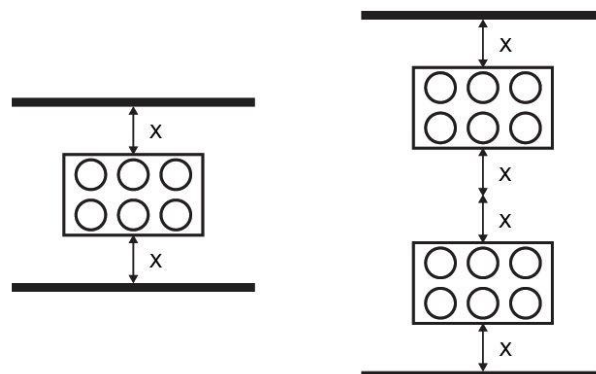
CASE 7

2Y obstructed



CASE 8

2X obstructed

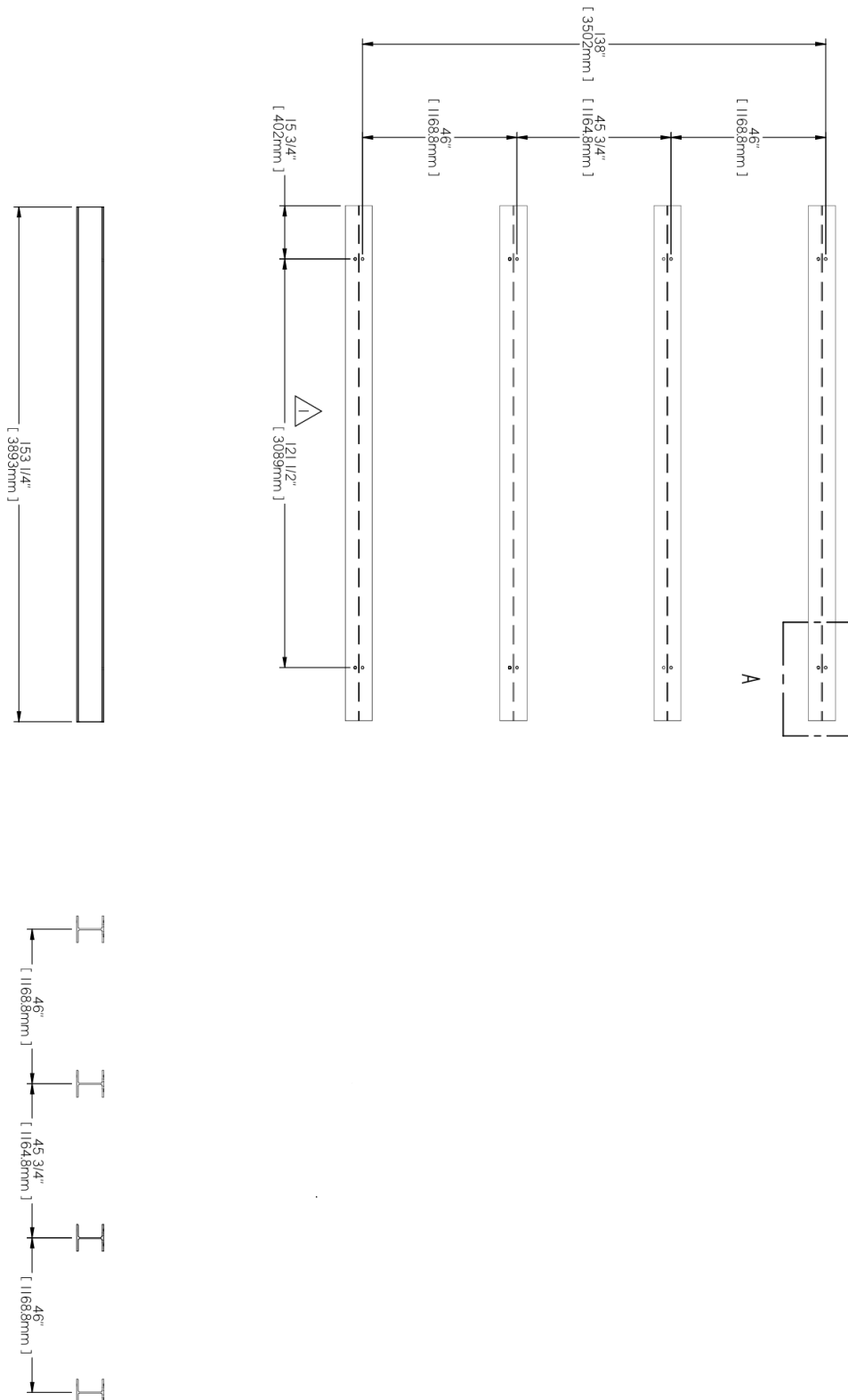


5.4 Support structure

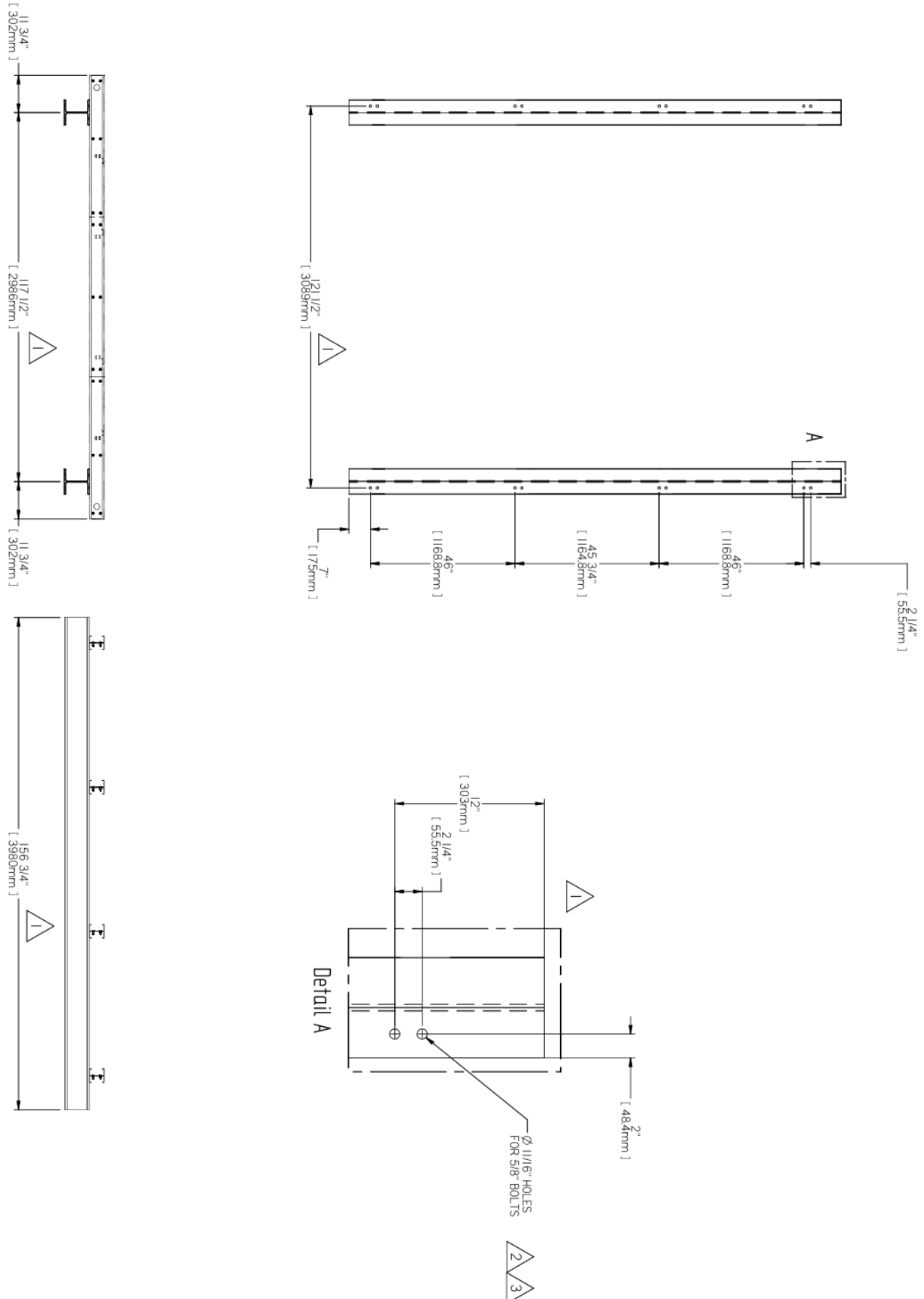
Concrete pads are acceptable

Units will need to be structurally supported with two parallel “I” beams traversing the entire length of the unit (see drawing below).

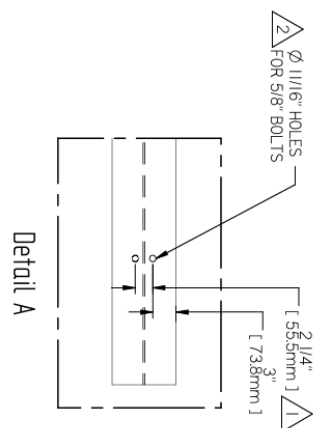
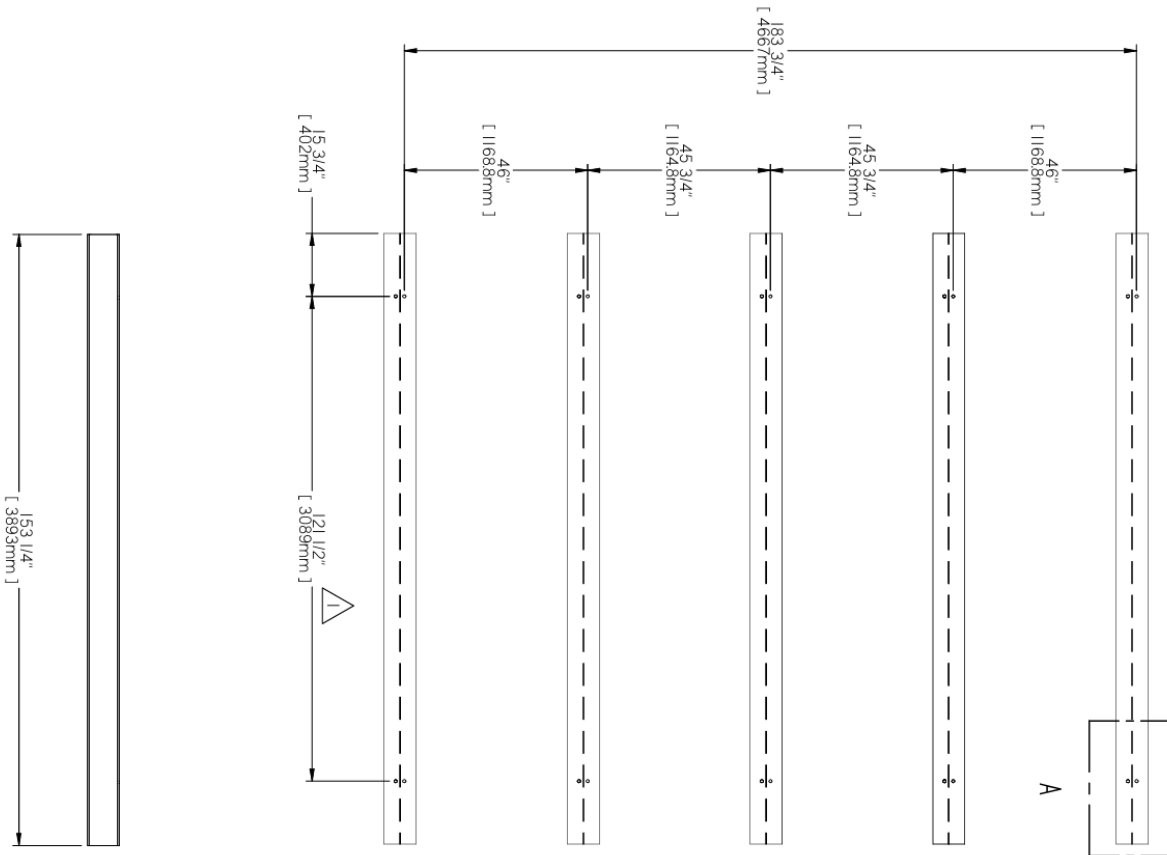
CROSS MOUNTING ADCHD 2x3



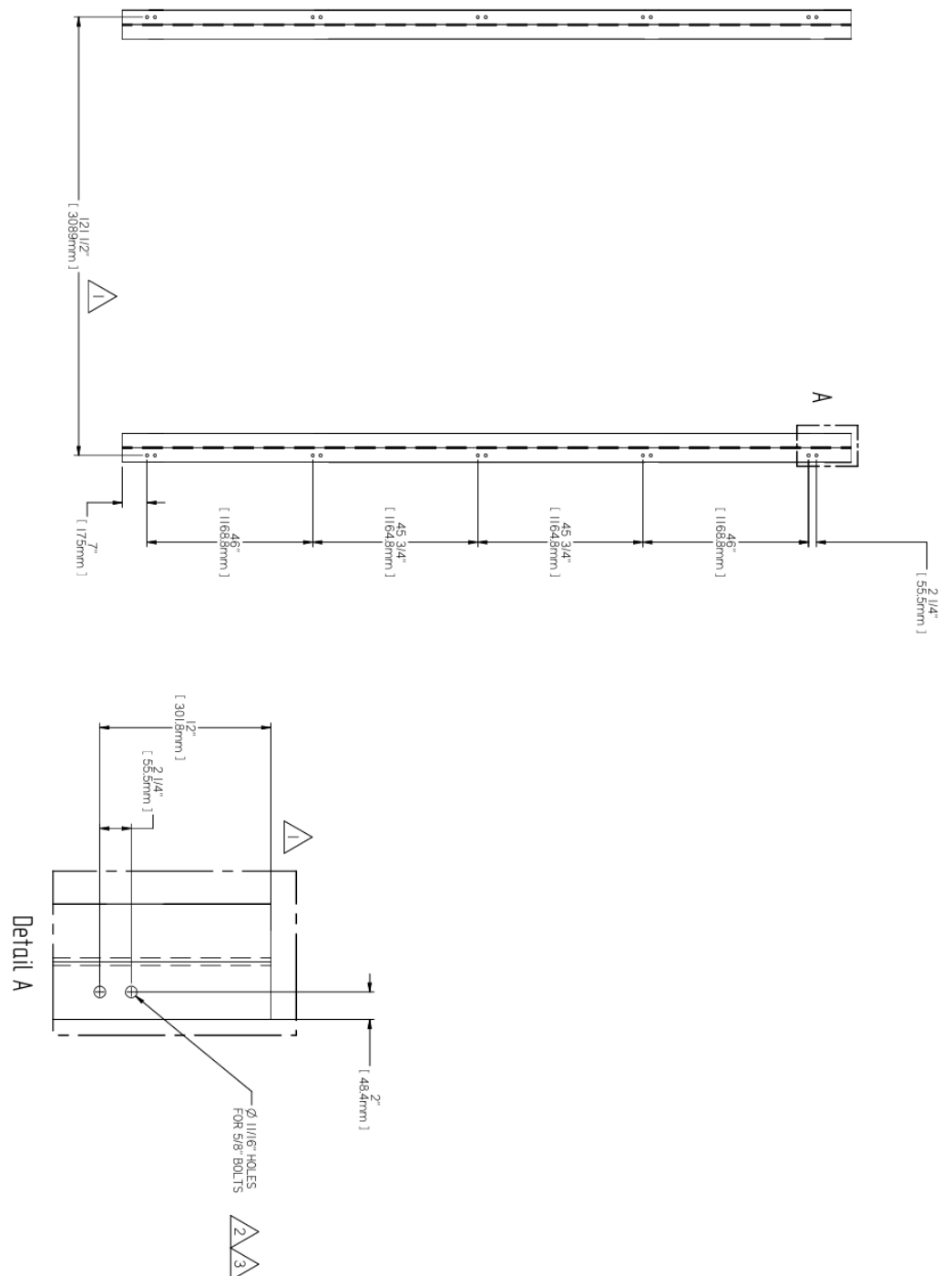
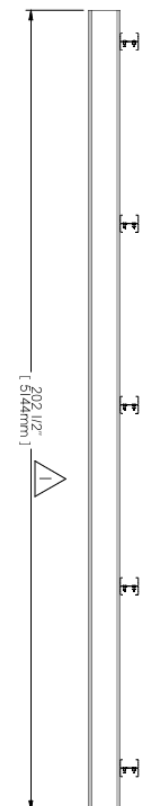
LONGITUDINAL MOUNTING ADCHD 2x3



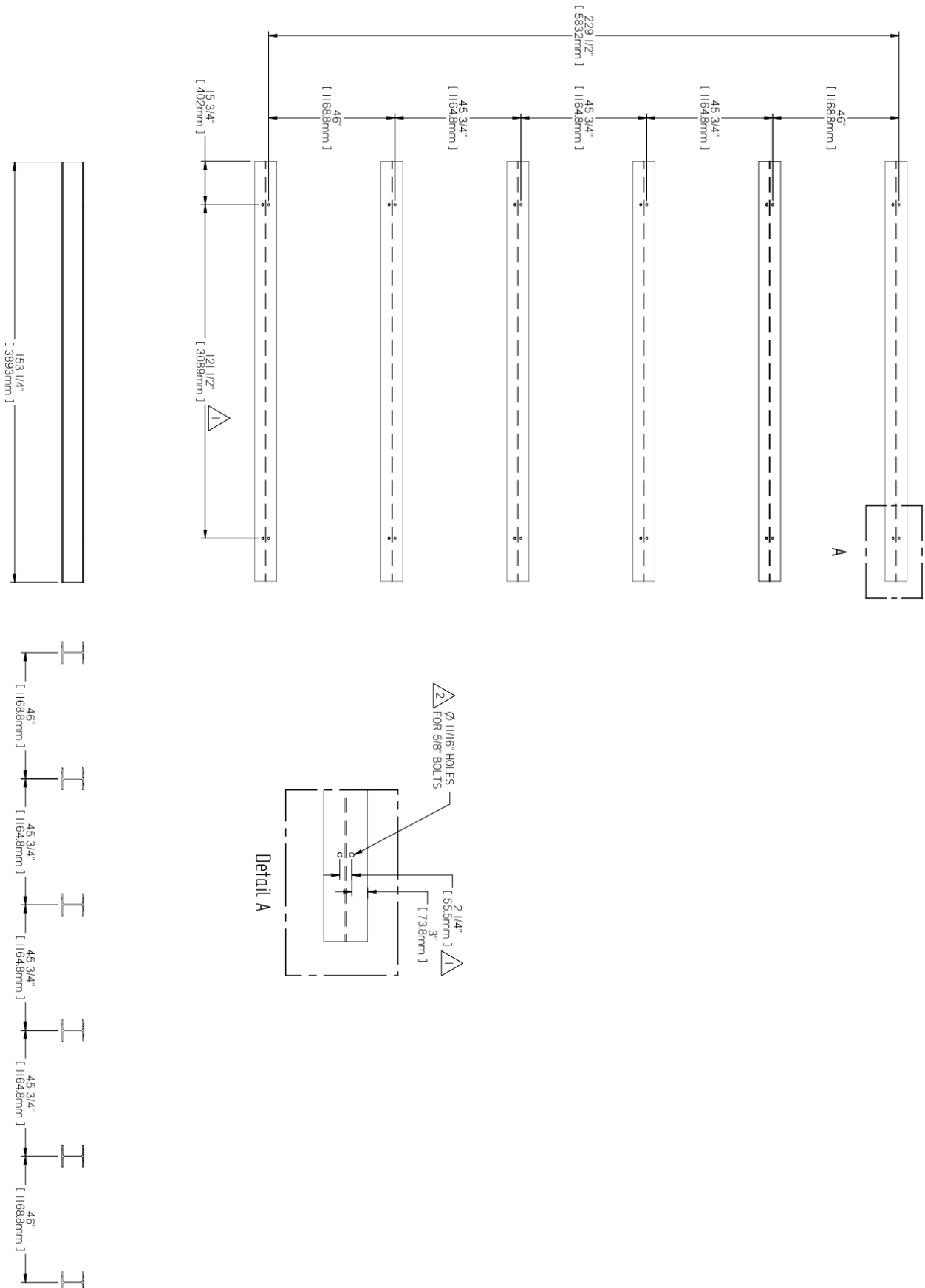
CROSS MOUNTING ADCHD 2x4



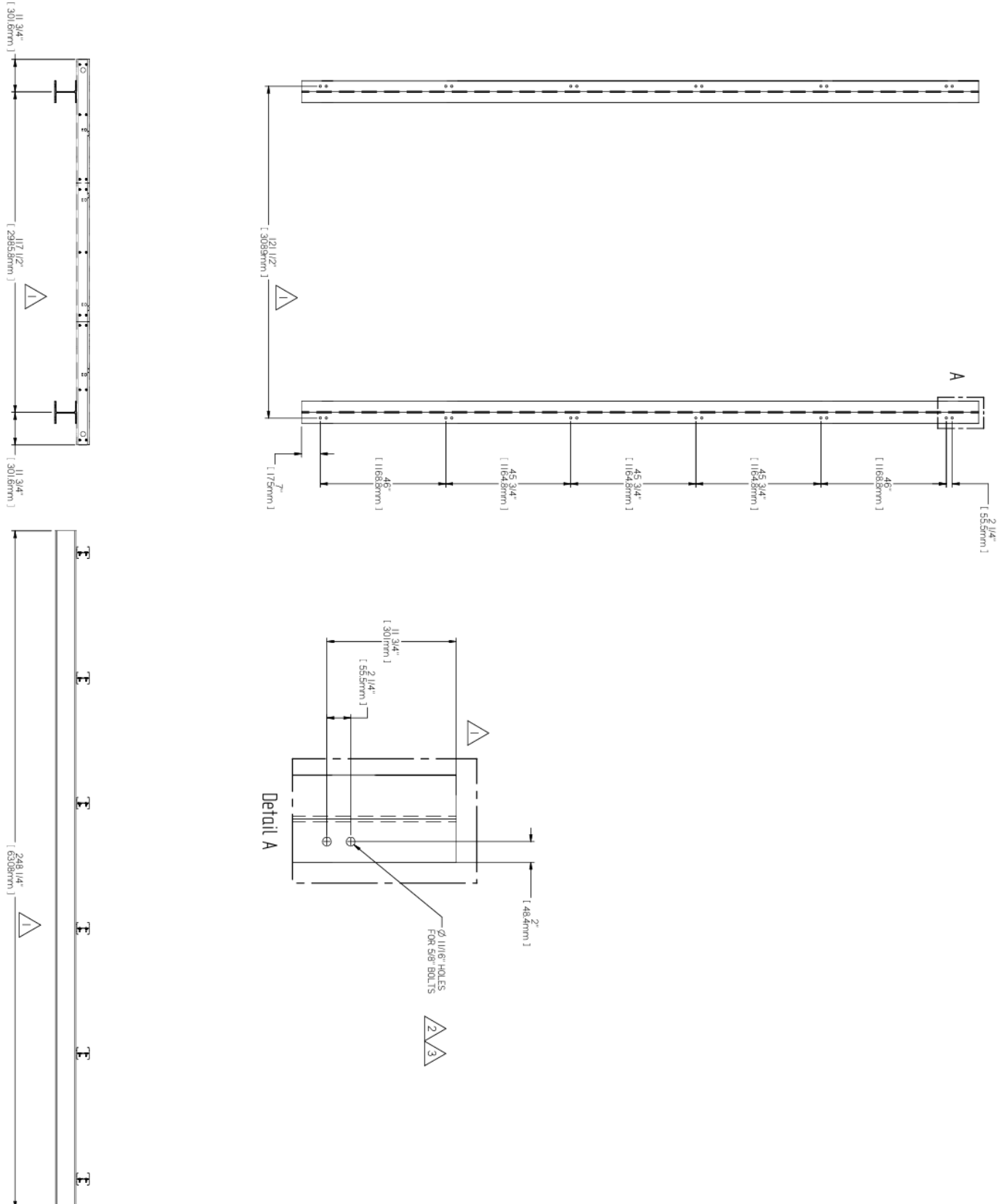
Technical drawing of a rectangular plate. The overall width is 117 1/2" [2985mm]. The overall height is 11 3/4" [301mm]. The plate has a central rectangular feature with a width of 11 3/4" [301mm] and a height of 11 3/4" [301mm]. The central feature is defined by two vertical lines and two horizontal lines. The top and bottom horizontal lines are 11 3/4" [301mm] from the top and bottom edges of the plate, respectively. The left and right vertical lines are 11 3/4" [301mm] from the left and right edges of the plate, respectively. A small triangle is located in the center of the plate, with its base on the left vertical line and its apex pointing to the right. The triangle is labeled with the number 1.



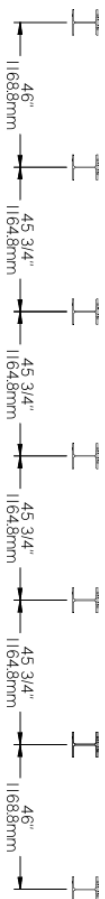
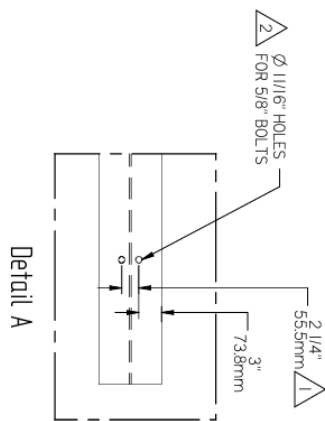
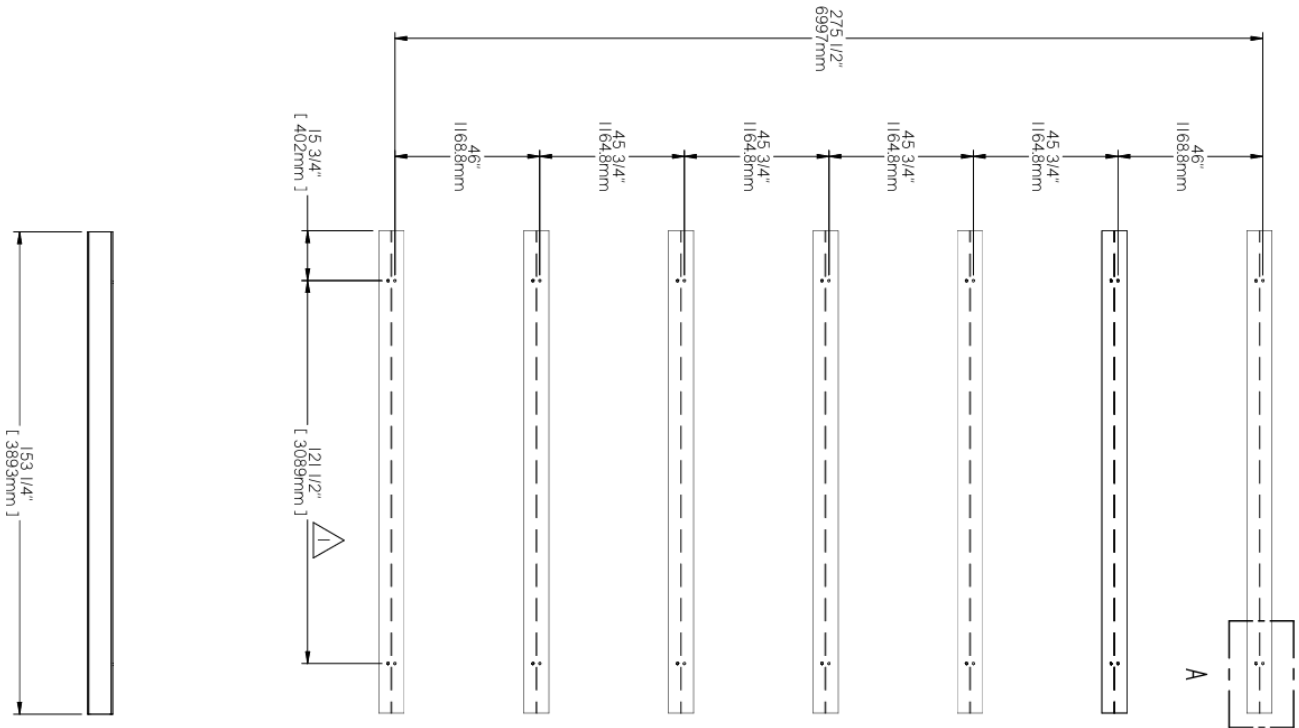
CROSS MOUNTING ADCHD 2x5



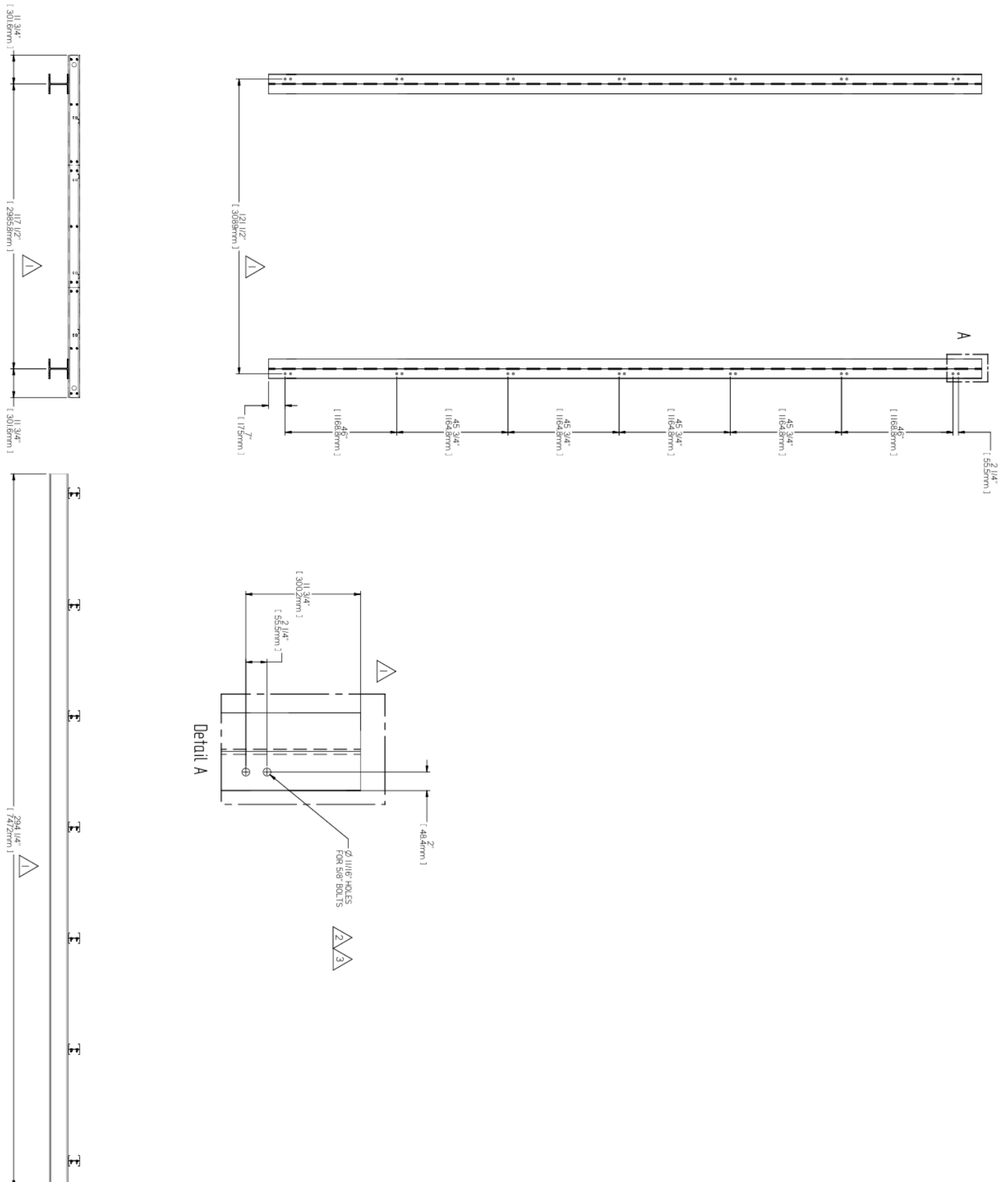
LONGITUDINAL MOUNTING ADCHD 2x5



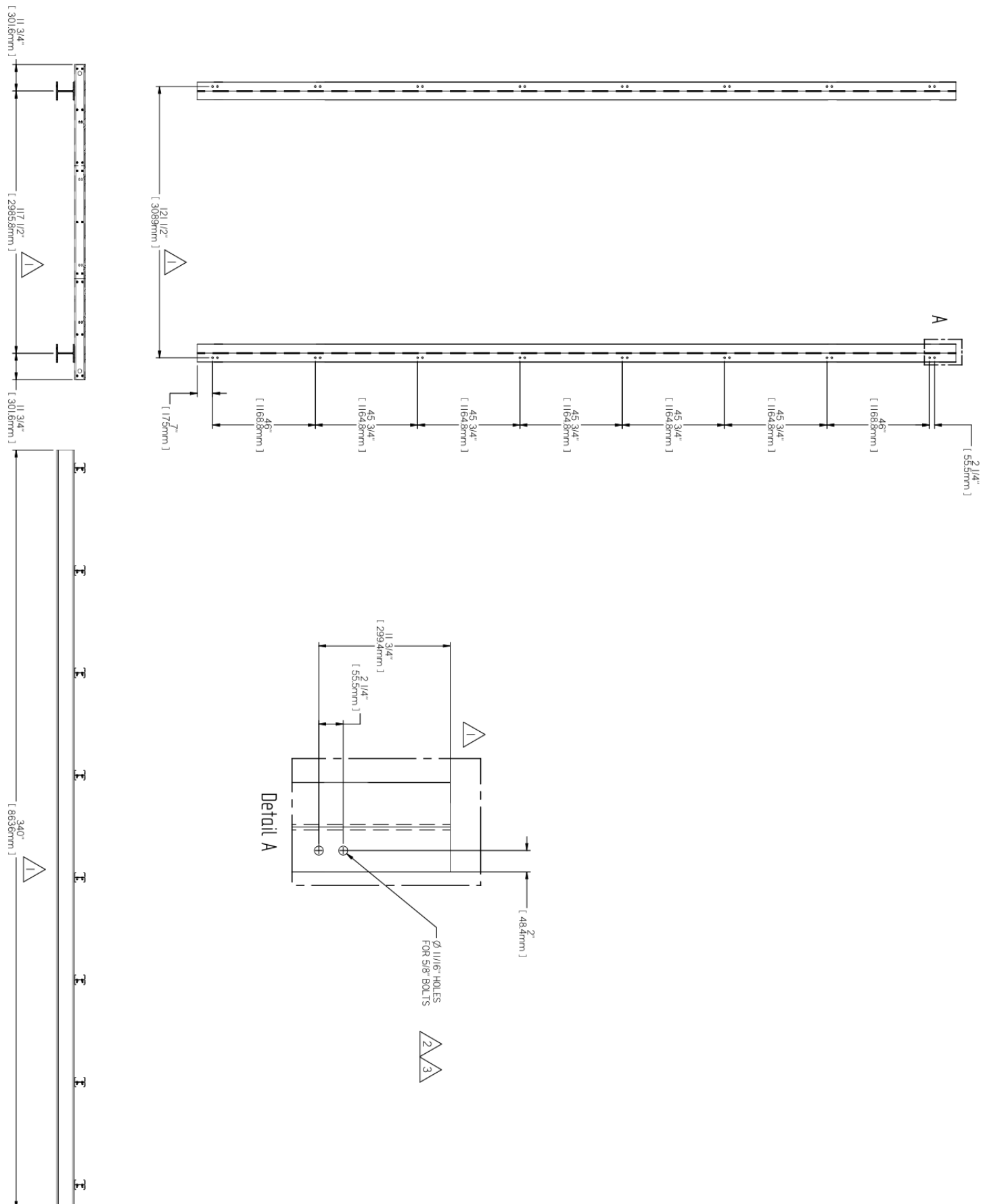
CROSS MOUNTING ADCHD 2x6



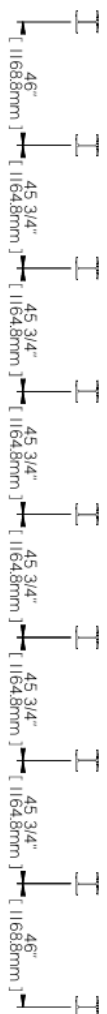
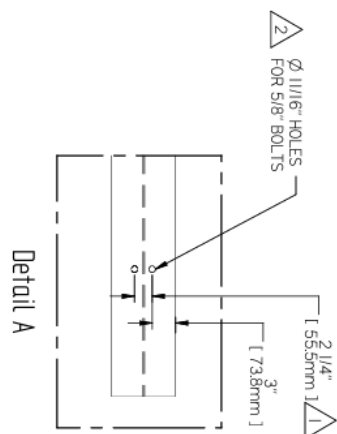
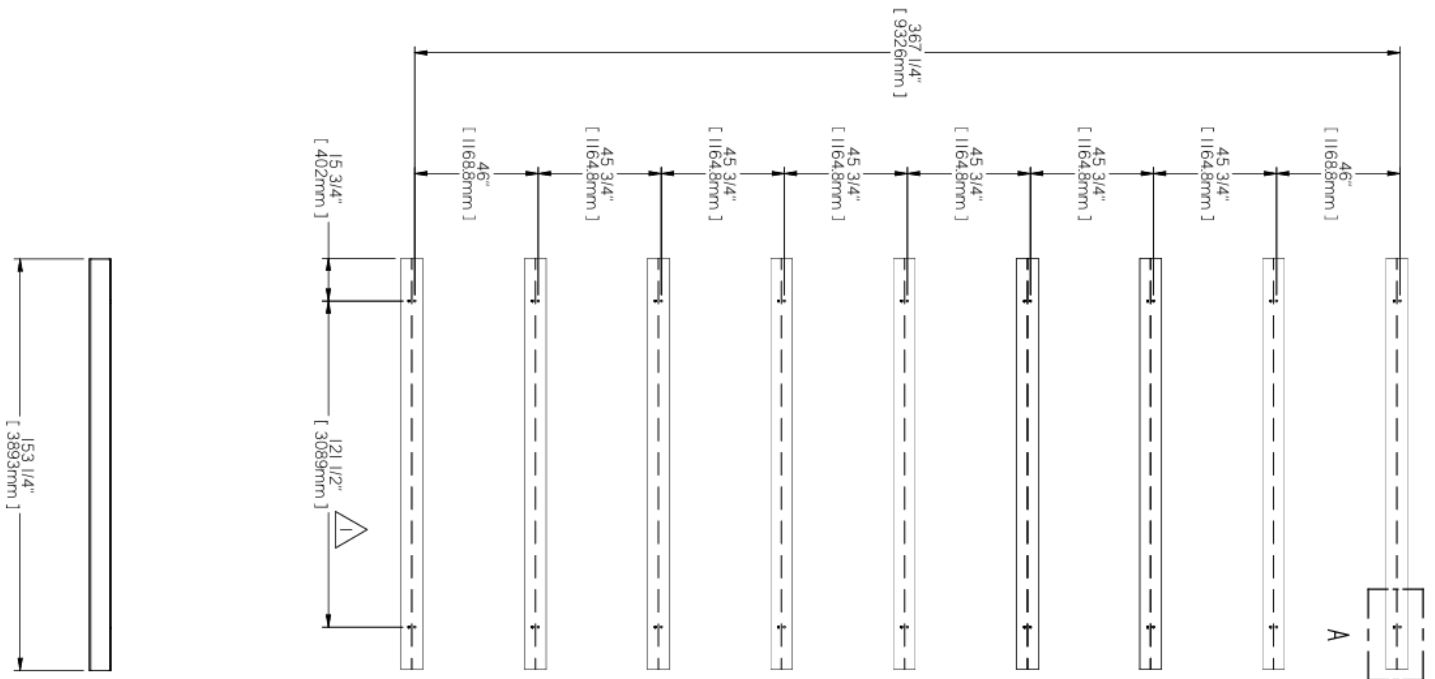
LONGITUDINAL MOUNTING ADCHD 2x6



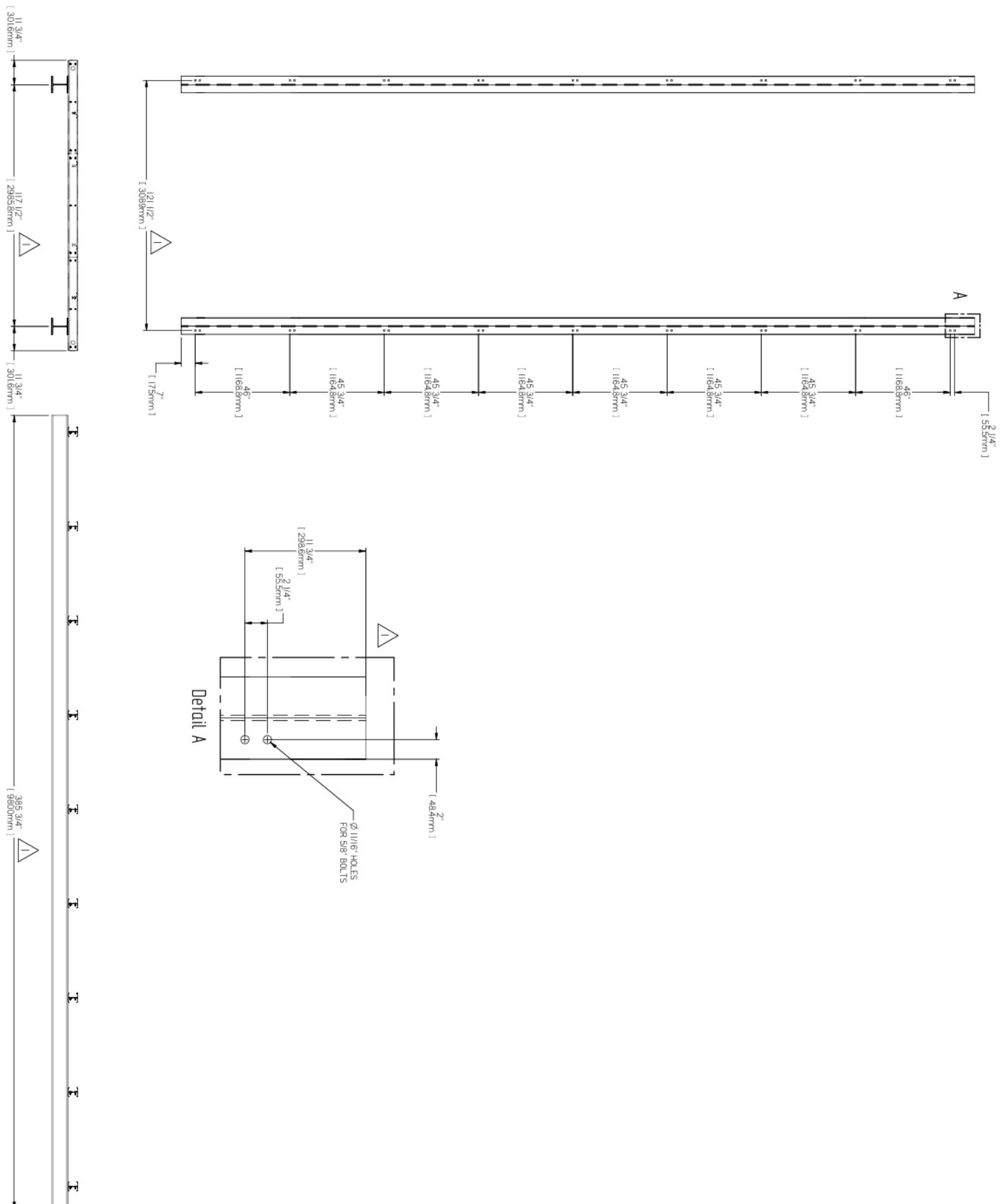
LONGITUDINAL MOUNTING ADCHD 2x7



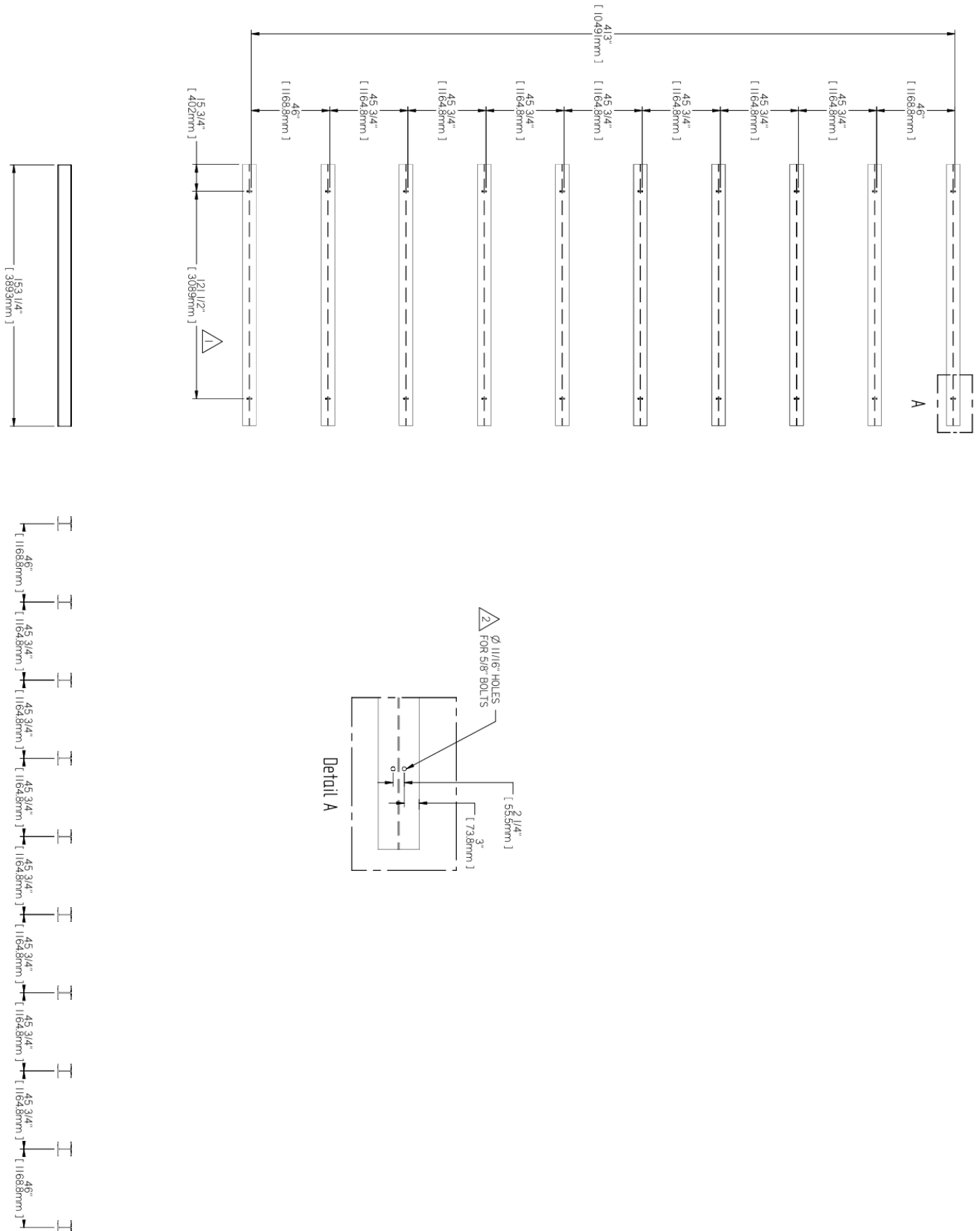
CROSS MOUNTING ADCHD 2x8



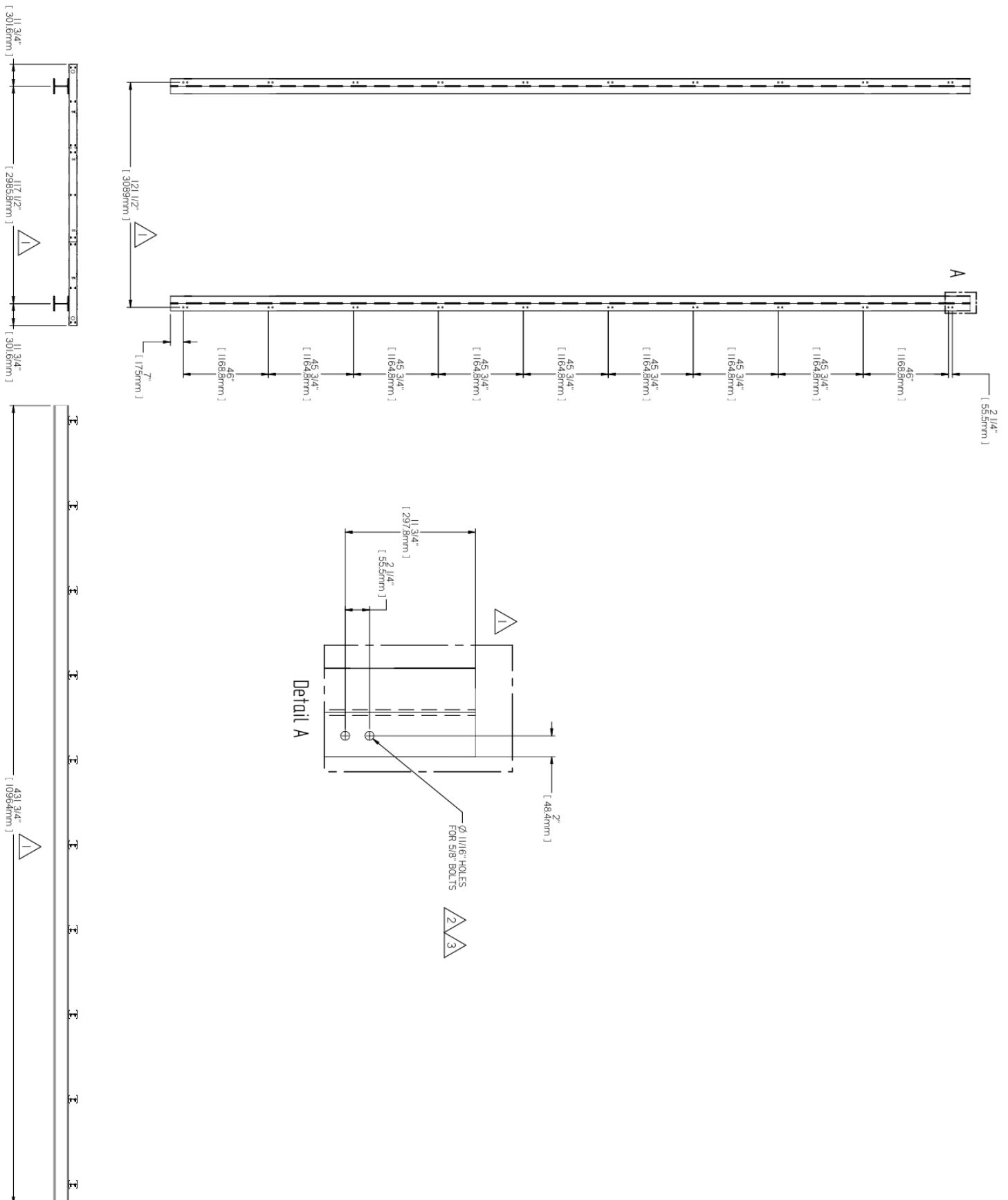
LONGITUDINAL MOUNTING ADCHD 2x8



CROSS MOUNTING ADCHD 2x9

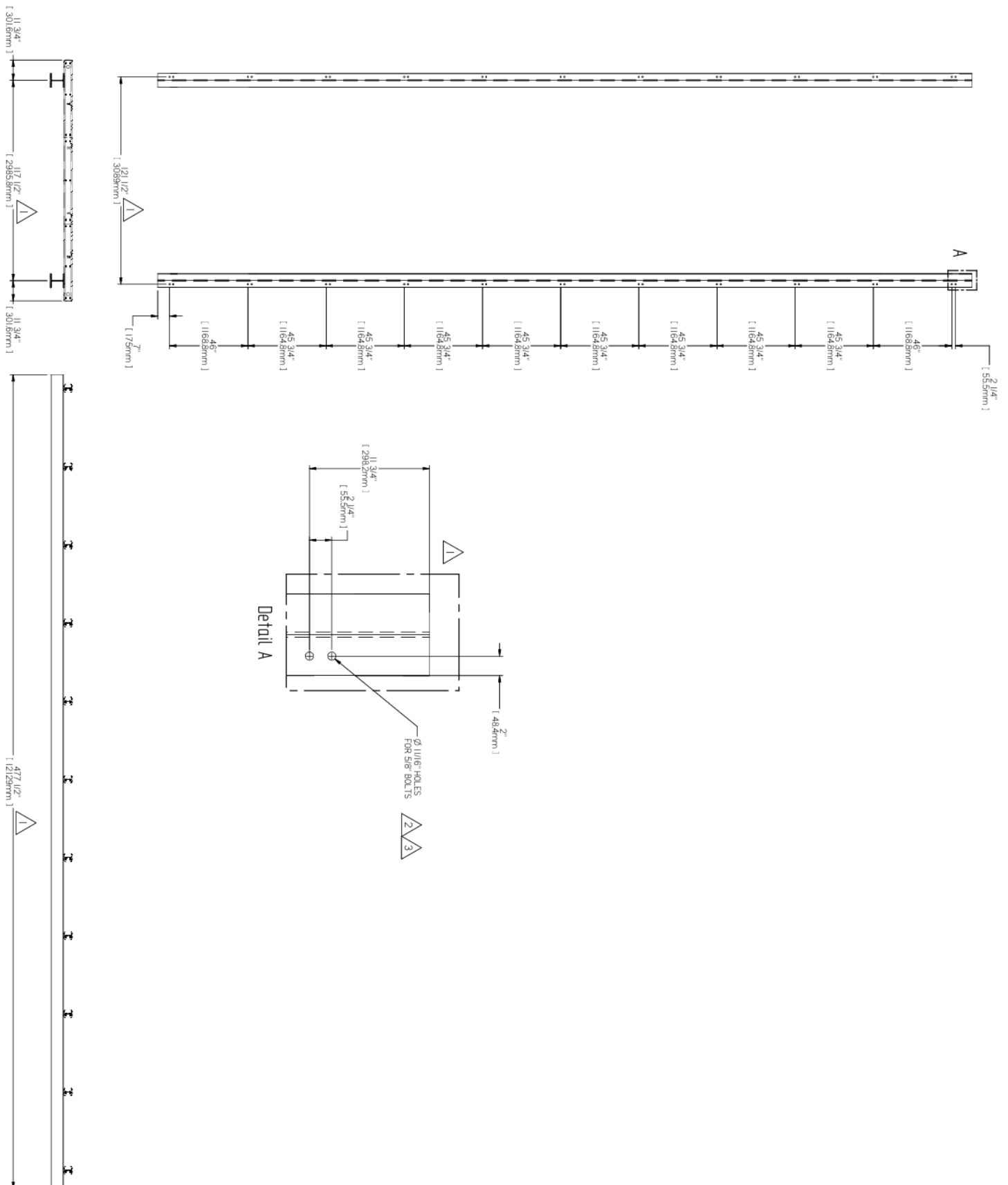


LONGITUDINAL MOUNTING ADCHD 2x9



Detail A

LONGITUDINAL MOUNTING ADCHD 2x10



Technical drawing of a 12m long metal structure, likely a bridge or industrial component, showing dimensions in feet and inches, and millimeters in brackets.

The main structure is 121 1/2' [402mm] long. It features 11 vertical stiffeners, each 45 3/4" [1164.8mm] high. The stiffeners are labeled with dimensions: 45 3/4" [1168.8mm] for the main body and 45 3/4" [1164.8mm] for the top flange. The total length is 121 1/2' [402mm].

A detail view, labeled "Detail A", shows a cross-section of the stiffener. It includes dimensions: 2 1/4" [55.5mm] for the top flange, 73.8mm for the web, and 3" for the bottom flange. The detail also shows a hole for a 5/8" bolt, labeled "Ø 1 1/8" HOLES FOR 5/8" BOLTS".

Base beams must be level to within 1/8" over a 6' span. Shims cannot be used to level off the unit as this will compromise the load bearing surface. Mounting holes (11/16" diameter) are provided at the ends of each base of the bottom section, to secure each unit to the support structure utilizing two 5/8" diameter bolts grade 5 or higher per base. Refer to the Güntner unit certified drawing for the bolt hole locations."

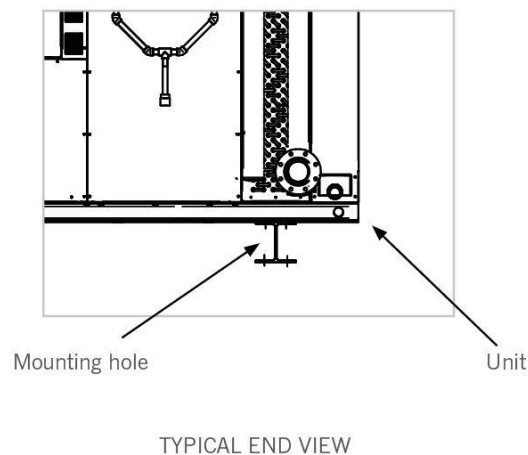
All support beams and anchoring bolts will be provided by others and must be selected in accordance with sound structural engineering standards. When selecting the support beams deflection may be calculated by using 55% of the unit's operating weight as a uniform load on each beam.

NOTICE

The support beams must be level at the top and meet industry acceptable tolerance related to the overall length of the unit installed. Do not level any unit with shims.

ADCHD Steel Support Structure Dimensions (Box Dimensions)			
Single Cell Arrangements	A	B	C
ADC HD 2X3...	152"	108 9/16 "	46"
ADC HD 2X4...	198"	108 9/16 "	46"
ADC HD 2X5...	244"	108 9/16 "	46"
ADC HD 2X6...	290"	108 9/16 "	46"
ADC HD 2X7...	336"	108 9/16 "	46"
ADC HD 2X8...	382"	108 9/16 "	46"
ADC HD 2X9...	428"	108 9/16 "	46"
ADC HD 2X10...	474"	108 9/16 "	46"
ADC HD 2X11...	520"	108 9/16 "	46"

* ADC HD 2X3... = Two lines of three fans each



5.5 Installation Procedures

5.5.1 Receiving & Inspection

Compare the data on the nameplate of the unit with the submittal information to verify the correct unit is received. Model nomenclature and electrical data should also be verified with original order.

All Güntner units are packaged such that they can be removed from a truck with a crane.

All units are factory tested to ensure safe operation and quality assembly. Units are packaged and shipped in two pieces or more (depending on options ordered) for easy handling and storage, if required, at the job site.

NOTICE

Record any unit damage or shortages on the Bill of Lading and report to the carrier and Güntner factory immediately. Shipping and handling damages are not warranty items.

Take photos of all damaged equipment if possible. Damaged equipment is the responsibility of the designated carrier and should not be returned to the manufacturer unless prior approval is given to do so. Confirm that all items listed on bill of lading are received.

NOTICE

Refer to the submittal package for specific unit information such as weights, dimensions, etc.

NOTICE

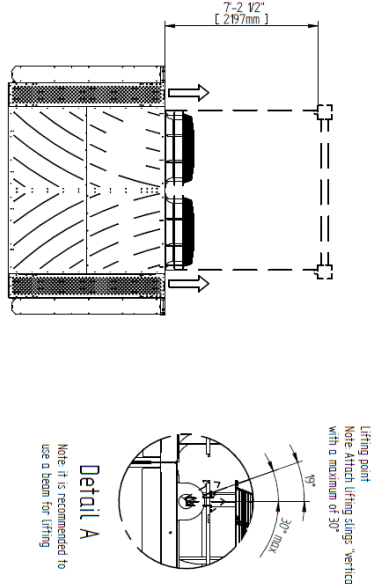
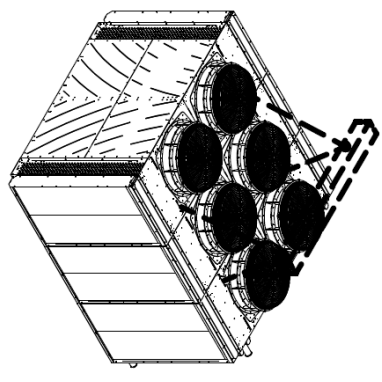
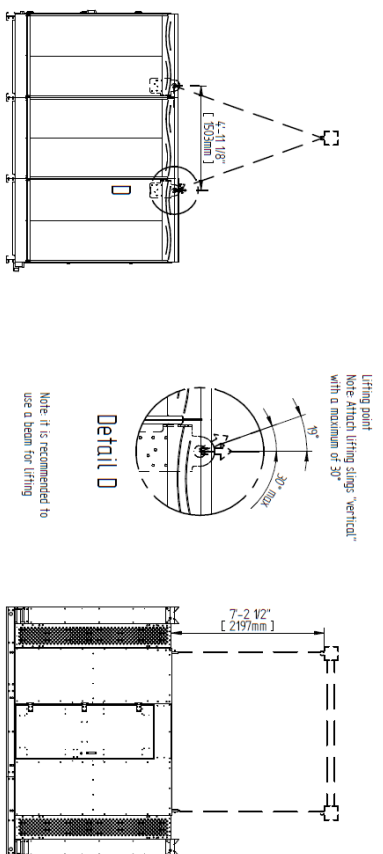
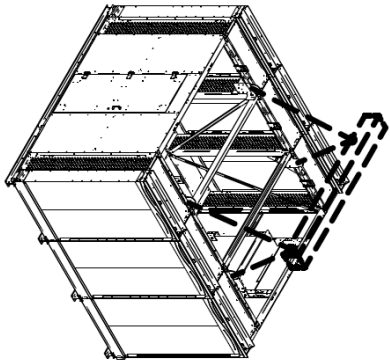
When lifting the unit use only the designated lifting lugs as detailed on the rigging drawing attached to the unit at the time of shipping. Always ensure that the lifting points are balanced so that the unit is level during lifting.

5.6 Offloading & assembly

5.6.1 Rigging

The following images show the acceptable rigging configurations for each size of unit

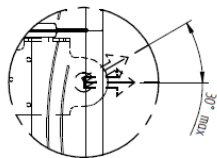
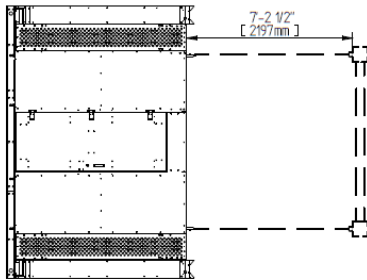
2x3 Rigging

measures without specification of tolerances		protection rate acc. to: DIN ISO 1676	
welding / brazing	DIN EN ISO 1892, tolerance class D	general tolerances	DIN ISO 2768-1, tolerance class component parts m / assembly v, length -4m DIN 7768, tolerance class component parts m / assembly sp.
general tolerances	DIN ISO 2768-2, tolerance class component parts K / assembly L, length >3m DIN 10762, tolerance straightness and flatness 0,002x, length		
Top Section Weight of 6,398 Lb – 2,902 Kg			
			
			
Bottom Section Weight of 6,176 Lb – 2,801 Kg			
			
			

2x4 Rigging

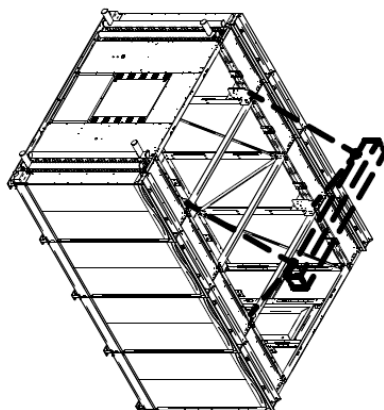
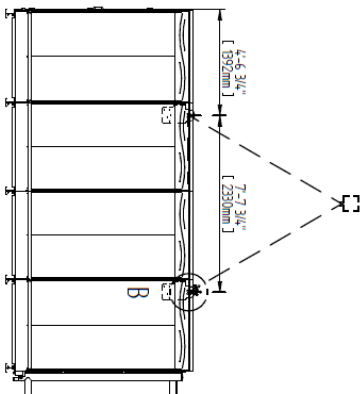
measures without specification of tolerances
 production note see: to: DIN ISO 16006
 welding / brazing: DIN EN ISO 15610, tolerance class B
 general tolerances: DIN ISO 2768-1, tolerance class component parts m / assembly v, length <4m DIN 7763, tolerance class component parts m / assembly sg,
 general tolerances: DIN ISO 2768-2, tolerance class component parts K / assembly L, length >4m DIN 7762, tolerance straightness and flatness 0.0024, length

Bottom Section Weight of 7,946 lb – 3,604 Kg

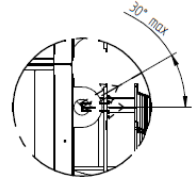
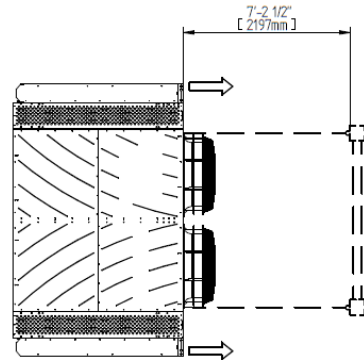


Detail B
 Note: it is recommended to use a beam for lifting

Lifting point
 Note: Attach lifting slings "vertical" with a maximum of 30°

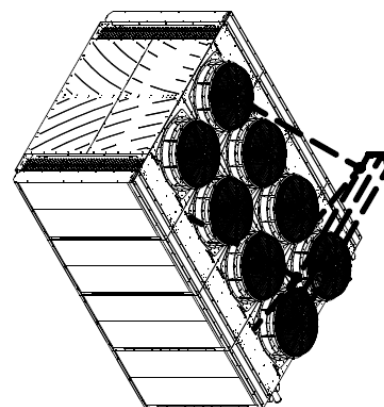
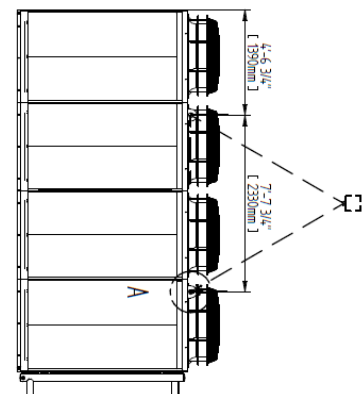


Top Section Weight of 8,321 lb – 3,774 Kg



Detail A
 Note: it is recommended to use a beam for lifting

Lifting point
 Note: Attach lifting slings "vertical" with a maximum of 30°

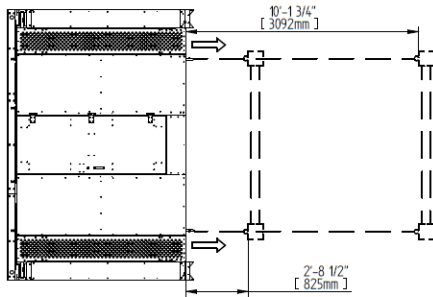


2x5 Rigging

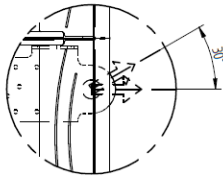
measures without specification of tolerances:
 welding / brazing: DIN EN ISO 5817-2, tolerance class B
 general tolerances: DIN ISO 2768-1, tolerance class component parts m / assembly v, length >4m DIN 7168, tolerance class component parts m / assembly sg
 general tolerances: DIN ISO 2768-2, tolerance class component parts K / assembly L, length >3m EN 10362, tolerance straightness and flatness 0/02X, length l

protection note acc. to: DIN ISO 16016

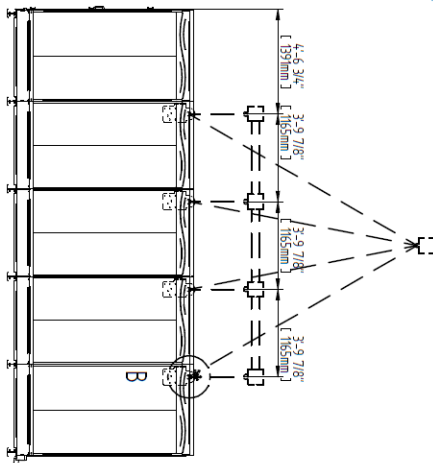
Bottom Section Weight of 9,593 Lb – 4,351 Kg



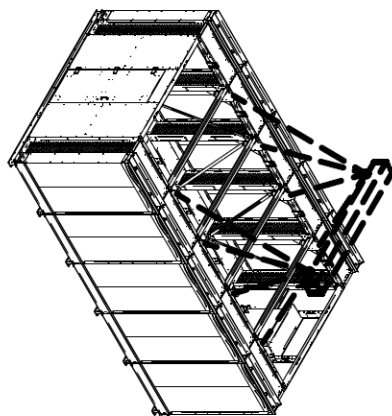
Detail B



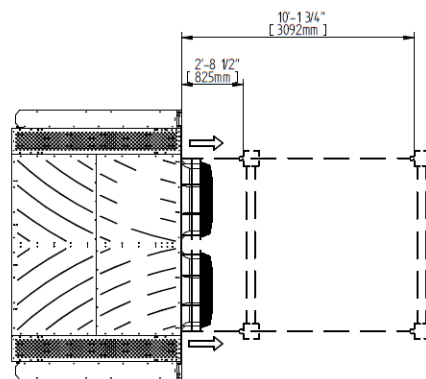
Lifting point
 Note: Attach lifting slings "vertical" with a maximum of 30°



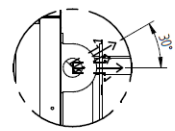
B



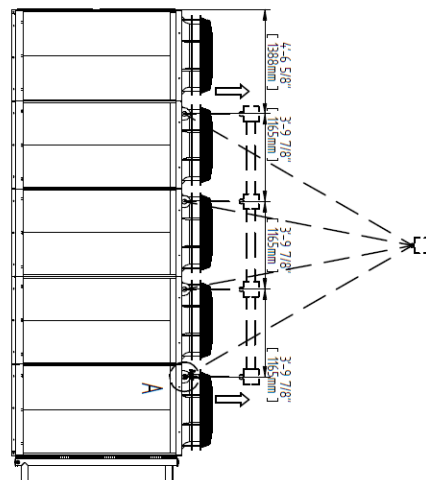
Top Section Weight of 10,215 Lb – 4,633 Kg



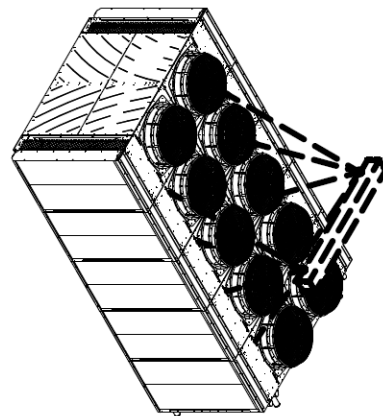
Detail A



Lifting point
 Note: Attach lifting slings "vertical" with a maximum of 30°



A

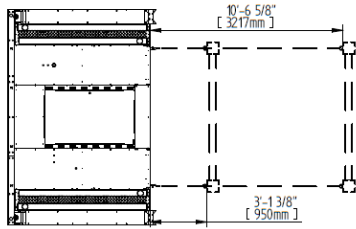


2x6 Rigging

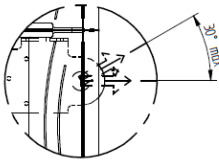
measures without specification of tolerances
 welding / brazing: DIN EN ISO 15925, tolerance class D
 general tolerances: DIN ISO 2768-1, tolerance class component parts m / assembly v, length <4m DIN 7165, tolerance class component parts m / assembly sg
 general tolerances: DIN ISO 2768-2, tolerance class component parts K / assembly L, length >3m DIN 1062, tolerance straightness and flatness 0/02L (length)

protection note acc. to DIN ISO 15046

Bottom Section Weight of 11,390 Lb – 5,166 Kg

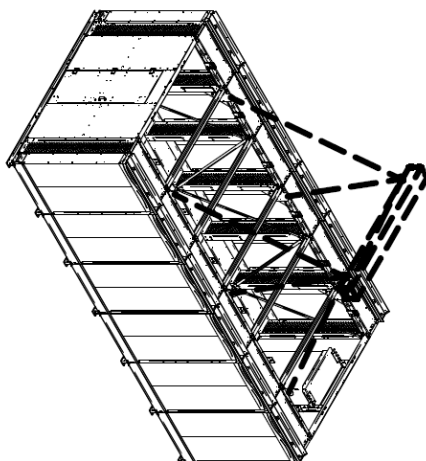
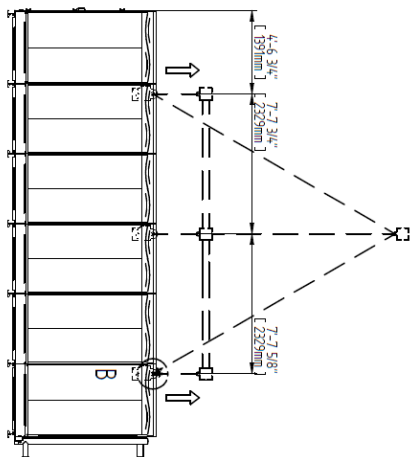


Detail B

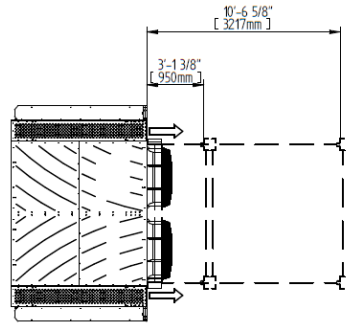


Note: It is recommended to use "H" beam cranes

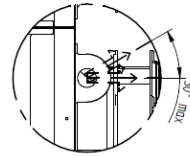
Lifting point
 Note: Attach lifting slings "vertical" with a maximum of 30°



Top Section Weight of 12,104 Lb – 5,490 Kg

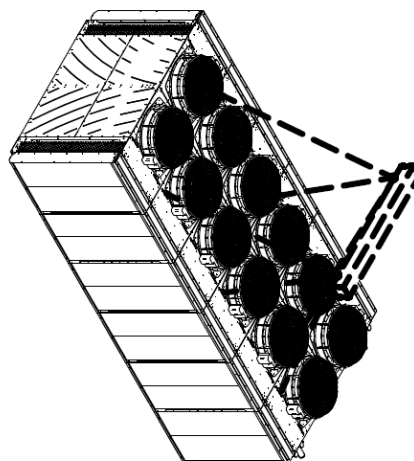
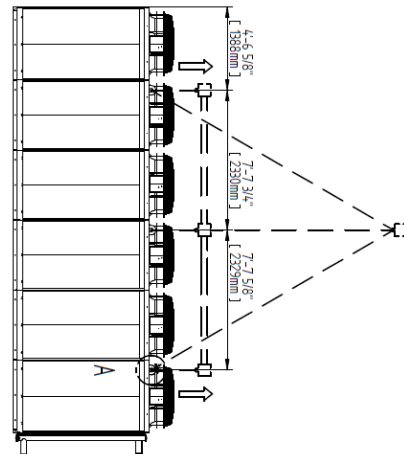


Detail A



Note: It is recommended to use a beam for lifting

Lifting point
 Note: Attach lifting slings "vertical" with a maximum of 30°

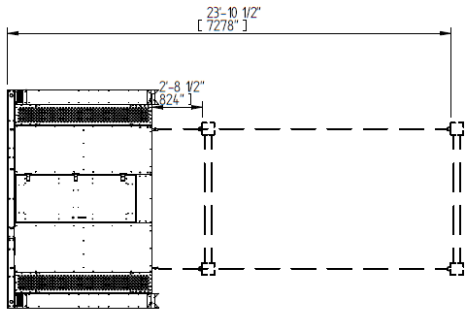


2x7 Rigging

measures without specification of tolerances
 welding / brazing: DIN EN ISO 1856, tolerance class U
 general tolerances: DIN ISO 2768-1, tolerance class component parts m / assembly v; length -4m DIN 7168, tolerance class component parts m / assembly sg
 general tolerances: DIN ISO 2768-2, tolerance class component parts K / assembly L; length -3m EN 1062, tolerance straightness and flatness 0.002d, length

protection note acc. to: DIN ISO 16016

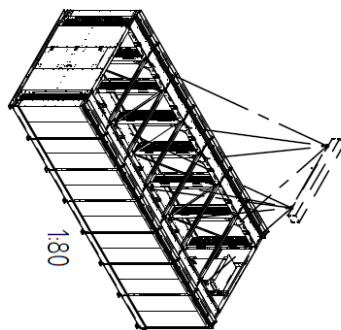
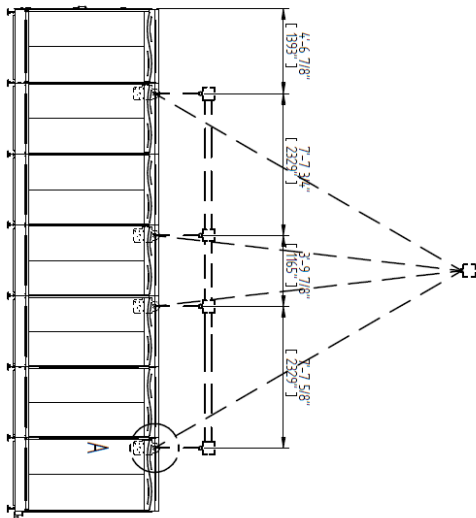
Bottom Section Weight of 13,045 Lb – 5,917 Kg



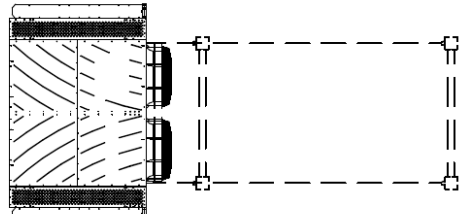
Lifting point
 Note: Attach lifting slings "vertical"
 with a maximum of 30°

Detail A

Note: It is recommended to use
 "H" beam cranes

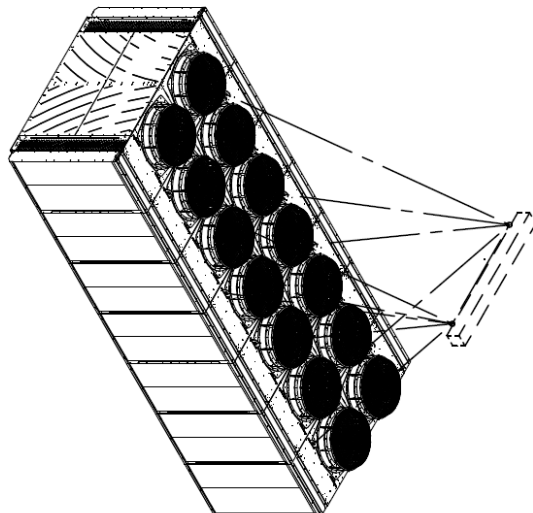
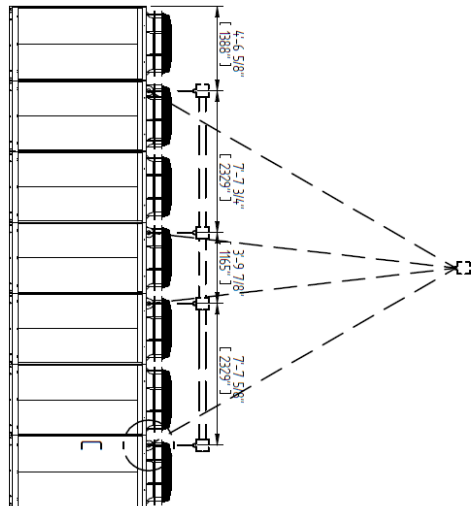


Top Section Weight of 14,029 Lb – 6,363 Kg



Lifting point
 Note: Attach lifting slings "vertical"
 with a maximum of 30°

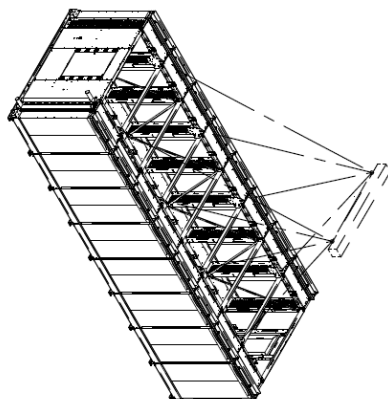
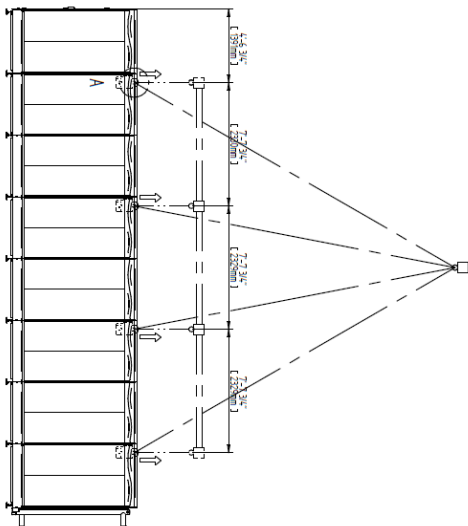
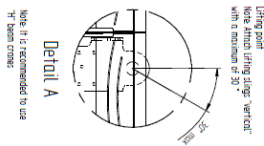
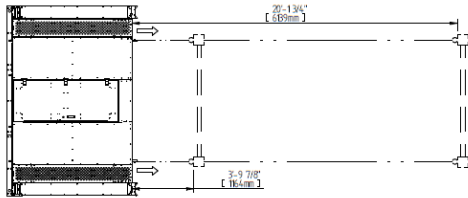
Detail C



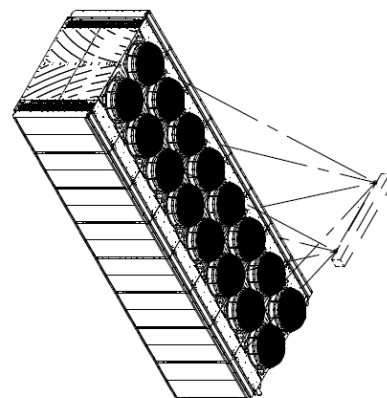
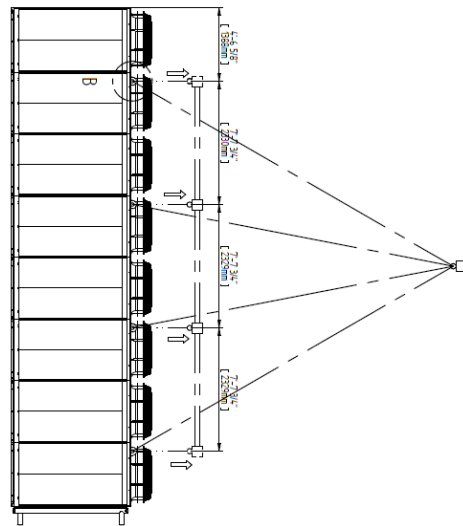
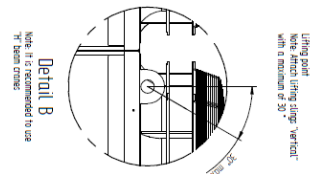
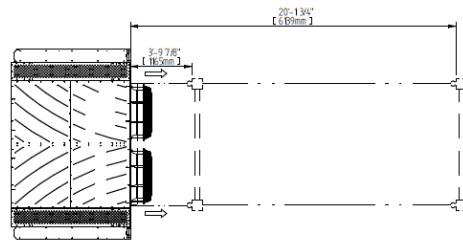
2x8 Rigging

measures without specification of tolerances	protection rate ACC to DIN ISO 10716
setting / breaking	DN ISO 1792, tolerance class 0
general tolerances	DN ISO 2768-1, tolerance class component parts in / assembly v., length >= 40 DN 7168, tolerance class component parts in / assembly sg.
general tolerances	DN ISO 2768-2, tolerance class component parts K / assembly L, length < 30 DN 10162, tolerance straightness and flatness 0,002xL (length)

Bottom Section Weight of 14,802 Lb - 6,714 Kg



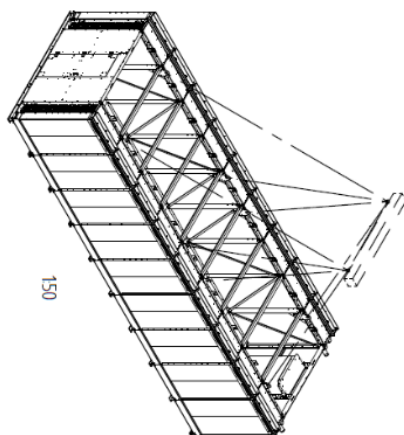
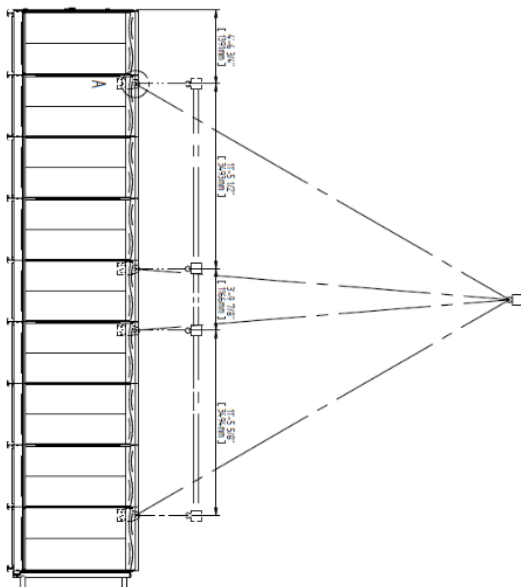
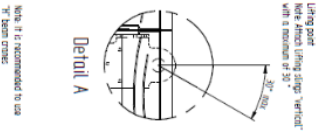
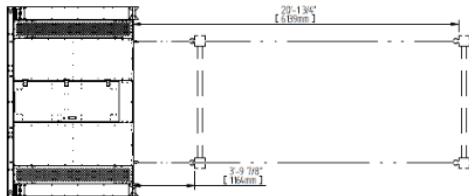
Top Section Weight of 15,949 Lb - 7,234 Kg



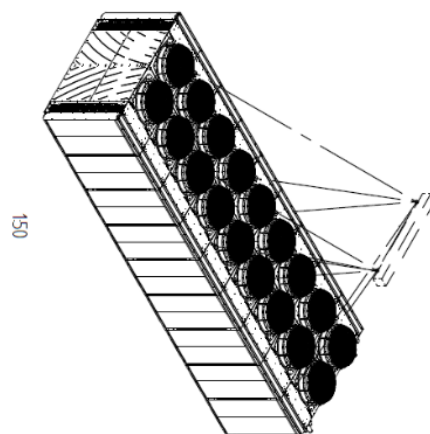
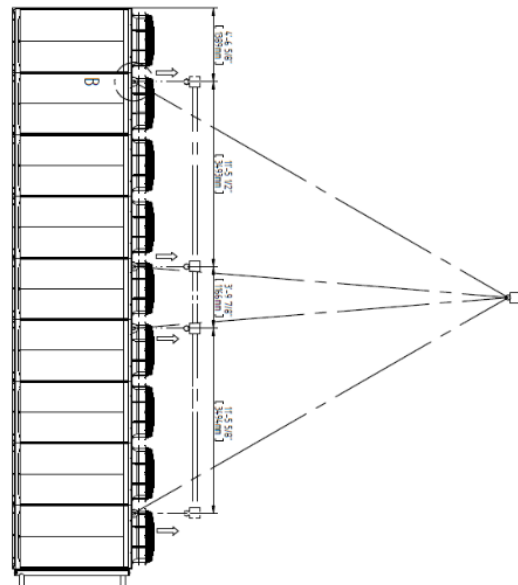
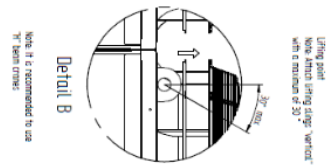
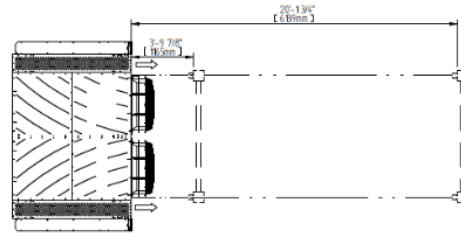
2x9 Rigging

features without specification of tolerance	protection references to DIN ISO 15000
welding / joining	DIN EN ISO 15000, tolerance class 0
general tolerances	DIN ISO 2768-0, tolerance class component parts m / assembly k, length <= 40 DIN 7160, tolerance class component parts m / assembly q
general tolerances	DIN ISO 2768-0, tolerance class component parts K / assembly k, length > 40 DIN 1082, tolerance straightness and flatness G0004, length

Bottom Section Weight of 16,546 Lb - 7,505 Kg



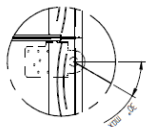
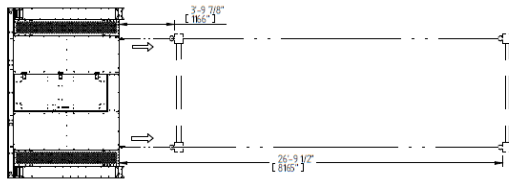
Top Section Weight of 17,831 Lb - 8,088 Kg



2x10 Rigging

measures without specification of tolerances	protection rate acc. to DIN ISO 9016
welding / brazing	DIN ISO 2768-2, tolerance class II
general tolerances	DIN ISO 2768-2, tolerance class component parts in / assembly w, length >40 DIN 7168, tolerance class component parts in / assembly sg
general tolerances	DIN ISO 2768-2, tolerance class component parts K / assembly k, length <40 DIN 10162, tolerance straightness and flatness 0.0024, length

Bottom Section Weight of 18,224 Lb - 8,266 Kg

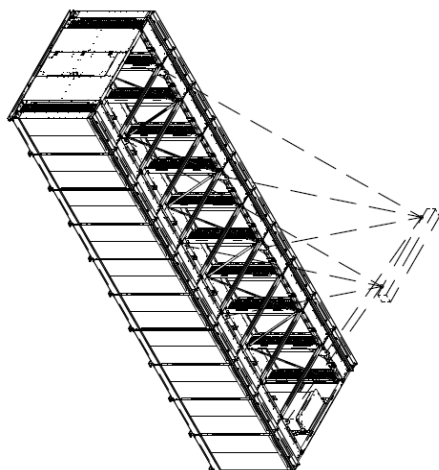
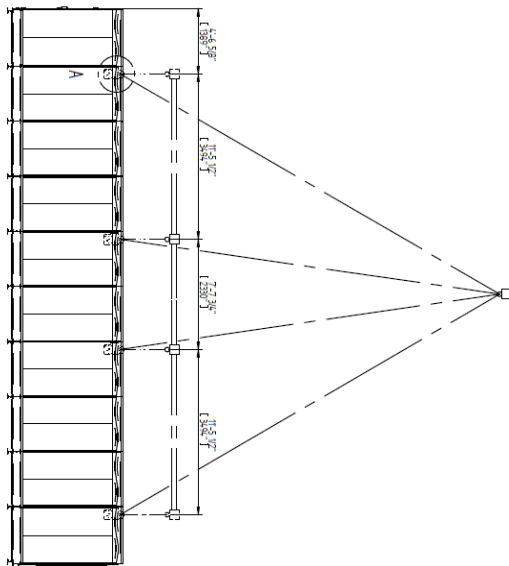


Lifting point
Note which lifting slings: vertical with a maximum of 30°

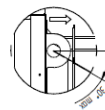
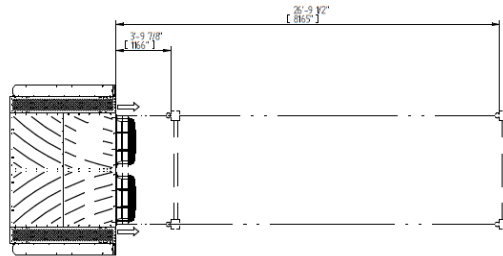


Detail A

Note: it is recommended to use 1x Beams corner.



Top Section Weight of 19,710 Lb - 8,940 Kg

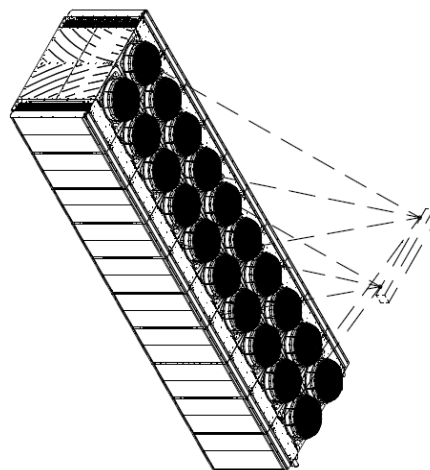
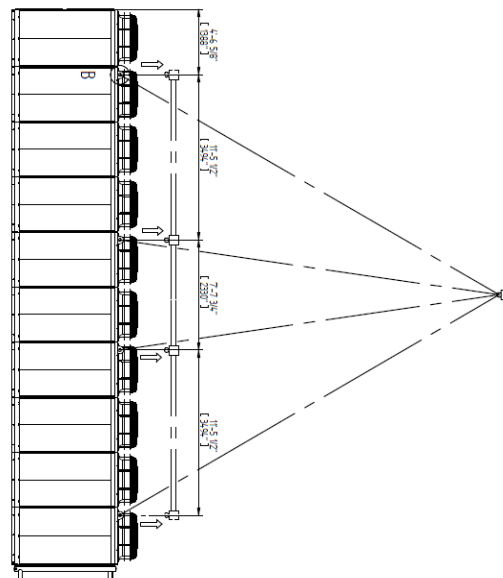


Lifting point
Note: Attach lifting slings "vertical" with a maximum of 30°

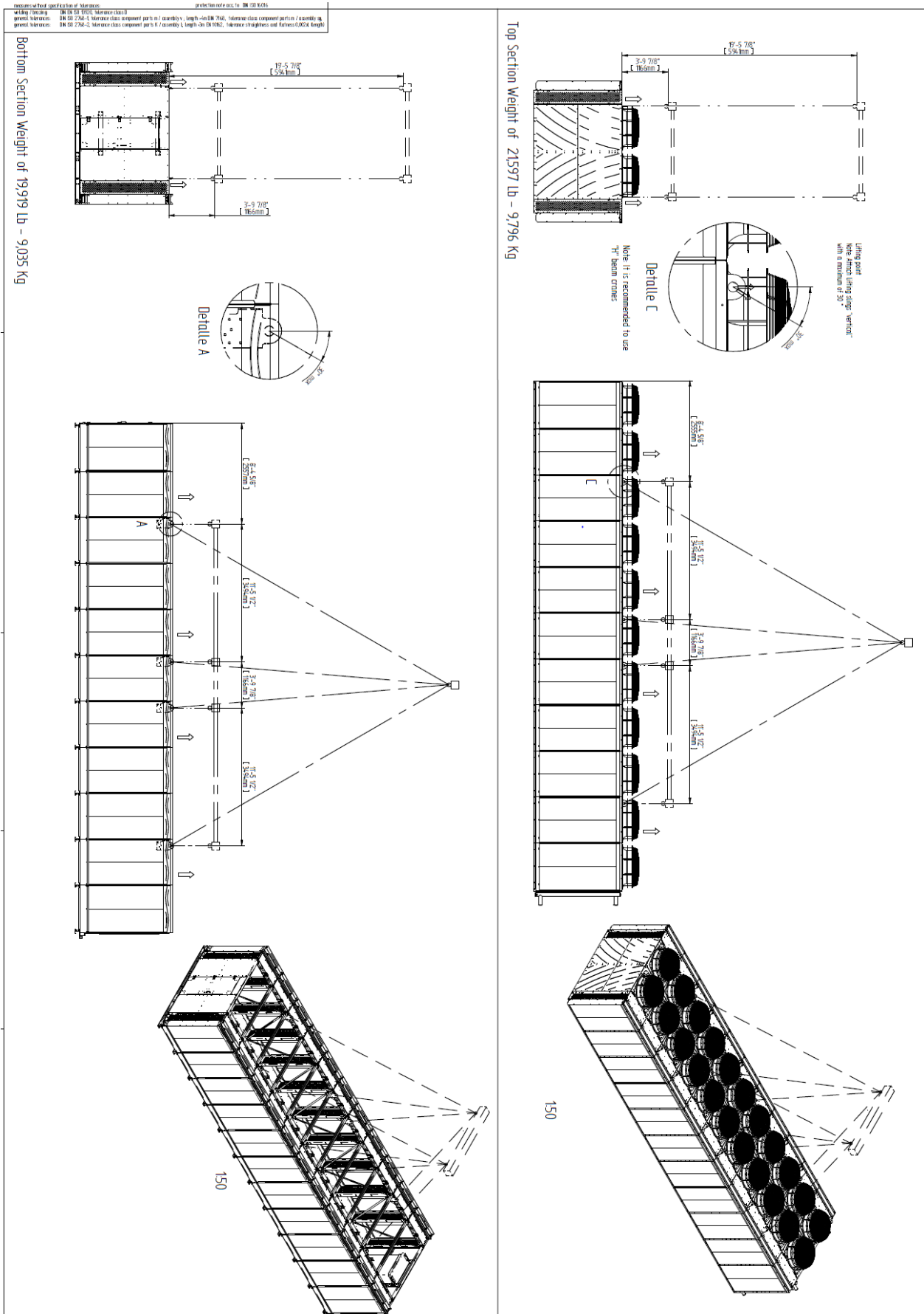


The diagram shows a circular cross-section of a beam with a central hole. A lifting point is indicated by a horizontal line passing through the center of the hole. A curved arrow indicates a maximum angle of 30° for the lifting slings. A note states: "Note: It is recommended to use 'H' beam cross".

Detail B



2x11 Rigging



5.6.2 Bottom section

Rig the bottom section as outlined earlier.

Slowly lift the bottom section from the shipping support structure, move to the installation location and set on the support structure.

NOTICE

Care should be taken when lifting the bottom section such that it is lifted level (with little or no tilt) to ensure the headers do not come in contact with the ground or any objects in order to prevent damage.

Check the position of the bottom section on the support structure to ensure proper positioning and that it conforms to the information provided in section 5.4 Support structure on page 12.

Secure bottom section of unit to the support structure with suitable 5/8" diameter bolts (not provided).

- Use ALL of the bolt holes to secure the unit to the support structure (for bolt hole locations, see Güntner unit certified drawing).

5.6.3 Upper section

- Rig the upper section as outlined earlier.
- Slowly lift the upper section and move to the installation location to fit the upper section on top of the bottom section.



- Align the upper section with the bottom section.



- Align connections side with connection side.

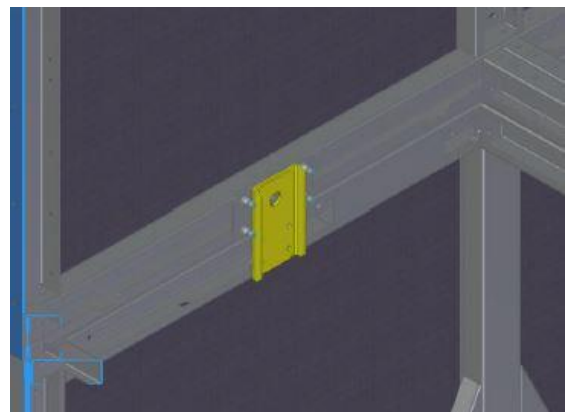
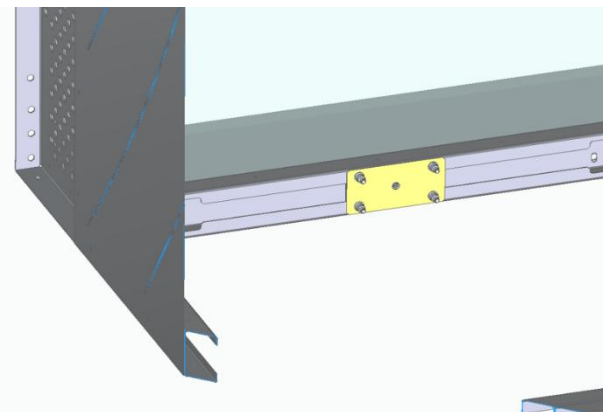
- Ensure that mechanical seal is placed correctly all the way length throw unit's middle section.



- Appropriately guiding the upper section safely into the recess and free from pinch points.

5.6.4 Connection joint

Bolt the upper section and the bottom section together using the connection joint located inside of the unit, using M 12 bolts. The union plate is shipped loose. It is located in the accessories box.



- Bolt the four tube sheet unions by external side.

⚠ WARNING

Do not try to lift the unit in both sections together.

5.6.5 Riser pipe union nut Installation

- Align upper section to bottom section then proceed with tightening the union nuts.
- The union plate is shipped loose. It is located in the accessories box.



5.6.6 Electrical start-up wiring

- Make sure the power supply is not connected to the main panel, and proceed to connect fan wires to control panel.
- Inside of the unit, fasten on the upper section find the fan's wires, proceed to unfasten (Picture 1).
- Every male plug is marked with a number. The corresponding female plugs are found under the electrical panel.

1)



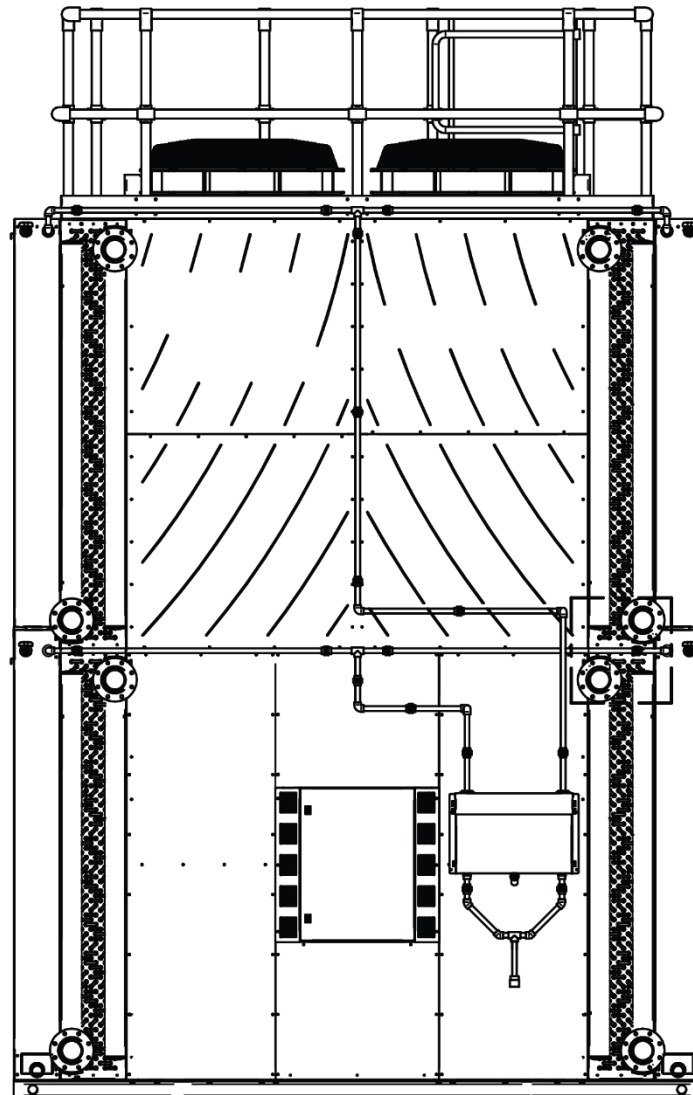
2)



3)



5.6.7 Ladder & external service walkway package (OPTIONAL)



NOTICE

Refer to the submittal package for specific installation instructions.

5.7 Piping

All field piping external to the ADCHD unit must be supported and anchored separately. External loads must not be placed on the unit connections. Piping supports must not be anchored to any part of the cooler's panels and/or frame

NOTICE

Failure to comply with this will result in damage to the ADCHD product and void all warranties.

Pressure or temperature sensors should be field installed at the appropriate location(s) within the system and in accordance with your local refrigerant guidelines for piping installation best practices.

When the equipment is mounted on vibration rails or springs, all connecting piping must incorporate compensators to eradicate any vibrations being carried through the connecting pipework to the ADCHD unit.

External water distribution piping must be heat traced and insulated when exposed to subfreezing ambient conditions.

Evaporative condenser refrigerant piping should be designed and installed in accordance with generally accepted condenser piping good engineering practice as per ASME B31.5 - Refrigerant Piping.

The unit is intended for outdoor use only. To protect the unit from damage due to the elements, the unit should be stored in a clean, dry location and away from areas with excessive traffic. The unit should be well ventilated at all times during storage.

Do not store the unit(s) for longer than necessary, and make sure the original packaging is kept intact. Do not remove the bottom and / or the coil sections from their respective shipping support until bottom section is mounted on support structure and upper section is properly positioned and fastened to the bottom section already mounted and fastened properly to the support structure.

During extended storage or downtime periods, the fans must be operated for at least 2 – 4 hours each month. At an absolute minimum the motors should be rotated a minimum of ten (10) revolutions per month.

6. Operating instructions

6.1 Pre-start up inspection

- All ADCHD units must only be installed, operated, maintained and repaired by trained, experienced and qualified personnel
- Confirm the power supply matches the electrical rating indicated on the nameplate
- Conduct a visual inspection of the entire unit and verify that there are no structural or component damages whatsoever
- Check to confirm that all safety interlocks are working and fully functional
- Confirm that the installation of the unit is in accordance with the guidelines laid out in the Location Layout section of this manual
- If required, clean the media pads using low pressure water in a range lower than 20 psig (1.4 bar)
- Do not use pressure washers to clean the cooling pads
- It is recommended to clean and flush the distribution headers prior to allowing any water to flow over the pads, opening the drain header valve cap. After flush, close the valve
- Confirm that all drain piping has been completed and water flows freely out of the gutters. Drain piping installation on site shall avoid overflow in gutters
- Ensure all electrical connections and terminals are tight
- Bump (jog) and verify the correct rotation of all fan motors
- The inlet water pressure must be 30-60 psig (2-4 bar)
- hydroBLU™ systems has been set according to factory setting table below

Table 1. Parameters required for start-up water control system

1. Parameters required for start-up	
Parameter	Factory setting
Geodetic height (in meters)	540 (Monterrey)*
Airflow (xx*1000 m3h)	According to model**
Air speed (m/s)	According to model**
Max. Water Flow (l/h)	According to model**
Drive parameter (EC, FU, PC)	EC
Electric power (kW) fans	According to model**
2. Parameters required after Start-up	
Parameter	Factory setting
Wetting	
Humidification on	98%
Humidification off	85%
Outdoor temperature	22°C*
Draining	
Non-operating	24 h
Outdoor temperature T<	6°C
Water parameter	
Water threshold (Base value)	According to model**
Full load mode	100%
Increment	0%
Delay	3 min
Max H2O supply	1.3
H2O Offset	1.5
Selection IP/SI	
Selection	*SI

*Adjustable value on field by customer according with each site or Customer requirements.

**Variable value according with each unit depending of unit fan quantity. Find this value on datasheet or Table 2 of this IOM.

Table 2. hydroBLU™ Water flow for ADCHD

ADCHD Unit Model	Maximum water flow for HydroBLU™		Minimum water flow (Water Threshold)	
	l/hr	gpm	l/hr	gpm
ADC HD 2X2	2,270	10.0	227	1.0
ADC HD 2X3	3,400	15.0	340	1.5
ADC HD 2X4	4,540	20.0	454	2.0
ADC HD 2X5	5,680	25.0	568	2.5
ADC HD 2X6	6,815	30.0	681	3.0
ADC HD 2X7	7,950	35.0	795	3.5
ADC HD 2X8	9,085	40.0	908	4.0
ADC HD 2X9	10,220	45.0	1022	4.5
ADC HD 2X10	11,350	50.0	1135	5.0
ADC HD 2X11	12,490	55.0	1249	5.5
IMPORTANT NOTE: Inlet supply water pressure must be between 30 psig (2 bar) to 60psig (4 bar)				

6.2 Water quality guidelines

Typical municipal and well water supplies are suitable for use on the ADCHD. The application of other water sources, cleaning agents, or treatments must be compatible with the materials of construction. The ADCHD components include polypropylene piping, brass valves and fittings, PVC distribution headers, cellular media, and type 304L stainless steel frames and gutters.

Table 3. hydroBLU™ Water Quality Parameters

Designation	Lower	Upper	Unit
Conductivity	-	< 450	microSiemens/cm
Calcium Hardness (as CaCO ₃)	-	< 170	ppm [mg/l]
Chlorides (as Cl)	-	< 50	ppm [mg/l]
Total Alkalinity (as CaCO ₃)	-	< 170	ppm [mg/l]
pH	6.5	8.5	-
Sulfate (SO ₄ ²⁻)	-	< 250	ppm [mg/l]
Silica (as SiO ₂)	-	< 25	ppm [mg/l]
Iron (as Fe)	-	< 0.2	ppm [mg/l]
Oil and grease	-	< 2	ppm [mg/l]
Total dissolved solid	-	< 550	ppm [mg/l]
Suspended solids	-	< 5	ppm [mg/l]
Colony-forming units	-	< 50	ppm [CFU/ml]

⚠ WARNING

Failure to adhere to these water inlet quality parameters will reduce the lifespan of the adiabatic pads. Further, scaling, sometimes severe, can also occur.

6.3 Cooling pad media guidelines

- The functionality of the hydroBLU™ system is such that the evaporation of the water occurs at the pad media surface as it flows over and through the pads. Standard water treatment practices are therefore somewhat different to standard heat exchanger practices. The hydroBLU™ methodology is to provide just the required water quantity to the pads to maintain the process temperature, or pressure, set point.
- Many water related problems can be avoided if good system design and basic housekeeping practices are followed.
- The hydroBLU™ system is designed to operate with partial or completely wetted pad media. In some conditions excess water will flow into the gutter(s).
- Clean and flush distribution PVC headers on a regular basis to prevent buildup of deposits or microbiological growth.
- Replace damaged or spent pad media.
- At times or specific locations when the pad media experiences extreme evaporation, a flush cycle is recommended every 24 hours with the fan off.
- Locate the equipment and use appropriate water sources to minimize or avoid ingestion of contaminants that can clog or damage the media pads. Some examples include airborne dust/debris and exhaust air from other processes or equipment.

6.4 hydroBLU™ system check-up

There are only two set points, which must to be modified in field by the customer before to startup the unit:

Geodetic Height: This value needs to be entered to GHM in order to consider the air density depending the height where the unit will be placed. This is a metric value, and must be entered in meters above sea level.

Outdoor temperature: The adiabatic switch point needs to be entered into the GHM, and will determine when to turn on the water system based on ambient conditions. This can be set at present ambient temperature, or a specific value.

For more information on the set-up and functioning of the GHM, please refer to the GHM IOM.

Prior to system start-up, verify the operation of the water distribution system with the following steps on each GHM controller:

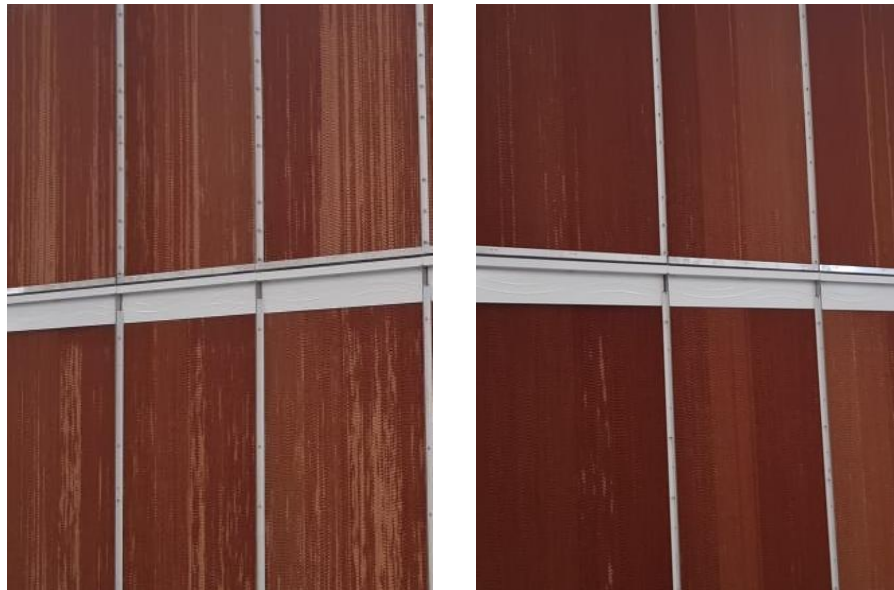
Enter an outdoor temperature set point lower than the actual ambient temperature on the GHM controller.

Enter a water threshold (minimum water flow required to turn on the hydroBLU™ system) 10% lower than the unit requires.

Modify set point on GMM to a value 20 °F lower than the actual process temperature.

Once finished points 1 to 3 mentioned before, verify that the water regulating valve has being activated and allow water flow through media pads (The discoloration of the media, once wetted, will be clearly visible). This confirms a properly functioning of hydroBLU™ system.

Figure 1. Water distribution comes from distributor media pads on top. Cooling Pads transition from dry to wet.



NOTICE

Ensure there is no water carry over outside and inside due to damage or unforeseen modifications made after the unit left the factory.

Confirm any water overflow from the pads are collected in the gutter and able to drain completely unobstructed

6.5 Operation mode

After test the hydroBLU™ operation, adjust back to factory setting or set desired parameters.

Enter the desired ambient temperature set point in each GHM. This will be the switch point at which time, water supply to the adiabatic pads may be initiated.

The minimum water threshold is preset in each GHM and is dependent on the unit size.

Enter the desired temperature set point in each GMM.

Only when all three of the above parameters are met, will the water supply to the adiabatic pads be initiated.

NOTICE

When the ambient temperature drops below 43°F (6°C) the water distribution system will drain automatically.

The end-user's water supply and piping to the metering valve are not protected from freezing. **This protection must be supplied by the customer with heat trace and insulation or other satisfactory method.**

⚠ WARNING

Do not open the door when the unit is in operation.

7. Extended shut down

If the system will be shut down for a period of three weeks or more, please ensure the following:

- Lock out, and tag, all electrical power supplies.
- The hydroBLU™ water system uses a normally open solenoid valve to ensure water is drained from the system in the event of a power outage. Assure that drain solenoid valve is open.
- The media pads must be removed from the unit and placed in a well ventilated storage area and not exposed to sunlight

For removing cooling pads follow instructions indicated at Maintenance guidelines 9.2 Cooling pad removal on page 33.

- Clean all dirt and debris from the exterior and interior of the unit(s)
- Storage area and not exposed to sunlight. It is recommended to cover the fan discharge outlets to prevent the ingress of dirt and debris

During extended storage or downtime periods, the fans must be operated for at least 2 – 4 hours each month. At an absolute minimum the motors should be rotated a minimum of ten (10) revolutions per month.

8. Electrical

The ADCHD unit is shipped with all motors pre-wired to groupal male plugs connectors. A Modbus communication cable from each EC motor is wired to the optional Güntner Motor Management (GMM) Controller housed within a NEMA 4X enclosure.

All hydroBLU™ valves and components are wired from factory to control panel.

The electrical enclosure on ADCHD are NEMA 4X constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects.

(windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water and hose directed water); that provides an additional level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure. NEMA 4X is equivalent to IP66 protection classification. As standard the enclosures are of FRP construction but stainless steel enclosure is optional.

The field wiring is dependent on the electrical option selected. The selected motor power supply will need to be run to the unit.

NOTICE

Refer to the submittal package for each unit supplied to verify all electrical field wiring requirements.

All wiring must be undertaken by qualified personnel in accordance with national and local electrical codes and standards.

8.1 Adiabatic cooling system controls

8.1.1 Güntner hydro management (GHM)

The wetting system is used to increase the capacity of heat exchangers at peak load times with high external temperatures and for more efficient heat dissipation with moderate ambient temperatures making efficient use of the water consumption. The adiabatic evaporation of the water on the media pads cools the air drawn in by the heat exchanger, which increases the heat exchanger's capacity. The wetting controller GHM governs the regulation of the wetting process. The required water volume is calculated on the basis of the load state, the ambient temperature and the relative humidity. The GHM sets the appropriate water volume using the water regulating valve. The system's frost protection is secured with automatic draining.

The water supply to the unit must be protected separately against frost.

There are several possible operating conditions when the hydroBLU GHM accessory is selected with the ADCHD

- Dry Mode
- GHM Water Saving Mode
- GHM Energy Efficiency Mode
- GHM Manual Mode

8.1.2 Dry mode

This is the standard operating mode for the unit when ambient temperature and process are within the design operating conditions. In this operating mode the GMM (Güntner Motor Management) controls motors and regulate the speed to achieve the desired process set-point, no water is used in this operating condition.

8.1.3 GHM water saving mode

Only as much water as the media pads can evaporate is applied. hydroBLU™ technologies works with this mode as standard.

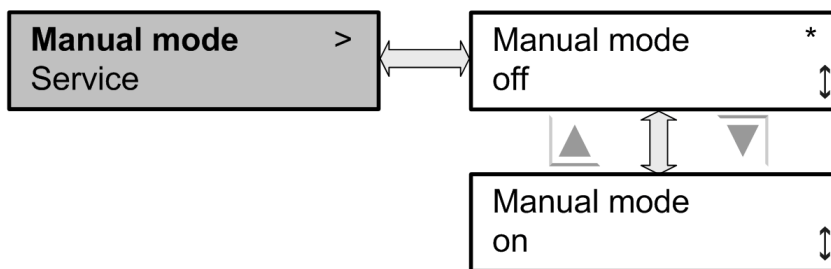
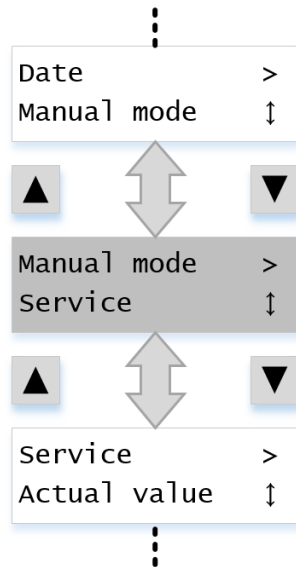
8.1.4 GHM Energy efficiency mode

More water is used in this mode, as the focus is on conserving as much fan power as possible.

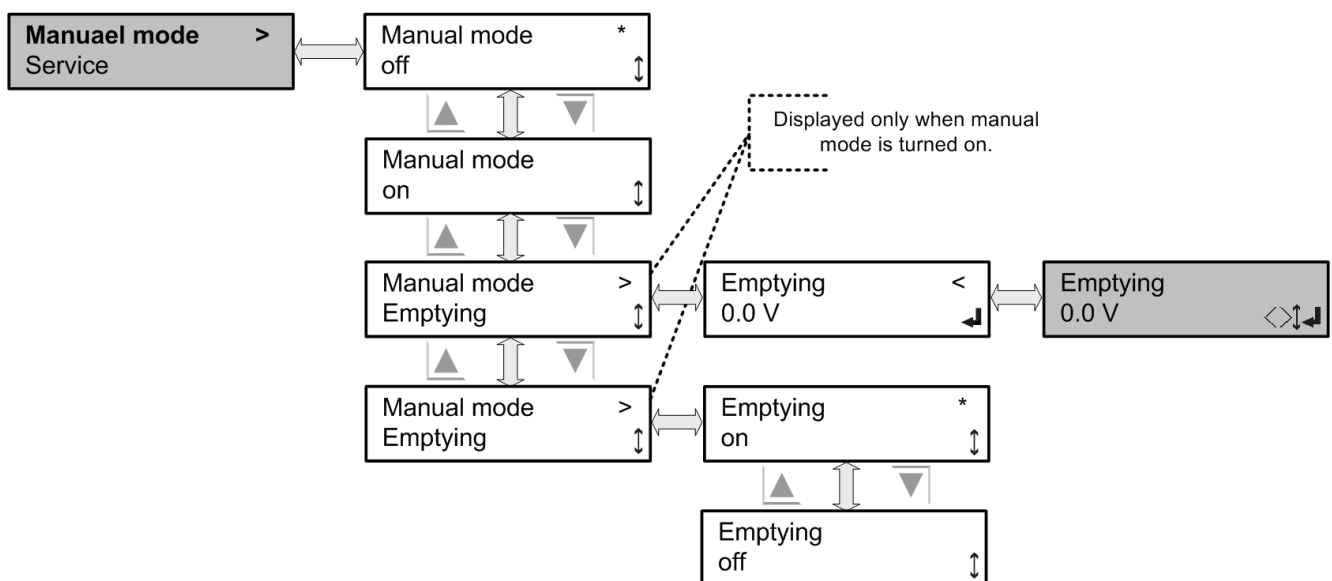
8.1.5 GHM mode

- Manual mode is used to operate the system's water inlet valve and drainage valve by hand.
- Manual mode does not depends on DI1 enabling.
- Manual mode has the highest priority and switches all other control types off.
- The prerequisite for switching on the manual mode is the set external temperature.
- This must be above the frost temperature, as otherwise the manual mode cannot be switched on. Wetting is not permitted in the manual mode without recording the external temperature.
- The fact that manual mode is active is recorded permanently. In other words, it will still be active after you have switched the system off and back on.

8.1.6 Manual mode ON/OFF:



Manual mode - valve control value/draining



8.1.7 Adjusting settings on the GHM



Cancel and return to INFO menu.



Enter key for function selection; change to EDIT mode and value acceptance.



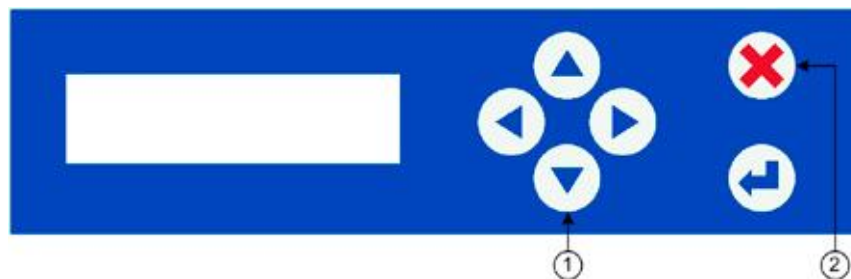
Right arrow for moving to the next menu level.



Left arrow for moving to the previous menu level.



Up / down arrows for scrolling through the menu level.



1. Use this key to move from the "INFO" menu to the Operating menu
2. Use this key to return to the "INFO" menu at any time



Select menu option you want (top line)

Humidification ON
Humidification OFF



Change to menu option

Humidification ON <
rpm > 60%



Change to writing mode (cursor flashes)

Humidification ON <
rpm > 60%



Decimal point selection (cursor flashes)

Humidification ON <
rpm > 60%

Humidification ON <
rpm > _0,0%



Change value

Humidification ON <
rpm > 60%

Humidification ON <
rpm > 65%

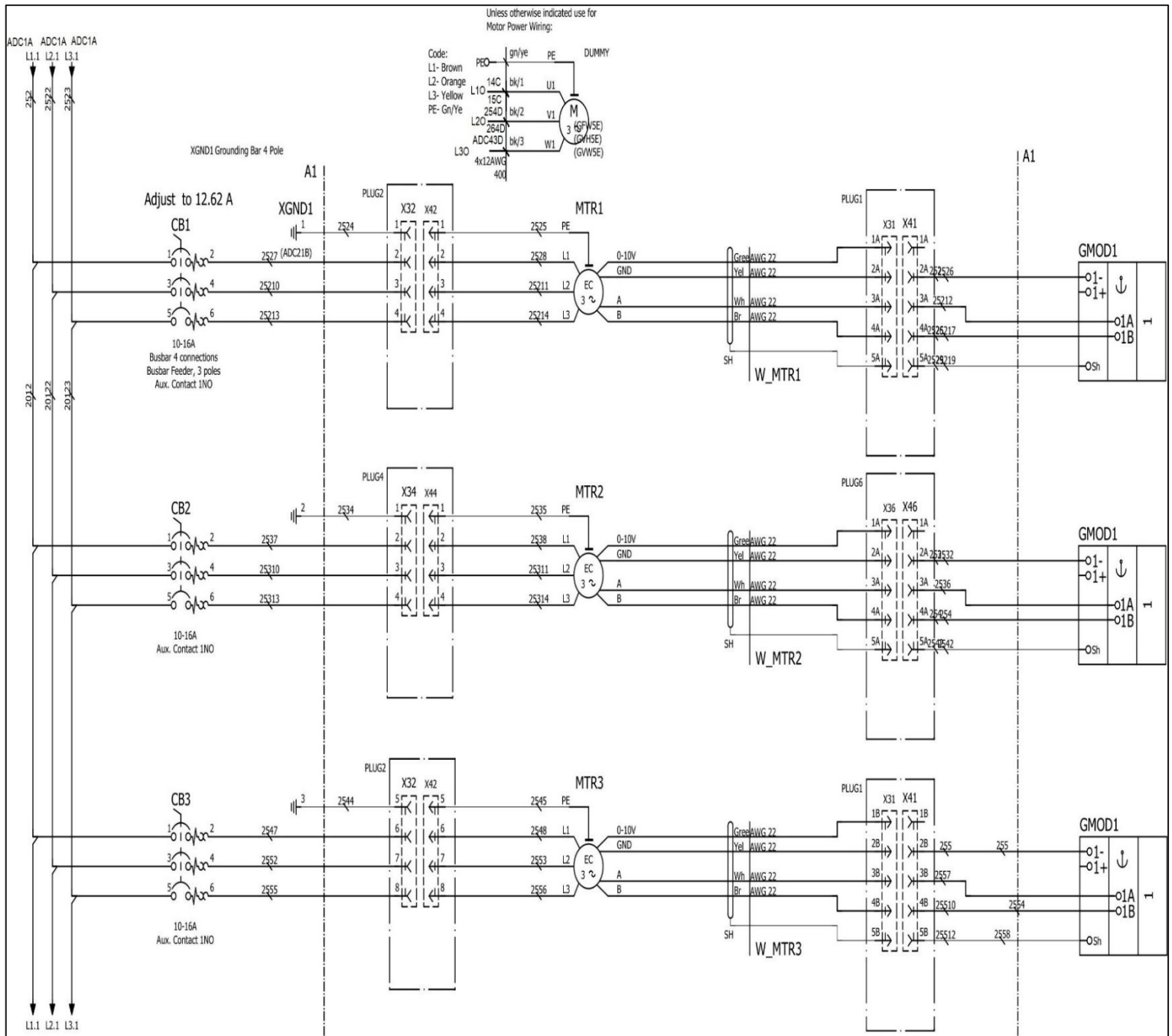


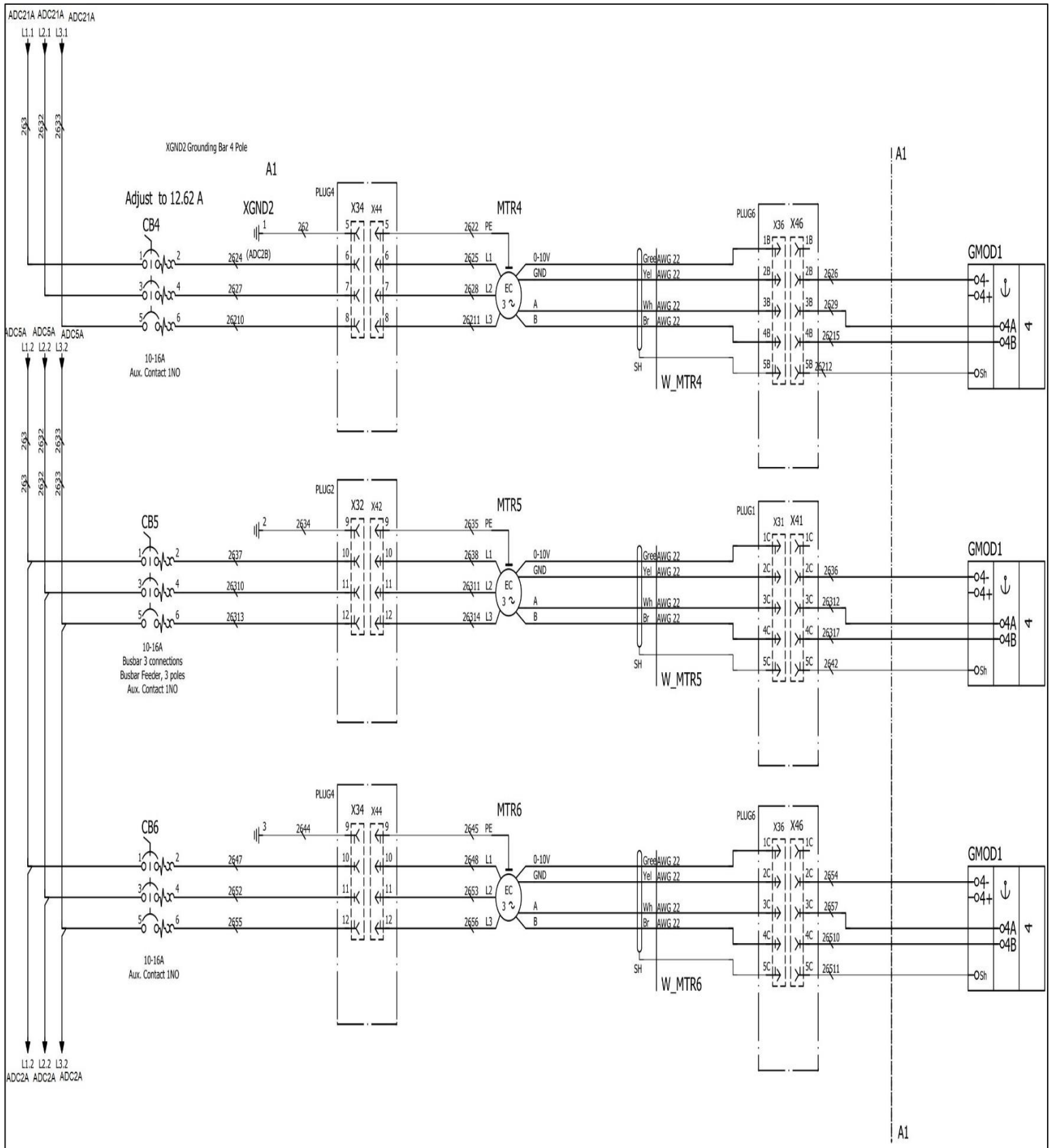
New value acceptance

Humidification ON <
rpm > 65%

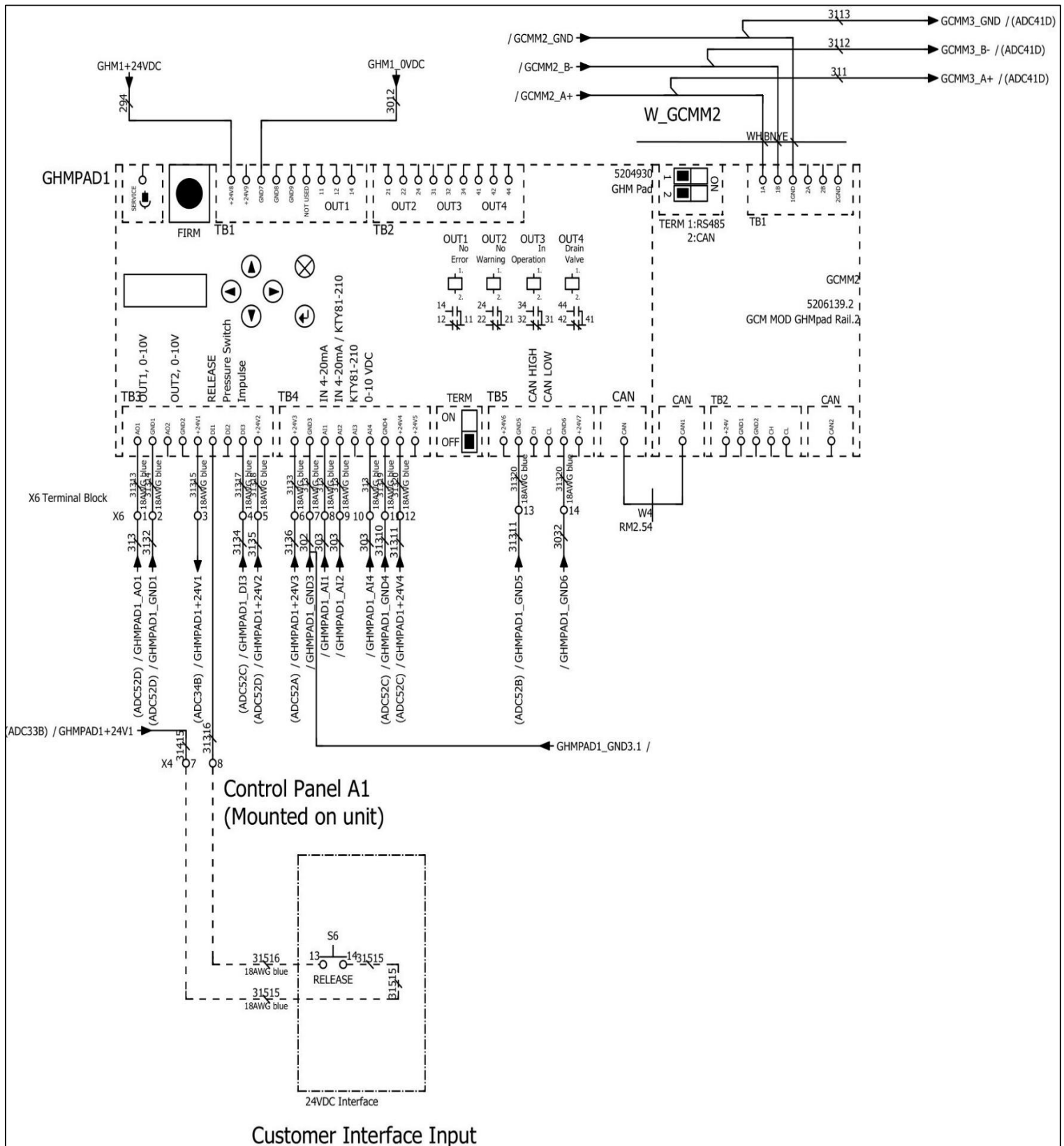
For more information on the set-up and functioning of the GHM, please refer to the IOM for the GHM or in GHM startup video on Güntner web site.

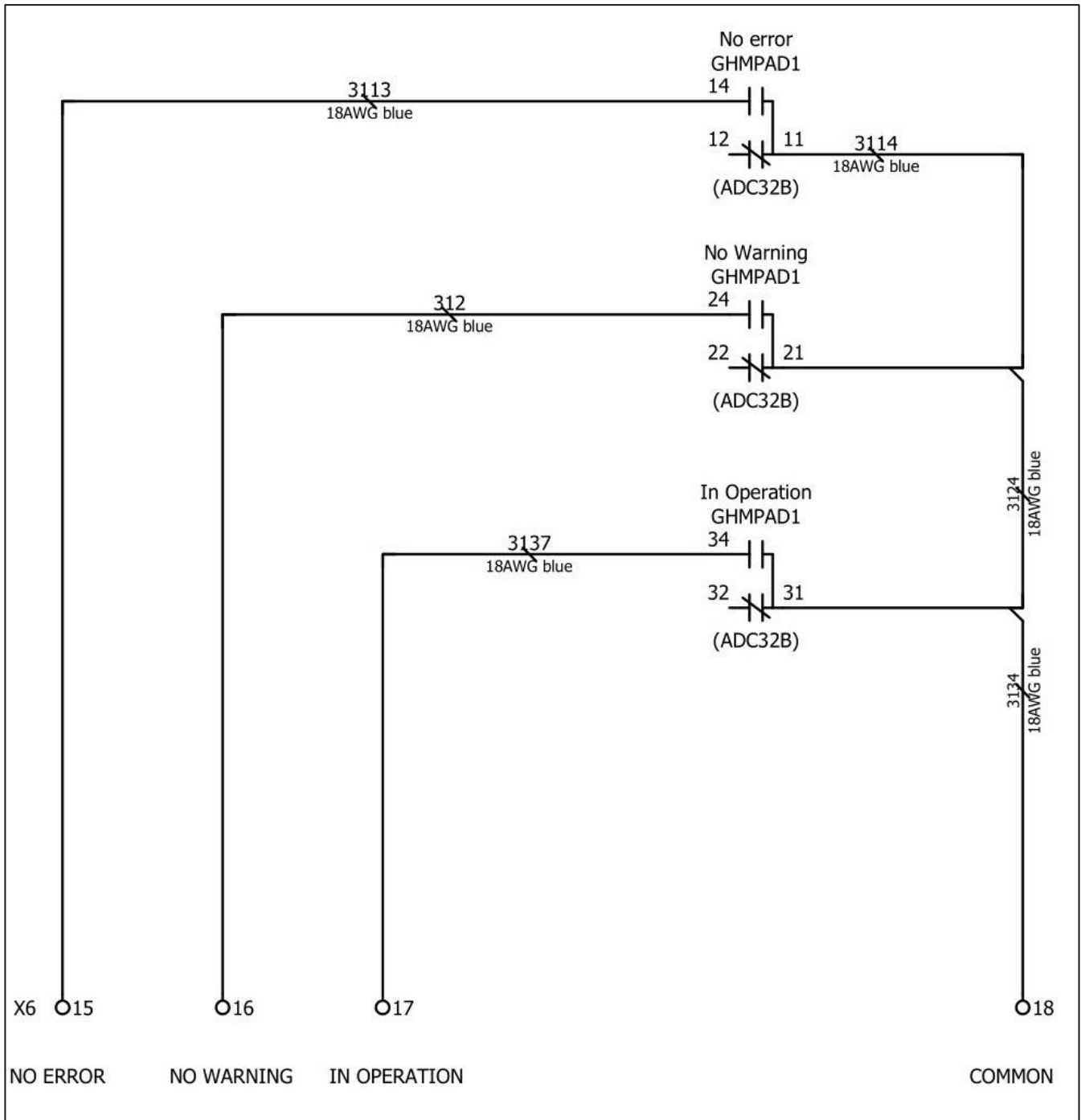
8.2 EC Motors - generic schematic

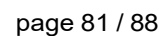


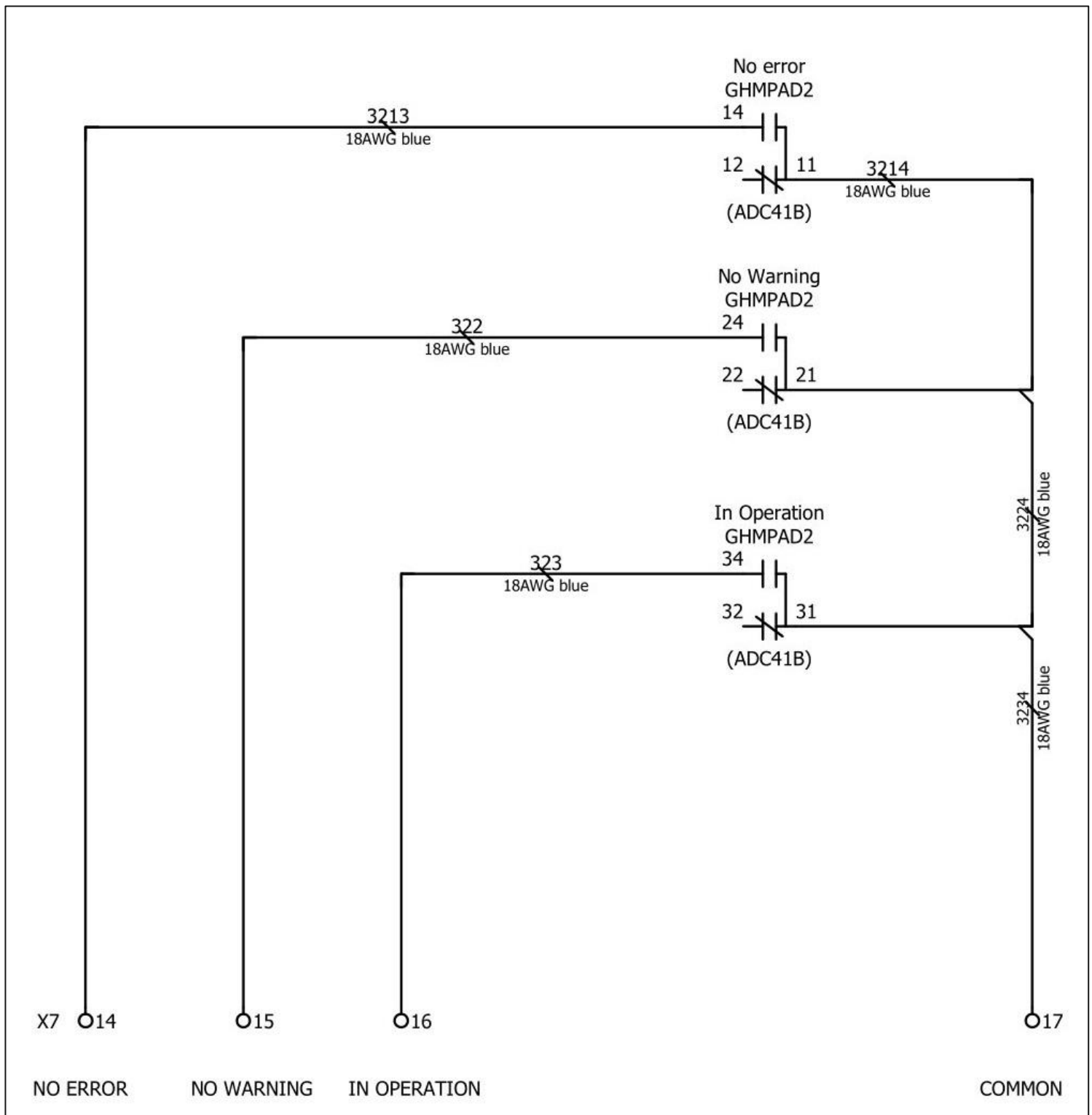


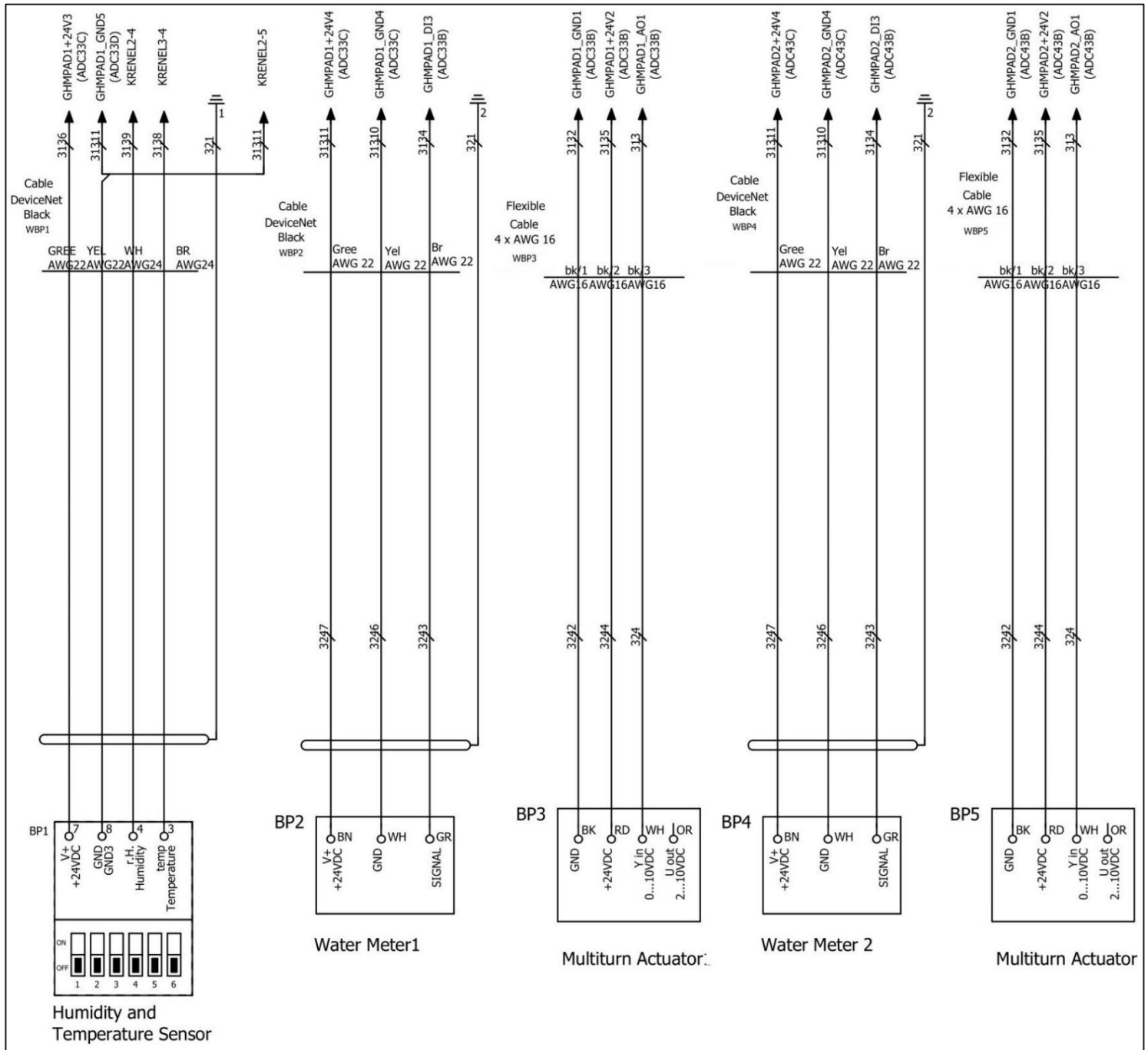
8.3 hydroBLU™ components - generic schematic











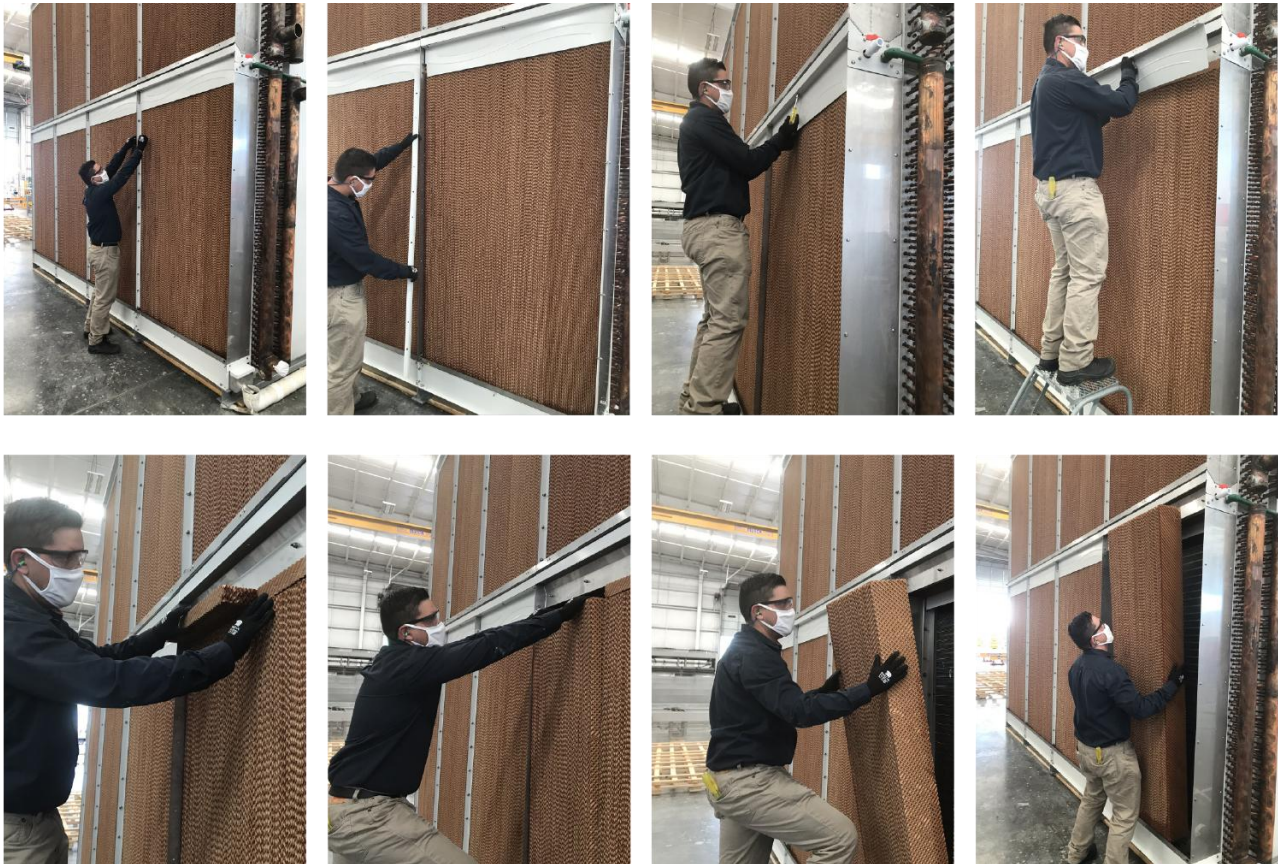
9 Maintenance

9.1 Inspection and maintenance frequencies

Recommended Inspection and Maintenance Frequencies	Start-Up	Weekly	Monthly	Quarterly	Annually	Shut-down
Inspect and Clean as Required						
Visually inspect pads for bowing, sagging or dry streaks	X	X			X	X
Inspect gutters and remove any debris	X			X	X	X
Check water distribution system for leaks and clogged distribution holes	X	X			X	
Flush water distribution system			X		X	X
Drain and disinfect the entire water distribution system				X		
Check water flow rate and adjust if necessary	X		X		X	
Check water distribution is even across entire length of unit	X		X		X	
Remove all dirt and debris from the media pads			X			X
Clean the Y Strainer's mesh	X			X		

9.2 Cooling pad removal

1. Using 10 mm wrench stat to unscrew the nuts on holding removable "L" bracket.
2. Unscrew and remove the drop catcher cover.
3. Take out the distributor pad which are place above of Cooling Pad.
4. Slide up the Cooling Pad and take it out. Repeat for the second one.



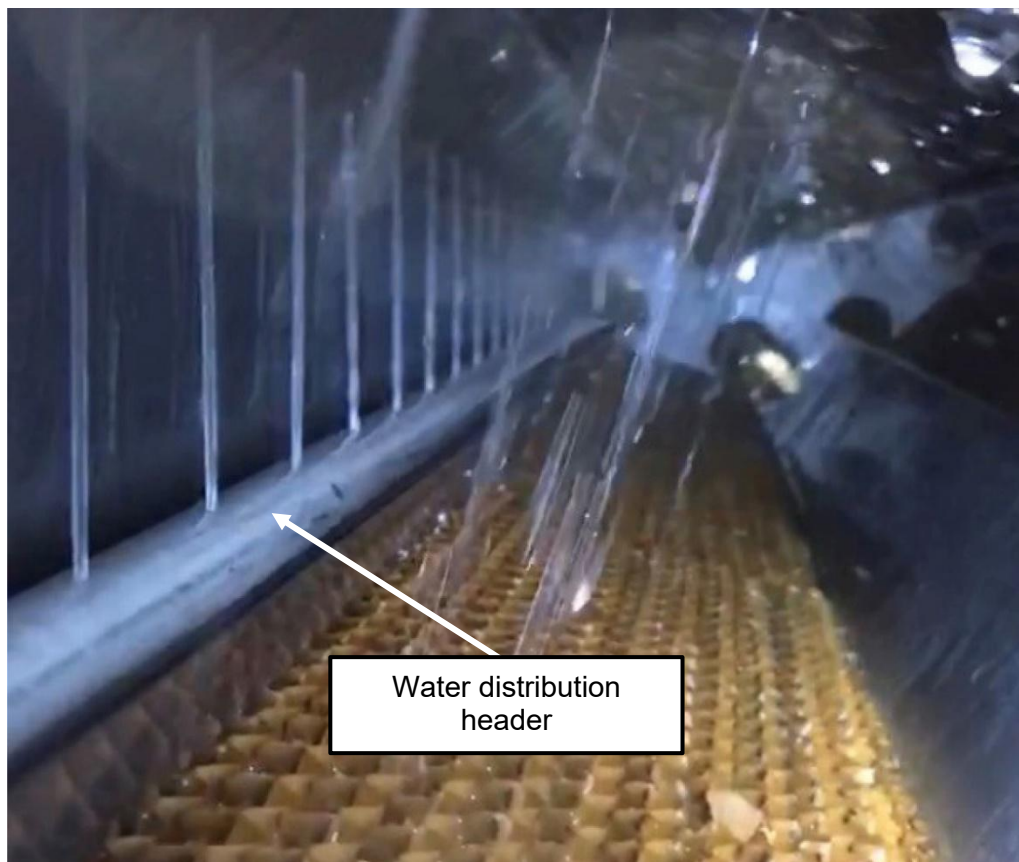
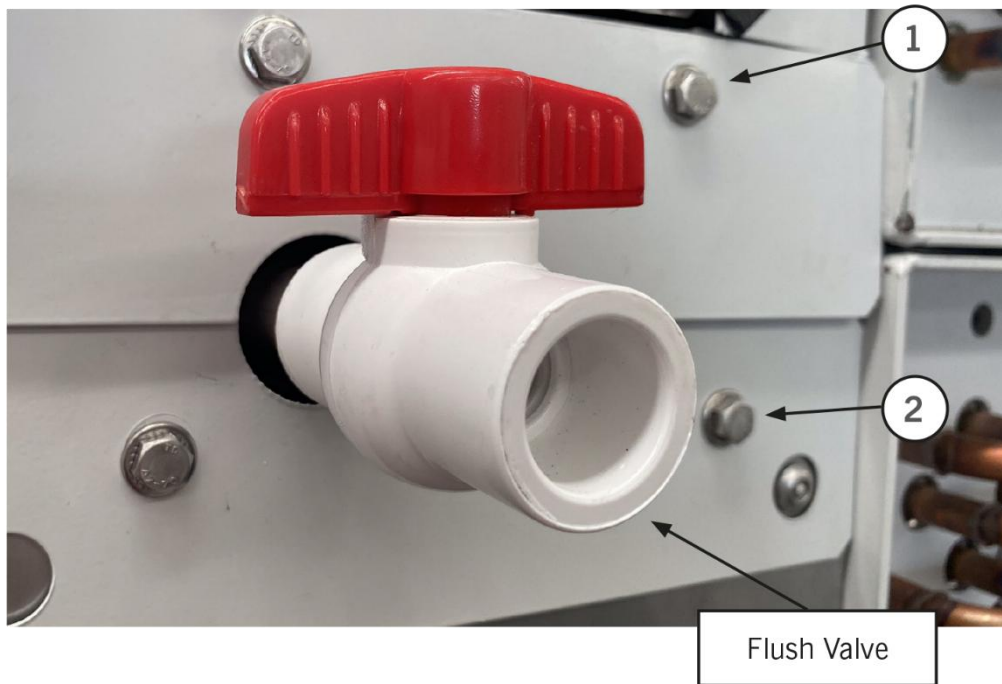
For mounting the Cooling Pad back, repeat the step from 4 to 1.

9.3 Water distribution headers

The holes on the water distribution headers are self-cleaning due to the turbulence spray of low pressure water. Even so, due to evaporation and potential scaling, the holes should be checked periodically to ensure the holes never clog.

Poor water distribution is detected by watching the wetting pattern of the pad. If uneven patterns, proceed to inspect the distribution header.

1. Unbolt upper cover using 10 mm wrench and protect cover
2. Proceed to unbolt the lower cover using same wrench
3. Supply water
4. Inspect the water distributions headers for debris or clogged holes

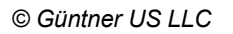


NOTICE

A proper water distribution is shown on the picture; all the holes must be spraying water.

If it appears there is uneven water distribution, proceed to clean the water distribution header.





This image shows a full page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook paper. There are no margins, text, or other markings on the page.